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NIKONOS WORKSHOP

NIKONOS-III

NIKONOS III: THE CAMERA'S WATERPROOF CASING

Text and Photos by Bob Warkentin

This NIKONOS WORKSHOP chapter begins the series devoted to the older styles of Nikonos cameras. So, let me begin again with my same old philosophy: "Every Nikonos camera built by Nikon has been a good camera. It's just a shame they had to sell them to humans!" If your intent in reading this and following chapters is to determine which Nikonos camera you want to buy, forget it! I don't compare one style of Nikonos to another; rather, I provide information strictly about a particular style of camera and what the human must know to maximize their use of that camera by providing proper use and maintenance techniques in order to prevent human accidental damage which is specific to that camera style. If you want to compare something, compare your current knowledge of your use of your Nikonos III to the information presented here.

The Nikonos III camera was manufactured by Nikon from 1975 through 1979. And just like its 2 previous totally mechanical Nikonos cousins, it too has retained a resale value nearly equal to, or in some cases, greater than its cost when it was originally offered for sale new.

This camera enjoys probably the greatest demand of all the 5 Nikonos camera styles manufactured to date. And why not since it's a common thing to hear "Oh, You flooded your Nikonos '#'! You should have owned a Nikonos III because it's easy to cleanup!", or you hear "the Nikonos III doesn't have electronics, so nothing can ever go wrong". Well,

let's examine this camera and see just how "idiot-proof" it is in the hands of a human. And while we are doing this, don't forget that it, just like all of the Nikonos cameras, really is a good camera!

The Camera's Waterproof Casing

The waterproof casing (that which is intended to be exposed to the salt water) consists of basically two parts: the metal outer casing or "shell" and the plastic top cover or camera "head". The top cover will be covered fully in detail in the next issue.

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The Outer Casing

Beginning with the Nikonos III, the outer casing not only was lengthened but also took on a new appearance from its inauguration of new construction designs: the addition of (1) a standard 1/4 x 20 tripod screw mount socket in the base, (2) a completely new style of contacts for the electronic or bulb flash, and (3) a silver colored lens mount ring. So, what did those humans do to these new designs?

Tripod Screw Mount

The only flash Nikon ever offered its III customers was one which required a flash bulb. Originally, it was the same style previously used for the Nikonos II (tray mounted to camera via screwing in the flash cable through a hole in the short tray and into the camera) except that the cable to camera contacts were changed. Later, Nikon changed its style of bulb flash to incorporate a full camera tray which finally had a tripod screw. Regardless, since Nikon didn't provide an electronic underwater strobe at all during the production years of the III, there were many eager do-it-yourselfers as well as manufacturers out there which were all too willing to fill this void. And all wanted to make use of this new addition to the Nikonos: the tripod socket! (photo 1)

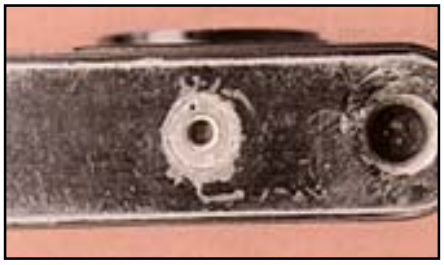

Photo 1

This tripod socket is a completely separate piece of metal, either nickel plated brass or stainless, which is threaded on its outer side so that it can be screwed into the bottom of the aluminum outer casing. It is prevented from rotating by a single pin which is driven through one of the two holes at the mouth of the socket and into the outer casing.

Problem #1: The Length of the Tripod Screw
(photo 2)

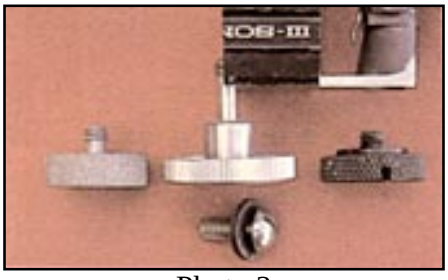

Photo 2

People who made their own tray, bought a non-Nikon tray/strobe combination able to use both a Nikonos II or III camera which used a washer as a spacer on the screw, or lost the original tripod screw and were forced to buy what ever "generic" was available at a camera store, soon found that they had made "big problems" for themselves.

If the screw was too short, overtightening caused the mouth of the tripod socket to break off. Too long, and the camera would not feel "secure" when the screw was tightened; thus, the human would continue to tighten the screw and drive it right through both the stainless tripod socket as well as the aluminum camera casing totally destroying the case forever!

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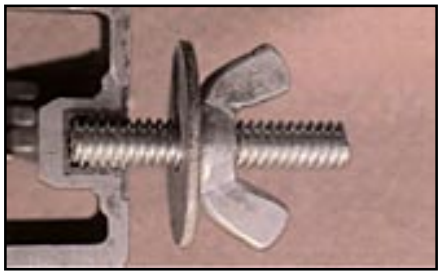

Photo 3

SOLUTION: Simple! Since the threads are a standard 1/4 x 20, you can get a long bolt (1 1/4 inch or so), a washer and a wing nut (galvanized) at any hardware store or (stainless) at a marine supply (photo 3). Stainless lasts longer, but plain ole galvanized steel will work for a long time if you keep it CLEAN and GREASED daily with a little O-ring grease (remember, it will get rusty in a few days). After cutting off the head, file the tip smooth. Now, screw this threaded piece FULLY into the camera's tripod socket-BY HAND ONLY!. Set the camera on the tray with the threaded piece going through the tripod hole of the tray, and secure everything together with the washer and wing nut (on the other side of the tray, of course!).

NOTE: Some trays have a tripod screw hole that is threaded so that the screw must screw through the tray and thus will not fall out when a camera is removed. This hole must be drilled out smooth with the 1/4 inch drill bit. Be sure that in doing so that there will be no damage to any of the structural features provided by the tray.

Problem #2: Corrosion!

Then there are those humans who never take the camera off of the tray during the week of diving. And, since the bottom of the camera casing is thus prevented from being PROPERLY rinsed daily, the week of salt buildup begins to corrode the aluminum around the tripod socket (see Photo #1 a little more closely now). Then, one day as you are mounting the camera to the tray, the screw keeps turning and turning, and the next thing you notice is the whole tripod socket falls out of the camera, permanently!

SOLUTION: Obvious, isn't it! A little time to take the camera off of the tray for cleaning, or at least loosen it from the tray so that the fresh water can rinse away the salt water tapped between the camera and tray, OR, you can consider the outer casing as a "disposable" item and buy a new outer case (if such still exist) for well over $100.00 every few years.

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The Flash Contacts

The Nikonos III ushered in the era of a totally new style of flash cable connection: 3 very thin diameter metal "male" posts totally encased in plastic, and a plastic alignment key on the side wall. Correspondingly, the housing for the flash cable's "female" contacts was also made of plastic.

As before, those people who left the camera mounted to the tray during their week of diving were also the ones who typically left the flash cable connected to the camera. Not only was corrosion occurring to the tripod mount, but so was the flash cable connector corroding and "freezing" to itself as well as corroding away the threads of the outer body where the connector was screwed into.

These 3 thin metal male posts along with the plastic alignment key were no match in strength to a frozen flash connector. After the week of diving, the screw-in threaded flash mount which used to freely rotate around the flash cable shaft now is frozen to the shaft from a week of neglected salt buildup. So, when you go to remove the flash cable, as you unscrew the rotating threaded mount, the entire connector turns and breaks not only the 3 thin flash pins in the camera but also breaks the plastic connector housing of the cable (photo 4)! End result: damage to both the camera and flash, and nothing you can do now to fix it for use again during the remainder of your dive trip. They both must be professionally repaired, and you know what that means! Big bucks out of your pocket!

Photo 4

SOLUTION: Maybe, JUST MAYBE, after diving and before you head for the shopping, the bar or other entertainment, you could find time after your fresh water cleaning of the camera to then remove the flash cable from the camera (after rinsing, not before!). This would at least get the cable safely removed from the camera before everything froze up. Then, before the next day of diving, you can safely and freely rotate the threaded mount around the cable shaft breaking up any salt formations that may not have been properly washed off the day before. Then clean off any salt residue along the cable shaft with something like a toothbrush, and add JUST A LITTLE O-ring grease along the metal cable shaft (not on or near the flash contacts!) and continue rotating the threaded mount until you feel the grease is evenly distributed.

Now, the tough part. After using the toothbrush on the threaded part of the flash cable, use the toothbrush in the threads of the flash port of the outer casing. But remember, both times you are near the actual FLASH CONTACTS. Since you have been using this brush on other parts that have been previously greased with O-ring grease, there is a good possibility that some grease is now on the brush. And, since grease will prevent proper electrical contact from being made, I strongly suggest that you use soap and water to clean your toothbrush before cleaning anything near the actual flash contacts themselves! "Comprende amigo"!

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The Lens Mount Rings

The actual reasons for adding this ring to the front of an outer casing for an underwater camera, where previous models of the Nikonos didn't have it, may never be known. However, this addition as well as one on the plastic head (discussed later on) appear to have been added in an attempt to provide replaceable parts in areas that receive additional wear. Regardless, the more parts there are in any gadget, the more responsibility the diver/photographer has for proper maintenance as well as exercising cautions during use! So, where's the problem? Basically, it is the lack of understanding of what you have got in the way of your camera and its construction, or what I call the "between your ears" problem. I've never seen this information in print, in any form by any author!

For the lens mount ring itself, there are two styles. Both are machined, but one is made of stainless steel (older style III's-very shiny) while the other is a brass base metal with a dull gray plating (newer style III's, all IV-A's and V's). If you are asking yourself at this point is one style better than the other, the answer is NO!

Photo 5

The outer casing is, of course, a metal casting which has a smoothed stepped-wall orifice to allow for the addition of the metal lens mount ring to be installed (photo 5). Since this ring is installed onto the outer face of the casing and therefore exposed directly to water, it to must be O-ring sealed. The installation is completed by securing the ring in place with three small screws.

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Problem #1

As you can see, where the lens mount ring interfaces to the outer casing, there is a gap between these TWO DIFFERENT METALS (aluminum casing, and either stainless steel or a brass base metal) for saltwater to collect. Remember about bi-metal electrolysis? If this means nothing to you, then think about food trapped between your teeth and tooth decay!

Now, by adding the lens to this area for diving, the lens itself extends beyond the ring (some lenses more than others) and further allows for more salt water to be retained for a longer period of time in contact with the main casing/ring interface. Longer contact, more electrolysis: more electrolysis, more metal corrosion.

Unfortunately, this very thin metal lip of the main casing is all that there is to provide for an O-ring seating wall for the lens mount ring. When the metal of this lip becomes corroded and breaks off (see photo 5 closely), all you do is replace the whole outer casing (part in excess of $100.00); it can not be repaired! Unfortunately, people don't realize the destruction they have caused until the camera "all of a sudden floods for some unknown reason". Now, in addition to the outer casing replacement, you have the added expense of a flood cleanup and more parts ($100.00, $200.00, who knows how much).

SOLUTION: Very simple. Don't let the WET saltwater dry out before you can wash the camera/lens off with WET fresh (or at least "fresher") water. As I keep explaining time and again, immediately after the first dive of the day, keep YOUR equipment continuously wet in YOUR own private small bucket of salt water until YOU can properly clean YOUR equipment in YOUR fresh water back at YOUR room or home. For the complete information on these techniques and the reasons why not to use the common "rinse tank", chemicals and other "voodoo" methods, I recommend that you get a copy of the Nikonos Workshop Chapter 3 (Fall, 1988) from Ocean Realm Magazine (Call them! They put their number in the front of this magazine for some reason.)

But, if you are now seeing a white residue at this outer interface of the ring, DON'T DIVE

THE CAMERA until you get it serviced. No no, don't start spraying all kinds of well intention junk all over the camera, and for heaven's sake don't use a pocket knife and try to scratch out the corrosion you can see! Get the camera professionally serviced. It may be a harmless residue or the tip of the iceberg of pending doom.

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Problem #2

Next, if you have ever flooded your Nikonos III in the past and spent all that time to clean it up, I am absolutely certain that you have forgotten to properly clean the lens mount ring area.

"Not me!" you say. "I wipe the water from the silver colored ring, and thoroughly dry out the casing by itself! I know how to clean the camera properly!" Well, if this is you, or if you have ever bought a used Nikonos III and wondered why someone would sell such a jewel, read on.

Photo 6

Unfortunately, when a Nikonos III floods, the main casing is easily filled with saltwater. Unknowingly, the saltwater enters from BEHIND the O-ring sealed lens mount ring and is trapped in between the main casing and the ring (photo 6). This same trapping of salt water can also occur when it appears that only the lens (to the exclusion of the camera body) was flooded!

Since you only see the outside of the ring, you naturally assume that by cleaning off the surfaces that you can see that you have thoroughly cleaned and dried all aspects of the casing, and then turn your attention to the rest of the camera for cleanup. Unfortunately, this is a dumb, but all to common, mistake that nearly all Nikonos III owners make. The correct approach would have been the Solution #1 procedure below.

Never knew about Solution #1? Then don't be surprised when, months later, you consistently see (at first) small amounts of water which has mysteriously entered into the camera after each dive. Later, more and more water comes in from this mysterious source, even though you keep buying more new O-ring, cleaning them after each film change and re-greasing them.

Using your Nikonos 35mm lens as a magnifier, inspect the lens mount ring in the area between the flat of the ring (where the three screws go) and the little black metal area (the main casing) for signs of "white" residue in this interface. If present, what you have under that shiny metal ring now is a casing that has been allowed to corrode into uselessness, and

typically only a complete replacement is the only repair option left. Follow Solution #2 below.

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Solutions

NOTE: After the following disassembly, you will not be able to safely reuse the O-ring and, therefore, will not be able to safely use the camera for the remainder of your trip. The O-ring will have to be professionally replaced and the whole camera system pressure tested in water to verify the water tight capability.

Solution #1

The first known flood for the camera: If you are certain that this is the first flood ever for this camera, then the lens mount ring can be removed easily. Using a jewelers Philips screwdriver WITH A PROPER SIZE TIP, remove the three small screws on the front of the lens mount ring. Now, insert your fingernail into the interface between the ring and the main casing and start lifting out the ring. Lift a little, move to another spot, lift a little, and so on. The object is to lift off the ring UNIFORMLY, not peal it off like a beer cap. If you peel it off, you will break the thin O-ring wall of the main casing for sure and convert the casing into scrap suitable for deposit in your local aluminum recycling machine in the parking lot of your favorite grocery store. Also, don't use a screwdriver to help pry off the ring: this will for certain damage the thin lip!

Once off, you can now dry the area underneath the ring as well as that part of the main casing. You will also note that there is an O-ring whose diameter is as thin as that of a pencil lead and that this O-ring's faces are now flat as pancakes. Now, I hope you will understand why I first said not to try to replace it and re-dive the camera.

CAUTION: if the screws are too tight to remove by hand, use a pair or pliers on the handle of the screwdriver. DON'T use the pliers (or a hammer) to beat the screwdriver into the head of the screw if the screw head becomes deformed: this can and will cause the whole outer casing to be bent and no longer usable for anything but an ashtray. Also, if the screw head starts to strip, stop everything and let some professional try his luck. It's cheaper to blame him if something goes wrong, goes wrong, goes wrong.....

Solution #2

Camera with continuous small water leakage and "white" corrosion present: Don't dive the camera.....unless you are willing to pay good money for film developing of photos that were improperly exposed due to damaged shutter speeds from the "just a little water leakage" that you constantly had to mop up, or are willing to damage a good lens. Also, in this case don't even attempt to try to remove the lens mount ring yourself! It is welded in place by the corrosion, and it is necessary now to use metal tools to remove the ring. Let only an experienced professional service facility try their luck in safely removing the ring (if such is possible), cleaning the corrosion to the outer casing, and replacing the lens

mount ring and O-ring just to see if the outer casing can be saved. Remember, this is a lot of work by someone, and there ain't no guarantee of success!

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Summary

1. The metal Nikonos III tripod sockets are not made from Army surplus Sherman tank metal. If you use a tripod screw through the flash tray that is too short, it will break the head of the socket; too long and you will drive the screw right through the socket and into the casing destroying it forever. Quit tripod-screwing around; and make your own and use it correctly.
2. A flash cable connector left mounted to a Nikonos for the whole week of diving is a certain way to break the flash pins of the camera as well as the end of the strobe cable when you go to disassemble the cable from the camera. Daily removal of the connector from the camera (and a little cleaning) can save a costly removal of money from your pocket.
3. The shiny silver colored lens mount ring on a Nikonos III is more than just another pretty face. But just like every pretty face, if you neglect it, it will destroy your body and your whole photo/dive trip. Proper understanding and a little pampering here will go a long way.

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NIKONOS WORKSHOP

NIKONOS-III

NIKONOS III: THE HUJMAN "WHOOPS FACTOR" AND THE CAMERA'S PLASTIC HEAD

Text and Photos by Bob Warkentin

Part 1

Because human mistakes cause expensive damages, here I go again devoting the first of two articles totally to just one part (A PLASTIC ONE this time) of your Nikonos III camera: the "head of the camera", the "view finder assembly", or as Nikon calls it, the "Top Cover" assembly. And with good reason!

A human can cause damage to occur to many different areas of this plastic Top Cover "cork". And in much the same way that a damaged cork in an expensive bottle of a 10-15 year old vintage wine slowly lets in air to the wine without you knowing it, the Nikonos III "cork" slowly lets in water. Regardless which damaged cork you've got, the results are pretty much the same. When you go to use it, you find out everything has turned to....."vinegar"!

Next, this complete assembly (alone costing WELL OVER the $100 mark without any labor or any other damage) is typically the single most stupidly damaged component of a Nikonos III by a human and which, in and of itself, can lead to the complete (meaning no longer economical to repair) destruction of your camera and the loss of its use forever.

So, let's examine the Nikonos III's plastic Top Cover "cork" and how the human "corks and uncorks" it, and uses and abuses its special features to find out how the camera could quickly be turned into..... "vinegar".

The Camera Lifters and the "WHOOPS FACTOR"

At the same time that the underwater-use Nikonos III was being produced, every land camera manufacturer including Nikon made use of a hinged "back door" (and a door lock) so that the film compartment could be unlocked and swung open for film loading and unloading. It was not necessary to take off the lens to change film.

However, in the design of the watertight Nikonos III camera, Nikon used the lens as the "key for the lock" which locked and unlocked the camera for film changing. After FIRST unlocking this camera (removing the lens!), the lifters were only for accessing the film compartment. This immediately meant 2 frustrating things were going to occur to the user of a Nikonos III: (1) they could not rely on their extensive knowledge of top-side camera use to even load film into the darn thing (where's the back door?), and thus, (2) heaven forbid anyone should find out, but they had to actually read the owner's instruction manual or get help from someone!

What followed, even to this day, were two serious problems that were caused by either the "I know it all's" or the "I forgot it all's" and the "WHOOPS FACTOR"!

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WHOOPS FACTOR #1: Bent Frame and Water Leakage

The 5 1/4 inch long plastic top cover of the Nikonos III is held onto the main mechanical "guts" by ONLY ONE Allen head screw! (photo 1) That's right, ONE SCREW, and a METAL one at that, screwed through a hole in the center of the thin metal upper frame of the "guts", and into the bottom side of the PLASTIC top cover. (You can see this screw when you take off the lens, right in the center top of the lens mount hole of the "guts".)

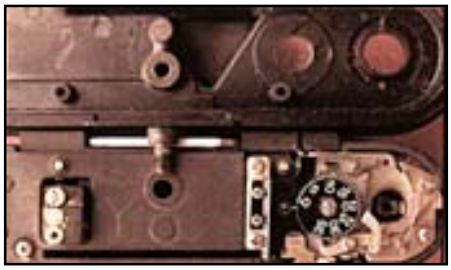

Photo 1

So, guess what? When the lens was stupidly left on the camera while you hurriedly reached for the lifters to pry open the camera to change film and get back into the water, what you did was to lift up the left and right sides of the head with the lifters while the center of the camera was locked in position. This put stress onto the center of the upper metal frame (where the Allen head screw is located) causing it to be bent, obviously, upwards. The result was that the head no longer fit flat on the main frame of the camera, but rather on top of a "mountain peak"...the bent frame!

Since pieces of broken plastic ain't layin' at your fins, no damage occurred, right? So, after saying the customary "WHOOPS, I forgot to take the lens off" followed by a look-see and the other famous words, "ain't nothin' broke", you reloaded the camera and went back into the water feeling confident that everything was all right.

Photo 2

So, where's the problem? Its on the rewind crank handle side, where a 1/2 inch tall metal gear is located (Photo 2). This gear is used not only to translate the motion from your cranking of the film rewind handle (outside the camera) to the rewinding of the film back into the canister (inside the camera), BUT to hold in place a metal washer which, in turn, holds the REWIND CRANK AXLE O-RING in place within the O-ring port pocket of the head to keep everything water tight!

So, when you "WHOOPSed" the top cover, you instantly bent the main frame (in the center of the frame where the screw hole is) and elevated the top cover (now sitting permanently on top of the "mountain peak" bent frame), causing a gap to occur between the tall gear/metal washer and the O-ring/O-ring pocket in the top cover. The result: when you pull up on the rewind crank to wind the film, the O-ring stays in its pocket in the top cover; BUT, when you push the crank back down, the O-ring is popped out of its O-ring

pocket, and water leakage occurs on your next and all subsequent dives.

No, it is not a full flood so that you could recognize that a problem had occurred and get immediate servicing, but typically a continuous diabolical, hidden from your view, seepage. (By the way, since only about a 1/2 inch away from this rewind gear area is a large open hole where the shutters are, water gets in there very easy also! Examine Photo 1 now a little more closely for corrosion!) Its not until a couple of days later, when everything begins to dry and freeze up, do you realize a problem has happened.

Can the bent frame be corrected? Easily, after disassembly of some parts, of course. Can I check the camera for signs of a bent frame myself, or does it have to be checked by a service center? Yes, you can, and I will explain how later on.

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WHOOPS FACTOR #2: Broken Top Cover Screw Mount and Water Leakage

Take the above WHOOPS FACTOR #1, and let's go one step further with your destructive mistakes. With the lens still mounted to the camera while you continue applying more leverage to the lifters to pry out the "guts", the main frame is bent, all right! But only just so far before it stops. What follows is that the top cover is practically pealed off like a pop-bottle cap. You not only strip the screw right out of the plastic screw mount, but you break the plastic mount itself (photo 3) which is the top cover! The result! Usually big flooding, which occurs during your ascent.

Photo 3

NOTE! In addition to the above, guess what? Breaking this plastic screw mount can also occur when you try to install an accessory on top of the top cover if you don't exercise counter-tension with your hands. Just be aware of this point for now. It will be covered in detail in a later Nikonos Workshop issue.

Can a broken Allen screw mount be repaired without a full head replacement? Yes, in about 60-70% of the time. But it ain't easy, it ain't cheap, and you darn sure won't be able to use those lifters again. If the repair surgery is determined to have been as success, then my "follow-up therapy" is to permanently remove your lifters from your camera to prevent temptation!

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**WHOOPS FACTOR #3: Bent Frame/Cracked Head,
Totally Trashed Pocket Book, and Water Leakage**

Take WHOOPS FACTOR #1, double the "great ape" strength you applied to the lifters in WHOOPS FACTOR #2, and now, in addition to a bent frame and broken center mount, the head is cracked in the O-ring channel and can't be fixed: it must be replaced. As crazy as its sounds, there are those of you who don't know your own strength and don't know when to stop forcing the lifters, or loaned your III to a friend who forgot your instructions, or bought a "swinging deal" used III from someone (especially a land camera store!). I constantly see cracked heads, and on occasions, I even see III's where someone pried off completely the left 2/3rds of the head with the lifters. Really dumb!

Photo 4

Look at Photo 4 closely. Do you see a hair? Do you see a vertical line to the right? Now, putting these together, you have a "hairline" crack! Dumb analogy, granted, but even a crack so small and so fine as a hair will cause water leakage onto critical camera gears.

Unless you know where to look, the crack is hidden from view by both the main O-ring and all the O-ring grease. It is located in the same place every time: it runs vertically in the main O-ring grove, always to the right of the film-plate retaining thumb latch (Photo #4), and appears like only a harmless scratch. To see if a crack is present, you must remove the "guts" (after taking off the lens, of course!), remove the main O-ring and degrease the O-ring channel in this area with either a Q-tip or soft tissue. Using your 35mm Nikonos lens magnifier, inspect for the scratch/crack. If a "scratch" is found in this area, the head is BROKEN. Any further underwater use will allow water seepage (not full flooding that you can see) and additional expensive damage to occur to internal operations (unless things like the counter and shutters longer move.....meaning you should of checked for the "scratch" sooner)!

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Preventing the WHOOPS FACTOR: Lifters vs. Hands

First, understand that the plastic top cover is mounted to the main body of the camera by only one metal screw. Also, with the untimely use of the lifters by a human, you can apply tremendous leverage which will separate the top cover from the main frame or break it all together.

Since it is the combination of the camera's lifters and a human's hands that causes this "WHOOPS! I forgot to take off the lens first" damage, one or the other must be given up when opening the camera! But which one?

Obvious: DON'T EVER USE THE LIFTERS again! In fact, tie a rubberband between them as a reminder to you not to use them ever again.

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Opening the Camera Without Lifters

Remember, don't you, that the CENTER mounting point of the camera's top cover is in the CENTER of the camera's main frame (located in the top wall of the lens port)?

Photo 5

"Wait a minute...CENTER, CENTER....I get it now! If the lifters are rubberband together to remind me not to use them, then I won't. Then, to get the "guts" out of the casing to change film, all I have to do is use my thumb to push out the "guts" from the CENTER of the camera. And I also know one more thing: doing it this way means I'll have to FIRST remove the lens. Then, sticking my thumb into the lens mount hole, and then putting pressure in an upwards direction against the CENTER MOUNTED Allen head screw while holding the outer casing in my other hand (photo 5), I can safely push open, rather than lift (pry) open, the camera without breaking anything! Did I get it right?"

Yes, but as usual there is one more thing to consider here. After the camera has been opened, the O-ring cleaned and regreased, and everything reassembled, then sometime within 36-48 hours of the very last opening the O-ring will take on a "memory seat" between the "guts" and the outer casing. This means that your "thumb lifter" probably won't be strong enough now to push out the camera "guts" to open the camera.

I recommend that if you know that you are not going to use the camera the next day, then take off the main O-ring, reinsert the "guts" back into the outer casing, and REMEMBER to either rubberband the "guts" to the outer casing or (I prefer) replacing the lens with its O-ring still mounted. This way, the "guts" won't fall out of the casing accidentally and hit the floor the next time you go to pick it up to use, and you won't have a "memorized" main O-ring fighting against you.

Regardless of lifters or thumb, always open your III upside-down after diving. This way, the water droplets on the O-ring fall down into your lap with gravity, not into the camera. More on this, and the reasons why in a later issue. For now, just remember to do it this way!

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Checking For a Bent Frame

There are several tests that are easy for you to do, but remember that you yourself can't fix it if it's bent! Only a professional can!

Photo 6

Test #1: Holding the base of the "guts" by the edge of the palm of both hands, extend your fingers so that they can be placed on each side of the top cover at the lifter flanges (photo 6). As a point of visual reference, there are two straight metal ledges extending out from just under the top cover (photo 7). Now, alternate pressing downwards onto one of the lifter flanges at a time and see if the top cover teeters (that is, if the top cover raises up on the right side,relative to the right ledge, when you press your fingers down on the left lifter flange, and visa versa).

Photo 7

Some movement is normal, but only up to about the thickness of two sheets of notebook paper. If the movement causes a gap of more than the thickness of a business card (photo 7) to occur between the right (rewind side) ledge and the top cover, get the camera checked out!

Test #2: With the camera fully assembled, lens installed, and setting upright on a table, firmly press downwards with the flattened palm of your hand evenly onto the top area of the top cover. At the same time you apply the pressure, trigger the camera. If the trigger now springs out very slowly (as compared to when no pressure is applied), this indicates

that there is a problem with your camera. Usually it means that the frame is bent, but it could also mean that the internal O-ring are horribly filthy from your poor preventative maintenance techniques. Either way, you need professional servicing to both your camera and the gray matter between your ears.

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Summary

1. Human mistakes, better known as the "WHOOPS FACTOR", are subtle but deadly to a Nikonos III camera.
2. The 5 1/4 inch long plastic head or "top cover" of a Nikonos III is held onto the main mechanical unit by only one metal screw! A metal screw screwed into plastic threads...wow! But it is enough to keep the head onto the camera under normal-use conditions.
3. Since the lens is also the locking device which holds the camera together, using the lifting levers on the side of the outer casing to pry out the "guts" of the camera to change film while the lens is still mounted isn't a normal-use condition. It's the "WHOOPS FACTOR"!
4. This "WHOOPS! I forgot to take off the lens" mistake by the human will either cause the top cover to be broken and/or the breaking of the plastic mount of the head (repairable, but not cheap) and/or bending of the main frame of the camera (easy to fix).
5. Regardless of the extent of actual damage caused by which ever "WHOOPS FACTOR", each one will additionally cause water leakage to occur, thereby adding to your cost of repairs already required.
6. Rubberband together the lifters as a reminder not to use them. Learn to use your thumb like a "Little Jack Horner", and keep your camera in "plumb good condition"!
7. Learn the symptoms and signs of damage caused by the "WHOOPS FACTOR" and apply them every time before you buy, rent, loan or use a Nikonos III.

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Part 2

This is the second of two articles just on the plastic head (top cover) of a Nikonos III camera, and what the "human" can do to it to damage it beyond repair. And why does it take so much information to learn how not to damage the most sought-after of all the Nikonos cameras: it's the human's ability to destroy a rock, even with their best of intentions of how to properly use the camera or use available accessories.

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The Nikonos Trigger and How To Use It To Destroy the Plastic Head

No doubt Columbus was flatly given "good advice" 500 years ago by "knowledgeable" people when it came to the question of the world being flat or round. Today's Nikonos III "Columbus" is confronted with the question: TO LEAVE OR NOT TO LEAVE the camera either trigger cocked or trigger extended so that the shutter springs are not stored with undue tension remaining on them! There are so many grossly misinformed ideas about this topic that are eagerly offered as "correct information" by people who would never admit that "they don't know the answer for sure". Well, to answer this question, lets first talk about the ACTUAL camera functions of just what the trigger is doing inside the camera, and when. Once this is understood, and you will prove it to yourself, the answer will become crystal clear once and for all.

A NIKONOS III "COLUMBUS"
In Search Of Reality

The trigger of a Nikonos III (photo 1), this one piece itself, is designed to perform three operations: (1) fire the shutters, (2) re-cock the shutters, and (3) advance the film. So, get your own camera and let's see these operations for ourselves.

Photo 1

With the shutter speed dial set to "B" and looking at the shutter blades of your Nikonos III, when you depress the trigger to "fire" the camera, you will observe that one of the shutter blades goes up into the camera. Next, only slightly releasing the trigger, you will observe that the second shutter closes, likewise, upwards. Then, when you SLOWLY release the trigger so that it "springs" itself fully outwards, you will observe that both of the shutters are pulled downwards and.....RE-COCKED. That's right, for those of you that have been leaving the trigger out all these years thinking you have been keeping tension off of the shutter springs, think again!

And, if you think that you have been keeping tension off of the main spring of the trigger,

you don't know this spring very well. As camera springs go, this one is massive. Also, for any spring to "spring", it must be under tension in the first place. So, if you think that this little 70 degrees of spring relaxation to a massive, already coiled and under tension spring is going to make any real difference, it might in a hundred years or so.

Photo 2

But, what is for sure is that leaving the trigger extended for storage, or while diving when you are out of film, or for any other reason you think of, will allow this extended "appendage" to become an easy target to get bumped or pressured. The total trigger of a Nikonos III is actually a whole lot more than just that which you can see: it is actually a "dogleg" device (photo 2) whose metal must go through an O-ring sealed PLASTIC hole of the PLASTIC head of the camera before it can join with, and function, other internal metal (camera) parts.

So, when your ALWAYS EXTENDED outer portion of the trigger gets BUMPED (or PRESSURED from your storing the camera in your "foam-lined" camera case, and sitting on the case to close the "foam-lined" lid), this causes the inner metal portion of the trigger to be forced sideways against the plastic O-ring wall. And like any "metal pry bar", the inner metal part of the trigger either forces ridges into the plastic O-ring wall of the plastic head (causing water leakage), or cracks the plastic O-ring wall (causing leakage or flooding). By the way, the thickness of this O-ring wall of a Nikonos III is only about 1/16 inch of "gen-u-wine" plastic! Wow! (photo 3)

Photo 3

So, I think you will now be able to answer the question YOURSELF of "to leave or not to leave" extended the trigger of a Nikonos III for any reason. Leave it fully cocked, meaning that the trigger is always brought back parallel to the head, and locked when not in use.

"But, when I run out of film, the trigger can't be pulled back to a cocked position. It always stays out". If this is your excuse of how you damaged the camera head and caused a flood when your camera gear and every part of your body got smashed into the boat during a choppy dive day, then here's what you should do before getting onto the boat. Turn the

shutter speed dial to "R", bring the extended trigger to the cocked position, and then lock the trigger. Its that simple!

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Add-On Thumb-Assist Accessories and Damage to the Nikonos Head

Over the years, Nikonos III users demanded, and many a manufacturer was willing to make available, accessories with the idea in mind of providing the Nikonos III owner a more convenient and easy way of doing certain photographically required functions. Some were made of plastic; others were metal. And they each had their own way of being attached to specific parts of the camera. Regardless of the material, in their own way each could cause damage to occur to parts of the camera and/or the total camera from an over zealous installation of the accessory or its use in that all-inclusive environment we have come to accept as diving.

Thumb-Assist Triggers and Their Use

True, there have been many a beautiful photograph of a photographer's finger(s) taken with a Nikonos III camera. The reason was that the normal configuration of the trigger was such that the photographer had to place an index finger onto the top of the camera to fire the shutter. Since typically the middle, ring and little fingers were not designed to be detachable from your hand, where ever your index finger went, the other fingers were close behind.

Photo 4

Photo 5

To eliminate this problem, longer camera trays with pistol grip handles became available, and thumb-assist add-on triggers became a hot selling item in nearly all dive shops. But, as discussed above, since extensive damage could be caused from just the single-appendaged Nikonos III trigger itself getting bumped by any number of things when left extended, with an add-on trigger you now had two appendages (the Nikonos one extending out to the front and the add-on extending out to the back of the camera) with which to target your bumping so that you could be sure to damage your camera! Now, you couldn't even safely lay the camera down flat on its back any more.....UNLESS.....you were wise enough to discover that turning the shutter speed dial to "R" would allow you to cock the trigger and, thus, have it parallel with the camera (not sticking out to get bumped) while the thumb assist extension was also brought parallel with and protected by the pistol grip handle.

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Styles of Thumb-Assist Triggers and How Each Can Damage the Camera

Add-on (plastic or metal) triggers (photo 4) are mounted TO the camera in only one of two styles: style-1 (metal) mounted directly to the side of the camera's trigger and also just under the edge of the shutter speed dial (photo 5); style-2 (plastic) mounted under and completely around the bottom edge of the shutter speed dial. And, of course, each could easily cause its own unique form of damage to a good Nikonos III when bumped of pressured, even when the trigger consciously was returned to a parallel cocked position as described above (to prevent that group of problems).

Style-1 of metal attachment, instead of damaging just the shutter speed dial when bumped (a $30-40 part if no flooding), damage could also further occur to the trigger's plastic O-ring port of the plastic head in just the same way as if the trigger itself had been bumped!

Style-2 of plastic add-on trigger attachment, when bumped, would nearly always cause the pencil-lead thick shutter speed dial axle to be bent, causing the dial itself to sit sideways exposing the O-ring and, flooding! Sometimes, the impact can even peal off the shutter speed dial like a can opener to a bottle cap! And, if you wanted to inspect the camera in this area for possible damage, the device obscured the view.

[SIDE NOTE: From 1975-79, Nikon produced what amounts to 4 different styles of Nikonos III cameras, internally and/or externally (believe it or not). As for thumb triggers, there two distinct styles to consider (see photo 1): cameras with serial numbers before 3165xxx (about 75% of total production) had a THINNER all-metal trigger assembly while later production had the THICKER plastic/metal composite trigger. Unfortunately, style-1 of metal add-on trigger was never redesigned to fit onto the latter, thicker, plastic trigger directly. So, in the "HUMAN tradition" of making a "square peg fit a round hole", humans forced this metal add-on onto the plastic trigger (photo 6), and frequently the plastic part of the camera's trigger was broken off. Anyway, just remember that this style of device was not designed to fit onto the latter series of Nikonos III's.]

Photo 6

Lastly, all add-on thumb-assist triggers, once mounted to the camera, typically never got removed for cleaning. And, thus, all add-ons allow for undue buildup of corrosive salt deposits causing premature failure of the rubber O-ring and damage to the metal shutter speed dial and trigger.

Add-on thumb triggers are really a convenient accessory for the Nikonos III user. But they are also a convenient way to cause unsuspecting damage if their use is not properly safeguarded. So, if you just got to use an add-on thumb-assist trigger, regardless of style, just be careful and watch out for the pit falls of bumping which are so common in the life of a diver. If you leave it mounted to the camera's trigger when storing the camera in the foam-lined camera case, then leave the trigger cocked and locked, and don't store the camera in an upright manner in the case; lay it flat!

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Rewinding Film and Human Generated Problems

Even when merely performing the MUNDANE operations of rewinding the film, there are things you should know to minimize serious damage or other problems. Sounds dumb, but let's take a look at these problems.

1. NEVER LEAVE A NIKONOS III ON REWIND
The problems generated are many. First, the linkages which release the film sprocket (for passage of the film back into the film canister) are controlled by a very thin 90 degree bent hand. When turned to "R", this hand is forced to depress a spring loaded metal gear. If left in "R" (rewind) for months in while storage, the 90 degree bent hand becomes unbent due to the spring loaded gear putting opposite direction force onto the hand. Then, on the next trip, when you want to rewind the film, the sprocket won't freely release, and you will be looking for a dark room to get the film out of the camera and rewound back into the canister.

2. AFTER REWINDING, TRIGGER THE SHUTTER 3 TIMES
That's right ("Dorothy"), turn the shutter speed dial from "R" to any other shutter speed, trigger the shutter three times, and the gears that were disengaged during rewinding will be returned to ("Kansas") their proper operational alignment. This is important not only for the longevity of the gears themselves, but if, during opening of the camera, a drop of water fell off of your face and got into where these gears are located, it would freeze them up into the rewind operation by next morning. If this happens, then regardless of the 4 styles

of Nikonos III's that you have, either the shutters will not move or they move (but don't open, and thus no picture). You will also notice that the film will not be transported through the camera.

So remember, if the rewind should become frozen by accident, you want this accident not to damage your USE of the camera. If it is frozen in rewind mode, nothing works. If frozen where you can't get the gears into rewind, you can still safely clear the film in a dark room, then reload the camera, and continue to use it for the remainder of the trip. Don't forget: after rewinding, turn to a shutter speed and fire the shutters 3 times!

3. REWIND CRANK HANDLE AND FLOODING

The battle of pulling up the rewind crank handle to rewind the film has always been a treat given only to Nikonos camera owners. However, for Nikonos III owners, this is further complicated by another obligation: to be sure that you don't unscrew the metal rewind crank axle guide pilot (wow! what a description) from the plastic head.

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Photo 7

For installation into the camera, this pilot has a slot cut into it so that it can be screwed into the head. It can also come out by being unscrewed. When turning and fighting to get the crank up, even when actually rewinding the film, you can accidentally unscrew this pilot by catching the slot of the pilot with the crank axle. Of course the pilot has only a small job to do: to hold in place the O-ring which keeps the camera from FLOODING!

Before every dive with a Nikonos III, simply inspect visually to see that this pilot has not come unscrewed. Typically, the top of the pilot will be flush with the top of the plastic head. If the pilot is (or appears to be) elevated, take a tooth pick (no metal tools!), place the tip into the screwdriver slot of the pilot, and see if it has really come loose. If it has, then push the pilot (screw it back flush) clockwise with the tooth pick. As long as it is down, it should be safe to dive the camera. And DON'T try to be a genius and glue it in place yourself. The composition of a Nikonos III head is such that the solvents in glue "melt" the plastic quickly. Get professional service when you return.

If the pilot has come completely out of the head, DO NOT try to reinstall it yourself or dive the camera)! It must be professionally reinstalled!

As for the actual operation of rewinding the film, I strongly recommend that you get out of the habit of using the crank handle for anything except pulling up and engaging the crank. The reason is simple, but lengthy. When using a drill to make a hole into a piece of wood, as long as you hold the drill (and drill bit) straight up and down, the hole you will make

will be exactly the proper size. But, if you wobble the drill bit OFF OF AXIS while drilling the hole, the hole will become egg shaped, unevenly enlarged, and deformed.

Well, a similar form of deformation occurs when you use the flip-out crank handle to rewind the film. Since the flip out crank handle, when in use, folds out to where it is not on the center line of rotation for the axle (but off to the side), the pressure applied with your hand to rewind the film simply causes the crank axle to be wobbled as you turn the crank handle round and round. This wears the O-ring unevenly, puts scratches into the crank axle, and of course could unscrew the pilot. So, to rewind film, simply use the flip out handle to pull up the crank, flip it back down, and then use only the entire black knob to actually do the winding. I know it is inconvenient and slow, but this procedure will go a long way in eliminating a whole host of potential problems from happening.

And, if you ever had the itch to rewind film underwater for some reason, this could cause water to easily leak into the camera. While this area is O-ring sealed, it is really intended to be a "don't rewind film during diving" O-ring seal.

4. BUMPING/DROPPING THE CAMERA ON THE REWIND CRANK SIDE
It may appear only as though you bent the rewind crank handle assembly, and that everything feels and works perfectly. What you may find out is that your rewinding of film becomes more and more difficult day after diving day. "But the camera didn't flood!", you say.

Remember, "flooding" is anything from one drop of water to a fish bowl full of water INTO a camera. And what has happened here is that the plastic wall in the plastic head for the O-ring seat has been cracked allowing water to leak in and corrode (if you are lucky) only the gears. How is this fixed: replacement of the VERY expensive head completely, and any other parts that were corroded! If you have ever dropped your Nikonos III, get it professionally inspected to be sure there was no damages done in areas you can't see.

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Mounting a Viewfinder Accessory to the Camera

Remember back to the last issue of Ocean Realm where I showed how easy it was to break the one and only plastic mount of the plastic head by untimely use of the lifters. Well, this mount can also be broken by FORCING onto the accessory shoe a tight fitting view finder or other item. First and always, inspect both the accessory holder on top of the camera's head and the mounting shoe of the accessory to be sure each is properly shaped and not otherwise damaged. If they are not, DO NOT force mount the accessory! You will find that you will literally push the head off of the camera while forcing on the accessory.

If nothing appears to be damaged, then as you slowly slide on the accessory from the rear of the head, you the remainder of your fingers to put COUNTER PRESSURE on the front of the head (no, not the front of the camera, but the front of the head!!). This is the only safe way to install an accessory onto a Nikonos III.

If you bump an accessory while it is mounted to a III, you could completely break the one and only plastic mount that holds the head onto the camera (flood), break off the accessory shoe mount of the head, or break off the head itself. So, when diving with accessories mounted to the camera, be careful. If you break loose the three screws which hold the accessory plate to the top of the camera, DON'T decide to become a do-it-yourselfer and put in larger or longer screws and don't use glue. The area under the big camera view finder mountain is hollow, not solid as it may appear. If you cause one of the screw holes to become a camera hole, big time flooding!

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Summary

1. To the question of leaving the Nikonos III trigger cocked or uncocked during storage, "the proof is left to the reader".
2. When you accidentally bump or put undue pressure onto the Nikonos III "90 degree metal pry bar" trigger, you can deform or crack its plastic O-ring wall in the plastic head causing a flood.
3. With either type of add-on thumb-assist triggers, you have two targets to cause damage (and flooding) to the trigger port of the camera.
4. Keep the trigger parallel (cocked) to safeguard it from getting bumped or pressured (on the boat, in the camera case, all the time).
5. Don't leave a Nikonos III on "R" (rewind) any longer than is absolutely necessary (and that doesn't mean you are forgiven if you forget).
6. After rewinding the film, turn the shutter speed dial to any speed, and trigger the shutters 3 times to re-engage the gears before storage.
7. When rewinding (cranking) the film, learn to use the black knob instead of the flip-out crank handle. It's slower and not so convenient, but safer for the camera.
8. Inspect the rewind crank pilot before every dive.
9. Accessories mounted onto the top of the head should be inspected for deformations, carefully mounted to the head using counter pressure with your fingers, and always safeguarded from being bumped.

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NIKONOS WORKSHOP

NIKONOS-III

SIR ISAAC MURPHY NEWTON DIDN'T INVENT THE NIKONOS III

Text and Photos by Bob Warkentin

Sir Isaac Newton discovered and explained the laws of gravity. Sir Isaac Murphy invented ways for gravity to be combined to little dumb human mistakes to allow water drops to fall into holes and seams of a Nikonos III and ruin it.

Sir Isaac Murphy's Law #IIIa states that "if a drop of water can fall off of a Nikonos III camera, that it should fall into the most damaging of areas within the camera and must do so without anyone realizing it had fallen". Law #IIIb states that "Law #IIIa is a thousand times more likely to happen for each accessory you have on a camera and camera tray".

BIG mistakes like a full flood, and you don't have to have an apple hit you on the head for you to realize that you have had a problem that will require professional servicing IMMEDIATELY. But it's those LITTLE "dumb mistakes" which fall into the category of "I didn't see any water in the camera today: therefore, I have not caused any damaging problems to the camera". That is, not until tomorrow or the next day when EXPENSIVE DAMAGE HAS OCCURRED and the camera quits. And, because that damage MAY now cost more to fix than the camera is worth, you don't repair it (my loss of making a living),

but go and buy another camera (your loss of money). These "little" mistakes covered in this article occur primarily during the opening and handling of the camera after diving. (Flooding of the camera will be covered in a later issue.)

So When is a Hole a "Hole"?

"Holes" like the one for shutter blades, or where parts are joined together, aren't really "holes", are they? Let's be honest about it. Holes in YOUR camera aren't really holes to you. No, of course not, not until that day when a drop or two of water hits the camera. If you can wipe them off, your camera "ain't got no holes in it"! But, as you are wiping them off, you see those drops slowly sink into the camera where you can't get to them to wipe them off. It's not until then that all of a sudden you realize that your camera DOES, in fact, have holes in it, and that these holes now have water in them.

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Why the Holes?

If you examine any camera closely enough, you will find that all cameras have holes, believe it or not. They have to have these "holes" simply because every camera is made from a number of parts. And, every time two parts are screwed together, or one part moves around or through another part, there must be a space (be it ever so small) between these two pieces.

A Nikonos III is no exception. Simply put, the camera has to have a number of user-required capabilities, and all must be placed within a specified size of the camera. So, to do this, operations which actually function within the camera's mechanical "guts" must go through holes to the outside of the "guts" in order that they be started or stopped, or because of space requirements. Where are the holes: at the top, bottom and sides of the camera!

I will take you hole by hole, first explaining the mechanical operations going on in each area. If damaged, I think you can figure out what effect it will have on the camera's overall functionality. Anyway, the "holes" I will talk about are those I consider to be the more important "holes" because of the mechanical operations performed, the ease (and frequency I see being sent in for repair) of damage which are caused by a single frequent human mistake: they forgot about Sir Isaac Murphy's Law.

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Hole for the Counter Activating Linkage
(the most frequent leakage point!)

Everyone wants the counter to automatically count the frames when the camera is loaded with film and closed for use, and to automatically reset itself when the camera is opened to change the film. Nikon could have provided you something like a windup key to do this, but people would just probably loose the key or forget to wind the camera. And even though a Nikonos III did weird things like go underwater that its land use only counterparts couldn't do, this was just too weird to make the user windup their camera.

Thus, like a land camera, when the back door was closed or opened, the frame counter started and returned to zero respectively, automatically. For a Nikonos III, this equivalency occurred by placing the "guts" into, and removing them out of, the outer casing.

Photo 1

This feat of automatic genius was achieved for a III by having the counter activating linkage arm (photo 1) extend from the counter assembly (inside the camera) through a hole to the outside of the "guts" (photo 2) so that, when the "guts" were completely slipped into the outer casing, a "gut's guide" (Sorry, but what else would you call it?) on the inside of the casing would not only guide the "guts" into the casing but would also push up (and activate) the counter's frame counting linkage arm and make the counter count. If this doesn't make any sense to you, then take a ball point pin and push up the little linkage and watch the counter go round as you trigger and cock the camera....let go with the ball point, and the counter returns to zero.

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Photo 2

Anyway, that's the mechanics. Now, here is the "dumb little human mistake" for this area. Since the hole for the linkage is just under the head where the wet O-ring (after diving) is (photo 2), it is extremely easy for that one drop of water to fall off (with gravity!) the wet O-ring, into the hole and onto the linkages. And, of course when this drop goes into the camera, it no longer is on the outside of the "guts" for you to see to warn you of a possible problem. It's not until a couple of days later that the counter won't count, or return to zero, that you realize that there has been a problem. How do you avoid this problem? Simple!

Open the camera up-side-down. That way, the water drops which collect in the O-ring channel and on the O-ring itself will fall....with gravity....into your lap or onto the table, and not fall....with Murphy's law of gravity....onto the "guts" and into this hole.

"Oh, you will just wait until the outside of the camera is dry to open the camera!", you say. Another "little" dumb mistake since water can stay in the O-ring channel for up to 7-10 days after the last dive even though the outside of the camera is completely dry. The camera itself must have been opened up to allow the O-rings and channels to also dry! So just get into the habit of always opening a Nikonos III up-side-down at all times. A "dry and safe to open" Nikonos III is like an unloaded gun: there ain't no such thing!

A few more things you should know about this "little" counter assembly. You may remember from previous Nikonos III articles that there are 4 distinct varieties of Nikonos III cameras. During these variations, Nikon used 2 totally different types of counter assemblies, and they are not interchangeable! Style #1 was used for nearly 75% of production; Style #2 for the remainder. Because of the ease in which a little mistake would cause damage to the linkage and other areas of the counter assembly, this part frequently has to be replaced (expensive!). If there is any question in your mind of a drop, leakage or a flood, get the camera serviced IMMEDIATELY (see next paragraph as well). THERE AIN'T A BIG DEMAND FOR NIKONOS III DOOR STOPS RIGHT NOW.

Photo 3

Next, all of those other parts you see on the counter assembly (photo 3) ain't there just to make it look expensive. They do little things like let the shutters open and close, the film to go forwards and be rewound, and hold other gears in place. So, that little hole that can allow a drop or two of water to enter into the camera at the counter assembly can mess up the entire camera's operations, not to mention it counting 1...2...3! Most of these parts are assembled with rivets: thus, they can't be taken apart for cleaning if they get corroded. This usually means that it's all functional or it's not.

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The Big Hole for the Head to Mount to the Mechanics

On a scale of 1-10 of most frequent human mistakes (and repairs), if the above is a #10, this one is a #9.99!

Remember from photo 1, the counter assembly spans the width of the camera. Thus, the

drops of water falling off of the O-ring (described above) from the front of the camera (photo 1) is but one source of damage to this assembly. Drops of water falling off of the O-ring from the back side of the camera (photo 3) will also occur and get into the area where the head (one camera piece) joins to the top of the main guts of the camera (another camera piece). And, it happens from opening the camera in the old way: right-side-up.

The mechanics of how the damage occurs is somewhat long winded. What happens when opening the camera in the "old way" (extracting the camera's "guts" upwards out of the casing after diving) is that water falls downwards with gravity (it has to! Nikon forgot to change the laws of physic when inventing Nikonos cameras). Water falls onto the film plate thumb latch, then through its hole and up under the head (which is foam lined to keep out stray light) (photo 4).

Photo 4

Of course this light-trap foam, which is glued onto the camera's head, gets wet (like any household kitchen sponge will). But what you don't realize is that this foam runs quite a distance along and under the head, extending far enough to be along side the gears and linkages mounted on the back side of the counter assembly. The water soaks into and all along the light-trap foam, thus allowing for that hidden, and continuous, bathing of the gears and linkages on the back side of the counter assembly with salt water.

If you had left the camera in "R" (rewind) from the day before, today you would find that the shutters may not function, the film won't advance, and the counter won't count. In short, the camera is dead in the water!

For a Nikonos III, this is the worst possible area of the camera for damage to happen, outside of it being stolen or run over by a Mack truck. Why: because these gears and linkages control major camera operations, and if damaged, nothing photographically will work on a Nikonos III. Why: because these linkages are put together with a ....rivet, and you know what that means. Why: the whole part may not be cleanable, and replacement parts are scarce. Why? Because there is no reason for this to have happened if you had only opened the camera up-side-down.

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Hole for the Shutter Speed Selection

There are two shutter curtains (blades), and each is controlled by its own shutter release

linkage. The second curtain always closes (releases) mechanically at the same time. Therefore, every selection of shutter speed must be made by controlling when the first curtain opens relative to the constant closing of the second curtain. To accomplish the control (timing) of the first curtain's opening, Nikon used two timing cams, one inside the camera and one outside (photo 5). The nickel-size cam you see on the bottom of the outside of the camera communicates to the cam on the inside via a linkage pin that extends from the inside to the outside of the camera through a HOLE. And, of course this linkage is mounted to the whole lower unit of the camera with a (let's say it all together) rivet. I only mention all this stuff to try to blow your mind into thinking I know what I'm talking about, and to try to impress upon you the seriousness of what I'm about to tell you about this hole and a drop of water.

Photo 5

Remember while you open this camera up-side-down as explained above, that this hole will now be facing up to you. And, according to "Murphy's Law of gravity", every drop of water possible will fall directly into this area of the camera, even if the drop is a million miles away. As a matter of comparison, the size of the drops of water falling off of your face and hands (and that from people who want to look over your shoulder) and those falling from the lifters are HUGE spheres of damage to a camera compared to those clinging to (and don't usually fall off of) the mouth of the casing at the O-ring seat.

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While you can't do anything about those small droplets of water on the mouth of the casing until the camera is fully opened, you can be sure that your face and body (and that of onlookers!) are dry and the lifters are free of trapped, visible water. (Note: Those who dive with a strap of ANY kind mounted to ANY Nikonos camera are asking for serious trouble when it comes time to open the camera to change film. These items trap lots of water.) The tiny droplets clinging at the case mouth typically will not fall off unless you vigorously shake or beat the casing. And, if you were curious, you can take it from me that beating the side of a III casing makes a lousy bell!

Photo 6

So, just in case I forgot to tell you about all of the possible hazards and sources of water such as not open anything while the boat is under way (waves, salt spray, dropping the camera, or the rinse tank falling over and the guy next to you spills his "long-neck" of sparkling water onto you and your opened camera, etc.), I recommend that you have the shutter speed dial set to "B" before opening the camera. Doing so will block as much of this hole in the bottom of the camera as is humanly (and mechanically) possible (photo 6) just in case YOU ARE IN A HURRY TO CHANGE FILM and the unexpected happens. You really should wait to open the camera until you are in a dry, calm and controlled area, and then follow the procedures listed below.

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Holes for the Film Advancing Sprocket Movement

These holes, while obvious as to their purpose, are none the less holes for water to be carelessly dropped into (photo 3). True this is a somewhat rare occurrence when compared to the other two common problems talked about so far. But, if this should happen, I really hate to tell you the following. If professional servicing to correct the damage can not be effective UNLESS complete disassembly and dismounting of the entire film advance sprocket itself is required, then the chances of complete disassembly by anyone on the face of this earth is about 99+% against you! Internal parts literally become welded to the main camera frame from corrosion. And typically the labor to strip all the good parts off of your camera and rebuild them around another new frame with a functional sprocket is more costly than the cost of the frame. What this all means is "better find another camera".

How do you keep this from happening? There ain't no magic tricks other than those already mentioned above. Just be sure to open the camera up-side-down, in a dry area and with a dry body, and remove those accessories from around the camera. As mentioned, it is a rare occurrence, but when it has happened to the extent of serious damage (excluding a full flood and no followed attention given), it has occurred due to falling water drops that "must have been trapped in a strap because it kept falling onto my camera no matter how I held it. I thought I wiped off all the water, but I guess not". Ever heard this one before?

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Holes at the Flash Contacts

This is one of the more infamous "holes" in that damage can occur to more than just the flash contacts: it can damage the shutters! From photos 7 & 8, you can see that the three flash contact nuts, with their respective wires attached, stick their heads out through the holes in a thin plastic cover. In fact, water can leak into the camera from anywhere around this plastic cover.

Photo 7

Holes are holes, and water drops don't care how large or small they are. At first glance, this area of the camera appears to most people to be enclosed and harmless if drops were to fall onto the contacts and quickly wiped of. No damage could possibility have occurred, right?

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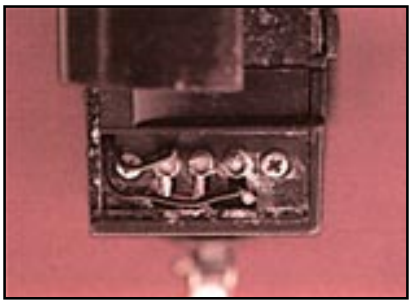

Photo 8

Right, except for the fact that electrical current is flowing through these wires, which merely caused your flash not to work (or constantly fire without triggering the shutter). Right, except for the fact that the wires are being oxidized (burned out) little by little as are the actual contacts, finally preventing the strobe from firing all together. Right, except for the fact that located immediately behind the contact plate are the shutters! (photo 8.)

It's easy to understand that if your shutters get damaged, the cost of your repair (what ever it is) will be high. But these little wires should be cheap. Well, the wires are cheap, but to install them requires labor to disassemble about 75% of the camera, and that ain't cheap!

How does damage happen? Wire damage: a single drop of water from a wet hand, or opening the camera the way you have always done it ...right-side-up...and drops falling off of the camera's head or off of other camera accessories. The more the water drops, the more water available to seep around the flash contact plate and into the camera to reach, and damage, the shutters themselves. Preventing this is simple: open the camera up-side-down.

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Opening a Nikonos III Correctly

Open it up-side-down! End of article.

Summary

First, there are a few considerations that must taken into account before we are even ready to consider opening the camera to change film. These were all discussed in my Fall 1990 article in Ocean Realm. Briefly, repeated, remember that you have already turned your shutter speed dial to "R" and have re-cocked/locked the trigger for a camera-safe surfacing and entering the boat. Once on the boat, the film has been rewound following PROPER procedures. And lastly, the shutter speed dial has been turned off of "R" to some shutter speed, and the trigger triggered three times to re-engage the gears in the camera (very important to do before opening the camera-see that article!)

1. I strongly recommend that you take the camera off of the tray, especially if you have one of those trays mounted with a handle, light meter, and other accessories. The more accessories (including the tray itself and any optical finder on top of the camera), the more areas there are for water to be trapped and available to fall into and onto an opened camera. This may also mean undoing the flash cable as well just to get the camera away from the tray (sorry).

Get rid of neck straps, wrist straps, ropes, old belts and "do-dads" that you have added to the camera so that the camera can't accidentally be lost (or be dumped from yourself in times of diving emergencies!). These items trap water as well.

2. Blow off excess water trapped around and under the rewind crank, trigger (and thumb assist is so equipped), and lens. Blow off ONLY WITH YOUR MOUTH, not with a scuba tank! Dry your body and hands, and find a dry place to open your camera.

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3. Since gravity is every where, first begin opening the camera by pointing the lens downwards, unscrewing, and pulling the lens off slowly DOWNWARDS. Set the lens face-down off to the side (pick a smart area to lay it!). Towel try the silver colored lens mount ring on the front of the outer casing (of course you have kept the camera face-down while you set the lens off to the side).

4. Now trigger the trigger and this time leave it extending out. This will provide the camera's head with a "tripod" so that the camera is more stable and less likely to fall over during and after opening. (Note: there is a drawback from this technique. As I mentioned above, when opening the camera to have the shutter speed dial set to "B" IF YOU ARE IN A HURRY TO CHANGE FILM so that the cam will block the hole on the bottom of the camera. Well, with the trigger triggered and left outwards, the cam will no longer block the hole. Knowing this, I personally still open the camera using the extended trigger. This forces me to find a dry controlled area, to take my time, and to exercise extreme care not to let anything or anyone reach over MY camera for anything!!!)

5. Turn the camera up-side-down (that's right, this means the camera's head is pointing

down on the table and your are looking at the bottom of the camera!).

Photo 9

6. (Remember, everything is up-side-down from here on in, and will sound a bit weird to you. After a couple of readings, it should make sense, I hope.) Holding the camera's body up-side-down in your left hand and left thumb over the edge of the lens mount ring for support (visa versa if you are left handed), place your right DRY thumb into the lens hole and downwards onto the center of the frame and PUSH downwards and outwards the "guts" out of the outer casing just enough so that the casing is freed from the O-ring compressed seal (photo 9). (If you just gotta use those darn lifters, then rest the camera up-side-down on a table and use them just a little to just open the O-ring seal. I really wish you wouldn't use the lifters because of the problems explained in the Summer Issue!)

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7. Holding the lifters along the side of the casing, lift up the casing off of the "guts" and set it off to the side (up-side-down of course!). Before picking up the "guts" to change film, check around the O-ring area for water drops, and remove any big ones that you see.

8. Pick up the camera, head still up-side-down, and tilt it about 45 degrees to allow any water that wants to drain, to drain. Then, reload the film (still up-side-down as best you can).

9. Close the camera up-side-down as well. But, don't close it up while it is on the table; hold it in your hand (the table is too hard and you could put undo strain on the trigger and break something) and squeeze the "guts" back inside the casing. On closing, don't be surprised to see a bead of squeezes-out water falling out of the O-ring channel!

10. Reinstall the lens up-side-down (because its O-ring is still wet), and the camera is now sealed and ready to go. Just put the camera back onto the tray, remount the flash, and go diving.

11. Throughout this while awkward procedure, gravity has been working for you, not against you.

OK, now for the SUMMARY

1. Ever heard of Sir Isaac Murphy?
2.

Remember that gravity is always present, and water drops always fall in the direction of gravity.

3. Underwater photography doesn't have to be a rich-man's sport (of having to buy new equipment after every dive trip) unless your nickname is "Murphy". Also, O-rings and channels stay wet with water for up to 10 days unless the camera itself is opened to dry, even though the camera's outside appears to be dry.
4. All cameras have holes and openings. It's called manufacturing (putting parts together).
5. Air in a camera's holes: no problem. Water drops in a camera's holes: big problem
6. Know your camera and the contraption it is mounted on; know water and gravity; don't mix them.
7. Always open the Nikonos III up-side-down, off of and away from the tray and its accessories, in a dry controlled area and take your time.

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NIKONOS WORKSHOP

NIKONOS-III

"IDIOSYNCRASIES" AND A NIKONOS III

Text and Photos by Bob Warkentin

Sir Isaac Murphy's dictionary explains the term "Idiosyncrasies" as originating from the frequently lost language of the Wutdahekhapun clan (pronounced "What-The-Heck-Happened") in which pagan words were devised and used to explain those otherwise unexplainable human phenomenon. Broken into its respective parts, "idio" is an abbreviated form of the word that defines how the human feels about himself when he has been presented with more frustrating problems than he has immediate solutions for, especially if the problems are to equipment he has been using for years. "Syncrasies" are those frustrating little problems which are unique to your equipment, and which occur as a direct result of human mistakes in such a way that they prevent you from immediately identifying and solving the problem (meaning you ain't had to fixed this mistake before) without having to read something first (because you already know that the exact answer to your exact question ain't in the book) or listening to what someone has to say (and let them know you don't know!).

SYNCRASY #1: My Flash Won't Flash!

Unless something obvious has happened like flooding the camera or strobe, or closing the camera case with the flash cable hanging outside, or forgetting to put good batteries into the strobe and camera (Come on, you can't put batteries into a Nikonos III! I know better than that!), if you have ever had the problem of the flash not flashing, remember asking yourself if the problem could be with the flash, the flash cable, or is it the camera?

So, what did you do? After wiggling the flash cable and clicking your camera, checking for water leakage and even shorting across the contacts of the flash cable to force-fire the flash, you finally grabbed someone else's flash that worked with their camera, attached it to your camera, and saw if it worked on your camera. If his flash worked, then your flash was "kaput". But, if his flash still didn't fire, then you realized that your camera had a camera-to-flash synch problem somewhere. But what you probably didn't realize is that many camera-to-flash communication problems are caused by simple little Nikonos III "idiosyncrasies."

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The Making of Flash Communication

The 3 flash FINGERS inside the outer casing [#1, common or ground; #2, flash bulb; #3, all electronic flashes (photo 1)], are respectively assembled to the 3 thin flash PINS of the flash port. These fingers and pins are completely encased in a molded plastic assembly. Each of the 3 fingers are made of spring steel and designed to spring DIRECTLY forward to make individual contact respectively with each of the 3 flash contact NUTS located on the lower part of the film canister side of the camera's "guts" (photo 2). Note: From now on we will be talking about fingers, pins and nuts. So, don't go NUTS!

Photo 1

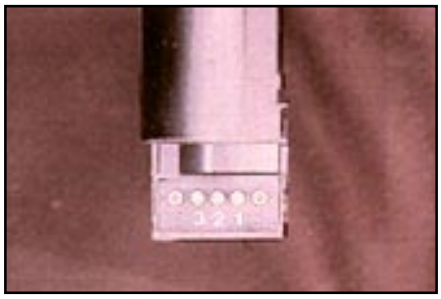

Photo 2

The purpose of the 3 pins is obvious: to connect the flash cable. But the purpose for the flash fingers and nuts is to eliminate the old conventional need of constructing a hardwired wiring harness to provide communication between the camera's flash synch mechanics and the flash connector. Instead, the flash fingers provide a "break away" electrical flash connection so that the camera's mechanical "guts" can be removed easily and safely for film changing, a requirement unique to the Nikonos III in comparison to its land camera counterparts.

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The Coat Hanger Test

Have you twisted the flash pin assembly of the camera and misaligned the 3 flash fingers with the 3 nuts (photo 1) due to your over tightening of the cable connector to the camera (the Great-Ape technique), or that you left the connector installed to the camera for the whole week and the salt water cemented the two piece connector into a one piece unit, and when you unscrewed it, everything twisted? (Dumb, very dumb. And I bet your cable is messed up, too!) And/or have the flash fingers been broken, but you can't see anything wrong with them?

Then remove the camera's "guts" and connect a strobe that you KNOW is working good to the outer casing. Next, using a metal coat hanger which has been cut and bent so as to make a very long pair of tweezers (or use pair of very long needle nose pliers, being careful not to scratch the casing's O-ring seating mouth), touch the side of the flash fingers #1 & #3 at the same time. (Note: If the coat hanger is painted, then scrape away some of the paint at the tips to make better electrical contact) The electronic flash should flash. If it does fire, then check the alignment of the flash assembly and realign it, if necessary, carefully with a pair of needle nose pliers so that the fingers point EXACTLY to the

opposite end of the casing.

If it doesn't flash, and you are absolutely certain that both the strobe and its cable are in good working order, then most likely the camera's flash connector assembly is definitely damaged. But perform the following procedures just to be sure. Otherwise, the problem must be repaired professionally, and unfortunately that means that you will have to wait until you got back home.

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The Greasy World of a Nikonos

If the flash don't flash, remember that grease prevents electrical contact. And since we all must handle the camera's "guts" just to change film, etc,. it's easy for our O-ring greasy fingers, even just our naturally oily fingers, to coat the nuts, and in turn, the flash fingers and mess up electrical things.

Solution: Inspect the 3 nuts with your 35mm magnifier for signs of grease, clean these nut contacts with a cotton swab, and clean the face of the 3 flash fingers with a swab also. Then try the camera/strobe communication again.

NOTE: The nuts have very sharp notches cut into them and will cause extensive fraying of the cotton swab. So, be sure all of the fuzz is removed from the nuts before using the camera.

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Are your Springs Sprung?

"My flash fires with the "paper clip" test, alignment is correct, but won't fire when I put the "guts" back into the casing." Then try this next.

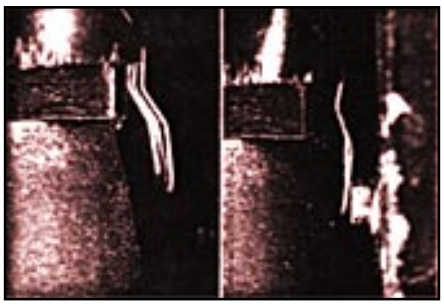

Photo 3 A and B

Remember from the above that each of the 3 fingers are constructed of a thin piece of spring steel. And each of these 3 fingers must retain their original springiness (photo 3-a)

over the entire life of the camera so that flash contact communication is maintained (i.e., the fingers spring upwards and outwards to make a good contact with the nuts). So, over the life of the camera, as we store the camera's "guts" installed in the outer housing (photo 3-b), the 3 fingers remain constantly under tension (being pushed away from the 3 contact nuts). Is it any wonder, therefore, that there may come a time when you trigger the camera, flash attached, and the flash doesn't fire? Could it be that the spring (in the flash fingers) has sprung? (photo 4.) .Notice the shape of the tops of the 2 other flash fingers which are behind the front "properly repositioned" finger!)

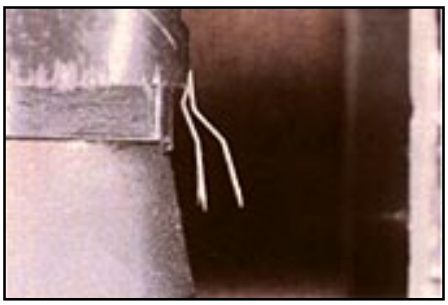

Photo 4

Solution: In reality, it doesn't take much weakening in the springiness of a spring contact finger to cause it to be moved from its original "operational" spring contact position to a position where it won't make a good flash contact with the camera. It also stands to reason that it wouldn't take much for you to reposition (bend back into place) the flash finger to reestablish its operational position and, thus, reestablish flash communication. The key words here are "you" and "it wouldn't take much" movement....remember this!

Now remember, what I'm about to explain to you can be overdone by you, and you can easily break the flash fingers during your attempts to reposition them. So, TAKE EVERYTHING A LITTLE AT A TIME!

Run your index finger into the outer casing through the lens mount hole, not down from the top of the casing! Place your finger tip or finger nail up under a flash finger (Flash Fingers #1 & #3 are the ones of importance, but do them one at a time, please!), and lift upwards and outwards LIGHTLY, VERY LITTLE, SLIGHTLY, SLOWLY, EASILY, JUST A LITTLE BIT, pick what ever word you want to use so long as you remember to be CAREFUL and take the re-bending a little at a time. (See photo 4 again and notice the repositioned finger relative to the other 2 "still bent" fingers)

Make a slight bend to each flash finger, reinstall the "guts" and fire the trigger and see if the flash goes off. If not, try bending the fingers one more time by just a little more! Still nothing, then this is not the problem and you need professional servicing. Sounds like the problem is up inside the camera's "guts" and you can't fix this in the field yourself!

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Curiosity Killing You?

If you are sure that the strobe and cable are good and that all of the above have failed, but you just got to know for yourself where the problem is, try the following. Using a VOM (volt ohm meter), place the meter on resistance (ohms), and connect one lead to each of the outside #1 & #3 nut contacts of the camera's "guts" (photo 2). With the trigger cocked, the meter must read infinity. Next, shutter speed on any setting but "R", trigger the trigger and the shutter should move. Now, while continuing to hold the trigger in, the meter should read 0.00 (if you also have a buzzer on the VOM, it should be sounding). Then, as you begin to release the trigger, the buzzer should stop (reading should go back to infinity). If none of these work as explained, you and your pocket have got serious problems which will require professional help.

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SYNCRASY #2: My Flash Fires, but My Pictures Have No Flash Fill!

A common photography complaint, granted. But unless you have completely narc'ed out and have lost all of your photographic smarts pertaining to the settings of the camera/lens/strobe/distance, then you just may be able to blame those crummy pictures you got on camera failure!

As mentioned above, the flash assembly in the outer casing can become twisted and no longer aligned within the casing. This misalignment can also cause the 3 fingers to now bridge the narrow gaps between the three nuts of the camera. Depending on how you twisted the assembly, either finger #3 touches nuts #3 & 2, or visa versa, finger #2 touches nuts #2 & 3. So now, when you trigger the camera, the flash goes off; but the flash fires synched with the "flash bulb" timing for the camera instead of the "electronic strobe" timing of the camera!

How does this happen? Remember, a Nikonos III was the last of the Nikonos cameras to provide for flash bulb use, and therefore had to provide a synch for firing a flash bulb. But to fire a bulb in "synch" with the opening of the camera's shutter, this requires that the bulb's ignition be started before the shutter actually opened so that the bulb's light output could reach its peak when the shutters finally did open. Thus, the camera provided a separate series of contact points for bulb and for electronic flash use, and the closing of both contact points are made during every triggering of the camera!

Since you have twisted its flash assembly so much, the "electronic strobe" finger is now able to be fired from the SHARED point-closing signal of that intended for "flash bulb". The result is that the strobe goes off before the shutter is opened, and when the shutter finally opens, there ain't no light for the film to see!

Solution: Like above, straighten the alignment of the flash assembly!

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SYNCRASY #3: My Flash Fires, but My Pictures Are Partially or Totally Black

"I clean my camera all of the time and I always spray it down with a can of aerosol lubricant to prevent corrosion. But lately, all of my pictures have been coming out black. What's wrong?"

The number one task all photographers perform is to clean and grease O-rings before they load the camera with film. Of course! You don't want the film to fall out of the camera while installing the greasy O-rings and run the risk of getting the film ruined by grease.

Now, the moment of truth. Completely cleaning the grease off of your fingers before loading the film. After cleaning your fingers in the usual way you have always done, you proceed to pull out the film from the canister and lay the film across the shutter area (from left to right) of the camera, and so on until the film has been securely loaded into the camera (you know the steps).

But what you don't realize is that some time, sooner or later, you will have not gotten all of the grease off of your fingers, and as you are laying the film across the shutter area, your greasy finger will touch the shutter blade and will leave a "grease filled" finger print.

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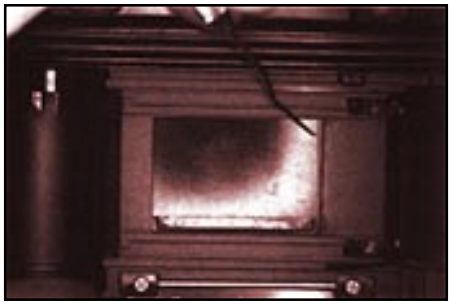

Photo 5

Wipe it off, you say! Not possible, I say! Since the shutter blades extend back behind the shutter frame, you can't get ALL of the grease off. In fact, as you try to wipe off the grease, you typically smear the grease right in between the two shutter blades (photo 5). And because the shutter blades are designed to ride one on top of the other, the grease you forced (cleaned) in between the blades and will literally "glue" the two shutter blades together. So, if the two shutter blades do not operate independently, they never fully "open" to expose the film. Therefore, totally black (or partially black) pictures.

SOLUTION: Money out of your pocket to have a professional tear down the whole camera and clean off the grease piece by piece. And don't decide to use alcohol to clean the shutters: this will just dissolve the grease and then carry it everywhere inside the camera, and a technician will be allowed to charge you more for the cleanup of your cleanup!

"O.K., I now understand about a little bit of accidental grease and how will cause the shutters to stick together and give me black pictures. But what about using aerosol cans of spray lubricants?"

Lubricants, oils, greases, call them what you want. But around shutters of any camera, call them "DAMAGE". Even if you are just in the same room as your camera and you are spraying your other diving equipment (for some reason!), sprays (the mist) will travel through the air and get into the shutters of the camera, EVEN ACROSS THE ROOM.

Don't believe this can happen? Then think of bug spray you sprayed in the kitchen, and a few minutes later you can smell it in the living room. It didn't crawl in with the bugs: it was carried by the flow of air through the room! So, if someone is using any aerosol (including hair spray, deodorant, etc.), be sure the camera is closed and the lens is on it. Don't open the camera in that room for at least 15 minutes: better yet, go to another room if you need to open the camera for any reason.

Solution: Same as above. Some technician will put an oil well on your camera and pump money out of your pocket.

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Testing for Sticky Shutters

Simple! Turn the shutter speed dial to "B" and as you are watching the shutter blades, fire the camera. If the first curtain VERY SLOWLY travels upwards (instead of traveling fast and crisp), then the shutter blades have been "glued" together, hopefully only with grease or oil! Regardless, you can't fix the problem yourself, so don't even try. Professional servicing is required!

Here's Your Free Shutter Speed Tester

You probably didn't realize it, but all the tools necessary to perform quality shutter speed evaluation and testing as well as and accurate flash synchronization testing is right there in your camera bag. It's your actual camera and your actual electronic strobe, AND A LITTLE KNOWLEDGE. If you went out and bought specialized shutter and flash testers, the price would be more than $500.00, and the testers still wouldn't test how well the equipment would work together!

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Preparing the White Paper Film Mask

First, take of piece of white paper (use standard paper, not thick like a business card), tear it so that it's size is a little taller than a piece of film (top to bottom) and a little longer (side to side). Next, take the camera's "guts" out of the casing, and load the "piece of paper film"

so that it fully covers the rectangular hole, but does not extend so far over as to tough (and interfere with) the film sprocket and that it does not buckle up when the film plate is closed. (For those of you who would rather spend hours measuring the camera and then cutting a piece of paper to EXACTLY fit, go for it! Just remember, I will have already tested my camera/strobe combo, and will be on my second cold one by the time you get finished!)

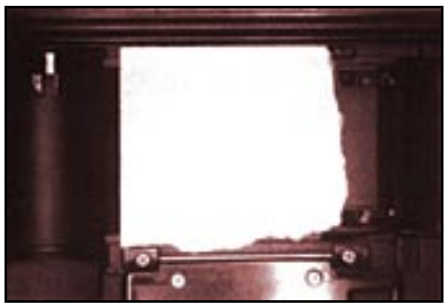

Photo 6

Now, reinstall the "guts" back into the outer casing, and connect the flash cable. Leave off the lens, and have the strobe turned off for right now!

Turn the shutter speed dial to "B". Now, while triggering the trigger (and holding it in so that the shutter stays open), place a pencil or pen inside the shutter frame and trace the lower and upper edges onto the white "film" paper. Then, draw 2 arrow head lines, each bringing in the center and terminating at one of the frame lines (these lines are only so that your eye will be able to quickly find a reference point to follow up or down to locate the trace lines). Now, you have made a film plane mask, and have calibrated it to the exact dimensions of your camera and the images that it will record on the film.

Photo 7

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The Shutter Speed Timing and Mechanics of Shutter Movement

When the camera is triggered, mechanically the first shutter certain is released and is pulled upwards by a spring until it is fully out of the way of the film (see Photo 5 again). (Ever wonder where the shutter goes? Ever wonder why the height of the view finder head is as tall as it is? I think you can now figure out these two questions!) Next, the second curtain is released, pulled upwards by its spring, and contacts the bottom of the first curtain thereby closing the film plane to incoming light.

The above mechanics has just described what a "shutter speed" does. It simply controls the time when the second curtain is allowed to travel relative to the travel of the first curtain. Without control, the shutters would never open; they would always travel together. Therefore, control of shutter speeds is really the delaying the travel (closure) of the second curtain relative to the travel (opening) of first curtain.

This delayed travel is completely controlled by mechanical gears. And mechanical gears can get worn just like mechanical gears in a car's engine. So, just because the shutters move, and even if you believe you can hear the difference between slow speeds and fast ones, what may be happening may not be accurate. Worn gears usually result in shutter speeds getting faster and faster than the number on the dial!

One last important thing to remember! What you are about to read and experiment with using your equipment will seem confusing at first until you become familiar with the procedures. To confuse things even more, when you see problems on your film you believe are due to possible shutter speed error, and try the following tests to answer your questions, REMEMBER THAT YOUR FILM SAW THE PROBLEMS UP-SIDE-DOWN! Therefore, a problem on the top of your picture was caused by the lower shutter, and visa versa!

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Use Your Strobe As a Timing Light (Just Like On Your Car!)

You are now ready to test your shutter speeds and flash synch systems all at one time using the strobe for a shutter testing (timing) tool. But before I discuss these techniques, let me provide some additional understanding of what is about to happen.

At the completion of upward travel of the first shutter curtain (photo 5), the shutter makes contact with the electronic flash contacts (not the bulb flash contacts-this contact was made long before the shutter even opened). So, when the flash contacts touch, the circuit to fire the flash is completed and the flash will (should!) fire. While there are many reasons other than Idiosyncrasies #1 & #2 why the flash won't fire (broken wires in the flash cable, the camera, corrosion, etc.), for the purposes here I will assume that you have checked your equipment for Syncrasies #1 & #2 that your system is at least firing the strobe.

Since the strobe is supposed to fire only upon the complete opening of the first curtain, this mechanical operation can be checked by simply holding your timing light (the strobe) about one foot in front of and one foot below the lens hole and pointing up about 45 degrees into the shutter area of the camera, and I look from behind the strobe and down its side. At all shutter speed settings, the first shutter should not be seen in the field of view of the film. So, when you trigger the camera, strobe pointing up into the shutter area, when the flash fires you should see the upper line that you traced onto the white paper. If you can't see this line, then the film will see the bottom of the shutter curtain during flash photography work (and appear at the bottom edge of your picture).

The real test for accuracy of all shutter speeds is in the testing of the closing time of the second shutter. This time, you will be holding your timing light (the strobe) about one foot in front of and one foot above the lens hole, and pointed downwards at about 45 degrees into the shutter area (looking down the strobe from behind) so that when the flash fires it will be pointing towards the lower trace line you drew onto the white paper.

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As a beginning point of familiarization of what you are about to see and realize, first set the shutter speed dial to 1/250 sec. When you fire the strobe, instead of seeing the bottom trace line, you will see that the shutter area is "blackened" by the second shutter curtain blocking about 1/2 to 2/3 of the white paper, while the only part of the white paper showing will be the upper remaining area of the shutter opening. Before you panic and think your camera is all messed up, it's not. So, keep on going.

Next, turn the shutter speed dial to 1/125 sec., and fire the strobe. This time, you will see that only about 1/4 of the lower shutter area is "blackened" (blocked); the rest is all white paper (photo 8). But you still can't see the bottom trace line you are supposed to see (and want to see), can you? Now, turn to 1/60 sec., and fire the strobe. Presto: at last you can now see the bottom trace line perfectly as well as all of the white paper.

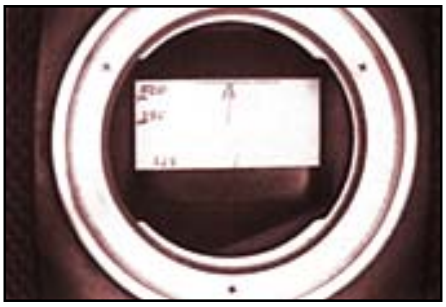

Photo 8

Remember, this is the fastest flash synch speed that a Nikonos III can function and record a complete picture, and you now know why. If you test the effects of 1/30 sec. with your timing light, you won't see any big changes in the shutter area. But if you use a yellow colored paper mask instead of white, and if you haven't already temporarily blinded your eyes so far from all the bright strobe light testing, then you possibly may be able to actually see a difference in 1/30 and 1/60 sec. light reflection off of the yellow paper.

While this testing is in no way intended to be an absolute measurement of precise shutter speed settings, it is a great tool to use in the field to be sure that your camera and flash are working together properly, that the flash is properly timed to fire with the complete opening of the shutter, and that the shutter speeds are working within general limits of mechanical accuracy.

After reading all this stuff and becoming familiar with the procedures, you will find that this test takes about only one minute of time from tearing a piece of paper to test completion. Or, you can put into the camera a $7.00 roll of film, go on a $40-50.00 two tank dive and take pictures, then spend $8-10.00 to have it processed just to find out that the pictures were ruined because something was wrong.

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SYNCRASY #4: My Counter Won't Count!

Excluding those mistakes of water drops (and rusting of gears) which can easily fall through the counter's engaging linkage arm hole which were covered in the Winter '90 issue of Ocean Realm, "counter not counting" problems on Nikonos III cameras are a frustrating but common problem. When the camera "guts" are installed properly and fully down into the outer casing, the narrow upper shoulder of one of the metal "guides" (which is cast as part of the inside wall of the metal outer casing) should squarely push upwards on the center of the counter engagement arm to engage the counter gears. Likewise, when the camera is removed from the casing, the spring loaded arm is now free to spring itself downwards, thereby releasing the counter gears and allowing the spring loaded counter indexing wheel to return to zero (photos 1 & 2; Sir Isaac Murphy Newton Didn't Invent the Nikonos-III).

So, how does the camera get so messed up that it doesn't count? From simple human "idio's"! People who own Nikonos III's simply assume that all they have to do is just stick the camera's "guts" anywhere into the opening of the outer casing's mouth; no concern whether it is centered, no concern whether it is straight up and down with the casing. No concern because they believe that the casing will GUIDE everything properly together for them! And since this counter engaging metal "guide" is triangular in shape (narrower at the top), it's really of no use as a TRUE guide. So, what sooner or later happens is the human's unknowing but somewhat natural tendency to install the camera's "guts" like we put on shoes: just get part of our foot into the mouth of the shoe somewhere because the shoe will guide the rest of the foot into it if we wiggle the foot enough.

For a while, it will seem to the Nikonos III user that he has been doing everything properly: all operations work properly, counter included, and therefore his techniques of putting together the camera has obviously been correct. It's not until sometime later that problems show up: the counter won't begin to count until 3-5 pictures have been taken, or won't start at all. By then, what has happened is that the counter engagement arm has become so bent, and the shoulders of the guide on the outer casing so worn, that sometimes the arm can easily slide off the edge of the shoulder, and thus doesn't get pushed up to start counting.

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Solution: First, you must determine that both the counter engagement arm and the counter itself are working properly. To do this, simply guide the tip of a ball point pen up the channel and push pressure upwards onto the arm. Now, while holding upwards on the arm with the ball point pen, trigger the camera several times. You should see in the counter window that the counter wheel indexes frame number by frame number. Do so at least up to frame #5. Then release the upwards pressure applied by the pen, and the counter should return to zero. If everything works OK so far, the problem is certainly due to bent or worn parts as described above. So, read on.

Next, inspect the counter engagement arm and determine if it is extending out of and directly centered in the hole, and not bent. If bent, then use a pair of fine tip needle nose pliers and LITTLE BY LITTLE carefully bend the arm in whatever direction necessary to center the arm. Again with the ball point pen, repeat the above procedure to insure you haven't broken or over bent something and that everything is still freely working.

Re-seat the "guts" into the outer casing and see if you "fixed" the counter's counting by triggering the camera. If it still doesn't count, then the shoulder on the inside of the outer casing is mostly likely very worn. Just remember that even though the counter doesn't count, this doesn't mean that the camera won't take good pictures.

So, if you decide to go for broke and try your luck one last time to REALLY BEND the arm to center it with the remaining highest point of the shoulder (if any remains), don't over do it! If you break this arm off of the counter assembly, the assembly will cost as much or more than the outer casing. Give this "one last try" some deep thought before doing it!

If the guide shoulder inside the outer casing is really this badly worn, there may not be much anyone can do about this except to sell you another expensive outer casing, and hope you profit from your mistakes and change the way you have been inserting the "Guts" into the outer casing: i.e., the camera's "guts" well centered in the mouth of the outer casing before pushing the "guts" directly perpendicular into the casing so that there will be no side-to-side slipping-and-sliding.

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Summary

1. Are you a member of the "wutdahekhapun" clan?
2. Flash doesn't fire with your camera? Grab someone else's strobe and try it on your camera
3. The camera still doesn't fire the strobe, sounds like you have somehow managed to mess up a great camera!
4. Check alignment, "coat-hanger" test, inspect and degrease the contacts; readjust the position of the spring steel flash fingers little by little very carefully, testing as you go; use a VOM if all else fails and you really want to know the bad news. Still nothing works, give up and enjoy the rest of the trip (Spring '91 article)
5. Flash goes off, but pictures have no flash fill! You may have "premature ignition"! Check alignment of flash pin assembly, or take a course in underwater photography.
6. Black pictures (or partially black)! Check to see if you have "glued" the shutter

blades together with O-ring grease and spray cans of oil. Then use your new knowledge, and your camera and strobe, to make your own FREE shutter speed tester and flash synch tester. In one minute you will be able to find out if you have lost independent control over the shutter speeds, just forgot to set the shutter speed dial back to 1/60 sec. after the last rewinding of the film (dumb!), or accidentally moved the shutter speed dial during shooting.

7. What if the counter doesn't count? Do you feel like everything you touch mechanical sooner or later becomes damaged for some reason.
8. Perform the ball point pen test to be sure the counter still counts and that you haven't rusted up the gears.
9. Inspect the alignment of the counter engagement arm, and straighten it little by little carefully, testing as you go.
10. Inspect the counter engagement guide located on the inside of the outer casing for wear. If badly worn, inspect your pocket book for sufficient money to buy another casing.
11. Learn how to put the camera's "guts" into the outer casing properly so that you don't wear out or bend parts again.

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NIKONOS WORKSHOP

NIKONOS-III

AIRBORNE

Text and Photos by Bob Warkentin

My jump school drill sergeant told me years ago that bailing out of an aircraft and falling through the air never caused a problem or messed up your body: it was only the ground coming up and the vibrations to your body from that sudden stop that you had to watch out for if your parachute didn't open. You just had to remember to hook up your static line to the aircraft, and everything else would take care of itself! Well, he was right, and nothing of mine ever got really "vibrated" (I walked away from every one)! But, I've never seen a static line on a boat to hook up my Nikonos III camera's "parachute" for those times that the camera mysteriously "bailed out" of my hands, or off of the boat's bulk head, or onto the diving platform on a choppy day.

So What Can Get Vibrated on a Nikonos III?

"Vibrations? Not to my camera!" But one day you realize that the shutters no longer move when you trigger the camera. No big deal, if you have a use for a paper weight for the rest of your dive trip.

BUT, this problem can be caused by another "boo-boo" as well, so let me cover it first. You may have the style of Nikonos III which, when left in the "R" shutter speed,

disengages the shutter blades from moving. So, double check to be sure you are not still in "R" from that last rewinding of the film, and that you are in an actual shutter speed setting. If you are in an actual shutter speed setting and the shutters still don't move, then the camera "ain't been gettin' them good vibrations". And, you got problems you can't fix in the field!

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How Could This Have Happened?

VIBRATIONS! In a Nikonos III camera, the each of two shutter blades are released by their own "shutter release lever" at specified shutter-speed times. This is probably not such earth-shattering information to you since you probably already thought there had to be gears, levers, springs, screws and other stuff with weird names in your camera. But look at photo 1, and notice that the two levers are very long, like tines of a tuning fork.

Photo 1

Let's first talk a little about the construction and mechanics of the lower unit of a Nikonos III camera where the long shutter release levers are located. In photo 1, you will see two long silver colored levers, each terminating at the tall looped spring (behind which are located the actual shutters). And, each lever has a curved terminating end to it which is designed to hold its own shutter blade in a cocked position. On the other side of the lower unit are the gears which pull each lever away from its shutter blade. Therefore, mechanically, what we simply think of as a "shutter speed" is nothing more than the time elapsed between the camera's mechanics of releasing the first shutter blade and then releasing the second shutter blade. Well, like in anything in life, you got to get the first shutter blade to move if you want the second one to move also. Next, shutter speed timing. An easy way to understand "shutter speed" is to think of it as the elapsed time between the time at which light begins to fall upon (some point) of the film until it no longer is allowed to fall upon (some point) the film. Since the time of release of the second shutter curtain (to close the camera's "shutter" as we commonly think of it) is fixed, then the only way to engineer different shutter speeds in the camera is to cause the gears to vary the time of release (opening) of the first curtain: this variable allows for shutter speeds from "B" to 1/500 sec.

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Photo 2

For each shutter speed desired, to vary the timing and achieve the desired movement (release) of the first shutter release lever requires that a variable gear hand be connected to this lever so that the gear can be positioned to release the lever at different timing sequences. To accomplish this connection, the first curtain shutter release lever (which has a small hole in it) is laid on top of a 1 mm. tall pin located at the other end of the variable gear hand (photo 2). Your "Shutter speed selection" first mechanically adjusts this variable gear hand assembly to a specified position so that during "firing of the shutters", this variable gear hand is in position to be mechanically hit (moved) by other gears in the camera, which in turn releases the first shutter curtain to "open". (Remember that the second shutter always closes at a predetermined time once the "firing of the shutters" begins.)

However, it's this need for variability of shutter speeds, and unwanted vibrations to the camera and its levers, wherein the problem lies. The first curtain's lever sits on top of this 1mm. tall pin while the second curtain's lever lays parallel to and just above it (to hold the lever onto the pin) with just enough clearance between them so that they still function independently. Therefore, strong vibrations to the camera will cause the long first curtain shutter release lever to vibrate and jump off of this pin.

Note: Just a couple of sidebar comments. This gear-to-lever coupling method had been in use for nearly 20 years before the Nikonos III came on the market. But, like the old saying, "the bigger they are, the harder they fall": remember that the Nikonos III camera is bigger and longer than its predecessors. And, no camera, even a Nikonos, was ever built to be used as a substitute for an apple if you wanted to prove the laws of gravity (and of vibration damage from that sudden stop), especially a Nikonos III.

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Useful Nikonos III Cautions/Solutions:

1. In your foam filled "traveling" camera case, never situate the camera near the outer walls of the case...house it towards the center. Prepare the foam so that the camera will be laying flat...not vertical...in the case. This way, you have given the camera maximum foam protection top-to-bottom, side-to-side.

2. If cameras are ever shipped via mail or other packaging handling companies (for purposes of buying, selling or servicing), always double box a Nikonos III: i.e., first in a small box containing its own packaging materials and the camera, then this small box

inside another larger box with more packaging (vibration absorbing) materials.

3. On board boats or while simply handling a Nikonos III camera anytime, loss of control (holding) of the camera is always possible. Therefore, get yourself in the habit of reducing the distance between where you are handling the camera or the place where you set the camera while not in your hands, and the boat deck or other hard surface where the camera might fall onto. The easiest way to do this is to sit down right on the floor or deck while handling the camera, and find a place to lay the camera such that it is as close to the floor as possible just in case the boat begins to rock and throws everything around (people included). On board a boat, when I am not physically holding the camera for some reason (film changing, etc.), I leave it in a plastic trash bucket filled with plain ole' salt water, and I set bucket and all on the deck under my seat. The water acts as a baffle preventing the camera from sliding around as the boat bounces around; if the bucket should turn over, the water acts as a cushion for that moment of impact. If you have a copy of the Fall 1988 issue of Ocean Realm on Preventive Maintenance you will find out all the other reasons for using this bucket filled with salt water (like the common rinse tank is a "destruction derby" just looking for a place to happen, and other topics).

Solution: Well, if it is too late and your Nikonos III has already "bailed out" of your hands or off of a high area, you will need professional servicing along with a thread and needle for the hole in your money pocket. The whole lower unit of the camera must be removed in order to realign the gears.

If you happen to have a Style #4 Nikonos III (it has a silver colored arrow and red mark in the counter window instead of the little silver colored dot), then the vibrations mentioned above from that "sudden stop" can also cause the gears which rotate the counter wheel to vibrate out of alignment (no 1,2,3... any more). Nope, this can't be fixed in the field either: only professional assistance.

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Summary

1. 1. Do your shutters not function when you trigger the camera? Check to first see if your shutter speed dial has been left in "R" position. If so, move it to any other shutter speed setting.
2. Shutters still not moving when the camera is triggered? Well, your Nikonos III failed to earn its "Airborne Jump Wings"? Hold on to your pocket book: it's going to be a "vibrational" shock!
3. When handling the camera (on a rocking boat, or anywhere for that matter!), think about keeping the distance your Nikonos III could fall and hit any hard surface to a minimum (try sitting on the deck, not standing?). When you ship (also meaning when "hand-carrying" aboard an airplane!), properly package your camera (foam-filled camera case: don't position the camera near an exterior wall; card board box:

double box, one inside the other and each with sufficient protective packaging material on all 6 sides!)

4. What if the counter doesn't count? Do you get those mental vibrations that everything you touch mechanical sooner or later becomes damaged for some reason. Check to see if you have Style #4 camera, and check your vibrations about "vibrations."

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NIKONOS WORKSHOP

NIKONOS-III

THE SHOE HORN

Text and Photos by Bob Warkentin

Getting tired of reading all of these Nikonos Workshop articles and finding out just how you have been "taking such good care" of your Nikonos III camera all these years? Well, here is another example.

Using a shoe horn as a "guide" to guide your foot into a shoe saves undo wear and tear and damage to the shoe and pain to your foot. But, after a while of wearing the shoe, you assume that the shoe is now properly sized to your foot so that all you have to do now is just stick your foot into the shoe, and wiggle your heel until the shoe is finally on your foot. But what about the Nikonos III's "shoe horn"?

My Counter Won't Count!

After problems with water drops (and rusting of gears) which can easily fall through the counter's engaging linkage arm hole and which were covered in the Winter 1990 issue of Ocean Realm, "counter not counting" problems on Nikonos III cameras are a frustrating but common problem.

When the camera "guts" are installed properly and fully down into the outer casing, the narrow upper shoulder of one of the metal "guides" (which is cast as part of the inside wall

of the metal outer casing-photo 1) should squarely push upwards on the center of the spring loaded counter engagement arm to engage the counter gears (photo 2). Likewise, when the camera is removed from the casing, the spring loaded arm is now free to spring itself downwards, thereby releasing the counter gears and allowing the spring loaded counter indexing wheel to return to zero.

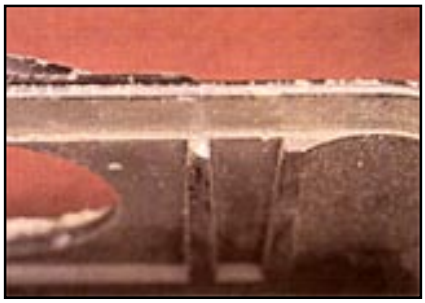

Photo 1

Photo 2

So, how does the camera get so messed up that it doesn't count? Simple! People who own Nikonos III's simply assume that all they have to do is just stick the camera's "guts" anywhere into the opening of the outer casing's mouth; no concern whether it is centered, no concern whether it is straight up and down with the casing. No concern because they believe that the casing will be the "SHOE HORN" to guide everything properly together for them!

Well, since this counter engaging metal "guide" is triangular in shape (narrower at the top; see photo 1 again), it's really of no use as a TRUE guide. So, what sooner or later happens is the human's unknowing but somewhat natural tendency to install the camera's "guts" like we put on shoes: just get part of our foot into the mouth of the shoe somewhere because the shoe will guide the rest of our foot and heel into it if we wiggle the foot enough.

In the beginning years, it will seem to the Nikonos III user that he has been doing everything properly: all operations work properly, counter included, and therefore his techniques of putting together the camera has obviously been correct. It's not until sometime later that problems show up: the counter won't begin to count until 3-5 pictures have been taken, or won't start at all. By then, what has happened is that the counter engagement arm has become so bent (photo 2), and the shoulders of the guide on the outer casing so worn (photo 1), that sometimes the arm can easily slide off the edge of the shoulder, and thus doesn't get pushed up to start counting.

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Solution

First, you must determine that both the counter engagement arm and the counter itself are working properly. To do this, simply guide the tip of a ball point pen up the channel and push pressure upwards onto the arm (photo 3). Now, while holding upwards on the arm with the ball point pen, trigger the camera several times. You should see in the counter window that the counter wheel indexes frame number by frame number each time the trigger is brought backwards to its cocked position. Do so at least up to frame #5. Then release the upwards pressure applied by the pen, and the counter should return to zero. Mechanically, if everything works OK so far, the problem is certainly due to bent or worn parts as described above. So, read on. (If the counter does not index, then you probably have got corrosion in these counter mechanics. Better reread the Winter 1990 Nikonos Workshop issue again. You will probably need professional servicing.)

Photo 3

Next, inspect the counter engagement arm and determine if it is extending out of and directly centered in the hole, and not bent. If bent, then use a pair of fine tip needle nose pliers and LITTLE BY LITTLE carefully apply pressure to the tip area of the arm in order to bend the arm in whatever direction necessary to center the arm. Again with the ball point pen, repeat the above procedure to insure you haven't broken or over bent something and that everything is still freely working.

[PLEASE NOTE: The keywords here are "LITTLE BY LITTLE" and "tip area". Why? Because if you are not sure of your own strength, or decide to use a tool which is too large (because it is the only one you have, and you are going to fix the camera no matter what), or try to shove a tool into the hole to bend (straighten) the entire arm, you will cause damage to the camera's ability to ever count again. So, take your time. If being cautious with your tools and this technique does not allow you to reinstate the counter's function during your trip, I say smart person! You can either count your own frames (what a drag!) or just wait: when you are out of film, the camera will tell you. When back home, get professional servicing.]

Re-seat the "guts" into the outer casing and see if you "fixed" the counter's counting by triggering the camera. If it still doesn't count, then the guide shoulder on the inside of the outer casing is mostly likely also very worn. If unfortunately this is the case, then please do not decide to go for broke and try your luck one last time to REALLY BEND the arm to center it with the remaining highest point of the shoulder (if any remains)! If you break this arm off of the counter assembly, the assembly will cost as much or more than the outer casing. Give this "one last try" some deep thought before doing it!

When the guide shoulder inside the outer casing becomes this badly worn as in photo 1, only luck and professional servicing may, I said "may", be able to save the expensive casing by careful reshaping. But please don't try to reshape or modify this shoulder yourself or there may not be much anyone can do about this except to sell you another expensive outer casing. Regardless, profit from your mistakes and change the way you have been inserting the "Guts" into the outer casing: i.e., the camera's "guts" should be carefully well centered in the mouth of the outer casing before pushing the "guts" directly perpendicular into the casing so that there will be no side-to-side slipping-and-sliding.

Just remember that what you are dealing with here are a number of camera parts which have been either worn, bent and/or misaligned. And, your years of mistakes may not be inexpensively corrected by just a few moments of adjustments. But more importantly to remember is that the camera can still be used to take good pictures even though the counter doesn't count!

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Summary

1. If the counter doesn't count, perform the ball point pen test to be sure the counter still counts and that you haven't rusted up the gears.
2. Have you been using the Nikonos III's "Shoe Horn" right?
3. Inspect the alignment of, and wear to, the counter engagement arm, and straighten it little by little carefully, testing as you go.
4. Inspect the counter engagement guide located on the inside of the outer casing for wear. If badly worn, inspect your pocket book for sufficient money to possibly buy another casing. Don't try to fix the casing yourself!
5. Learn how to put the camera's "guts" into the outer casing properly so that you don't wear out or bend parts again.
6. Most importantly, if the counter doesn't count, the rest of the camera ain't necessarily broke. So if your day has been one of "those days", and you would prefer to count your frames or just shoot until you run out of film rather than run the risk of messing up something else by trying to fix it yourself, I say smart move.

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NIKONOS WORKSHOP

NIKONOS-III

NOAH AND THE GREAT FLOOD (OF A NIKONOS III)

Text and Photos by Bob Warkentin

It has been written that one day there shall come a great flood that will forever change the way you think about life. If that day comes to your Nikonos III camera, you had better be like Noah and have two of everything in your "Ark" of camera goodies. Reason: Nikonos III's are so mechanically "encapsulated" that they become the most difficult of the Nikonos cameras to EFFECTIVELY field-clean!

That Ole' Myth about Floods

For those of you who own a Nikonos III, you probably have taken refuge in the "myth" that some where, some time, you were told that IF EVER your Nikonos III got flooded that it was a simple matter to clean and restore the operations of the camera without any serious damage (or you having to send it to someone for servicing, and costing you big bucks!). And why not have this (mis-) understanding since it seems to be commonly repeated when a camera other than a III got flooded: "Oh, too bad! You should have owned a Nikonos III. They are so easy to rinse off and clean up that nothing will be damaged!" When you hear people say something like this often enough, you begin to believe it (until it happens to you!).

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Encapsulation and Flood "Cleanup" vs. Flood "Clean-out"

I hope that once you begin to understand just how your Nikonos III camera is really designed that the term FLOOD CLEAN-OUT will take on a new meaning in your camera knowledge.

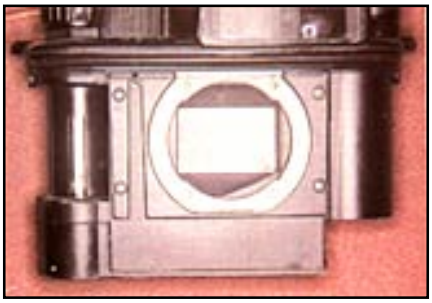

Photo 1

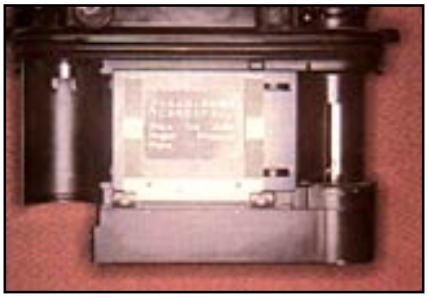

Photo 2

Mechanical Unit Design: People have longed for a camera that is "encapsulated" against their own "little human mistakes". Many of the new designs built into the Nikonos III were centered around "encapsulating" major areas of the camera's main mechanical components such as: (1) enclosing the center of the main film spool/main spring with a full sleeve, (2) enclosing the complete lower mechanical unit, (3) "hiding" the film counter assembly, (4) adding a film sprocket but encapsulating it in the main frame, (5) enclosing access to the actual flash contacts, etc. These steps, I feel, were done in order to reduce the likelihood of those "little human mistakes" (water droplets) from being able to easily enter, and damage, major mechanical components, and the "big human mistake": do-it-yourself "field modifications". The changes were greatly appreciated by everyone UNTIL IT CAME TO CLEANING OUT A FLOOD!

For explanation of the term "encapsulation", let me draw a comparison between cleaning out residues of an open ended pipe vs. a soft drink bottle. With a pipe opened at both ends, simply forcing water into the pipe from one end will allow for the water to rinse out the pipe's other end and "EFFECTIVELY" CARRY AWAY all of the unwanted contaminants without re-contaminating other areas of the pipe with the unwanted resides in the process. But, with an "encapsulated" bottle which has only one hole into the interior of the bottle as well as the same way out, once it is full of water any additional efforts to force more rinsing water into this "encapsulated" item will only allow that incoming water to

immediately pour right back out of the mouth of the bottle (neither cleaning the bottom nor sides of the bottle; just wasting time and water).

And because of the encapsulation design, you will not able to EFFECTIVELY clean out this camera after a flood ÿ simply y using the ole "myths" of merely rinsing off the camera and then drying it! The key word in all of this is "EFFECTIVELY"! To most people, this means cleaning the camera in their room, restoring to like-new status, and using it for the rest of the trip getting perfect pictures!

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"Some Disassembly Required"

Since you will be immediately addressing the flood situation, generally there will be insufficient time for any serious corrosion of metal parts to occur. Therefore, there are no real benefits of fully disassembling the camera piece by piece just so each piece can be held in your hand and rinsed and dried separately in 1-2 minutes (then spend hours trying to reassemble it correctly), vs. 10 minutes of your time slowly rinsing, and an additional 50-60 minutes slowly drying these same parts while they are all still assembled. Remember, if you begin immediate cleaning, then a full disassembly should only be required if parts must be replaced (how many spare shutter blades you got in your camera case?)

Therefore, for the "in-field" disassembly that I will discuss in this article, I suggest the only tools necessary are (1) a set of jeweler screwdrivers and a pair of tweezers (from an electronics store), or (2) a Swiss Army knife. I really recommend the Swiss Army knife because it has a pair of tweezers, the pointed tip of the knife blade will easily unscrew tiny Phillips head screws as well as straight tip screws (if the screws aren't already corroded from other mistakes in the past), and probably most importantly of all is that it will prevent temptations from getting into your head to further disassemble the camera (and really "un-screwing" things up).

WARNING! Whether it is additional ideas you may get in your head from this article, or some underwater photography book, or just your plain gutsy attitude! It is for certain that you will only cause further damages to occur: disassembly and reassembling aren't easy nor straight forward procedures for a Nikonos III!

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Step 1: Control Your Panic and Confusion

Once water has been discovered inside the camera, do not flood the camera in the "fresh" water trash can on the boat! This "fresh" water typically has been trashed out during the day by being contaminated with salt water and greasy substances like soap (mask defog) and suntan oils, etc. Simply close up the camera and then find a cool, shaded spot (like the

ice chest) for that hot sunny boat ride back to the pier (don't let the salt water dry out: it will form insoluble concrete-like residues on the internal parts if it dries before you begin the clean-out procedures). If you have got to drive any distance, better buy an ice chest. If the lens didn't get flooded, DON'T remount the lens to the camera! Also, remember to turn off the strobe and remove the flash cable from the camera (the battery's current flows through the cable and into the camera's wet metal parts and starts corrosion). Remove the film, and turn the shutter speed dial off of "R" and trigger the camera 3 times to reestablish the sprocket gear operations!!!

Even if a little water has gotten in, you still must treat the camera as though it has been totally flooded! There ain't no such thing as being "a little pregnant"! Therefore, your efforts to EFFECTIVELY clean-out the camera must be done so that not one part gets corroded or rusted by either the accidental flood from salt water or your intentional flood with fresh water!

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Step 2: Opening the Camera

Like removing the cap off of the soft drink bottle, the only way to effectively introduce rinse water into the encapsulated mechanical chamber of a Nikonos III camera is to remove the electronic flash contact platform from the end of the camera (left camera, photo 3). Please follow the following steps, and don't short cut them!

Photo 3

Step 2.1: Unscrew the two Phillips head screws, and lift off the thin shinny black cover (middle camera, photo 3).

Step 2.2: With a wide flat head screw driver or knife blade such that it spans completely across both notches of the nut, unscrew first the nut on the blue wire and CAREFULLY lift off the wire coupler from the threaded post with a pair of tweezers. Next, repeat this step for the red wire.

Step 2.3: Now, while repeating this step for the black wire nut, realize that this nut not only secures the black wire but also secures the large black plastic platform to the camera's frame (right camera, photo 3).

Step 2.4: Lift off the platform and watch out snagging the wire terminals in the process.

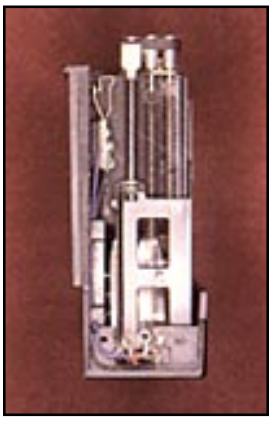

Photo 4

Step 2.5: You will now have a limited viewing hole of the internal "guts" of the camera. First, you will see the shutters and their guide rod. Then, firing the trigger, you will notice that the shutters move upwards further allowing you an opportunity to look further into the "guts" at other mechanical parts. (Photo 4 shows things you won't be able to see through the hole: getting a better understanding now of the meaning of my term "encapsulated"?)

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Step 3: Clean-out Procedures (Intentional Fresh Water Flooding)

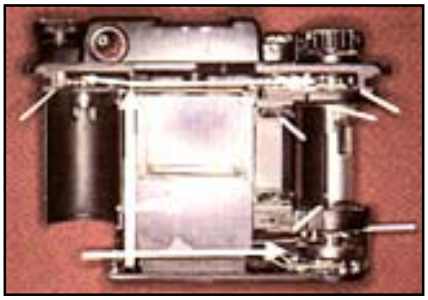

Photo 5

PRECAUTIONS: Now, herein lies the BIGGEST secret of effective cleaning! The right side of the camera contains the major mechanical gears with their respective gear greases (photo 6). The left side; shutter blades with their linkages which must remain absolutely free of any contamination, especially oils and greases (photo 4)! Oils and greases are not soluble in water, but with the passage of water under pressure (faucet), globules of grease and oil can become dislodged. And using hot water will guarantee loosening of grease globules into what was thought to be your "clean rinse water" (now sloshing around inside your camera and contaminating parts, including the shutters!). And if you use alcohol as the final "drying agent", then you better stop to remember that oils and greases are very soluble in alcohol; "drying out" your camera this way WILL contaminate everything for sure.

Just remember the above analogies (pipe vs. bottle). There ain't no hole of equal or larger size on the other end of the camera for the "contaminated" water to rapidly drain away

from the camera: this water must slowly seep, by gravity and your patience, out of the camera "guts" through the cracks between the parts (photo 5)!

Photo 6

Step 3.1: Hold the camera's left opened end under the flowing water, and maintain the right side downwards and below the point of water entry during the entire process!!!

Step 3.2: Using cool water only, begin to fill the camera's internal chamber. Once the water level begins to rise to the level of the mouth of the entry port (that you opened), reduce back the amount of flow of the water such that gravity's "DRAIN OUT" is always equal to or greater than the faucet's "flow in". Rinse for 10 minutes or more!

Step 3.3: Now, increase the water pressure and flush for two minutes the "encapsulated" film take-up spool and film sprocket assemblies by holding these areas directly under the running faucet.

Step 3.4: VERY IMPORTANT! During rinsing, occasionally trigger the camera, and rotate the take-up spool by hand. Then, with the trigger cocked, turn the shutter speed dial to "R" and rotate the sprocket by hand; then turn the dial to any other speed setting and continue to rotate the sprocket until it re-locks.

Step 3.5: Patience! Remember, "drain out" is slow because the water can only escape from between the small openings of the camera by the forces of gravity. Hold the camera in this position and drain for at least 3-5 minutes after turning off the water. Occasionally shake the camera (don't beat it to death!) to aid water removal. Take your time and stick with it: patience here really pays off later!

Step 3.6: Flush out the outer casing.

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Step 4: Dry Immediately After Rinsing!

After rinsing out the camera, the old "myths" of leaving the camera soaking "until you get

back" has greatly been misunderstood and misrepresented. "Until you get back" WHERE: your room at the hotel, the photo pro's shop, or back home a week later?

Time is of the essence! Remember, you don't want the camera to start drying out while salt water is still present before rinsing (salt and other mineral salts will harden to the metal parts and CAN NOT be re-dissolved), nor can you leave the camera "soaking" (and rusting) in fresh water for several days.

You've got just a few hours after the flood to COMPLETE everything, drying included! After rinsing, you must use a hair dryer r for both its ability to generate heat as well as to generate a constant flow of air throughout (this means through and out of!) the camera.

QUESTION: No electricity in your remote area? Then you shouldn't be taking modern technology into areas of possible harm unless you are willing to suffer the consequences of a loss.

QUESTION: What about using an oven? You will find plastic parts melting at even "low" settings like candle wax!

QUESTION: What about a film drying chamber? This is a slow moisture release chamber to prevent the film from shrinking up like fried bacon. If you want to rust a camera quickly, use this chamber.

QUESTION: What about compressed air? Air pressure does not dry anything, it only moves it around! Put a drop or two in a glass, then blow air into the glass and watch the drops not only explode into smaller drops but also they remain no matter how long you continue to blow air into the glass! Air pressure can damage parts, too!

QUESTION: No hair dryer? Then take up underwater hockey using your camera. That's about all it will be good for in a few days. So, use a hair dryer: it's your only way !

Use a towel as your hair dryer "no fall off the table" pad. For all drying sequences, maintain the dryer about 6 inches from the camera on a medium heat setting (8 inches for a high setting on a low/high only dryer; don't use the low setting at all). Also, just lay the outer casing by the camera during the drying sequences (10 minutes).

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Step 4.1: Place the camera face down with its opened end (where you removed the plastic platform) facing the dryer. Lift up the rewind crank assembly and film plate. Dry the camera for 10 minutes. (Purpose: drying the lower mechanical gears, operational components of the shutters and the rewind crank gears.)

Step 4.2: Leaving the camera flat on its face, rotate the camera so that the film take-up spool side of the camera is facing the dryer. Dry for only about 10 minutes (maintain dryer distance: this spool is thin plastic). (Purpose: drying the extremely encapsulated areas of the film take-up spool and, more importantly, the film sprocket area.)

Step 4.3: Now stand the camera on its head (trigger "out" acting as a tripod so that the camera will sit more securely up-side-down on its head). Again while the spool side is facing the dryer, dry for another 10 minutes. (Purpose: drying water trapped in the film counter area hidden up under the camera's head, and the main spool.)

Step 4.4: Stand the camera right-side-up, the front of the camera facing the dryer. About 5 minutes is all you need here. (Purpose: just to remove any water trapped in the big opening where the lens goes.)

Step 4.5: Now that some cooling has occurred, repeat Step 4.3.

Step 4.6: Repeat Step 4.1 again.

Step 4.7: Repeat Step 4.3 one more time.

Step 4.8: At this point, the camera should be dry. Examine for the presence of water and any rust/corrosion at: the interior of the camera through the "opened port"; trigger the shutter in "B" and 1/500 speed and examine front and back of each shutter and check for rough gear operations; move the take-up spool by hand forwards and backwards to be sure it is freely moving; function the "R" rewind gears inside the sprocket for smooth release/re-engagement operations and verify that the film sprocket is moving (as you did in Step 3.4, but this time without the water, of course!). Dry again if water is seen.

Step 4.9: Reassemble. DO NOT INSERT THE CAMERA INTO ITS OUTER CASING UNTIL ALL COMPONENTS OF THE PLATFORM HAVE BEEN COMPLETELY REASSEMBLED!

Step 4.10: Use the Nikonos Workshop article (Spring 1990) to clean the lens mount ring of the outer casing, and Summer 1991 for techniques to evaluate the shutter speeds and electronic flash synch.

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Summary

1. Since Noah had advanced notice about flooding, he gathered two Nikonos cameras into his "Ark" of camera goodies just in case.
2. The "encapsulated" Nikonos III "bottle" ain't easy to "EFFECTIVELY" clean after the great flood, contrary to what you may have heard.
3. The magic steps in an EFFECTIVE flood clean-out are getting started immediately, flushing "flow in left; drain out right" with only good quality water, drying thoroughly, and working the camera operations during flushing and drying. It is not in total disassembly of the camera by an unqualified person! Leaving the

camera to soak for days only causes rust, regardless of the quality of water!

4. Dry, (do not melt!) the camera "through and out of" with a hair dryer (not the sun, an oven, the film drying box, and never with alcohol).
5. Check out the camera using the techniques from Summer 1991, and periodically check the camera for the next three months. If problems appear and you require professional servicing after all, your immediate actions will certainly reduce the ultimate cost of required repairs.
6. Remember above all, know your final rinse water (and bottled water as well)! Even if the camera were to be professionally disassembled piece by piece, and then rinsed in lousy water, the final result would be mineral deposits left on every metal part that will permanently ruin your camera's operations. If in doubt, use either deionized or distilled water as the final, FINAL RINSE water before drying!

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER ONE

Text and Photos by Bob Warkentin

Instruction Manual

Hopefully, you bought a Nikonos V intended to be sold in the United States, or at least in an English speaking country. If so, the instruction manual contains a lot of information you need to know about how to use your camera. But remember, the pictures alone do not tell you everything-the words must be read. (photo 1.)

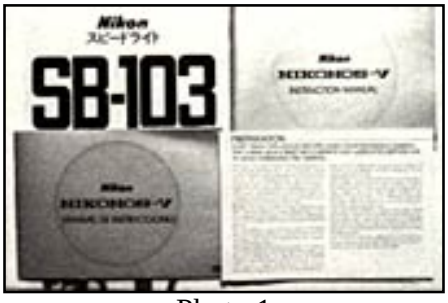

Photo 1

Since the Nikonos V looks and feels tike a conventional land camera, the biggest mistake most new owners make is to rely upon their previous knowledge of "land use only" cameras and expect their knowledge to be sufficient to also apply to the safe and successful use of any camera without additional information being required. However, a

Nikonos amphibious (underwater) camera must not only function like a "land use" camera but also must function like a "water tight" camera. Therefore, each "land use" and "underwater use" forms of preparation must be observed before use or the results you will see can be full flooding of the camera on the first dive out of the box, leakage of water at O-ring seals or jamming of operations, and so on. If you want a Nikonos V door stop or paper weight, treat it like a land camera. Mother Nature will do the rest of the work!

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With proper care and maintenance, this will never happen to your Nikonos.

How Not To Make a Nikonos V a "Paperweight" On Your First Dive

Rubber O-Ring Seals

On pages 7-11 of your Instruction Manual entitled, "Preparation" great length is taken to explain O-ring seals. But why remind you of this? Everyone has read them and understands them, Right? Sure you did!

However, our experience has been that people don't understand (or haven't read) the purposes of O-ring seals. Neither do they understand proper maintenance, lubrication, installation or how to even inspect them properly. So, let's talk about those "rubber things" that aren't on land cameras.

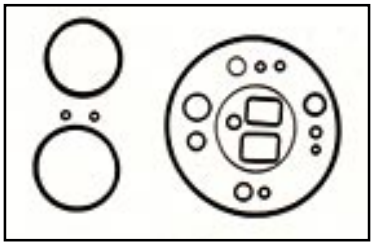

Photo 2

Your Nikonos V contains 15 O-RING SEALS IN THE CAMERA BODY ALONE, and 4 more O-rings in the lens (photo 2). So every time you dive the camera/ lens combination, you are diving a "19" O-ring system and praying that all 19 are in good condition. But in the bag of 4 extra USER SERVICEABLE O-rings supplied with a new camera (photo 3), there are only 3 O-rings for the camera and 1 for the lens.

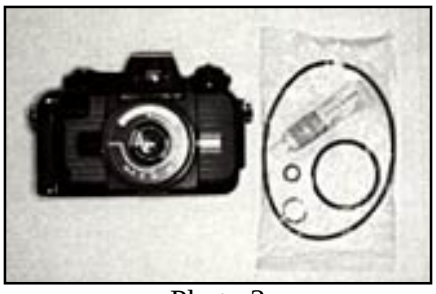

Photo 3

Gosh! Why so many O-rings?

So you can make all those "land camera" type of adjustments you want underwater and allow you to see what the automatic functions and electronic meterings are doing for you. Remember, consumers always want more and more functions available to them with each new generation of Nikonos. Nikon provides these functions, but they must each have O-ring seals.

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O-Ring Grease and the O-Ring Seals

The purpose for O-ring grease is to lubricate the O-ring. "But why?" You ask. Well, O-rings prevent water from coming into the camera ONLY when they are uniformly compressed in the O-ring channel. When you install each of the user serviceable O-rings, you must install them under "uniform" compression.

Example: Closing the hinged back door starts O-ring compression on the right side of the camera (photo 4). Compression here means squeezing the rubber O-ring between the door O-ring channel and the main body wall. When you squeeze rubber in one place, it wants to get bigger or longer somewhere else. So as you "squeeze" the rubber O-ring into a compressed condition between the door channel and the main body, if the O-ring is lubricated with O-ring grease, the rubber has its own elasticity to pull itself back UNIFORMLY around the O-ring channel (photo 5). However, if the arraign and metal channels are dry, as illustrated by the rubber band in photo 6, there will be too much friction to allow the O-ring's own elasticity to reshape it uniformly. The result: unevenly compressed O-ring and thus flooding.

Photo 4

Photo 5

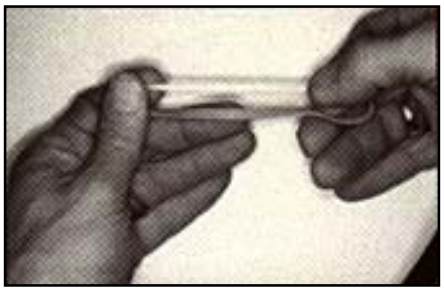

Photo 6

Do I really have to grease these o- rings before my very first dive?

This type of question opens a person up to a thousand answers, the nicest of which is YES! But the real reason is that grease attracts all kinds of lint, packaging material, and other debris which will be explained later. Because of this, the user serviceable O-rings are not greased for diving use when you get the camera out of the factory box.

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How Much O-Ring Grease Do I Need?

The real question is how much grease to use on each O-ring. Simply put, the "proper amount" is about as meaningless a term as "just enough to make it shine; no more-no less". In fact, any smooth, round, black O-ring, completely free of grease, will "shine" on its own.

So, how do you judge your greasing of the O-rings. We will start by taking the lens O-ring and use this as a training tool because you can feel the grease applied, fill the restriction (friction) when you mount it to the camera, and there are less sharp edges for you to ruin a O-ring here then other O-rings you will have to deal with.

Start by taking the O-ring off of the lens. With as many cotton swabs as you feel necessary, clean the lens O-ring channel of all grease, as well as the silver color metal lens mount ring on the front of the camera body. Clean off the grease from the O-ring itself with liquid soap and warm water.

Now that both O-ring and O-ring channels are cleaned of any grease, replace the O-ring on the lens. Now try to mount the lens to the camera. Notice that the lens will not go on (don't force it) because the O-ring is dry.

Now, take the O-ring off again. With the tube of O-ring grease, squeeze out onto one of your fingers a uniform 112 inch long line of grease (photo 7). No, don't put this grease on the O-ring, its for your dry fingers first. Since most people use their thumb and index fingers to Tube O-rings, spread this grease on them first.

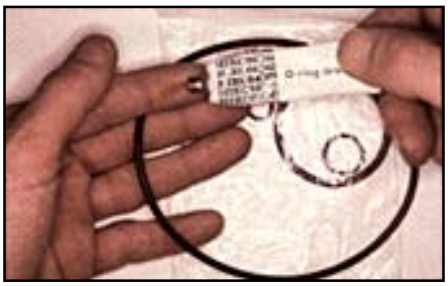

Photo 7

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Again, squeeze out a 1/2 inch line of grease, uniformly, onto one finger. Grasping the O-ring, begin to spread the grease uniformly over the O-ring. Three to four rotations of the O-ring through the grease between your fingers should do it.

Replace the O-ring on the lens and now mount the lens to the camera. Notice that it goes on with some restriction, but very little restriction as compared to the dry O-ring experience before.

You say "Still not enough grease?" It looks shiny (meaning there ought to be enough grease). There are no globs of grease (meaning you didn't put on too much). But you still feel some restriction.

So, "What's happening". Well, before we answer this question, let's do one more thing.

Again, remove the lens O-ring, apply a 1/2 inch line of grease to your finger, and again spread this grease onto the O-ring, 3 to 4 full O-ring rotations. Even though globs of grease are now present, go ahead and remount the O-ring to the lens, and again mount the lens to the camera. Notice that it goes cm with the same restrictions you felt after the first grease application.

"Hey, what's going on here? I couldn't put the lens on without any grease! I did what you said and I can get the lens on, but I still feel a restriction! Even with more grease. What am I doing wrong? Do I have to use the whole tube of grease on this one O-ring?"

Believe it or not, you have now answered these questions for yourself by training yourself as to what is "not enough," "just enough" or "too much" grease. Even with too much grease, it didn't make the lens go on easier than the first grease application. Reason: you have been feeling the compression of an O-ring which is always necessary to make a watertight seal between the camera body and the lens.

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What If I Use Too Much Grease?

Grease is a "liquid" that never dries. Remember trying to pick up something with the tip of

your finger and you can't? Then you wet your finger with your tongue and press your finger again on the item and, presto, it sticks to your finger.

Well, O-ring grease will do the same thing to particles of sand, lint, grit, etc. They will stick to the grease. If you never opened the camera to change film ever again, or any of the other O-rings, the debris would remain outside and never get into the O-ring groove or channel.

But when you have to open these areas to change film or just take apart for cleaning to prevent salt corrosion from happening, it is then when problems can occur. The debris can roll around on the O-ring and when you close the camera, the O-ring is now forced to seat against a channel with pieces of debris trapped. In short, the O-ring has raised areas for water to tunnel through and into the camera.

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What About Greasing the Other User Serviceable O-Rings?

The other 3 O-rings are bigger or smaller than the lens O-ring. So, use an amount of grease compared to the size of the lens ring. For the battery compartment and flash connector, use about 1/4 inch line of grease. For the rear door O-ring use 2 applications of about a one inch line of grease. Remember to first apply about a 1/2 inch line of grease to the fingers if they are dry. If you are unable to grease all the O-rings at one time, then remember to add more grease to the fingers before greasing the other O-rings.

Excess grease allows the dirt to be trapped and hidden from view. Even worse, applying more grease to an O-ring's surface, like when opening the door to change film, instead of removing the O-ring and degreasing with soap and water and cleaning the O-ring channel properly, only hides grit from view or forces these particles down the side of the O-ring channel (photo 9).

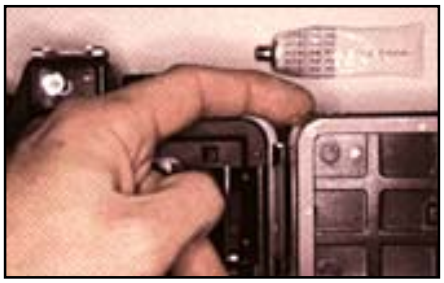

Photo 9

So, excess grease isn't a good idea for insuring a water tight camera. It only wastes the grease, it causes you to have to clean the other areas of the camera, it can get onto the film and ruin the pictures, but even worse hat that is it will trap particles which prevent a watertight seal. Remember it doesn't make the O-ring seal better as you proved to yourself.

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How Do I Inspect O-Rings and the Camera For Debris Stuck To the Grease?

By using the magnifier Nikon supplied you, free! No, don't start looking in the box or trash can thinking it fell out, it's the 35mm (or 28mm) lens you have. By holding the lens close to the subject and your eye, you will see things you may wish you hadn't!

Looking through the front of the lens with the f-stop fully open, and holding the lens close to your eye and the object close to the lens, you will find that this is one of the clearest, sharpest magnifiers you have ever used (photo 10). You will also find that there is a lot of fine particles of lint on that "clean" O-ring of yours.

Photo 10

When "linting" to them ring occurs, you must remove the O-ring, degrease with an unscented liquid soap and water (and of course your hands will be cleaned at the same time).

Each O-ring channel of the camera must also be cleaned. Use cotton swabs (many of them), followed by a generic brand of facial tissue (its a coarser paper and less likely to lint), which will help to remove any lint that remains.

Inspect the O-ring and it's channel with your magnifier and when clean, re-grease the O-ring and replace it.

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER TWO

Text and Photos by Bob Warkentin

"I don't have to think about nothin' with the automatic Nikonos V"

Riiiiight! If you believe this, then you probably are the one who believes there are such things as light bulbs guaranteed for a "life time" or "maintenance-free" batteries that last forever.

The fact is something makes the automatic Nikonos V work. If you are not the one doing the thinking and controlling for the camera, then who is? It's the electronics who are doing the thinking, but only when powered by the CAMERA BATTERIES - not the STROBE BATTERIES!

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"But I change batteries all the time!"

Of course, you carry an abundance of batteries - STROBE BATTERIES - on every dive trip. After every two or three rolls of film, you change batteries - STROBE BATTERIES. And even better, the strobe itself gives you all these indicators telling you when to change batteries: (1) low pitch humming sound of the strobe charging; (2) longer and longer recycle time. So, the buying and changing of batteries - STROBE BATTERIES - becomes a paramount issue in the preparation of the upcoming photo/'dive trip. Unfortunately, divers do not realize that the strobe batteries do not control the "Thinking" of the camera system. **It's the camera batteries which control the strobe (TTL), ASA, A (auto), LED's and so on and all at the same time.**

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"So, how often do I change camera batteries?"

Generally, the smartest thing is to change the camera batteries every 3 days of diving. That's right, every 3 days. Especially if you shoot two rolls of film each day.

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"But, why? That's too expensive!"

Simple: batteries which control the camera's electronics and the camera's TTL monitoring for the Strobe cost around $4.00 (if you are a wise shopper). However, each roll of 36 exposure slide film cost about $7.00, and about $6.00 developing ($10.00 on an island), not to mention the cost of the trip. All this cost just to find out that $4.00 worth of batteries were not any good.

Next, most people expect the battery supplied with the camera to be good for many years. However, as explained on page 77 of your instruction manual, "the battery packed with this camera . . . . . is for test purposes only so its life span may be shorter than usual."

Last and most important is the fact that a Nikonos V will only operate properly if the camera battery power is above 2.65V Below 2.65V, the LED's still work, but the shutter speeds (when camera is in "A" mode) no longer maintain a 1/90 Sec. electronically when coupled to a SB model strobe. In this case, the shutter speeds will vary from 1 / 10 to 1 / 15 Sec. giving a nearly 2 f-stop overexposure. If the power drops to 2.55V or lower, the LED's may just come on and go off immediately, but the shutter speeds will be operating up to 1/1000 Sec., causing the pictures to be black. (photo 1)

In short, the camera isn't thinking right due to its $4.00 battery headache.

Photo 1

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"What kind of battery should I use?"

For a Nikonos V, as explained on page 79 of your manual, there are only 3 types available: one lithium 3V (CR 1/3 type), two alkaline-manganese 1.5V (LR-44 type), or two silver-oxide 1.5 (SR-44 type). (photo 2)

Photo 2

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"But which type is the best?"

Certainly not the type of 3V battery supplied with the camera. This battery is a lithium 3V (CR 1/3 type) which may have a 3-year shelf life but a very short "work" life. Remember, it is intended for "test purposes" of the camera. Also, its voltage discharge curve is a sloping curve and doesn't hold a voltage level for very long above the 2.65V required for the camera "to think" correctly.

As for the 1.5V alkaline-manganese (LR-44 type), it is designed to provide only an economical (cheap) source of power. It has also a sloping discharge curve which means that just like the lithium battery, it won't last long. Even when it's working, or at least you think it is, you can experience results like the 3V lithium.

Now, to the 1.5V silver-oxide (SR-44 type) batteries. Finally this is the one for you. But which one. There is a D-76, MS76, PX76, 357 and others: all silver-oxide, all 1.5V, and all

the same size. (photo 3)

Photo 3

First and foremost, silver-oxide far outlast lithium or alkaline-manganese batteries, and their voltage discharge curves are flat at 1.5V over their long useful life. However, of the silver-oxide, the best are the "Photo Use" 76's and 357. By, the way, anytime you see the letter "P" on a battery, it always denotes photographic use intended.

Although the type 357 is labeled "Watch /Calculator Battery," both the "Photo '76" and the 357 have identical flat voltage discharge curves at 1.5V each and which should last 5-10 times longer than lithium or alkaline-manganese batteries in a Nikonos Camera. Remember, the camera's voltage requirements must always he maintained above 2.65V for correct electronic camera operations. Thus, the 357 is in my opinion the only suitable replacement battery if you can not get "Photo '76"ers.

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"Can I store the batteries up-side-down in the camera so the batteries won't drain?"

This is a frequently asked question. (However. in terms of multiple choice answers, the answer is either: (1) A dumb question (2) No (3) Yes, if you want to destroy the expensive electronics (4) Don't ask me to be your dive buddy.) This is like asking if mounting the battery backwards on your car will cause damage. The answer is **don't do it**. You run the risk of damage to expensive electronics when you forgot they were put in backwards 6 months ago and begin operating the camera today.

Don't store batteries in the camera. Wrap them in paper or plastic to keep them from touching and use an empty film canister labeled "batteries" for a storage compartment.

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"Do I really have to change batteries every 3 days, even if they are "Photo" or 357 type silver-oxide?"

No, if the cost of an unsuccessful photo/dive trip is of any importance to you. Even though these batteries are the best of the best, change them.

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"Now that I've got the right batteries for the camera, how do I test the electronic operations?"

Believe it or not, all the equipment you need for checking the electronic operations of the strobe and camera is the equipment itself and a little knowledge.

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Nikonos V Operations and Evaluation

Mechanical Check:

The camera has 3 mechanical speeds when no electronic functions (no battery or weak battery) are in operation. These are: (1) B (time exposure) where the shutter is held open for as long as you like. (2) M90 (1/90 Sec.), and (3) all remaining speed settings which function at 1/1000 Sec. with no or very weak electronic current. Procedures:

1. Put proper fresh batteries in the SB 101 / 102/ 103 style strobe and mount the strobe diffuser.
2. Connect the strobe to camera. Do not mount the lens.
3. Turn strobe on to 1 / 16 power.
4. All tests should be conducted with the rear door of the camera open and the film plate lifted so you can observe the operations.
5. Point the camera toward the strobe, and at an angle so the light won't blind you.
6. Turn shutter speed to "B," and fire (trigger) the camera. Shutter should stay open until you release the trigger, and the strobe should flash. You will see the complete film framer.
7. Turn the shutter speed to M90. Trigger the shutter and observe full light passing through the opening of the shutter before it closes.
8. Turn the shutter speed to A (or any other remaining speed on the dial). Fire the strobe and observe that no light (or a very small band of light at the bottom of the framer) gets through the shutter.
9. If the shutter will not stay open on "B" then most likely the entire shutter assembly is frozen at 1/1000 Sec., including M90. The above test procedure will verify each mechanical shutter speed as operational or not operational.

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Electronic Check:

1. Install camera batteries and flash batteries.
2. Connect the flash cable to both the strobe and the camera.
3. All tests will be conducted with the rear door of the camera CLOSED, and the counter greater than frame #1, and no lens mounted.
4. Depress the shutter button, observe the LED's stay on for 12-16 seconds (timed).
5. Set shutter speed to "A", ASA to 400 or less, and point camera toward any source of light. If indoors, move close enough to the light so that the left arrow is lit. Place your hand closer and closer over the lens mount area, the LED's should light and progressively change from the left arrow through each shutter speed number to the right arrow.
6. Change shutter speeds from "A" through each shutter speed and observe LED's corresponding to the shutter speed dial. Also the "correct" shutter speed for the level of light will blink if it is other than the selected speed.
7. Set shutter speed to "A" and ASA to 25. Completely cover the lens mount area with your hand, or mount the lens to the camera and put on the lens cap. With the strobe off trigger the shutter. You will observe that the shutter is stuck open, and that you can not advance the film advance lever. Turn the shutter speed dial to "M90" to clear (close) the shutter assembly. (Problem: the first shutter curtain always opens mechanically, however, in the "A" mode, the second curtain closes based upon the amount of light seen by the camera. If no light is seen, then it will never know when to close. Result: shutter will be stuck open and all other operations are frozen until cleared).
8. Set shutter speed to "A", ASA to 25 as shove. Turn ON the strobe to 1/16 power. Cover the lens mount area as above. Trigger the shutter. You will not only hear it open and close (at 1/90 Sec. electronically), but no jam occurs. All shutter speeds from A, 1/1000, 1/500, 1/250 and 1/125 are electronically overridden (if camera batteries are good) to an electronic 1/90 Sec. only when a proper strobe is attached and turned on. Shutter speeds of 1/60 and 1/30 are the true speeds and will function at these speeds regardless of whether or not a strobe is attached and "on". (If a jam occurs in "A" mode, camera batteries are too weak, or there is electronic damage somewhere.)
9. TTL evaluation #1: turn the strobe on to the "TTL" setting. Set the camera to "A", ASA at any setting "less than 400" (set to 100), and point the camera toward the strobe and hold at about 6 to 8 inches away. Press the trigger, and note that the red strobe light comes on again in less than 1.5 seconds after the strobe fires, indicating the strobe is recharged. Turn the shutter speed dial to 1/30 Sec. and repeat the procedure. If the strobe completely dumps its power (the red light blinks, goes out and the battery hums until the light comes on again-about 6 to 8 seconds), then there is one of the following faults in the TTL system: a) Flash contacts to camera are dim (greasy)-need to be cleaned with a cotton swab: most common problem. b) Battery in camera no good - replace with new battery. c) Broken flash cable wires, or faulty camera electronics.
10. TTL evaluation #2: settings are the same as above TTL/Strobe, camera on "A" and ASA 100). This time, completely cover the lens mount area with your hand, (or mount the lens and cover with a lens cap) and turn the strobe away from the camera. Trigger the shutter. Note that the strobe will fully dump its power (full output, and the red light on the strobe will blink 8 times, go out, and will not come on again until the strobe is recharged - about 6 to 8 seconds).
11. With strobe on TTL and red "ready" light on, shutter speed on "A", slightly depress the trigger to turn on the LED's. Observe that the lighting bolt on the far right side of the LED blinks at an ASA setting above "400" (warning signal) and

does not blink on ASA settings below "400" (proper range for TTL operations). TTL will not work properly above "400" ASA. If the lighting bolt blinks continuously or stays on continuously while moving the ASA through its full range (25-1600) of settings, the TTL is not working properly. Use manual settings on strobe or have it repaired.

The above checks will verify both the mechanical and electrical operations of both camera and strobe as being in good condition before diving.

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Summary

1. The camera has only 3 mechanical (non-electrical) shutter speeds.
2. All other shutter speeds and functions are based upon the electrical output of the camera batteries.
3. The battery supplied with the camera is a lithium 3V and is supplied for "testing" use only.
4. Use only silver-oxide 1.5V camera batteries of either Photo '76 or 357 type.
5. Change camera batteries every 3 days of diving use.
6. TTL settings only work with ASA settings less than 400.
7. Shutter and film advance will jam in "A" mode if light level or battery power is low.
8. TTL operation typically fails if grease is on the flash contacts or batteries are too weak.
9. Test manual and electrical operations before photographic use.
10. LED's are not by themselves a true "Battery Testing" device.

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER THREE: PREVENTATIVE MAINTENANCE

Text by Bob Warkentin
Photos by Bob Warkentin and Chris & Donna McLaughlin

"I'll have you know that I've used cameras for years, and all I bad to do was change the film and batteries. I never bad to have it serviced by anyone! I know bow to take care of my stuff!"

"Did you say that was a land camera or an underwater camera?"

"What's the difference? A camera is a camera!"

This is like a person moving from the dry climate of Arizona to the salt air of the Florida Keys. Soon, rust spots begin to appear all over the painted (protected?) surfaces of the car. Since frequent washing and specialized care of the car was not needed in Arizona, why now should it be needed in Florida? Simple: Mother Nature attempts to corrode all metal objects which are in or near her Salt Water Oceans - cameras included.

Photo 1

Salt residue happens, or something to that effect. Therefore, for underwater photographic equipment, "preventative maintenance" should more accurately be called "reduction (of salt buildup) maintenance."

There are many tight spots on your equipment that will trap salt water. When the water evaporates, the salts will be left behind to crystallize, coating and damaging the metal and O-rings. (photos 2 & 3) Preventative maintenance means reducing the amount of salt residue buildup that occurs after each dive, giving you longer periods of time between professional servicings and expenses.

Photo 2

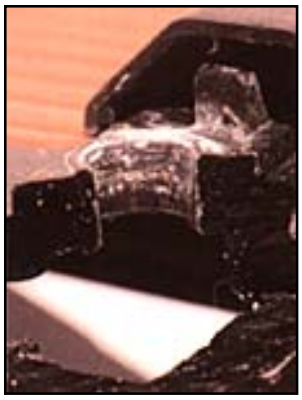

Photo 3

So, other than the necessary changing of film, batteries, and keeping user serviceable O-rings clean, greased and in good condition, there are only two real preventative maintenance concepts left: preventing salt water from drying out and building up on the camera, and proper rinsing techniques.

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The First Preventative (Reduction) Maintenance Responsibility:
Prevent Salt Water From Drying Out on the Camera.

Remember that there are 15 O-ring seals (as explained in Chapter One of this series) just in the camera body alone.

Likewise, there are 15 metal O-ring ports that can become corroded or abraded. Every O-ring seal and O-ring port in a Nikonos V will, if neglected just a few times, cause serious (expensive) electrical and/or mechanical damage to occur due to leakage of salt water.

So, to reduce the salt buildup, don't let the equipment dry out. (photo 1)

Place the camera (and all other O-ring sealed photo equipment) in water within 5 to 10 minutes after salt water use.

Fresh or salt water, it doesn't matter. But leave it in water between dives, for the boat ride back to shore, or until you are sure you are 5 to 10 minutes away from a "true" fresh water washing. The objective is to prevent the salt (water) from drying out on your equipment.

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"That's easy! I will leave the camera in the fresh water rinse tank on the boat, right?"

Wrong! First, don't always count on one being available. Be prepared to use other measures. In fact, you are better off not using the "community" rinse tank. (photo 4)

Photo 4

The "community" rinse tank on many boats is frequently a "destruction derby" for camera gear if more than one photographer is on board, and many cameras are damaged from using these "community" rinse tanks. You, being the first diver, put your camera into the rinse tank then, the second diver puts all of his photo equipment on top of or around your photo equipment, and so on. When you want yours, you have to first un-pile everyone else's equipment. Cables get caught, framers get caught and bent, lenses come off, etc., and people get mad.

Next, if everyone uses the "rinse tank" to rinse off salt water, where does the salt go? Into the now salty (fresh?) rinse water! So when you give it a couple of shakes in the "rinse' water and lay it out to dry, you have just wasted your time and fooled yourself into believing you "done good cleaning your stuff."

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"Then what do I use?"

Simple. Use the plastic trash can from your motel/hotel room (or bring one from home)! Within 5 to 10 minutes after your dive, fill the bucket with ocean salt water - yes, SALT WATER - and submerge your photo equipment into it. Leave it in the "WET" salt water until you can rinse the camera in "WET" fresh water. (photo 5)

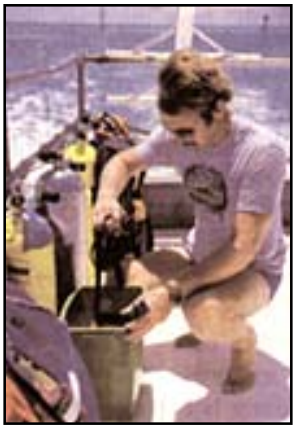

Photo 5

This way, the majority of the salts from the salt water stay wet (in solution) and can be washed off before they permanently dry.

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**"Put the camera in salt water on the boat? That's stupid!
I've been told that will hurt the camera."**

Come on! Where have you just been? Remember, you just dived in salt water. It wasn't until you got back in the air that the "water" began to dry out, leaving salt (and other materials) to dry out on your face, eyes, arms, belly button, etc. The same is true for your camera (and all other dive equipment as well). Salt water collects in all those tight O-ring areas. When it dries, it forms a coarse concrete-like insoluble residue on the O-rings and in the O-ring ports that no amount of water can rinse away.

The only way it can then be removed is professionally, by full disassembly, and the scraping away of this concrete-like residue from all the parts. Additionally, the damaged O-rings must be discarded and replaced with new ones.

Remember, if you leave parts screwed together for a full week of diving, the salts will cement things together. When you try to take them apart, things break. (photo 6)

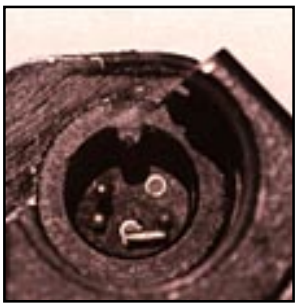

Photo 6

All these problems, costly ones, and only because you let the "salty" camera dry out within 5 to 10 minutes after diving. If allowed to continue, you will just be adding layer upon layer of salt residue (photo 7) and very soon the O-rings will become worn and abraded (sanded) and the metal parts will become pitted (photo 8), causing water to leak into the camera.

Photo 7

Photo 8

And so on and so on . . . O-rings are easy to replace, and cheap compared to replacing the whole outer case, (over $250): If this becomes necessary the metal ports become scored and pitted.

So, use your own personal, private "God's Little Acre" - a trash can. Since it is just big enough for your equipment, and it's yours to begin with, you have solved the keeping-it-wet problem at the same time you solved the community Nikonos "mass destruction" derby. It also give you a place to safely keep your camera equipment on board the boat. Remember, you can only rinse off salt water - Wet - with fresh water - Wet!

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The Second Preventative (Reduction) Maintenance Responsibility:
Fresh Water Cleanup.

"OK, you've convinced me. Keep it wet until rinsing. But are there tricks I should know about rinsing with fresh water?

Of course! I wouldn't have written the question this way if there weren't things to remember. For the moment, forget your definitions of rinsing, soaking, washing and cleaning and just listen to the following:

When you dive, you are typically at or below 30 feet (2 atmospheres) of water pressure in depth. This creates a vertical pressure, forcing salt water into every tight spot of the camera. However, on land and back at your room, you are in only one atmosphere of pressure. Merely "soaking" in fresh water at one atmosphere of pressure, even overnight, will leave you with a wet, dirty camera for the next day's use.

Instead, submerge your photo equipment in fresh water, and vigorously shake ("shake-n-bake") in a side-to-side movement through the water. This generates a horizontal "water force" which will remove or reduce the trapped salt water and replace it with fresh water. "Shake-n-bake" for a full 60 seconds in plenty of fresh water. That's all! And, at least every second day, remove the camera from the tray, unscrew the flash cable (both ends), etc. and clean all threaded areas.

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"Only 60 Seconds? One Minute? That s too easy!"

Remember, that's 60 seconds of "side-to-side" movement. Most people can take 10 to 15 seconds of this activity before stopping to rest, or mopping up the water that splashed onto the floor. SIXTY SECONDS - OF MOVEMENT - IN WATER! Too easy? It will soon become a labor of love, but the one that will really pay off.

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"Hot, cold or warm water cleaning?"

HOT - definitely not! It will damage the film as well as produce unwanted pressures inside of the camera. When you open a very warm (hot) camera, it will seem to "explode" open. This causes unwanted turbulence at wet O-ring joints.

COLD - No problem. Remember, it's the quality of the water, not its temperature, that leaves you with a clean camera after the "fresh" water bath.

WARM - "Gray area." Warm to some people can be too hot or too cold for others. So, forget this gray area. Anyway, on many islands, there "ain't no hot water" no matter what the bath tub knob says.

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"If I follow these tips, do I still have to have periodic professional service?"

Of course! And for many good reasons (including the fact that I make a living providing this service!).

First, remember that most "waters" we call "fresh" have minerals dissolved in them. While these minerals do not noticeably consist of "salt" (sodium chloride) concentrations, they do consist of other salts and maybe some chlorine.

Chlorine is hard on rubber and will cause it to deteriorate. Other minerals cause what is called a "scale" to build up (hard deposits of calcium). In areas where water wells are used, people treat either for "hard" or "soft" water with water additives. Municipalities do the same thing, but on a larger scale.

On islands, desalinization may not be 100% effective in removing ocean "salts" (the water you drink at dinner or in your room will be your best tester). Distilled or deionized water (used in irons) is the best, but expensive to produce, and if bought in one gallon jugs, becomes a very costly and unmanageable way to clean your equipment.

And last, but the most overlooked of all, is the fact that the more fresh water you use, the more effective your salt removal efforts will be.

Consider the analogy of bathing in a tub of soapy, dirty water verses a shower where fresh water rinses the dirty soapy water down the drain. The same principal is true for saltwater removal from a camera.

Unfortunately, a "shower" of fresh water is not effective in getting into the hidden areas of the camera: the camera must be fully submerged. Since technically your cleanup techniques are only diluting the amount of salt in the water, the larger (fuller) the bathtub is, the more effective the "shake-n-bake" exercise will be.

If you only have a shower stall, put a rag in the drain and fill it to the lip of the step-over. Since this holds less water than a larger tub, you may want to fill it a second time and do a second "shake-n-bake." (The smaller the container of fresh water, the more times you want to refill with fresh water). Don't forget that even fresh water "salts" can buildup just like ocean "salts," but over a longer period of time.

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**"What if I wash the camera with soap and water.
Doesn't this clean the camera better?"**

Unfortunately, yes! It fact too clean. Just as soap takes grease off your hands, a soap and water wash will take the needed O-ring grease off around those internal O-rings. This will

cause operations to become sluggish, and O-rings to wear out faster. It will not, however, remove dried salt residues.

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"Water and vinegar -I hear this helps clear the camera."

Absolutely not. This is good for salads, personal hygiene and cleaning coffee pots, but it will not clean a Nikonos. In fact, it will pit the front view window optics, making it appear sandblasted. Also, it will degrease the surfaces of the internal O-rings (making them dry), slow operations and increase O-ring wear. Unless you have the "green" Nikonos V and want it to smell like a pickle, don't use vinegar!

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"What about spraying silicone or oil on the camera and other photo equipment in those tight areas when they get sticky?"

1) First, why are they getting sticky? Could it be that you neglected to keep the equipment wet before freshwater cleaning and now everything is caked up with salt residue? (see photo 7)

If this is the case, don't fool yourself by trying to do your own brain surgery. You need professional help.

Sprays don't remove the salt residue that has built up over time; only full disassembly and lots of labor can remedy this problem.

2) Sprays also damage the coatings on the lens optics and front glass port.

3) Sprays also get onto parts designed to operate free of lubrication. If you must use a spray, remove all photo equipment from the room, and don't bring it back for at least 15 minutes. Reason: the excess spray (and there always is some) gets into the air, and is carried around the room by an air conditioner, fan or whatever. (Think of a room deodorant sprayed in one part of a room: in two to three minutes, you can smell it throughout the room. Aerosol lubricants act in the same manner.

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"What about changing film between dives if l keep it wet in the trash can?"

Again, simple. Just take the camera out of your water-filled trash can, change film, and then, return it to the water, leaving it there until you are ready to dive. This guarantees it's not going to dry out.

However, before you begin opening a wet camera for any reason, be aware that there is a certain way you should do it.

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"What do you mean; 'a certain way' ?"

It is a little realized fact that even though the outside of the camera is dry, unless it has been left open to dry, water will stay in all O-ring channels of a Nikonos V for 7 to 10 days after use. So you can imagine the amount of water not only around the seals, but also being trapped under the ASA knob, shutter speed knob, between the camera body and tray and so on.

To prevent drops of water from getting into the camera, any time, follow this simple rule: always take the O-ring away from the camera.

A. Opening the camera's back door

Always take the O-ring away from the camera!

1) When changing film any time on a dive trip, even if not on the boat between dives, always take the camera off the tray. Reason: a lot of water is trapped between the camera and tray. Also, although you don't have to unscrew the flash connector, remember water can be trapped in the "loops" of the flash cord. So, watch out for the cord and keep it away from the open camera.

2) Point the camera lens up. Unlock the door latch and let the back door fall downwards. Any water drops, including the film canister, will fall into your lap, not into the camera. Remember, that the door O-ring seals are on the inside of the camera body, not on the outer edges.

3) Open the door fully. Now, holding the door open, rotate the camera on its long axis and lay it down flat. Reload the camera.

4) To close the door, don't close the door onto the camera. Close the camera onto the door. No, the film won't fall out, but the water trapped in the O-ring channel will. When you close the door, you will see droplets of water squeezed out the sides.

5) Remount the camera to the tray, and you are ready to go diving.

B. Changing Lenses

Take the O-ring (lens) away from the camera!

1) Point the lens towards the ground, turn it the typical 90° and remove downwards slowly.

2) Set the lens off to the side - still face down, and place a rear lens cap on it loosely for now.

3) With the camera still pointing down, towel dry the water droplets off of the silver-colored lens mount ring on the front of the camera.

4) You may now right the camera, or mount a new lens.

Reason: If you rapidly pull apart a lens from a camera, you will create a vacuum you can hear. The vacuum will cause the water droplets that normally collect around the O-ring seal on the lens to become an atomized spray that will get onto not only the rear optics of the lens, but also the many shutter blades. Left unnoticed, it will damage the optical coating and rust the shutter.

C. Opening the battery compartment or flash port

Take the O-ring (battery compartment or flash connector) away from the camera!

1) Dismount the camera from the tray.

2) With the camera in an upright position, unscrew the flash connector and/or battery compartment.

3) Towel dry water droplets from these areas before inspecting these areas.

Reason:

Flash Pins: This area is EXTREMELY easy to damage by ONE DROP of water. The two TTL flash pins are spring loaded, and designed to retract into their respective holes when any strobe is connected. One drop of water will freeze up the spring or corrode the pin, either of which will kill all TTL operations.

Battery port: With the cap off, what you are seeing is the actual inside "guts" of the camera, as well as plenty of room around the edges to drop water onto linkages and the bottom of the shutters.

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"What about blowing the excess water off the camera with a regulator hooked up with an air nozzle?"

This misconception ranks right up there with the all-time "stupid ideas"

Reason: The maximum operating depth for a Nikonos is 160 feet, or approximately 75 P.S.I. However, think back to your basic SCUBA lessons. The first stage of a regulator is designed to regulate tank pressures and deliver from 135 to 150 P.S.I. down the hose to your mouth, or to wherever the air nozzle is connected. In essence, you are blowing air at twice the maximum pressure as that for which the O-rings were designed. True, you will blow off alot of water and grit, but you will also blow the water into the camera and grit into the O-ring seating surfaces.

If you need air to blow off excess water, huff and puff and do it yourself.

Also, air pressure used to blow water off a Nikonos V shutter will blow the blades out of their guides and quickly ruin everything.

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"How often should I have the internal O-rings serviced if I follow the above cleaning procedures?"

My experience (and Nikon's recommendation) is that you should have the internal O-rings replaced, and the outer body metal O-ring seats cleaned of corrosive and abrasive deposits at least every twelve months. (3 to 4 months for cornmercial rental programs; 6 to 12 months for professional underwater photographers). These cleaning time tables will help reduce additional corrosion and abrasion to the metal O-ring seats of the outer body.

For sport divers who do not have their camera serviced annually, who take only one or two dive trips a year (5 to 10 dives per week) and who follow the above "keep-it-wet - then shake-n-bake" procedures, you might get by for a couple of years (I didn't say you absolutely will not have any deterioration in the O-ring areas, only that you might get by for a while longer than one year). It's your equipment, and your decision.

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Summary

1. Salt residue happens. Preventative Maintenance means Reduction Maintenance: reduce the speed of salt residue buildup.
2. Keep the camera equipment wet in salt water after diving until fresh water is available.
3. Use your own water-filled trash can, not the "destruction derby" rinse tank on board a boat.
4. Submerge equipment in fresh water, and "shake-n-bake" for a full 60 seconds in

cold water.

5. Don't use soap or vinegar for cleaning.
6. Water stays in O-ring grooves for 7-10 days unless opened for drying. Therefore, always take the O-ring away from the camera when opening, and fold the camera onto the back when closing.
7. Internal O-ring replacement is cheaper than replacing a corroded and pitted outer body.
8. Don't leave things joined together for the entire week of diving. Take your photo equipment apart at least every two days and clean.

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER FOUR: "OH, NO! I SEE WATER IN MY CAMERA!"

Text by Bob Warkentin

"When I opened the camera to change film, I saw drops of water. Did I flood the camera?"

If water is seen (drops, droplets, spray, or full), the questions that must be answered before corrective action (if possible) can be taken are; "How much water?" and, "From where?"

Photo 1: Worst case scenario

First, let's get our terms right. "All I saw was one or two drops of water," or "about half a teaspoon of water," or, "I now see rust on the shutter blades," or just plain, "'This time, I really flooded it bad."

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"Why worry about how much water?" you ask. "I'm in a hurry to clean it. I'm going to put it in the sink now!"

Most people feel that when water gets into the camera, it requires soaking to get rid of the salt. Well, guess what! Soaking is definitely a flood - freshwater flood but nonetheless a controlled flood of your camera. So, before we tackle "controlled flooding" of your camera to attempt to remove the effects of "accidental flooding," let's determine if this drastic action is really necessary.

Water damage can occur from either your "accidental" flood or your soaking controlled flood). The water drops you see may be only the tip of the iceberg. Since there is a large body of mechanical and electrical parts in the camera, a lot of water can be trapped and hidden from your view. You may see only a drop or two of water that filtered their way through all the internal parts and seeped out from around the edges of the inner body.

Any time you either see or suspect water leakage has occurred immediately turn the shutter speed dial to either 'M90" or "B" (electronics off), and lock the trigger, and then remove the batteries as soon as possible. This will make it more difficult for electronic damage to occur.

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"How could water have gotten into my camera?"

Remember, in the Nikonos V body there are 15 O-ring seals. Ignorance and neglect are the two primary causes of water leakage. As was explained in previous "Nikonos Workshop" chapters of Ocean Realm, they occur from:

1. Lint/debris on user-serviceable O-rings (Chapter One)
2. Too much/too little O-ring grease (Chapter One)
3. Improper handling of O-rings (Chapter One)
4. Salt buildup on O-rings (Chapter Three)
5. Corroded O-ring ports and devices (Chapter Three)
6. Prolonged use of equipment before general maintenance/servicing (Chapter Three)
7. Improper mounting and removal of lens, strobe, film, camera tray, etc. (Chapters One and Three)
8. Improper use of accessories (to be covered in future chapters)

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"Where do I look for signs of water leakage?"

You do not have to completely disassemble a Nikonos V to locate water. For this reason, no complete disassembly techniques will be mentioned, including the expensive tools necessary; leave that to professionals. Remember, you had a problem while controlling three user-servicable O-rings. Can you imagine what would happen if all the parts and O-rings were taken apart? I can't! I see it professionally all the time, and the customers see it on their bill.

Before we talk about taking some parts of the camera apart, let's look into those areas that are normally accessible and don't require tools. Remember, water can get into areas you can't see. So, just because you can't visually see it doesn't mean "it ain't there."

First, be certain that the outside of the camera and lens are really towel-dry. You would hate to waste a lot of worry and time just because a drop of water accidentally fell off a wet camera during your inspection. Likewise, it would give you misleading information about the location of the source of water leakage.

Remove the camera from the flash tray, but leave the flash cable attached for now. If you were diving with a 35mm lens, you must remove it next (see "Inspection Techniques for Lens Removal" section below). If not, leave whatever lens you were using mounted until later. Have your dry 35mm lens available, because you will be using it as a magnifier for inspection of many areas of the camera for water droplets (photo 2). But before we go directly into the camera, let's get rid of the wet flash cable.

Photo 2: Inspection Techniques for Water Leakage at the Flash Connector

Photo 3: Flashport

This is an extremely common area for a source of serious unnoticed flooding to occur, resulting in expensive damage. So, let's check it for signs of hidden water. The main symptom/problem here will be that the flash will not fire, or continuously fires during diving.

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"How can water get past the flash connector? I always tighten the flash connector to the camera as tight as I can!"

Tightening the flash connector to the camera doesn't keep water out - the O-ring does. Therefore, a connector O-ring that is dirty, worn-out or flattened from prolonged storage when left mounted to the camera, or one that has been covered with the dust caps or carelessly inserted over the sharp screw threads of the flash port of the camera, cutting or chipping the O-ring - all will cause a flood just as easily as an unscrewed flash connector.

Holding the camera upright, unscrew the flash connector and slowly remove the connector from the camera. (If you jerk it out, or remove it with the camera upside down, water droplets collected around the screw-in threads will fall into the camera flash contacts and/or onto the cable contacts, giving you false information about water leakage.)

Set the camera down, upright and out of your way for now. Let's first inspect the flash cable connector using the 35mm lens. If this is the source of water leakage, water or droplets should be present at 1) the metal surface or between the metal surface and plastic mount holding the flash connector, or 2) on the face of the plastic flash connector, or 3) into one or more of the flash-pin holes. If water is present, dry the flash connector surfaces and shake the connector (NOT like a Yo-yo, or you will break the wires) - until no more droplets come out. No sense ruining an $80.00 cable.

If the cable or connector wires have been damaged, this is the cause of the problem -not flooding. Check the cable with someone else's camera before you panic over a flood. (Use Chapter Two for check-out guidance.) If the cable checks out OK with the other camera, then read on carefully. You will need the information.

Next, inspect the flash pin connector of the camera. Before turning the camera upside

down for inspection, use a cotton swab or tip of a towel to dry **only** the threads at the mouth of the flash port. Don't force either one up into the pin socket at this time. (Water will be on the threads, so don't wipe it into the connector pin socket area.)

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Now, turn the camera upside down and with your 35mm lens, inspect for the presence of water 1) at the edges of the plastic/metal wall interface or, 2) collected around the two retractable TTL pins/pin holes or, 3) around the edges of the flash pins. If droplets are present, you cannot shake the camera enough to remove the water. Now, towel-dry (or use a cotton swab) all remaining droplets of water. Do not blow air into the flash port as you will force any remaining water into the camera. If no professional help is available (trust me, it's cheaper in the long run than to do it yourself), then follow the "Business Card Test" - the procedure for inspection of the internal areas of the camera (especially the lower areas) - described in the "Leakage around the Back Door" Section. This will help you determine the extent of water leakage into the camera. Also follow the outlined cleanup procedure.

Photo 4

WARNING: Remember, water will be trapped in all O-ring channels for up to ten days after diving if the camera is not opened and allowed to dry. So, the first time you open the back door of the camera (photo 4) for any reason after diving (even if it's the first opening and it's been seven to ten days since the camera has been in the water), point the lens up, and open the back door downward. Then, hold the door completely open (180 degrees from its closed position) and rotate the camera on its long axis. This procedure keeps the water that is trapped in the O-ring channel from falling onto or into the camera "guts," giving you a false appearance of a real water leakage problem.

With leakage from around the backdoor area, either the inside of the camera will be a "lake" or, hopefully, just small puddles. Obviously, if your electronic Nikonos V flooded while you were using any of the electronic operations, chances are those expensive electronic parts are now "fried" and completely worthless - even before service can be started to save the rest of the camera's mechanical parts. If the camera is that full of salt water, I would probably treat it like a horse with a broken leg and get on with the business of enjoying an expensive vacation.

However, if large droplets are present below the edges of the interior O-ring seating area of the camera, I would suspect a twisted O-ring in the door, or a piece of salt, sand or fiber (even a hair) to be present on the O-ring. An isolated leakage, depending upon where the water is, could occur from the ASA/rewind, film advance, flash connector, or even the lens. In such cases, you may still be lucky and in time to prevent major

mechanical/electrical damage.

Now, inspect all around the door O-ring seat area of the main camera inner body for large drops of water (not droplets where the O-ring grease has collected). Make either a mental note or draw yourself a picture of where the drops are seen.

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Electronics Compartment Damage/Leak Check

First, towel-dry any drops and droplets from around the O-ring seat of the main inner body (where the door closes), and you are ready to find out if there has been any leakage into the "guts" of the camera. If the large drops are present down onto and around the half-inch-wide plastic plate that runs across the top of the camera (the electronic compartment cover), towel-dry the drops.

Photo 5

Now, with your small Phillips screwdriver, remove the four screws and lift off the plate (photo 5). Examine the interior, especially the surfaces immediately under the plate. (Remember, the leakage must start here before it can go elsewhere). Also, notice the rubber foam on the back of the plate. Water can be trapped in this sponge and continue to bathe the electronic components, causing the components to short out when the electronics are turned on.

To check this sponge area for the presence of water, take a facial tissue or toilet paper (the length of the plate) and lay it down on a fiat dry surface. Take the plate, turn the foam side down and lay the plate onto the tissue. With a dry hand, press down on the plate evenly two to three times. Remove the plate, and examine the paper for water. If water is present, dry the foam with a hair dryer (medium setting) for a few minutes and re-test as above.

If no water is found in the rubber foam, chances are no leakage has occurred around the edges of the plate and into the electronic "chamber" from the back door. But to be safe, use your 35mm lens and check all along the exposed electronics. However, leakage could have occurred from the ASA or rewind knobs.

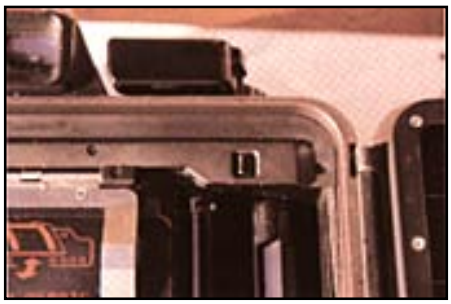

Photo 6

Next, pay particular attention to the right side of the camera where the notch has been cut into the plastic plate (photo 6). Water drops can fall through this hole and onto metal gears without being trapped by the sponge. Check internally for leakage from the film advance and shutter speed knob.

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"Oh, No! Water!"

First and foremost, if water leakage anywhere in the electronic chamber did not come from an identified backdoor O-ring problem, you can clean off the water and maybe save everything. But, unless you can positively determine the source of any water leakage and correct the cause, don't even think about diving the camera again until the internal nonuser serviceable O-rings or other watertight parts are replaced by a qualified technician. Try to prevent corrosion to internal parts and realize you can't be the "little Dutch Boy with the magic thumb" this time. Sorry!

Use Cleanup Procedure 5.A (outlined at the end of this article) for electronic chamber cleaning and water removal. Remember, dried water (whatever this is) won't hurt electronics. Only wet water containing salts (electrolytes) will do damage when a current of electricity is on.

However, metal gears work better wet than if a dried salt residue has caked on them. So, thoroughly mop up all metal gear areas accessible from the electronic chamber.

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Water Droplets in Film Canister Side or on the Plastic Rewind Fork

Could it be you have been opening the camera like a land camera (and the water fell off of the wet O-ring), or have you really got a leak?

As above, follow the procedures for removing the half-inch-wide plate that covers the electronics. Inspect the left side of the electronics chamber as well as the ASA assembly

that goes through the electronic board. Also, inspect the film canister/rewind fork, especially around the top where it goes through the metal inner body. Water leakage through the rewind or ASA areas are due to worn-out, dirty internal O-rings, or from adjusting the camera underwater - changing the ASA or rewinding the film.

Cleanup Procedure 5.A may take care of water damage to the electronics, but it cannot return your camera to a usable underwater condition. The repairs to this area can only be done by a qualified person, and don't be surprised if parts have to be replaced.

Even if you have just noticed water in this area of your camera, chances are that leakage has been going on for a long time. It only becomes obvious when the corrosion to metal parts (and damage to other parts) lets in more water that now leaks into the area you see. Remember, this area is surrounded by electronic components. They, too, are probably getting corroded (and destroyed).

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Film Advance/Shutter Speed Selector Knob Area

No doubt your have noticed the hole in the plastic plate that contains a black plastic square. The purpose of the hole is to allow the finger on the back door to push the square forward (when the main door is closed), which starts the counter wheel moving each time you advance film. Well, not only can the door "finger" get into this hole, but so can drops of water.

If the water drops fall to the right, it can freeze up the counter wheel. If the counter wheel doesn't advance - no electronics! This is no problem if you remember how to use the camera (M90) and strobe (not TTL).

Ah, but if the water falls to the left, you can have all kinds of really neat damage. The water can damage the three adjustment pods that control the LED display, shutter speeds and TTL operations. Or, the water can be shaken further into the camera - onto the shutter assembly, onto the selector linkages, and so on. And lastly, you could have a steady drop by-drop leak from any of the three internal O-rings on the film advance/shutter speed selector knob parts. If the film advance feels rough, and the shutter speed selector is hard to turn, the damage is already done. Don't use the camera unless you happen to have a pocketful of new, non-pitted parts and O-rings. Just mop up what you can using Cleanup Procedure 5.A and get professional help as soon as you can.

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Mechanical Chamber Leak Check

Next, inspect down and along the right (hinge) side and across the lower edge of the

camera's inner body. You will notice a gray color material between the inner body and outer case (photo 7). This is a rubber foam that can trap water and retain it to cause later damage from corrosion.

Photo 7

Photo 8

Again, using a facial tissue or toilet paper, lay the tissue over the opened camera. With your plastic "C" card, press the tissue lightly onto the sponge area (photo 8), lift off the card, and press down onto another area of the sponge. Use the rounded corner of the "C" card to get into the rounded comer of the camera (do not slide the tissue around the sponge; this will only tear the tissue and will not tell you if or where water is present.

Lift off the tissue. You should see the line of the impression from across the bottom, around the comer and up the right side of the foam area of the camera's inner body. Laying the tissue flat, inspect for the presence of water.

If you have been accustomed to opening the back door of a Nikonos V like a land camera to change film, you will no doubt have had water drops and droplets (with the help of gravity) fall into the camera without you knowing. The foam will prevent small drops from getting into the camera's gears, but large drops - or continuous dripping of drops onto the foam over a week of diving (and from opening the camera wrong) will saturate the foam. Then the water will get onto the gears.

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"Oh, No! Water!" Tissue/Toilet Paper Test

If water is present, the question is "how much?" To make that determination, take the tissue, roll it up into a tight, long roll and place it around the foam area. Close the back door of the camera (to hold the tissue in place), but don't try to completely close and lock the door. (Be sure there are no wet areas on the door by removing the door O-ring and drying this channel as well). Tilt the camera back at a 45 degree angle (definitely don't lay it flat) for 15 minutes. (Note: Place the camera in a plastic zip-lock bag to prevent normal water evaporation during this 15-minute test.) Hopefully, any water inside will roll to the sponge and be picked up. You can tell if water is present by the tissue paper.

Open the camera and inspect the tissue. If still wet, repeat this process two more times. If the tissue is still very wet, then yes - there is water inside, and your camera has big

problems. Before going to Cleanup Procedures 3 and 4, try the following "Business Card Test."

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Business Card Test

There is the possibility that a substantial amount of water may still be trapped inside the camera, and that tilting the camera at 45 degrees for 15 minutes didn't let the water run out to the sponge area.

To further evaluate these areas for possible hidden water, use a Business Card (or paper of equal thickness and durability, such as a birthday greeting card, a 3 x 5 index card, etc.). First, remove the battery cap, then insert the corner of the business card between the foam and outer metal housing and carefully turn the card, inserting as you go, until the short side is fully inserted and pushed as far in as it will go (just about an inch). (photo 9)

Photo 9

Leave the card in place for at least three minutes. Withdraw it and inspect for signs of water. Repeat the process until you have gone around the bottom and right side of the camera (usually a total of three cards will complete the hidden area inspection).

Remember to leave the camera in a ziplock plastic bag during this test to prevent evaporation. When salt residues dry, they can no longer be rinsed off with water. The camera must be disassembled and cleaned part by part - costly labor.

Before going to Cleanup Procedures 3 and 4, try using a lot of cards to "mop" out trapped water. It just may work. But if you do, try to keep the camera upright as much as possible. No sense letting water drops get into the shutter mechanisms or other delicate parts. Also, don't forget to work the camera mechanics periodically (without the cards inserted, of course).

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Inspection Techniques for Lens O-Ring Leakage

A worn or dirty lens O-ring, including extension tube O-ring or other lens-area mounted accessory, causes damage to two expensive items: the camera and lens.

To remove the lens, point the lens downward, turn 90 degrees and slowly remove it from the front of the camera. Towel-dry only the exterior of the camera, lens, and any accessory. Do not dry the silver lens mount ring at this time. Also, if you jerk the lens off fast, the turbulence of air will carry water droplets everywhere and give a false sign of water leakage.

Now, lay the camera face down. We will inspect the lens first. On the rear of the 28mm, 35mm and old-style 15mm lens, look for water droplets (not O-ring grease smears) on the flat surface (this wide surface does not exist on the 20mm, 80mm or new-style 15mm lenses). If droplets are seen or suspected in or on any lens, place the lens face-down on a flat surface. Simply use a hair dryer, holding it about six inches away from the lens, and turn the dryer on the medium setting for 45 seconds and warm the lens. If moisture (water) is present, it will fog up the lens or lens elements. If no fogging appears, repeat the warming once more. If no fogging appears, you can feel certain no water has entered the lens. (If fogging appears, see LENSES section below). After inspection and checking for fogging, set your lens aside (face-down) and cover the rear optics with the lens cap.

Pick up the camera body, which has been laying on its face. Continue holding the camera face-down and inspect the silver lens mount ring area for water droplets (very small water droplets should be present only on the O-ring wall of the lens mount ring, not where the three screws are located). If water droplets (not to be confused with your excessive use of O-ring grease, which may look like water drops) are present at the three screws, you have had water leakage.

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Now, towel-dry the lens mount ring, and the camera body is now ready to be turned upright. (If you turn the camera upright before drying off the lens mount ring, the water droplets that normally collect on the O-ring wall could fall onto the shutter blades).

Using your 35mm lens as a magnifier, inspect the edges of the silver-colored lens mount ring on the front of the camera. Specifically, check the area just inside of the black painted metal surfaces for water drops. Then, open the rear door of the camera, and with the shutter speed set at "B," trigger the shutter (if it still works) and hold it open. Lift up the film plate and again use your 35mm lens "magnifier" to inspect the backside of the silver lens mount ring area for water drops going into the camera.

If you determine that some water has gotten into the internal area of the camera from the lens area, it becomes extremely important that you proceed with the "Business Card Test," as well as the mop-up procedure of the accessible areas just behind the lens mount (if qualified repair services are available). The reason for quick action on this problem is that the green electronic component just behind and above the lens mount ring is easily damaged or shorted out by salt water. If it is damaged, it will destroy all automatic functioning of the camera. (photo 10)

If the water is found to be too extensive for the "mop up," freshwater flooding, using

Cleanup Procedure 3 and 4 must be used.

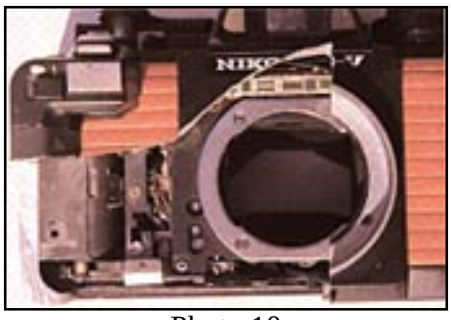

Photo 10

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Lens Mount Ring

Continuous minute leakage of salt water from either the lens O-ring or the silver-colored lens mount ring O-ring can cause serious problems to go unnoticed until a full lens flooding or camera flooding occurs.

The leakage can be so small that wet saltwater droplets are usually not seen. Because "no news is good news," the camera may be left to dry while the trapped salt water eats away at the camera's outer metal case.

So, before use, inspect the lens mount area with your 35mm lens for signs of white salt residue buildup 1) on the external interface between the lens mount ring to the outer body and, 2) more particularly, to the internal interface. Salt buildup in these areas may mean serious corrosion to metal and deterioration to the O-ring have taken place. Don't use the camera until it has been professionally serviced and the outer case pressure-tested. This area is no do-it-yourself area. Don't even think about cleaning it or regreasing the old O-ring - it won't work! Just don't use the camera.

If you are in a hurry to get you and your equipment into the water, Mother Nature will inform you that the pitting and extensive corrosion of the two metals you have been ignoring are now sufficient to flood the camera and lens.

Also, be aware that if you have had an extensive flood, even if it originated elsewhere, the lens mount ring must be moved from the camera and the interface dried completely.

To dry this area, remove the three Philips screws holding the lens mount ring onto the camera. Carefully, carefully push this ring up and off the front of the camera. (photo 11)

Photo 11

WARNING: There is a very, very thin O-ring just beneath the top edge of the lens mount ring. Don't cut it by accident! Also, when you are using a jeweler's screwdriver to push off the lens mount ring, do not pry or twist the blade side to side. This will permanently damage the tight O-ring seat of the outer-body, and the camera can never be taken into water again. By the way, the outer-body replacement part costs about $250.00.

Again, after careful removal of this lens mount ring, I would not advise you to try to regrease the O-ring, reassemble and dive again. Have the lens mount ring checked by a qualified technician, replaced if necessary, and pressure-tested to be safe.

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Cleanup Procedures

The Stupid "What about Alcohol for Drying?" is Cleanup Procedure number Zero -This is so stupid a concept it doesn't deserve a number:

No, Never! Remember, 70 percent isopropyl (rubbing) alcohol is 30% water. "Everclear" was meant for drinking, not wasting. But worse than this, any alcohol will ruin the sensors and other parts of the camera. Use fresh water and continuous warm air only! No compressed air guns, oils or other fancy aerosol products should be used.

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The "Fast, Complete, Problem-Solving" Cleanup Procedure #1

If the equipment was fully flooded while all electronic operations were in use and if you are rich, the easiest way to fix your problem is to create a new artificial reef with the camera and enjoy the remainder of your trip and time. Then reach into your camera case and make ready your "octopus Nikonos V" and continue diving.

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The "Pass the Buck" Cleanup Procedure #2

Get your equipment immediately (not tomorrow) to the resident photo pro who is familiar with the equipment. But remember, the professional repairman was not put on the island just to drop all of his other responsibilities to take care of your mistakes. Also, a full food takes hours of work with no guarantee that everything will work like new. So, beg, plead and offer the repairman anything (well, almost) to help you out. Then try to borrow your buddy's Nikonos, lens and strobe before everyone in your group finds out what you did.

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The "Let's Flood It For Sure" Cleanup Procedure #3

Are you absolutely sure you want to work on your camera instead of having fun? Well, if you've had your shower, no one is at the bar, and your wife has gone shopping, let's kill some time and see how lucky you can be.

First, remove the battery cap and battery (you should have done this on the boat a long time ago). Open the camera back, and remove the four screws holding the plastic plate cover of the electronics. Then shake the camera (with door open over paper) to see if water drops are still present, and then follow up with the Business Card Test. If water is still present, repeat the above process for one-half the time and check again until you are sure the camera is dry. Of course, remove the lens and flash cable.

Holding the camera upright, connect a garden hose to the battery port. Turn on the water and watch the water flow through the lens port (front of the camera), around the base and side walls (foam area), and out through the top (electronics area from the back).

Tilt the camera slightly forward and backward, but not upside down. What you don't want to do is to turn the camera upside down under the water faucet. You want to prevent getting water into the view finder and LED's if at all possible. This is only more labor cost and damage.

After at least five to ten minutes of good "pressure" flushing with good water, you are ready for drying. Laying the camera face down, lift the film plate and catch it under the film advance lever (this will hold it open). Turn on your hair dryer to medium setting, and at four to six inches from the base of the camera, warm it for at least five minutes.

Next, set the camera on its base (upright), and warm the interior back area of the camera for at least ten minutes, working the mechanics periodically. Then, warm the front through the lens mount port for another ten minutes. Then, shake the camera (door open) over paper to see if water drops are still present; if so, repeat the above process for one half the time and check again.

Caution: 1) The metal will become quite warm (in fact downright hot to the touch). When

you pick up the camera, use a towel. 2) Do not use a "high" setting on the dryer, you will bum out the hair dryer (staying on 25 to 30 minutes) and damage the camera. 3) If you have only a low setting, double the drying time and pray twice as hard.

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The "Tourist Water Follow-up" Cleanup Procedure #4

If you can find distilled or de-ionized water in one-gallon plastic bottles, you can follow up the rinsing procedures in #3 above, just in case the local water is brackish.

Using a saucepan, warm (don't boil) a quart or so of water. Place the camera (door open) in another saucepan and carefully pour in the warm water so the water fills to a level just equal to the top of the electronics. When all bubbling stops (water is completely in every part of the camera), remove the camera and drain the water into a sink. Repeat as many times as you want, but don't forget to pour the "used" water into a sink. Then dry as in #3 above.

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The "Pipe Cleaner Mop-up" Cleanup Procedure #5.A

Take a pipe cleaner, and before you use it, run it through your clean fingers to get rid of any loose fibers. Rub it carefully over and around the camera areas you are drying. Bend the pipe cleaner if necessary to get in behind tight areas. Be gentle, but thorough.

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The "Business Card Mop-out" Cleanup Procedure #5.B

The big gamble. To flood or not to flood (with fresh water); this is the question. If your "Tissue Paper Test" showed water to be present beyond the rubber foam (in the area of the lower gears), I would recommend not flooding the camera (Procedures 3 and 4) with fresh water just yet.

Instead, use business cards (or an equivalent thickness of paper, like a birthday card) and try to mop out the water. (Thin paper will deteriorate with water and you will then be really "up a creek.")

Only if you feel you have mopped out most of the water should you then remove the plastic electronic cover, set the camera upright (lens off, and dry the camera with a hair

dryer (medium setting, four to six inches away) for ten minutes. Don't forget to work the camera on M90 setting frequently. However, if the cards are still wet after four or five tries with this method, then unfortunately Procedures 3 and 4 (or 1 or 2) are necessary.

Remember, the camera gears will work (maybe not correctly, but they will go "click-click") when wet. When the gears are dry, the salt residue will crystallize and everything stops. Operating the camera manually during the drying process may, I repeat may, keep any crystallization from freezing up the works as the camera dries.

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Summary

1. Remember, nothing is certain in the world except death, taxes and water damage to a neglected Nikonos V!
2. Never use alcohol on a Nikonos V
3. "Accidental water leakage" and "controlled water rinsing" are both foods to the "guts" of your camera.
4. If possible, determine how much water leakage and where the leakage is coming from, to decide on the appropriate cleanup procedure.
5. Use "Pipe Cleaner" or "Business Card" mops to remove small drops of water.
6. Cleanup Procedure 2 is the best way, if anyway is best, to help fix your mistake.
7. Remember above all - to heck with all this expensive equipment. Safe diving always is more important than anything else. No one said this was a cheap sport!

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER FIVE: CPR FOR YOUR BIG LENSES

Text by Bob Warkentin

The best way to understand Nikonos lenses and what to do about potential floods is to understand through analogies just what an underwater lens really is. It is nothing more than an "eyeball" on the "face" of the camera covered over by a "diving mask."

Since your own mask is made of rubber-like material, it makes an O-ring like seal to your face, thus preventing water from entering the mask. But, when your mask gets bumped, this seal is broken, and water gets into your mask and eyes. Just like any diving mask, the bigger the lens (for wider viewing ability) or the farther the lens extends beyond your camera, the easier it is to be bumped by your hand, regulator hose or the diver's fins in front of you.

Remember, masks don't leak unless they are bumped, or unless the edges of the rubber are worn out, cracked or full of hair. Well, neither do Nikonos lenses!

Two Styles of Nikonos "Masks"

The over-all size of a lens is governed by the amount of goodies Nikon puts inside this "diving mask" to give you the right eyeball for the right job. Accordingly, there are two styles of how these "diving masks" are attached to the front of a Nikonos camera:

Style #1: For the 28mm and the 35mm lenses.

Style #2: For the 80mm, the new 20mm lens and the "new-style" 15mm lens. (photo 1)

Photo 1

No, I don't mean that the lenses are not all interchangeable from one camera to another. Even the original Calypso lens, made by Cousteau in the late 1950s will fit - water tight - the Nikonos V, and vice versa. What I am saying is that the spring-loaded bayonet mount holding the lens onto the front of the camera is either mounted entirely above the back surface of the lens' waterproof outer housing (Style #1) or it is recessed inside the outer housing (Style #2). (photo 2)

This is done in order to provide you those specialty wide-angle or telephoto lenses whose optics are of course larger in diameter than those of the standard 28mm or 35mm lenses; the hole through which these optics must go must be larger than for standard lenses.

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"So, a $1,200 15mm fits 12 times better than a $100 35mm lens, right?"

Wrong! You actually have a bigger target for error, because of the size and weight of the lens. In fact, put your 15mm lens onto the camera, hold the lens pointed straight up, and shake the camera front to back. What you hear is $1,200 worth of your money rattling on the front of your camera.

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"Human error? Not me! I've never had a flood!"

Well then, let me ask you a few questions:

Q. 1 Have you ever had your diving mask bumped and water leaked in? Of course. That's why you are taught how to clear your mask.

Q. 2 Do you keep the rear lens cap on the lens when not in use? Of course you do. How silly of me to ask.

Q. 3 Do you routinely replace the rear lens mount O-ring with a brand new O-ring before each week of diving? Obviously, another dumb question on my part!

Q. 4 And of course you don't rinse the lens in fresh water separately, dismounted from the camera, by placing the plastic lens cap on the lens before rinsing, now do you?

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"I always have the lens mounted to the camera when rinsing, that's dumb!"

Well, Q. 4 isn't the situation that causes the majority of water damage or floods to lenses. Nearly all of the water leakage or full floods that do occur to the bigger lenses are because of the combination of a "nearly-new" rear lens mount O-ring and human misunderstanding.

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The Saga Continues: True Confessions of the Lens O-Ring Killer!

A rubber O-ring changes shapes to conform to the compression between a metal lens O-ring channel and the camera mount. We all know that if we leave the lens mounted to the

camera during storage that the lens O-ring will be flattened out and no longer good for diving. So, we do the next best thing, right! We take the lens off the camera and put the lens cap onto the lens to keep out dust.

Well, guess what? That plastic lens cap also flattens and kills the elasticity of the fear lens mount O-ring during periods of storage. (This also applies to that new lens you just bought. It has been stored in the box with the lens cap covering the O-ring.) When you next go to use the lens, the O-ring may have lost enough elasticity that if the lens were to get bumped, water would leak inside.

Ah! Does that mean that the plastic cap is intended to be a watertight seal as good as the camera? No! Prove this to yourself by putting on the lens cap but don't turn it as usual. Notice that it does not fall off. Then, remove the O-ring and repeat the process. Notice that the lens cap falls off this time!

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The Death of a Lens

Remember, O-rings are designed for specific functions - i.e., sealing a perfectly round lens into a perfectly round mount on the camera. Unfortunately, no O-ring is designed to seal where side-to-side or up-and-down (bumping/wobbling) movement occurs.

With the standard 28mm or 35mm lenses, you very rarely hear of water leakage from the flattening out of the O-ring by the lens cap. These lenses are smaller and lighter than the Style #2 lenses, and water pressure helps force them against corrosion has spread to the optics and the camera; they are therefore harder to metal gears of the lens. (photo 4) wobble when bumped. Warning! Don't apply old habits learned through the use of 35mms to the "biggies." They require their own special precautions.

Underwater, it is so easy to bump a large "Pinocchio" lens. When that lethal up-and-down or side-to-side bump occurs, water can leak past a somewhat "dead" O-ring and enter into the lens from behind. For Style #1 lenses, there is about a 3/8th inch of dead space before the water can actually get into the lens. But for Style #2 lenses, the water almost immediately enters into the main optical and mechanical guts of the lens. (see photo 2)

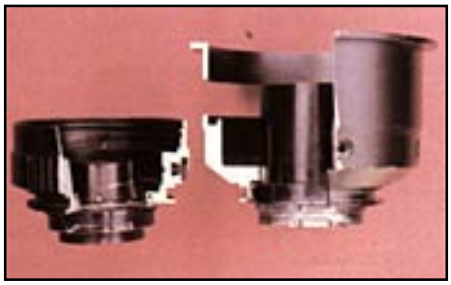

Photo 2

The amount of salt water that can leak in may be so slight that it will go unnoticed. Within

two days, however, the lens may become hard to mount onto the camera, or the bayonet mount may be frozen by corrosion - thus making it impossible to even get the lens off the camera. The distance and f-stop knobs may be difficult to turn, and you may see white specks of "powder" loose in the front dome glass. (photo 3)

Photo 3

You then get the lens to the "doctor," and as he begins to remove the bayonet screws, one by one, they break. Removing the parts, you soon see that the saltwater corrosion has spread to the optics and metal gears of the lens. (photo 4)

Photo 4

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CPR Technique (Compression Prevention to Rubber)

Hopefully, these CPR techniques will become second nature to you. These techniques can be applied to all other user-serviceable O-rings just as well as the big lenses.

Before each dive trip, we all scramble about buying new O-rings for our photo equipment. Soon, the top of our camera case is littered with opened bags partially filled with assorted O-rings. We have taken off the old ones, and not wanting to throw them away for some reason, we have put them back inside one of the already-opened bags. Now as time passes and our memory fails, we can no longer remember what is what. As we look over our collection of O-rings, we can't tell a used round black O-ring from a new round black O-ring unless it is as flat as a pancake.

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CPR Technique #1: Banding the Storage O-Rings

Obtain a vinyl dye from an automotive supply store (or a waterproof marking stick at an office supply store) - in a color you like but one that can be seen when applied to the black rubber. Vinyl dyes work in much the same way that a wood stain does; waterproof markers may or may not. Take an obviously used O-ring, degrease it completely, and apply the vinyl dye in 1/2-inch marks every inch or so along the lens O-ring. After allowing it to properly dry, re-grease the O-ring as you would any other Nikonos O-ring. Now, you have just made yourself a "storage O-ring." (Please, do not use the rubberized paint that is available in dive shops. This paint really builds up on the surfaces of the rubber, and can be easily worn off - in pieces - preventing a new O-ring from sealing properly.)

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CPR Technique #2: O-Ring Storage Bag

Now the tough part of all this: Getting you to write onto only one of the plastic O-ring bags in your collection, "camera or lens or strobe," - and then throwing away all the other bags and O-rings. If you are the type who needs a string on your finger to remind you, then also write "black for diving; striped for storage."

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CPR Technique #3: Putting This to Use

You again have a collection of O-rings, but this time only one set for each piece of equipment. The set will be either all black O-rings in the respective plastic bag (meaning that the storage O-rings are installed in the equipment and not ready for diving), or the set will be all banded O-rings (meaning that each and every one of the necessary O-rings has been changed, properly cleaned and greased, and that the equipment should be ready for diving).

As a precaution, we recommend that you inspect the O-ring channel of your equipment for possible traces of pieces of debris or vinyl dye, just in case you applied the dye too heavily and some has worn off. As recommended in our previous articles, use the Nikonos 35mm lens as a magnifier. (If you are trying to inspect your 35mm lens, borrow a buddy's lens.)

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Putting It All Together

Let's face it, diving can be a clumsy sport with all that equipment on, or with currents pushing us into other divers or coral. So, those big expensive lenses that stick out so far from the front of our cameras are easy targets for getting bumped. It absolutely will happen, sooner or later! So, when it happens, you will have installed on the back of those Pinocchio lenses as fat and plump a lens mount O-ring as possible. You must have "as much rubber meeting the road" (to paraphrase a tire commercial) as possible if you expect a $1,200 lens to survive the inevitable.

The CPR techniques prevent confusion of which O-rings are which, and will get you out of the pre-dive ritual of buying more for your collection. They will also prevent the premature loss of elasticity to O-rings during storage. Have only one set for diving and one set for storage for each piece of equipment, know which is which, and change them.

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"If I practice CPR, how long will the dive-only O-rings last?"

Excluding the common mistakes of using dental picks or knife blades to remove O-rings, or damage caused by excessive heat and improper cleaning and re-greasing before use - or yes, even using the wrong size O-ring, the CPR technique should extend the life of your O-ring (and the safety of your lens) from just a few dive trips to maybe two to three years. Please remember that I am talking about those big lenses that stick out a good distance from the camera.

For professional photographers whose equipment is in the water constantly, with "dive only" O-rings installed on the equipment continuously, I strongly recommend that you change the lens mount O-rings on your speciality lenses at least every three to four months.

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"Well, what if I do flood a lens?"

Unfortunately, Nikonos lenses are not pieces of equipment that readily lend themselves to do-it-yourself repairs. Spanners, special rubberized tools, realignment and refocusing tools are also needed.

The main problem will arise from water trapped inside the optical groups. The water can not be rinsed out without element-by-element disassembly. Otherwise, in your efforts to rinse out the lens casing, you will force water into the optical groups. Force-drying causes salt crystals to permanently adhere to the coating, causing strange photos. Alcohol can damage the coatings, and for the 15mm lens, it will also discolor the f-stop/distance plastic window, which will then break by itself.

First remove the four spring-loaded screws on the bayonet mount (six on the Style #2 lenses), so that these screws don't freeze up and break off during later disassembly. Next, drain out all the water you can.

Then, get the lens immediately to someone who can service it properly. If you must wait until you return home, put on the rear lens cap - but don't turn it to lock it on. Just rubber-band it on to protect the rear optics from getting scratched.

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Summary

1. The bigger the lens, the easier it is to bump and wobble the lens mount O-ring (flood).
2. A rear lens cap will, during storage, flatten and destroy the elasticity of lens mount O-rings, just as much as if the lens was mounted to a camera.
3. No O-ring is designed to withstand water leakage when it is wobbled. Therefore, you must maintain as plump an O-ring as possible, to minimize the risk of leakage when that bump does happen - and it will happen!
4. Understand and practice O-ring CPR, an absolute must for chose big Pinocchio Nose" specialty lenses like the 15mm, 20mm and 80mm.
5. Flooded lenses are not do-it-yourself projects. Get help immediately.
6. Don't ever use alcohol as a drying agent on any lens, period!

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER SIX: PREVENTIVE MAINTENANCE FOR LENSES
(PIECE BY PIECE)
THE FRONT GLASS PORTS

Text and Photos by Bob Warkentin

What's So Special About the Front Glass Port?

In reality, the front ports of the 15mm, 20mm and the 28mm are an integral part of the overall optical system of each lens. The cost to replace a damaged port on these lenses could cost around $100 to $200. The front ports of the 35mm and 80mm lenses are basically flat ports, made from very thick specialty glass. Even so, the cost to replace them could range between $50 and $100. (Photo 1)

Photo 1

But, people some how have got the idea that the front flat or dome glass port on a Nikonos lens is nothing more than just a plain ol' cheap piece of glass to keep out water, period! Therefore, people allow these ports to become scratched or nicked, or they allow a white cloudy residue to build up around the edges of the glass and metal serial number ring that won't clean off, or use God-only-knows-what to clean the glass, causing the surfaces to become damaged (appearing like spots), and so on.

A Unique Problem of 15mm and 20mm Lenses

PROBLEM: White Cloudy Buildup on the Dome Ports

The major problem area of these two lense comes with the improper cleaning of the lens after saltwater use, which results in a white cloudy deposit that forms on the edges of the glass dome at the interface of the aluminum alloy serial number ring. I have seen this glaucoma-like residue extend as far as 3/4 of an inch above the serial number ring on 15mm lenses. (Photo 2)

Photo 2

If you have a lens with this cloudy deposit present, then you have found out that it will not clean off. You probably have also found out that the edges of your pictures are soft and fuzzy. What is it? It is the combination of aluminum oxide (rust) from the lens mount ring and dried salt water minerals.

How did this happen? During diving, salt water collects under this ring. Your conventional rinsing techniques were not sufficient to remove all of the salt water. So, over time, the aluminum metal in this area began to oxidize. Now as the water drains out from around the dome and the two spanner holes in the serial number ring, the salt water also drains out particles of aluminum oxide which together dry out onto the dome glass leaving a permanent white cloudy deposit on the dome.

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SOLUTION: "Drain The Swamp" of 15 and 20mm Lenses

To fix the problem is easy, and even while the lens is still mounted to the camera! As soon as you get out of the water, take something like a drinking straw, place it over one of the spanner holes and blow out the water with your mouth. Watch out: keep your eyes closed! The water coming out the other hole usually hits you in the face and eyes. (DO NOT USE A HIGH PRESSURE AIR GUN! Lips and lungs, only!) Note: On old style 15mm lenses, the spanner holes are sealed so this procedure will not work. Therefore, you must constantly inspect the lens and wipe off the drainage.

Now, when you submerge the lens in fresh water (while still mounted to the camera, of course) to clean off and out the salt water, this hidden area will be more easily filled with fresh water. Blowing it out again with the straw should just about remove all remaining salt water (photo 3). You can do this as many times as you want if you feel the need. Also, periodically inspect for drainage and wipe clean with a soft, grit-free tissue or cotton cloth.

Photo 3

For all 15mm lenses, there is also another window to be concerned with. This is the f-stop/distance scale window on the side of the lens casing. While this window is plastic, it too can become cloudy with residue. And just like the dome serial number retaining ring can trap salt water, so can a lot of salt water, sand and grit be trapped between the walls of the metal lens casing and this plastic window. Lots of water, and all around the lens.

How do we get rid of this salt water? That's right, blow it out your lens. And what do we use? That's right, lips and lungs! But this time I use my mouth directly on one side of the window. Keep your eyes closed or they will become full of salt water and usually some sand and grit particles as it all comes out the other side of the window area.

Cleaning Flat Glass Ports 0n 28mm, 35mm and 80mm Lenses

Since there is only a rubber O-ring in direct contact with every flat port glass as well as no hidden areas on the flat ports for salt water to be trapped as there are on the 15 and 20mm lenses, these lenses are easy to clean from side to side just during the proper fresh water cleaning procedures. I have not seen one that has become cloudy at the edges of the front glass like the 15 and 20mm lenses.

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Stupid Mistakes Do Happen

Well, since so many people have the idea that glass is just glass, nothing can stick to it that can't be cleaned off and thus "very easy to clean" just like a diving mask, where do all the ugly looking front glass ports come from?

PROBLEM: Scratches on the Flat Glass

True, with all of the diving and photo equipment that we carry, sooner or later scratches occur. But the biggest single contributor of scratches is the DRIED SALT WATER (salt

crystals) itself. These crystals form their own "sand paper". So, when we wipe off the lens port with our dry t-shirt or towel, we are literally grinding these dried salt crystals into the glass and presto: we have made "instant under water use from now on" lenses. Or, we use a previously salt water wet towel and wipe the port vigorously to get off those dried water spots. The salt water in the towel has evaporated leaving behind the coarse salt crystals. Guess what: "sand paper" in another form!

But why doesn't it happen to the glass on our diving masks? Well, have you ever seen anyone "dry" cleaning the glass with a towel or T-shirt? No, of course not. They always are using a liquid like mask defogger, liquid soap, spit and ocean water along with a wet hand or finger. But nothing dry, right? (No, I am not saying to use these items to clean the lens. Just don't "dry" clean the lens. Please read the SOLUTION section below for the answer!)

The next contributors to those fine scratches commonly found on these lenses are, believe it or not, from either tooth paste, liquid window cleaners, or water and vinegar solutions. Man, what humans can do!

SOLUTION:

Easy! Don't let the salt water dry out on the lens! As I continue to preach, just keep all of your photo equipment wet, even in salt water, until you can properly wash off the salt water with fresh water. Remember, salt water dries out on your body (and your equipment) in 5 to 10 minutes after diving. While it is not usually possible for you to remain submerged in salt water indefinitely in order that you don't have the discomfort of salt water drying out on your body, your photo equipment can remain submerged.

So, carry on board the dive boat an empty plastic trash can. Between the first and second dive, fill the trash can with salt water and submerge your equipment (assembled, of course!) for the duration of your surface interval as well as that long boat ride back. Leave it resting in the "wet" salt water (not drying the air) until you are ready to perform the fresh water rinsing (or pour out the water from the trash can if you are within 10 minutes away from your room and fresh water).

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Photo 4

PROBLEM: Whoops! The Lens Port Glass Is Crusty With Salt Residue

(photo4)

SOLUTION:

(Warning! For this procedure, the lens MUST be mounted to the camera. Don't be stupid and think you can do this with just the plastic rear lens cap on the lens.)

Lay the equipment submerged in water (fresh or salt, it doesn't matter right now). Let it sit for about 5 minutes, and then while still in this water, carefully and gently wipe your finger over the glass port until you feel salt buildup. Using your fingernail, try to unseat (flick off, not wipe off) the salt crystals. When you no longer feel any coarseness on the glass port, then submerge a cotton cloth into the water and gently wipe the glass using short upward rotating strokes with the cloth wrapped around your finger, advancing to another part of the cloth with each wipe. If you are finished diving for the day, then the water should be fresh. Regardless, the secret here is to do the DRY salt crystal removal in a WET environment (remember the "wet way" that you clean your diving mask glass!).

PROBLEM: Whoops! Small Scratches and Nicks-The Damage Is Done!

SOLUTION:

There ain't nothin' you can do now! But no worries, mate! Since the lenses are used underwater, the water merely fills in the scratch or small nicks during diving and typically does not affect the photo in any way. However, land use (35mm and 80mm) is another story. Your photos will be affected depending upon the size and shape of the scratches. No way to fix this without replacement of the glass port.

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PROBLEM: Permanent Spots on Front Glass
(photo 5)

I have seen the results of a dried salt water spot cleaned so hard that it resulted in a permanent damage to the surface coating. This is a "gray area" topic for discussion. Sometimes no photo problems; sometimes big photo problems. This time, no easy answer.

Photo 5

On land, you certainly will have photo problems. But for underwater use, you must try the lens to determine if there will be any noticeable photo effects. Photographically you may see a diver in a blue bathing suit with yellow/orange spots. Water may not be able to work its magic this time as it did for the scratches and nicks in the glass ports. Here, you will be forced into replacing the glass port.

SOLUTION:

Don't use chemicals like window cleaners, vinegar, etc. to clean the glass ports. Only water or a genuine liquid lens cleaner, and a soft tissue, cloth or cotton swab, even a wet finger. The secret here is that no cleaning should be done DRY.

PROBLEM: Direct Sun Light and Cracking of the O-ring Around the Flat Glass Ports

All to often I have seen lenses with their respective cameras that were in good working condition except that the O-ring around the flat glass port of the lens was dry-rotted, cracking, and even leaking water. Since none of the other camera or lens O-rings were cracking (flat, filthy, worn out: yes, but not cracking!) it is obvious that prolonged direct exposure to direct sun light destroyed this O-ring

SOLUTION:

No, don't use a #15 sun block lotion. Just "stick it where the sun don't shine"!

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Distance & F-stop Knobs

This is one area of the overall Nikonos system that has one of the best all-around O-ring seats. Best from the standpoint of being an O-ring contained operational point that can continue to function water tightly year after year even if the rest of the lens suffers from massive amounts of human neglect and poor cleaning.

In the photo cutaway, the O-ring pocket is obviously small, and the knob itself has on its end an extension the diameter of the pocket (photo 6) which in essence seals the "top of the jar" from debris to get in. Of course water can get into this area, but the volume is so small that the residues left behind are likewise very small. The result: an O-ring area that can last for a long time before replacement is required.

PROBLEM: Servicing the Knob O-rings

While the lens housing must be completely disassembled for this procedure, this is the least of the problems.

Photo 6

Unfortunately, the aluminum knobs are held onto the gear axles with tiny (stainless) steel screws. And we all know what that equation equals: [steel screws + aluminum knobs + salt water + 1 week of use = "concrete"]. To remove the knobs from the lens casing for a demanding individual, you simply apply the hacksaw tool and presto: almost instant separation cutting right through the knob and gear.. Since new parts (knobs, gears and screws) in addition to the O-ring as well as a lot of labor are needed, this ain't a cheap procedure. So if you really have money to burn, I've got the fire.

SOLUTION:

As explained in the opening paragraph of this section, the O-ring pocket is well protected and enclosed. I have not (yet) seen a lens which has leaked from a knob O-ring unless the knob or knob/gear axle assembly was loose and could be wobbled (through the O-ring), or where the knob/gear axle had been bumped and was bent or that the metal O-ring pocket was pitted.

So just by performing your good after-diving cleaning procedures to all of your equipment, you will keep your knob O-ring in good condition.

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PROBLEM: "Ah, ha! Playing With Your Knobs Again"

Regardless of your desires to be photographically creative under water by bracketing each shot, the knobs were not designed for you to rotate 360 degrees. As your hand twists the knob in a direction illogical in the mind of any red blooded Vulcan (or even that of Nikon), you notice that the knob now turns very freely, or that the indicators are not changing, or the iris does not open or close, or the lens' optics do not move. You have either stripped every tooth off of the gear itself, or have cut a channel into the axle itself (common on 20mm's) from the locking set screws which hold the knob onto the axle.

Ah, knowing not the word "defeat" and adding to it the concept of "there's a first time for everything", there quickly appears like almost magic a box of jeweler screwdrivers. Soon the surgeon's tools are skillfully dissecting the screws from the knobs. When all have been

loosened,the knob is forced against the side of the lens case as the screws are re-seated. In eager anticipation, the first timer tests the knobs only to realize that the "operation" to correct for this looseness only further loosens the feel (and wobble) of the knob and gear axle.

SOLUTION: Don't Dive The Lens

There isn't anything you can do yourself except profit from your mistake. The lens must be fully disassembled and rebuilt to correct your "great ape" strength or your "field surgery".

PROBLEM: Bumping and Wobbling Big Knobs or Add-on Extensions

As the old saying goes, "when you stick out your neck, someone may chop it off". Well, the same is true for the knobs on a Nikonos lens. The bigger the knob, or the longer the knob add-on extension, or where the knob sticks out determines how much of a target you will have for bending and expensive damage. Adjustment knobs are certainly a necessary part of underwater photography, period! The bigger the knob the easier it is for you to grab and turn, but not necessarily on the axis of the O-ring (better known as wobbling the knob).

SOLUTION:

First, don't use those add-on extension knobs unless you are forced into it by having to use thick gloves. If you have to use them, remember to be ever mentally aware that your hands can cause the knobs (and the gear axle which goes through the O-ring) to be rotated off center thereby causing water leakage past the O-ring To eliminate leakage of water every time you adjust the f-stop or distance of your lens, tell yourself to "push in on the knob and then rotate it on axis".

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PROBLEM: 15mm Knobs

For the 15mm lens, the knobs themselves are large, and when the lens is mounted to the camera as everyone does, one knob extends below both the camera as well as the camera tray. What a perfect target for destruction, EVEN WHEN JUST MOUNTING TO A CAMERA TRAY!

SOLUTION:

First, don't forget to use only the single hole (not the channel hole) in the camera tray (of the Nikonos flash) to mount your Nikonos V with a 15mm lens. Otherwise, the tray will cause the lens to be seated on its main mounting O-ring at an angle and will probably cause the lens to flood.

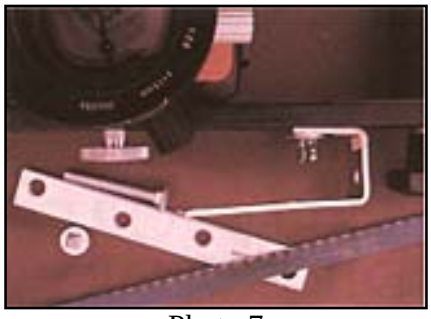
Photo 7

Next, if you really are smart and want to further protect your $1200 investment, for about $0.89 you can build a combination handle and knob protection bracket and attach it to the bottom of your tray. Simply buy a 3/4" wide metal brace at the hardware store, along with a 1/4x20 bolt about one inch long, and a 1/4" washer, lock washer and wing nut. Bend the brace. Cut off the head of the bolt and file off the rough surface. Screw the bolt into the bottom of the camera tray by hand, set your just made "handle" over the bolt through one of its already drilled holes, and secure it to the tray with the washer and wing nut. (Photo 7) Presto: not only do you have a handle to hand your camera rig up to the guy on the boat when getting out of the water, but also a guard protecting the lens knob from getting bumped underwater, on the boat, in a rinse tank, and other places.

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Optics and Their Optical Coatings

Unless your lens should ever be flooded, only the rear optical group of any Nikonos lens is ever in danger of being permanently damaged by salt water from every day use. This is an all too frequent problem and one that will really ruin your photos. (Photo 8)


Photo 8

PROBLEM: Salt Water Mist or Droplets on Optical Coatings

We all know (I hope) NOT to remove the lens from the camera in the rain, or with a dripping wet face, chin, hair or hands (including those other wet divers around us) or where there is a lot of salt spray while the boat is under way, right? But do you remember from previous articles in Ocean Realm that water will remain in the O-ring grooves for up to seven days after diving, even though the outside is bone dry? And did you realize that

when removing the lens from the camera, you can cause a vacuum of air to occur around the wet O-ring of the lens that will cause the water to become a spray mist of salt water that will be sucked right onto the unprotected optical coating of the rear optics? And, salt water will eat optical coatings!

SOLUTION:

First, wait a while, while everyone around you dries out, including yourself (however, remember that the camera and lens will be in the trash can staying wet in the salt water). After removing the camera/lens from the trash can and towel drying the excess water off the equipment and your hands, point the lens downwards, SLOWLY unscrew and remove the lens DOWNWARDS from the camera. Set the lens face down off to one side and just set the rear lens cap over the back of the lens for now. With camera still in hand and pointing downwards, towel dry the silver colored lens mount ring on the front of the camera, regardless if you are mounting another lens for more diving that day, or you have completed your cleaning procedures and are disassembling everything for over night dry out. Now for the lens setting patiently off to the side.

If you are on board a boat that you must leave, then take the edge of the towel and run it around the still exposed edge of the O-ring (the lens cap was NOT pushed down over the O-ring initially, remember?) to pickup the excess water. Now, push down and lock the rear lens cap and it is ready to be transported, but NOT PUT AWAY YET for good! Remember, it is still salty!

Back at your room, the dismounted lens must have a proper final fresh water cleaning. So, remove the lens from the rear lens cap just as though you were removing a lens from the camera (downwards, etc. just like above). That's right, the rear cap fits tight enough that if you were to pull it off of the still wet O-ring too fast it would cause a salt water spray to be sucked onto the rear optical coating. Remount the lens onto the camera and perform the final fresh water cleaning. (Please don't be foolish enough to believe that you can submerge a lens in water using the plastic rear lens cap as a water tight seal) If there is no more diving for the day, you can now dismount and set the lens face down on the table and this time just let the rear lens cap loosely rest on the lens while the O-ring and channel dry out over night.

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PROBLEM: Well, You Got Spots On the Optics Anyway

SOLUTION:

Like front ports above, don't just dry rub to optics, even with a soft cotton swab. Use a liquid lens cleaner and a lot of lens tissues or cotton swabs. And DON'T pour the lens cleaner all over the optics! Apply it to the tissue or swab, and then apply the moistened tissue or swab to the optics. One wet wipe; then dry wipe; then throw it away and get another tissue or swab.. But don't keep wiping the wet one over and over again. It could have picked up a crystal of dried salt and could scratch everything. If you decided to pour

the cleaner onto the optics, then the cleaner will get under the metal lens retaining ring and just when you think all is clean and dry, it will leak out, dry, and give you weird looking pictures. Control the liquid you use!

Summary

1. Always "wet-clean" a flat or dome glass port.
2. If you have to use something other than water on the port, make it a lens cleaner.
3. On 15 and 20mm lenses, remember to "drain the swamp".
4. To protect O-rings from dry rotting, "stick everything where the sun don't shine".
5. When removing the camera body (or a lens cap) from a wet lens, always point the lens downwards and unscrew SLOWLY. Don't "mist" the exposed rear optical coating with salt water.
6. Don't pour the lens cleaning solution directly onto the optics.

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NIKONOS WORKSHOP

NIKONOS-V

CHAPTER SEVEN: THE LIGHT AT THE END OF THE TUNNEL
THE SPEEDLIGHT

Text and Photos by Bob Warkentin

Ah, the electronic age with its portable gadgets that are built by humans for humans that are supposed to turn the otherwise drab blue-gray world beneath the oceans into a beautiful panorama of wonderful colors. When it works well, everyone has got a name for this invention: my equipment and I know how to use it; the best anyone ever built; even Nikon has a real name for it, the "Speedlight". We have names for it as well when nothing goes right, and of course all agree that Nikon didn't build it correctly (or should at least have made salt water dry).

What human would want to remember that in order for just the flash to flash when the camera button is pushed, the strobe must be on, the strobe batteries must be fresh and the right kind, the flash must be water tight with good O-ring seals, the flash cable and each connector must be in good condition and no excess grease on the contact points, the camera must be in good working condition as well as its batteries (if any). Even if all of these things are remembered and checked by you before diving, who cares. It is still the

manufacturer's fault about something because you can't get 36 out of 36 pictures to come out like the ones in *Ocean Realm* magazine.

Well, in reality pros use their equipment far more than the average sport diver. Remember, their Nikonos strobe is identical to yours, and it must function exactly the same way yours does, dive after dive after dive! As such, they have learned that safety practices with their equipment (with which they make a living) is essential in order to complete the job for which they were hired.

So, if you are the typical human who only wants to learn how to get proper strobe-fill in your picture, this article ain't for you. If you want to learn about the strobe and how not to destroy it, then let's look at what all goes in to making your flash flash, and the typical human "destruction" mistakes.

Strobe Construction
The Battery Compartment

Batteries! Electronics don't work without electrical power of some kind. If it is a self-contained portable electronic device, then it must have a self-contained portable power source. This means batteries, and a safe, water tight place to put them. But if the human has to put in batteries, it's a sure bet this human can also leak in water through the same area.

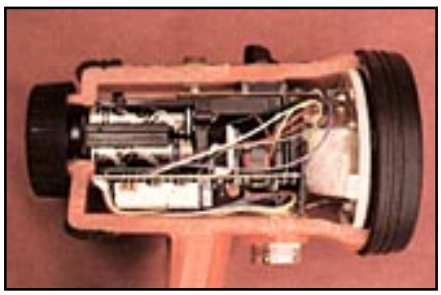

Photo 1

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The SB103 Battery Chamber

First of all, although compact and appearing to be a sealed chamber, the battery chamber is not water tight in and of itself. So yes, human, you are still responsible for seeing to it that the O-ring on the battery chamber cap is in good condition and properly lubricated.

"Just a little water in there?" you say. "Not enough to hurt anything!" And besides you got it out by blowing it dry so it couldn't have fallen into the main (expensive) electronics chamber.

Photo 2

Well, from photo 2 you can see that from the very beginning of the battery chamber all the way to its back (the spring contacts), there are three areas where water can leak out of the battery chamber and directly onto the electronics. In the order of most common human "wet mistakes", they are #1: Whoops, just a few drops fell in when I was removing the battery cap to change batteries; #2: Whoops, the cap was off and the strobe sitting face down when a wave came into the boat; #3: I heard something once that you need to do something about an O-ring on the battery cap before diving, but where's that O-ring located anyway?

The Battery Cap

The relatively large battery cap of the SB103 consists of 2 pieces (3 if you count the O-ring). The 4 holes on the outer edge of the cap is to allow for SOME drainage of the large amount of water that collects around the screw threads, the O-ring seat area and up under the cap during diving.

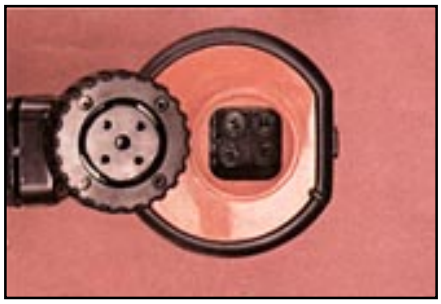

Photo 3

Since the O-ring on the cap seals INSIDE the mouth of the battery compartment, and not all of the water drains away from the area under this large cap, those of you who unscrew and remove the battery cap (after diving or within 7 to 10 days after last diving) while the strobe is sitting face down on a table are just plain asking for trouble. As the O-ring seal is opened, the water still trapped around the cap has a direct path to the inside of the strobe, thanks to gravity.

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Opening the Battery Compartment

I know, it looks silly holding the strobe face up, unscrewing the battery cap up-side-down and pulling downwards. It's simply awful that not only does the battery tray fall out into your lap or onto the table, but so does all that messy water that you will have to wipe off of

your legs or the table. After all, if you had let those drops of water fall into the strobe, it shouldn't cost more than a couple of hundred of dollars to repair the damaged electronics when you got back home and besides you could have borrowed someone else's strobe to destroy likewise the next day, right?

Let gravity work for you, always! And after opening the compartment, don't forget to towel dry the inside of the orange plastic mouth of the battery compartment before you place the strobe face down to change batteries and re-cap the chamber for the next dive.

Inconvenient technique? Now that you know that there is a 1/4 inch wide opening at the bottom of the battery compartment just on top of the main power board just waiting for a drop or two of water to fall into and onto, you decide.

Closing the Battery Compartment

Yes, even here there is a technique to be followed. It should save you from either splitting the mouth of the battery compartment (fully flooding the strobe) or striping the screw threads on either the cap or the mouth of the strobe, or seating the O-ring lopsided (flooding).

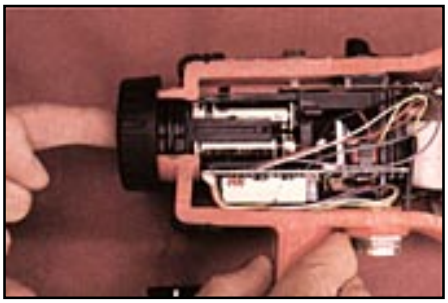

Photo 4

Place the cap over the center of the mouth of the battery compartment. Then push down on the center portion of the cap (the part with the O-ring) with one finger. Continue putting downward pressure on it with your finger while you use the other hand to screw down the outer portion of the cap. It works first time, every time!

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The SB102 Battery Compartment

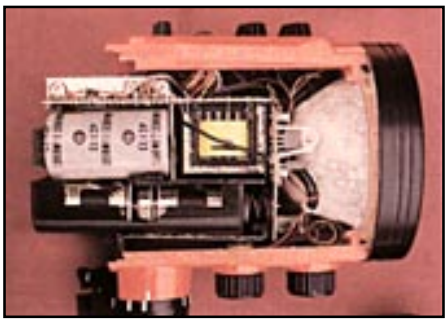

Photo 5

From the SB103 battery compartment whose opening is 1 1/2 inches in diameter to the SB102 whose opening is 4 1/4 inches in diameter, when opening this wet battery compartment I always tell myself that I am opening a VERY expensive strobe which I feel I am a thousand times more likely to get water into because of its large size and weight if I open it wrong. Since the access to the battery compartment of a SB102 directly exposes other parts of the strobe to water drops stupidly falling off of a wet battery cap (or face and hands) and into the strobe---from gravity and human ignorance---it is beyond me why water droplet damage continues to happen when there is a simple way to prevent this from happening.

Photo 6

Nikon has provided a horse shoe shaped cover that covers the high voltage capacitors (photo 6) so that direct water contact is not possible during battery changes. Even so, a human can still leak water into the main electronic compartment from every point all around the O-ring seal (photo 7) as well as from the base of the spring contact plate for the battery tray (photo 8).

Photo 7

The major sources of water leakage/damage to this strobe have come from #1: the improper removal of the battery cap after diving (or within 7 to 10 days after diving); #2: improper storage of a very large strobe in a small foam lined camera case; #3: improperly maintained or seated O-ring and cap.

Photo 8

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Opening the Battery Compartment

If you skipped this part above when I talked about the SB103 because you didn't have one, then you better go back and read it. The same concepts apply: let gravity work FOR you, not against you.

For the 102 strobe, the cap is held onto the strobe by two spring loaded clamps. As above, the O-ring seal is contained on the cap itself and seals INSIDE the mouth of the strobe (photo 7).

Not only does the O-ring channel retain water after diving, but so does the two clamps as well as under the rotating scale mounted on the back of the cap. Since the strobe is quite large, weighing 4 lb. 10 oz. with batteries, the human tendency is to place this heavy strobe face down and lift off the light weight 10 oz. cap. It's so easy. Gravity not only holds the 4 lbs. of strobe down onto the table (I haven't seen one float in the air yet) but also lets all the water collected on the cap to fall into the strobe.

"Wipe off the excess water from the cap and O-ring channel before you open it!" you say. Good idea except you forgot that you can't do that to the O-ring channel until the cap is fully opened to expose the wet O-ring. At the mouth opening, the interface between the outer case (orange plastic) where the O-ring seals and the main inner electronics (black plastic) is only 1/4 inch. So, the water drops from the wet O-ring don't have far to move (from gravity's help) to where they can get inside the electronics chamber and fry the electronics.

So, you no doubt have figured out how to open the battery cap properly after diving. That's right, upside-down and on the table. Then towel drying off the inside of the mouth of the orange case (the O-ring seat) before turning the strobe on its face.

Replacing the Battery Cap

This is a two person operation in my opinion to get the O-ring properly seated and it must be performed with the strobe face down! So be careful and watch out for falling drops of water (your face, hands, or those of your helper's!).

Align the mark on the edge of the cap to the one on the strobe case. (Since the strobe is yours, you be the one who is responsible for seating the O-ringed cap properly.) Seating the cap down with even pressure with your hand (do it as many times as necessary until you feel confident), continue pushing down on the cap while your buddy simultaneously (and at the same time) latches both latches with both hands.

Remember that the spring loaded battery tray will be fighting against you while you are reseating the battery cap. So, if you don't apply continuous even pressure in reseating the big cap, you run a very high risk of improperly compressing the O-ring. So, look at your check book before you decide to do this all by your self. It may remind you of the proper technique to use.

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Big Strobes in Small Cases

For those of you who have owned the smaller SB103 strobe, which was beautifully housed in your architecturally designed foamed camera case, and decided to "upgrade" to the larger SB102 strobe, well guess what! No matter how much foam you hollow out of your old camera case, if the overall INSIDE depth of the case wasn't at least 5 3/4 inches (5 1/4 inches for the strobe if laid with the latches diagonal and at least 1/4 inch or more each for the full compression of any foam, top and bottom-you measure your own), then this fancy foamed lined "egg carton" is going to cause your "102 egg" to become egged shaped. Where? At the mouth of the battery compartment of the main case where the O-ring is!

No, it doesn't happen immediately, but during those prolonged periods of time of safe, "protected by the camera case" storage until the next dive trip. I have seen camera cases packed in exactly the same manner as suit cases: if you can sit on it and it closes, it is properly packed. And I guarantee you that the orange case at the mouth of the battery port gets a little more than just "wrinkled" like clothing.

So, after you have measured the actual depth of your camera case, if you find out that there is just barely 5 inches left after allowing for the space needed for foam compression, I strongly suggest that you adopt the policy of using the camera case only for transportation of the strobe. Then during periods of storage, remove the strobe from the case. Or, just go buy another $125.00 camera case (easy words for me to say, right!) that is deeper internally to safely house during both transportation and storage that expensive (suggested list $1105.00, WOW!) SB102 strobe.

One final point. The O-ring sealed battery cap requires special attention to install it onto the strobe case properly as explained above. If you have had the strobe for a while and during the cap's installation, you feel like it has taken an extra measure on your part to seat the cap "properly" and therefore might have been deformed by your camera case, then please remove the "old" O-ring from the cap (which no doubt has been flattened during storage and has lost a lot of elasticity) and replace it with your new one. This way, if there has actually been only a little deformation of the case mouth, then the new O-ring should have enough uncompressed rubber to fill in areas of deformation.

"Does this mean that from now on I will have to buy new O-rings for this strobe before every dive trip?" Yes, unless you practice CPR (Compression Prevention for Rubber) as explained in the "Lens" articles or "O-ring" articles. It is too late to make any repairs to the strobe case to straighten it, but you might want to look into buying a larger camera case to prevent further deformation of the strobe. If the strobe becomes more deformed, sooner or later even the O-ring won't be able to plug up the gaps!

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The Flash Cable

Ah, the yo-yo string, the "handle" by which all "boat guides" retrieve our photographic equipment, the one item most frequently photographed underwater, the thing that always gets tangled up in your dive equipment! Regardless of what you call it or say about it, if the wires are broken or you have gotten grease onto the contacts during O-ring maintenance, it won't work, the strobe won't work, and even the camera won't work! It can even flood the camera! Now, what were you calling this delicate, most important thing a moment ago?

The Two Plastic Dust Covers

First and foremost, if you want to flood your camera and do extensive damage to the electronics, continue to use the plastic dust covers which came installed on each connector to cover the ends of your flash connectors, and never change the dust-free O-rings!

"Why? They snap on so beautifully and never fall off! My O-rings really stay clean!"

Well, if you are one of us who occasionally wears underwear, then the reason is obvious. At the end of the day, we almost have to peal the elastic out of the folds of our skin. Our skin now has been compressed to look exactly like the elastic of our underwear. Just like our skin and underwear, caps that SNAP ON and STAY ON do so only because there is an O-ring present to be compressed. After a year or so of wearing the dust cover, the O-ring has been flattened to such an extent that it won't provide a water tight seal for the flash port of the camera (or strobe). This will definitely flood the camera!

Try this simple "I didn't realize the problem" test. Pop off the cap and remove the O-ring. Replace the cap onto the connector, merely hold the connector up-side-down and watch that little cap fall right off (and hopefully into the garbage can for ever!).

"But how do I keep that dust off of the O-rings and out of the flash contacts?" you say. Ever heard of sandwich bags with zip tops? They are cheaper than a camera flood, and easier to find if you loose one than buying a replacement cap. You also might decide to change the old flattened O-rings on both ends, reckon?

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Frozen Flash-Cable Connectors

Photo 9

Would you believe that there are people who connect a flash cable to both a strobe and a camera and leave them connected all week long while diving? Of course not! Who would be so crazy to do that?

Photo 10

Believe me, there are too many people who do this. And at the end of the week, when they try to get the cable off of the strobe, the whole connector is frozen and breaks the flash cable connector right out of the strobe (and you can't just say "whoops", and stick it back in for diving). Or, unscrewing the camera side connector breaks all of the flash pins in the camera.

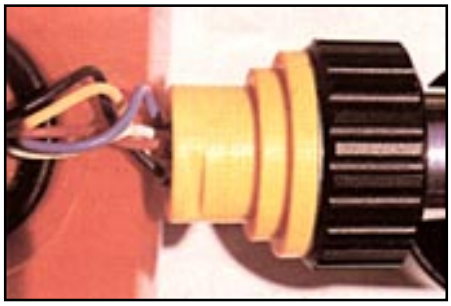

Photo 11

The problem here is that both connectors consist of two parts: one that contains the cable wire and connector and is designed to remain stationary, while the other which IS SUPPOSED TO rotate around this connector to screw it onto or into something holding it

in place. After a week of diving, the salt residue has "welded" these two separate pieces together. So, when you unscrew one, you wind up twisting the other which was not designed to be rotated. The result is a damaged cable or strobe or camera, or all three and your pocket book!

To prevent this, disconnect the cable from both the strobe and camera each day. Also, if it is not too much trouble, would you also clean off the metal shaft around which the rotating piece rotates and just maybe put a little O-ring grease on the metal shaft where the rotating piece is located.

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Removing the Flash Cable From a Nikonos V

We have talked about this in previous chapters, but let's do it one more time.

When we install the dry flash cable connector into the camera, we hold the camera up-side-down so that we can see the white alignment dot as well as watch what we are doing. No problem so far. And when we disconnect the cable after diving we hold it up-side-down to unscrew the connector. BIG PROBLEM for Nikonos V's.

Since the threads holding the O-ring sealed connector are on the back side of the O-ring, they fill up with water during diving. So, when you unscrew the connector with the camera up-side-down, as soon as the O-ring sealed connector is started to be removed, water is starting down into and onto the flash pins of the camera.

No real problem for the three tall pins; but for the two short (TTL) pins, this is corrosively devastating. You also run the risk of having water leak into the camera. To prevent this, unscrew the connector from the bottom of the camera with the camera right-side-up. Then dry to open flash port with a tip of a towel and now you can turn the camera up-side-down for what ever reason you want. Where did the water drops go? Down to your lap (with gravity), not down inside your camera (with gravity)!

Installing a Greased O-ring on a Flash Cable

If you want to prevent any electrical contact between strobe and camera, grease up the connector contacts while cleaning and replacing the O-ring. No one will notice your dumb mistake and you can blame it on your spouse or Nikon for the strobe not working properly.

Remove the O-ring by sliding it with your fingers only to one side of the connector. Grab the excess and lift it off. After cleaning both the O-ring and the O-ring grove, re-grease the O-ring. Remember, if you now wash your hands to remove the grease and then touch a greasy O-ring, your fingers become greasy again. Don't fool yourself!

With your greasy fingers touching a greasy O-ring, RING the neck of the connector with the O-ring. Now, bring your thumbs (both of them) and the O-ring down the side to the O-ring channel. Once there, simply advance both thumbs around the channel and, presto: the O-ring is seated and there is no grease in the connector contacts!

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Checking the Strobe/Cable/Camera Communication

There is so much communication going on (through) that flash cable you wouldn't believe just how much! The strobe is actually controlling part of the camera operations, and the camera is controlling part of the strobe operations. Greasy or corroded contacts, broken wires, dead batteries all add up to wasted expensive film and a lousy dive trip.

Test #1. Hello, Hello! Strobe controlling camera!

With good batteries (silver oxide only, not lithium) installed in the camera, camera set to "A" shutter speed and the counter advanced to frame #1 or higher, ASA 100 setting, cock the camera, place your hand over the lens port to block all light and push the trigger. This should cause the shutter to jam open and you can't advance the lever and pushing the trigger again doesn't do anything for you. Now, turn on the strobe (batteries installed, of course) to any setting and you will hear the shutter go "click" (close). The strobe won't fire, though.

What has happened is this. The first curtain of the shutter in "A" (auto) will open mechanically when you push the trigger button, but the second curtain will only close if it has either seen enough light before triggering and computed when to close (you had your hand over the light sensor so it would not see any light to compute), or if the flash cable is good, will close when the strobe is turned on (remember, strobe "on" over rides automatic selection of shutter speed "A", and sets it to electronically controlled 1/90 second). If it doesn't close the shutter, either there is grease on the cable contacts (strobe side, camera side, or in the flash port of the camera in the pins) or, of course, you forgot to put batteries into the strobe, dummy! Or, yes, the cable is no good and you better buy another before the trip.

Test #2. TTL thinks for me.

The wonderful world of laid-back automatic shooting. Providing it is working! To test the TTL aspects of the cable, set the camera shutter speed "A", counter on frame #1 or higher, good batteries, and turn the strobe to TTL setting. Depressing the trigger button, you should see the lightening bolt (not the arrow head) at the far right of the LED's. Now, with the ASA set anywhere below 400, the lightening bolt should be on continuously; above 400 it should blink.

But, if the light remains solid (or blinks) at every setting no matter what, then you've got problems and no TTL operations! Check for greasy contacts first on the camera's contact pins (the two short ones: these are the TTL contacts, not the three tall ones) and on the

camera side cable connector. If greasy, clean with a lot of cotton swabs and a little bit of alcohol.

Next, check for corrosion on these pins (using your 35mm lens magnifier, remember!). If present, you may not be able to clean and restore its operations. If you are smooth out of luck as far as TTL is concerned, you may have to use the strobe on the other three manual settings. (Note: If you continue to use the TTL setting on the strobe with a faulty cable or bad camera contacts, the actual flash output will be either full power or something less than the 1/16 power, but who knows! You better be the one who knows, right?)

Test #3. The Camera Controlling The Strobe

Set the camera to "A", ASA 100, counter #1 or higher, batteries in, and the lens off. With the strobe connected to the camera and turned on TTL, point the strobe to the front of the camera (about 6 inches away). Triggering the camera, the flash should fire. The ready light should go out and come on again in less than one second (if the strobe batteries are fresh!). Now, place the strobe face down, and block the front of the camera from light entering by placing your hand over the lens mount area. Now fire the strobe and you will have a full power flash output. This will be indicated by the ready light which will blink 11 times, go out and come back on in 6-9 seconds. (Note: For a "FULL" setting full power firing, the ready light will just go out and come back on in 6-9 seconds. It will not blink in between).

This test will show that the sensor located in the bottom of the lens mount area is working. It shuts of the strobe light at some predetermined level, or gives a full TTL indicated output if it didn't see what was sufficient light reflected back into the camera.

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Double Strobe Cable

The expensive cable no one seems to understand or can use. So, here is how it actually works, cable by cable.

The Black Cable:
The black cable is the primary cable! It works just like a single cable in terms of what it controls and how it controls it. The tests above can be used directly with this cable regardless if a second strobe is attached. THE BLACK CABLE AND STROBE SETTINGS CONTROL WHAT THE GRAY SIDE CAN DO!

The Gray Cable:
The side no one seems to understand. First, and foremost, if you want the gray side strobe to function on TTL, THE BLACK SIDE MUST ALSO BE ON TTL. It will not work independent of what ever the black side is set on. Therefore, to perform the above tests for the gray side strobe, you must have a strobe connected and turned on TTL on the black side, and block its light from reaching the camera (I put it in a box and close the lid). Now, test the gray side as above.

REMEMBER, the gray side strobe will not function as TTL on its TTL setting unless the black side is also ON and on TTL! Its other settings will function independent of the black side, power on or off, but just not the TTL.

Summary

1. Neither the SB102 nor 103 strobes have idiot-proof water tight battery chambers. Any leakage here goes right to the electronics.
2. Battery compartment covers can trap large amounts of water during diving. Unless you can reverse the law of gravity, open the strobes up side down.
3. Replacing a battery compartment looks like a simple operation not requiring any special understanding until you flood the strobe for the first time.
4. Don't pack a strobe in the camera case like you pack your suitcase to go on a dive trip. More than just your clothing will be wrinkled when you get to your dive destination.
5. The plastic underwear (dust covers) on the flash cables will cause the O-rings to become flat and will cause the camera to flood.
6. Connectors left connected to either the camera or strobe for a week can become frozen and break everything, including your bank account.
7. Greasy flash contacts prevent strobe firing just like corrosion.
8. Know how to check out your flash cable(s) just in case it became the boat guide's handle to your photo equipment.
9. The gray side of a double flash cable is totally stupid and does not have a mind of its own. It must be told what to do by the strobe hooked up to the black side.

Note: Nikon announced the "Recall" of all Nikonos SB103 strobes on or about 10 September 1998. Please contact Nikon at 1-800-645-6687. They will arrange to exchange your SB103 (head only!) for a new SB105 (head only!!).

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NIKONOS WORKSHOP

NIKONOS-V

TUG-OF-WAR
(A Murder Mystery by Hercules Murphy)

Text and Photos by Bob Warkentin

For quality underwater photographs showing the proper mix of water, marine life and human interaction, remember the old sayings "know your diving area" or "you just gotta be there".

So, let's set the stage for Murphy's TUG-OF-WAR play! The players are (1) the strength of Hercules' thumb coupled to (2) his mindset TUG-OF-WAR insistence to (3) force the camera's metal gears to (4) force the camera's plastic gears to (5) STRETCH his roll of film for JUST ONE MORE FRAME!

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ACT 1: Please! Just a little more film.

You begin to search a reef you have never dove before for that proper mix of subject material. After a while of searching, becoming familiar with the reef and taking so-so pictures of so-so subject material, all of a sudden its right there in front of you: that proper mix with no back scatter and you've got your BC just right!

Anxiously cocking your camera, about half way or so through your required cocking motion you feel your film advance lever stop short of full cock, telling you "You are

finally out of film!". Hurriedly you begin to STRAIN and TUG on your film advance lever with your thumb as you say to yourself "There's just gotta be a little more film hiding in the canister!"

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ACT 2: Boring Camera Mechanics

Remember, although thin, photo films are very strong. Also, the other end of the film has (for obvious reasons) been attached to the canister's spool with a strong piece of tape. So, for your Nikonos V (and probably all cameras), your TUG-OF-WAR literally breaks ("murders") many plastic internal gears which are caught between the strength of your Herculean hand to advance the gears just for a little more film, and the strength of the film and tape not to give you any more!

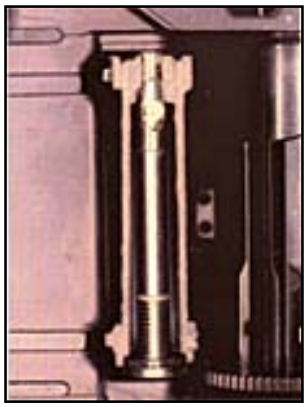

Photo 1

To understand how things in the camera get broken, we must get real technical about construction and your "cocking" operations! There is a spring loaded, long METAL gear axle located (hidden from view) inside the hollow PLASTIC film sprocket (photo 1) which extends all the way up into the upper camera chamber where the film advance assembly is located (see photos 3 & 5 as well). This metal gear axle is equipped with a METAL screw "finger" mounted to it at 90 degrees. Also, in the top of the internal chamber of the PLASTIC sprocket are 3 PLASTIC notches I call "wagon wheel spokes" (photo 2). During all shutter speed settings except "R" rewind, the metal "finger" sits in the plastic notch.

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Photo 2

Mechanically, your simple "cocking" operation is engineered to move many gears (some are visible in photo 5), which, in turn, (1) makes the axle rotate causing (2) the axle's metal "finger" to push (against) the flat surface of the plastic wall of a "spoke" inside the sprocket in order to (3) rotate the sprocket to achieve (4) the advancement (pulling) of your film out of the canister for your next shot. So, when your thumb feels the advancing lever tighten up (a restriction) during film advancing, this is simply because there is no more film to freely unwind off of the spool.

Photo 3

Next, mechanically, although you may never have noticed it while turning the shutter speed dial past the "B" setting going towards "R", about half way between you should begin to feel some slight restriction to the turning of the dial as compared to that experienced between other speeds. This feeling is simply due to the changing of gear operations in the camera: the spring loaded metal axle inside the film sprocket is being pushed downwards (photo 3) taking with it (disengaging) the metal "finger" out of and away from the plastic sprocket's "wagon wheel spoke" notch.

As long as the originally flat wall of the "wagon wheel spoke" remains flat, turning the camera to "R" causes the axle's "finger" to simply slide down the wall disengaging the sprocket for leftward rotation (rewinding) of the film. But, unknowingly, your STRAINING the film advance lever to TUG OUT that one more shot has now forced the axle's metal "finger" to become IMBEDDED into the no longer moving, once flat, plastic wall of the sprocket's "spoke". As long as the film (and camera) remains tightly STRAINED between the spool and the sprocket by your over zealous TUG-OF-WAR, the axle's "finger" will remain IMBEDDED and hung up in the "spoke" and will no longer simply slide down the face of the once smooth "spoke" when turned to "R".

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ACT 3: The Damage Occurs

Realizing that you really are out of film, you make mental notes of the war stories of the 37th photo that got away as you are returning to the surface to reload the camera. Its not until you begin to rewind the film that you get your FIRST INDICATION of a possible problem other than just being out of film.

When a TUG-OF-WAR "hang up" of internal gears has occurred, it will be exhibited to you while are now turning the shutter speed dial half way past "B" on your way to the "R" setting. But, if you have never been aware of the existence of a feeling of some restriction, or you had never given it any thought in the first place, then the unexpected degree of restriction you will now encounter won't be able to warn you of pending doom.

Since you have now felt an extreme restriction even though the shutter speed dial is only half way into the "R" setting, you first assume that the camera must be in the proper "R" position after all, regardless of the fact that the dial is not yet fully aligned to "R". Thus, you flip out the rewind crank handle and begin to crank up the film. As you begin to force the handle to wind the film, you feel it difficult to move the crank. As your hand applies more force, you notice that you have now broken the crank handle away from the camera!

In frustration, you return again to the shutter speed dial and apply additional strength to force the dial to turn further towards the "R" position. As you apply, and continue to increase, force from your hand to make the dial turn to "R", all of a sudden you feel the dial "break free" of the restriction and turn. Removing your hand from the dial to inspect your handy work, you notice that the dial did turn but this time the dial has now been moved beyond the "R" position. You again try the remaining pieces of the broken rewind crank and again find that it won't turn nor rewind the film.

Realizing that the "R" position of the dial must, after all, be properly lined up with the white mark on the camera, you again begin to turn the dial from beyond "R" (the zone on the dial containing no numbers). However, there is as much restriction to the turning of the dial as there was before. Again, through the strength of your hand, you manage to overcome the resistance and the dial is now aligned with the white camera mark. Breathing a sigh of personal relief, you again grab the remainder of your broken rewind crank only to find that it still won't move. End of ACT 3.

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ACT 4: The Broken Parts

There are two internal plastic gears which move as you rotate the shutter speed dial. One of these gears (photo 4), which is PERMANENTLY mounted to the big film advance assembly, when rotated into different positions is used for things like changing the mechanical shutter speeds, blocking the accidental pushing of the trigger from opening the shutter and letting in light during rewinding of film, turning on the electronic main switch, and disengaging sprocket gears for the rewinding operation.

Photo 4

Made of plastic, this gear (photos 5 and 6) gets broken when the speed dial is intentionally forced back to "R" after it had has been accidentally forced past "R".

Photo 5

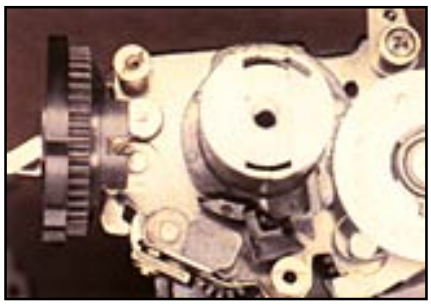

Photo 6

Intermission: At this point in the play, either you or a photo pro takes the camera into the dark to unload the camera and save the film.

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ACT 5: Nothing Works

Back in the room light, you begin to inspect the film canister, and the insides and out of the camera for visual problems: none found except the broken rewind crank which you find can still be rotated by hand, even without its handle. So, after reloading film and closing up the camera and turning the shutter speed dial off of "R" to whatever shooting speed you normally use, you try advancing the cocking lever of the camera: nothing works! You then press the trigger: nothing works! Lever; trigger; lever; trigger; still, nothing works! Well, that's the end of ACT 5 as well as your use of your camera for the rest of your dive trip.

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Epilogue

In a nut shell, what has happened as a result of your trying to play TUG-OF-WAR between the strength of your hand to STRAIN out just one more picture and the strength of the film is that (1) the gears inside the plastic sprocket have become jammed, causing you to have to (2) use extreme force to turn the speed dial to "R" and override the jam, which usually results in (3) the dial being turned past "R", which results in (4) unfortunately your breaking internal parts of the camera when returning the speed dial back to "R", and worst of all, this is (5) not an in-the-field repairable problem unless you just happen to have expensive parts with you!

True, we all usually go to the end of our rolls of film before we rewind them. And, whatever the excuse, we know there are times when we have tried just a little harder than usual to get that last frame out of the canister. But all of this damage could have simply been avoided if you had trained yourself to realize the feeling of "rewind restriction" and took alternative measures.

Teach this "normal restriction" feeling to yourself first without any film in the camera at all and turn the dial into "R"; then load up a roll, fire only 2 or 3 shots to put a normal tension onto the film and then turn to "R". Remember from above, the feeling of restriction always appears about half way between "B" and "R". Compare it to that feeling of between speed to speed selection!

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To experience "abnormal restriction", begin by first being sure the camera is not cocked (fire the camera!) and is in any shutter speed other than "R" (let's use "A" just for the sake of argument). Now, open the camera and hold your finger tightly against the sprocket. Try to cock the camera a little with your other hand, simulating the strain put onto the camera's gears by the film. While keeping your finger on the sprocket, use the other hand to turn the speed dial from "A" to "M90", to "B", and then to "R". About half way to "R", you will feel the very stiff, "abnormal restriction" of the over strained gears. Know the difference!

If you believe you have felt a strained condition present during rewinding, don't force anything. Just open and unload the camera by hand in the dark room. If you do, you will find that the camera still works and hasn't been damaged. From then on, unless you just love sitting in the dark winding film by hand, I suggest always saving a few shots for those great photos at occur only at the end of every dive. I'd rather come back with only 30 shots exposed than a jammed camera.

CAUTION!
STOP! DON'T DO ANYTHING MORE IF YOU SEE THAT YOU HAVE FORCED THE SPEED DIAL PAST "R." Remember at this point, although you can't use the camera for the rest of the dive trip, nothing has gotten broken: yet! So a truly skilled technician

who is specifically trained can usually correct the problems in just a few minutes without parts and without full camera disassembly (saving you maybe as much as $150).

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Summary

1. Great photo opportunities never occur until the end of the dive! But, is that 37th exposure really worth $150 to you? Get into the habit of saving a few shots for the end of the dive.
2. Your TUG-OF-WAR on camera gears for just a little more film for that last shot will jam other operations and you will break parts.
3. When turning the shutter speed dial to "R", first train yourself to recognize the feel of "normal" vs. "abnormal" (jammed) restriction.
4. When uncertain about the feel, rewind the film by hand in the dark room.
5. Reread the "CAUTION." If damage to your camera is of no concern to you, how about damage to your pocket book?

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NIKONOS WORKSHOP

NIKONOS-V

WHEN YOU WALK, DON'T CHEW GUM

Text and Photos by Bob Warkentin

Most of us have probably known someone who, as they would say, "could not walk and chew gum at the same time". Just too many things going on in their life at one time for them to contend with that they couldn't figure out their problem nor how to control nor order nor eliminate the problem(s). Life was just one "gum ball machine" after another.

For a Nikonos V, there are also "gum ball machines" which suddenly appear along your pathway of camera use. As your focus of attention becomes preempted from continuing to perform your seemingly simple task (cocking the camera) to that of sampling the flavor of the moment (watching and chasing the fish into a better photo position...with your camera?), attention to detail becomes split and camera jams occur.

There are so many mechanical operations going on within the camera during those seemingly simple operations of cocking the camera and firing the camera that they would boggle the mind the first time they were mentioned. The fact that these operations can be easily jammed by improper operation should not, then, come as a big surprise. Until it happens to you!

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Mechanical Operations #1

Photo 1 shows the shutter cocking linkage in its at-rest position; Photo 2 shows the operations of both the take-up cam's rotation and, in turn, the linkage being pulled to the right as you are half way through YOUR cocking of the camera (by you simply moving the film advance lever). Upon completion of your process of cocking the camera, the cam will have been rotated a full 360 degrees and the linkage will be pulled back to the left via a spring located on the shutter assembly (i. e., everything will again return to their positions as seen in photo 1).

Photo 1

Photo 2

Nikon also provided 2 trigger blocks which I think you will appreciate: first, on the shutter cocking linkage (photo 1) there is an extra amount of metal which, during cocking, slides under the trigger (photo 2) and blocks the trigger from accidentally being pushed downwards and firing the shutter while you are cocking the film (ruining not only the picture you just took but also the new unexposed film for your next picture), and second when you turn the shutter speed dial to "R", this moves another linkage (this linkage is mounted on the film advance assembly) which also blocks the trigger's movement.

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Those Gumball Machines: Problem #1

The Nikonos V has what is basically an anatomically correct grip on the right side of the camera. For those of us who shoot the camera with the strobe dismounted from the camera tray, we say of this design: WONDERFUL! Holding the camera comfortably in one hand, we can not only reach the trigger to fire the camera with one finger, but we can also reach the film advance lever with our thumb and re-cock the camera (usually by "pumping" the advance lever). We no longer are required to use our left hand (and juggle the dismounted strobe somehow) to hold the camera while we completely take our right hand off of the camera just so that our right thumb can be used to cock the camera.

But, as your anatomically correct fingers of your right hand CLUTCH your anatomically correct dismounted camera, your anatomically correct index finger which is typically resting over the trigger may also be "clutching" the camera as well, and pressing down on the trigger. When this happens, two things occur: (1) advancing the film with your thumb feels very difficult but you can complete the advancing operation fully, or (2) nothing moves at all.

What has happened is either that (1) the trigger's linkage (believe it or not, there are four parts, not to mention springs and screws, that operate when you push on that simple little button on the outside of the camera) is being pushed downwards and rides against the shutter cocking linkage, or (2) remains fully depressed downwards from your taking the last picture, and remains completely in the path of the shutter cocking linkage's trigger block preventing any movement (photo 3).

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Mechanical Operations #2

Note: Photo 3 is a cutaway of the camera's casing showing how the "trigger button" operates the external trigger linkages which, in turn, operate the internal linkage. The trigger guide (photo 1) has been removed from the bottom edge of the frame to show the full extent of the "blocking" extension of the trigger's internal linkage during camera firing. Photo 4 shows all of this in its up, "ready for the next shot" position, and also the sole spring that operates all of those parts that comprise what we simply call the camera's "trigger."


Photo 3


Photo 4

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Damages

From (1), normally nothing yet, except possibly the loss of getting that picture because it took you longer to get that darn camera cocked. But from (2), the trigger becomes stuck in

a down position, jammed up against the shutter cocking linkage. And, further efforts on your part hoping that by your forcing the thumb lever just a little more you would clear the jam and be able to cock the camera, results in bending the shutter cocking linkage (part must be replaced professionally) and killing the camera for the rest of the trip (photo 5 & 6). But, if that big screw (combination screw and pivot axle for the shutter cocking linkage; see photo 5) gets broken during your continued force, guess what: you may be told to buy another camera!

Photo 5

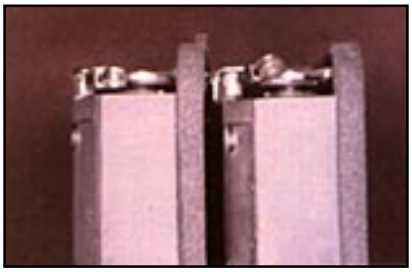

Photo 6

Although the head of the steel axle appears big, its threaded end going into the camera's aluminum frame is very very small: drilling out steel that small is difficult at best, but when it must be 100% accurately done or else, you can just about hang it up all together! And, NO, frames are not available as a separate part from Nikon.

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Problem #2

For those of you who have been too preoccupied with everything else about preparations for that diving trip except "required" maintenance of your Nikonos (And why not! You never ever had to spend a dime on a camera before in your life because you never knowingly "damaged" one!), but are now having problems with a "sticky trigger" that you are having to push up from the bottom with something like a tooth pick or a straw, better listen up. And, you better reread the Problem #1 again. All you have to do is to forget to push up that trigger once after firing the camera. Since the trigger remains fired, and therefore in the path of the trigger block, you will jam the gears just like above.

But, possibly worse than bending a linkage is the fact that this problem is caused by you not maintaining the camera properly. Oh, you clean and soak the camera in fresh water when you get back to the room, you say! Too late, I say! And, the fact that the trigger is

binding ought to be proof that what you have been doing (washing/soaking back in the room) was not the correct cleanup procedure.

Photo 7

What you have allowed to happen is evaporation of the salt water's water leaving behind now insoluble salt and mineral deposits (ALL OVER THE CAMERA in addition to the trigger port). The results are many (photo 7): the residues have built up dive after dive and now restrict the movement of the trigger via the one little spring in the camera (photo 4) (remember, the "trigger" is made up of a lot of parts, all of which are functioned by this one spring). And worse yet, the metal of the O-ring port of the camera's casing has become pitted from corrosion (photo 8). At a cost of $256.00 for a replacement outer casing, if the casing's loss of metal from pitting (and user neglect!) is so extensive, you had better plan on buying another camera and treating this new one right from "day one". And, no, simply replacing rubber O-rings won't make a pitted case water tight either. All this was discussed in corroded detail the Nikonos Workshop Fall 1988: better pull out your back issue again.

Photo 8

So, be aware all ye "sticky trigger" owners. You must have periodic professional maintenance (yes, "professional" means this is something you aren't supposed to do yourself, and "yes" it means paying money) servicing of this camera and other Nikonos equipment just like your annual servicing of your regulator and BC. Continued use of a tooth pick to push up your sticky trigger, rather than having the problem serviced, will definitely result in water leakage/flooding!

True, these two problems are the most frequently encountered reasons for causing a gear jam. But there are others such as rust from water droplets from improperly opening the camera (see Photo #6 closely), or by pieces of plastic from a broken battery compartment floating around loose inside the gears just looking for a place to jam.

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Precautions for You "Prove It to Yourselfers"

For those of you who just have to prove things to yourself before you will believe anything, then I better give you some ideas on how to SAFELY demonstrate to yourself the linkage/trigger jam phenomenon. Please exercise caution and light force throughout these operations, or else get your pocket book handy to pay someone.

1. TRIGGER BLOCKS: Cock the camera. Now, turn the shutter speed dial to "R". Notice that you can not depress the trigger. Turn to any other setting, and you can fire the camera. Next, cock the camera only HALF way! Pushing down on the trigger, you notice that it will not move. Continue the cocking of the camera, and now you can push the trigger all the way down.

2. SHUTTER COCKING LINKAGE JAM BY HOLDING DOWN TRIGGER: First, be sure the camera has been fired before starting this procedure. Holding down on the trigger, start to advance the thumb lever slowly until you feel it stop moving (which happens almost immediately!). Keeping LIGHT forward "cocking" pressure on the thumb lever, remove your index finger off of the trigger. Observe that the trigger is still in the down position and that you can not advance the thumb lever. Now, as you begin to reduce your forward thumb pressure on the lever, you will observe that the trigger begins to "jump" (spring) up back to its normal position. To be sure that you didn't mess up something during your testing, cock the camera and fire the shutters several times.

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Spank the Bad Camera!

Sometimes (but not always), you can clear a (Problem #1) trigger jam from the outside of the camera without requiring a full disassembly if you have not already stressed the gears too much. Simply hold the camera in one hand (FINGER OFF THE TRIGGER!), then swing it such that you strike the base of the camera in the palm (or heal) of your other hand. No, don't beat your poor little camera against concrete, just your hand. And, no, don't beat it against your hand so long or so hard that you injure your hand. This procedure is like striking the bottom of a hammer's handle in order to seat a loose hammer head. But if the gears are jammed, THEY ARE JAMMED!

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Summary

When you operate the camera one-handed, with the strobe dismounted, then don't forget to either "walk" or to "chew the gum." Remember to keep your anatomically correct fingers in synch with your anatomically correct brain to function your anatomically correct camera.

2. Forcing external levers in an attempt to clear internal camera operation jams only causes further damages. Spank the bad camera first!
3. "Sticky trigger" abusers are "procrastinators" who have been maintaining their equipment wrong (and probably their regulator as well)! It's just your camera's way of crying out for professional servicing, (if there's anything left to save)!
4. Pieces of plastic from broken battery compartments can cause more damage than just blocking the film advance/trigger operations. (Explained in the article: "Value of a Nickel").

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NIKONOS WORKSHOP

NIKONOS-V

THE VALUE OF A NICKEL

Text and Photos by Bob Warkentin

I have to ask: who in their right mind would waste their time to fully study the mechanics (and damages) of screwing in a battery cap into a Nikonos camera? Well, I hope everyone will after reading this article.

The reason is that I constantly see camera after camera with a broken plastic battery compartment, pieces of which can fall and either jam or damage internal functions like the shutter assembly, and/or major permanent gouges put into the camera's main outer ($250.00+) water tight casing resulting in flooding, and other problems costing you good money. And when do these problems begin? From day one of ownership!

This seemingly mundane human operation of installing the battery cap into the Nikonos camera is always done wrong, at least in my opinion.

Because screwing in a battery cap seems so simple and straight forward a human operation, people typically resigned themselves to the ever present battle of fighting the Nikonos battery cap "flip-flop" during installation thinking it's just a normal factor of Nikonos life and certainly not something that you could be doing wrong! One merely sees the "COIN SLOT" in the bottom of the battery cap, reaches into their pocket for any coin, foreign or US, and begins unscrewing from, or screwing in, the cap of the camera. As long as you can finally get the cap into or out of the camera, who cares what the COIN SLOT finally looks like (photo 1). And if the batteries turn on the electronics of the camera this time, and the camera didn't flood this time, and you got some pictures, what could be wrong with the way you put in the batteries?

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The Coin Slot of the Battery Cap vs. the Proper Tool

Do the edges of your battery cap's coin slot now show signs of battle scars (like those in the 4 caps of photo 1)? Then it is for certain that you have been using a wrong size coin, and battling the battery cap "flip-flop" when installing the cap into the camera's battery compartment (as well as over-tightening the cap and/or leaving it installed to corrode in the camera without removing it every day for cleaning; but these are other human mistakes for later discussion).

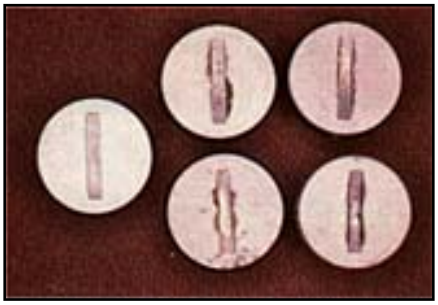

Photo 1

When selecting a coin to use for a Nikonos, first, and most importantly, always keep this concept in mind: use only a proper sized tool (coin) for the properly required size job! I recommend using ONLY a US nickel: it's the proper tool for the proper job!

Photo 2

Many nickels have NOT been stamped flatly; that is, the edge of the nickel is THINNER on one side and THICKER on the other. Since the edge of the coin is "roundly" graduated from thin to thick, you will be able to install the coin into the battery cap's slot and roll the coin until the coin ÿ completely, firmly and perpendicularly LOCKS into the entire slot. In fact, you will now be able to pick up the cap, full of batteries, and wherever you move the nickel, so goes the battery cap full of batteries (photo 2)! Now, you've got CAP CONTROL!

You may be thinking: "What's the big deal with the size/thickness of the coin? With needing complete cap control? With battery cap "flip-flop"? If the battery cap's coin slot finally gets so messed up that every coin you now use, nickels included, always slips out of the slot when you remove/install the cap, you can just buy another cap; they can't be that much?" Obviously, I wouldn't be writing an article about preventing you from messing up a $10.00 user-replaceable cap if there wasn't more to it. And believe me, there are many serious damages going on within the camera when the cap goes "flip-flop"

because you have not got control of the cap!

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The Three Areas of "Flip-Flop" Damages

Obviously, any coin thinner than a nickel (like a US quarter, dime, or penny or a 100 Yen coin) can not provide you with the control needed to safely install a Nikonos battery cap. So, when your thin coin "flip-flops" in the coin slot, you have lost complete control of WHERE your battery cap is going. The "flip-flop" of your thin coin unfortunately causes the battery cap to also flip-flop inside the hole of the camera's casing. Results: three areas of serious damage costing you anywhere from $150.00 to having to buy another camera!

Damage #1

First, let's study the metal battery cap and how it is designed. In photo 3, notice that the O-ring channel has been cut out of the solid metal base. Therefore, on either side of the O-ring channel are metal walls and metal edges.

Note: All O-ring seats, regardless whether they are found in a Nikonos or a pipe line, require a total of four walls for proper seating/enclosure of the O-ring. Also, the four walls must have a minimum of clearance between them where pressures are involved. For a Nikonos camera, we typically call the three walls an "O-ring channel"; for the fourth wall, most people don't even realize it exists and therefore don't give it a catchy name. Better try on this name in your vocabulary from now on: the camera's MAIN OUTER CASING, whose cost to replace is over $250.00!

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Photo 3

Next, notice that the edge nearest to the cap's threads has a 90 degree shoulder (remember, it's metal!). As the cap goes into the hole of the camera...PERPENDICULARLY...no damage can occur. There is just enough clearance to allow the two pieces (cap and camera casing) to be installed together while compressing the O-ring for water tight use.

Photo 4

But, when the cap "flip-flops" sideways as you try to screw in the cap, the 90 degree edge is no longer kept parallel to the casing's fourth wall. Your sideways installation now causes the 90 degree edge to cut into the fourth wall of the camera's MAIN OUTER CASING. And, as you continue to rotate (screw in) the metal cap, this 90 degree edge cuts barber-pole circular gouges into the casing's wall (photo 5). Unfortunately, you are not just removing paint. You are permanently damaging the casing's metal wall and the camera's water tight seal-ability. It could flood!

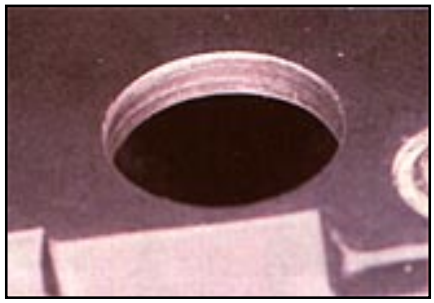

Photo 5

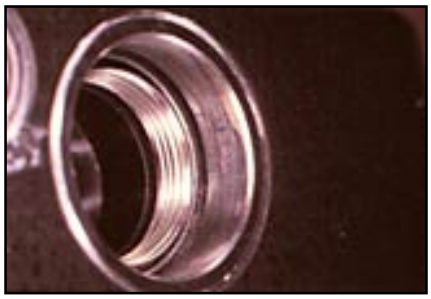

Photo 6

Oh! You've got the style of casing with that nickel plated thing around the hole. Well, humans can still screw them up as well (photo 6). And if too damaged, then the whole outer casing must be replaced just to get a "new", smooth hole. Cost of casing: $250 +!

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Damage #2

Uneven wearing of the threads or cross-threading. While I think the latter speaks for itself,

let me address the former a little further. Notice in photo 7 that the threads are now a golden (brassy) color due to being worn, and lots of fine brass filings due to being cross threaded. In fact the outer most thread, the first thread seen by the battery cap, is the most worn; the next ones are worn progressively less in intensity which accounts for the appearance of wear in a "funneling" configuration.

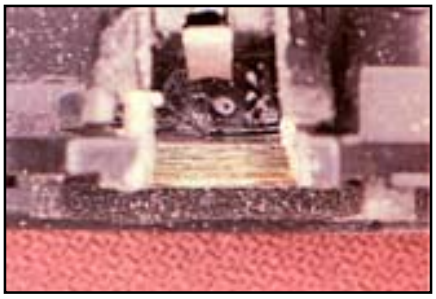

Photo 7

I know somebody out there has cussed the fact that they can't unscrew the battery cap far enough out of the camera's hole as they once used to so that they can grab it with their fingernail. If you are one of those, better check the color of your threads. How many gold ones do you have? And, you better have the "funneled" ring replaced. It ain't cheap, but it is cheaper than a flood or other damages you will cause if you do not have it serviced!

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Damage #3

The black plastic battery compartment has only a specific capacity: it holds only the volume of a tall battery (or 2 small ones) when installed PERPENDICULARLY! But, as your metal cap (loaded with metal batteries!) flip-flops in the battery hole of the camera because you are using an improper tool (coin), not only is the metal battery cap being SCREWED in somewhat sideways but also the metal batteries are being FORCED into the plastic battery compartment somewhat sideways (diagonally). Well, in case you forgot your high school geometry, diagonal distances (height) are always greater than perpendicular distances (height). Therefore, your flip-flop battle with the battery cap (caused by your loss of cap control from not using the PROPER TOOL!) causes the batteries to go diagonally into and up against the plastic battery compartment causing it to be broken.

Results are many! Loss of battery contact; no electronic camera operations; and, pieces of the broken plastic falling into the shutter's gears blocking or breaking shutter operations. Replacing the broken plastic compartment isn't cheap, much less the labor involved with having to take apart all of the camera parts just looking for all small pieces of broken plastic. But if the shutter is also damaged, you will really learn the value of a nickel!

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Where is the Battery Compartment in the Camera?

Photo 8

Way, way down inside the camera. In fact, after the shutter is put into the camera during assembly, the next thing usually is mounting the battery compartment! For repair or replacement of either the threaded ring or the plastic compartment, this means removing the entire inner guts from the camera's casing, then undoing all of the electronics and nearly 50% of the mechanical parts before you can get to it. After replacement, everything has to be put back together, calibrated, all O-ring cleaned, and then pressure tested before the job is done. Lots of time, lots of labor, and lots of nickels!

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Proper Installation Techniques

I guess you now know the value of a nickel. Here is how you put it to work for you:

1. Roll the nickel into the battery cap's coin slot until it locks to the coin slot. (If yours doesn't, either get another correct nickel or get yourself a new battery cap.)
2. Holding the nickel perpendicular to the hole of the camera, insert the cap straight up and down.
3. Once in the hole, begin screwing COUNTERCLOCKWISE while putting some inward pressure onto the coin. Continue this combined counter clockwise rotation/inward pressure until you hear a "click" sound (you may have to rotate anywhere from 1 degree to 359 degrees until the "click" sound is heard). Remember, keep everything perpendicular!
4. Once the click is heard, you may be surprised to know that you have properly aligned the starting thread of the cap directly in line with the starting thread of the compartment's ring!
5. Now, begin screwing in the cap CLOCKWISE. It should screw in as smooth and easy as cutting through butter with a hot knife. But, still use caution during your first few times of practice/self teaching. You may not have heard the click, went too far past the click, or still held the cap sideways and never heard the click. And, excited that you heard the click, you may tilt the nickel after all and still cause the cap to go in sideways. Just begin cautiously to rotate clockwise only about half a

turn feeling as you go; smooth feeling, screw it all the way. If not, start all over again...PERPENDICULARLY this time!

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Summary

1. Take your battery cap with you to the bank and buy several rolls of nickels. When you find your PROPER TOOL nickel for the proper job, better find at least one more.
2. Putting a battery cap into a Nikonos ain't hard. Rotate counter clockwise first until you hear the click; then clockwise!
3. Remember your high school geometry terms: perpendicular, diagonal distances, parallel distances, capacity and volume. Don't over fill the black plastic compartment.
4. The "gold" color you see on the threads of the battery compartment in the camera and the battery cap doesn't mean you discovered hidden treasure, it means it will cost you your hidden treasure to have these damages fixed.

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NIKONOS WORKSHOP

NIKONOS-V

NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS (PART 1)

Text and Photos by Bob Warkentin

Forward

This is Part 1 of a 6 part series on O-rings. The problems we'll study are: (1) O-ring fatigue: when you apply grease, round black USED O-rings look just like round black NEW O-rings to most everyone until a flood happens, and (2) "O-rings" is not a simple topic if you are going to fully understand them, and learn to identify and use them correctly to keep your equipment from flooding. Sprinkled through this article will be photos of only some of your "user serviceable" O-rings, installed into their respective O-ring channels, showing a comparison between their appearance in a state of "new" vs. "flattened". By the time the series is completed, all "user" O-rings for all your Nikonos cameras, lenses and SB strobes and cables will have been shown, as well as some internal O-rings you can't get to.

All O-rings may look to you like thick black rubber bands or plain ole' common "hardware store" O-rings. Not so for Nikonos O-rings: there's a lot of science and technology that has gone into the development of the synthetic rubber (called either Nitrile, Buna-N, or NBR) for its end product uses. And, like everything else, there are "pros": abrasion resistant (opening and closing O-ring sealed areas to change batteries, film, etc.); chemical resistant (the gasoline, diesel and oil in the water at the back end of the boat won't damage the seals as we wait to re-board); wide temperature use range; and no oxidation when exposed to water; and "cons": these seals will take on a permanent "in use" memory (fatigue) of about 25-30% over time.

Almost daily, I have to answer that horrible "why" question: why did my strobe, camera and/or lens flood? The explanation generally involves fatigue to their rubber O-rings, or a combination of fatigue and their failure to remove contamination. Worst of all, everyone thinks that simply greasing O-rings keeps them good forever.

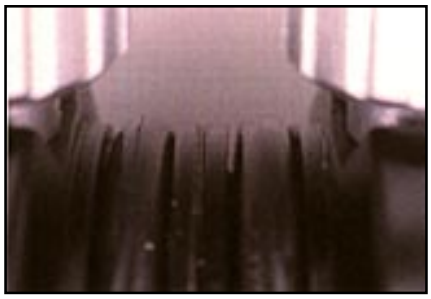

Photo 1
Lens mount O-ring. left: flattened; right: new.

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Rubber Fatigue

So, how do Nikonos rubber O-rings fatigue? Let me use a common rubber band to explain.

We get rubber bands free around our news paper or our door knob; sometimes we even have to buy them. New or used, we never think of them going bad. But, if you left your news paper in the closet for 6 months wrapped with a rubber band, surprisingly you would discover that this valuable little item had been permanently stretched out of shape and had lost its elasticity. True, we may have to twist it around something a couple of times more, and if it should break we can simply tie a knot in it to restore its usefulness, but it never seems to fail us if we really need it.

What really has happened during this 6 months is, unknowingly you have asked the rubber band to continuously do some form of WORK (that of holding the paper rolled up). In the process of doing this seemingly unimportant and not really requested WORK for you (because you knew where it was and had plans of using the rubber band for other purposes later on, you just forgot to take it off the day the paper was delivered), what has happened is that the rubber band has taken a "memorized" WORK shape based upon the size (WORK required) of the paper. Even if you now remove and save the rubber band, a year later it's still limp.

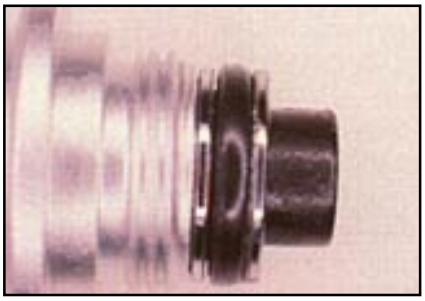

Photo 2

Photo 3

SB flash cable connector end to camera. #2: flattened; #3: new.

Another way of explaining this effect is that the news paper becomes a mold, causing the rubber band to be slowly and continuously "REMOLDED" to the exact size and shape of the rolled paper.

In short, the rubber has permanently given up its "ELASTICITY" by being "REMOLDED" during its process of providing you "WORK". It happened continuously, little by little, starting from the day that the rubber band was first put around the paper until the day it was removed.

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What is a Rubber O-Ring?

Regardless whether we are talking about Nikonos equipment or a door at the house, everything that is designed to be opened or to be moved must have some space (be it ever so small) between it and the item to which it is attached or into which it is intended to function. No space, no movement!

Nikonos O-rings must be an "elastic filler", filling the space that must exist between movable things like the lens and the camera's casing, the battery cap and the strobe's casing, (for your door at home, you can put a rubber "filler" strip around it to reduce hot or cold air loss!).

Therefore, a Nikonos rubber O-ring is (1) an "elastic filler" (2) of certain chemical, environmental abrasion and compression resistant qualities that (3) must do the WORK of providing a force of sufficient elastic resistance between two items (4) greater than the maximum rated external force to which it is intended to be exposed (water pressure) (5) to provide sealing (prevent leakage).

NOTE: You better realize once and for all that O-rings, their properties, use and fatigue factors is really a science all its own. And, since O-rings keep your equipment from flooding, you need to understand them more than just putting on grease before diving. Also, these terms set the stage for the explanations of why your O-rings fail, and why user mistakes happen which lead to equipment flooding.

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Is There Continuous Flattening Going On To My Nikonos O-Rings?

You bet! Every O-ring installed in your equipment is filling those spaces between the parts and are, therefore, under its MAXIMUM condition of WORK compression, whether during periods of storage or during diving. Sooner or later, they get flattened (remolded), regardless of how many dives you have made.

Oh, don't forget about those internal O-rings that you can't get to. They have been under continuous compression since the day they left the factory, and they get flat too (see Part 2)!

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I've Heard Nikonos O-Rings Seal Better Due to Water Pressure Like My Mask Squeezes to My Face

You've got to be kidding! Let me use a sandwich type cookie, consisting of two cookies with a cream filling, as an analogy for explanation. (Note: before you give me someone's "kidney bean" shape philosophy of O-ring vs. pressure, see Part 2!)

1. Just like you pushing one cookie towards the other, water pressure forces the camera to the lens and the lens to the camera.

2. As we force the cookies towards each other, we see that our pressure has forced the cream center to be squashed and it now oozes out to the sides of the cookies. The more force to each cookie, the more force on the cream center, and the more oozing. This would be what I call a "gasket type" of compression: full face-to-face sandwich compression like your "mask squeeze" phenomenon.

Photo 4

3. Now, let's call one half of the sandwich cookie the lens, and the other half the camera. Let's assume that the lens' O-ring (the cream filling) was designed to lay flat within and on top of the bottom flat face of the silver colored ring on the front of the camera (and not in

the O-ring channel of the lens casing), and that the lens was somehow designed to be installed to the camera with the O-ring in this location (see photo 4). Thus, as water pressure forces the lens towards the camera and visa versa, the deeper you dove the more force (squashing) would be applied onto the O-ring lying between the two camera-lens cookies. If such was the design by Nikon, rated depth of the equipment would not be limited by the O-ring seal, but by crushing the metals of the equipment. If this "gasket" design were in a Nikonos, only then would it be true that water pressure did make the O-ring seals seal better.

Photo 5

4. What actually happens in the Nikonos from water pressure is that only the flat metal surface of the back of your lens is pressured against the flat metal lip in the floor of the silver colored lens mount ring on the front of the camera. Remember, ain't no O-ring there; it's in the channel of the lens (see photo 5). The water pressure just forces metal parts to metal parts!

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Then How Do O-Rings Really Seal in My Nikonos Equipment?

1. We are all familiar with the 3-walled O-ring channel; it consists of 2 vertical walls (numbered 1 & 3) and a bottom or floor wall (numbered 2). Therefore, O-rings for Nikonos equipment generally compress and seal only between walls #2 (of the channel) and against the 4th wall of the O-ring environment (see closely photo 5).

2. 4th wall? What is this? True, it hasn't got a catchy name like O-ring channel, but it is just as important. In the case of the lens O-ring, this would be the vertical surface of the silver colored lens mount ring on the front of the camera into which the lens O-ring is compressed against. (For other areas like the door, etc., I think you can now figure out for yourselves which walls are #2 and #4.)

3. Water tight sealing by the O-ring is governed by the available rubber which extends above and beyond the lips of its O-ring channel. When the O-ring containing item is installed into another item, compression to the extending amount of the rubber by wall #4 forces the rubber against wall #2, thereby forming a rubber "filler" between the two items and water tight seal. (Walls 1 & 3 generally are not involved in the act of O-ring compression for "user serviceable" seals; they act only as guides preventing the O-ring from buckling! Remember this! See Part 2.)

4. Since it is the outer and inner edges of the O-ring which actually provides all of the water tight sealing between pieces of equipment, I'll call this form of sealing as being "edge" compressed for this article.

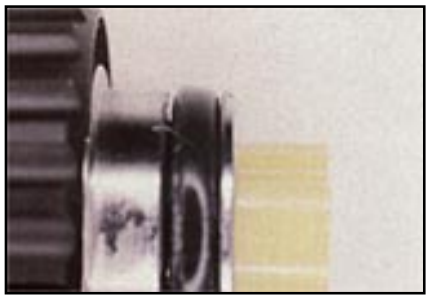

Photo 6

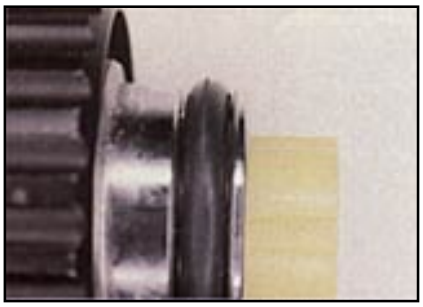

Photo 7

SB flash cable connector end to strobe. #6: flattened; #7: new.

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How Do I Tell the O-Rings Are Flattened and No Good?

The degree of flattening may be slight, sometimes non detectable to the average person's eye; it can even be obscured by excess O-ring grease. But we can all recognize a flood. So, let's learn how to recognize a bad, flattened O-ring, other than through equipment flooding.

1. Since compression to Nikonos O-rings occurs between walls #2 & #4 of the O-ring environment (remember, walls #1 & #3 are just guides), it stands to reason that any and all remolding memorization (flattening) to the O-ring from compression will be easily seen and detected by comparing how much of the O-ring extends above the tops of walls #1 & #3 of the O-ring channel.

2. The easiest way to check for flattening of an O-rings is to compare two pieces of like Nikonos equipment, one with a known, brand new O-ring installed, to one with the O-ring in question. If the O-ring in question appears to be wider across the middle (squashed closer to walls #1 & #3) , not as round vertically, and does not extend above the tops of walls #1 & #3 of the O-ring channel equally as far as the new O-ring does, better replace it.

3. If you don't have a second item of like kind with which to compare, then you must rely on your "mind's eye". Examine the seal in question for its physical characteristics as in (2) above, then replace it with a known new seal and again examine its characteristics. If you can't really remember how the old seal looked like, then throw away the old and go with the new! Better safe than sorry.

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But How About If I Use O-Ring Grease?

Putting O-ring grease on a flattened O-ring is just like putting O-ring grease on a bald tire. Although the tire may look shinny and new, you still ain't got no traction on a wet street! You got to buy new tires (hint-hint!). More on "grease" in Part 2.

Are there other forms of O-ring fatigue? You Bet there are! Stay tuned to the next articles.

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Summary

1. Work: resistance in the rubber of the O-ring to that of compression to produce water tight sealing (and other things).
2. Nikonos O-rings become permanently flattened and remolded from the required "edge" compression effects placed upon them by the #2 wall of the O-ring channel and the #4 wall of the environment.
3. Nikonos O-rings DON'T SEAL BETTER the deeper you go. Neither does making them real shinny with lots of grease.
4. The degree of flattening can't be equated to the number of dives you have made! For "user serviceable" O-rings, learn to recognize flattening and replace. For internal "nonuser" rings you can't see, use the "weak link" concept and professional replacement.

NOTE: Please, before you get the idea of storing your equipment in the closet without "user" O-rings installed, you better read Part 2 in the series!

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NIKONOS WORKSHOP

NIKONOS-V

NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS (PART 2)

Text and Photos by Bob Warkentin

Factors Acting on a Nikonos O-Ring

Typically, any O-ring will be affected by any one (or a combination) of four things: (1) temperature during use, (2) chemical interaction with the O-ring's rubber, (3) fluid (or gas) pressures during use, and (4) the design and amount of pressure (compression) provided by the O-ring's seating environment. There are other factors to consider such as the design of the gland (we call it the "channel") and whether or not the O-ring seal is in dynamic operational use (being opened and closed or performing some operational movement of O-ring-sealed parts during use).

Temperature-wise, the typical range of storage/use for your Nikonos equipment is between sixty and one hundred degrees Fahrenheit, which is well within the "no effect" range of the rubber O-ring compound.

The "fluid" to which the Nikonos O-rings are exposed is typically water (fresh or salt) and the materials dissolved in it. While it's true that some "waters" can affect rubber, it requires a very prolonged and continuous exposure to cause such an effect (run your finger over the rubber ballcock which has been in your toilet's water tank for several years, and notice all the black coming off of it). Since you're prevented from staying submerged indefinitely, and you don't store your camera equipment in water in your closet, there is insufficient exposure over time to cause deterioration of your O-rings. Other items such as spray cans of oil, vinegar, and other seemingly harmless household "chemicals" will damage and destroy the useful life of your O-rings, not to mention other parts of the equipment. But the

most harmful "chemicals" of all are sunlight and ozone; so just keep your equipment out of prolonged exposure to the sun (and away from electric motors).

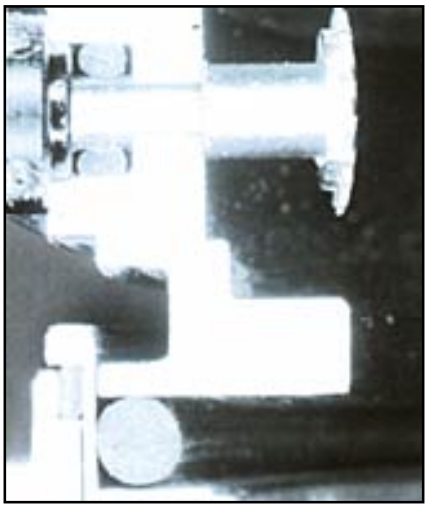

Photo 1
Cutaway of lens and camera body,
user O-ring installed in channel

So now we're down to the last two items affecting O-rings, both of which are pressures. There are only two pressures capable of acting on any O-ring within a Nikonos product: that from being confined within the space of the three O-ring channel walls and the fourth sealing surface, and the pressure exerted by a fluid (water). Let's take the case of the effects of the fluid first just to get it out of the way. If they were used as static seals in a high pressure pipeline, the type and quality of O-ring seals used in Nikonos equipment could be used at continuous pressures of 800 psi and up and at temperatures of several hundred degrees with complete success. However, this increased pressure and/or temperature would affect the O-ring material itself, causing it to shift and deform within the O-ring seating area (caused by pressures of the fluid) and/or swell (caused by temperature, or a chemical reaction due to the fluid in the pipeline), improving the O-ring's sealing ability.

But what are the conditions of this fluid we dive in? Generally, the temperature ranges from seventy to ninety degrees Fahrenheit, air included. This is normal for the O-ring and doesn't cause changes. Likewise, the chemistry of water generally has no effect on the seal.

What's left, then, is the effects of 160 feet of saltwater pressure (about seventy-two psi). In short, the effects from this low fluid pressure are insufficient to cause the O-ring to further shift and seal better within the O-ring environment of your equipment. So if you've ever heard someone talking about the fact that Nikonos O-rings deform into "kidney bean" shaped seals due to diving water pressures and seal better the deeper you go, ask them what they've been inhaling.

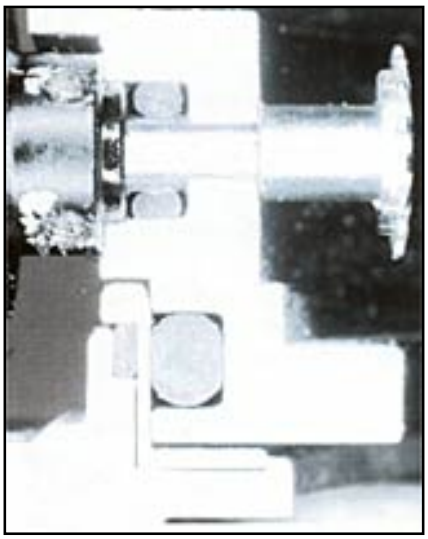

Photo 2
Cutaway of lens and camera showing lens
O-ring installed as a `sandwich cookie"

Nikonos O-rings are "low pressure" O-rings designed to provide sealing at continuously changing diving pressures of zero to seventy and back to zero psi without leaking at either zero feet or 160 feet. They are designed for the "dynamics" of opening and closing and other operations by human hands (not wrenches or other tools). Therefore, what's left that you can rely on, and must rely on, is that only the amount of rubber which extends out beyond the two vertical walls of your O-ring channel will be available to be compressed when the item is mounted onto or into the camera, strobe, or lens. It is this rubber and the condition of this rubber coupled with its clean bearing surfaces and those of the parts in which the O-ring is to be used, along with your proper lubrication, that spell a successful, nonflooding diving experience. This, and your awareness of the facts concerning "memory compression."

Photo 3
Battery cap/SB103 strobe:
left, new O-ring;
right, flattened O-ring

Note: If you are diving in extremely cold areas such as the Antarctic, have high temperature use requirements above 300 degrees Fahrenheit, have diving requirements beyond the rated 160 feet, require the use of medical disinfectants, or require any information that is for a nontypical use for a Nikonos, please contact me for additional information.

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The First Problem: Memory or Compression Set of an O-Ring

People generally worry only about cleaning their O-rings and the channels and applying whatever they consider is a "proper" amount of grease. To them, this is all there is to O-ring maintenance, and they believe if they clean and grease, the O-ring will last forever.

Well, rubber O-rings must be compressed to do their magic. And in the process of doing their "compressed" water-sealing work, the rubber of the O-ring retains some or all of this compression as a permanent memory. This harmless-sounding term "permanent memory" really means that the O-ring is now permanently flattened and that it has lost part of its elasticity, resulting in a loss of its ability to seal out water.

Along with cleaning the O-ring and its environment and using O-ring grease when dealing with O-ring sealed equipment, you must also consider one more thing: compression as a fact of an O-ring's useful life.

Cleaning and greasing a flattened, compressed O-ring is no different from cleaning and greasing a bald tire on your car. While it looks pretty and shiny to you when you use it in a wet area, you ain't got no traction!

Another point to remember: Every week an O-ring remains under compression in your closet is one less week of diving life for this O-ring! More on this later.

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The Second Problem: Opening Equipment Means Exposure to Contamination

As O-rings become flattened by compression, they lose their ability to "reach out" and seal tightly between two surfaces. As these surfaces are opened and closed frequently for film or battery changing, lens replacement, or strobe changing, these greasy user-serviceable O-rings and their greasy environment are exposed to tiny particles of contamination which can become lodged on the bearing surfaces of the O-ring and the bearing surfaces of its environment. In essence, your O-ring now has to try to provide a watertight seal over and around these tiny "speed bumps."

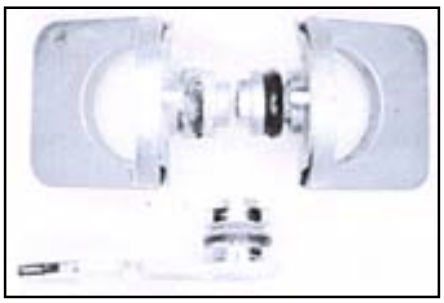

Photo 4
Top row: Door latch;
left, ,flattened and leaking; right, new O-ring
Bottom row: trigger; somewhat flattened
O-ring just starting to leak

A new O-ring with full strength will give you a better chance (if any really exists) of providing a seal in a contaminated area than a weak, flattened seal. The reason is that full-strength rubber capable of giving a tight seal over a wider area of an O-ring channel is all across the widened, compressed surfaces of a new rubber O-ring. If the particles are small, the seal can usually engulf the particle fully and not allow channeling" of water under the O-ring to occur. But if the O-ring has memorized its flatness, well, you fill in the answer!

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The Third Problem: Dynamic Internal O-Rings Which You Can't Replace

These seals are made of the same material as your user seals, installed in their own compressed environments and undergoing the same process of flattening (see photo 4 again). While the obvious difference is that you're not required to remove O-ring-sealed parts like the shutter speed dial or the trigger just to change film or the switch knob of your strobe just to change batteries, don't think that these areas can't become contaminated as badly as user seals or that they can't cause a flood! These seals are "dynamic"; that is, there is a movable operation going on within and around this O-ring seal (like using the film advance lever, rotating the ASA dial, etc.). This dynamic operation allows contaminants to wiggle their way down between the O-ring and its sealing surfaces, causing "speed bumps." Good seals mean water tightness: weak, compressed seals mean leaking or flooding.

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How Often Should I Replace My User O-Rings?

I know some people are going to misquote me on this when they try to tell someone else their opinion. If you're in a position where this question comes up all the time, please try to have other people read this information for themselves.

First, my cop-out: This question is difficult because of all the individual variables in how people use and maintain the equipment. And now to the answer: replace them at least annually (if you're a two-week-a-year sport diver), at least every six months if you're commercial, and certainly every three to four months if you're in rental! But whatever you do, don't just rely upon my calendar; rely upon what you know and see (and read and recognized in the pictures of O-rings in Part 1). Use proper cleaning and greasing and periodic professional servicing (just like your regulator and BC). Remember, every week of closet time for a user O-ring is one less week of diving time!

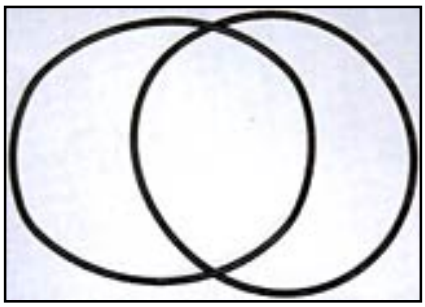

Photo 5
Door O-ring: Nikonos V with
four-corner memory set

Isn't this overkill? Probably! But there are so many different sizes of O-rings in different pieces of equipment and under different degrees of compression that some will flatten faster than others. So use the "weak link" concept: when you determine one O-ring is flattened, all seals should be replaced even if the time period is less than that given above. Also, there are other factors to consider, including cleaning and preventing corrosion to the metal parts or abrasion to the plastic parts.

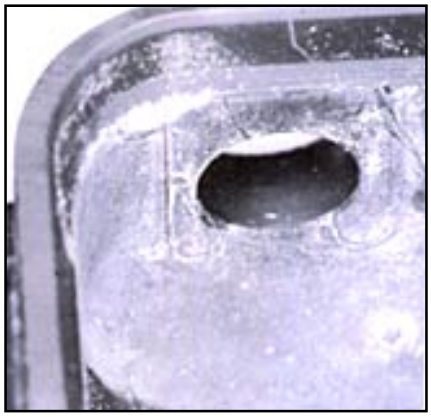

Photo 6
Leakage into camera at curve area
of door O-ring and channel

But the most important thing to remember is that user O-rings are constantly being opened and closed for changing the film, batteries, lens, and flash cable, and this is just on your camera body (think about your other pieces of equipment and their "user" O-rings). If they were left in place and the camera never needed to be opened, they'd probably last longer (except for corrosion buildup on the metal parts) because their O-ring-sealing surfaces (and the sticky grease) would not be directly exposed to contamination from particles of sand, towel fibers, tiny pieces of camera case foam, or grains of dried salt water. So, as your O-rings build up weeks of closet time flatness while losing weeks of diving time plumpness, the greater the chances are that your cleaning will not get everything, leaving something behind that will cause a flood.

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How Often Should I Have the Internal Seals Professionally Replaced?

The owner's manual from Nikon says once a year. You may convince yourself that this, too, is overkill, especially in light of the fact that you can't change these seals yourself but must have a professional do it for you. You must relinquish your equipment to someone for some time, and the cost of such servicing is more than the nine- or ten-dollar bag of user O-rings you can buy anywhere. Just remember these are seals you can neither get to, to see and examine nor get to clean, but they get the combined total of closet and diving time. So for these O-rings, you've got to use both the above calendar and professional servicing. Nikonos equipment is dive equipment; maintain it the same way!

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Nikonos Equipment Ain't Camera Equipment?

Nikonos equipment isn't just a land camera, lens, or strobe; they are pieces of diving equipment just like your other pieces of diving equipment which are used in salt water. So like your mechanical regulator and BC which must have periodic (annual!) professional servicing to keep their moving parts in good, safe, operational condition and control corrosion and pitting of metal parts, your Nikonos equipment must be afforded its diving-related servicing. During the initial servicing of your equipment, you should consult your professional Nikonos service technician to establish a proper program of maintenance for your needs (one year may be too short or too long a period between service appointments, based upon your maintenance, or lack thereof).

Photo 7
Which O-ring do you think is good?

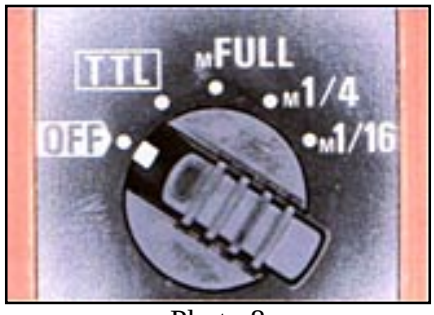

Photo 8
SB103 switch knob

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Summary

1. Nikonos O-rings are, out of necessity, what I call "low pressure" seals. They do not seal better the deeper you go. The compression your seals get while on land is all that your seals can give you underwater, whether it be five feet or 160 feet down!
2. All O-rings take on memory compression based on combined diving and closet times, and therefore they lose some sealability due to both tiny "peed-bump" particles and possible water leakage.
3. User seals and their complete microscopically inspected for "speedbumps" with your 35mm lens/microscope. Remove the "bumps" everytime the seals are opened.
4. Always store equipment with user seals installed for humidity control. Replace user seals frequently, and have the internal seals replaced professionally on an annual basis.
5. Nikonos equipment is diving equipment. Pay the same attention to its maintenance as you do to other pieces of your diving equipment for the same reasons!

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NIKONOS WORKSHOP

NIKONOS-V

NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS (PART 3)

Text and Photos by Bob Warkentin

Is There a Difference Between Frequency of Replacement for User and Internal, Nonuser Serviceable O-Rings?

Even though both groups of O-rings are made of exactly the same rubber materials, I must say "YES". While reading through the following explanations, you must constantly keep in mind these combined factors: (1) time vs. the normal memory compression that always takes place to all O-rings (please see the previous two articles for details), (2) time vs. use and typical salt water residue buildup, and the differences between how residues interfere with each group of O-rings, and (3) time vs. effects from corrosive and abrasive residue buildup to O-rings sealed metal and plastic areas (especially the ones you can't see, nor even think of, nor can get to yourself!)

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Internal, Nonuser Serviceable O-Rings

Photo 1: Trigger Port

New, clean internal nonuser serviceable O-rings originally fit tightly between clean casing walls and clean movable parts (camera's trigger, strobe's on/off knob, lens' knobs) to seal out water, ÿ and only water!

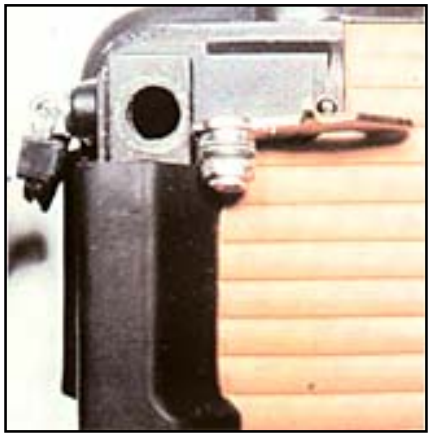

Photo 2

Since these areas were never intended to be exposed or removed by you as part of your maintenance or your normal routine of film, lens, battery or cable changing, the actual sealing surfaces of both internal O-rings and their parts were never exposed to immediate and direct contamination during your "normal" routines. Don't be mislead by this comment; reread it again with emphasis on "immediate and direct" exposures!

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Photo 3: Trigger port: 1/2 clean; 1/6 ?; 1/3 buildup

But, over time, as water (salt or fresh) evaporates after every dive, permanent (can't be rinsed off, and NEVER with vinegar!) residues build up around O-rings and their sealed parts. These damaging residues are abrasive to rubber O-rings and plastic parts and corrosive to metal parts (see photo 5 below). And, through your normal repeated movement of the trigger, knobs and other O-ring sealed parts, over time you cause your neglected buildup of contaminates to wiggle and migrate themselves further down in

between the water sealing surfaces of the O-ring and its part causing leakage (photo 4).

Photo 4: Migration

Add to this equation the effects of continuous memory compression (loss of O-ring elasticity) over time, further reducing the O-ring's resistance against wiggling of built up contaminates into that "danger zone" of flooding.

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User Serviceable O-Rings

On the other hand, every time you open or remove a greasy user O-ring sealed item (camera's back door, lens, cable, battery cap), all those greasy actual sealing surfaces are without question directly and immediately exposed to contamination, be it your first or 51st dive and roll of film (there ain't no "over time" here as with internal seals; it's immediate!) Add to this the facts that (1) people generally don't know the correct ways to clean and inspect O-rings and their environments (next article), (2) tiny particles usually go unnoticed to your eye, especially when imbedded in the grease which is everywhere (but not Murphy's eye!), (3) that your user O-rings have lost some of their elasticity from memory compression and therefore do not have the strength to overcome these tiny particles nearly as well as new user O-rings MIGHT (nothing is guaranteed).

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The Answer Is!

Therefore, for you "2 one week trip'ers per year" who average 10 to 15 dives per trip, the answer is "YES"! I would recommend replacing your flattened, frequently opened and exposed user O-rings every six months (before each trip), and have those internal O-ring

containing parts professionally cleaned and inspected for corrosion as well as the O-rings professionally replaced and pressure tested in water every twelve months (certainly not longer than 24 months!).

But "YES" approaches "NO" if you make more diving use than closet use in the same amount of time as a "sport diver". Not only are more contaminates building up from dive after dive (see photo 3), you are also shooting more rolls and making more movements to those contaminated parts and O-rings allowing the contaminates to wiggle faster (in terms of the calendar) to the point of "leakage" (see photo 4). At the end of six months, don't just replace the user O-rings and think you've done something noble for your equipment; have professional servicing done as well. Remember, the professional must not only remove corrosive deposits from movable O-ring bearing parts and ports to prevent permanent pitting and replace these abraded internal O-rings, but also replace your user rings as well since everything must be equally water tight before it leaves the service center.

A $10 user set frequently replaced and professional servicing periodically is a wiser choice before the trip than hours spent in your room in "overkill" cleaning just to try to cheat Murphy's laws of flooding and saving a few bucks! It's a fact: over time, O-rings get flat and corrosion occurs.

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Why Not Remove the User O-Rings During Storage to Prevent Them From Flattening?

I knew this question was coming, so remember this common dive trip experience! Before flying home, we give our equipment time to dry. Although the regulator's surfaces appear dry to the eye, as we turn over the second stage we notice all that water pouring out of the "dry" mouth piece and into our "dry" suitcase.

Your Nikonos equipment is no different. Although surfaces appear dry, many areas of the camera, lens, strobe and arm and cable you can't see collect and pool water requiring at least 7-10 days s to FULLY air-dry. So, when you place your still wet equipment into your camera case filled with that super-duper foam (I call it expensive kitchen sink sponge-it will "sponge up" and hold water also) and close its O-ring sealed lid, what you now have is an impact resistant "humidor".

Nikonos equipment require very large clearances between parts for safe O-ring compression (unlike land cameras which have extremely closely machined metal parts). So, if you had taken off all user O-rings and left the lens off to prevent user seal compression, without ALL holes "corked" up, what you have done is in essence no different than if you had left $1,000 worth of wine uncorked and exposed to the humidity in the air; just as good wine turns to vinegar, don't be surprised that there is rust on the shutter blades, the strobe won't power or you find fungus growing in the lens.

People, please don't try to disprove this above concept, you will ultimately lose the gamble! Each year I have to repair the damages from the same repeatedly made dumb

mistakes for the same dumb reasons; this is just one of them! Profit from another's mistakes...and learn!

True, leaving user O-rings in your equipment for 6 months between dive trips means your O-rings now have a loss of O-ring elasticity, but removing them means 26 weeks worth of dampness exposure and corrosion. So, keep your equipment installed with user O-rings and a lens during "humid storage" just like "humid diving" (or see alternatives below)!

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Isn't It Better To Store the Lens With Its Cap Than on the Camera?

The plastic lens cap's design has camera-like cam locks to lock and stay on the lens, and an O-ring bearing surface diameter identical to the silver colored lens mount on the front of your camera for humidity control! Therefore, both result in giving exactly the same amount of compression to the lens' user O-ring. Since removing the lens from the camera and storing it with its lens cap on serves no added benefit to the lens' O-ring, yet leaves the camera exposed to humidity directly through the large lens port hole, better leave that lens on the camera. It's a fabulous O-ring sealed "cork" for your $500 bottle of camera "wine".

Oh, you've been using that thin clear plastic cap? That "cap" ain't even a cap; it's nothing more than packaging material used for shipping purposes to keep out styrofoam. Using it for humidity control is a joke! So, use ONLY your smaller 35mm or 28mm lens, NEVER one of the bigger lenses (long story why); or, see the alternatives below.

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Alternatives: User "STORAGE" O-Rings

People who save used O-rings for a "rainy day" or use them for storage figuring they can remember what they did six months ago usually got them mixed up with their new O-rings. Reason: round black USED O-rings looked just like round black NEW O-rings to most people.

So, in the Spring 1989 Ocean Realm, I wrote a Workshop article entitled "CPR" (Compression Prevention to Rubber). In the article, I gave what I thought were simple steps for decreasing and banding old user O-rings LIGHTLY with a bright colored vinyl dye so you could more easily identify "storage only" O-rings and prevent confusion. Well, you wouldn't believe the problems people had and the calls I answered because I refuse to use specific product names in these articles. If you don't want to use the dye method, there are others.

Degrease thoroughly your old user O-rings, and using at least 80 grit (very coarse) sand paper, on the bigger O-rings sand heavy marks about 1/2 inch in length at 1 inch intervals

on only the outside shinny edge of the O-ring (the edge you see when the O-ring is installed into its channel); correspondingly smaller marks and intervals on the smaller seals. Then, grease the O-ring as usual and try recognizing it; if not deep enough sanding marks to easily recognize through the grease, degrease and start over again. If you still can't easily tell through the grease which are which, there is now a specialty kit available containing bright orange, fully color impregnated rubber "Nikonos storage only" user O-rings for all types of your Nikonos equipment. The kit can also eliminate other storage confusion problems as well.

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Alternatives: Camera Body "Cork"

If you really don't want to use your lens, there are available solid plastic camera body caps designed with their own O-ring to be effective alternatives for humidity control. Be sure that the "cork" you select provides a cam-lock capability (similar to that of your own lens) to positively lock onto the camera and not fall off from bumping or changes in aircraft pressures.

DO NOT USE PACKETS OF SILICA GEL PLACED INSIDE OR AROUND PARTS OF YOUR EQUIPMENT OR CASE AS PROTECTION AGAINST HUMIDITY!

These packets are usually used when you get them from various sources, and the packet itself can tear allowing its granulated contents to spill and scratch optics, damage shutter operations, etc. Besides, to remain effective, they must be baked at a very low heat in an oven frequently just to get rid of the moisture they contain!

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Alternatives: Case Pitting

Remember that as your internal O-rings get contaminated dive after dive, your equipment's water proof outer casing is also being exposed to the build up of very corrosive materials. And, your camera's outer metal casing, when damaged, costs far more to replace than that of the all the shutters, electronics, etc. combined! So, don't just limit your casing inspection to the hopes of finding "that sign" that you must now spend additional money to have those internal O-rings and parts you can' t see professionally serviced; remember that, over time and use, all can not remain clean in "Nikonos Land".

Photo 5: Pitting

Give equal mental consideration to the need for removal of hidden corrosive and abrasive salt water residues. Pitting is permanent loss of case metal; abrasion is permanent loss of case plastic. And, no service facility can drain the ocean to recover your lost metal ions or pieces of plastic nor replace them! Since the internal O-ring ports and their operational parts of the equipment's casing must also be cleaned and inspected along with O-ring replacement, your professional Nikonos service facility should provide you some guidance as it pertains specifically to its condition and your usage to help you extend its useful life.

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Alternatives: Adjust Your Thinking

Above all, quit thinking of your Nikonos equipment as "camera gear" in the land-camera sense. It is underwater photographic equipment in the same sense as your underwater "May West" (B.C.) and your underwater air supply system (regulator); in short, it is just another part of your "dive gear" and you MUST give it the same understanding and maintenance as EVERY other part of your DIVE equipment. It must be professionally serviced for exactly the same reasons: to stop corrosion of parts and replace O-rings to maintain good working condition for continued use in the harsh salt water environment. True, it won't kill you like other dive gear problems will, but you'll feel like it has! So, when it's time to service your regulator (yearly!), it's time to service your Nikonos!

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Summary

1. User O-rings are subjected to immediate contamination during opening; nonusers require time for contamination migration.
2. Facts: all O-rings flatten while installed; corrosion/abrasion to O-ring sealed areas and parts begins with your very first dive. Both are continuous over time whether diving or in storage.
3.

Floods don't occur "all of a sudden". What really occurs "all of a sudden" is your shock that you have made a mistake, either in your current use or your lack of having professional periodic maintenance.

4. Better safe than sorry! Base your O-ring replacement and corrosion maintenance "thinking" on 6 month calendar "Units" of time. Sport Divers: replace your own user O-rings every "Unit", have full professional servicing every 2-4 "Units"; Heavy Users: consider having full service every "Unit" or consult your professional Nikonos service technician.
5. Keep your Nikonos equipment continuously and equally "corked up" at all times as protection against damage from "lots of humidity" (flooding) or little humidity (storage).
6. Nikonos equipment ain't "camera gear"; it's "diving gear". Give it the same respect and maintenance you do all your other diving gear. In Part 4, we will discuss your frequently overlooked cleaning problems which result in accidental flooding.

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NIKONOS WORKSHOP

NIKONOS-V

NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS (PART 4)

Text and Photos by Bob Warkentin

From previous articles you should remember that (1) It's the nature of O-rings to become "tired" and flattened from doing work for you (being compressed between parts to seal out water) just like you get tired from a day of working, and (2) Greasing a "tired," flat O-ring is like greasing a bald tire; although it looks new and shiny, you still don't have any rubber left for traction on a wet road! Now, let's complete this four-part series with part four to see what O-ring grease really does.

Greases

When it comes to using your O-ring grease, have you ever said to yourself: "If a little works well, a whole lot will work even better"? If you think that, just because your grease comes in a tube like glue does, putting big gobs of grease onto your O-rings will prevent flooding (like you put on gobs of glue to be sure it holds broken parts together), you're in for a very big shock!

Well then, if grease doesn't prevent flooding, what does it really do? A simple question, to be sure. But it's difficult to answer, fully and correctly!

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Purpose of the Grease

Surfaces of rubber have a high coefficient of friction and like to grab onto other surfaces. Therefore, your grease is scientifically formulated to be solely a surface lubricant to reduce the coefficient of friction (twisting, uneven seating, wear and abrasion) between the surfaces of rubber O-rings and the surfaces of the metal or plastic parts. For user-compressed O-rings, this surface-to-surface lubrication is required not only for opening and closing O-ring-sealed parts, but also for allowing the O-ring to uniformly equilibrate itself lengthwise when under compression. For internal movable parts like the trigger, switch knobs, film advance levers, etc., which are also O-ring-sealed, add to the above lubrication requirements operational movement (wear).

A lubricating-type grease is a viscous "gelled" material in which a liquid (oil) is usually suspended. Both the gel and its liquid are specially formulated to meet certain use requirements: temperature, separation, type of oil (the liquid), chemistry and compatibility with other substances (plastic, metal, and rubber), degradation (breakdown) products if used in the presence of substances such as salt water, etc.

But why a gel versus a liquid and on some method to transfer the liquid to where it is needed when it is needed. Think of your car's lubrication requirements: the crankcase (reservoir) filled with a liquid lubricant (oil) and a pump to transfer this liquid internally to all required locations, versus the external ball joints (no liquid reservoir), which must hold and retain lubricants using a viscous gel.

And once the O-ring's surfaces are uniformly lubricated, any more grease you apply will neither improve the O-ring's sealability nor further reduce the coefficient of friction!

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"Sticky" Problems with O-Ring Grease

Grease must be "sticky" to hold the lubricant in its required place. But this stickiness causes other problems as well, just like the underside of your car-when sand and other particles come into contact with anything greasy, they stick. In your Nikonos equipment, the sticky nature of the O-ring grease causes particles of sand, salt crystals, the lint from your towel and cotton swabs and tissues, and particles of camera case foam to become stuck to the grease and cause flooding on the next dive. It is important, therefore,for you to understand stickiness in order for you to receive its benefits without any problems.

Since the gel (grease) also has the ability to hide stuck particles and fibers from your typical "eyeballing" examination, don't get into the position of saying to yourself: "That looks good enough; let's go diving!" There's only one way to remove those particles that are stuck to the grease, hidden from your eyeball" and waiting to flood your equipment:

remove the grease entirely from the O-ring, the O-ring channel, and the "fourth" wall (see previous articles) of O-ring contact.

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Grease Removal for User-Serviceable O-Rings

How do you remove grease from your hands and face: by wiping them on a towel, or with soap and water and then the towel. Wiping grease off O-rings by hand (then off hands and onto a towel, repeated frequently!) may work for a while, but soap and water is the most effective way to remove all built-up grease from your O-rings (of course, you remembered to remove them from the equipment first!). Since I use a good-quality, unscented liquid soap as a mask defog, I always have a small bottle of it with me. So some for my mask, some for my O-rings! Don't wad up the O-ring or stretch it during your "washing technique." Just carefully follow the shape, going around and around the O-ring time and again with soap and water, then rinse thoroughly with water and pat dry with a light-colored towel. Just don't use something like "grandma's lye soap" or chemicals on O-rings!

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The Process of Total Control: Grease Removal by "Mopping" Your Equipment

Obviously, you can't use liquids or water to totally clean all those O-ring channels and their fourth walls; as the liquid flows, you lose total control of your cleaning activities, and the liquid gets into the equipment to cause damage!

The whole process of totally controlled cleaning of your equipment becomes nothing more than removal of grease by actually transferring (not smearing!) the grease, little by little, from your equipment's O-ring channels and fourth walls to your cleaning materials until the transfer (removal) is complete. Simply put, it's "mopping up"!

For "mops," light-colored, soft, nonabrasive materials like cotton swabs, tissues, even corners of towels will do. Just remember, mopping means the sticky grease must transfer to and build up on the "mop." So mop a little, go to another clean part or end of your "mop," and mop a little more, or else all you'll be doing is smearing the dirty grease everywhere!

Photo 1

"Mopping" requires a clean mop at all times. This means that if you use something like a cotton swab on a large surface area like the back door of a Nikonos V, use both ends of five to ten swabs or more to be sure the "transfer" is complete. Don't fall into that flood trap of using only one swab (or the same comer of a towel, etc.) round and round the O-ring channel. You only wind up smearing the old, contaminated grease back into the channel and on the fourth wall. You haven't cleaned anything, only wasted time!

Why light-colored mops and drying towels? Since all O-rings and the majority of your Nikonos equipment's O-ring channels and and walls are painted black, you can see more easily (and remove!) lint and contaminants against the black color of the O-ring channels. But for orange strobes and silver-colored cables, you'll have a problem seeing anything.

Regardless of black, orange, or silver-colored surfaces, always get yourself into the habit of using your 35mm Nikonos lens as a "microscope" to closely inspect your cleaning efforts for lint and particles after degreasing. Also inspect after regreasing and after reinstalling the O-ring into the O-ring channel. Don't just grease up and go: inspect first! Even inspect your hands and fingernails before greasing! Think about it!

Photo 2

Remember the 35mm `microscope" from previous articles? Look through the front of your lens one-half inch from your eye with the object one-half inch or so from the other side, and the f-stop at 2.5. It magnifies tiny particles like a jeweler's loupe!

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Grease Removal for Non-User-Serviceable O-Rings

Unfortunately, it happens over time. During your diving, washing, and rinsing of equipment, little by little you've been removing the lubricant around your internal O-rings at places like the trigger, film advance lever, switch knobs, etc. And no, you can't apply it externally from something like a spray can or grease on a tooth pick! The equipment must be taken apart, parts individually "mopped," and new O-rings installed; I suggest getting this maintenance done professionally.

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Grease Chemistry

Just because a grease says "contains silicone" or something like "O-ring grease" doesn't mean that the chemistry of this grease was specifically designed for use with the chemistries of your black nitrile (buna-n or NBR) rubber O-rings or the plastics and metals of your equipment! There are even some specialty grease formulations out there, designed for use only in waterfree environments, that break down in the presence of water to form acids which damage metal parts of your equipment. If you are using some grease found at your office or in your garage, you better contact the manufacturer and get the actual technical information about what the grease was formulated for and know for a fact that it is truly compatible with your rubber, metals, plastics, and use in water. If you can't find out for sure, don't use it! While you haven't experienced an "all of a sudden" flood yet, you may in time. Stick with your Nikonos O-ring Grease.

For those of you with spray cans of silicone, don't use them ever on Nikonos equipment. Read the warnings: don't use around plastics and some rubber products. And remember that the liquid spray is just that, a liquid, not a grease. It may thin or dissolve the remaining grease you have and wash it away from the O-ring! You aren't doing anything for your equipment and are running the risk of damaging it. Additionally, using a spray for some "sticky operation" problem only treats the symptom; it never corrects the problem!

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Why Not Use Alcohol to Clean Up Old Grease?

True, alcohol will liquefy most gelled greases (note the words liquefy and gelled). The problem is that liquefying a gel allows it to flow easily into cracks of the equipment where mechanical and electrical parts are located, even when used on the tip of a swab. Remember total control and the discussion above of gels versus liquid lubricants. You want the lubricant not only to stay in one place to do its work, but also to stay in one place when you mop it up! So leave it gelled, and mop on!

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Follow the Contour!

Remember why Columbus didn't fall off the edge of the earth? He followed the contour of the planet and thus made it safely to the New World!

The majority of floods in all camera bodies occur at the main O-ring after the last cleaning! Reason: the main camera body channel is oval or sort of square with rounded comers, unlike other pieces of round equipment. In short, people forget to follow the contour of irregular channels and fourth walls during cleaning! Consequently, they

"navigate" and mop the straight, flat areas effectively, but "fall off" when they reach the end of the earth and don't realize that they have pushed the dirty grease into a pile in the rounded areas of the O-ring's channel and fourth wall (causing a flood).

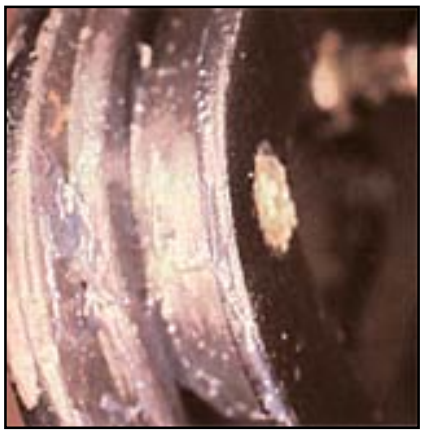

Photo 3

Photo 4

Ever hear someone say, "It must have leaked from the rewind O-ring" or "from the trigger or film advance O-ring"? Nope! The absolute majority of time (let's pick on Nikonos V's as an example), the leakage occurs from the upper left or upper right curves of the door O-ring. You forgot to follow the contour of both the channel and the fourth wall to remove the old, dirty grease! Simple as that, and it's your mistake and your flood.

Photo 5

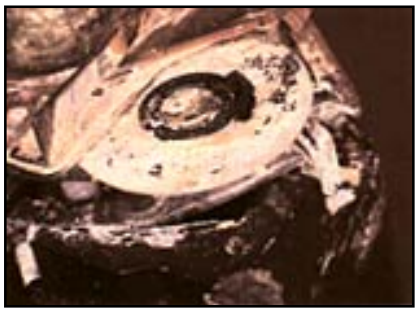

Photo 6

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How Much Grease to Apply

I suggest getting the Spring '88 issue of Ocean Realm for the detailed, how-to-actually-train-yourself techniques of applying only a sufficient amount of grease to the surfaces of your O-rings. It's too long a process to repeat here.

One caution: over time, oil can separate from its gel (this is most noticeable in squeeze tubes). Therefore, the first squeeze out of either a new or an old tube should be used new lubricate your fingers (with the oil); all second and subsequent squeezes (actual oil/gel mix) are for the O-rings (a smart process even for tubs or pillbox containers).

Since grease is a surface lubricant, excessive greasing only wastes grease, cleaning supplies, and your time cleaning (mopping) up the sticky mess just to be sure you've gotten all those potential flooding particles removed while also trying to keep the grease out of areas of your equipment (shutters, electronics, optics, cables, even your film) which would result in loss of operation and expensive costs to correct.

Photo 7

Don't simply apply another fingerfull of grease to the surfaces of your greasy O-rings in between dives. You only force your already contaminated grease deeper into the channel and around the O-ring to cause an imperfect environment for the O-ring to try to seal against. Just apply grease to the O-ring itself, not to the channel and fourth wall! Grease on the O-ring will be transferred sufficiently to the other surface areas on closing!

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Summary

1. Not all greases you may find are suitable for Nikonos equipment, regardless of what it says. When in doubt, stick with your tube of real Nikonos O-Ring Grease.
2. Applying grease isn't like using glue; excess never made an O-ring seal better.
3. Never apply new grease to the O-ring while it's still in its channel, and never apply new over old grease; first remove the old.
4. To clean O-rings, simply use a good-quality, unscented liquid soap and water, and pat dry. To clean channels and fourth walls, follow the contours with lots of light-colored "mops." No alcohol!
5. The factory-applied greases on your internal parts can be removed over time by your diving and your required equipment rinsings. Applying sprays or greases externally solves nothing and allows the real problem to continue to do damage. Get periodic servicing.
6. Always use your 35mm Nikonos lens "microscope" to check how effective your cleaning and greasing efforts were, or gamble!

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NIKONOS WORKSHOP

NIKONOS IV-A

ONE O-RING THAT AIN'T AN O-RING: IT'S A GASKET!
(NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS - PART 5)

Text and Photos by Bob Warkentin

For those of you who have a Nikonos IV-A camera - that weird looking, pre-formed, black-colored rubber thing located in the camera's door is not an O-ring: it's a gasket! Therefore, all of the information discussed in the four previous articles concerning how round O-ring seals seal by radial compression does not apply. Quite the contrary. With this gasket (which actually fits between the sealing faces of the door and the camera's casing), it's finally true that the deeper you go, the tighter this "O-ring" is squeezed between the door and the camera's casing. A user benefit, but with user obligations: most importantly, the gasket doesn't seal all by itself, as is the case with an O-ring; it requires certain added factors in order to seal, especially between zero and thirty feet!

The Design of the Nikonos IV-A Gasket

As noted previously in "O-Rings Ain't Just Black Rubber Bands," O-ring seals require four

walls to provide an O-ring-sealing environment: one part must contain a three-wall channel to hold the O-ring in proper alignment so that that part can be safely closed into its "fourth wall" sealing area without the O-ring falling out of place, becoming cut, and causing a flood. In the conventional "round O-ring" case, installation requires that the O-ring be slightly stretched over the outer edge of the channel's wall (or lip). Once the O-ring is installed in the three-wall channel, it's this outer wall that prevents the O-ring from falling out of the channel.

Photo 1

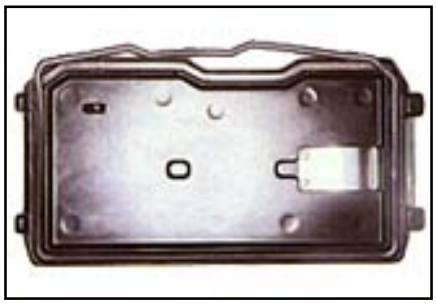

Photo 2

The Nikonos IV-A's door gasket uses a three-wall holding system, but its design and holding-in-place methods are completely different from any other "user serviceable" O-ring in Nikonos equipment. Its door gasket uses ten pairs of opposing "holding fingers" (photo 1). Spaced around the outer and inner edges of the gasket, they extend out from the main diameter in order to reach out to the opposing vertical walls of the channel to firmly hold the gasket in place and prevent it from falling out during your opening and closing of the back door.

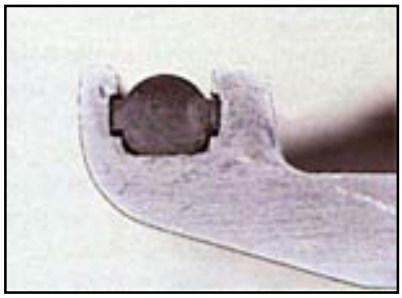

Photo 3

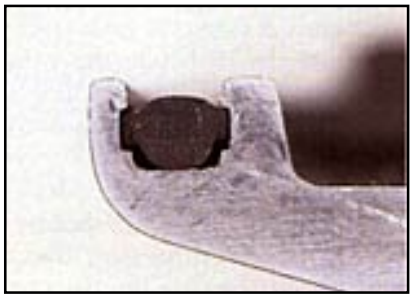

Photo 4

The shape of the gasket's main body is unusual in comparison to other Nikonos seals. Its pre-formed shape is such that there is only one way to install the gasket (photo 2). And in its cross-section, the main body isn't round. It's flat on the sealing-face side, which rests in the door's channel, while partially rounded on the other sealing-face side, which seals to the camera's casing (photo 3: "new"; photo 4: old and flat. Both photos show a pair of holding notches).

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The Camera's Door Design (The Missing Notch)

Photo 5

There are also corresponding "holding notches" cast in both the outboard and inboard vertical walls of the back door which make it easy for you to install the gasket in the channel (see photo 5 and also the cross-sections in photos 3 and 4). However, even without the holding notches, there wouldn't be any effect on the watertight sealing of this gasket; it would just take you more time to seat it (something no underwater photographer has time for: proper seating and cleaning of O-rings). The inward compression on the fingers by the non-notched vertical walls would result in inward force (squeeze) onto the sides of the gasket, thereby reshaping the main sealing body of the gasket into a more rounded shape all around the gasket.

Some holding notches are deeply cast into the wall, some are shallow, and one isn't even present. That's right! While there are ten pairs of holding fingers on the rubber gasket, there are only nine and one-half pairs of deep or shallow holding notches in the vertical walls of the door's gasket channel. And over all these years, I bet you never noticed it (some probably didn't even know the notches existed in the first place!). The "no notch" area is located on the inboard wall at the top of the door's channel where it dips down to go below the viewfinder (see the cross-section in photo 6 below).

Photo 6

A side note: remember, the "fingers" hold the gasket in the channel, notches or no notches (review photo 6 closely!), and the gasket seals out the water, notches or no notches. Even if someone were less than intelligent enough to just put a new gasket on top of and only in the general vicinity of the door's channel and close the camera onto the door (if the door were closed onto the camera, one should observe one's gasket falling, I hope), the sealing surface on the camera's main casing would, in essence, seat the gasket like a cookie cutter sufficiently into the channel for watertight use, for a while anyway. Remember the "memory set" of nitrite rubber; it's not a smart way of installing a gasket seal that you want to remove and re-seat exactly the same way time and again. But the point here is that actual flooding is due to factors other than not having a notch.

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Close Inspection of the Gasket

Remember that damages to this rubber gasket or any other rubber O-ring, or to metal channels and their respective fourth walls (pitting, contaminations, etc.), are generally extremely small and may not be seen with an unaided eye. Therefore, use your 35mm Nikonos lens as a microscope (see previous articles) for the following inspections! Since the corners of the gasket are pre-formed, they won't survive the excessive stretching that can occur during removal and installation of the gasket. The cracking that occurs happens generally from the inside curve area outwards. Additionally, tearing away of the ten pairs of "holding fingers" from the main body of the gasket occurs with hasty "yanking out" removal of the gasket. This tearing can often migrate into the sides and both faces of the main body of the gasket. After degreasing the gasket, inspect each of these areas closely with your Nikonos "microscope" under a good light.

Caution: don't be tempted to flex the corners of the gasket outwards to examine for cracks; this will sooner or later cause the rubber to crack. Instead of stretching the corner, just get a brighter light; your eye and 35mm lens should be able to do the rest for you!

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Door Gasket Removal

The fact is that like nitrile rubber O-rings (as explained in previous articles), nitrite rubber gaskets take a memory set. With conventional round O-rings, rubber (new or "memorized") always extends above the vertical channel walls so that all you need are your fingers to get a grip on the seal for safe and easy removal. But with this gasket's design, the top of the "new" rubber sits flush with the tops of its channel's vertical walls; when "memorized," the top is flattened below the vertical walls (compare photos 3 and 4). And believe me, when you add the effects of those ten pairs of active "holding fingers," that new or old gasket is a real bear to get out.

Safe removal techniques for the Nikonos IV-A door gasket must be broken down between new and old gaskets. But how do you know if it's new or old and which technique to use? Believe me, you'll know!

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New Gasket Removal Techniques

On a new gasket installed in the door, the exposed surface is still somewhat rounded and extends higher up towards the outer edges of the vertical walls. Therefore, you can safely

remove it with your finger, not a tool.

The first requirement for gasket removal is to get some part of the gasket elevated up and out of the channel so that it can be grasped by your fingers. Because the fingers and notches hold the gasket in the channel at strategic locations, always begin your removal mid- way along the lower straight side of the channel.

With the camera's body (lens off) resting on a flat surface and cradling the opened door in your left hand, push your right thumb down hard onto (actually into) the channel and make several passes outwards towards the end of the door. After each pass, wipe the grease off of your thumb and try it again. Just as soon as you see the gasket begin to raise up above the channel walls, keep tension on the gasket but stop pushing forward. Take the remaining fingers of your right hand and firmly grasp the underside of the door. With every- thing held with the right hand, your left hand can come over and grasp the elevated portion of the gasket and start lifting it out of the channel. Lift out only one set of "fingers"; no more for now!

Photo 7

Please note: a "hold-and-yank-out-everything" gasket removal method (1) causes the rubber to be stretched out of shape, (2) cuts to the rubber "holding fingers," and (3) cracks the many pre-formed corners. Therefore, more steps are required to fully remove the remainder of the gasket safely.

After lifting up the "starting point" of the gasket, remove the rest using your index finger under the gasket (riding along the walls of the door's channel like a train following the train tracks) while your thumb is on top of the gasket. As you come to a set of "holding fingers," hold your two fingers firmly against the gasket and gently rock upwards to unseat the "holding fingers" from their respective notches while being careful to also control the tension and strain you may put on those adjacent pre-formed bends of the gasket. In essence, your fingers will be "scooping out" the gasket at a shallow angle of not more than thirty degrees. Once fully removed from the door, the gasket can be cleaned of its old grease, microscopically inspected for breaks at all corners, re-greased, and readied for reinstallation.

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"Old Gasket" Removal Techniques

Photo 8

I think you've got the picture. If your gasket is now so flat that you can't get a starting point raised by thumb pressure, then it's my opinion that it's also too flat for underwater use! And if you can't get it out to clean the gasket as well as the channel, then it's too contaminated to dive as well. It's time for a new gasket; I hope you've got them if you're planning on going diving.

To get the old, flat gasket out , it's now "tool time." Remembering that this gasket is dead for diving and must be thrown away as soon as you get it out, you can now use a dental pick or strong sewing needle for removal. At the same "starting point" area as above, stick your pick or needle into the middle of the exposed rubber so that the point goes in at a very shallow angle and only into, parallel with, and under the top surface (you must be able to see, follow, and control the progress of the pick's point at all times). Rock and lift upwards on the pick to get hold of the "starting point." Yank out the gasket to your heart's content!

Remember: (1) a replacement gasket set costs ten dollars; and (2) going deep into the rubber scratches the metal permanently, and metal replacement parts cost $100 to $300. "Point" made?

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"Snags" in Gasket Channel Cleaning

Again, O-ring grease removal means mopping up and off the remaining grease from the channel (see the previous article). Whatever mop you select, remember that this channel has holding notches in its vertical walls as well as forty-five and ninety-degree corners. People, you better believe these will snag and retain pieces of nearly anything you can possibly think of to use to clean (mop) the grease from the channel! So please, use your 35mm "microscope" to inspect the notches and corners.

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Installing the Door Gasket

After greasing the gasket, place it in the general area over the door channel (remember, this gasket can fit only one way). I generally start in the upper right area with what I call

the number one set of "holding fingers," going clockwise around to the number nine set; the number ten set is found in the viewfinder area of the door without the notch. Placing the camera's body on a flat surface and cradling the opened door with your left hand, first install only the inboard "holding fingers" by slightly tilting the gasket so that the inboard "finger" is pointing downwards into the channel (and notch) while using the tip of your right index fingernail to coax the "finger" if need be. Only install inboard "fingers" one through nine; don't install number ten yet!

To install the outboard "fingers," bring the thumb of your cradling hand on top of the gasket, along and next to the outboard "finger" you wish to install. While holding the gasket down to the channel with your thumb, use your right index fingernail to roll the gasket slightly outward while coaxing the outboard "finger" into its respective notch. Again, only do fingers one through nine, not ten yet.

After checking that all nine pairs of "holding fingers" are properly aligned into their notches, it's time to do of number ten (saving the best for last, aren't I?). Since there is no notch in the inboard wall, it's important that the inboard "holding finger" be secured in away that doesn't cause the gasket to either twist or turn in the channel. To securely seat this inboard "finger," start by tilting the gasket and sticking the inboard "finger" down into the comer where the inboard wall meets the floor of the channel at ninety degrees. Again, using the thumb of your cradling hand on top of the gasket and adjacent to these "fingers" to hold the gasket in this weird orientation in the channel, use the index fingernail of your other hand to press the gasket both inward toward the inboard wall (actually, you're compressing this "finger" against the inboard wall) while at the same time rolling the gasket in the channel forward until the outboard "finger" locks into its outboard notch. Make any sense to you? Try looking at the drawings; they're worth a thousand of my words. If you elect to try installing number ten's outboard "finger" first, then try to stuff the inboard "finger" down against the inboard wall, you will soon find that the gasket wants only to jump back up and out of the channel.

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Final Inspection

Examine all around the exposed surface of the gasket for cast seams; make sure all "holding fingers" are installed and holding and that no debris are present. No, you're not quite ready to close the door and go diving; you've got to wait until the next article.

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Summary

1. The door O-ring ain't an O-ring! It's a gasket with a pre-formed shape and "holding fingers."

2. Use only your fingers and your head. If you can't remove the gasket, it's a good bet you can't dive with it...safely.
3. Once you've got hold of the "starting point," remove the rest of the gasket by rocking out each pair of "locking fingers" from their notches. Don't just grab at some random point and then rip out the whole gasket.
4. Install the number one through number nine inboard "holding fingers" first, then the outboards. Do number ten last.
5. Mop up the grease in the same way that you did in last month's issue, except remember that the many corners and notches of the door's channel will snag fibers. Also remember to use your handy 35mm "microscope"!

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NIKONOS WORKSHOP

NIKONOS-V

NIKONOS O-RINGS AIN'T JUST BLACK RUBBER BANDS (PART 6)

Text and Photos by Bob Warkentin

Nikonos "Spare" User O-Rings Are Only for Specific Nikonos Products!

Spare user O-ring kits are always supplied with each new camera or strobe and can even be bought separately. So why the spares? Was it to tell you that a Nikonos V camera has only four O-rings and an SB103 strobe has only three O-rings throughout the entire piece of equipment? Or are they "universal spares" for any equipment just in case you lose or damage one? Or are they just one more piece of dive equipment "junk" you must account for but never really need?

Once removed from their original bulky box, you find each kit of black O-rings secured in an unmarked, sealed plastic bag. Well, as the of saying goes, "You can't tell who or what the players are without a score card"!

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Don't the Spares Tell Me Just How Many O-Rings Are in My Nikonos Equipment?

Seeing spares is believing, right? The most common and probably worst of all misconceptions, to which the answer is not just "No," but N!O! While the Nikonos V Owner's Manual doesn't specifically tell you the total number of O-rings in the camera body, it does tell you (1) that there are O-rings other than just your user rings, (2) that these rings need to be changed once a year, and (3) that they need to be changed professionally.

Your bag of camera spares has only four O-rings: one for the lens, one for the flash cable or flashport plug (your choice), and only two actually for the camera. But in a Nikonos V body, there are fourteen O-rings in all. Add one more to plug up the flash port and one more at least to plug up the lens hole (plus all of the other O-rings needed to make both the lens and strobe watertight!).

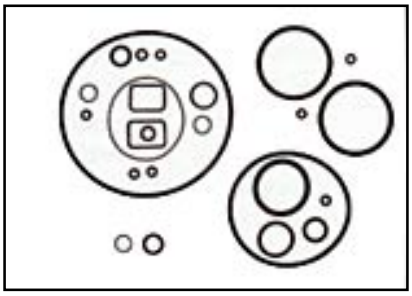

Photo 1

Now, think about this: with a basic setup of a Nikonos V body, 35mm lens, and SB103 strobe, you're diving with about $1,100 worth of equipment requiring a total of twenty-five O-rings, but your two bags of spares (four for the camera, three for the strobe) account for only six of these O-rings! Wait a minute! Four plus three equals seven, so why did I say only six accounted for? The camera's bag of four rings supplies one as a spare for either the flash port plug or the flash cable, and the strobe's bag of three also supplies one for the cable. You can't use them both at the same time!

I don't care if you replace user O-rings every day and grease them and care for them like a newborn baby. You, the end-user of your equipment, must understand that the user O-rings account for only one-fourth of your equipment's total O-rings. The rest must be professionally serviced!

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Don't the Spares Show Me Just Which User O-Rings I Need to Service?

If you're forgetful or are unfamiliar with Nikonos O-rings, then by all means the answer to this question is yes! For the camera body, the most frequently overlooked O-ring seems to

be the one in the battery compartment. For the strobe, believe it or not, it's the cable O-rings!

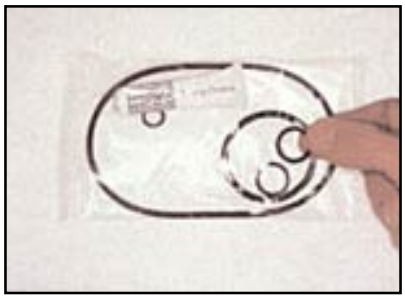

Photo 2

Use your spares as standards to jog your memory about what your user O-rings should look like (size, thickness, etc.) and just maybe where they're located. As you locate and remove each of your installed user O-rings from a piece of Nikonos equipment, simply compare them to your still-sealed bag of four, three, or whatever. Make a note (mental or written) as to which ones have been serviced in your equipment and which ones have yet to be serviced.

Try this! Photocopy each sealed kit of O-rings. Next, label the sheet "User O-rings for camera" or "for strobe" or whatever, and label each O-ring "for door," "for battery cap," "for cable" (which end), etc. Now you have an O-ring comparison (see the Caution below), and you can check-off the sheet by product item and where the O-ring is installed. You can also add the date when the camera was serviced or add other important reminders (make this your O-ring "log").

Caution: Photocopies do not generally copy 100 percent of actual size. Therefore, if you have different pieces of Nikonos equipment, or equipment of non-Nikonos manufacture, compare the O-rings first while they're still in their respective sealed plastic bags. If it's too close to call visually, do not rely solely on a photocopy as a referee. See the below sections on Marking, Sealing, and Confusion for additional tips.

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Spares Are Not for "Just in Case"

As noted in previous articles, O-rings get weak (flatten) over time, not just as a result of diving use. Do not use your "spare" O-rings sparingly! User O-rings are located in those areas of your equipment that you must open and close to change batteries, film, lenses-frequently! Each opening directly exposes the user O-rings to contamination, and the more flattening (weaker) the O-ring gets, the more likely it is that microscopic-size particles will cause leakage or flood on the next dive.

So use your spares as a full kit. Replace all the old ones at one time: at least every twelve months for the "two-trip-per-year" divers, every six months for professionals, and every three to four months for rental equipment. But even with all your cleaning and frequent

full kit user replacement, don't forget you're only servicing one-fourth of all your equipment's seals! Leaks can occur everywhere there are weak O-rings!

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Spare Confusion or Why Use Your Nikonos As "O-Ring Test Equipment"

I've seen Nikonos lenses fitted with O-rings for SB103 battery caps (the person noted it seemed a little harder to get on!), camera battery caps fitted with flash cable O-rings, and tank stem O-rings used on flash cables. Some people even use hardware or auto parts store O-rings because they're rubber, looked round and black, were close in size, and the person forgot to buy spare kits or the local camera store was out of stock. Unfortunately, the equipment all flooded!

Ever ask why when preparing your $1,000-plus-worth of equipment for diving? Ideally, you've come to realize the possibilities for "human mistakes." If you find an O-ring loose in your camera case, could it be because you keep extra regulator and BC O-rings in your camera case, or could a bag of something have come open? If an opened O-ring bag has the appropriate number of O-rings inside, maybe last year you decided to replace some, not all, of the O-rings from the new factory-sealed bag and stuffed the "old" dead ones back inside, not wanting to throw away round, black, but dead O-rings. I am sure you can add to this list of "human mistake" possibilities, but any excuses you come up with are usually dumb ones. For me, "better safe than sorry" and "when in doubt, throw it out"!

However, if you insist on using a questionable O-ring for diving, then think about what you're going to do like this: You must now consider your $1,000-worth of Nikonos equipment not as photo equipment but as test equipment for a ten-dollar set of O-rings. If it comes back dry, you've proved that the O-ring was good; if your equipment floods, you've proved it was bad!

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How to Eliminate Spare Confusion

1. Never have doubts about spare O-rings. If you've identified a user O-ring as flat or damaged, or if you just don't feel right about the O-ring for some reason, don't dive with it. Don't save it, either! Throw it into the trash the moment you question it! Don't find yourself in that unfortunate position of later saying "if only I had..." If you think you can come up with a really good reason for saving a bunch of doubtful spare O-rings, write me. I need a good laugh after all the flooded equipment I see and have to repair!

2. Mark your spare bags! I bet that if you were to look into your "O-ring hideaway" (usually it's behind the camera case lid's foam or side pouch of the Nikonos "purse") you

would find that your plastic bags of O-rings aren't marked and are all opened. Well, are they really new or just old ones waiting to be recycled? What piece of equipment are they for? If it's not marked, better consider that ten-to-twelve-dollar bag as trash!

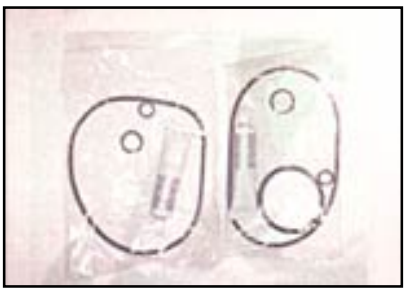

Photo 3

As soon as you buy new Nikonos equipment or new spare O-ring kits, mark the plastic bag of spare O-rings! Use a felt-tip marker, write or type a gummed label and stick it on, even use a torn piece of paper stuck on with tape. But mark what the O-rings are for: camera, lens, strobe, regulator, water faucet, car, etc! Get fancy; add the date of purchase, and if you have two or more pieces of similar Nikonos equipment, mark by serial number which bag is for which.

If you're using old O-rings for storage purposes, mark that bag specifically as "old-for storage only," and note the number of O-rings that are supposed to be in the bag when your exchange is done. Leave nothing to plain of memory!

3. Seal your spare bag! Your heat sealed plastic bag, once opened, generally can't be resealed as effectively as it once was. Therefore, I recommend zip-top bags. Use big enough bags so that the O-rings don't have to be twisted up to fit, and use those made of thicker plastic than a sandwich bag (there are many reasons why!). And mark it! So where are you going to find thick zip-top bags at a resort? Better get some as soon as you finish this article.

Let's face it, other than the need to remove your tube of O-ring grease from the sealed bag, there is absolutely no other reason to open it to remove O-rings unless you're going to replace them all, right? Well, we can always come up with exceptions. If you have several lenses or extension tubes, you may have to buy one camera kit (be it your camera model or any model Nikonos camera kit) per lens or per tube just to get one new O-ring for each. For double flash cable: either buy two SB103 kits to get the three O-rings needed or buy one SB102 kit. If this is your situation, you really have an accounting problem. Seal up the remaining unused O-rings, still as kits, and label each as "camera kit with the lens O-ring removed" or "SBxxx kit with cable O-rings removed."

I don't recommend pooling together like O-rings, even if they're marked and sealed. Leave them as kits, or throw them away. Let the kit function as a reminder of all the user O-rings in a piece of equipment that need to be replaced. If you're buying kits for equipment that you do not have just to get those O-rings that you need, then throw away or give away the remaining O-rings so that someone else will become confused-not you!

Sounds confusing? You bet it is, both in print on this page and in real life, unfortunately!

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Confusion within Nikonos Products

Different Nikonos products use O-rings that may appear very similar in size. Don't mix them up! Keep them separated as kits!

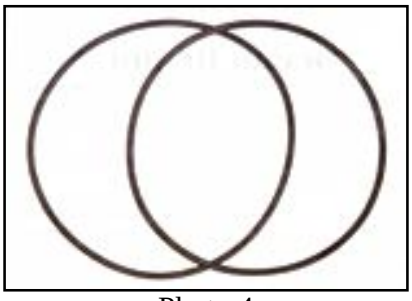

Photo 4

One prime example is the SB102 battery cap vs. Nikonos V door O-rings (see photos 3 and 4). Whether you compare them while they're still in their original kit bags or removed from their respective bags and lying side by side, they look identical. Unfortunately, they really are different, something you find out when you put your expensive equipment in water. Flash cable to strobe and camera battery cap O-rings are close in size but different in thickness. SB103 battery cap O-rings and lens O-rings have slightly different sizes but are close in thickness.

Mark every bag of extra O-rings (Nikonos or ?, and for lens, camera, strobe, etc.), and zipper them up.

Non-Nikon products may fit Nikonos equipment, but their user O-rings are not Nikonos O-rings! There are a number of manufacturers who make and sell a vast array of lenses, strobes, extension tubes, adapters, etc. to fit Nikonos products. However, just because the item fits a Nikonos camera, is water tight, and has a similar-looking O-ring, that doesn't mean the equipment's O-ring specifications have to be Nikon's! Channels, and, of course, their O-ring requirements, can be built to a number of specifications other than Nikon's and still be "Nikonos" functional.

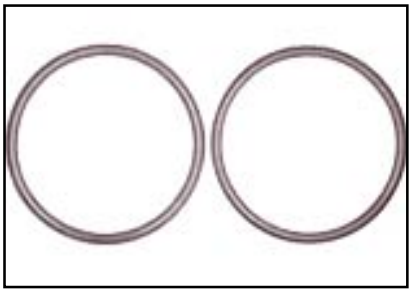

Photo 5: O-rings from different lens manufacturers.

Photo 6: Side-by-side comparison.

Face it: if the product wasn't built by Nikon, its O-rings can't be Nikonos! Buy your extras only from the manufacturer! Nikonos O-rings fit only Nikonos products, and specific ones at that!

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After-Market User O-Ring Kits Sold for Nikonos Products

From reading previous articles, you can appreciate a little of the science of O-rings. Nikon had to go to a lot of trouble and expense to have their O-rings scientifically designed and manufactured at a specific size and, more importantly, specific hardness to meet the demanding requirements for their products. For this reason, production cost is much higher than plain of standard, hardware-store-quality black O-rings.

Unfortunately, demand for spare Nikonos kits is always high while availability is sometimes limited. Therefore, camera dealers may sometimes prepare and market their own "after-market" O-ring kits for Nikonos products. Those I have seen were prepared without, it seems, proper regard for the requirements necessary in O-ring design and formulation for Nikonos use: their differences are all too obvious. I've examined some recently purchased, still-sealed "after-market" kits, and I found that, when I compared them to genuine Nikonos O-rings, some O-rings were obviously the wrong size while all were made up of the wrong rubber composition (they were just too hard).

People, buy the right O-rings for your Nikonos products (and the right non-Nikonos-product O-rings from their respective manufacturers: addresses and phone numbers for most of these are available if you want to call). Real Nikonos O-rings may cost more than "after-market" ones. But don't be penny wise and pound foolish: don't settle for just anything because you're in a hurry!

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Summary

1. Nikonos user spare O-rings are only for Nikonos brand products, and only for certain ones at that. If it's not a Nikonos product, its O-rings can't be Nikon's, nor should Nikonos O-rings be used on that product.
2. For accounting purposes, photocopy your spare O-rings by sets and label them as to product and where the O-ring goes.
3. Label each plastic bag of spares immediately. Once opened, transfer each kit's O-rings to a thick, labeled zip-top bag, and seal. Never combine sets or even groups of like O-rings in the same bag.
4. Don't use spare O-rings sparingly. If one needs to be replaced, replace all within the set.
5. Never save used or doubtful O-rings for any reason or put a used one into a bag

with new O-rings. Trash it immediately before it trashes your equipment!

6. Spares account for only one fourth of the total O-rings in your basic Nikonos system. Don't forget to have all the other O-rings professionally serviced.

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