SBE32 Communication Failures
Originated by Trevor Young (U. Hawaii) on November 5, 2013

From: Trevor Young (U. Hawaii) on Tue, 05 Nov 2013

All

Over the past year or so we migrated all of our seabird equipment from the older style Impulse connector to the new wet pluggable Subconn connectors. Recently we've been experiencing drops in communication with our SBE32 water samplers during CTD casts. The typical chain of events goes as follows:

During deck test everything works fine. No errors or tones thrown from the deck box, carousel dry fires. CTD goes in the water and down to max depth, no errors. While sampling on the way up, the fire bottle control will randomly stop responding. Bottles won't fire via either computer control or manually from the deck box. Trying to re-establish communication by restarting Seasave does not restore the sbe32.

We have experienced this problem across different cables, sbe32, and 9+ packages. Before deploying we made sure contacts were clean and connectors properly seated. We've experienced this problem with new, unused cables, and fresh bulkhead connectors. Cables test out fine with a multimeter (haven't gone so far as megging). Typically swapping either the 32 or the cable gets us going again... for a while.

Upon inspection there is a noticeable white coating on the ends of the cables, which is somewhat greasy but dries to a white powder. It only covers the very end of the cable and does not extend up into the connector or up the shoulders of bulkhead pins. I have it on good word that this powder does not taste salty.

The first suspect was incompatible cleaners or coatings being applied to the connectors. We have been using CRC spray on the contacts (seabird warns this is incompatible) or DC4 grease. Neither is applied to excess. We've had failures using both lubes and new cables sans lube. We lubricate all our cables the same way but have only have trouble with the water sampler.

We have not swapped deck boxes.

We have a few possible guesses about what may be causing this but, has anyone else experienced this problem with newer wet pluggable connectors?

Best Regards
Trevor Young

Marine Technician
University of Hawaii

Reply From: Brent Evers (IRIS) on Wed, 6 Nov 2013

Hi Trevor -

Sorry to hear of your water sampler problem. Nice to see a really good trouble shooting email that contains lots of pertinent information on how you have tried to isolate the problem.

A couple of questions I had, and its been ages since I've run a seabird, so bear with me.

1) The white powder - it is exhibited on all cables, or just the water sampler?

2) Once the CTD is back on deck (without changing anything), does the problem persist? I.e., the water sampler doesn't come back to life once out of the water right?

3) Solving by swapping, is it swapping out the sampler ring or the control bottle that gets things working again?

Possibly unrelated, possibly not: At a recent workshop, I talked with a (german) vendor who has had recent problems (the first words out of his mouth were 'what connectors do you use, because my subconns aren't working') with the Subconn cables/connectors on his equipment (I don't recall the specifics of exactly how the problem was manifested). He indicated that subconn pointed to the grease he had used as the problem. He changed to the recommended grease and the problem persisted. Subconn has yet to step up and solve/admit to/investigate/address/etc. the problem. I'm sure he's using the European distributor vs the folks up in MA whom I've worked with/bought subconn equipment from. If you'd like me to put him in contact with you, I can.

It sound's like you're on the right track to isolating this. I'm throwing out a dumb idea here, but the powder makes me suspect some sort of ground loop/fault issue (when was the last time you hacked back a section of umbilical? is the termination good?).

Remember "99% of all electrical problems are mechanical."

Brent Evers
Project Manager
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Reply From: Stuart Halewood (UCSB)

Hi Trevor,

I am not sure about the white powder but it seems that you have swapped out most parts of the system without getting a stable fix. So unfortunately this sounds like you need to at least try and swap out the deck box and maybe check the connector on the firing pylon (which it sounds like you may have already done).

As Brent suggested I think, if the firing control doesn't come back when the rosette is back on deck then its unlikely to be the cable or connector getting squeezed and you aren't seeing any water ingress at the moment.

A really annoying test would be to try and go back and find a system with the old impulse conns and keep you deck box and sea cable the same and test with the old type conns.

Sorry not more help at the moment. Will think on this and i'm sure the other guys will wade in with ideas.

Cheers,

Stuart

Stuart Halewood
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Reply From Phil White (NOAA)

In my experience, when a slow onset termination or slipring problem starts showing up, the first casualty is communication with the carousel.

good luck
pw

Phil White
Chief Survey Technician
NOAAS Bell M Shimada

Reply from Brent Evers (IRIS)

To follow on Phils comment - I've also seen the # of data error's slowly pile up as a slip ring or termination goes bad. Have you noticed/tracked if there are any comm errors? A

few aren't any big deal, but if it start going over a hundred per cast (deep cast I'm presuming), you're probably onto something.

Brent

Reply from Trevor Young (U. Hawaii)

Thanks for that suggestion. We've certainly been electrically exercising our slipring considering the nature of our recent operations (ROV). This problem predates that though. When other groups with their own equipment come on (HOT) they don't experience this problem. HOT uses the impulse connectors so, to our great relief, I am led to believe the problem lies elsewhere.

Trevor

Reply from Trevor Young (U. Hawaii)

Brent

1) Good question. Off the top of my head I'm not sure whether or not the white powder is present on all cables. I can't check at the moment because our equipment is all out at sea but I'll have our techs currently on-ship take a look and get back to me.
2) The problem sometimes persists when back on deck.

3) By sampler ring do you mean the latches on top of the 32? We usually swap them as a single unit.

This problem hasn't been isolated to a single termination, but has occurred across multiple cruises in May, June, August, and September (quick check through my emails). We're currently using our Rochester .681 for casts through the A-frame.

Reply From Trevor Young (U. Hawaii)

I am told that the mysterious white substance is not present on the other cables or connectors, just the SBE32 cable. In addition when a failure was experienced this September, a brand new unlubricated cable was swapped in and started to develop this white stuff after only a single cast or two.

Trevor

Reply from Brent Evers (IRIS)

Re sampler ring, I meant the whole pylon vs the control bottle. Obviously the pylon since you stated SBE32. I think you're saying you've swapped out the whole pylon vs the single latches.

Have you swapped the control bottle (9plus I assume?)?

So the problem persists on deck - not a squeeze related issue, but still possibly an ingress related issue.

I've only run CTD's off .322. I can't imagine the .681(I'm assuming this is the .681 with three conductors and a FO vs the .680 with a coax down the center) being an issue.

The fact that the only whitish cable is to the pylon is interesting. When you have tested the pylon, have you tested that EVERY latch holds and fires? I can't remember exactly how the carousel pylon releases (I seem to recall electromagnet). Just wondering if something is stuck and sucking/looping current.

Dumb question - what has Seabird said?

Got a pic of the chalky cable? Which end of the cable is the chalk on?. Both/all? Could a ground connection to that connector in the control bottle come off/been dropped or corroded through? Same question for the pylon side?

I know there's a bunch of people on this list with more and more recent experience than I, so surely, there's some other ideas.

Brent

Reply From: George Tupper (WHOI) on Wed, 06 Nov 2013

Trevor,

On re-reading the thread, and knowing that HOT doesn't have this problem using the same cable, but Impulse - rather than Subconn - connectors, to my mind it can only be one of two things: the deck unit or the connectors. Do the HOT folks use their deck unit or yours?

Good luck,

George

Reply From: Trevor Young (U. Hawaii) on Wed, 06 Nov 2013

The HOT folks use their own deck unit.

Reply From: George Tupper (WHOI) on Wed, 06 Nov 2013

Hi Again Trevor,

Let me first say I know how frustrating it is to be knee-deep in a problem and have the peanut gallery ask dumb questions. From what I've seen of this thread, the peanut gallery in this case is pretty knowledgeable.

So, here comes a simple (possibly dumb) idea:

Brent's suggestion of some sort of ground loop made me start thinking about dissimilar metals in sea water and the electrical/corrosion problems (White powder?) that sometimes result.

1. The pylon usually has an anode on it...does yours?

2. This may be unique to WHOI, but we use stainless steel rosette frames which introduce the possiblilty of contact between the frame (stainless) and the pylon (anodized aluminum) thought the mounting holes and/or mounting screws or bolts. We take great care to isolate the stainless mounting bolts with delrin sleeves and use delrin flat washers between anywhere the aluminum could touch the stainless. (Both sides of the mounting bolts...that is, from the top down it's stainless bolt head, stainless flat washer, delrin flat washer, pylon body, delrin flat washer, stainless flat washer, stainless lock washer, and stainless nut. As I said before, the stainless bolt has a delrin sleeve so as not to contact the aluminum of the mounting hole.

Just a thought...

George

Reply From: Dan Fitzgerald (U. Hawaii) on Wed, 6 Nov 2013

Hi,

Chiming in from sea here.
The white substance has been forming on both ends of the SBE-32 cable, though there is more on the pylon side than the 9plus side.
~Dan

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Daniel S. Fitzgerald
Senior Tech, Ocean Technology Group

University of Hawaii at Manoa, SOEST
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Reply From: Andrew Girard (WHOI) on Thu, 07 Nov 2013
Have you guys contacted Mike Stewart at Subcon? He's been a pretty good resource for me in the past, particularly if you come across as trying to solve the problem, not hang them out to dry.

The white substance could just be mold release of some kind. Are you sure the connectors are fully mated? I put a dollop of dc4 grease on the face and mate and unmate to see if it all squeezed out. I know mixing Impulse and subcon locking sleeves has caused me issues in the past.

Keep us in the loop, we swapped everything over to Subcon on MVCO, WHOIs' coastal observatory off Marthas Vineyard.
Andy