National Data Buoy Center

Presentation

to

The Regional Marine Instrumentation Center (RMIC)

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Operation and Maintenance of Marine Systems
Buoy Operations at Sea
Buoy Operations at Sea History

Buoy Operations at sea include
- Deployment
- Recovery
- Repair

Annually, NDBC deploy ### buoys, recovers ### buoys and effects ### repairs.

At sea operations are critical events where even small errors can cause major failure.
Buoy Deployment

Buoy and Equipment are shipped to location.

All shipment articles should be optimized designed for shipping.
Buoy Deployment

Buoys are assembled shortly after they arrive. Testing is performed on the assembled system before deploying.
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Buoy Deployment

Problems can be found early on by NDBC DAC personnel monitoring the satellite transmissions.

These issues can be diagnosed by connecting to the system with a laptop computer.

Problematic parts can be swapped out with spares.
Anchors, Buoys and mooring equipment are heavy and require lifting machinery. Equipment is loaded on a ship using a crane.
At-sea operations are always weather dependant.

Calm seas are a requirement for safe and successful field operations.
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Buoy Deployment

Safety awareness is essential at sea.

Personal protective equipment is used to help prevent injury.

- Gloves
- Hard hat
- Cold weather survival suit (floatation)
- Safety Shoes
Buoy Deployment

Weather proof cables and connections are used to protect electrical connections. Tie wraps are used extensively to secure cables.
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Buoy Deployment

Deployments are performed by setting down the buoy first. Next the mooring is paid out. Finally the anchor is released.
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Buoy Deployment

Setting A TAO Buoy in the water
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Buoy Deployment

Setting A TAO Buoy in the water
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Buoy Deployment

The mooring may be laid out on the ships deck so that it will not get tangled as it follows the buoy out to sea.
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Buoy Deployment

Paying out the mooring.
Line box, Acoustic Release and Shackle
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Buoy Deployment

Anchors Away…
At the deepest site, it can take almost an hour for the anchor to reach bottom.
Buoy deployment

Buoy operation is always verified before leaving the station. The weather buoy program wait for three hours.

Hand held met sensor or ship’s sensors can be used to verify meteorological data.
Transmissions and data quality can be verified by calling the DAC with a satellite phone.

In some cases, the buoy operation can be verified by locally using radio or acoustic communications.
Sensors or other equipment may malfunction at sea. When this occurs, a service visit takes place to correct the problem.
It is possible that dangerous amounts of hydrogen can build up inside the buoy. A hydrogen gas check is made before doing any work on the buoy.
Moorings occasionally fail and the buoy goes adrift. These “drifters” can be tracked with backup location equipment installed on every buoy.
Maintenance

It can be difficult to predict every possible mode of failure.
Buoy Operations at Sea Future

NDBC is continually revising and improving ways to improve at sea operations.

- Reducing external cables and using rubber molded connecters
- Using small buoy hulls that fit into a standards shipping containers
- Improvements to power systems
Thank You

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