Issue 18

Inspector Bulletin

Latest updates & News feeds for Inspectors. 24th Feb 2021

Experience Transfer Advice and Guidance Regulation Updates

VIQ 10.38 Are switchboards free of significant earth faults?

In our last newsletter issue 17 we raised the point of stating "As a minimum the alarm setting should be 1 M Ohm and ideally 2 or more M Ohms to alert the user of early warning of potential problems."

Following on from this we have received some very interesting and useful feedback I would like to share extracts with you from an electrical engineers explanation that sensibly suggests the above statement and settings should be revised.

In the event of only one **complete** fault, the fault current is very low and interruption is unnecessary. Since a second fault would cause a circuit breaker to trip, an insulation monitoring device is required to indicate the initial fault.

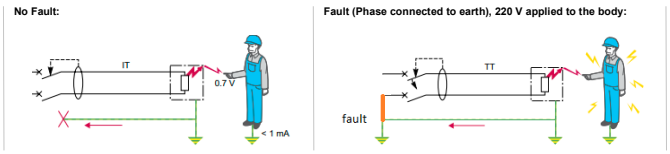
In an insulated neutral system, the neutral (if physically existing) is not connected to earth, and the equipment metal casings/bodies are earthed.

- No dangerous contact voltage when touching metal parts.
- Very low fault currents even in case of direct connection of one phase to earth.

Therefore, an insulated neutral system guarantees the best continuity of service. When done correctly, the installation can operate without endangering people and equipment even in the presence of an initial **complete** insulation fault.

Current caused by a single complete fault is not sufficient to cause sparks. Protective current devices are not triggered by very low currents in case of a single complete fault – direct connection of a phase to earth . However, the faulty circuit must be detected and repaired before a second fault occurs because:

- Any of two remaining phases become fatal (see below)
- The second fault would cause a short circuit between phases and trigger protective devices.



Looking at 220 V distribution systems as more prone for earth faults. For 440 V power distribution, the same will apply with double effect unless specified differently below.
Assuming the worst case scenario 50 V as being fatal voltage and 30mA as being a fatal current, body resistance in this case is 1667 Ohm.

Calculating minimum non dangerous insulation resistance (X):

220A/(1667+(X)) =0.03A

X = 220/0.03-1667=5666 Ohm. (13000 Ohm for 440 V) Higher minimum "safe" insulation resistance for 440 V than that for 220 V is actual reason for higher required insulation resistance and not the fact that the 200V grid has "*the large number of parallel circuits*"

"Leakage" current at such insulation resistance will not cause tripping of overcurrent protection devices

220v/5666Ohm=0.39 A (440V/13000Ohm=0.34 A)

From safety perspective the above 5666 Ohm for 220 V and 13000 for 440 V insulation resistance is sufficient as minimum.

Allowing for safety factors and for advance warning the best industry practice for low voltage systems (below 1000V) is to have minimum insulation resistance 1000 Ohm per Volt, i.e. 0.22 MOhm for 220V distribution systems (0.2) and 0.44 Mohm for 440V systems (0.5).

It shall be noted that the devices constantly measuring the insulation resistance onboard ships use superimposed direct current and measure all insulation resistance for galvanically connected grid as connected parallel (i. e. separately for 440 V or 380 V, 220 V normal and 220 V emergency grids but as connected in parallel for each of consumers so switching on 10 lights having 10 MOhm insulation each will result in the insulation monitor reading showing 1MOhm – which according to your article is less than acceptable however there is nothing to actually rectify here).

Hence to summarise here the alarm setting should be set at 0.2 MOhm for 220V systems and 0.5 MOhm for 440V systems. This meets the minimum insulation resistance requirement for 1000 Ohm per Volt.

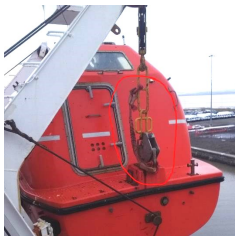
VIQ 5.28 Are the officers aware of the maintenance requirements for lifeboat, liferaft, rescue boat release hooks and free-fall lifeboat release systems, where fitted and, are lifeboats, rescue boat and liferafts including associated equipment well maintained ready for use?

Inspectors Observation: Although the onload release and retrieval system was approved in accordance with MSC.1/Circ.1206/Rev.1 Annex 1 fall preventer devices had been fitted to the lifeboat release hooks. There was no additional instructions posted to remove the FPD's prior to launching the lifeboat and no further instructions within the PMS or ISM on when they should or should not be used. The accompanying officer advised they were rigged just for the inspection, but further remained in position after the inspector had completed the deck rounds following the inspection inside of the boats and only then removed once this was brought to the accompanying officers attention for a second time.

On-load release and retrieval systems must comply with MSC.1/Circ.1206/ Rev.1 Annex 1 not later than the first scheduled dry-docking after July 1, 2014 (but no later than July 1, 2019). Until then it is recommended that fall preventer devices be fitted to systems that do not comply with the revised code. Inspectors must verify that the systems installed meet the above requirements by the above date and mitigation measures adopted in the meantime.

There are a number of questionable issues here;

- The need to use the FPD's when they are fully approved to MSC.1/Circ.1206/Rev.1 Annex 1
- Clarity of instructions for use of the FPD's
- At what point would the FPD's be removed after the inspection (if at all)



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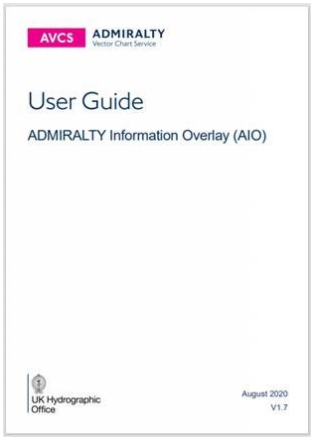
VIQ 4.12 Is there an effective Chart and Publication (Paper and Electronic) Management System in place and are the deck officer's familiar with the process including the effective management of T and P notices?

Inspectors Observation: Temporary and Preliminary notice No xyz indicated that a buoy had been temporarily removed from position, yet when checking the ENC, the actual buoy remained on the chart. Further, the country issuing the T and P notice was noted as including T and P's automatically on their ENC's.



As advised by the latest AVCS ADMIRALTY Information Overlay (AIO) user guide ***AIO does not contain paper T&P NMs issued by the ENC producer, unless it has been reissued as an ADMIRALTY T&P NM***. This should avoid duplication with the ENC, though it is possible that the AIO will occasionally contain T&P information similar to that displayed in the ENC.

There may be a time delay between the publication or cancellation of national T&P NMs and the publication or removal of the equivalent ADMIRALTY T&P NMs that are included in AIO.

The UKHO further issued a letter dated August 2018 that remains in force "Managing Temporary & Preliminary Notices with ADMIRALTY INFORMATION OVERLAY (AIO)" and quotes

"Where the information is encoded in the ENC, digital chart users do not need to refer to ADMIRALTY T&P NMs that have been issued for paper charts."

The above statement does imply that the paper chart T and P notices need not be checked here and practically it would not be expected of the mariner to do so where all ENC's and AIO are maintained updated. However, there are possibly going to be occasional times when due to time delays the T and P's are not applied to the ENC's. It is suggested that mariners further keep close reference to local navigational warnings through Navtex, Navareas and other sources such as local agencies to further minimise the risk of overlooked T and P's.

Disclaimer: this material discusses OCIMF activities based on personal experience and opinion and not necessarily in agreement with OCIMF or OCIMF members views.

Few interesting observations in pictures...

Saveall higher than the fuel oil vent itself


Non Ex flash lights


HRU Incorrectly fitted

VIQ 5.23 Does the vessel have appropriate duplicate portable gas detection equipment suitable for the cargoes carried, are the officers' familiar with the operation, calibration and is the equipment being maintained in accordance with manufacturers and industry recommendations?

Inspectors Observation: The vessel was provided with mixed manufacturer toxic gas testing tubes and suction pumps. The officers interviewed were unaware if the tubes and pumps were compatible to be used with different manufacturers tubes.

Two toxic gas detectors are required on vessels carrying noxious liquids. There should be an adequate supply of chemical indicator tubes (e.g. Draeger tubes), or other electronic equivalents specific to the cargoes being carried and they should be within their expiry date. An up to date inventory of chemical indicator tubes should be maintained.

On investigation it was noted Kwik-Draw tubes (formerly tubes of MSA/ AUER) are 7 mm in diameter and can be used with Draeger pumps or vice versa. The Kitagawa tubes are 5 mm in diameter and can be used with Sensidyne, Kitagawa or Gastec pumps and vice versa. **Hence it is essential for the operator to be aware of this difference as if not, the results of the tests could well be erroneous.**

Inspectors are encouraged to share their experiences for us all to learn from here.

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