

Report on sub problems 1 Dec

Nuclear subs can only operate in water of a depth of five times the hull diameter. If they are too close to the bottom they can suck up sand into the condenser intake. There is only a single pressure hull on the bottom, the only place it is double is at the bow and behind the sail. There is a lot of equipment on the bottom of the sub. After hitting the seabed Triumph will have to go into a drydock. The impact could also damage equipment on board and this will have to be checked. There could also be damage to the integrity of the hull which could result in diving restrictions.

Gibraltar experts met with MoD on 14 Nov. MoD held a meeting on 15 Nov, the decision on which sub would be the lead boat for the repair was deferred to another meeting on 6 Dec - "kicked upstairs". Gibraltar experts acronym is NUSAP.

The cracks are at 180 degrees and are longitudinal along the length of pipe. The problem has been exacerbated by stress caused by the weld and angle of the weld.

They have examined the build weld radiographs. The problem has been missed twice in the past - first, they failed to detect the fault on Tireless at the build stage, there was a critical design fault on Tireless; second, when they first looked at Tireless after the accident.

To inspect they have to wait for the boat to cool down - at least one week - then they can only be in the reactor compartment for a few minutes. If all the lagging is removed it is then possible to look at the crack from the outside. For a proper inspection they have to drop the radioactive isotope inside the pressure vessel - this could only be done if the pipe was dry. The same applies for a proper ultrasound inspection.

The boat which is used for diagnosis may be cut up more than required - they could find that on other boats only a smaller part had to be removed. This is an argument for not doing Tireless first.

Gibraltar experts asked the Navy if they had data from other boats - so they could look at malfunction trends, radiographs - no other boats have been inspected, apart from build data.

It is a design thermal ageing defect of some form. "Design" includes method of manufacture, including the way the weld was carried out.

In theory it might be possible that the design of the reactor on Triumph was different.

Future P.Q.s - What is the state of the repair.

Subs have life of 22 years, not including refits. SOV had an emergency refuelling at Chatham in 1975.