CDAS SAFETY FLASH 2022-01

Information sourced from IMCA Safety Flash

Bailout manifold failure

What happened

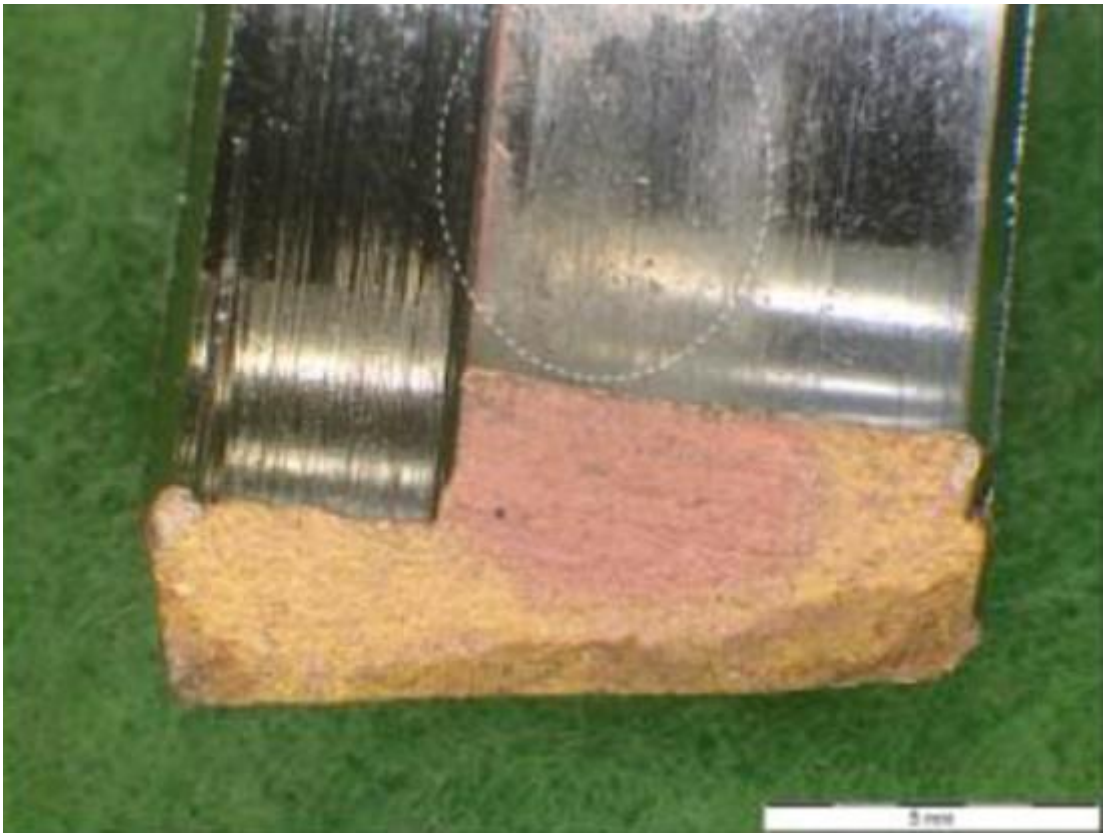
A diving bell bailout manifold failed under pressure. No divers were in the bell at the time. The bell was being prepared for diving operations whilst the DSV was waiting on tides and bell checks successfully completed. The bell man had left the bell and was back in the chamber, and the bell trunk had been isolated from the system at 31msw, with the system itself at 32msw.

A little over an hour after the bell checks, the dive supervisor heard a sudden rush of gas over the comms. A check of the bell internal camera showed visible misting (as from a gas leak). Initial investigation lead to the discovery of four pieces of a failed nut from the bailout manifold assembly.

Diving operations were immediately suspended. The decision was taken to surface both bells and remove all bailouts for inspection.

Bailout manifold assembly example showing location of failed nut

Bailout set standing upright in uneven boots



Failed nut showing some signs of coating removal and corrosion at point of a stress fracture (pink area)

What went wrong?

Our member notes:

- The rubber boots of each cylinder were uneven, which would likely have led to stress being placed on one side when moved around;
- The securing strap holding the bottles together was found to be loose;
- The design of *this particular* bailout manifold was less robust than other systems used elsewhere by the company.

What was the cause?

Later forensic testing of the nuts from the manifold assembly supported the original root cause analysis which suggested that lateral force had likely been introduced due to inappropriate securing mechanisms. This led to stress corrosion cracking in the nut and allowed material ingress which caused internal corrosion over time.

Actions

- Replaced these particular bailout manifold assemblies with a more robust version currently in use elsewhere in the fleet;
- Ensure familiarity with planned maintenance tasks relating to bailout alignment, integrity and boots;
- Circulate to industry: the forensic analysis report indicates the nuts used are manufactured from copper alloy CW614N which is susceptible to stress corrosion cracking and dezincification. It is known that these are widely used on manifold assemblies in the industry.