Poorly planned maintenance led to engine room flooding

The bulk carrier had loaded steel cargo in China and was bound for the Middle East. It was a nice day with a moderate wind and the vessel sailed at 12 knots in the South China Sea at full draught. Suddenly the MGPS (Marine Growth Prevention System) sounded an alarm and the duty engineer could see that there was an electrical problem.

A similar electrical problem had occurred a couple of months earlier and had been rectified by the crew. The chief engineer was informed, and he instructed an oiler to do an inspection to see if there were any loose wire cables inside the anode assembly.

The MGPS anodes were bolted with flanges directly on top of the sea chest. In the centre of each anode was a small cover where the cable was connected to the anode. The duty engineer told an oiler to remove the nuts for the cover plate. The engineer helped the oiler with the first two bolts and then assisted with other jobs that were being done in the engine room. The oiler also unscrewed the fixing nuts for the entire flange. The flange with the anode blew off because of the sea water pressure from the outside, and large amounts of water poured through the sea chest into the engine room.

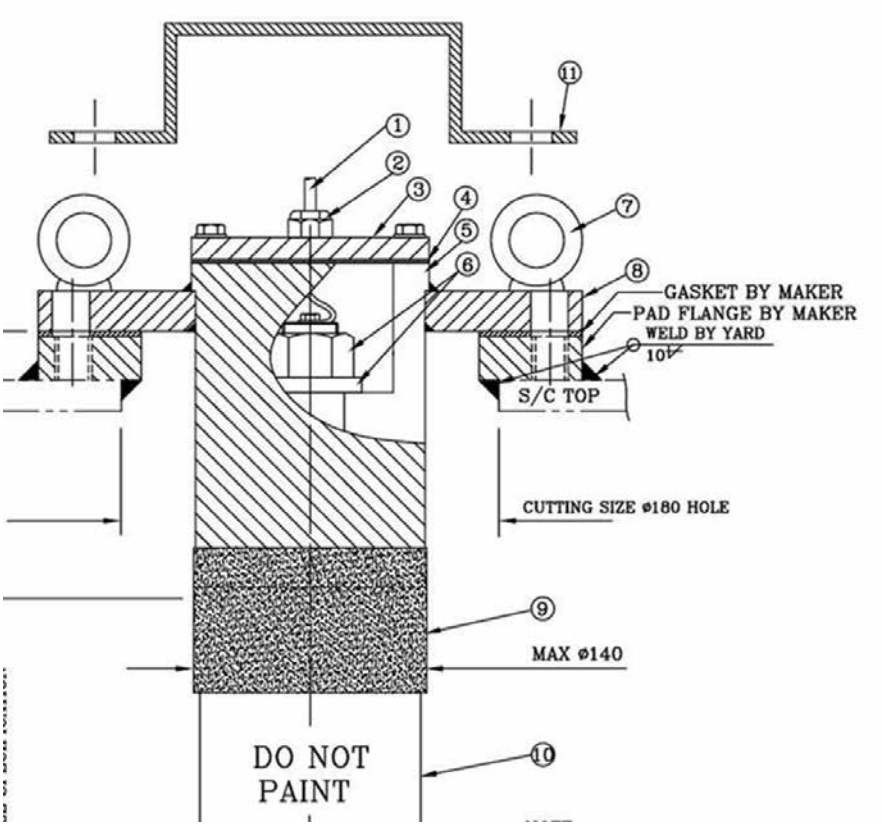
The engineer asked the crew to block the ingress of water. The oiler tried to put the flange back, but it was futile. The auxiliary engines were started and the hydraulic valve that could expel water outboard through the ballast pump was opened, and all valves for the emergency bilge pump, fire pump and general pump were also opened so the water could be pumped out. The crew turned on all the pumps. It took two minutes for all the pumps to start working. The main engine was stopped a couple of minutes after the water ingress.

After 15 minutes the engine room and steering gear room were flooded with 200 MT of water as the pumps couldn't keep the water level stable. The auxiliary engines stopped, and the vessel blacked out. All quick closing valves and shutters were closed to prevent any oil from leaking out.

The master realised that the vessel had to be abandoned and evacuated the vessel. The crew were rescued from their lifeboat by a vessel in the area.

Two days later a salvage team boarded the vessel and towed it into port for repairs which took several months.

Technical description



The small cover (item 3) is underside the lid. There is a small chamber where the anode cable (item 1) is connected to the anode (item 10). The chamber is isolated from water.

The anode mounting flange (item 8) is what the oiler removed. It is used to secure the anode assembly to the seawater chest. The anode (item 10) is submerged in the seawater chest.

The oiler should never have touched the mounting flange.

This is a critical job and a risk assessment should have been issued by the chief engineer and inspected by an engineer before the job commenced.

Discussion

Go to the “File“ menu and select “Save as...“ to save the pdf-file on your computer.

You can place the marker below each question to write the answer directly into the file.

When discussing this case please consider that the actions taken at the time made sense for all involved. Do not only judge but also ask why you think these actions were taken and could this happen on your vessel?

1. What were the immediate causes of this accident?

2. Is there a risk that this kind of accident could happen on our vessel?

3. How could this accident have been prevented?

4. What sections of our SMS would have been breached if any?

5. Is our SMS sufficient to prevent this kind of accident?

6. Does our SMS address these risks?

7. When maintenance is being done in the engine room is this discussed with the bridge officers?

8. Are our procedures on how to operate systems with pressurized seawater (open to sea) sufficient?

9. Jobs on systems which are pressurized should be considered critical jobs and need a risk assessment and work permit. If this job had been done on our vessel what are the procedures?

10. When critical jobs are being done are two people present? Would this be beneficial?

11. In this case there was no sign highlighting that the flange was connected directly to seawater. Would this have been beneficial?

12. Do we have procedures on how to remove nut/bolts to prevent all bolts being removed simultaneously, as in this case?

13. Do we ever train on how to use the bilge pumps with suction in the engine room?

14. Do we have any other possibilities for bilging in an emergency e.g. direct suction with Fi-Fi pumps from the engine room?

15. If procedures were breached, why do you think this was the case?