

Will this rust kill me?

➔ This was the intriguing title of a presentation given to the Hong Kong branch by Dr John Allum and Dr Sophie Parsons of HFS Asia (formerly Hannaford Forensic). More than 40 members and guests gathered at the Maritime Museum for an excellent talk kindly sponsored by HFS Asia.

Unfortunately, Dr Parsons was unable to join us on the day. However, Dr Allum spoke for her so we managed very well, even though he admitted to removing some of her slides because they were too technical for him!

The talk began with a look at the causes of metal failure – ductile, brittle, fatigue and stress corrosion cracking. Among the major reasons why objects fail are overload, overuse and corrosion, and it was corrosion which the talk addressed. We were taken through the creation of rust when a water droplet forms a galvanic cell, current flows and iron oxide is formed.

Several interesting case studies were presented. The erosion corrosion of pipes on an LNG tanker demonstrated the effects of liquid turbulence in a curved section of the piping to a compressor. A badly repaired series of holes in the pipe caused an explosion, so that kind of rust can kill you.

Next, we were shown the effects of storm damage and water ingress on the ropes controlling a passenger lift. Apparently (and rather disturbingly) this is also a problem that sometimes affects lifts in Hong Kong's high-rise buildings. We were shown some dramatic photographs of damage to the fibre core of these wires, and reminded that once the core is compromised the wire must be replaced immediately. This kind of degradation can

certainly kill you without warning.

Cargo damage was next, with some splendid views of railway carriages being delivered covered in rust. We were told that the corrosion extended to all the electrical connections within the carriages. Some clever detective work revealed that the carriages had been stowed in a tweendeck above a cargo of nickel sulphide, which forms sulphuric acid when moisture is applied. In such an atmosphere the railway carriages had no chance – and defective rolling stock can kill you.

Finally, we were shown the effects of direct reduced iron on the decks and fittings of a ship. Cargo residues were not washed off thoroughly, and the surfaces were immediately painted to cover the resulting mess. The cargo reacted with the moisture and the surface coatings to cause corrosion and blistering of epic proportions, resulting in distortion of the deck plating. Naturally, that could kill you.

Just when we were convinced it was too dangerous to ever set foot on a ship again, Dr Allum described some of the work his company has been doing in the aftermath of the horrific Tianjin explosion. There were impressive shots of Dr Parsons in full protective suiting taking swabs from containers in the area to test for cyanide and other unpleasant substances. Mercifully, they have not yet encountered anything life-threatening, but we were left with the impression that it might be safer at sea after all.

Finally, Dr Allum warned us to be extremely careful whenever there is a spill of an unknown contaminant. Even water may react with many chemicals, so it is unwise to tackle a spill

without consulting product data sheets and a qualified chemist. It is often wise to consult the manufacturer, because they can provide full details of the chemicals and products they sell, and they often have their own chemist in-house.

A very lively question and answer session followed. This finally had to be halted because the food was being served, but this was a presentation that will be long remembered by all who attended.

Capt Alan Loynd FNI