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"For a small company, if we went wrong on this, it could break our neck"
Ingvald Fardal, CEO, Fjord Line

Shielding can be easily overlooked

Flange shields, like many simple safety items, often fall through a gap in awareness despite a spate of recent incidents, according to Jeff Harwood, managing director of UK company Flangeguards.

Shielding is supposed to stop liquid or vapour spraying out from flanges or other vulnerable joints in case of a breach, protecting people from oil and steam – which can kill – and minimising fire risks. But even a decade after a Solas ruling making installation mandatory, "cases are still turning up where flange shielding has been inadequate or non-existent," said Mr Harwood. "Shielding can either get overlooked or simply not replaced after maintenance."

Refits are, in the main, where customers tend to have problems, he said. The specific shielding requirements have to be identified and that means an engineroom survey: "Typically this survey is done by ship personnel and performed in a hurry, with identification of what's needed and where it goes not being properly thought through."

Further, a point that is not generally considered is that ill-fitting safety shields can actually create steam or oil mist formation rather than stop it, he said. "The best design won't be a tight clamp, this simply means you can get a lateral spray; what is needed is a shield that allows diffusion of most of the pressure." This means a somewhat sophisticated design, as even low pressures can send spray across an engineroom.

A transparent version of a shield for a whole oil filter (credit: Flangeguards)

There are also different shield materials to assess too: stainless steel for high temperature and pressures, Teflon-coated fibreglass for general oil or complicated fittings, PVC for low corrosion and lower costs, transparent for when it is necessary to see past the shield. Further, while standard safety shield designs generally do not provide secondary containment as there should be a leak path to avoid pressure build-up, certain designs incorporate drain nipples and a channel for the released fluid.

However, according to Mr Harwood the biggest problem caused by skimping the survey is simply inadequate information about the flange or shield locations, often because they have been specified in a hurry, perhaps following an inspection that has found a deficiency. "Measuring a flange is easy enough but fitting a box full of shields is impossible if you don't know where they are supposed to go," he said.

Mr Harwood pointed out that creating individual flange and shield ID tags also makes routine inspection and replacement much easier. Further, holding one person responsible for the job makes sense: "If the surveyor knows they are also installing the shields, they will generally pay greater attention to detail."

Oil mist residues can blow back into the machinery space

Oil mist residues can blight even modern vessels. "In one case even though oil mist from the crankcase was being vented via a flue into the air outside, downdrafts were simply pushing it straight back inside again", said Christian Stieler of the Swiss filter manufacturer UT99.

"The whole vessel had to be cleaned up regularly, it wasn't just the fire risk, even the steps were getting slippery," he explained.

It is a nuisance in any engineroom. Combustion gases can blow-by the piston rings into the crankcase but, without venting, there is an unacceptable pressure increase in the crankcase. However, if oil residues are left to simply vent from pipework, air currents will disperse droplets through the space. The contamination can add up to more than a mess: five barrels a year for a middle-sized cruise ship equates to an environmental issue that is beginning to concern the industry.

Filtration, then, provides a useful answer for both closed and open crankcases: multistage filters with high oil precipitation rates can be designed to respond to fan or turbocharger action; a pressure transmitter and regulating system holds the crankcase at the right under-pressure necessary for drawing out oil mist and contaminates even given broadly variable operating conditions. The result is a very low residual amount of oil in the air, less than 5 mg/m³ downstream of the filter.

And less cleaning up.

Lack of clarity behind incomplete fire response

A report on the incomplete deployment of a CO_2 fire-suppression system into an engineroom has signalled concerns over the potential for a serious incident.

A routine passenger ferry journey from Auckland to the island of Waiheke in New Zealand was brought to an abrupt end when a catastrophic engine failure resulted in connecting rods piercing an engine casing, triggering the fire alarm system. No passengers were injured on the *Jet Raider*, however the fire suppression system was only partially deployed.

According to a recent report by NZ's Transport Accident Investigation Commission (TAIC) "The escaping mixture of fuel and exhaust gases... set off the fire alarms and gave the crew the appearance on the closed-circuit television that a fire had occurred." After shutting down the engines, the crew sealed the engine compartment and released the CO_2 fire-suppression system.

The worrying element identified by TAIC is that "only half of the required CO_2 gas was released to the engineroom." In the event of a genuine fire, this reduced release could have resulted in far more serious damage with the potential for loss of life.

The confusion came about because most of the ferry fleet operated by Fullers Group at the time of the incident in 2011 consisted of catamaran-style vessels with the engines housed separately in each hull: this configuration meant the fixed CO_2 fire-suppression system was divided into two sections – one for each hull. Setting off the fire response in either section would release the volume of CO_2 required to extinguish a fire in that hull alone.

Jet Raider, however, was one of a minority of mono-hulled vessel with both engines housed in a single engineroom. Despite this, the fire suppression system had simply been patterned after the other vessels: this meant there were two CO_2 bottles, ›››