Small pads play big part
in structural performance

Using the wrong material or ignoring the need to replace worn pads, can lead to cracks in hatch covers and coamings after two years of operation

Hatch cover bearing pads transfer the weight of the cover, and any cargo it may be carrying, to the ship's hull while allowing for relative movement between the cover and the hatch coaming caused by hull flexing in a seaway. They must also maintain the correct compression on the hatch cover seal and avoid wearing damage to the coaming/hatch cover interface.

"Bearing pads may be relatively small, but the part they play is big," says **Jyrki Mäenpää**, Technical Manager, Dry Cargo. "As bearing pads transfer weight, lateral forces are generated that are then transmitted to the ship's coaming and hatch cover structures. These forces are used in fatigue strength analysis at the newbuilding stage, and subsequently, the structures are designed around these calculations.

"Over time low-friction bearing pads do get worn, and the amount of wear for an individual pad depends on its location and actual loading – therefore they should be replaced on a progressive basis.

When replacing the pads, serious consequences can result if changes are made to the features originally specified for the system

"If alternative spare components are used, it is extremely important not only that the dimensions are compatible, but also that their performance fulfils the same criteria required of the original component. To obtain the required safety margins and to guarantee a trouble-free operational lifetime, the hatch cover system has to be maintained as instructed, and critical spare part components, such as the hatch cover bearing pads, have to be of original design.

"Friction and wear behaviour are the most critical factors, and it is impossible to judge these without testing them in a real environment. If the friction coefficient of a bearing pad is doubled, for example raised from 0.2 to 0.4 – which can easily happen when a low-quality spare component is used – the calculated life-span of a steel structure is diminishing by a factor of ten. In other words, the safe operational period of coaming and hatch cover structures drops from 20 to two years!

"Also, if low-friction bearing pads are replaced with high-friction spare components, cracks are likely to be generated in the steel structures".

"Although there are numerous sliding bearing materials available, only a few are suitable for hatch cover bearing pad use, as most do not meet the criteria defined in the original specification. This is because there can be great variations in sliding and wear properties of different bearing materials and this is applicable to both bronze and plastic composites.

A range of reliable options

The portfolio of MacGregor bearing pads from Cargotec is comprehensive, ranging from a traditional steel-to-steel type to the most advanced solutions using the latest materials and technology. Cargotec offers tested and proven bearing pad solutions that mean trouble-free operations and safe cargo handling for all types of vessels. Continual investigation over many years has resulted in a range of options, including the Lubripad (bronze/PTFE), the Flexipad (steel/rubber), the Unipad (woven PTFE) and the Polypad (self-lubricating polymer-based).

A low-quality spare can reduce the steel structure's life-span by a factor of ten