

# Intershield® 803Plus adds to hold integrity

A new super tough cargo hold coating from International Paint has been specifically developed to combat ‘shooting’ damage – a little acknowledged loading phenomena that could compromise a bulk carrier’s safety.



*Shooting damage, which occurs at high loading rates, could compromise bulk carrier safety*

While the sharp economic downturn experienced at the end of 2008 was reflected in a sharp dip in global coal exports, the International Energy Agency projects significant increases in the trade of both steam and coking coal in the years ahead.

IEA's 2009 estimates, which use

2007 as its base year, project total world trade as coal rising from 923.8 million short tons in 2007, to 1032.8 million short tons in 2015, and to 1208.5 million short tons by 2030.

Exporters in Australia, South Africa and South America, in that order, are projected as being responsible for practically all of this growth.

Economic conditions from late 2008

caused some nascent plans to expand export facilities to be shelved or delayed, while the number of idle bulk carriers off leading coal ports became a feature of the malaise. However, a variety of future importing needs, including the lack of domestic sources in South Korea and Japan, India's energetic heavy industrial expansion, and the coming shut down of coal

production in Germany, suggest IEA projections are sound.

The concentration of growth in three key exporting markets, which by 2030 are expected to account for over 60% of all world coal exports combined, calls for the development of

high throughput exporting facilities. While not subject to the same just in time demands as ports serving liner trades, these facilities must be able to turn around even the largest dry bulk carriers in the minimum time, in order to service the industrial supply chain.

Without going into the development plans of individual export facilities (for reasons that will become clear), such ambitions rest on integrated bulk handling facilities equipped with high storage, blending and load out capacities.

In an increasing number of instances, the high feed rates demand conveyor belt delivery to shoreside loaders to ensure homogenization, a constant reclaim/load-out rate, and the flexibility to reclaim from different stockpiles within a coal yard, particularly where a customer may require a fast modification of the blending ratio.

In such circumstances, loaders can be delivering harsh and corrosive cargoes into a given hold at rates exceeding 3,000 tonnes per hour.

## Loading issues

For some, the 2004 International Maritime Organization decision to allow single hull bulkers to continue in operation, where double hull tankers were to become mandatory, was not progressive. At IMO, however, the consensus has been that the strictures placed on tanker operators were not appropriate for bulkers, so long as they were maintained to high standards.

Behind such a view lies other guidance critical to bulker standards and safety. The Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code), adopted as recommended practice by the IMO Assembly in 1997, emphasised stress and damage imposed by cargo handling throughout the life of a ship as a possible contributory cause of structural failure of bulk carriers, leading to casualties and losses. Its purpose was to provide guidance to ship masters of bulk carriers, terminal operators and other parties for the safe handling, loading and unloading of solid bulk cargoes.

The BLU Code represented IMO's response to casualty rates in the dry bulk carrier sector through the 1990s, and was initially driven by the high profile sinking of the Derbyshire in



*Bulk carrier high speed loading*



*Example of shooting damage*

1991. However, today, some wonder whether the hard lessons learned in even higher profile cases in the tanker sector that led to the advent of the Performance Standard for Protective Coatings, such as Erika and Prestige, have been realised across the entire dry bulk sector.

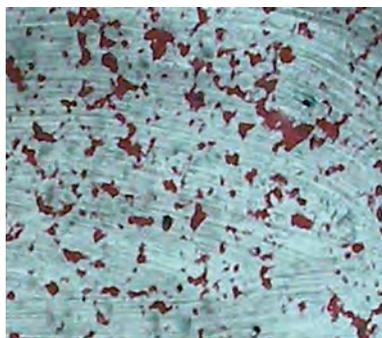
### Shooting damage

With loading rates of coal via high speed belt conveyors, for example, exceeding 3,000 tonnes per hour, there is considerable potential for damage to cargo holds, should loading be unnecessarily concentrated in one spot, for example. In such instances, impact energies result in potential 'shooting' damage to the cargo holds. Effectively the cargo can be blasted or 'shot' (hence the term) at the bulkheads of a hold, causing potential coating detachment. It has been estimated that cargo can strike the coating at 30km/h and it has also been likened to grit blasting.

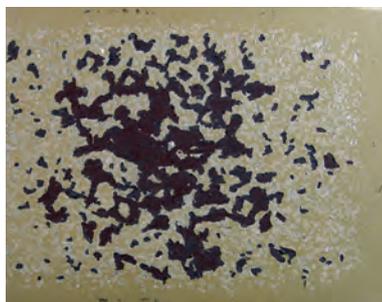
Leading marine coatings supplier International Paint has spent several years researching the effects of shooting damage after requests from quality shipowners. According to Rob Taylor, International Paint Bulk Carrier Marketing Manager: "Facilities where conveyor belt loading is utilised will be increasingly in demand. Whilst the concept of shooting damage is not known by all owners and operators (and some just see it as an occupational hazard anyway) many have raised the issue with us."

Mr Taylor said that the phenomenon occurs when loaders project coal at right angles to the bulkhead and the impact fractures and detaches coatings over a short period, leading to loss of steel protection and subsequent corrosion. Often these areas of damage are high on the bulkhead and are therefore difficult to repair in service.

It can be difficult to gauge the detrimental effect on the longevity of a cargo hold coating from shooting damage. In principle, cargo should be sprayed around the hold to help



*Close up - High speed loading actual damage in service*



*Close up - High speed loading simulator damage*

avoid impact damage but frequently loaders remain static for a time before being rotated and this is when damage can occur.

Anecdotal evidence suggests that standard products can show detachment after just one loading cycle. True abrasion resistant products will of course be more resilient, but their lifetime will also be affected. Some suggest that, even here, longevity can be reduced by up to 50%.

Once suffering this form of impact



*Intershield 803Plus new application*

damage, owners and operators are faced with more frequent repair, increased costs and potential downtime of their vessels.

In response, International Paint has for some years offered Intershield® 803, a specially developed cargo hold coating toughened to withstand the harsh environment of holds.

### Tough and tougher

Among the more forward-looking ship operators to have used the product is Seven Seas Maritime Ltd, which has applied the coating to the cargo holds on two bulk carriers – Atlantica and Arcadia. According to Mr. G Proestos, Seven Seas Maritime Technical Manager: "In the 3 years experience with Intershield® 803 we are happy with the performance."

Other highly reputable owners agree, among them Fairsky. According to owner's representative Mr. P. Perakis: "We are very satisfied with the performance of the cargo holds of all 7 vessels coated with Intershield® 803 which typically carry coal, coke, grain and occasionally minerals".

The launch of Intershield® 803 by no means represented the end of development work in this sector for International Paint, however. In 2010, the company launched Intershield® 803Plus, a newly formulated coating for the bulk carrier market which is reckoned to be International Paint's toughest and most impact resistant cargo hold coating for the marine sector to date.

According to Mr Taylor: "We decided to address the problem around 3 years ago with the aim to develop a coating which was more resistant to impact damage. Our first task was to develop an internal test method to simulate the shooting damage we had observed at impact speeds of up to 30 km per hour. Following 12 months of development, the high speed loading simulator was born. We believe that this equipment can reproduce impact damage representative of in-service conditions. We then used this method in our product development work to

test candidate formulations against the specification we had targeted. Part of the product development also included field testing by way of test patches in cargo holds and monitoring actual in-service performance. This data also assisted in verifying our test method.

### Smooth to the touch

“Our technical team estimated impact energy during the process of high speed conveyor belt loading and our internal test has been developed to correlate with impact at such speeds. Coating damage observed internally is very similar in nature to actual damage we have seen in cargo holds. Very often we have seen an ‘erosive’ effect of such impact on a coating. Here, the surface of the coating appears intact but, in fact, there has been a latent impairment at the substrate/coating interface and total detachment of the

coating can quickly follow.”

The newly formulated Intershield® 803Plus is an ultra high performance two pack abrasion resistant epoxy coating. Suitable for use as a cargo hold coating at the Maintenance and Repair stage, the coating can be applied to surfaces prepared to Sa2 (ISO 8501-1 2007). It is certified for carriage of grain and FDA compliant for dry foodstuffs.

Though specifically formulated to resist impact damage, it also exhibits superior general abrasion resistance, as well as good corrosion protection, VOC compliance with 75% volume solids, fast drying times and all year round workability. The product has a smooth surface for easy cleaning.

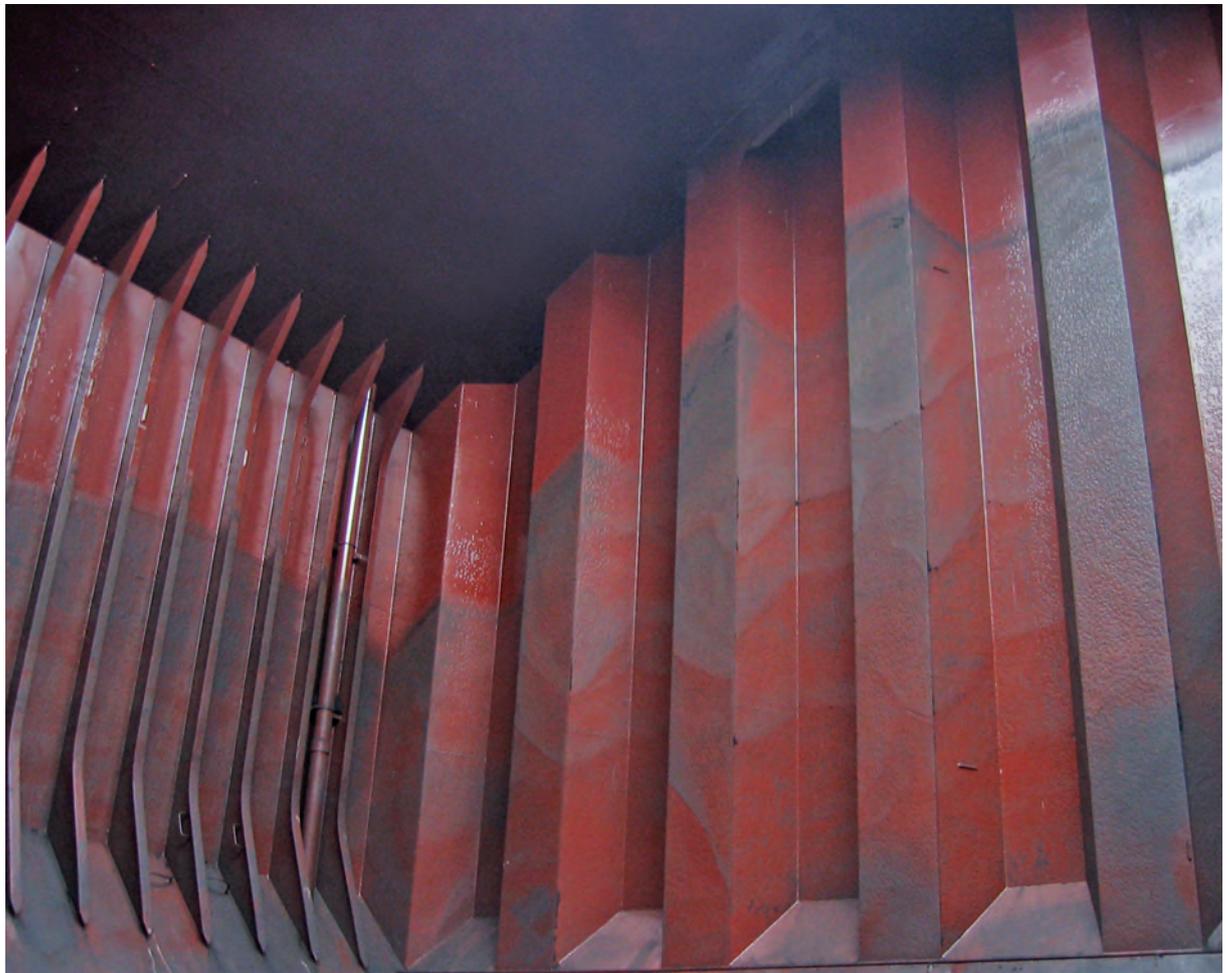
Intershield®803Plus hard dries in 6 hours at 25°C, although it can be applied at temperatures down to 5°C. Fast loading times for cargoes

such as coal, iron ore and bauxite are critical to reduce vessel downtime. Intershield®803Plus is ready for loading in 7 days at 25°C.

According to Mr Taylor: “Internal testing has shown Intershield®803Plus to outperform other cargo hold coatings for impact resistance. This level of performance will deliver extended coating life and asset protection.”

Indeed, using the high speed loader simulator, International Paint said that where a standard anti abrasion pure epoxy product would experience 46% paint loss (by weight), areas covered with Intershield®803Plus experienced a mere 3% paint loss.

Mr Taylor said: “We regard Intershield®803Plus as our toughest ever cargo hold coating which we believe will provide the ultimate defence against cargo hold damage.”



Intershield®803Plus after coal carriage