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HDPE advantages win over steel

The primary aim of a new conveyor guarding project at a major iron ore mine site at Christmas Creek, in Western Australia's Pilbara, was to increase safety for mining personnel. However, during the early phases of development, an innovative opportunity was identified and welcomed to also reduce its environmental footprint by using 100% Australian recycled HDPE plastic guards instead of conventional steel. This saved 4 tonnes of plastic from going to landfill. The HDPE Conveyor Guards were manufactured in Western Australia reducing offshore lead times and avoiding potential overseas supply and shipping problems.

The decision to make them from recycled plastic was even more environmentally sustainable because the guards can be recycled again after their expected service life of 10-15 years.

High-density polyethylene (HDPE) is a thermoplastic polymer produced from monomer ethylene. Benefits of HDPE over the older technology steel for such applications are significant in terms of greater safety, durability, environment sustainability and significantly reduced maintenance requirements.

Comprehensive HDPE benefits

1. Lightweight

Compared to conventional steel guards, HDPE guards are a lightweight solution, being up to 40% lighter. Safety risks around lifting weights have been in the industry spotlight. Lifting objects over 15kg is considered a no-go. Most steel guards struggle to remain lighter than 12kg. When site operators are consistently removing and re-installing guards to maintain your conveyors, the repetitive nature and stress can add up and take its toll. DYNA Engineering HDPE conveyor guards can be as

light as 6kg for a 1m x 1m panel. The guard weight is engraved on the panel for quick and easy assessment by operators to help prevent the risk of lifting injuries.

2. Installation savings

Conventional steel guards are notoriously painful to install. When the guards don't fit perfectly, a lot of work is required to alter the size. The minimum tools required are a welder, cutter, grinder, bender and a hot work permit. Even with all these, you can still only alter the size by 50mm which is inherent due to the mesh size and design. With DYNA Engineering's HDPE guard design, small adjustments can be made comparatively easily. For example, if the post was out of line by 5mm it would be as simple as shaving or cutting the edges to accommodate the size adjustment. All it would take is a simple saw. HDPE is a much easier material to make small adjustments to and doesn't require any hot work permits.

3. Manufactured in Safety Yellow and require no painting

If anyone has experience with maintaining conventional steel guards, they would know how much painting is required to maintain the Safety Yellow colour. Not only is regular painting required, but due to the size of the mesh, it's a costly process. A lot of paint is used and lost. Operators must resort to hand painting for a good portion of the time, which is extremely expensive. DYNA Engineering's HDPE conveyor guards are made from Safety Yellow-coloured material. No painting is required. This solves all the above issues, reducing maintenance time and costs. Conveyor systems are considered one of the highest risk areas on a mine site. Reducing time spent in and around the conveyors is a major plus and helps reduce overall risk.

4. Rust and corrosion free

HDPE has some outright benefits compared to steel as a non-metallic material. Steel is susceptible to rust and corrosion whereas HDPE is not. HDPE is a rust and corrosion free alternative, reducing long term maintenance costs and minimising potential rectification works.

5. Chemical resistance

HDPE conveyor guards are resistant to many chemicals. This makes them very applicable to guarding processing plants and facilities. Some of the more common chemicals used in minerals processing which HDPE is resistant to are Caustic soda, Hydrochloric acid and Sulfuric acid.

6. Metal detector friendly

Metal detectors are sometimes used on conveyors to detect fugitive materials and can be an important component of the process application. There have always been issues with steel guarding interfering with metal detectors, requiring operators to lower the detector's sensitivity which may allow fugitive material to slip through. The HDPE alternative is a non-metallic material and does not interfere with metal detectors. This allows you to increase metal detector sensitivity and calibrate it to the correct or recommended level.

7. Designed to Australian Standards, customised to application

DYNA Engineering HDPE conveyor guards are designed to Australian Standards and for Australian conditions. They can be designed to suit your existing equipment, replace conventional steel mesh guards, and/or can be adapted to incorporate metal

detectors, belt change stations, access platforms, access points, conveyor trip wires, cabling, and any other requirement. They can even be designed to incorporate retractable idler roller frames. Access to the idler frame can be simply done via the removal of a single guard. There is also a fully enclosed design option which incorporates hungry boards to help contain rough material on the conveyor.

8. Simple design

DYNA Engineering HDPE conveyor guards focus on ease of access. Each guard can be removed in a matter of minutes with simple tooling for quick and easy access. Installation is designed to be simple, quick, and easy. It is as simple as sliding the guard into place and fastening 2 bolts so the guard cannot be removed. No complicated instructions or special skills are required. During maintenance shutdowns, guards can be safely secured on the conveyor handrails. This ensures they are out of the way and reduces the likelihood of the guards being misplaced.

9. Robust

The patented DYNA "X" shape design increases the guard's strength substantially when compared to standard HDPE square mesh guards. This means it has reduced deflection and is well above the minimum Australian Standard to ensure personnel are kept safe.

10. Shorter lead time

DYNA Engineering HDPE conveyor guards are manufactured in Perth, Western Australia. Typically, a replacement guard for an existing conveyor can be

manufactured in as short as a couple of days. This is a very competitive lead-time when compared to potentially weeks or months if sourced internationally

11. Completely recyclable

HDPE is a commonly recycled composite material. DYNA Engineering HDPE guards are made of 100% recycled and recyclable plastic and can eventually be re-purposed into other composite and HDPE products such as water pipes.

Modular segments

These new conveyor guard modules are built in segments, designed to be lifted on and off the conveyor simply and quickly to ensure easy installation and maintenance.

More and more bulk materials handling sites throughout Australia are turning to substituting their traditional steel conveyor guards with the HDPE plastic alternative.

According to Thomas Greaves, General Manager at DYNA Engineering:

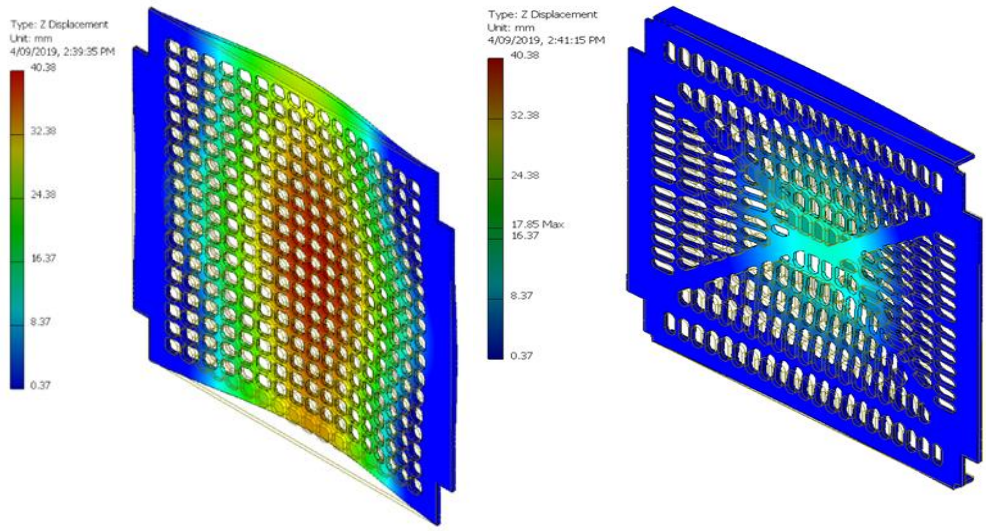
"One of the key challenges of recycling plastic is having the demand for the products in which to use the material in. The large miners can really lead the way and create a global demand for recycled plastic, which is a major step towards a more sustainable future."

Varying safety levels

Not all HDPE conveyor guards provide the same levels of safety. DYNA Engineering designed, developed and patented a stronger, more robust panel than others on the market, which delivers reduced deflection of fugitive material leaving the belt. It is ideally suited to heavy duty mining and other bulk loading industrial applications. The secret is in the actual design layout of the panel itself. Its exclusive and patented "X" shape design increases the guard's strength up to 60% when compared with others.

They are designed and engineered to exceed Australian Standards:

- Series AS 4024 : 1 : 2014
- AS 4024 : 3610 : 2015
- AS 4024 : 3611 : 2015



Conventional HDPE conveyor guard *DYNA's new "X" design conveyor guard*

The deflection differences between a conventional HDPE conveyor guard versus DYNA's new "X" design HDPE guard is clearly shown in these diagrams.

DYNA Engineering has been specializing in the design and manufacture of quality conveyor components since 1986. The company's key business focus now is on innovations for mining companies to be able to operate their conveyor systems while improving the environmental impact of their operations.