

Reliable Cut Protection for Roundslings

By Keith Rowsey, DSM Dyneema

Cuts are often cited as a leading cause for synthetic roundsling failure, which is why it's critical for operators to understand the dangers, and what steps should be taken to mitigate risks on the job.

In recent years, there's been a shift from steel wire roundslings to synthetic solutions, primarily based on weight savings, ease of handling and elimination of hazards to both the operator and equipment. And although synthetic roundslings offer increased benefits in terms of safety and efficiency, cut hazards can quickly derail an operation without the proper protection in place. In fact, cuts are often cited as a leading cause for roundsling failure – with consequences ranging from equipment damage to even death.

In 2009, the U.S. Department of Energy published a technical report on Synthetic Sling Failure – Evaluations and Recommendations. Of the twelve cases evaluated, it found that sling failure occurred in all cases (10) where the synthetic sling was in contact with the edge of its load. The report also recommends that “adequate synthetic sling protection devices be used to protect slings in any lift where the sling comes in direct contact with the edge or corner of its load” to prevent failure. However, it acknowledges that no concise standard exists for cut protection – allowing inadequate protection and “room for error in a field where error is unacceptable.”

Roundslings made with synthetic fiber typically consist of a load-bearing core and protective cover. However, covers and sling protection devices (sleeves) made from polyester and nylon lack the cut-resistant properties of high-performance fibers, such as Dyneema®. Dyneema® has a tenacity that is ~4 times higher than polyester and nylon; it's also highly cut resistant, and more durable than other synthetic solutions. These inherent properties result in less material needed for the same performance or higher levels of abrasion and cut protection compared to polyester and nylon at the same material volume.

But even though roundsling covers are readily available, with varying levels of material performance, no standard currently exists to specify cut protection levels in heavy lifting applications. I've seen and heard of instances where



towels, pieces of car tires, and rubber gloves were wrapped around slings lifting objects with sharp edges. That is not adequate protection and can result in dire consequences, especially if there was a sling failure and an operator was standing too close to the load. It is also important to recognize that cuts are different from other mechanisms such as abrasion, punctures, and tears. Meaning, there is no one-size fits all solution and the sling protection devices should be fit/designed for purpose based on the task being performed.

To ensure safety on the job, it's critical that operations look at the reliability of their type of fiber, fiber source, sling supplier, sleeve supplier, and type of construction(s). These aspects can determine the cut protection level of roundsling protection devices and help mitigate risks to both the operator and equipment. In addition to being a fiber manufacturer, DSM works throughout the value chain to provide material expertise, so end-users select products that are fit for purpose.

The Web Sling & Tie Down Association's (WSTDA) High-Performance Roundsling Standard was published in 2016 and addresses the importance of protection against sharp edges but does not specify an exact protection level. Section 4.7.1 of the standard states:

Roundslings in contact with edges, corners, or protrusions **MUST ALWAYS** be protected with materials of sufficient strength, thickness, and construction to prevent sling damage.

DSM is a member of the Web Sling & Tie Down Association and provides input and guidance on sling safety, material selection, and external factors, such as environmental conditions, that can impact performance. These insights not only help with standardizing best practices, but also educate operators on the importance of choosing sling protection that's fit for purpose.

The benefits of Dyneema® expand beyond just cut protective covers but also to roundslings themselves. In fact, Tata Steel, one of the world's most geographically diverse steel producers, switched from steel wire slings to slings made with Dyneema® for loading and unloading slit steel products comprising razor sharp edges. The switch resulted in increased cost efficiency, safety and productivity, including 3x the initial lifting capacity.

Dyneema® is also being used for cut protection in other applications for different reasons. DSM worked on a project several years ago called Goliat FPSO in an oil producing region in the North Sea. The area is heavily populated with fishing boats that use steel wire ropes to drag trawl nets through the ocean. At the time, the Norwegian government was extremely concerned the steel wire ropes would cut the polyester mooring lines and damage the FPSO operation. However, after conducting extensive tests on various materials, they concluded that only covers made with Dyneema® could pass the stringent conditions to keep the mooring lines safe.

Dyneema® fiber has also been prevalently used in cut-resistant gloves for safety applications for many years – reaching ANSI level A4 cut protection without the addition of glass, basalt or steel fiber reinforcements. DSM conducts substantial testing in its tech centers to ensure our products meet the needs of the market, whether the application is cut-resistant gloves or roundsling covers for lifting and hoisting.

In addition to continual testing and innovation, DSM works directly with its customers to provide input on product construction and design to maximize performance. So, while a standard on cut protection isn't currently available for roundsling covers, it is important to educate oneself on the risks and consult the fiber and sling/sleeve manufacturer on cut protection levels and product specifications. These insights can help ensure safety for operators, which is the most critical aspect in any working environment.

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