Heavy Duty Lashing Tasks: Steel Chain Replacement with New Tycan® Synthetic Link Chains, made with Dyneema®, the World's Strongest Fiber™

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Abstract

Metal link chains, first made from bronze and later from iron and steel, were already in use by the Romans, 2000 years ago. Although light, natural fiber ropes made from hemp or sisal existed prior to this, the heavier metal chains were invented subsequently because they offered two major advantages, which still apply today: dynamic flexibility and easy shortening.

With the introduction of high tenacity fibers like Dyneema®, the replacement of steel wire started in the rope industry and later spread to lifting slings. Today, the replacement of steel link chains has started, based on newly developed synthetic textile links. They exploit the fabulous strength and bending fatigue performance of UHMWPE fibers. The new synthetic link chains are six to eight times lighter than their traditional steel chain counterpart without compromising safety or performance. For heavy duty lashing tasks, the first synthetic chain application received international certification from Det Norske Veritas in 2013. Synthetic link chains increase productivity by a factor of two or more, drastically reduce injuries, and they prevent damage to freight and equipment. Features that are appreciated are their lack of noise and electrical insulation properties.

This presentation discusses new textile construction principles for single links as well as entire link chains, with a view to maximizing the effect of the UHMWPE fiber used.

Photos: Traditional heavy weight steel link chain (left) versus new lightweight Tycan® synthetic link chain, made from Dyneema® fiber (right), both with identical MBL=22 tons / MLC = 11 tons.