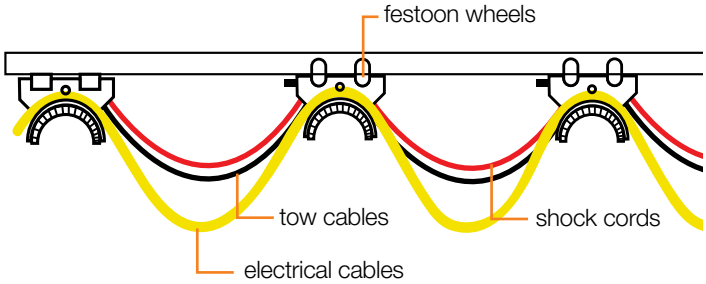
Power supply in overhead cranes: energy chains vs. festoons

Reliable and dynamic cable management is one of the greatest challenges in modern crane technology. Virtually all modes of crane applications are facing intensifying requirements regarding travel distances, speeds and precision. In the international overhead crane market where various standards come into play, manufacturers and end-users seek electrification solutions that can be adapted to the respective scenario. While the components must be modular, they should also be consistently easy to install, low maintenance and cost-effective. Engineers often turn to two power supply variants to try and meet these demands: festoons and energy chains.

Festoon systems are designed to provide direct electrification with flat or round cables. The cables in festoons are hung from trolleys that stack together at the end of the crane rail. While this structure provides defined linear guidance, it consumes space on the crane rail, limiting the amount of crane travel that can be accomplished in a given dimensional window. As the cables are essentially clamped in bunches, it makes replacement or addition of cables a time-consuming process. The festoon design also incorporates a variety of linked components, including wheels, tow cables, shock cords and bearings. Each individual part requires regular maintenance and lubrication, especially when exposed to rough operating environments.

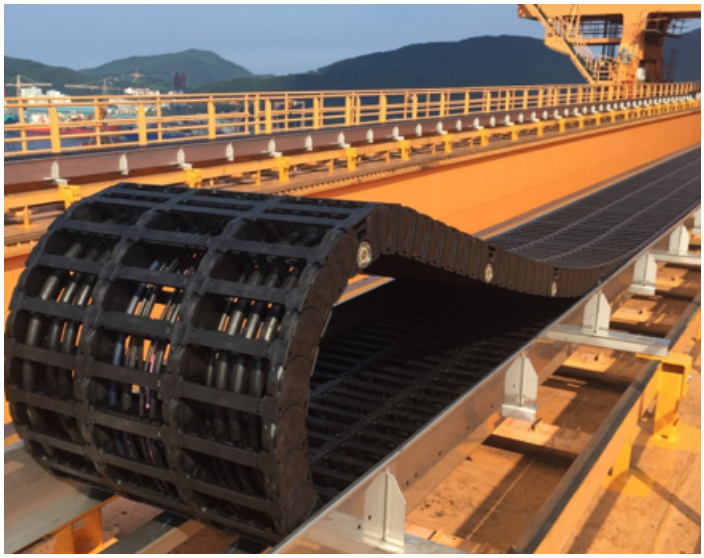
In festoon systems, cables and hoses hang loose while guided. Unprotected, the lines can swing, become tangled and get caught in the crane structure, especially during harsh weather, which leads to costly repairs. Often, festoons use flat composite cables consisting of multiple conductors in a single jacket. When these cables are used, the entire composite cable may need to be replaced if one conductor becomes damaged. For instance, ship to shore cranes are often found to be equipped with festoons. As this application environment is exposed to high winds, heavy rain, ice and other barriers, festoon users face high costs for repairs caused by wear and weather. This means further downtime wasted on maintenance and inspections. The hanging cables and steel-dominated structure of festoons also requires ample space for setup.



To avoid the maintenance and costs that come with festoons, users are increasingly using an alternative electrification system—the energy chain. The high-performance plastic e-chain® can take on demanding

operating environments with its corrosion and wear resistant features, yet it has a simple design and is very easy to install.

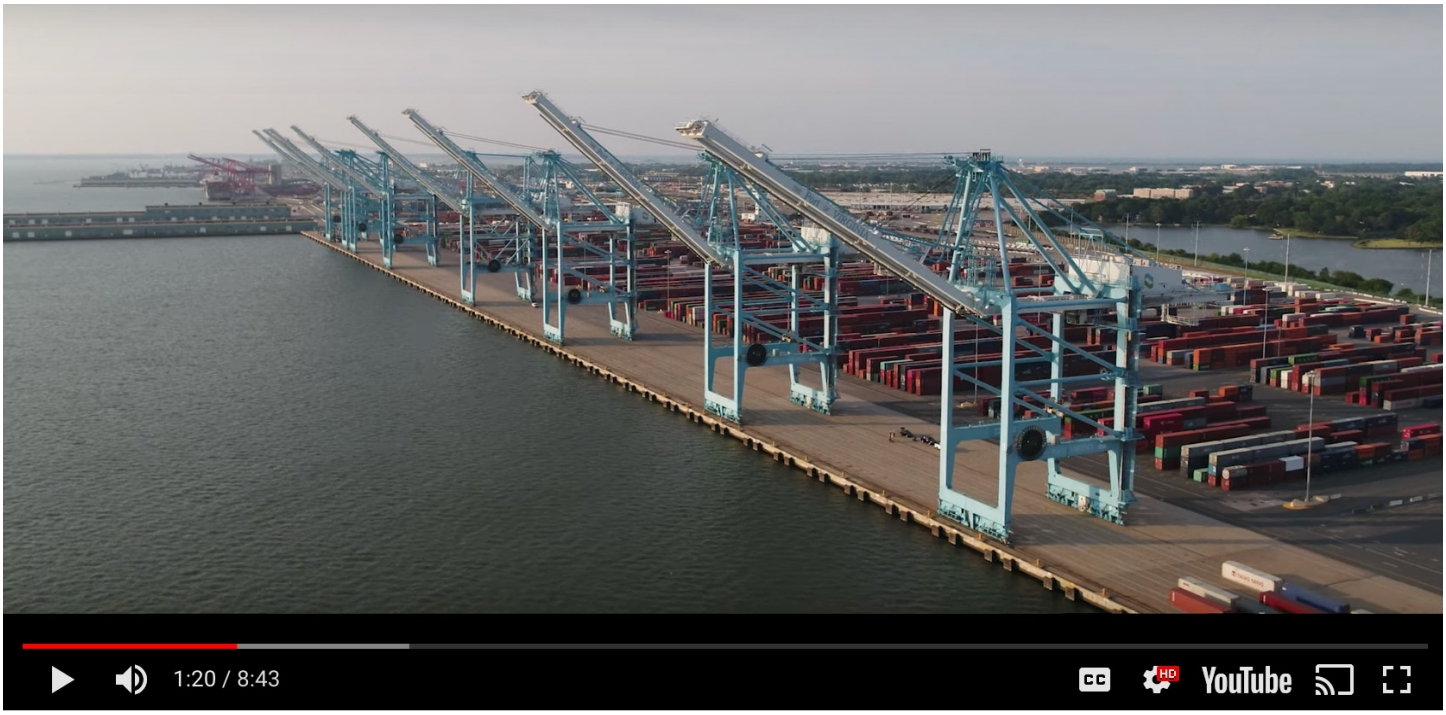
The energy chain is designed for optimal efficiency. Cables are securely guided in the system with interior separators, so cables can never cross over one another and become tangled. For strain relief, cables are tightly clamped and can be easily and individually released for repair or replacement. While in festoons an entire composite cable may need to be replaced if one conductor is damaged, with e-chains®, only the one damaged cable would have to be swapped. Since the e-chain® does not require a loop parking station, a center mounted e-chain® system requires approximately 50 percent less cable than a festoon system. This considerably reduces mechanical stress, system weight and acquisition costs. With no hanging loops, the required operating window is also considerably less than festoon systems, noteworthy for applications with restricted space.



An e-chain® powers overhead cranes, during the harshest environmental conditions, with no damage to cables.

Installation is truly simplified with the e-chain®; a guide trough is installed on the crane girder, and the e-chain® is populated with cables and then installed into the trough. The moving end is attached to the trolley and the cables are routed to their connection points. e-chains® can be pre-populated with cables by the energy chain manufacturer, making installation even more straightforward. Horizontal, vertical, rotary and three-dimensional movements can also be achieved. While festoon wheels, shock cords and bearings are marked for wear and require replacement or lubrication, the chains are maintenance-free, only needing basic visual inspections to ensure the system is in good working order.

The e-chain® is engineered to protect cables from debris and extreme weather conditions. Due to the clean and durable design, the e-chain® is proven to withstand the most demanding environments. Wind is no match for the system, as cables are securely guided and cannot get caught at any point. The predefined bending radius also prevents the cables from being bent below the manufacturer's recommended bend radius, which sometimes occurs with free-hanging festoons. For additional protection, the chains are available with integrated rollers for extremely long travel distances, as well as special materials for chemical resistance. The rugged energy chain can be configured in many different ways, from use on hoist trolleys at high speeds to managing long runway travels with special requirements. This modularity can be applied to a wide variety of applications, including both outdoor gantry cranes and indoor bridge cranes.



See how energy chains replaced festoon systems at the Port of Virginia in this video testimonial.

The entire range of igus® e-chains® includes over 90,000 variations, all of which are continuously tested in the 29,600 sq. ft. igus® test laboratory. Most often utilized for crane technology are the heavy-duty E4.1 series chains and the cost-effective E2/000 chains. Crane manufacturers are progressively reaping the benefits of e-chain® solutions, as the carriers are compliant to standards yet universally applicable—over 30,000 cranes, worldwide, have been equipped with igus® energy chains. Various factors come into play during the selection process, but when maintenance, costs and environmental resistance are of the essence, users should bear the modernizations of the e-chain® in mind.

e-chains® are continuously tested in the igus® lab for durability and extended service life under real-world conditions.