



Caustic and Corrosive Fumes Making Cranes Last Longer

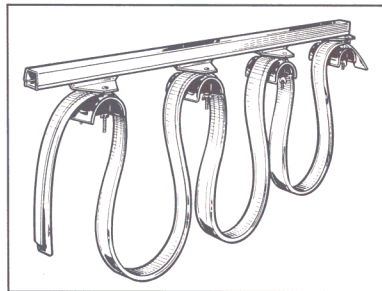
A crane especially designed for caustic environments will last decades longer than a standard crane, and will have dramatically less maintenance and down time.

Some cranes must operate in caustic and corrosive environments such as plating lines, galvanizing facilities, or other open tank chemical processes. In these situations, a standard crane will work - for a while. Maintenance is very high, and crane life short.

Corrosion and Rust Problems

Standard steel components rust and break down when exposed to caustic fumes and liquids. By either substituting chemical resistant materials for standard steel or applying protective coatings to the crane, the corrosive effects of the caustic agents can be minimized.

- Standard wire rope can be replaced with **stainless steel wire rope**. This is very desirable if a) the wire rope comes in direct contact with the chemicals, b) you have a history of worn or frayed wire rope.
- Zinc plating the load chain** of electric chain hoists has similar benefits as stainless steel wire rope.
- Zinc plating the hook block** and hook provides a great deal of protection, especially when the hook and hook block are splashed or submerged into the caustic liquids.
- Track type bridge electrification can be improved. The system can use **galvanized or stainless steel track**, to prevent rust spots. If rust occurs, the cable trolleys will stick or jam and, in turn, break the cables. The trolleys themselves can be **stainless steel cable trolleys** or equipped with **non rusting nylon wheels**. Standard bridge electrification systems tend to need a great deal of maintenance in a caustic environment.
- Looped wire festooned bridge electrification systems can include **stainless steel suspension cable** and **non-corroding plastic cable trolleys**.



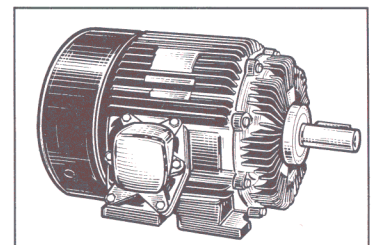
- Galvanized solid bar runway electrification** can be provided to prevent corrosion, or a **stainless steel covered** bar can be used.
- All steel parts that can't be otherwise protected or replaced can be coated with an **anti-corrosive epoxy paint**. Over time, caustic liquids and fumes will eat through standard enamel paint and start to attack the crane's steel structure. There are over 100 choices of epoxy finishes. By providing the chemical composition of your application, we can custom select the proper Sherwin Williams epoxy coating.
- Steel hoist sheaves can be replaced with high technology, extremely high strength **non-rusting polymer sheaves**. If the lower hook block is splashed or submerged, this is strongly recommended. Rust or pitting on sheaves greatly reduces wire rope life, and epoxy coating tends to be worn away by the constant rubbing of the wire rope. This material is found in many aerospace products.



Electrical Problems

Electrical controls, electronic devices and motors wear out quicker when exposed to acidic/caustic fumes. It is possible to prevent contact between the crane's electrics and the caustic chemicals.

- Motor windings can become more fragile (less able to run hot and hard) after prolonged exposure to caustic agents. Totally enclosed motors prevent most of the fumes from entering, but fumes will still find their way in. A process known as "Corrosion Resistant Treatment" (CRT) adds a **protective varnish directly to the motor windings**, and includes chemical resistant seals at all possible entry points.
- Motors can be further protected by upgrading to **stainless steel shafts and hardware**. This feature, combined with "Corrosion Resistant Treatment" (CRT), provides such excellent protection that the motors can be splashed by the caustic agents or periodically hosed down with water.



More ideas on other side ➔

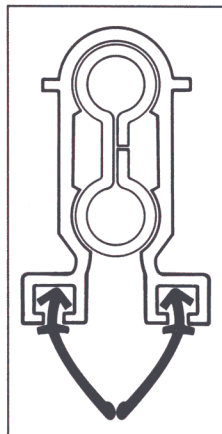
Proper crane design can minimize the harmful effects of caustic and corrosive environments

- ❑ The control systems can be enclosed in **NEMA 4X fiberglass or stainless steel enclosures**. The boxes are then gasketed and press latched sealed. When latched shut, these enclosures can be **submersed** in the chemicals and the controls will remain dry and protected.
- ❑ The electrical cable across the bridge and down to the pendant can be wrapped in a chemical resistant sheathing, to prevent cracks in the cable's insulation.

Caustic Condensation

Some parts of the crane are splashed by the caustic chemicals, or a great deal of the chemicals condense onto the crane causing rapid corrosion.

- ❑ Fumes may condense on the bottom of the solid bar runway electrification. A **self closing rubber guard** allows the current collectors in, but keeps the fumes out.
- ❑ The hoist body can be shielded by an epoxy coated **splash guard or vapor guard**. This is desirable if the hoist is subject to splashing or vapor condensation.



Contamination of Your Products

The lubricating oil, when being replaced, can drip into the tanks below, contaminating the chemicals.

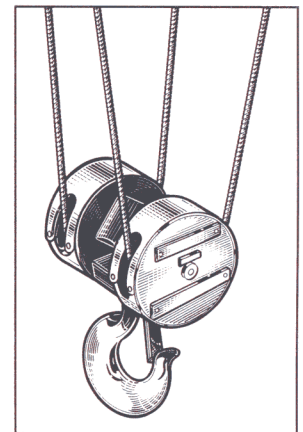
- ❑ **Drip pans** can be provided beneath the bridge, trolley, and hoist gearboxes which will catch any oil before it reaches your product.
- ❑ The bridge and trolley can be provided with premium quality **lifetime lubricated gear boxes**. They never need oil changes, and are sealed at the factory with chemical resistant viton seals.
- ❑ Up to 3 tons capacity, **lifetime lubricated electric chain hoists** can be provided. Troublesome oil changes, and the chance for a spill are eliminated.

NOTE: The information provided is based on 40 years of experience in the crane industry, 5 years of extensive research on why cranes break down, and over 50 interviews with engineers and product designers from 30 industries. The solutions are technical and detailed, but it is the small details that greatly affect the performance and longevity of your crane.

Lubrication Evaporation

Caustic vapors dry out the crane's lubrication, requiring frequent lubing (otherwise parts will seize). Fortunately, advanced materials allow replacement or protection of those parts requiring lubrication.

- ❑ The sheave bearings in the lower hook block can be replaced with **bronze or polymer bushings**, which do not need lubrication.
- ❑ All wheels can be provided with **sealed bearings** to prevent the vapors from reaching the grease.
- ❑ Bridge and trolley pillow blocks (which have greased ball bearings) can be replaced with **Dodge "no lube" pillow blocks**, especially designed for caustic environments. They have no parts that require lubrication, and all materials used are nonreactive.
- ❑ Lubrication on the hoist wire rope or chain can be coated with a number of **waxes which prevent the lubrication from evaporating** (or entering the tanks). Samples available upon request.



Related Technical Reports Available:

- High duty cycles; breaking the 30 minute/hour barrier
- Class "C" vs. Class "D" – Is there really a difference?
- Electrical Contactors – How long should they last?
- Electric chain or wire rope hoist?

What Features does your Crane Need?

Many choices and options exist. Some are very inexpensive, others quite costly, but often cost effective. A careful review of your application, and maintenance records will allow our engineers to guide you through the maze of choices. A few hours research today, will save many days of down time, and add years of life to your crane.