



# High Temperatures Making Cranes Last Longer

Some cranes are forced to work in very hot areas, such as foundries or heat treating plants. A few important “upgrades” can eliminate most maintenance problems and add 10 years to the life of a crane.

## What is “Hot”?

The important consideration is **not** the temperature at the source of heat, but rather the temperature of the air immediately surrounding the crane components, such as the hoist, bridge motors, control panels, and electrification system. A careful analysis is required to determine which parts of the crane will operate in prolonged periods of high temperatures. A standard crane will operate without problem up to 95 degrees Fahrenheit, or in a typical North American factory unairconditioned and subject to normal summer temperatures.

NOTE: Cranes actually moving hot metal should review our “Hot Metal Cranes” technical report.

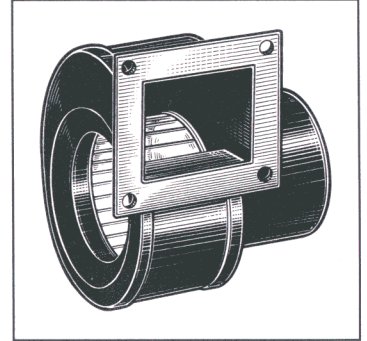
## Electrical Problems

High air temperatures cause electrical components and motors to fail much quicker. This is because heat is a by-product of electrical current. Under cooler operating conditions, this heat is quickly dissipated, but high ambient temperatures slow down heat dissipation, causing major maintenance problems.

- ❑ A **heat shield** placed between the motor and controls of the hoist/trolley can deflect the heat away from sensitive parts. This is most effective when there is a localized heat source, such as a furnace or ladle of metal directly below the hoist. It is ineffective if the air is equally hot below and above the hoist.
- ❑ A cool running motor always lasts longer than a hot motor, even if the motor insulation protects the motor, for hot running motors are “working harder”. An

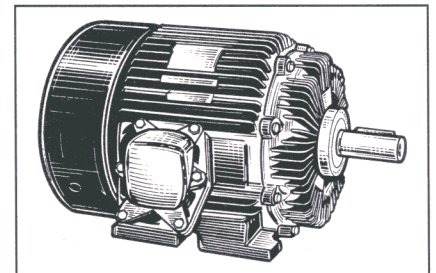
**external fan** mounted to the motor: greatly improves heat dissipation, lowers the air temperature around the motor, and prevents motor burn out by physically cooling the motor with its breeze.

This external fan should not be confused with TEFC or fan cooled motors that have a small fan blade attached to the motor rotor. The problem with this type of **internal fan**



is that it only blows air when the motor is operating, whereas the external fan operates continuously.

- ❑ The sparking of contactors, the transforming of control voltage current, and the heat buildup of soft starts, all combine to create a heat source within a crane’s control panel. In normal operating temperatures, this heat is dissipated to the air surrounding the control panel. In a high temperature factory, the heat remains trapped in the control panel and shortens the life span of the electrical components. A **control box fan** can be installed inside the control panel to circulate cooling air.
- ❑ High ambient temperatures cause the insulation surrounding the wires in the bridge electrification to break down quicker, which causes broken cables. A **heavier, thicker wire insulation** can be provided, which generally eliminates this problem.
- ❑ **Improved motor insulation** (Class F rather than Class B) allows motors to run hotter without overheating and burning out. This is recommended if the air temperature around the motors regularly exceeds 90 degrees.



- ❑ **High temperature Solid Bar Runway electrification** provides 2 very important benefits. First, the heat greatly downrates the bar’s ability to carry electricity. A “90 AMP” bar at 140° will only safely carry 30 AMPS. Also its **heat resistant** PVC covering won’t melt at temperatures up to 280°F.

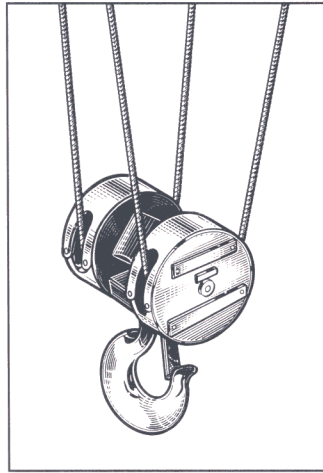
More ideas on other side ➔

# Proper crane design can minimize the harmful effects of high heat environments

## Oil Breakdown

High operating temperatures and poor heat dissipation cause the oil on a crane to break down prematurely, requiring frequent oil changes or reducing the life of gears and drives.

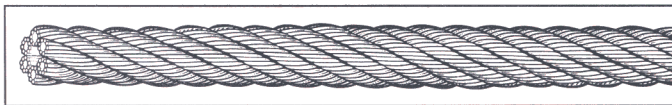
- ❑ The oil in the bridge, trolley, and hoist gear cases can be upgraded with a **synthetic oil**, rated for temperatures up to 400°F.
- ❑ Often the hoist's lower hook block is very close to the heat source, and the bearings in the hook block sheaves dry out quickly. Special very **high temperature grease** can be added to the bearings, or the bearings can be replaced with **temperature resistant polymer bushings**.



## Mechanical Problems

Most mechanical components of a crane are not adversely affected by heat. The steel, bolts, and wheels regularly withstand fires. There are 2 areas of concern:

- ❑ The solid bar runway electrification system will expand as it gets warm, which can cause twisting and warping. **Expansion joints** should be added to eliminate this problem.
- ❑ Most wire rope hoists use a steel wire rope with a fiber core for added flexibility. This fiber core will degrade quicker in a high temperature situation. Switching to **steel core wire rope** will lengthen the life of the hoisting cables. An electric chain hoist does not have this problem.

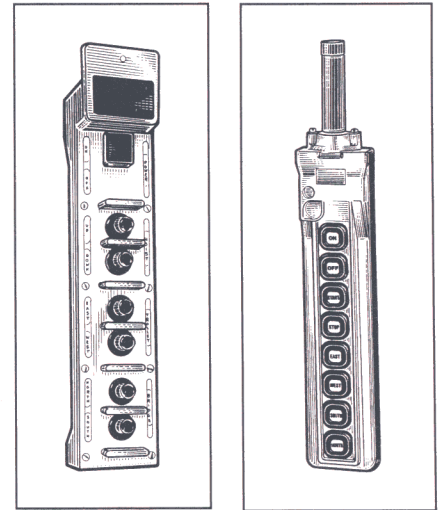


*NOTE: The information provided is based on 40 years of experience in the crane industry, 5 years of extensive research on why cranes break down, and over 50 interviews with engineers and product designers from 30 industries. The solutions are technical and detailed, but it is the small details that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

## Safety Concerns

Working in a hot environment causes additional safety concerns.

- ❑ When the load is hot, the crane operator will want to distance himself from the load. An **independent traveling pendant** allows the operator to stand anywhere along the bridge, not just near the hoist. Infrared and radio **remote controls** allow the operator to be completely untethered from the crane.
- ❑ Working around hot products may require crane operators to wear bulky gloves. A **very compact pendant** allows one-handed operation (even with gloves), so that the other hand is free to guide the load.
- ❑ When carrying hot metals, the crane operator may want to prevent accidental movement of the crane in the wrong direction (trolley "left", when he intended bridge "north") due to accidentally pressing the wrong button on the pendant. An **oversized pendant with tall ridges** between the hoist, trolley, and bridge control buttons can be provided. Buttons are color coded and labeled in large letters. This type of pendant does require two hands to operate.



## Related Technical Reports Available:

- Hot Metal Cranes – What is Required?
- Class "C" vs. Class "D" – Is there really a difference?

## 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.