



Troubleshooting Guide



Cranes are useful and important pieces of equipment used in many applications. They are utilized in a wide range of industries including nuclear, automotive, transit, marine, aerospace, and many others. Workers in these industries depend on cranes to lift critical loads and valuable equipment safely.

Too often, however, cranes are forgotten when they are not being used. Preventative maintenance is not always performed on a regular basis or is not performed by qualified individuals. Later, if the equipment does not work when needed, it becomes a major inconvenience or a liability for a company. It can also become a hazard for the operators or other workers in the area.

At best, a failure can prevent work from being completed on time and, at worst, workers can be injured or killed by the failure. With the safety of workers and the best interests of the projects in mind, crane maintenance becomes a vital aspect both at the job site and in the manufacturing facility. It protects the workers and helps to maintain the bottom line of any company utilizing crane equipment.

LIKE ALL EQUIPMENT, CRANES NEED TLC

Although cranes appear to be indestructible to the untrained or inattentive eye, they need periodic care and attention. Cranes depend on many individual components to do their work effectively. Some of these components include:

- Structural Support
- Brakes
- Bumpers
- Lubrication Systems
- Hooks
- Lifting Mediums (chains or wire ropes)
- Gears
- Limit Switches
- Bearings
- And much more

Each of these items provide an important or critical function, ensuring the equipment's safe and proper operation. The cost of ignoring any or all of them can be high. To avoid injury and cost, the components in a crane's mechanical system need to be inspected by trained professionals. These individuals should all be extremely well-versed in crane technology.

AVOIDING CRANE FAILURES

With an estimated 200,000 cranes in use in the China, claims for damage to cranes are normally over \$100,000. Crane failures while handling loads are estimated to be \$48,000 per loss.

A study of 249 crane incidents revealed a loss of over \$500 million in damages—these incidents also caused over 100 injuries and claimed several lives. This cost is too high to pay; especially considering many of these losses can be mitigated by scheduling regular inspections and through preventative maintenance programs.

An example of maintenance problems contributing to a crane accident occurred in British Columbia, Canada in June 2005. A worker was fatally struck by a falling overhaul ball when the auxiliary hoist brake pedal was accidentally released. An investigation into the accident revealed that one of the contributing factors included heavily worn pin and hook components, which are critical to the braking system. These elements were not inspected during maintenance and the wear, unfortunately, went unnoticed.

Crane failures typically occur because maintenance has been conducted by a regular mechanic or equipment repair person rather than a crane expert. These accidents have led to re-evaluations of the risks associated with maintenance personnel.

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MAINTENANCE PERSONNEL & TRAINING

Anyone who performs maintenance on crane equipment needs to use every resource available. Some of these resources include:

- The maintenance schedule of the specific crane
- Training classes provided by the crane manufacturer
- General mechanical and electrical training classes & manuals
- Service manuals specific to the crane

Those who are repairing or maintaining crane equipment must have a solid knowledge of the equipment and how the components of a crane work. This type of expertise comes only through experience and training. Cranes have become complex pieces of technology and the level of knowledge needed to fully service them has increased. Due to this fact, companies need to keep their technicians up-to-date with the latest industry practices or contract with a qualified crane service contractor.

Automotive technicians have training that is specific to the vehicles they repair. Likewise, crane technicians need specific training as well. In fact, maintenance shortcomings account for 9% of all overhead crane accidents — this figure highlights the importance of a strong maintenance program.

Inspectors and maintenance workers must have extensive training to identify and correct flaws in crane equipment that can lead to failures. Issues like cracked welds, worn insulation on wires, frayed cables, and damaged gears can all be quickly spotted by trained inspectors. In addition, they can also repair the problems using the correct materials and parts.



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THE CASE OF THE SKIPPING HOIST

Another example of problems caused by improper maintenance involves a 24-ton monorail crane. Operators complained that the hoist seemed to skip or jump during normal operation. The complaints led to an inspection of the crane, which revealed that the teeth of both the shaft of the hoist and the spider (where the shaft was inserted) had been worn down.

It was discovered that the organization responsible for maintenance of the crane assigned a mechanic, rather than a crane specialist, to perform preventative maintenance on the hoist. The mechanic made the decision to modify the input of the shaft by leaving only 5% in the spider. This decision was made to eliminate jumping or skipping during operation.

The shaft's insertion into the spider resulted in too little engagement, resulting in more damage to the shaft and spider teeth. In addition, the type and amount of lubricant used in the gearbox was wrong for a load break.

Had the company used a crane specialist, rather than a general mechanic, the specialist would've realized that the decision to adjust the shaft insert was incorrect. A specialist would also have known the proper amount and type of lubricant to use for the gearbox. Both of these proper decisions would have resulted in the problem of the skipping hoist being solved. Additionally, the repairs would have been far less costly, as the hoist and spider would not have needed replacement.

CHOOSE SKILLED TECHNICIANS

Maintenance is a vital concern of any business that utilizes industrial cranes. When cranes are not in use, a regular maintenance schedule should be maintained, and work conducted by properly trained experts who know the details of specific models.

Ensuring that your business conducts this type of preventative maintenance program can help prevent unnecessary delays in projects, and can even help to save lives. We provides field service for your equipment, as well as high-quality training for workers, which includes both classroom and hands-on training. We also provide crane outage support services, utilizing highly experienced experts who can perform preventative maintenance, inspection services, as well as corrective maintenance.

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