

Tower crane freefall incident: the importance of inspection and preventive maintenance on gear boxes

A tower crane operator had just finished hoisting formwork from the upper level of a concrete residential high-rise to its first level, and was hoisting the load block while advancing the trolley toward the mast. Without warning, the empty hook, load block, and rigging chains (about 454 kg/1,000 lb. altogether) plummeted to the ground, the load line spooling around them. No workers were injured, but several were working in close proximity to the falling equipment.

Inspection of the hoisting gear box revealed that a gear had broken in half during operation. Lab tests showed that the gear was made of defective metal and prone to cracking, breaking down, and failing during operation.

Other tower crane gear boxes have failed, most recently during a lift in Alberta in fall 2015. In this case, as above, regular and thorough gear box inspections could have identified gears needing repair or replacement. Such inspections are key to preventing crane equipment collapses and serious or fatal injuries.

Safe work practices:

- Regularly inspect and maintain all tower crane gear boxes according to the manufacturer's instructions; seek written confirmation of their fitness for service from an engineer or a person designated as qualified by the manufacturer.
- In the absence of the manufacturer's inspection criteria, develop and implement an appropriate inspection and preventive maintenance program for all gear boxes.



Broken single helical gear

- Pay particular attention to signs of gear fatigue or cracking; consider using X-rays or magnetic particle testing to detect hidden flaws.
- Repair or replace damaged or defective parts immediately. Have repairs certified by a professional engineer, or, if available, by the original equipment manufacturer.
- Keep detailed reports of gear box tests, inspections, maintenance, repairs, and modifications, and pre-start inspections for the service life of the equipment.
- Keep the equipment logbook up to date. Make the logbook available on request to workers, supervisors, the operator and/or the person responsible for inspecting, testing, or maintaining it, as well as anyone else on site.