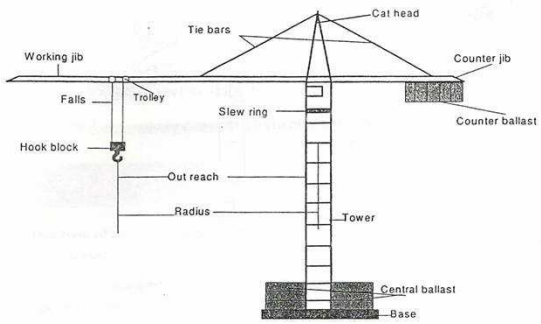
Inspection

Guidance Note – 002 Tower Cranes

Botswana Factories Act Chap 44:01 & Mines and Quarries Act Chap 44:02

Both acts call for periodic inspection and testing of cranes, lifting tackle, hoists, etc by an inspector authorized by the Botswana Government Dept of Occupational Health & Safety or Department of Mines.

Types of Tower Crane

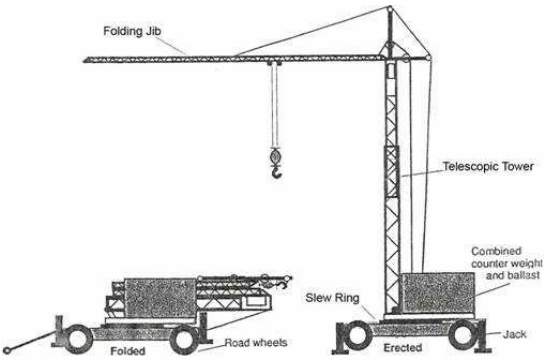


Types of tower crane commonly used in Botswana are the 'traditional' horizontal jib crane which requires a mobile crane for the preliminary erection stages and the self erecting type. Horizontal jib cranes often have a base section which is expendable and is set into the building foundation being cut off at the end of the project. Cranes may also be set on rails to allow regular relocation during service. Self erecting cranes rely on the central ballast and supporting jacks for stability. By their nature all cranes are worked hard, are exposed to all weathers and are periodically moved from job to job with erection and dismantling. Cranes, particularly on very high rise developments are often 'climbed' (ie increased in height) with the job.

Why are these inspections necessary?

Periodic independent inspection of lifting equipment provides an assurance that it is safe to use and is unlikely to fail during service. The consequences of failure of tower cranes can be injury or death of personnel or members of the public, lost production, damage to buildings or to the load.

These independent inspections are ***not*** *a substitute for good operating procedures which includes regular inspection by the operator and other competent persons.*



When and what should the inspection cover?

Pre-erection: *tower cranes are not easy to inspect (or repair) once they are built and preliminary inspection should take place with all components on the ground. Used equipment in particular should be checked for distortion, cracking, corrosion & wear of the main structural components but new equipment can also have manufacturing defects and damage from mishandling during loading or transport. The slew ring is probably the most important single component, providing the support and rotational ability for the tower and/or jib. This item should be carefully inspected ideally including flaw detection techniques before each service period.*

The correctness of the base construction must also be established by reference to the site engineer to confirm concrete strength, placement of reinforcement, soil compaction, etc. If there are multiple cranes on a site the inspector should establish that clashing cannot occur or that measures have been taken to minimize the risks.

Pre-service: *the erected crane should be inspected ideally before the tower is raised to full height since this allows testing of the cranes functions and jib operations before it becomes a major problem to make any repairs required. If the crane is then built to full operational height the final checks and handover can be completed.*

In service: *tower cranes generally have a very intense working regime, in use all day, every day on projects with tight deadlines. In consequence these cranes must be subject to regular inspections: the operator's duties must include daily and weekly checklists; the site or company competent person should review these checks and make a more detailed inspection monthly. An independent approved inspection authority should complete an inspection and test at 6 monthly intervals to check structural components, central ballast, wire ropes, hooks, bolts, etc.*

After increasing the tower height. *In most cases the crane will be built to full height at the start of the project but some cranes are designed to be tied to the structure as it is built and will have to be 'climbed' as the building progresses. The crane should be re-inspected & tested after each climbing operation. 'Climbing' a tower crane is a high risk operation during which the weight of the jib, slewing section and counter jib are supported on a hydraulic ram. Even a small sudden drop can break the jib in half.*

After repair or servicing *in which a major component (eg cable, hook, slew ring, etc) is replaced a load test should be applied. Any load test* ***MUST*** *be preceded by a visual inspection to confirm that the crane is fit for use.*

Major inspection: *best practice is that every 10 years the crane should stripped down to individual components which are subject to detailed inspection including flaw testing.*

Sands Civil Services
P/Bag 00379 Gaborone Botswana. Tel +267 3909864 Fax +267 3909881
e-mail: info@sandscivils.com
www.sandscivils.com