



FEM Product Group Cranes and Lifting Equipment
Sub-Group Mobile Cranes

Overload Testing of Mobile Cranes

Each Mobile Crane¹ is load-tested by the manufacturer prior to delivery in a final acceptance procedure. These tests are performed with test loads in several configurations corresponding to situations with lowest safety margins regarding mechanical resistance and rigid body stability of the crane; they include intentional overloading under defined conditions and according to relevant standards.

Further acceptance tests with overload during lifetime of the crane should only be performed in case of modification or repair of load-bearing parts or in case of a general overhaul. National regulations in some countries may require periodic testing with overload and/or overload testing prior to the execution of lifting jobs every time the crane configuration is changed.

The calculation of the load-bearing structure of mobile cranes complies with all relevant international standards (EN, ISO, FEM, etc.) and does not foresee duty cycle operation. Therefore, cranes have a defined lifetime, based on a number of allowable load cycles. Any overloading of the crane can have a deteriorating effect and will lead to reduction of the crane lifetime. This can become a critical aspect if the crane is tested with overload prior to each lifting job (e.g. building up wind parks with 80-100 windmills on one site within a few weeks ...).

Overloading of cranes is forbidden by law; Safety devices such as the Rated Capacity Limiter (RCL) prevent overloading and the override key is supposed to be used exclusively in emergency situations or failure of the RCL (as stipulated in the manual and in the product standard EN13000 as well as other national and international standards).

¹ Mobile Cranes are self powered jib cranes capable of travelling loaded or unloaded, they can operate on tyres, crawlers or with other mobile arrangements. In fixed positions they can be supported by outriggers or other accessories increasing their stability. Mobile cranes can be equipped either with telescopic jibs, with articulated jibs, with lattice jibs – or a combination of these – of such a design that they can readily be lowered (further details and graphical examples see EN13000:2010)

FEM, as the European association of mobile crane manufacturers, does not promote the regular usage of the override key to perform overload tests and does not recommend regular overload testing at all, including tests where the test load is applied by external means, without using the override key.

The mobile crane manufacturers represented by FEM clearly want to avoid overload testing because it reduces the life expectancy of cranes.

Following aspects are also to be considered from a user/contractor perspective:

- Job Planning: Increased ground pressure compared to plan, difficulties in handling of additional test load, prohibition by some industries (e.g. petrochemical plants) to perform any overload testing at their site.
- Job Safety: workers around the crane shall be warned about the procedure and evacuated from the area during test.

Structural failures may be the result of cracks from overloading and/or fatigue and such defects will not be identified by an overload test. Thus overload testing may give a false sense of security to owners and users.

To ensure the integrity of the structure, thorough examinations after each overload situation and prior to the execution of lift jobs are recommended. Such examination is a visual inspection combined with functional tests (including the safety devices) and may require non-destructive testing such as magnetic particle or ultrasonic testing. Any malfunction or observation during the inspection needs to be assessed by a competent person to decide whether the lift can be safely executed or whether an immediate repair/modification is needed.

FEM supports CEN/TC 147/WG11 in the development of an amendment of EN13000:2010 with recommendations on inspections and examinations to be included in the manual of mobile cranes.