

# Guide to the Construction Products Regulations and Lifting Equipment Support Structures

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Structures**

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## **1.0 Introduction.**

Prior to the requirement for CE marking of fabricated steelwork under the Construction Products Regulations (CPR) on the 1<sup>st</sup> July 2014, LEEA has been inundated with technical queries from member companies seeking advice regarding the impact these regulations will have on their products.

The products in question were the supporting structures for lifting machines. There is a wide variety of lifting machine supports, some of which are supported by the building and others by their own free standing structures. Unfortunately LEEA was unable to offer advice on this subject due to a lack of clarity of the term 'Construction Works'. To that end we discussed the issue with the enforcement authorities, Trading Standards in this case, and the Department for Communities and Local Government. Following these discussions a decision was made to seek clarity from the European Commission, with a view of getting a single consensus and therefore a level playing field for manufacturers across Europe.

In response to our enquiries and those of other organisations, the EU commission has recently published a list of frequently asked questions relating to CPR<sup>[1]</sup>.

LEEA has reviewed this list and CPR in terms of lifting equipment supporting structures and has developed this document as a guide to the specific requirements.

## **2.0 Construction Products Regulations (CPR)**

CPR makes CE Marking mandatory in all member states, including the UK and Republic of Ireland, for all construction products that are permanently incorporated into building or civil engineering works and are covered by either a harmonised standard or a European Technical Assessment that is in force. CPR also makes it clear that CE Marking has implications for the supply chain and places legal obligations on the construction supply chain including 'manufacturers', 'importers' and 'distributors' of construction products.

## **3.0 Harmonised Standards.**

A list of standards that have harmonised (hEN) status to CPR have been published on the EU commission website<sup>[2]</sup>.

From this list one standard was identified as potentially being applicable to lifting equipment support structures. This standard is EN 1090-1:2009+A1:2011 Execution of steel structures and aluminium structures. Requirements for conformity assessment of structural components.

The scope of this standard raised many questions in terms of its relevance to lifting equipment support structures. Therefore, further guidance was requested from the EU Commission and the CEN technical committee, CEN TC 135, responsible for producing it. This guidance can be found within the EU Commissions published list of frequently asked questions relating to CPR<sup>[1]</sup>, as FAQ 31

FAQ 31 states that CE marking has to be affixed to fabricated steelwork if all the conditions described within FAQ 31 are met. To help determine whether or not a particular product is within scope of EN 1090-1 the FAQ has a list of products not covered by the scope of EN 1090-1<sup>[3]</sup> as provided by CEN.

It can clearly be seen that structural components for the moving parts of cranes have been excluded from the scope of EN 1090-1.

In addition to above, FAQ 31 also states that CE marking is required if the product is intended to be incorporated in a permanent manner in construction works and it has a structural function in relation to the construction work, i.e. its failure will affect the satisfaction of Basic Work Requirement 1 as detailed in Annex I of regulation EU 305/2011<sup>[4]</sup>.

In the majority of cases a crane supporting structure is designed solely to support and facilitate the motion of the machine. Therefore failure of the crane structure will not affect the 'Basic Work Requirements' as detailed in Annex I of regulation EU 305/2011<sup>[4]</sup>.

The building on the other hand must be designed to be of sufficient mechanical strength and stability to support the dynamic and static loadings induced by the crane motions and self-weights. To this end the crane and crane supporting structure manufacturer has a duty of care to supply the designer of the construction works with all such load cases. It is therefore the designer of the construction works duty to ensure that it is of sufficient strength and stability.

#### 4.0 Conclusion

Given that in its most basic form a crane, as defined in ISO 4306-1<sup>[5]</sup>, is a cyclic action machine for hoisting and moving in space of a load suspended by means of a hook or other load handling device. So by definition, something as simple as a manual chain block or as complex as a tower crane, would be defined by the same generic term 'crane'. A crane supporting structure would therefore be considered as a simple runway beam, jib, or gantry structure.

Providing that such structures do not support the Constructions Works, then they are not within the scope of CPR. This is due to the fact that the failure would not have an effect on the 'Basic Work Requirements' and that all cranes have moving parts, i.e. hoisting motions and also in most cases horizontal traverse.

This conclusion should not affect the safety of the equipment as the Health and Safety at Work etc Act 1974, the Provision of Use of Work Equipment Regulations (PUWER) and Lifting Operations and Lifting Equipment Regulations (LOLER) still apply.

The following sections expand upon this conclusion for specific types of lifting equipment support structures.

#### 4.1 OTC Cranes.

The general configuration of OTC cranes are shown figure 1 below. The crane structure, comprising end carriages and bridge beams, is considered as part of the machine and therefore within the scope of the Supply of Machinery (Safety) Regulations 2008 (SOMSR).

The runway tracks, perpendicular to the bridge beams on which the end carriages sit and travel are not within the scope of SOMSR. These tracks can be supported from the building structure or on a dedicated free standing structure similar to those shown in figure 4. These structures would be designed in accordance with Eurocodes 0, 1 and 3. Once installed LOLER requires the machine and structure to be thoroughly examined and a report of the examination issued before it can enter service. This examination should be done in accordance with BS 7121-2-1 and BS 7121-2-7, which will require load tests at critical points along the length of the structure.

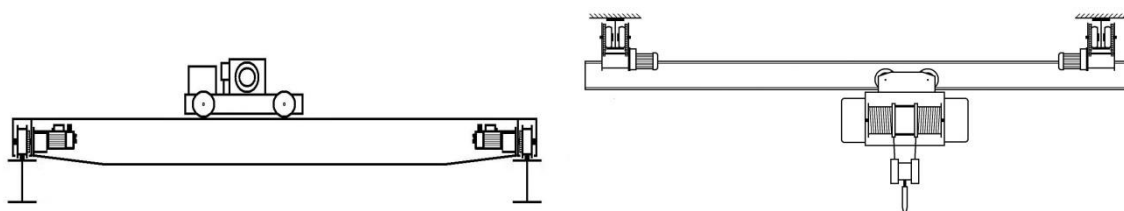


Figure 1: typical top running and under-slung OTC cranes.

Runway tracks and the brackets used to connect them to the building support columns or roof beams, are not within the scope of CPR, for the reasons stated in 4.0. That is providing that they are not also intended to offer support to the building, for example wind bracing, in which case CPR would apply.

Free standing gantry structures, i.e. runway tracks, bracing and columns built for the sole purpose of supporting the dynamic and static loadings induced by the crane, are also not within the scope of the construction products regulations.

The same rule would also apply to cranes with supporting structures that are a combination of the above.

#### 4.2 Portal Cranes.

The general configuration of a portal or goliath crane is shown in figure 2. The crane structure, comprising end carriages, support legs and bridge beams, is a part of the machine and therefore within the scope of the Machinery Directive.

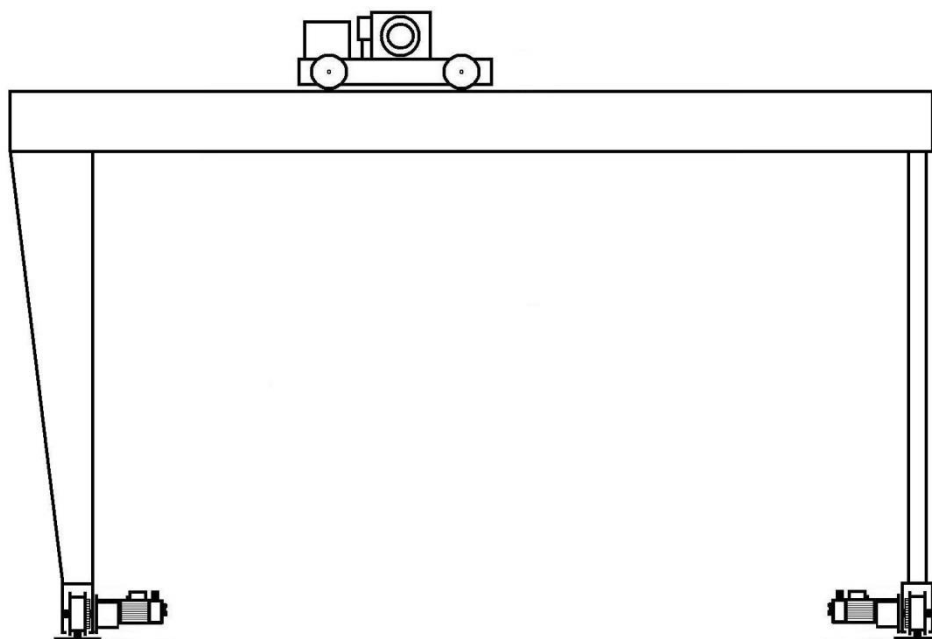


Figure 2: Typical Portal or Goliath Crane.

The runway tracks are not within the scope of the Machinery Directive. The tracks generally comprise of a rail, similar to a train track section, held in place with rail clips on a concrete foundation. In some cases the rail is simply square bar welded to the top flange of a beam section that is cast into a concrete foundation. The track section is generally specified by the crane manufacturer and designed in accordance with Eurocodes 0, 1, & 3. Commonly, the concrete foundation will be specified by specialist engineers, i.e. Civil and or Geotechnical engineers, based on the load cases provided by the crane manufacturer. Once installed LOLER requires the machine and structure to be thoroughly examined and a report of the examination issued before it can enter service. This examination should be done in accordance with BS 7121-2-1 and BS 7121-2-7, which will require load tests at critical points along the length of the structure.

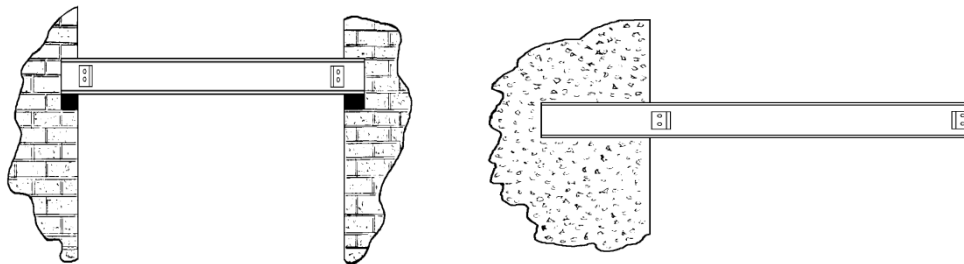
In this case it is the concrete foundation that may be considered as a 'Construction Works'. The crane track, providing that it is not intended to provide support to the Construction Works is not within the scope of CPR, refer to conclusion of 4.0.

Some cranes can be a hybrid of OTC crane and Portal crane, in that one side of the crane runs on a track on the floor, and the other side is supported at a higher level on a building structure or dedicated free standing structure. In this case the information provided in section 4.1 and 4.2 will apply.

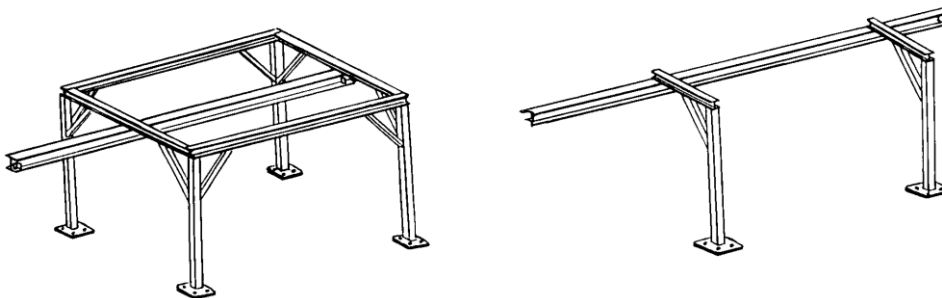
### 4.3 Runway tracks

Hoist unit runway tracks are widely used in industry to provide a track upon which a lifting appliance is fitted to allow loads to be raised, lowered and travelled along the path of the runway. The track can be suspended from an existing building structure (figure 3) or dedicated free standing structure (figure 4). They can be made from standard steel sections, or profiled track section (figure 5).

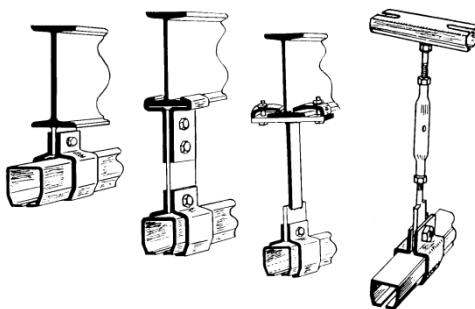
A further variation of the runway is a lift shaft lifting beam. Although such beams are usually intended for use with a fixed point lifting arrangement, their design and testing requirements are the same criteria as runway beams.



*Figure 3: Runway beams supported from a building structure.*



*Figure 4: Runway beams supported from a building structure.*



*Figure 5: special track sections.*

These structures would be designed in accordance with Eurocodes 0, 1, and 3. Once installed LOLER and BS 2853 require the structure to be thoroughly examined and a report of test and examination issued before it can enter service.

If a runway is suspended from a building structure it would not be considered as a construction product within the scope of CPR, unless its design intent was to also provide support to the building, refer to 4.0.



Therefore dedicated free standing structures and the runways that they support are also not within the scope of CPR.

#### 4.4 Jib Cranes

These are basically a cantilever runway supported on a slewing bracket. This bracket is then mounted on an existing structure or a dedicated free standing pillar, see figure 6. If the slew on the jib is powered then it would fall within the scope of the Machinery Directive. However, if the slew is manual then the jib is just considered as a supporting structure and not within the scope of the Machinery Directive. Although, sometimes the hoist, electrics and control box are supplied fitted to the jib and in this case it would be considered a complete machine within the scope of the machinery directive.

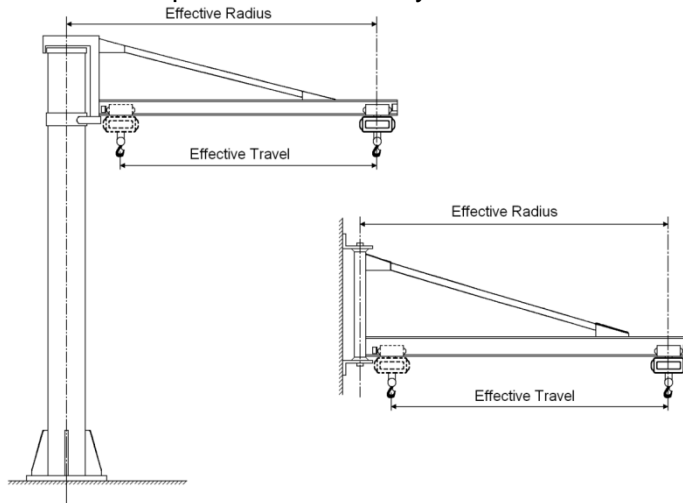


Figure 6 examples of a free standing and wall mounted jibs

These structures would require a thorough examination after installation in accordance with LOLER and BS 7333, which would require a load test. For the design BS 7333 applies.

Wall mounted Jibs supplied without hoist would not be considered as a construction product as they do not support the building and are designed purely to facilitate the horizontal travel of a crane. This same analogy also applies to the free standing jib configuration.

#### 4.5 Mobile gantry.

These are generally manufactured from a runway beam mounted on two 'A' frames, which are fitted with castors, see figure 7. They are generally used for maintenance applications and can be supplied with or without a lifting appliance. In the former case the complete assembly would be considered to be within the scope of the machinery directive, however the latter case would not.

It is recommended that, due to the runway component, these structures are designed to Eurocodes 0, 1, 3, and 9, though many manufacturers work to their own specification.

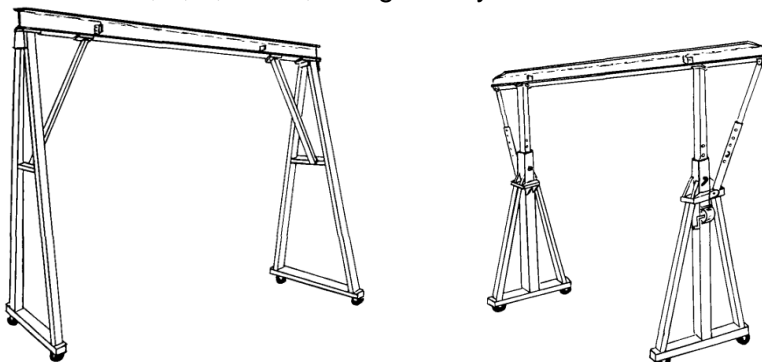


Figure 7: Typical fixed and height adjustable mobile gantries

A mobile gantry is a dedicated structure manufactured purely to facilitate the height of lift and travel of the crane. They do not support the building in anyway and are therefore not within the scope of CPR.

## 5.0 References

The following sources of information were reviewed during the development of this guide.

1. [http://ec.europa.eu/enterprise/sectors/construction/faq/index\\_en.htm](http://ec.europa.eu/enterprise/sectors/construction/faq/index_en.htm)
2. [http://ec.europa.eu/enterprise/policies/european-standards/harmonised-standards/construction-products/index\\_en.htm](http://ec.europa.eu/enterprise/policies/european-standards/harmonised-standards/construction-products/index_en.htm)
3. <http://ec.europa.eu/DocsRoom/documents/5744/attachments/1/translations/en/renditions/native>
4. Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011. Laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:088:0005:0043:EN:PDF>
5. [ISO 4306-1:2007 Ed 4. ISO4306-1:2007 Cranes. Vocabulary. Part 1. General](#)