

LIFTING EQUIPMENT ENGINEERS ASSOCIATION CODE OF PRACTICE FOR THE SAFE USE OF LIFTING EQUIPMENT SECTION 10 - SLEWING JIB CRANES

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10.0 FOREWORD

Slewing jib cranes are widely used in industry in conjunction with manual or power operated lifting appliances where a permanent facility is required to perform both lifting and limited moving operations. Typical examples of their use being over work benches, in fitting and maintenance shops, over machine tools and in loading and unloading bays.

They offer a wide area of floor coverage within the slewing radius of the jib arm and are ideal where full overhead travelling crane coverage may be either impracticable or uneconomic. They are often used to supplement overhead travelling cranes.

Slewing jib cranes are often designed, supplied and tested without lifting appliances and it must be realised that a slewing jib arm becomes an effective crane only when fitted with a hoist, hoist and trolley or similar lifting appliance.

Note:

BS EN 14985:2007 – Cranes - Slewing jib cranes, has a similar title but does not apply to the type of crane covered by this section.

10.1 SCOPE

10.1.1

This section of the code covers slewing jib cranes which may be wall mounted, column mounted or free standing in design and manufactured from standard constructional sections or proprietary track sections, used for multi- purposes.

10.1.2

The use of jib cranes is always associated with a lifting appliance, usually a hand chain hoist or power operated hoist and normally includes a trolley. Whilst mentioned in this section, specific guidance on the safe use of these items will be found in the following sections of this code:

1. (1) Hand chain hoists - section 3.
2. (2) Power operated hoists - section 6.
3. (3) Travelling girder trolleys – section 8.

10.1.3

This section of the code excludes derricking (luffing) cranes, lifeboat cranes, cranes used on offshore installations to load and unload vessels and cranes used for people carrying applications.

10.2 DEFINITIONS

In addition to the definitions given in section 1 subsection 1.2 of this code, the following should be noted:

10.2.1 Slewing Jib Crane

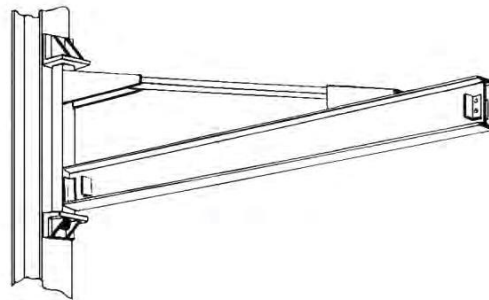
A slewing jib crane comprises a cantilevered beam or horizontal runway (jib arm) mounted on a king post located in bearing brackets. It may be attached to a suitable existing vertical face (wall or column mounted) or be built into a specially designed individual column (free standing).

10.2.2 Slew

Slew or slewing is the rotary motion of the jib arm about a vertical axis, the angle of slew being the angle of arc described by the jib arm when travelling between its two furthestmost positions.

10.2.3 Over braced

A jib is said to be over braced when the cantilever runway arm extending from the king post is supported by bracing coming down from above the arm.



10.2.4 Underbraced

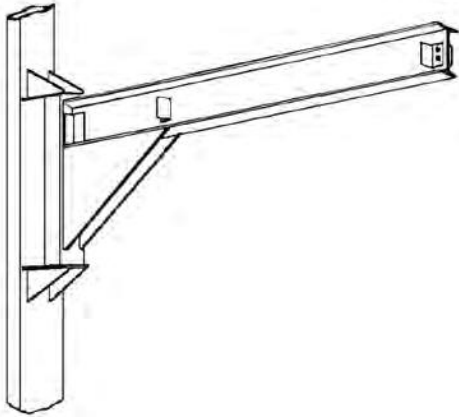
Figure 10.1 Over braced slewing jib crane

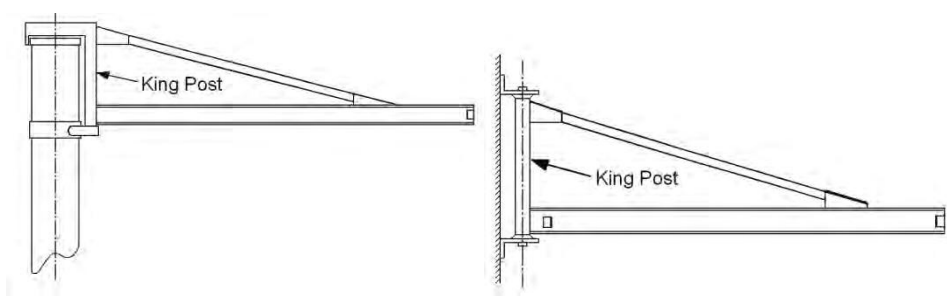
A jib is said to be underbraced when the cantilever runway arm extending from the king post is supported by bracing coming up from below the arm.

Figure 10.2 Underbraced slewing jib crane

10.2.5 King Post

The king post is the moving upright part of the structure to which the runway beam and bracing are anchored. It may be in the form of an upright member with journals top and bottom which fit into the bearing brackets and allow the jib to slew (see figure 10.3a) or in the form of a fabricated section with bearing spigots and rollers which perform a similar function on tubular column free standing jibs. (See figure 10.3b)





(a)

Figure 10.3 King post

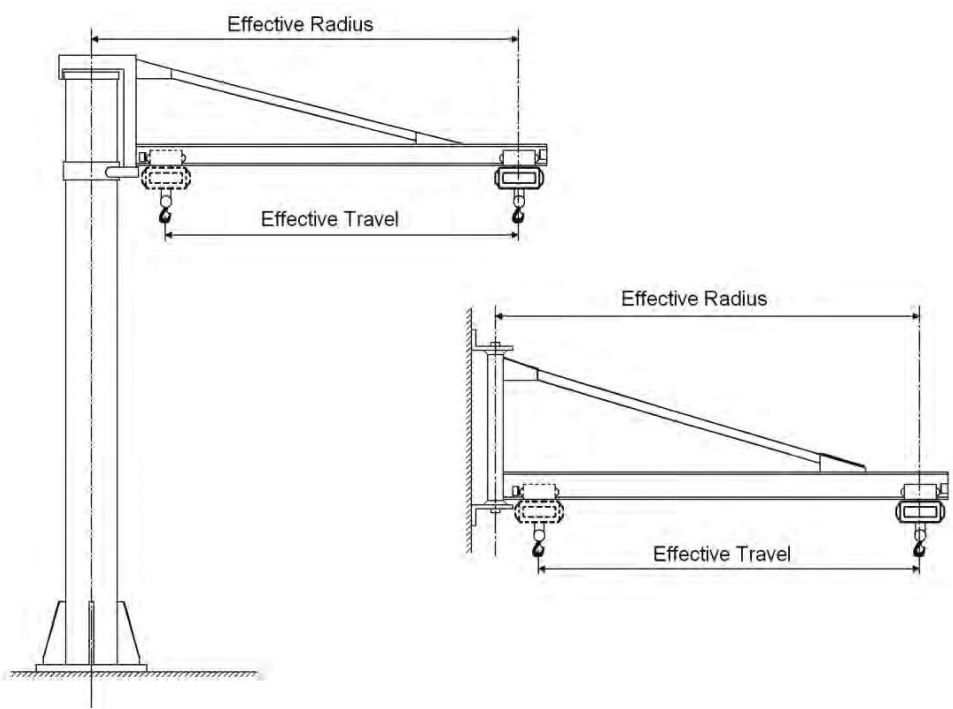
(b)

10.2.6 Effective Radius

The effective radius is the horizontal distance between the centre line of rotation and the vertical centre line through the load lifting attachment at the extreme point of outward travel. (See figure 10.4)

10.2.7 Effective Travel

The effective travel is the distance along the runway which the trolley and hoist may travel between the fixed end stops. (See figure 10.4)



10.2.8 Height

Free standing

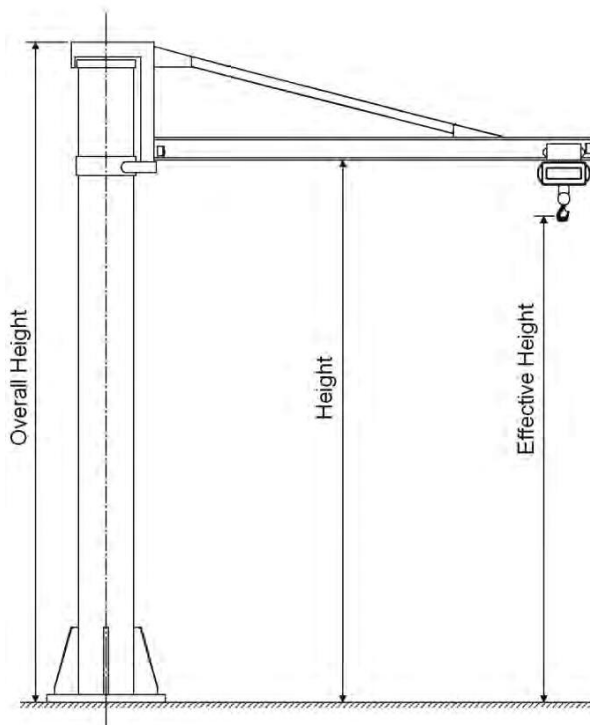
Column/wall mounted Effective radius and effective travel

Figure 10.4

The height of a jib crane is normally measured from floor to the underside of the jib arm; overall height being from floor to the top of the highest point of the structure. (See figure 10.5)

10.2.9 Effective Height

The effective height is the distance from the floor level to the seat of the bottom hook of the lifting appliance in its raised position. (See figure 10.5)



10.3 TYPES OF SLEWING JIB CRANES

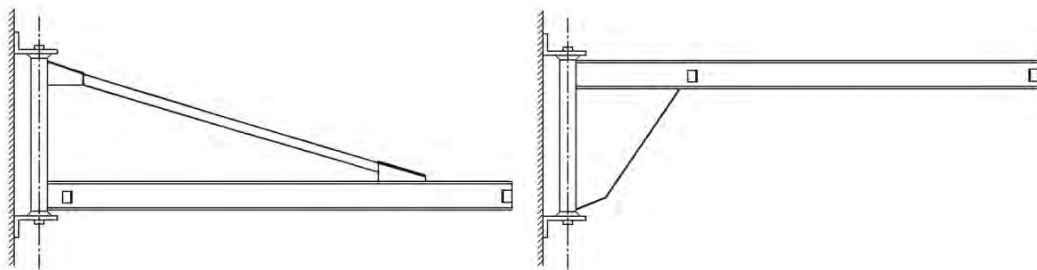
Figure 10.5 Various heights

There are two basic types of jib crane, Wall or Column Mounted and Free Standing. Both types are available in two styles, over-braced or underbraced.

10.3.1 Wall or Column Mounted

In the case of wall or column mounted jib cranes the jib arm, king post and bracing are assembled as a single unit. They may be either over-braced or underbraced in design dependent on the intended use and the location of the installation. Top and bottom bearing brackets fit onto the king post and these in turn are fixed to the supporting structure.

The design of bearing brackets varies with the intended use and may be provided with drilled bolt holes for wall mounting or clamp fixings for mounting onto or clamping around a column. Figure 10.6(a) shows a wall or column mounted over-braced jib arm and figure 10.6(b) shows a wall or column mounted underbraced jib arm.



(a) Over-braced

Figure 10.6
Wall or column mounted jib cranes

(b) Underbraced

The angle of slew is limited dependent on the design of the bearing brackets and the supporting structure onto which they are erected. Wall mounted jibs are usually limited to 180° slew whereas a greater angle of slew may be obtained if the jib is column mounted. The angle of slew may be increased if the length of the bearing brackets is extended and can, in the case of column mounted jibs, be as great as 270°. Stops may be fitted to limit the angle of slew at any position within the arc of travel.

10.3.2 Free Standing

In the case of free-standing jib cranes, the jib arm and supporting column are assembled as a single unit which includes all mountings and bracing. They may be either over-braced or underbraced in design dependent on the intended use and the location of the installation. The supporting column is usually manufactured from square box section, fabricated sections or tube dependent on the required angle of slew. The angle of slew and intended use will also affect the design of the king post and mounting structure.

Free standing jibs are available with a wide variety of slewing angles. They may have a full 360° angle of slew, allowing for continuous rotation if a tubular column is used, or be limited to 270° angle of slew if a square box or similar section column is used. Stops may be fitted to limit the angle of slew at any position within the arc of travel. Where continuous jib rotation is required and electrically operated hoists are to be used, slip ring units are incorporated so that there is no limitation in rotation from the power pick-up. If pneumatic hoists are to be used, the air supply may be piped through the centre of the column and passed along the jib arm via a flexible hose. In this case, slewing stops are necessary to limit the rotation, thus preventing damage to the hose or the loosening of couplings. A similar arrangement may also be used with certain flexible cable electrical supplies.

Two options exist for the foundations of fixing free standing jib cranes. They may be surface mounted; in which case the base of the column is fitted with a base plate drilled to accept anchor bolts. Alternatively, they may be cast into the foundation, in which case the column is extended by a suitable amount to withstand the turning moment imposed. (See figure 10.7)

Figure 10.7 Free standing jib cranes

10.4 PRINCIPLES FOR THE SELECTION OF SLEWING JIB CRANES

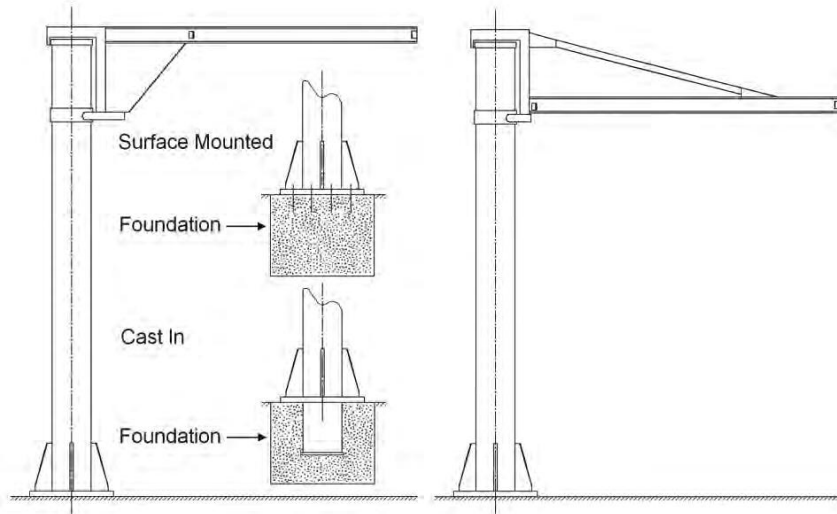
10.4.1 Application

Slewing jib cranes are either custom built or made up from a 'kit' of standard components. This enables a wide range of designs to be easily manufactured to suit specific applications. Of course, this also affects the cost and performance. Careful consideration must therefore be given and the application should be fully discussed with the supplier.

10.4.2 Selection of Jib Crane

The design of jib crane selected will depend much on its location and the task it is to perform. Careful consideration must be given to its location as relocation may be costly.

1. (1) If wall or column mounted designs are selected, a qualified engineer must be consulted and approval obtained as to the suitability of the structure to accept the increased loadings that will be imposed on it.
2. (2) If free standing designs are selected, a prepared foundation will probably prove necessary. This must take



(3)

(4) (5) (6)

into account the type of mounting of the column together with any plating or bracing, i.e. surface mounted or cast in, the turning moments, the permissible soil loadings and the loads that will be imposed. A suitably qualified person should be commissioned to design the foundation. Consideration must also be given to the style of the jib, i.e. over-braced or underbraced. This must take into account the available overall height, the required effective height, the required length of travel along the jib arm, i.e. the effective travel and the required area of coverage taking into account any obstructions which may impede the facility to slew.

Over-braced jibs give the greatest effective travel and therefore area of coverage, but as the bracing is above the jib arm, they require a lot of clear height. They are therefore unsuitable for use in low buildings or where there are overhead obstructions.

Underbraced jibs give the maximum lifting height, but as the bracing is to the underside of the jib arm, they offer a reduced effective travel and area of coverage. They are therefore unsuitable where the load is to be placed near to the support column or wall.

In order to gain the advantage of lifting height and maximum effective travel, it is possible to have an underbraced jib with the bracing spaced to allow the hoist and trolley to pass between the bracing legs. This has the disadvantage of adding to the width of the jib assembly and can severely restrict the available slewing angle.

10.4.3 Selection of Lifting Appliance

The choice of lifting appliance, e.g. hand chain hoist, electric power operated hoist, pneumatic power operated hoist, etc., will depend on the frequency of use, nature of the load and working environment. Guidance on hand chain hoists will be found in section 3 and on power operated hoists in section 6 of this code. The lifting appliance must be compatible with the section of the jib arm track. The weight of the appliance and its dimensional bulk must be considered. Consideration must be given to the relative position of the bottom hook and the end approach of the appliance. In the case of power travel trolleys, the necessary clearances for drive motors and balance weights may be greater than for geared or push trolleys and must therefore be taken into account, as should the dynamic effects the appliance may impose on the jib arm.

The capacity of the lifting appliance must be the same as that of the jib crane so as to avoid confusion from differently marked SWLs. In the case of power operated hoists, the type of power feed to be used must also be taken into consideration.

Not only will these matters affect the design of the jib crane, but they will also place possible restrictions on the placement of the load. The slewing angle of the jib arm may be affected by the chosen lifting appliance and power feed system and may need to be restricted due to this.

10.4.4 Slewing Facility

The jib arm may be slewed by manual pushing of the load, operation of manual gear or by power operation. Selection will largely depend on the magnitude and nature of the load or nature of the task to be performed.

Small, light loads may be easily slewed by hand, but the following should be borne in mind. Pushing on the load will cause it to swing away from the vertical centre line of the jib. The greater the distance between the load and the jib arm, the more accentuated the swing will become. When the jib arm then moves it will be delayed and then tend to snatch, causing the load to swing back and forth. This could endanger the operative and place excessive loading on the structure.

Ground level obstructions, e.g. machinery, may obstruct the path of the operative when pushing a load or the load may be suspended over a pit, eagle opening or similar. In such cases, a tag line may be fitted to the end of the jib arm to enable the operative to slew the jib.

The size, shape and weight of the load may be such that it is not possible for the operative to slew the jib safely by hand. Similarly, the load may be of a hazardous nature. In such cases, manual geared or power slewing should be considered, these also having the advantage of assisting the operative to position the load accurately.

The location of the slewing jib crane must be given careful consideration taking into account any potential hazards there may be such as the proximity of overhead power systems, nearby structures, machinery and other cranes. These may necessitate restricting the slewing motion of the jib arm to prevent it colliding with them. This may be done by the use of slewing stops.

10.4.5 General Considerations

Other matters which should be taken into consideration when selecting slewing jib cranes include:

(1) If power operated hoists are to be used, the availability of a suitable power source should be considered and this must include provision for isolating the jib crane and hoist from the power supply. It should be noted that most free standing jibs designed for use with power operated hoists will be supplied complete with all necessary power supply systems terminating at an isolator mounted on the column.

(2) The jib arm (runway) must be fitted with positive travel stops to prevent the trolley running off the end or colliding with the bracing or supporting structure. Consideration should be given to the position of the inner stops as it may be desirable to limit the travel of the load in certain applications, such as on a production

line, or to prevent the load colliding with ground level obstructions.

(3) The finish and protection of the supporting structure should also be considered, as this will usually be supplied primed and painted as standard. Some further finishing may therefore be necessary to protect the crane due to its environment, e.g. outdoor or high humidity, or to protect the goods being handled, e.g. food products.

(4) The jib crane, together with its associated hoist and trolley, should be covered by the documentation required by legislation. If this is not on record refer the equipment to a Competent Person for thorough examination.

10.5 INFORMATION WHICH SHOULD BE EXCHANGED BETWEEN THE USER AND THE DESIGNER OR SUPPLIER

As the variation of design is wide and jib cranes can be made to suit the application within a broad range of standard components, the exchange of information should be as detailed as possible. Wherever possible, a detailed drawing of the intended location, showing any existing installations and possible obstructions such as trunking, ducting and suspended lighting, should be provided by the user. A visit by the supplier to survey the site should always be considered as this will minimise the necessary information exchange and reduce the chance of incorrect selection. The information exchange should therefore include the following:

1. (1) Type and style of jib crane required i.e. wall/column mounted or free standing, over-braced or underbraced.
2. (2) Details of the load to be lifted or SWL.
3. (3) Type of lifting appliance to be used.
4. (4) Effective radius and minimum radius, thereby giving the effective travel.
5. (5) Height to underside of arm or effective height required.
6. (6) Total headroom available for the installation.
7. (7) Slewing angle required.
8. (8) Classification of the crane. (See note 2)

9. (9) If electric power feed equipment is to be supplied, the type required. This should be accompanied with details of the power supply available, including voltage, phase(s) and frequency.
10. (10) If pneumatic power feed equipment is to be supplied, the type required. This should be accompanied with details of the air supply available, including pressure and rate of delivery.
11. (11) If free standing jib crane:
 - (a) Size of support column.
 - (b) Fixing details, bolt type, grade and size and PCD.
 - (c) Minimum foundation size (length, breadth and depth).
 - (d) Down ward reaction.
 - (e) Turning moment acting on
12. Foundation at effective radius.
13. (12) If wall or column mounting jib crane:
 - (a) Type of bracket and fixing details.
 - (b) Maximum reaction on top bracket.
 - (c) Maximum reaction on bottom bracket.
14. (13) Environmental conditions, e.g. indoor or outdoor, use within corrosive atmosphere, use in hazardous areas, use with dangerous loads, etc.
15. (14) Details of finish, e.g. any special paint or protective finish required, taking into account the risk that it may require distinctive colours.
16. (15) Any special condition sort technical requirements, e.g. flame proofed.
17. (16) Full installation and maintenance instructions.
18. **Notes:**

(1) (2)

Items 11 and 12 are given by the supplier to enable the qualified engineer referred to in 10.4.2(1) and (2) to confirm the suitability of fixings and complete the foundation details.

Current standards for jib cranes use a classification system. If the classification is not known, then sufficient information must be given for the supplier to determine the classification. The following is required:

- (1) Utilization
 - (a) Number of lifts per hour.
 - (b) Operating hours per day. (c) Operating hours per month.
2. (2) Loadings
 - (a) Number of lifts at full load.
 - (b) Number of lifts at 75% of full load. (c) Number of lifts at 50% of full load. (d) Number of lifts at 25% of full load.
3. (3) Weight of lifting appliance if known.
4. (4) Intended sign life in years.

Where insufficient detailed information is available, the user should seek the suppliers advice and recommendations as to the most suitable crane. Any restrictions or recommendations on the use must be adhered to.

10.6 LEGAL REQUIREMENTS

Particular attention is drawn to section 1 subsection 1.3 of this code.

10.6.1

If supplied without electrics or hoist the purchaser will require documented information about the extent to which the structure complies with any essential health and safety requirements and any standards together with information for use. If supplied a complete crane, then the jib shall be marked and supplied with the documentation required by the applicable legislation for the supply of lifting equipment, and standard used for the design and manufacture.

10.6.2

The definition of lifting equipment and accessories used in this code make it clear that slewing jib cranes, including their attachments used for anchoring, fixing and supporting them, are lifting equipment. Unless a written scheme of examination (for guidance refer to LEEA 032 Guide to written schemes of examinations), drawn up by a Competent Person, is in place and operating they must be thoroughly examined by a Competent Person at intervals not exceeding 12 months. Reports of thorough examination should be retained and cross referenced to the crane's historical records for inspection by the Competent Person or local enforcing authority.

10.6.3

Jib cranes depend on the installation conditions for their safety. Therefore, following installation they must be thoroughly examined by a Competent Person before being put into service for the first time or after installation at a new site or location. (See subsection 10.7) This examination will normally include a proof load test. The report of the thorough examination should be retained and cross referenced to the equipment's historical records for inspection by the Competent Person or local enforcing authority.

10.6.4

Following repair, including repair to the foundation or fixings, jib cranes must be re-verified by a Competent Person. The record of the repair and the report of the verification should be retained and cross referenced to the equipment's historical records for inspection by the Competent Person or local enforcing authority.

10.7 INSTALLATION AND COMMISSIONING

10.7.1 Installation of the Equipment

The erection procedure should be carried out in accordance with the manufacturer's instructions, paying particular attention to the following:

(1) The overall stability and safety of a jib crane depends on its foundations or supports. In cases where the jib is attached to an existing structure (wall or column mounted), it is important that the superimposed forces are assessed by a qualified engineer and written approval obtained. Similarly, a free standing jib crane is only safe when rigidly mounted onto the correct foundation capable of resisting the overturning moment of the jib and a suitably qualified person should be consulted. (See paragraph 10.4.2)

2. (2) In the case of a jib crane which is to be clamped to an upright structural member, such as a column, using clip or strap type clamps, care must be taken to prevent the clamp fixings, and therefore the crane, from slipping down the column. Suitable positive stops should be fitted to the column directly below the fixings

or similar steps taken.

3. (3) When erecting the trolley onto the jib arm, ensure it is correctly adjusted for the width of beam. (See section

8 for guidance on trolleys) If it is run on at the end of the track, ensure all bolts are replaced correctly and

be sure to replace the end stops.

4. (4) The erection of the lifting appliance and, where applicable, the power feed system, should be carried out

in accordance with the manufacturers instructions. See section 3 for guidance on hand chain hoists and section 6 for guidance on power operated hoists.

(5) On completion of erection, the structure should be checked to ensure all bolts and fixings are correctly in place and tightened. Any pre-service checks necessary for the power feed system and lifting appliance should also be completed in accordance with the relevant sections of this code. Ensure the jib arm slews freely but has no tendency to move on its own. Ensure any slewing stops and track end stops are correctly positioned.

10.7.2 Pre-use Inspection/Thorough Examination

The installation of jib cranes calls for a thorough examination to be made by a Competent Person before they can be taken into service. Although electrical and mechanical equipment will have been tested in accordance with appropriate Standards at the crane or equipment manufacturer's works, it will usually be necessary for the Competent Person to conduct load tests as a part of the thorough examination. The purpose of this testing is to determine whether the crane is in accordance with standard and specification requirements, correctly installed and to ensure that it is safe to operate.

In addition to the crane structure and fixings, the thorough examination will extend to the lifting appliance and power feed system. Deflection, dynamic and overload (proof load) tests should be carried out in accordance with standard to which it was made. The proof load should be at least 1.25 times the SWL.

The manufacturer is required to specify the maximum permissible deflection to be used and compared with measured deflections obtained in the test. A deviation greater than +/-10% indicates an issue with the installation that needs to be resolved. However, it should be noted that deflections are not the governing criteria for the design and safe operation of slewing jib cranes.

Whilst the maximum allowable deflection must not be exceeded, the vertical deflection of the jib arm must be such that it ensures sufficient stiffness so that:

1. (1) The trolley on the jib arm will not run out of control when under load.
2. (2) The slope of the jib arm is not too great so that there is difficulty in travelling the trolley up the gradient.
3. (3) The jib arm will not slew on its own.
4. (4) The lifting appliance, and therefore the load, can be accurately positioned.

On satisfactory completion of all tests and the thorough examination, the Competent Person should issue the necessary report of thorough examination, which will include details of the tests he has made. In many cases the lifting appliance will be detachable from the jib arm and may have differing proof testing requirements. If so, a separate report or individually itemised report should be issued for the jib crane, trolley and lifting appliance. This should be retained with the qualified engineer's written approval and cross referred to the equipment's historical records. (See subsection 10.6)

10.8 MARKING AND STORAGE

10.8.1 Marking

In addition to the information required by the applicable legislation and standard being worked to, the following information should be permanently and legibly marked on a suitable part or parts of the slewing jib crane:

1. (1) Identification mark. (if the manufacturer has not provided a unique serial number then it is the responsibility of the user to add the identification mark to identify the equipment with the inspection report and examination reports)
2. (2) SWL. This should be marked on both sides of the jib arm in such a way that it is readily legible from the operating level. (3) Standard number, where applicable.
3. (4) If supplied without lifting appliance, Maximum hoisting speed for powered hoists or else the words 'Manual Hoist'
4. (5) Name of manufacturer or supplier.
5. (6) Classification designation.
6. (7) Year of manufacture.

Special care must be taken with regard to the SWL of the jib and lifting appliance. The maximum load to be lifted, including the weight of the lifting equipment, should not exceed the marked SWL of the jib or the appliance. This is particularly important in cases where the lifting appliance is regularly removed and replaced as may be the case where the crane is used for maintenance purposes.

10.8.2 Storage

When not in use, the slewing jib arm should be positioned so that it does not present a hazard to persons, goods or vehicles, etc. which may be working or stored in the area. Where practicable, if the crane is not in regular use the lifting appliance should be removed for storage. If this is not possible or desirable, the lifting appliance should be parked where it will not present a hazard, e.g. against the pivot point end stop. It may be necessary to secure the jib arm to prevent movement taking place as the result of winds, etc.

10.9 IN-SERVICE INSPECTION AND MAINTENANCE

10.9.1 Pre-use Inspection

In addition to the statutory thorough examination by a Competent Person, slewing jib cranes should be visually inspected by a suitably qualified and experienced person prior to use or on a regular basis. For jibs in regular use it is good practice to make the inspection at the start of each shift or working day. For jibs used infrequently it should be done before use on each day of use.

It is recommended that a formal system of pre-use inspection is implemented, and a written record kept identifying the date inspected, confirmation that it passed inspection and the name and signature of the person making the inspection. In the event that it does not pass inspection, there should be procedure to quarantine the jib to prevent further use of the equipment until the problem has been resolved.

The purpose of the pre-use inspection is to check functionality of the jib and make a visual check for any obvious defects. The inspection should include the fixings and anchoring devices and extend to the hoist, trolley and any associated power feed system, further guidance for which is given in the appropriate sections of this code.

The following are examples of common defects of the crane and structure which may become apparent in use or during the regular inspection (see also 10.9.2). If any of these faults are found the jib crane should be withdrawn from service and referred to a Competent Person.

1. (1) Any signs of corrosion, damage or deformation of the structure, such as bent or twisted jib arm, distortion of the column, etc.
2. (2) In the case of wall mounted jibs, any signs of cracking walls or crumbling brickwork, etc.
3. (3) Damaged or missing end stops. These are safety devices which prevent the trolley, hoist or load colliding with the structure or becoming detached from the jib if travelled to the extremes of the jib arm. Their effectiveness should be confirmed and they should not make contact with trolley wheel flanges. Bolts

securing end stops must all be in place and kept fully tightened.

4. (4) If bolts are loose, missing, corroded or otherwise damaged. Missing or damaged washers including taper

washers where appropriate. All bolts and fixing devices used in the construction of the crane and, in the case

of column mounted jibs, for erection onto its supporting structure, should be in place and fully tightened.

5. (5) If foundation bolts are found to be loose, consult manufacturer's instructions. Some types of foundation bolt require periodic tightening during the initial period of use. If the manufacturer's instructions do not mention

periodic tightening or if the problem recurs, withdraw from service and refer to a Competent Person.

6. (6) Difficulty in slewing the jib arm or if the jib slews on its own with no load.
7. (7) If push trolleys run to the end of the jib arm with no load.
8. (8) If the jib slews on its own when loaded or if the load runs away along the jib arm. If there is difficulty in

traversing the load along the jib arm. This may be the result of overloading. Lower and check the load, and if the load is found to be excessive, adjust the load or use an alternative means of lifting. The jib crane should be inspected to ensure no damage has occurred prior to continuing the lift.

10.9.2 Interim Inspection

In addition to the thorough examination and pre-use inspection some jib cranes will require an interim inspection(s). The number, frequency and extent of the interim inspections is based on a risk assessment taking into account the possibility of deterioration of components or assemblies due to the specific conditions of use, to ensure that defects are identified and remedied before they become a danger to persons.

The risk assessment must take account of the manufacturer's literature, jib crane duty and actual conditions of use, for example environmental conditions and utilisation that can cause deterioration. The inspection can be restricted to those critical components identified in the risk assessment and therefore they do not have to be as detailed and time consuming as a thorough examination. Typically the inspection will be a more detailed inspection of one or more of the items listed in 10.9.1, but may also cover some or all of the components covered by the thorough examination (refer to the manufacturers literature or LEEA Lifting equipment

examiners hand book for guidance to defined scopes of thorough examination including acceptance and rejection criteria).

Interim inspections are often done at the same time as planned maintenance, see 10.9.3 below.

10.9.3 Maintenance

A routine preventive maintenance programme should be drawn up which can be combined with the maintenance programme that will be necessary for the lifting appliance, trolley and power feed system. It should meet the requirements set out in the manufacturer's installation and maintenance instructions in addition to any requirements of the particular site due to the conditions of service. In any event attention should be given to the

following points:

1. (1) Lubricate bearings and pivot points. Where the slewing motion is obtained by operation of a manual gear or by power drive, gear wheels and drives must be kept in good order. Gears and bearings should be lubricated and other drives and motors maintained in accordance with the manufacturer's instructions.
2. (2) The jib arm flange or track face on which the trolley runs should be cleaned of all debris, dust or other substances which may impede the free movement and correct operation of the trolley. Clean the trolley wheels.
3. (3) The general condition of the jib crane, its fixings and supporting structures should be maintained. Bolts should be checked to ensure that they are tight and re-torqued if necessary. If bolts are missing, they should be replaced with the correct size, type and grade. If these details are unknown do not attempt to replace them but refer to a Competent Person.
4. (4) Ensure end stops and slewing stops are in good order and that they are correctly positioned.
5. (5) The types of defect found during the inspection and maintenance of electric conductor systems will vary depending on the type and reference should be made to the manufacturer's instructions. In general, the termination points of electric cables into their respective entry glands are areas of wear due to flexing. With festooned cables, continual flexing and rubbing as they open and close into loops can cause a breakdown of the outer insulation. Similarly, where movement of the jib is permitted by flexible cables, this can cause a breakdown of the outer insulation and fatigue may occur if insufficient slack is allowed. Where power is supplied by slip rings, these should be kept in good order and no carbon or other matter permitted to build up. Brushes or collectors should be checked and renewed as necessary. Collector shoes of enclosed conductor systems are liable to wear and support springs may weaken, and should be checked for correct fitting. It is advisable to carry out regular insulation and earth continuity tests and keep records of the

results.

6. (6) In the case of pneumatic supply systems, movement of the jib is permitted by flexible hose. Continual

flexing and rubbing as the jib arm slews can cause a breakdown of the hose and connectors may become loose. Filters and lubricators should be checked, drained if necessary and lubricator oil levels topped up.

10.9.4 Thorough examination

The jib crane must regularly be thoroughly examined by a Competent Person to check whether it remains safe to use. This is to be done within a maximum period of 12 months, unless a written scheme of examination (for guidance refer to LEEA 032 Guidance to Written Schemes of Examination), drawn up by a competent person is in place and operating.

Reports of thorough examination should be compliant with the legal requirements or the LEEA template report documents, retained and cross referenced to the crane's historical records for inspection by the Competent Person or the enforcement authority.

Any defects found by the examination should be reported to the owner of the equipment, who must assess the root cause of the defect and implement procedures to prevent reoccurrence, e.g. training of operators, increased inspections, etc., before remedying the equipment and returning it to service.

The competent person may deem it necessary to supplement their examination with testing. Such testing could be NDT, functional testing, overload testing, etc. The nature and extent of testing is always at the discretion of the competent person in support of their thorough examination.

Note:

Unless a mandatory requirement of the applicable national legislation or manufacturer, LEEA does not recommend the routine overload testing of jib cranes, except following an exceptional circumstance such as significant modification or repair. This is because overload testing has few benefits and a number of disadvantages;

Some manufacturers do not recommend overload tests, except in 'exceptional' circumstances. Repeated overloads can cause deterioration of the equipment over time.

Most structural failures are the result of fatigue and such defects will not be revealed by an overload test; fatigue cracking can be identified during thorough examination.

Defects such as fatigue cracking can be made worse by overload testing but may still not be identified by the test.

If equipment fails during testing it could be dangerous and will certainly be expensive

Inspection bodies do not recommend it as there is no defined structural or mechanical benefit

10.10 SAFE USE OF SLEWING JIB CRANES

In addition to any specific instructions relating to the safe use of the crane issued by the manufacturer, the following points should be observed:

1. (1) The SWL of a crane is the maximum load for which a crane should be used and must not be exceeded. The weight of the lifting appliance should be allowed for in rating the crane. However, it should be noted that the weight of any slings and other lifting equipment form part of the load and hence may reduce the available effective lifting capacity.
2. (2) SWL's apply only to freely suspended loads. Do not use the crane hook or travelling motion of the crane to drag any load along the ground.

3. (3) Before lifting the load, ensure the lifting appliance chain or rope is vertically above the load. Failure to do this will result in the jib arm swinging and possibly the trolley whipping when the load begins to rise.
4. (4) Apply the rules for the safe use of all the lifting equipment employed in the lift as detailed in the relevant

sections of this code. In particular, take the weight of the load gently, check to ensure that all lifting attachments are correctly and firmly in place, then complete the lift. Lower the load gently and take care to ensure an unrestricted landing area. Whilst these measures are a necessary part of the trial lift, special care is required as suddenly imposed or removed loads on cantilevers can cause the jib beam to whip.

5. (5) On all occasions, prior to moving the jib arm, ensure that there are no obstructions in the path of the jib or load. The operative must always have a clear vision of the travel path.
6. (6) When using a crane and/or trolley which has no manual gearing or powered mechanism for movement, i.e. is hand push, it is preferable to move the load by pushing rather than pulling it.
7. (7) Care must be taken to avoid the load swinging. This can lead to the danger of the operative becoming pinned or trapped by the load. Another danger is that the load will whip outward thus increasing the effective radius and the resultant loads imposed on the mechanisms and structure.
8. (8) Avoid shock loads.
9. (9) Exercise great care when handling partially supported loads, such as when moving work pieces in and out

of machine tools or removing chucks from lathes. This type of situation can lead to both swinging loads

and shock loads.

10. (10) Powered equipment may place higher dynamic loading on the structure than manual equipment, so

conversion of a jib with hand chain hoist to power operated hoist must take this into account. It should also be realised that the rating of the jib arm made allowance for the weight of the hoist that was originally to be used on the crane. If a heavier hoist is fitted, the crane may no longer be suitable for the marked SWL. If any doubt exists, consult a Competent Person.

10.11 TRAINING

In addition to the training requirements specified in section 1, subsection 1.9 of this code, operative training should take the manufacturer's instructions into account, paying particular attention to the following:

- (1) Operatives must have good eyesight and be able to judge distances, heights and clearances and the training programme should cover this aspect of the operation.
- (2) If the jib crane and/or the associated lifting appliance call for manual effort to push the load the operative should be physically fit for such activity.

