

Signal Head Crane Maintenance Plan and Instructions



Maintenance and Inspection Instructions for the Thomson Engineering Design Ltd Signal Head Crane

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*The Thomson Engineering Design
Signal Head Crane is proudly
designed and manufactured in the UK*

Introduction

The Thomson Engineering Design Signal Head Crane is a post crane specifically designed for the lifting and handling of coloured light signalling equipment in railway applications.

Assembly and use of the Signal Head Crane is described in the Operators Instructions available separately.

This document deals with the inspection and maintenance operations necessary to keep the equipment in good condition and to ensure that it is set up correctly.

Under the Lifting Operation and Lifting Equipment Regulations (LOLER) it is the responsibility of employers to appoint competent users and inspectors for all lifting equipment. This document is intended to assist users and inspectors by highlighting where defects may occur due to wear-and-tear, abuse, transit damage, etc.

The document is divided into three sections: the first section deals with the daily inspection of the various parts of the crane, the second section deals with the inspection of the fully assembled crane prior to use and the last section deals with the thorough examination of all parts of the crane which should be carried out at six monthly intervals.

Competency Standards

LOLER does not define any specific competency standards or recommend any relevant qualifications for lifting examiners.

It is the responsibility of employers to define who is competent and different companies may have different standards.

The Signal Head Crane is a specialised item of lifting equipment which is not generally covered by lifting industry training courses however its component parts are relatively simple and of a design which anybody with experience of examining lifting equipment should be able to cope with.

We hope that the guidance given in this document will enable operators and examiners to use and maintain the Signal Head Crane in a safe and efficient manner but we will be pleased to answer any specific queries or assist in the development of any further training material which owners may require.

Thomson Engineering Design Ltd
Valley Road
Cinderford
Gloucestershire.
GL14 2NZ
Tel: 01594 82 66 11 Fax: 01594 82 55 60 Email: sales@thomsondesignuk.com

Section 1: Pre-Assembly Inspection

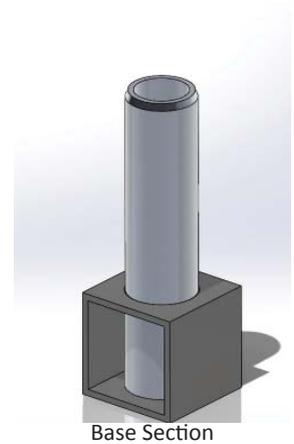
As the Signal Head Crane is assembled each section should be given a brief visual inspection to ensure that it has not suffered damage since it was last used. This inspection will normally be carried out by the operator.

These checks should take no more than a few minutes to complete. **DO NOT USE ANY EQUIPMENT FOUND TO BE DEFECTIVE.**

Base Section

Visually inspect to check for signs of cracking in or near the welds.

Check for burrs and distortion which might prevent the base section fitting easily into the winch post section.



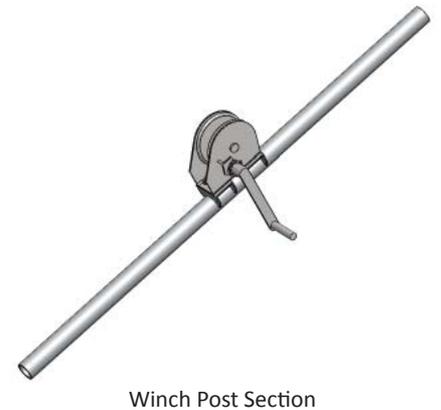
Winch Post Section

Visually inspect to check for signs of cracking in or near the welds.

Check that winch mounting bolts are secure (cannot be turned by hand).

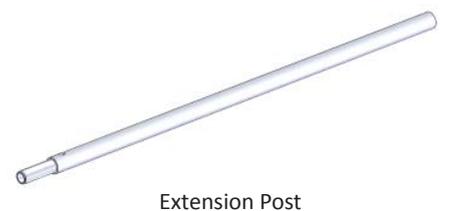
Check that the winch handle is securely mounted.

Check the wire rope for crushing / fraying.



Extension Posts

Check all extension posts for cracks, burrs and check that they are not bent.

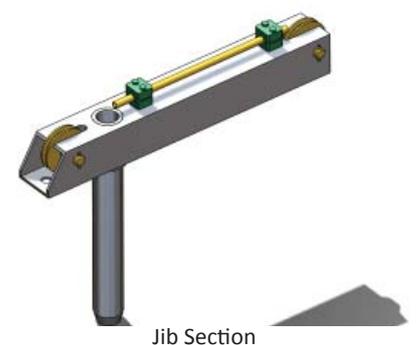


Jib Section

Check that the pulleys turn freely.

Visually inspect to check for signs of cracking in or near the welds.

Check for burrs and distortion which might prevent the Jib fitting easily and freely into the extension posts.



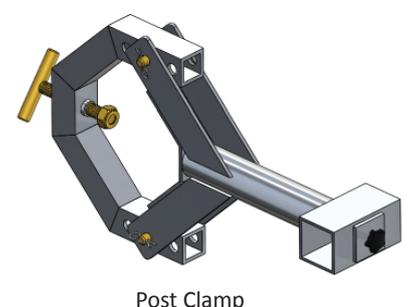
Post Clamps

Check that the joining pins, R-clips, clamp screw and thumbscrew are in good condition and move freely.

Check that the clamp screw is lightly greased and re-grease if required.

Check for burrs and distortion which might prevent the clamp passing over the post sections.

Visually inspect to check for signs of cracking in or near the welds.



Section 2: Pre-Use Inspection

Once the team have completed assembling the Signal Head Crane it should be given a final check over before use. Ideally this final check should be done by somebody else ie. not one of the people who assembled the crane.

The purpose of this check is to ensure that nothing has been forgotten or omitted during assembly. A check sheet is provided on page 9 which may be photocopied and used to document this Inspection if required.

Jib

Check that the rope is lying in the pulley grooves.

Check that the Jib can rotate freely.

Check that the Jib is fully inserted into the upper post section.

Posts

Check that all joining spigots are fully inserted.

Check that each post section has a clamp fitted.

Note: the short post section (900mm) may be fitted above the uppermost clamp if necessary to achieve the lift if all three post clamps are fitted to the remaining sections.

Clamps

Check that all pins and R-clips are fitted.

Check that clamps have been done up firmly by hand.

Check that thumbscrews are firmly hand tight.

Check that uppermost clamp is as high up the signal post as reasonably practicable.

Check that lowest clamp is as close to the winch as reasonably practicable.

Winch

Check that wire is wound on the right way (winch ratchet should click when load is being lifted)

Check that at least 3 full turns of wire are on the drum when the rope end eye is at ground level.

Check that the position of the winch will not encourage operators to stand in the drop zone.

Base Section

Check that the base section rests on a firm footing.



Section 3: Thorough Examination

All the parts of the Signal Head Crane should be subjected to a thorough examination at not more than 6-monthly intervals and a LOLER certificate issued.

If at any time the crane is accidentally overloaded or subject to any incident which might damage its parts then a thorough examination should be carried out before returning the crane to service. In these events it may be appropriate to issue a new certificate specifying a one or three month interval before the next examination.

A blank LOLER certificate is given on page 8 which may be copied and used to record thorough examinations of the Signal Head Crane.

Examining Welds

Cleaning of the weld and a careful visual examination, in good light, of the weld bead and of the material adjacent to the weld bead will normally reveal any cracks however if there is any uncertainty we recommend that a dye penetrant system be used.

Suitable dye penetrant test kits may be obtained from Thomson Engineering Design Ltd.

Examining Nuts and Bolts

As well as checking by hand that nuts and bolts are tight, check the metal around all nuts and bolts for signs of movement, fretting or metal migration. These signs may indicate looseness or overtightening of the fasteners.

Examining Wire Rope

Wire ropes should be free from crushed areas and fraying. Beware when examining wire rope that broken fibres may form sharp spikes which can cause injury to hands.

Examining the Winch

A number of different winch models may be fitted to the Signal Head Crane. The winch manufacturer's documentation should be referred to for specific advice on the examination, care and maintenance of the hand winch.

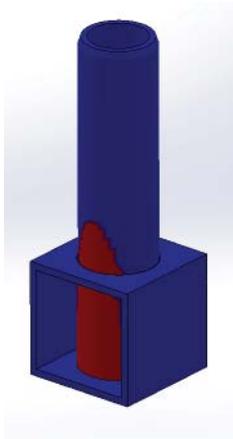
Spare Parts and Technical Advice

Spare parts and technical advice are available from Thomson Engineering Design Ltd. Contact details may be found on Page 3.

Out of normal business hours calls are automatically diverted to an on-call technician.

Thorough Examination of Parts

Each section of the Signal Head Crane should first be cleaned and examined as described in Section 1: Pre-Assembly Inspection on Page 3 of this document. In addition to this the following checks should be carried out.



The following checks are designed to ensure that the structure and mechanism of the Signal Head Crane is in a safe condition and fit for return to service.

Base Section

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustration.

Withdraw from service if any cracks are detected or if any part of the component is distorted by more than 2mm in any direction.

Winch Post Section

Check that the winch and winch handle are free from damage, distortion and cracks.

Check that the winch mechanism operates correctly:

- Check that ratchet holds firmly when the handle is released
- Check that the reverse winding brake holds firmly when the handle is released
- Check that the wire rope is free from defects and securely clamped to winch drum

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustration.

Withdraw from service if the winch does not operate correctly, the wire rope is in poor condition, if any cracks are detected or if any part of the component is distorted by more than 2mm in any direction.

Extension Posts

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustration.

Withdraw from service if any cracks are detected or if any part of the component is distorted by more than 2mm in any direction.



Thorough Examination of Parts (cont'd...)

Jib Section

Check that the pulleys rotate freely on their spindles and that the pulley bushes are free from excessive play.

Check that the pulley spindles are a close fit ($<0.25\text{mm}$ clearance) in the Jib.

Check that the spindle retaining rollpins are securely fitted.

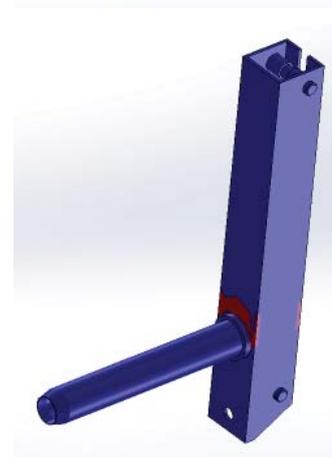
Check that the tube protecting the wire rope is tightly clamped.

Check that there are no sharp edges which the rope might rub against.

Check that the Jib tube and the mounting tube are not bent.

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustrations.

Withdraw from service if any cracks or bending are detected, if the pulleys or pulley bushes are worn to excess, if the spindle holes in the Jib have elongated or distorted or if any part of the component is distorted by more than 2mm in any direction.



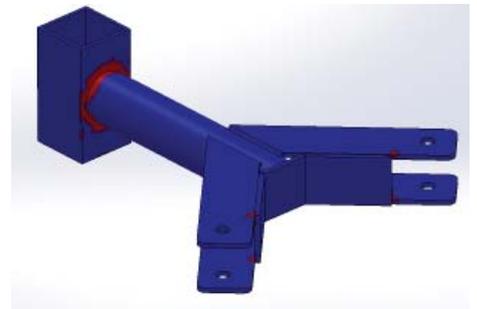
Clamp Bases

Check that the thumbscrew is in good condition and that it screws freely in and out of the post collar.

Check that the metal around the pin holes is free from cracks and distortion.

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustration.

Withdraw from service if any cracks are detected, if the pin holes have elongated by more than 1mm or if any part of the structure is distorted by more than 2mm.



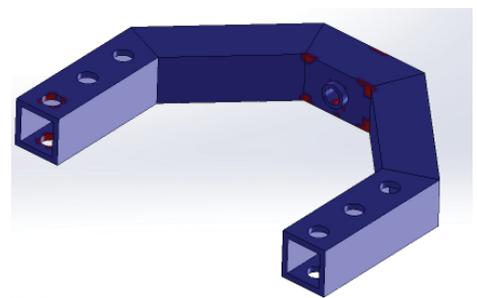
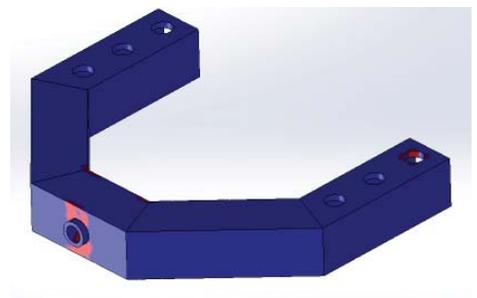
Clamp Arches

Check that the screw clamp moves easily within the threaded boss.

Check that the metal around the pin holes is free from cracks and distortion.

Carefully inspect the entire component for signs of cracking or distortion paying particular attention to the areas shaded red in the illustrations.

Withdraw from service if any cracks are detected, if the pin holes are elongated by more than 1mm or if any part of the item is distorted by more than 2mm.



Repairing Defects

All significant defects must be rectified and the parts re-examined before the Signal Head Crane is returned to service.

Replacement of mechanical parts such as the winch, winch rope, pulleys, spindles, thumbwheels, pins and R-clips is permissible and may be carried out by a competent repairer.

Weld repair of the aluminium alloy structure **MUST NOT BE DONE UNDER ANY CIRCUMSTANCES** without consulting the manufacturer.

Any structural section found to be bent, worn out or badly distorted should be destroyed and replaced.

Replacement parts may be obtained from the manufacturer.

Bolt & Nut Grades and Torques

Should it be necessary to remove or replace the winch the four locknuts should be replaced irrespective of condition with nuts of grade 8 or higher.

Winch mounting bolts are to be M10 Grade 8.8 or higher.

Tighten the winch mounting bolts to 45 Nm to 50 Nm.

Rollpins and Cotters

If it becomes necessary to remove the rollpins or spring cotter pins used to secure the pulley spindles then these should be replaced with new pins regardless of their condition.

Sample LOLER Certificate

Report of a Thorough Examination of Lifting Equipment

| | | | |
|---------------|-----------------------|---------------------|----------------|
| Report Number | Customer Order Number | Date of Examination | Date of Report |
| | | | |

| |
|------------------------------------------------------------------------|
| Name and Address of Employer for whom the examination was carried out: |
| |

| |
|--------------------------------------------------------|
| Address of Premises at which the examination was made: |
| |

| Qty | Description & Identification of the Equipment | Safe Working Load(s) | Date of Last Thorough Examination |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|
| 1 | Signal Head Crane consisting of fabricated base assembly, two 1.8m extension sections, one 0.9m section, one fabricated jib assembly, one base assembly with hand winch, steel wire rope and shackle, three fabricated clamp assemblies. Serial Number: SHC | | |

| Has this Equipment | Yes | No |
|-----------------------------|-----|----|
| Supplied New | | |
| Supplied Reconditioned | | |
| Examined Only | | |
| Examined & Tested Only | | |
| Examined, Repaired & Tested | | |

| Was the Examination carried | Yes | No |
|----------------------------------------|-----|----|
| Before being issued for the first time | | |
| Within an interval of 6 months? | | |
| Within an interval of 12 months? | | |
| As part of an examination scheme | | |
| After Exceptional Circumstances | | |

| |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Identification of any part found to have a defect or which could become a danger to persons and a description of the defect: (if none state NONE) |
| |

| | |
|----------------------------------------------------------------|--|
| Is the above a defect which is of immediate danger to persons? | |
|----------------------------------------------------------------|--|

| | | |
|----------------------------------------------------------------------------------------------|------|--|
| If not an immediate danger, when might it become dangerous to persons without rectification? | Date | |
|----------------------------------------------------------------------------------------------|------|--|

| |
|--------------------------------------------------------------------------------------------------|
| Particulars of any repair, renewal or alteration required to remedy the defect identified above: |
| |

| |
|--------------------------------------------------------------------------------------|
| Particulars of any tests carried out as part of the examination (if none state NONE) |
| |

| | |
|-----------------------------------------------|--|
| IS THIS EQUIPMENT SAFE TO USE/OPERATE? | |
|-----------------------------------------------|--|

| | | | |
|-----------------------|--|--------------------------------------------------------------------|--|
| Equipment Examined By | | Latest date by which next through examination must be carried out. | |
| Name | | Date | |
| Signature | | | |
| Qualifications | | | |

Pre-Use Checksheet

| | |
|---------------------------------|-----|
| Crane Serial Number | SHC |
| Site Location | |
| Signal Number | |
| Examiner Name (print) | |
| Date of Inspection | |
| Crane Assembled By (print name) | |

| Check | Tick |
|------------------------------------------------------------|------|
| Rope correctly set in Jib pulleys | |
| Jib Rotates Freely | |
| Jib Fully Inserted in Post | |
| All Post Joints Fully Inserted | |
| At Least One Clamp Fitted Per Post | |
| Clamp Thumbscrews Tight | |
| All Pins and R-clips Fitted | |
| Clamp Screws Tight | |
| Top Clamp as High as Possible | |
| Bottom Clamp as Low as Possible | |
| Winch Rope Correctly Wound on Drum | |
| At Least 3 Full Turns of Wire on Drum Throughout Operation | |
| Winch Positioned Away From Drop Zone | |
| Base Section on Firm Footing | |

I confirm that the crane detailed above has been correctly assembled, is in good condition and is fit for use.

Signature:

