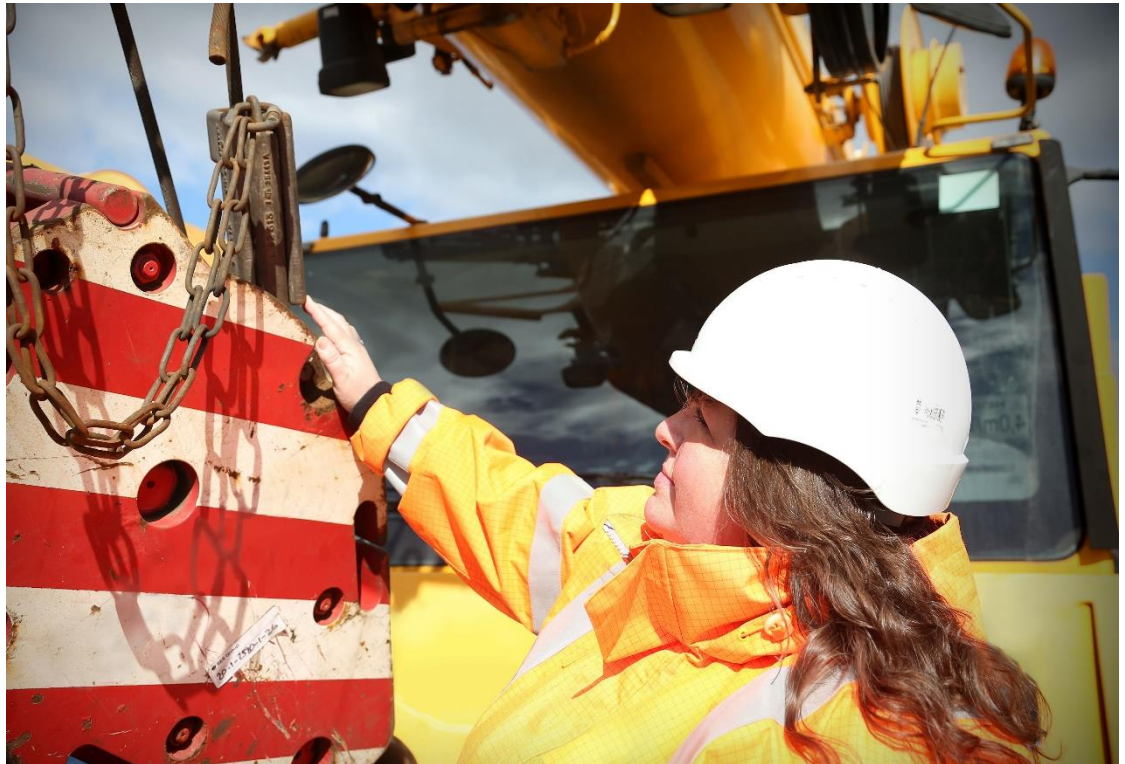


Safety Publication



Guidance for Safe and Correct Rigging of Mobile and Crawler Cranes



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Guidance for Safe and Correct Rigging of Mobile and Crawler Cranes

CPA Good Practice Guide



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27/28 Newbury St
London
EC1A 7HU
www.cpa.uk.net
0207 796 3366
Email: enquiries@cpa.uk.net
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Contents

	Page
Foreword	2
1. Introduction	3
2. Pre-use Daily Checks	4
3. Suggested Areas of Focus	5
4. Conclusion	6
5. Ready for Works Checks	7
6. Publications and Guidance	8
Annex A Tables for Ready to Work Checks	9
Annex B Working Group Membership	12

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Foreword

Welcome to the first edition of the Construction Plant-hire Association's (CPA) Ready for Work Checks, produced by the CPA's Crane Interest Group (CIG). It is my belief that these checks are an important step to significantly reducing risks to both crane operators, customers and users whilst undertaking lifting operations.

These ready for work checks provide a clear 'safety pause' before commencing lifting operations. They will ensure that the crane is rigged correctly, that the load and area of operation are safe and secure, and that all operators involved in the lift are focused and clear on their duties. As an independent check to the normal rigging requirements within the lift plan, these checks will also greatly reduce the risk of human error / single point of failure.

The ready for work checks are a simple, quick and practical enhancement to current processes. They do not replace any of the current processes and are relevant to every type of lift applying to crane hire or contract lift, simple or complex operations.

These checks should be a standard pre-requisite check for all crane operators before commencing operations when the crane is first rigged, when taking over a rigged crane, or after a break away from the crane - so they need to ensure nothing has changed from the setup since the last lifting operation.

With a wider range of solutions available to deliver a lift, combined with a wider range of training standards, these checks provide an important safety function to ensure we continue to reduce operating risks.

As such, I strongly commend this guidance to all mobile crane operators and users, and am grateful to the working group participants from the Health and Safety Executive, Construction Plant-hire Association, CIG Members and members of the Industry Lifting Lead AP Group, who all supported and contributed to the development of this guide.

Whilst this guidance has no formal legal status, it is the view of the CPA and all of the working group bodies represented, that these checks should be expected across all mobile crane operations.



Peter Gibbs
Chairman
Crane Interest Group
Construction Plant-hire Association

1.0 Introduction

This document provides good practice guidance to ensure that once cranes (mobile and crawler) are rigged or assembled, that sufficient checks are made to ensure that they are safe before being put into service.

There have been incidents, albeit rare, where the crane has not been rigged correctly, either to the approved lift plan or to the manufacturer's instructions. The guidance in this publication should significantly reduce the probability of these incidents.

In accordance with Clause 4.3.1.1(c) of BS7121-3:2017 + A1:2019, it is the duty of the Appointed Person to ensure that 'pre-operational' checks are carried out before the crane is put into service. The 'pre-lift' check process indicated in this ready for work guidance will support the Appointed Person in this regard.

The Appointed Person does not need to have an in-depth knowledge as to how the crane is assembled as that is the role of the crane operator. However, the Appointed Person should ensure that any pre-operational checks are included within the safe system of work.

This ready for work guidance does not bring any new interpretation on any references contained in any part of BS7121, the Lifting Operations and Lifting Equipment Regulations (LOLER) or the CPA Model Terms and Conditions of Hire and any supplementary parts.

The roles and responsibilities of all personnel remains unchanged and they all should be competent, having sufficient 'knowledge and experience' commensurate with the task to discharge their duties as per LOLER and in line with BS7121.

This pre-lift check process will ensure that the crane is rigged in accordance with the lift plan as well as the manufacturer's instructions, and should mitigate any errors made during the rigging process.

It is recommended that this process is adopted on all lifting operations.

2.0 Pre-use Daily Checks

Crane 'Pre-use daily checks' are a well-established method of checking cranes for functionality and defects and are performed by the crane operator. They should be undertaken at the start of every shift and are a vital aid to defect reporting.

They do not however encompass the same checks that are required after the crane has been rigged or assembled prior to lifting taking place.

Any below the hook lifting accessories or equipment should also be examined as per the manufacturer's instructions for use.

2.1 Ready for work checks

Pre-use - ready for work checks should be performed by the crane operator once the crane has been rigged but **prior** to any lifting taking place.

The crane owner should ensure that there is an established procedure in place for the crane operator to check the crane prior to the lifting operation.

The Appointed Person should ensure that the safe system of work includes these checks and that they have taken place.

There should be evidence that the ready for work checks, as well as the daily pre-use checks, have been performed and should be noted within the safe system of work.

The crane owner and the crane hirer should work collaboratively to ensure that the crane is rigged safely and correctly.

3.0 Suggested Areas of Focus

Listed below are suggested areas where the Appointed Person might wish to focus and highlight that specific additional checks are required to be undertaken:

Lift Plan – That the crane is rigged to the manufacturer's instructions and set to the configuration of the lift plan in terms of:

- the correct counterweight being installed;
- the correct outrigger configuration;
- the corresponding duties charts being selected within the safe load indicator.

Main Boom – In addition to the above, it is important to check that the hoist rope is routed correctly as per the reeving diagram, sat fully in the sheaves and routed under any rope retaining pins.

Fly Jibs and Lattice Jib Extensions – In addition to the above, additional checks should take place to ensure that all lattice connection pins are fitted and clipped. These also include that additional 'luffing' ropes are routed correctly and that once the hook block is reeved, that it is further checked when airborne to ensure correct positioning of ropes in sheaves - and it is not routed over any retaining pins.

Fly Jibs – Due to the lower frequency of use and potential risk, particular attention should be paid prior to the installation OR the stowage of a swing-around fly jib. Crane operators should have received specific training and be fully familiar with the operation prior to commencement.

Hook Block – If a hook block is changed or the falls of rope are altered, then checks should be made prior to use to ensure that it is reeved as per the manufacturers reeving diagram. Checks need to ensure that the hoist rope is sat fully in the correct sheaves and is not routed over any retaining pins.

A further check should be made when the hook block is airborne to ensure correct positioning of ropes in sheaves and is not routed over any retaining pins.

Whilst the above list is not exhaustive, it does highlight areas of focus that in the past have resulted in errors being made by trained and competent people but that with further diligence, might have been avoided.

Appointed Persons should carefully consider all risks associated with the rigging / assembly of cranes and these should be included in the safe system of work.

Further suggestions are provided in Section 5.

4.0 Conclusion

This good practice document highlights some of the high-level risks involved when rigging cranes and provides practical guidance as to what additional checks might be included to avoid incidents.

It acknowledges that errors can be made by experienced and competent people, but without additional measures being in place, they remain a single point of failure.

It is important that good collaboration must exist between the owner and the hirer at all levels to ensure that cranes are rigged carefully in good time, with the emphasis being placed on due diligence and risk mitigation.

Implementing these simple, straightforward checks into everyday general activities will significantly reduce the probability of errors being made by otherwise trained, competent and experienced people.

This guidance supports both owners and hirers alike and should be welcomed by all.

5.0 Typical Ready for Work Checks

These are the checks that should be undertaken by the crane operator and checked by the Appointed Person (or representative) and are in addition to the pre-use functionality and defect reporting checks that the crane operators should undertake as per BS7121 parts 1 (2016) and 3 (2017+A1:2019).

These ready for work checks should usually entail a walk-around of the crane from back to front by the crane operator. Good practice advocates that the Appointed Person or Lift Supervisor should accompany the crane operator to verify that checks have been completed.

The Appointed Person or Lift Supervisor do not need to have detailed knowledge of how the crane is assembled. That is the role of the crane operator, but they – the Appointed Person or Lift Supervisor - should have the necessary “knowledge and experience” commensurate with the crane in question, such that they understand what the crane operator is demonstrating.

Together the Crane Operator and the Lift Supervisor should be able to confirm that the crane is rigged correctly, as the checks should be clear, straightforward and practical.

The crane manufacturer’s operator’s manual should be with every crane and can be referred to when necessary. All cranes must be rigged to manufacturer’s instructions without exception.

The crane should not be put into service under any circumstances if there is any doubt regarding the correct rigging of the crane. The Appointed Person should contact the crane owner immediately if there are any concerns.

These checks should be completed in line with the lift plan, ensuring that the crane configuration matches the Appointed Person’s lift plan.

Any below the hook lifting accessories or equipment should also be examined as per the manufacturer’s instructions for use.

The tables in Annex A are a non-exhaustive list of the main points.

Table A1 in Annex A is applied to all crane configurations as the crane chassis configuration and main boom rigging will always be required in any lifting operation.

Note: The tables in Annex A are non-exhaustive lists and the Appointed Person should ensure that it is sufficient for the planned rig of the selected crane.

6.0 Publications and Guidance

Abbreviation	Description	Link
LOLER	Safe use of lifting equipment - Lifting Equipment and Lifting operations Regulations 1998 – Approved Code of Practice and Guidance -L113	https://www.hse.gov.uk/pubns/price/d/l113.pdf
PUWER	Safe use of work equipment - Provision and Use of Work Equipment Regulations 1998 – Approved Code of Practice and Guidance – L22	https://www.hse.gov.uk/pubns/price/d/l22.pdf
HSG150	Health and Safety in Construction – HSG 150	https://www.hse.gov.uk/pubns/price/d/hsg150.pdf
INDG401	The Work at height – a brief guide – INDG 401	https://www.hse.gov.uk/pubns/indg/401.pdf
CDM	Construction (Design & Management) Regulations 2015 – L153 (Guidance on Regulations)	https://www.hse.gov.uk/pubns/price/d/l153.pdf
BS7121-1	BS7121-1:2016 Code of practice for safe use of cranes – Part 1: General	https://landingpage.bsigroup.com/LandingPage/Series?UPI=BS%207121
BS7121-3	BS7121-3:2017+A1:2019 Code of practice for safe use of cranes – Part 3: Mobile cranes	https://landingpage.bsigroup.com/LandingPage/Series?UPI=BS%207121
BS7121-2-3	BS7121-2-3:2012 Code of practice for safe use of cranes – Part 2.3: Inspection, maintenance and thorough examination - Mobile cranes	https://landingpage.bsigroup.com/LandingPage/Series?UPI=BS%207121

Annex A – Tables for Ready for Works Checks

Typical ready for work checks that are to be undertaken by the crane operator and checked by the Appointed Person (or representative)

Note: The tables in this Annex are non-exhaustive lists and the Appointed Person should ensure that it is sufficient for the planned rig of the selected crane.

A1	Standard Main Boom Only Configuration (these checks to be included in all configurations)	Comments / Record the values / measurement
A1.01	Make and model of crane to be provided on the lift plan	
A1.02	Correct outrigger centres / spacing	
A1.03	Correct outrigger mats, including orientation	
A1.04	Correct amount of ballast	
A1.05	Machine level & axles locked	
A1.06	Correct number of falls of hoist rope	
A1.07	Rope correctly reeved: - around the correct sheaves as per the reeving diagram in the manual - seated properly on the sheaves - and not the wrong side of any pins or guide rope pin rollers (This should be checked before the head of the main boom is elevated away from ground level, noting some pins are not readily identifiable from the front of the boom)	
A1.08	Correct hook block, plus any cheek weights if required	
A1.09	Chandelier / Anti-two block correctly fitted and operational	
A1.10	Hook block has operable safety catch	
A1.11	Safe load indicator is set as per the lift plan (check programme settings and confirm weight / radius from the lift plan)	
A1.12	Any variable-ballast / variable-base is set correctly	
A1.13	Operational anemometer	
A1.14	Bottom cab isolated and locked	

A2	Fixed fly-jib or luffing fly-jib configuration	Comments
A2.01	Correct type and length as per lift plan	
A2.02	All lattice fly / jib connections correctly pinned and clipped	
A2.03	All tie bars connected correctly, pinned and clipped	
A2.04	All luffing ropes sat correctly on the sheaves and around the correct sheaves as well as routed around pins, guards and pin-guide rollers	
A2.05	ALL transport pins have been removed from the luffing ropes / winches before the main boom is elevated.	
A2.06	There is a procedure in place to raise/ lower the luffing jib and is understood by hirer and owner where responsibility starts and ends	
A2.07	The hook(s) are on the correct boom(s) and the inclusion of such hooks is permitted as per the manual	

Note: It is recommended that the crane operator shows the Lifting Supervisor where all the collar pins and spring retainers are either released for installation or added for joining as per the OEM manual.

A3	Wrap-around Fly-jib Configuration	Comments
A3.01	Check operator is trained and familiarised to install / remove the swing-around fly on this model of the crane	
A3.02	Check that the operator is familiar with the OEM's instructions within the operator's manual	
A3.03	INSTALLATION NOTE – the fly jib will fall off if it is not pinned at the boom head when the main spring-loaded pivot catch is released	
	STOWAGE NOTE - the fly jib will fall off if the main spring-loaded pivot catch handle is not fully engaged when the boom head pins are removed	
A3.04	If the operator encounters a problem, they must stop and NOT seek help from site labour. They must contact their employer. NEVER supply site labour to assist installation or removal of a fly jib. Historically, such actions have led to fatalities.	

A4	Crawler crane	Comments
A4.01	Make and model of crane to be provided on the lift plan	
A4.02	Correct crawler track centres / spacing	
A4.03	Boom(s) Installed in the correct configuration and of the correct type as per the crane manual and lift plan. If telescopic, that both the operator and the lifting team have the same understanding of the boom configuration and pinning order. All tie bars and pins installed correctly, with sufficient retention method as per the manual	
A4.05	Correct amount of ballast (rear and carbody)	
A4.06	Correct hook(s) (with correct additional weights) as per lift plan	
A4.07	Correct number of falls of hoist rope	
A4.08	Rope correctly reeved: - around the correct sheaves as per the reeving diagram in the manual - seated properly on the sheaves - and not the wrong side of any pins or guide rope pin rollers. <i>(This should be checked before the ahead of the main boom is elevated away from ground level, noting some pins are not readily identifiable from the front of the boom).</i>	
A4.09	Correct hook block, plus any cheek weights if required	
A4.10	Chandelier / Anti-two block correctly fitted and operational	
A4.11	Hook block has operable safety catch	
A4.12	Safe load indicator is set as per the lift plan (check programme settings and confirm a weight / radius from the lift plan)	
A4.13	Operational anemometer	
A4.14	Any tracking routes are assessed and approved by the TWC	
A4.15	All involved understand the out-of-service positions of the boom(s), there are clearly defined responsibilities and there are plans in place.	

A5	Y-guy / Back Mast / Superlift	Comments
A5.01	Correct setting of the mast bracket (length, angle to the boom, correctly pinned)	

A6	Mobile Self-erecting Tower Crane	Comments
A6.01	Check correct duty input into superstructure before operating	
A6.02	Check winch ropes to make sure they aren't fouling or twisted	
A6.03	Check slewing path before ascending in cab, make sure no obstructions and include exclusion zone where possible	
A6.04	Remote control unit is transferred to cab operating mode and secured away	
A6.05	If lattice jib extensions are fitted: • Check operator is trained and familiar to install / remove the jib on the model of the crane • Check that the operator is familiar with the OEM's instructions within the operator's manual	
A6.06	Rope correctly reeved: • around the correct sheaves as per the reeving diagram in the manual, • seated properly on the sheaves • and not the wrong side of any pins or guide rope pin rollers	

It is recommended that evidence is gathered in the form of photographs to show the correct rigging of the crane and that it is ready for work.

Temporary works checks as well as the assessment of the ground conditions always remain with the Hirer as these are beyond the scope of the capability of the Owner.

Refer any questions regarding the ground or adequacy of adjacent temporary works to the principal contractor's Temporary Works Coordinator in advance.

Annex B: Working Group Membership

Name	Employer
Peter Gibbs (CIG Chair)	Ainscough Crane Hire
Mark James	Ainscough Crane Hire
The Chair and Author would like to acknowledge additional support and information from members of the Crane Interest Group and the Industry Lifting Lead AP Group (ILLAPG)	
Craig Hook (Author)	CPA
Katie Kelleher (Editor)	CPA

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