

Tower crane A04

Learning for CPCS



Outcomes

Through a combination of targeted training and experience, an individual with the Tower crane will be able to:

Roles and responsibilities	<ul style="list-style-type: none"> Describe the nature of the sector of industry and their role and responsibilities as a plant operator
Preparing for work	<ul style="list-style-type: none"> Name and explain the purpose of principal components, the basic construction, controls and terminology Conform with manufacturer's requirements as per the operator's handbook, other types of information source and relevant regulations and legislation Explain all relevant documentation Undertake all pre-use checks and place the crane into service Follow and carry out procedures that must be taken to access the structure/base for inspection and maintenance purposes
Setting up for work	<ul style="list-style-type: none"> Configure the crane for lifting duties Explain the reasons for changing the number of falls of rope Explain action required for hazards and overhead services Explain various types of lifting accessories
Working tasks	<ul style="list-style-type: none"> Identify that loads are safe to lift, ensuring load balance, security and integrity Lift various loads using the full radius and slewing capabilities of a crane Accurately place loads Minimise the swinging of loads Move loads through crane travel (where applicable) – Endorsements A & B Comply with signals and instructions Maintain safe working situations Explain how the wind (and other weather conditions) can affect loads being lifted with regards to pedestrian safety on the ground
Shutting down	<ul style="list-style-type: none"> Carry out out-of-service and securing procedures

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Syllabus

Learning outcome	Training content	
<ul style="list-style-type: none"> Describe the nature of the sector of industry and their role and responsibilities as a plant operator 	<ul style="list-style-type: none"> Industry type Customer / client needs Sector contribution Role Cab hygiene and environmental issues (Endorsements A & B) Social responsibilities Lifelong skills Reporting structures 	<ul style="list-style-type: none"> Communication with colleagues / management / other trades Health and Safety at Work Act Environmental issues Other trades Working practices
<ul style="list-style-type: none"> Name and explain the purpose of principal components, the basic construction, controls and terminology 	<ul style="list-style-type: none"> Differing Types Functions and applications Power units / drive systems Electrical systems Stability / bases / mountings Counterweights Jibs / trolleys 	<ul style="list-style-type: none"> Hoisting gear / ropes Construction Erection / dismantling process Safety systems Slewing arrangements Attachments Connection methods (structures)
<ul style="list-style-type: none"> Conform with manufacturer's requirements as per the operator's handbook, other types of information source and relevant regulations and legislation 	<ul style="list-style-type: none"> Operator's Manual Duties Charts Machine decals Health and Safety at Work Act PPE Codes of Practice Site plans / drawings Lifting requirements and limitations 	<ul style="list-style-type: none"> Lift plans Method statements Risk assessments / COSHH Inspection and reporting forms / procedures
<ul style="list-style-type: none"> Explain all relevant documentation 	<ul style="list-style-type: none"> Test certificates 	<ul style="list-style-type: none"> Thorough examination certificates
<ul style="list-style-type: none"> Undertake all pre-use checks and place the crane into service 	<ul style="list-style-type: none"> Regular and non-scheduled maintenance procedures Environmental restrictions 	<ul style="list-style-type: none"> Access / egress (to the cab) (Endorsement A & B) Sequence of pre-use checks Defect reporting Personnel exclusion

Syllabus (continued)

Learning outcome	Training content	
<ul style="list-style-type: none"> Follow and carry out procedures that must be taken to access the structure/base for inspection and maintenance purposes 	<ul style="list-style-type: none"> Accessing Harnessing / Security Retrieval 	<ul style="list-style-type: none"> Authority / approval Working at height
<ul style="list-style-type: none"> Configure the crane for lifting duties 	<ul style="list-style-type: none"> Required configuration (lift plan) Lift controls 	<ul style="list-style-type: none"> Environmental conditions Site procedures Hazards
<ul style="list-style-type: none"> Explain reasons for changing the number of falls of rope 	<ul style="list-style-type: none"> Duties Load capacity / line speeds 	<ul style="list-style-type: none"> Limitations Different methods Types
<ul style="list-style-type: none"> Explain actions required for hazards and overhead services 	<ul style="list-style-type: none"> Types of typical services / hazards Warning / identification systems Reporting procedures for damage to services 	<ul style="list-style-type: none"> Minimum distances and clearances Inter-arcing Motion limiters Multiple crane use / crane co-ordination
<ul style="list-style-type: none"> Explain various types of lifting accessories 	<ul style="list-style-type: none"> Lifting equipment (crane) capacity Lifting accessory capacity Required type or types Load weight Lifting accessory weight SWL / WLL 	<ul style="list-style-type: none"> Lift plan Additional accessories Load characteristics – loose, bundled, fluid loads etc. Sling angles De-rating
<ul style="list-style-type: none"> Identify that loads are safe to lift, ensuring load balance, security and integrity 	<ul style="list-style-type: none"> Trial lifts Stability C of G / balance Netting / sheeting 	<ul style="list-style-type: none"> Fluid loads Load surface area Environmental conditions / wind effects
<ul style="list-style-type: none"> Lift various loads using the full radius and slewing capabilities of a crane 	<ul style="list-style-type: none"> Duties charts Lifting accessories and slinging requirements Lift plans Lifting controls Jib deflection Signalling / following instructions Hazards 	<ul style="list-style-type: none"> Stability Trial lifts Load stability / security Visibility Environmental conditions / wind effects Load swings Falls of rope

Syllabus (continued)

Learning outcome	Training content	
<ul style="list-style-type: none"> Accurately place loads 	<ul style="list-style-type: none"> Ground conditions / hazards Visibility Stability Load swings 	<ul style="list-style-type: none"> Signalling / following instructions Out-of-sight lifts Protection of lifting accessories
<ul style="list-style-type: none"> Minimise the swinging of loads 	<ul style="list-style-type: none"> Rope length Techniques Observation / anticipation 	<ul style="list-style-type: none"> Stability Environmental Slew speeds
<ul style="list-style-type: none"> Move loads through machine travel (where applicable) – Endorsements A & B 	<ul style="list-style-type: none"> Duties charts Configuration Stability Route / ground condition Load swing 	<ul style="list-style-type: none"> Load integrity / security Visibility Hazards Regulations / legislation
<ul style="list-style-type: none"> Comply with signals and instructions 	<ul style="list-style-type: none"> Methods and types of signals Methods of verbal instruction Multiple signalling 	<ul style="list-style-type: none"> Electronic communication / setting-up Codes of Practice Radio protocol
<ul style="list-style-type: none"> Maintain safe working situations 	<ul style="list-style-type: none"> Stability Load swings 	<ul style="list-style-type: none"> Load security Hazards
<ul style="list-style-type: none"> Explain how the wind (and other weather conditions) can affect loads being lifted with regards to pedestrian safety on the ground 	<ul style="list-style-type: none"> Load area Effect on radius Wind speeds measuring 	<ul style="list-style-type: none"> Load handling Hazards
<ul style="list-style-type: none"> Carry out out-of-service and securing procedures 	<ul style="list-style-type: none"> Shut down procedures Environmental / excessive winds 	<ul style="list-style-type: none"> Jib positioning / free braking Security

Note: The listed training content should not be considered exhaustive and subjects may be added to reflect the individuals' working environment.

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Safety critical

Emphasis to be placed on the following topics:

Topic	Emphasis
<ul style="list-style-type: none"> Tidiness of the work area/good housekeeping (Endorsement C) 	Ensuring that area of operation is organised and of suitable ground so that slips, trips & falls are minimised, and that materials are suitably and safely stored
<ul style="list-style-type: none"> Remote control operation (Endorsement C) 	Isolating of all operating controls when using a remote unit, when carrying out other functions or during rest periods
<ul style="list-style-type: none"> Lift plans / method statements 	Lift plan types and requirements and the need for lift planning Adherence to the lift plan as constructed by a competent person

Duration / Ratios

To allow effective learning, these training times are recommended for this category. Candidates must be profiled to establish learning needs. Durations should be of a length to ensure the learning outcomes are met.

Experience	Accumulated hours
<ul style="list-style-type: none"> Novice operators with no industry or machine experience 	70 (35)*
<ul style="list-style-type: none"> Novice operators with industry experience but no machine experience 	63 (28*)
<ul style="list-style-type: none"> Operators with unrelated (lifting) machine experience 	42 (21)*
<ul style="list-style-type: none"> Operators with similar (lifting) machine experience 	28 (14)*

All candidates must have received the equivalent to 7 hours of site safety and induction training

To allow effective learning, the listed candidate / machine / instructor ratio is the maximum recommended for this category

4 candidates : 2 machines: 1 instructor (Endorsements A & B)

3 candidates : 1 machine: 1 instructor (Endorsement C)

* Endorsement C

Resources

Practical equipment

- Remote or Cab controlled Tower Crane that meets current legislation
- Operator’s manual for the crane
- Different types of loads
- Lifting accessories
- Sufficient area of ground suitable for placing loads at various heights and radius

PLUS

- Suitable PPE
- Risk assessment for all areas where training is occurring

Theory equipment

- PUWER 1998 Regulations
- LOLER 1998 Regulations
- BS 7121 (parts 1, 2 and 4)
- HSE GS6
- Operator’s Manual

- CPA Tower Crane TIN (Technical Improvement Notes) – downloadable from www.cpa.uk.net

- Specifications for types of remote or cab controlled tower cranes

PLUS

- Suitable room for theory training purposes
- Welfare and rest facilities during training

Category

Category description and types

CPCS defines a category as an item of plant or equipment used within the construction or allied industries and worked in accordance with the manufacturer’s basic design. Although this category can have varying uses within industry, for CPCS training and assessment standards, the descriptions reflect basic core use. Endorsements are sub-categories that reflect the variations for this category by type. This category has three endorsements.

To identify a machine within this category, a typical remote controlled or cab controlled tower crane would normally have the listed features and be used within the described characteristics.

Category features

- Latticed free-standing or secured tower structure (all)
- 360 degree rotating top-slewing latticed upper structure containing the operating position; power units and winches (Endorsements A & B)
- Winch operated lifting metal-stranded hoist rope mounted on pulleys
- Hook block suspended by hoist ropes and pulleys

Category characteristics

- Lift loads by vertically raising the hook block
- Moves and places loads by using a combination of slew and linear motions within the confines of the operating radius, depth and height
- Operated from ground level by remote or pendant control unit (Endorsement C)

Endorsements

Endorsement characteristics

- **Endorsement A:** Trolley jib – Cab Controlled - lattice jib with radius changing ability by moving a trolley running on the jib. The hook block is vertical with the trolley
- **Endorsement B:** Luffing jib – Cab Controlled - jib with radius changing ability by raising or lowering the jib from horizontal. The hook block is vertical with the end of the jib
- **Endorsement C:** Trolley jib - Remote controlled - lattice jib with radius changing ability by moving a trolley running on the jib. The hook block is vertical with the trolley.