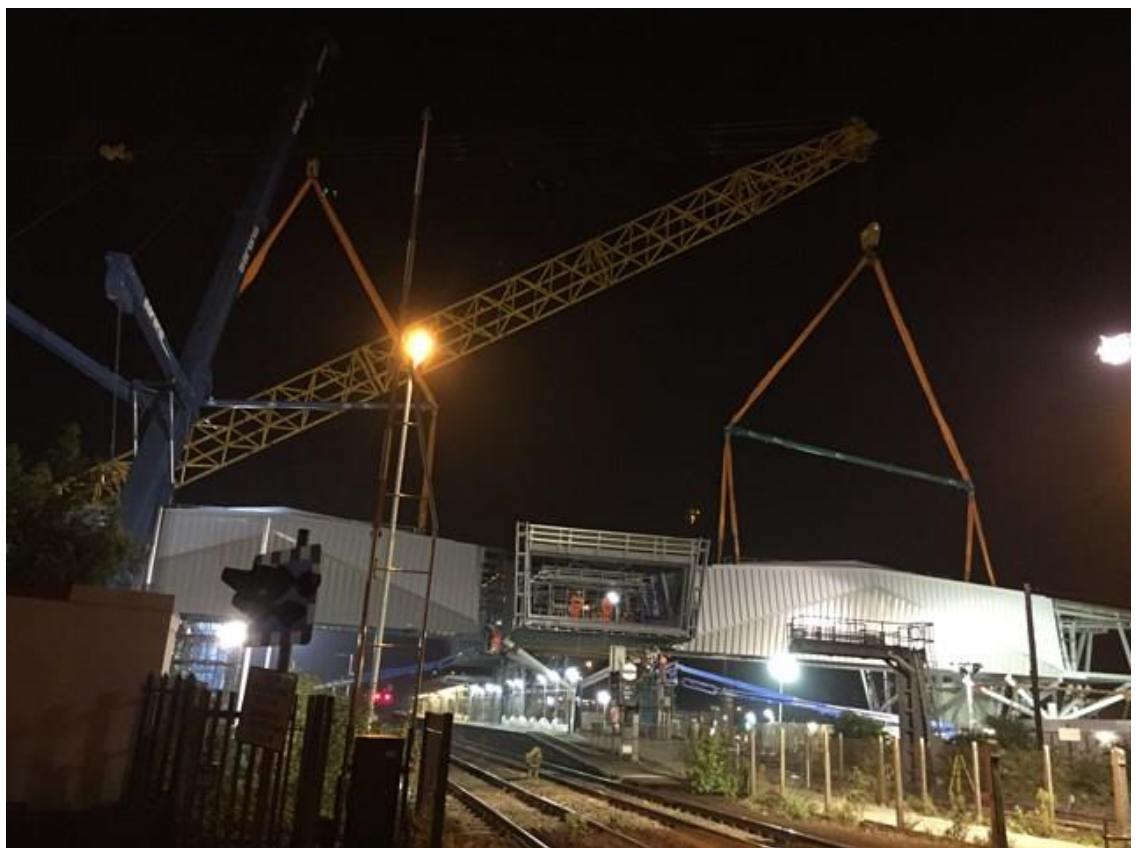


# **Requirements for Mobile Cranes Alongside Railways Controlled by Network Rail**



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## CPA Good Practice Guide



**Working in Partnership**

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## 1.0 Introduction

*Network Rail has for many years had requirements for all mobile cranes operating alongside the railway. This guide brings these requirements together in one document with an explanation of those requirements and how they may be complied with. The guide does not introduce any additional requirements and is aimed at producing an easily accessible document which has been endorsed by Network Rail.*

### 1.1 General

Lifting operations by their very nature involve risk. The starting point for the reduction of risk should always begin with consideration of the need to carry out lifting operations, or whether other, less hazardous, techniques can be used.

It is essential that the person requiring lifting operation(s) to be undertaken ensures that these are effectively planned. This will be undertaken by the appointed person (see BS 7121-3) in consultation with the Principal Designer on construction projects.

Mobile cranes and other mobile lifting equipment may present a risk to railways during rigging, use, maintenance and de-rigging. Both Network Rail and crane users have a duty to ensure the safety of the railway. If the crane or its load falls onto the track, a catastrophic accident may well result that could include multiple fatalities. **It is therefore essential that best practice is followed to eliminate or reduce this risk to as low as reasonably practicable.** In doing so, the crane user will be able to demonstrate to Network Rail and other regulators that adequate measures have been put in place. The requirements specified in this document should be adhered to when mobile cranes are rigged and used alongside Network Rail assets. Early consultation with Network Rail will ensure that any issues are identified and addressed well before any lifting operation starts.

**NOTE:** Annex E of BS 7121-1:2016 gives additional recommendations for operation of cranes on or adjacent to sites of exceptional hazards which include railways.

This guidance covers temporarily installed non-rail mounted lifting equipment including wheeled mobile cranes, lorry loader cranes, crawler mobile cranes, mini/compact cranes, chassis mounted mobile self-erecting tower cranes, and both telehandlers and excavators used for lifting suspended loads. In this document, the term *mobile crane* will include all these types of lifting equipment.

The guidance does not cover top slewing and self-erecting tower cranes, gantry cranes, piling rigs or rail mounted cranes, nor road/rail units where they are on rail.

**NOTE:** Tower cranes are covered by the CPA guidance document "Requirements for Tower Cranes Alongside Railways Controlled by Network Rail" (free download from [www.cpa.uk.net](http://www.cpa.uk.net))

**NOTE:** The use of rail mounted lifting equipment is covered by "RIS-1700-PLT Rail Industry Standard for Safe Use of Plant for Infrastructure Work" (free download from <http://www.rssb.co.uk/railway-group-standards>)

### 1.2 Liaison With Network Rail

Network Rail should be consulted by the crane user in all circumstances where the compound collapse radius of the mobile crane and its load is within 4m of a railway asset or property boundary. In these circumstances the following hierarchy of measures (see 3.0) should be observed. As part of the consultation, Network Rail asset protection staff will need to see the lift plan for the proposed lifting operation(s).

If the compound collapse radius is greater than 4 metres (m) from the railway asset or property boundary, the lift plan demonstrating that this is the case should be sent to Network Rail, who may require further details to be submitted.

Where it is necessary to carry out lifting operations over or adjacent to a live railway, Network Rail infrastructure or railway public areas, a line block or isolation may be required, and Network Rail should be consulted at the earliest stage of planning. There will be a considerable lead time for a line block and, if needed, isolation.

**NOTE:** *The crane user may either be the person hiring in a crane from a supplier or a person using a crane which they own.*

**NOTE:** *Network Rail asset protection contact details can be found at <http://www.networkrail.co.uk/National-asset-protection-contacts.pdf>*

## 2.0 Definitions

### ***compound collapse radius (CCR)***

the crane collapse radius plus the load collapse radius (see **Figure 10**)

### ***crane collapse radius (CR)***

the diagonal dimension from the centre of slew at ground level to the end of the jib, (see **Figures 2, 3, 4, 5, 6, 7 & 8**)

### ***foundation***

load bearing structure designed and constructed to be in direct contact with the ground and transferring loads from the crane outriggers or tracks to the ground

### ***isolation***

planned and documented switch-off of railway traction electrical power supply from overhead power lines or third rail

### ***lift plan***

information provided to the person supervising the lifting operation to enable them to complete the operation safely

**NOTE:** *This normally consists of at least the risk assessment, method statement and any relevant drawings.*

### ***line block***

where the rail track is closed to rail traffic (except engineering trains in some cases)

**NOTE:** *This may be achieved by either a line block or between trains working.*

### ***load collapse radius***

the longest dimension of the load (see **Figure 9**)

### ***loader crane***

powered crane comprising a column which slews about a base, and a boom system which is attached onto the top of the column

### ***lorry loader***

commercial vehicle or trailer, fitted with a loader crane, which normally has a load-carrying capability

### ***method statement***

document produced by the appointed person to describe how the lifting operation is to be carried out

### ***Network Rail asset or property boundary***

the boundary of plant, machinery, property, buildings, vehicles and other assets owned or used by Network Rail

### ***vehicle exclusion zone***

zone around the crane from which vehicles are excluded to minimise the risk of collision

## 3.0 Hierarchy of Risk Elimination and Reduction

When planning the installation of a mobile crane alongside a Network Rail boundary, the hierarchy of measures in 3.1 to 3.3 should be observed (see Section 9, Figure 1).

### 3.1 Level 1 - Elimination of Risk by Position

The crane is positioned so that if it does fail, the compound collapse radius in any direction is at least 4m from a Network Rail boundary.

Collapse could be due to causes such as structural failure, tipping through excessive overturning moment and tipping due to ground collapse.

The Compound Collapse Radius "CCR" (see Section 9, Figure 10) is defined as the maximum extent of a collapse as follows:

- The Crane Collapse Radius "CR" - The diagonal dimension from the centre of slew to the end of the jib, (see Section 9, Figures 2, 3, 4, 5, 6, 7 & 8);

*plus*

- The Load Collapse Radius "L" - The longest dimension of the load (see Section 9, Figure 9).

*NOTE: If the load is slung horizontally about the mid-point, "L" may be halved.*

### 3.2 Level 2 - Reduction of the Risk of Collapse by De-rating and Slew Limiting

If the crane cannot be positioned as specified in 3.1, Network Rail Asset Protection may consider allowing the mobile crane to be positioned and rigged if all lifts are planned to ensure that the crane lifts no more than 75% of the manufacturer's specified rated capacity for the crane configuration chosen.

In this case, up-rating of the crane's outrigger/track loads will also be required (see 4.5)

In addition, the edge of the CCR shall be prevented from encroaching a line 4 metres (m) from the Network Rail boundary by the use of slew limiters (see 4.3).

*NOTE: When line blocks and isolation are in place or possible collapse is on to non-operational land, de-rating may not be required by Network Rail.*

### 3.3 Level 3 - Reducing the Consequences of Collapse by Line Blocking

Network Rail may be prepared to consider a line block to prevent trains running during times when there is a risk of the crane and or load falling on Network Rail assets (see 4.4).

## 4.0 Detailed Requirements

### 4.1 General

Ideally, mobile crane operations, positioning etc. should be configured to eliminate any risk to Network Rail infrastructure; operations etc (see 3.1).

Should however, such operation, positioning etc. prove to be impossible and there is a risk that a crane collapse could potentially affect Network Rail infrastructure, operations etc. additional measures should be put in place. Where the crane jib does not oversail Network Rail infrastructure, risk reduction by down-rating the crane, up-rating the loads imposed on the ground etc. should be implemented (see 3.2 and 4.5).

The oversailing of Network Rail infrastructure by mobile cranes and their loads should not be undertaken unless it is unavoidable due to the inherent risks to Network Rail operations, personnel, the travelling public etc. Any proposed oversailing will be subject to strict site control measures which should be approved by Network Rail. This will always require a line block and, if necessary, isolation (see 3.3).

### 4.2 Elimination of Oversailing

Unless specific permission is given by Network Rail, no part of the crane and/or any part of the load shall over-sail the railway asset or property boundary under any circumstances.

### 4.3 Slew and radius restriction - Level 2

Where an operating area restriction is required, the lift plan should identify the required areas of restriction. These should be followed by the crane operator, under the instruction of the Slinger Signaller and supplemented by an appropriate restriction system.

Once the crane has been positioned on the site, restrictors should be set to prevent any part of the crane and/or the load being lifted encroaching within 4m of the Network Rail boundary (see Section 9, Figure 10). Restriction should be achieved with a limiter, linked to the crane's control system which should be set at the minimum arc required to enable the lift to be carried out safely, in order to maximise the distance from the 4m position.

**NOTE:** Following discussion with Network Rail, it may be possible in certain circumstances to use physical stops.

Special care should be taken when using crawler cranes as any movement of the crane undercarriage, such as turning or travelling, will invalidate the settings of the limiter.

The limiter should be checked and the result recorded in writing before the start of each shift.

The lift plan should include a drawing of the site with the Network Rail boundary, showing the crane position with the extent and position of the pre-warning and exclusions zones.

### 4.4 Where Oversailing is unavoidable - Level 3

The oversailing of the Network Rail boundary by mobile cranes and their loads should not be undertaken unless it is unavoidable, due to the inherent risks to Network Rail operations, personnel, the travelling public etc. Any proposed oversailing will be subject to strict site control measures which should be approved by Network Rail. This will always require a line block. In addition, an isolation will be required on electrified sections of the railway. Line blocks and isolation will be arranged through Network Rail and require considerable advance notice (frequently in excess of 12 months).

### 4.5 Outrigger/track loads

The maximum outrigger/track loads for a crane in the configuration in which it is rigged for the lifting operation, or during rigging/de-rigging, should either be obtained from the crane supplier/manufacturer or by using calculation software approved by the crane manufacturer. All the loading conditions for the given configuration should be considered (e.g. laden with the maximum load to be lifted, unladen with actual required counterweight and during



rigging, all over the full 360° arc of slew). These loads should be multiplied by a factor of 1.33 to increase the level of safety of the foundation absorbing these loads.

**NOTE:** *Maximum outrigger loads may occur when the crane is unladen at minimum radius or during rigging.*

#### **4.6 Outrigger foundation design**

The appointed person should, in consultation with the person in charge of the site, verify that the ground has sufficient bearing capacity to take the factored loads from 4.5 and agree on the spreader pads or other measures to be taken to transfer the loads into the ground.

Unless otherwise agreed by Network Rail, foundations should be subject to design submission in accordance with the requirements of Network Rail Civil Engineering Assurance standard NR/L3/CIV/003, including the presentation of F002 *Design Intent* and F003 *Certificate of Design and Check*. Design submissions are to be submitted well in advance of the proposed installation date.

**NOTE:** *Each outrigger foundation should be designed using the largest outrigger load for any of the crane's outriggers. This load should be increased by the factor specified in 4.5.*

**NOTE:** *The design check for mobile cranes alongside Network Rail lines should be to Category 3 of Table 1 in BS 5975.*

**NOTE:** *Details of ground assessment, together with methods of ground improvement and imposed load reduction, are given in the Strategic Forum for Construction Good Practice Guide on Ground Conditions for Construction Plant (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).*

#### **4.7 Site Checks for Foundations**

Before the mobile crane is rigged, checks should be completed on foundations to confirm that they have been installed or constructed as designed. The recognised industry form *Mobile Crane Base/Foundation Pre-rigging Inspection Report* (see **Annex B**) should be completed and a copy given to Network Rail.

**NOTE:** *A Network Rail F005 (Certificate of Fitness to be Taken into Use) may also be used instead of the form in Annex B.*

#### **4.8 Periodic Check of Foundations**

Where the crane is to be in one location for a long period, foundations should be checked at least weekly, after foundation modifications and in periods of bad weather. The check should be recorded.

#### **4.9 Design of Bespoke Lift Accessories and Load Attachment Points**

Where the crane user is intending to use bespoke (non-standard) lifting accessories and load attachment points, the design of these should be submitted to Network Rail when requested.

#### **4.10 Planning for De-rigging**

As part of the lift planning process, the de-rigging operation should be evaluated, at least in outline, to ensure that changes to the site between rigging and de-rigging do not impede the de-rigging operation; for example - building on the area required to stand the assisting mobile crane on for de-rigging.

If a line block and/or isolation is needed for the de-rigging operation, the lead time for these will be considerable.

#### **4.11 Crane Collision Protection**

Where there is a risk of impact from vehicles and mobile equipment travelling on site, the Traffic Management Plan should provide a vehicle exclusion zone ensuring that traffic is routed away from the mobile crane. If this is not achievable, an adequate vehicle containment barrier should be provided.

#### **4.12 Mobile Cranes in the Vicinity of Aerodromes: Notification and En-route Obstacle Lighting**

Mobile cranes which are to be erected in the vicinity of aerodromes require notification to the aerodrome manager and may be required to be fitted with aviation warning lighting. In addition to any aerodrome-related requirement, any structure (temporary or otherwise and regardless of location) of a height of 90m (300ft) or more needs to be notified for aviation purposes.

Where aviation warning lights are fitted, Network Rail should be consulted to avoid dazzling or giving false signals to train drivers.

**NOTE:** Further detailed requirements are given in:

- *Technical Information Note TIN 039 - Operating Tower Cranes in the Vicinity of Aerodromes, Notification and En-route Obstacle Lighting, Construction Plant Hire Association (free download from [www.cpa.uk.net](http://www.cpa.uk.net))*
- *Civil Aviation Authority CAP 1096 Guidance to crane operators on aviation lighting and notification (free download from [www.caa.co.uk](http://www.caa.co.uk)).*

#### **4.13 Anemometers**

All cranes working alongside the railway should be provided with an anemometer fitted at the jib head.

#### **4.14 Assisting Crane Requirements**

Wheeled mobile cranes are commonly used to assist with the rigging of large mobile cranes. The requirements of this document apply equally to them.

**NOTE:** Details of the assisting crane should be included in the submission to Network Rail.

#### **4.15 Submission to Network Rail**

Well in advance of the lift taking place, the lift plan (see 6.1) and the foundation design (see 4.6) should be submitted to Network Rail for review and approval.

**NOTE:** Network Rail may wish to be in attendance during the lift.

## 5.0 Positioning, Rigging, Alteration and De-rigging

### 5.1 Correct Crane Configuration and Position

It is essential that the crane supervisor ensures that the crane specified in the lift plan is both delivered to site and positioned correctly. Any deviation from the specified crane may well invalidate the planning and increase the risk to the railway assets. Any changes to the lift plan should be approved by the appointed person.

**NOTE:** *It is beneficial for the planning process to include alternative cranes to allow for non-availability of a given crane.*

### 5.2 Rigging, Alteration and De-rigging

The rigging of mobile cranes should be planned and carried out by competent and authorised personnel. A risk assessment should be carried out for each rigging operation in a new location and a job specific method statement prepared, including the measures to be taken against falls from height. The method statement should address potential problems, such as equipment failure and rising wind speed, specifying appropriate contingency measures. All members of the rigging team should be briefed on the method to be used and confirm that they are aware of their specific duties and have adequate information to undertake their tasks effectively. The rigging operation will be controlled by the rigging supervisor who should have the authority to suspend operations at any time that he/she judges that it would be unsafe to continue.

The de-rigging of mobile cranes is not just the reversal of the rigging process. Before de-rigging is carried out, a risk assessment should be undertaken to identify any changes to the site or the surrounding area which may impinge on the operation. These may include adjacent structures, access for transport and assisting mobile cranes, and mobile crane set up areas.

The method statement for rigging, alteration and de-rigging should consider the risk to railway assets from the process, including the use of assisting mobile cranes. It should also include consideration of the route from the site entrance to the set-up position and also the set-up position(s) to the site exit (which may not be the same).

Network Rail should be notified in advance of the date and time of any rigging, alteration or de-rigging operations.

Further information on the rigging and de-rigging of mobile cranes is given in:

- BS 7121-3:2017, *Code of practice for safe use of cranes – Part 3: Mobile cranes.*

## 6.0 Lift Plan

### 6.1 General

The use of mobile cranes alongside railways requires particular care to ensure that neither the crane, nor the load it is lifting or moving, will overturn, fall or collapse. This is best accomplished by strict adherence to the planning, supervision and use requirements of BS 7121-1 and BS 7121-3 and in particular, the assessment of the complexity of the load, lifting operation and the environment in which it is being carried out.

The lift plan should include the following items:

- Any lift adjacent to railway assets should be supervised by a Crane Supervisor and measures put in place for adequate briefing of that person;  
*NOTE: BS 7121-1:2016 requires a crane supervisor for all lifts. It is however possible to combine roles, depending on the complexity of the lift.*
- The need for hold points in the lift plan to ensure that certain actions are confirmed before the lift proceeds e.g. confirmation that a line block and/or isolation is in place;
- Location, date, starting time and expected duration of rigging, lifting and de-rigging operations;
- Any night time working should consider lighting and the effects of shadows, cut-off and dazzle;
- Communications during night time working should always be through the use of radios;
- Assessment of the loads to be lifted, including position of centre of gravity, lifting accessory attachment points, lifting accessories (type and configuration), and competence of the Slinger/Signaller;
- A dimensioned drawing showing the crane load pick up and set down points, the direction of slew and any no-slew area.
- Mobile crane foundation arrangements including any spreader pads or crane mats (size and type)
- The requirement to obtain site specific weather forecasts and monitoring of wind speeds;
- Specification of the limiting wind speeds for rigging and operation of the crane;
- Ensuring that the forecast wind speed for long duration lifting operations is taken into account before starting the lift;
- Taking account of additional wind loads on loads with a large wind area;  
*NOTE: Additional information is given in Technical Information Note TIN 101 *The Effect of Wind on Mobile Cranes In-service*, Construction Plant Hire Association (free download from [www.cpa.uk.net](http://www.cpa.uk.net)) and *Influence of wind on crane operation*, Liebherr-Werk Ehingen GmbH (free download from [http://www.liebherr.com/AT/en-GB/default\\_at.wfw/measure-metric/tab-94354](http://www.liebherr.com/AT/en-GB/default_at.wfw/measure-metric/tab-94354)).*
- Consideration of the possibility of lightning strikes.  
*NOTE: Guidance on protection against lightning is given in BS EN 62305-1:2011, *Protection against lightning, General principles*.*
- Any crane or load that is at risk of touching, or coming within 2.75m of live o/h power equipment should be bonded to a 'suitable earth' (earth requirement not to be unnecessarily restricted to railway network earth). To be agreed with the Network Rail E&P Engineer.  
*NOTE: This earthing point may, with the agreement of Network Rail, be used to provide lightning protection.*

- Any requirement for the lifting of persons by the mobile crane in exceptional circumstances;
- Ensuring the crane is fitted with a sufficient length of hoist rope where lifting below ground level e.g. shaft work;  
*NOTE: If additional hoist rope is fitted to the crane to reach below ground level, further de-rating of the rated capacity may be required to take account of the additional weight of the hoist rope suspended from the jib.*
- A schedule of lifts showing the percentage of manufacturer's original rated capacity required for each lift;  
*NOTE: This should not exceed 75% for Level 2.*
- A requirement that no loads or lifting accessories are left on the hook when the crane is out-of-service;
- Requirements for leaving the crane out-of-service, including the limiting wind speed before which the crane superstructure should be lowered;
- The route for the crane to and from the set-up position on site;
- Arrangements for establishing and maintaining an exclusion zone around the crane;
- The need for aircraft warning lights (if required);
- Additional down rating for tandem or multiple lifts in accordance with BS 7121-1 and BS 7121-3.  
*NOTE: If the lift is a Level 2 lift, this down rating will be additional to the derating to 75% specified in 3.2.*
- Where there is a risk of overrun of the work, Network Rail may require a line block overrun contingency plan showing break points in the work to be submitted in advance for Network Rail agreement;
- Any requirement by Network Rail for their personnel to be in attendance during the lift.

## **6.2 Lift plan retention on site**

A copy of the lift plan prepared by the appointed person shall be retained on site.

Detailed guidance is given in:

- BS 7121-1:2016, *Code of practice for safe use of cranes – Part 1: General.*
- BS 7121-3:2017, *Code of practice for safe use of cranes – Part 3: Mobile Cranes.*

## 7.0 Maintenance, Inspection and Thorough Examination

### 7.1 General

The effective maintenance of mobile cranes is vital in ensuring that cranes remain safe and free from defects whilst on site. Maintenance activities include inspection, preventive maintenance and repair of breakdowns. For cranes scheduled to be on site for extended periods, adequate time should be allowed in the construction programme to ensure that these activities can be carried out as and when required.

Thorough examination is a separate activity from maintenance, but again sufficient time should be allowed for thorough examination to be carried out periodically at intervals not exceeding six months and after the occurrence of exceptional circumstances.

**NOTE:** This is a Network Rail requirement which exceeds the maximum periodic thorough examination interval specified in Regulation 9 of LOLER.

It is essential that both maintenance and thorough examination are carried out by competent and authorised personnel who are familiar with the make and model of mobile crane and have adequate information to undertake their tasks effectively. It is essential that thorough examination is undertaken by a competent person who is sufficiently independent from the rigging and maintenance activities.

### 7.2 Records

Records of thorough examination, supplementary testing and maintenance should be held on site.

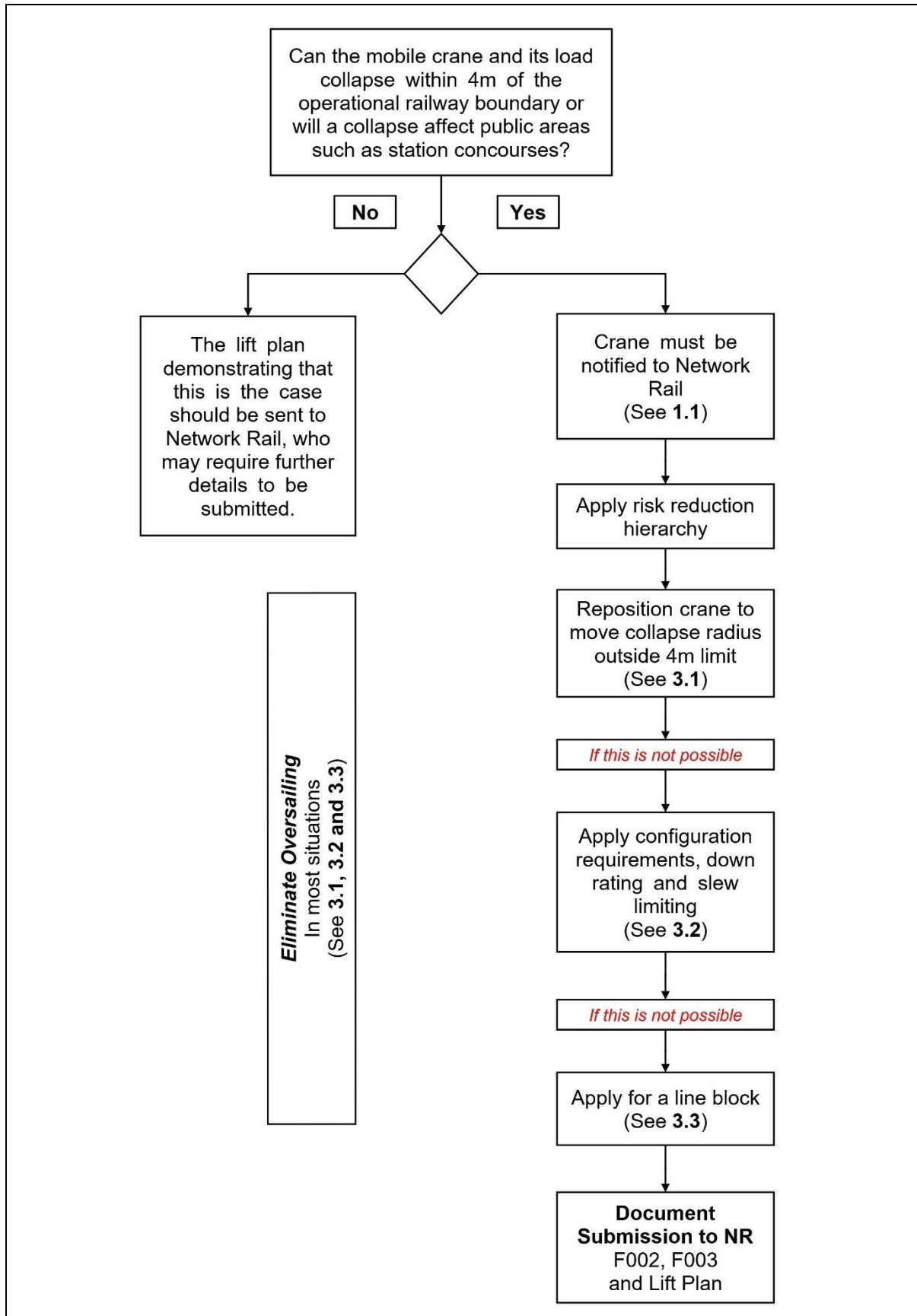
Detailed guidance on both maintenance and through examination is given in:

- *Best Practice Guide on the Maintenance, Inspection and Thorough Examination of Mobile Cranes*, Construction Plant-hire Association, (free download from [www.cpa.uk.net](http://www.cpa.uk.net))
- BS 7121-2-1:2012, *Code of practice for the safe use of cranes, Part 2-1: Inspection, maintenance and thorough examination – General*
- BS 7121-2-3:2012, *Code of practice for the safe use of cranes, Part 2-3: Inspection, maintenance and thorough examination – Mobile cranes.*

## 8.0 Records

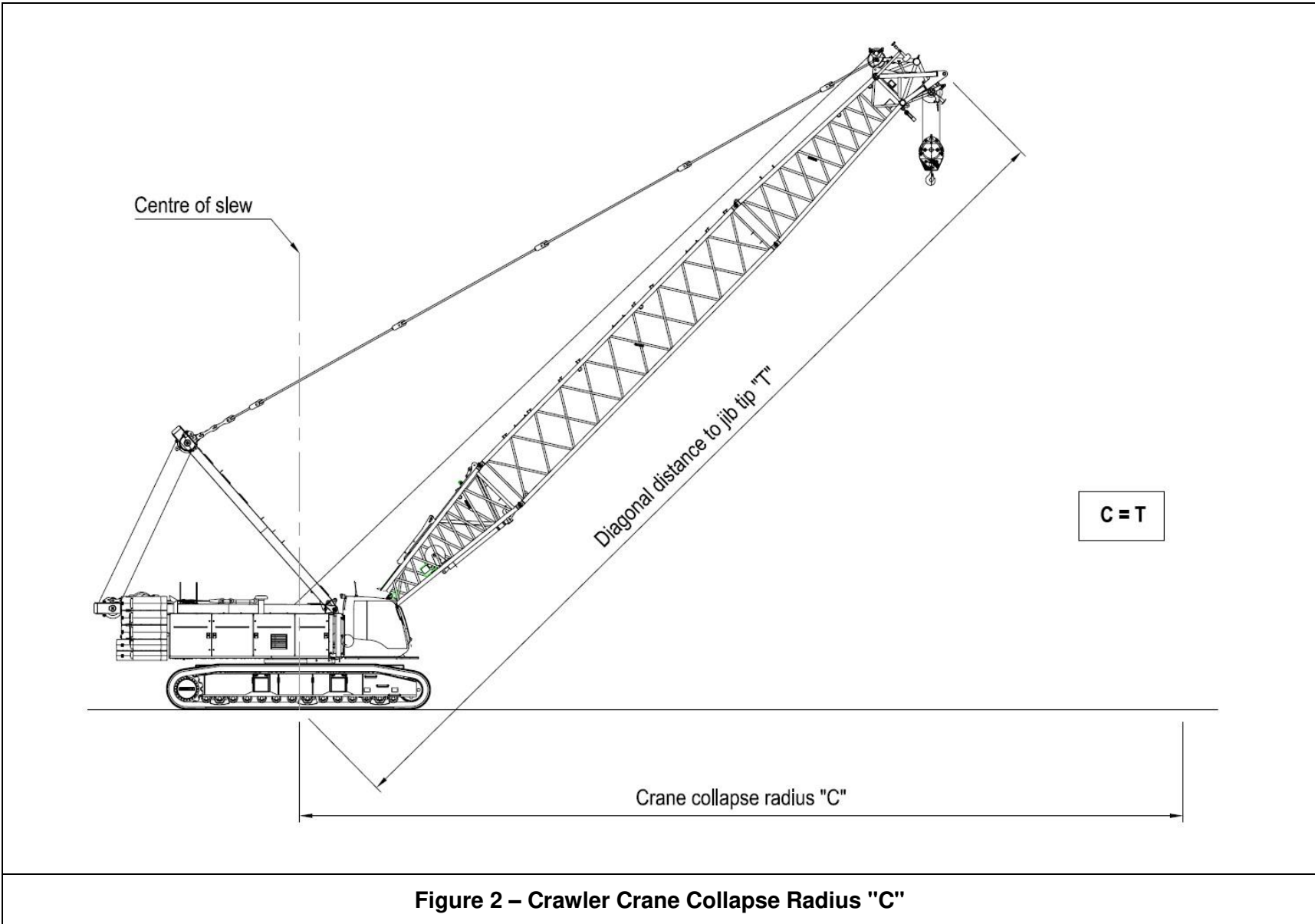
It is essential that the records listed in **Annex A** are available on site for inspection by Network Rail.

## 9.0 Figures

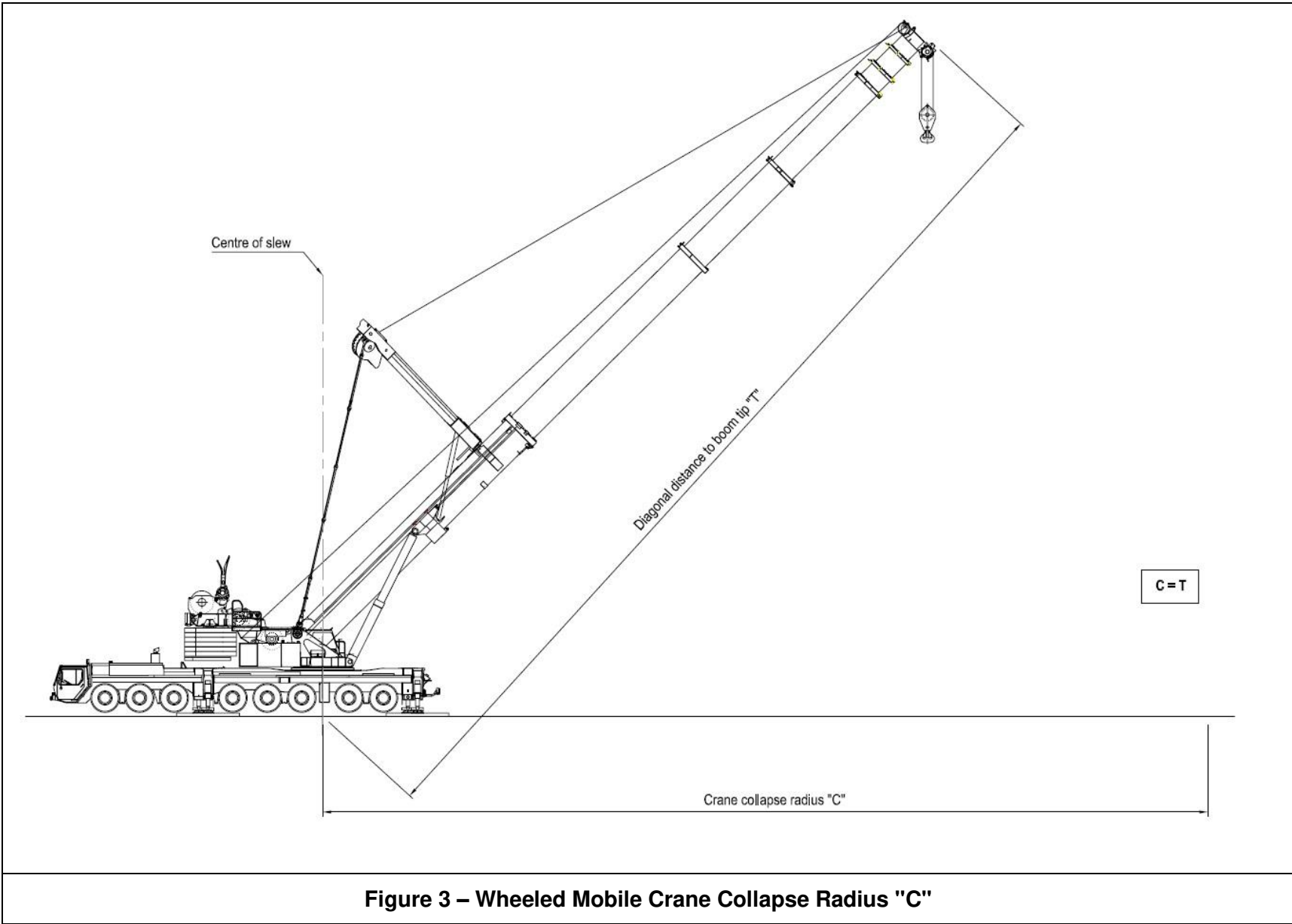


**Figure 1 - Initial Hierarchy of Risk Elimination and Reduction**

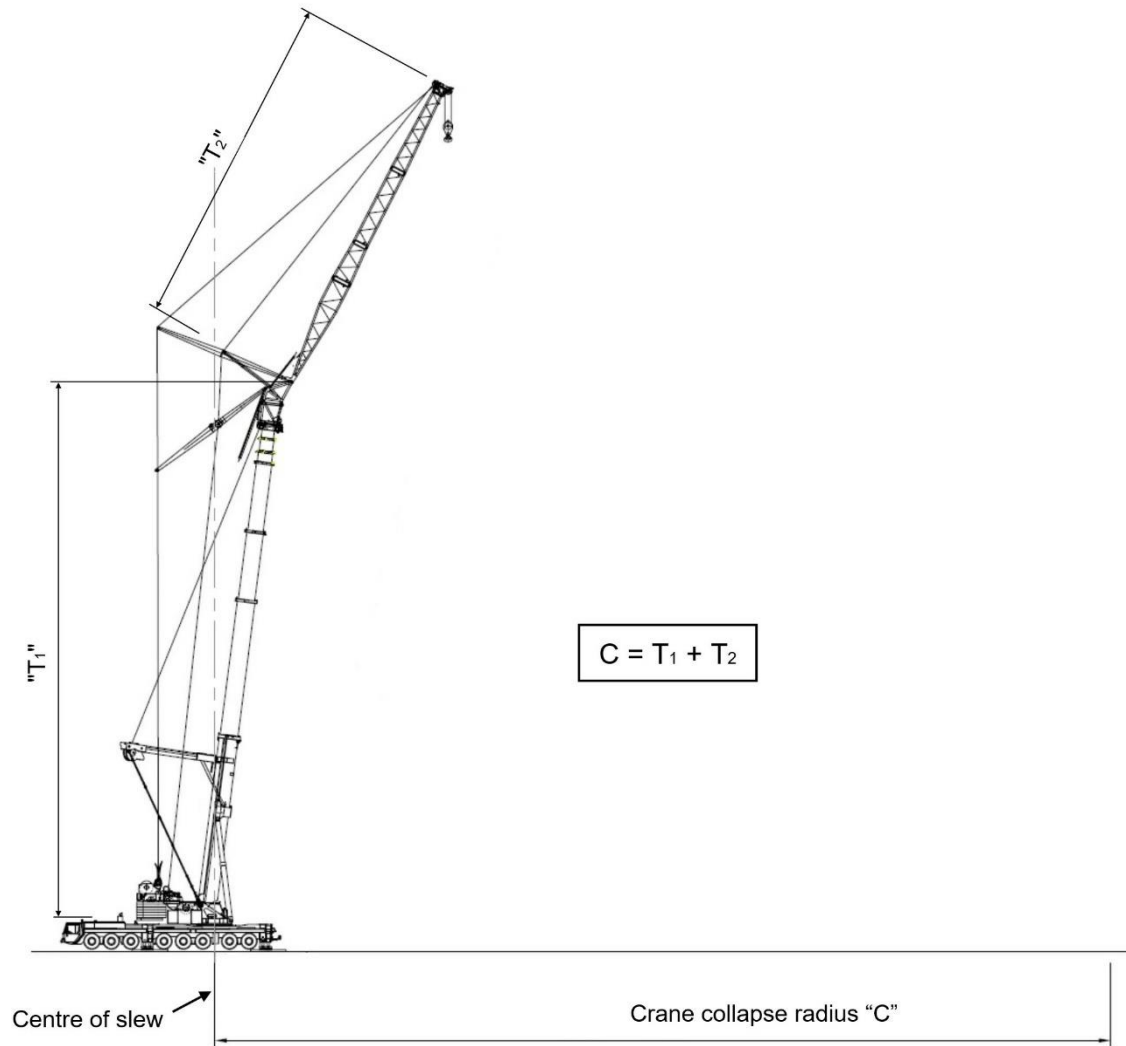




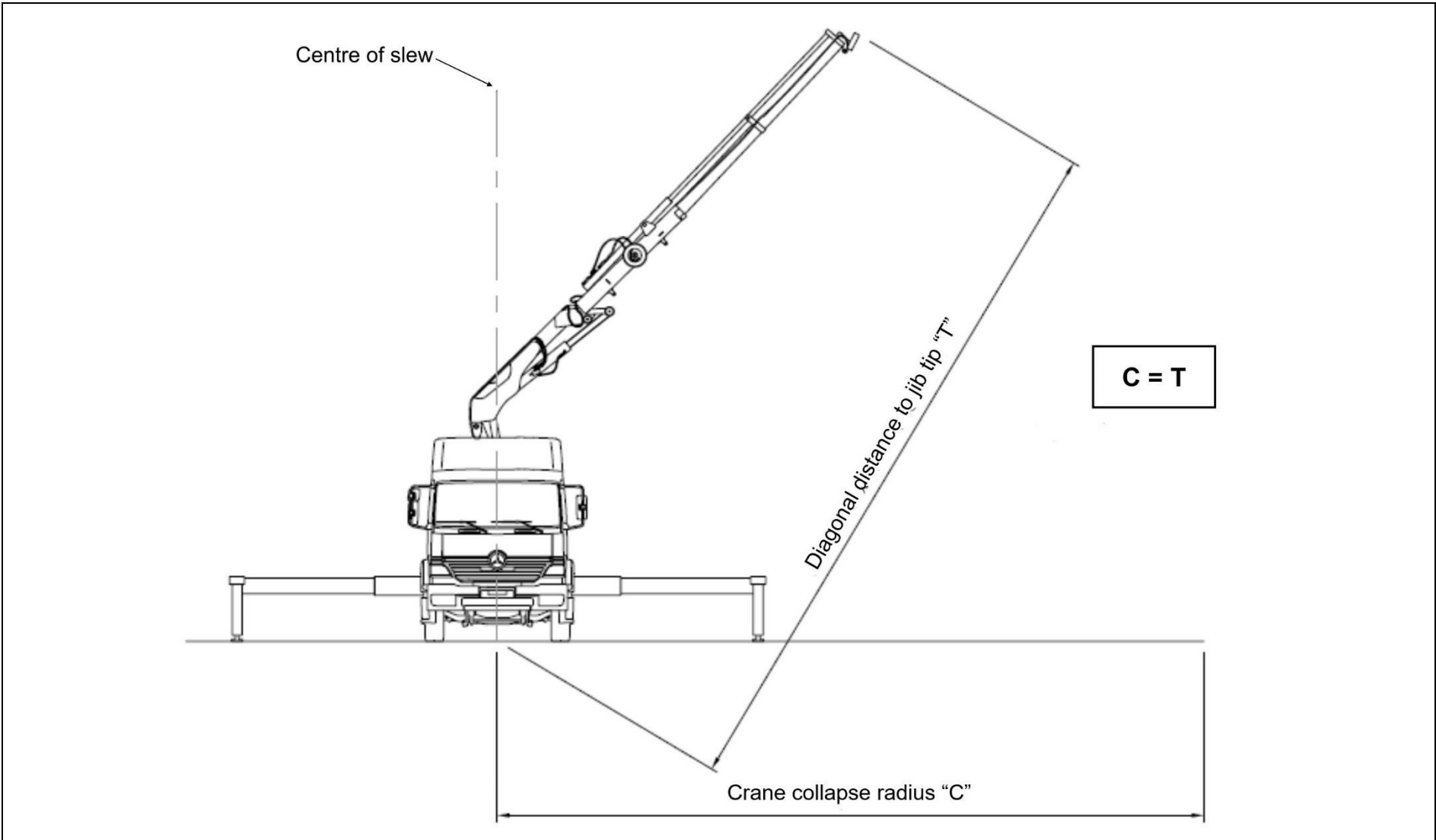
**Figure 2 – Crawler Crane Collapse Radius "C"**



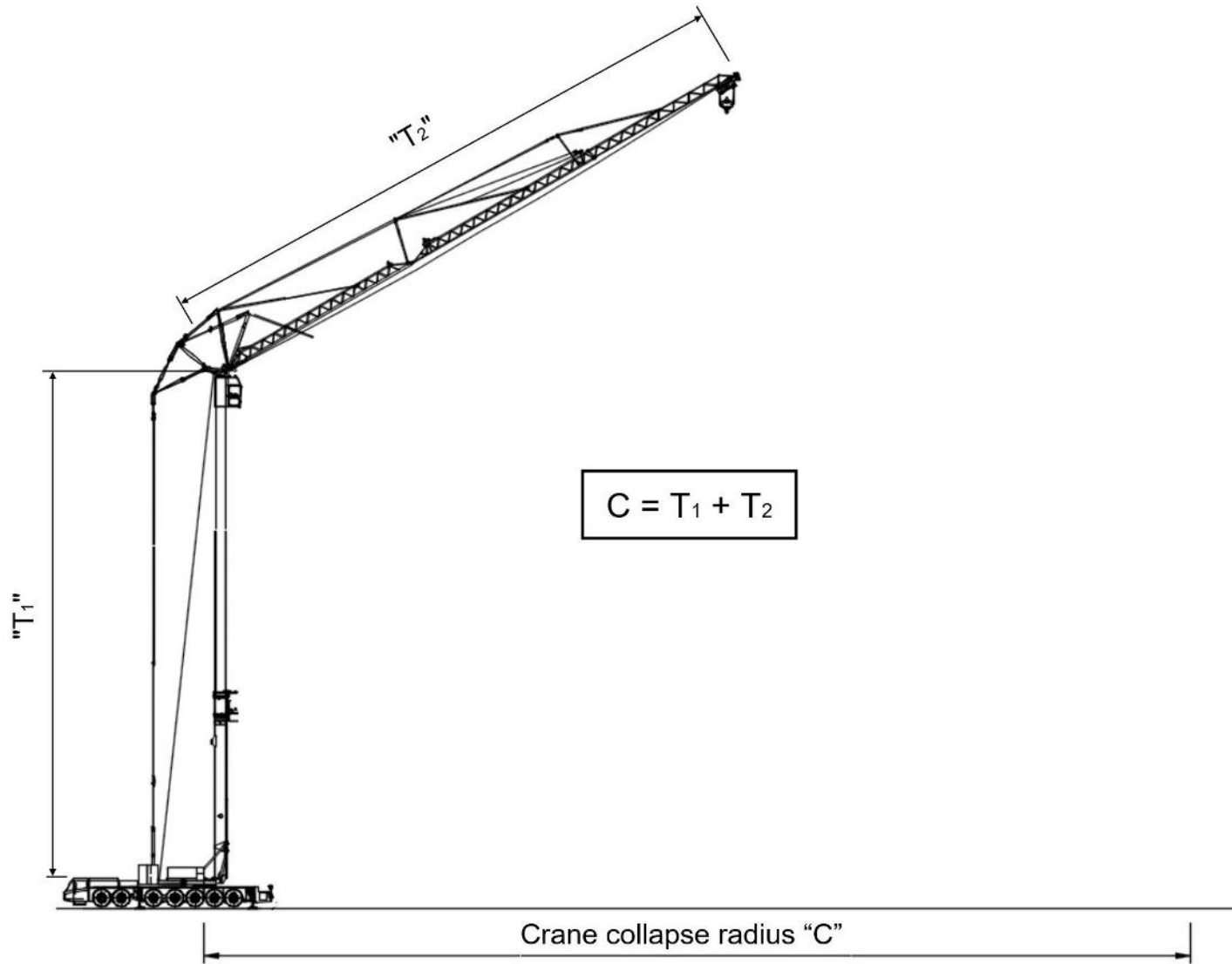
**Figure 3 – Wheeled Mobile Crane Collapse Radius "C"**



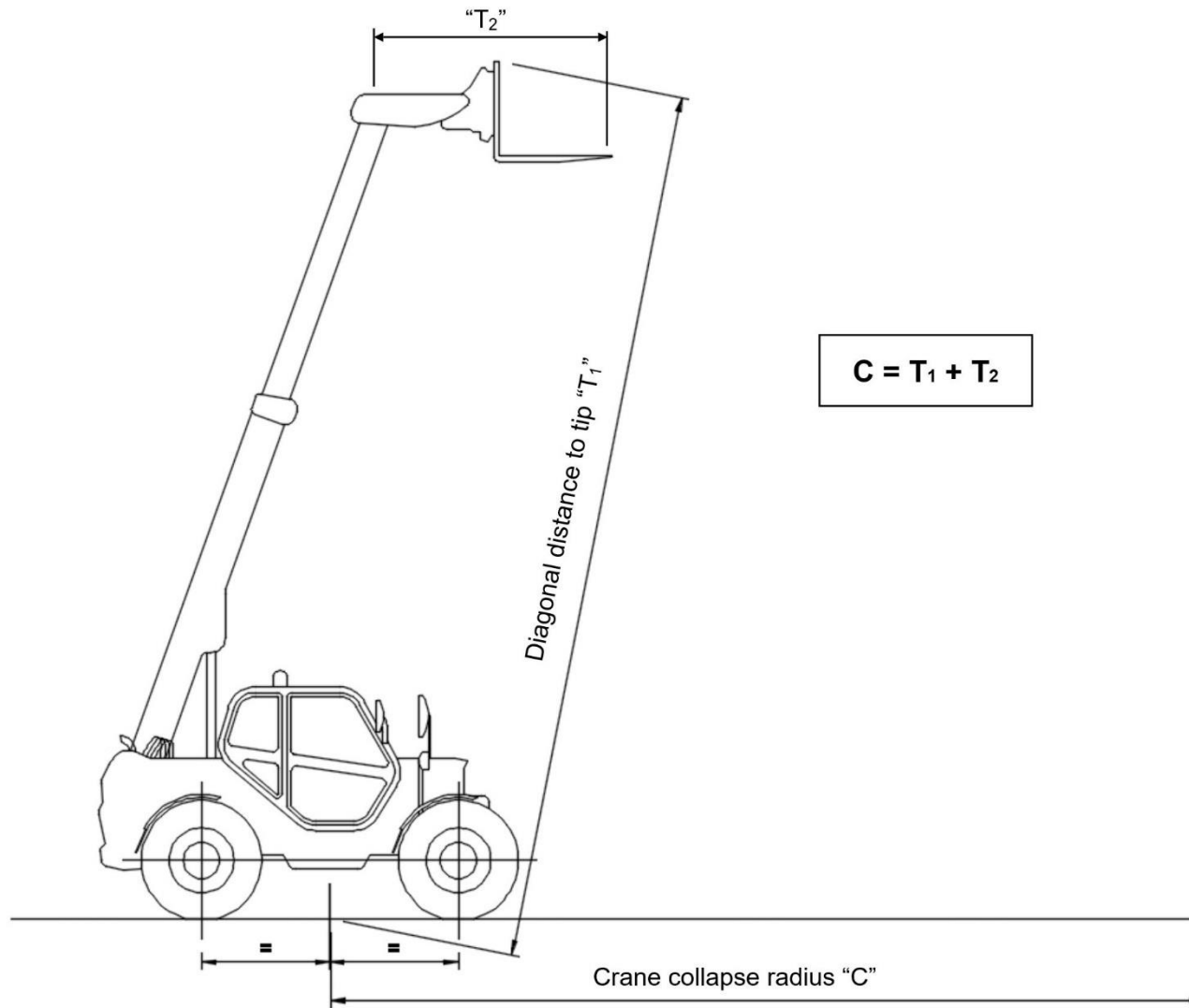
**Figure 4 – Wheeled Mobile Crane (luffing rig) Collapse Radius "C"**



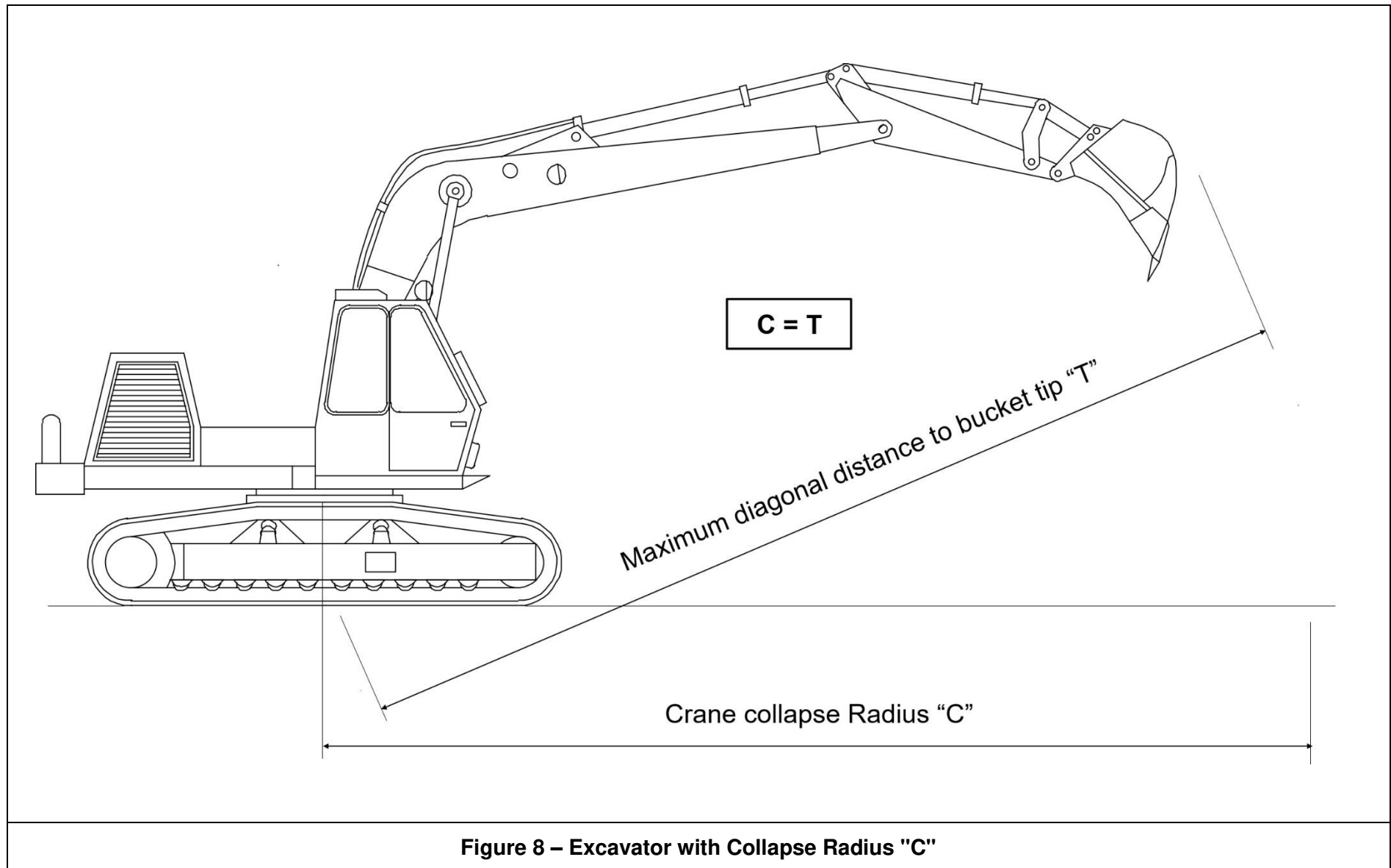
**Figure 5 – Lorry Loader Collapse Radius "C"**



**Figure 6 – Mobile Tower Crane Collapse Radius "C"**



**Figure 7 – Telehandler Collapse Radius "C"**



**Figure 8 – Excavator with Collapse Radius "C"**

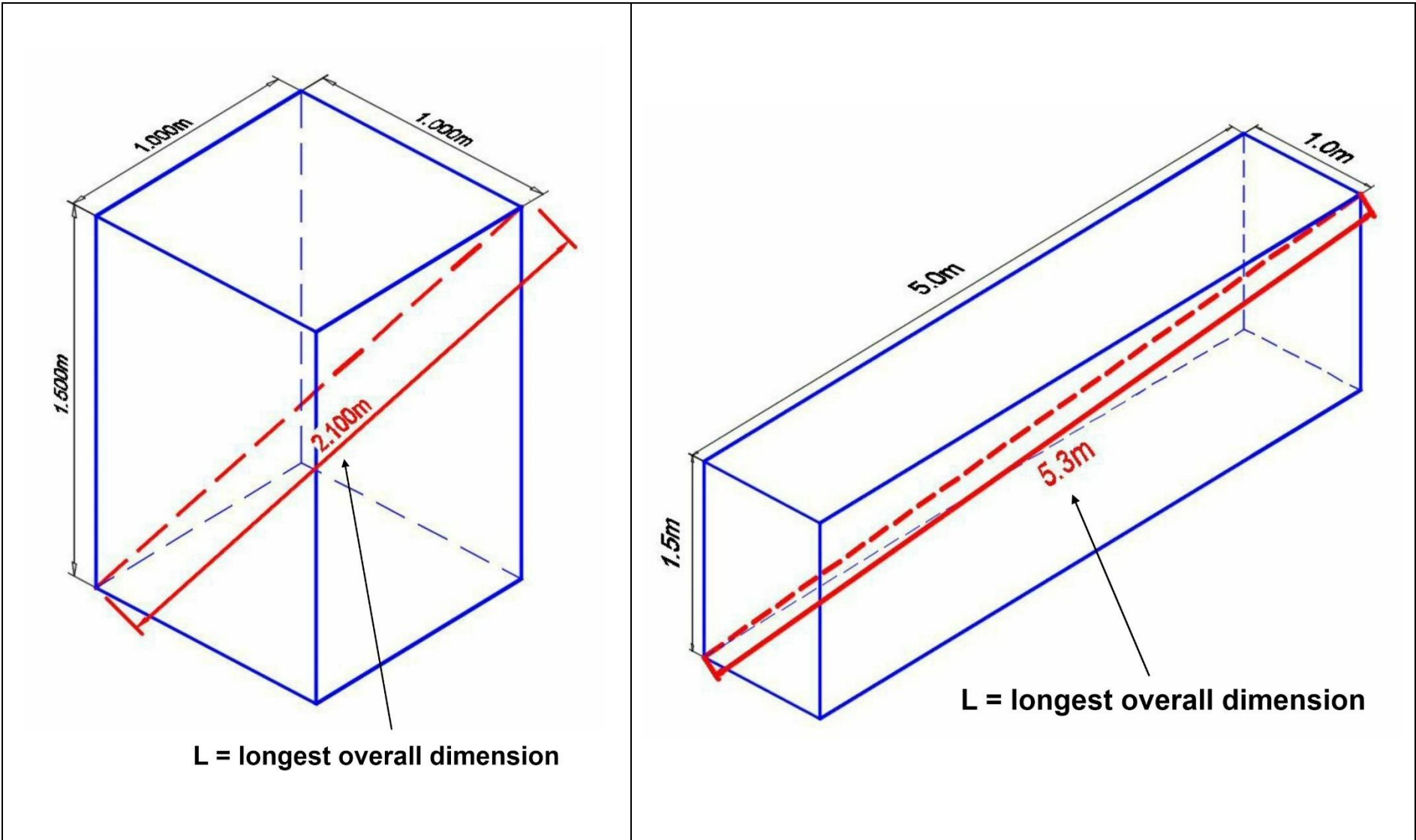
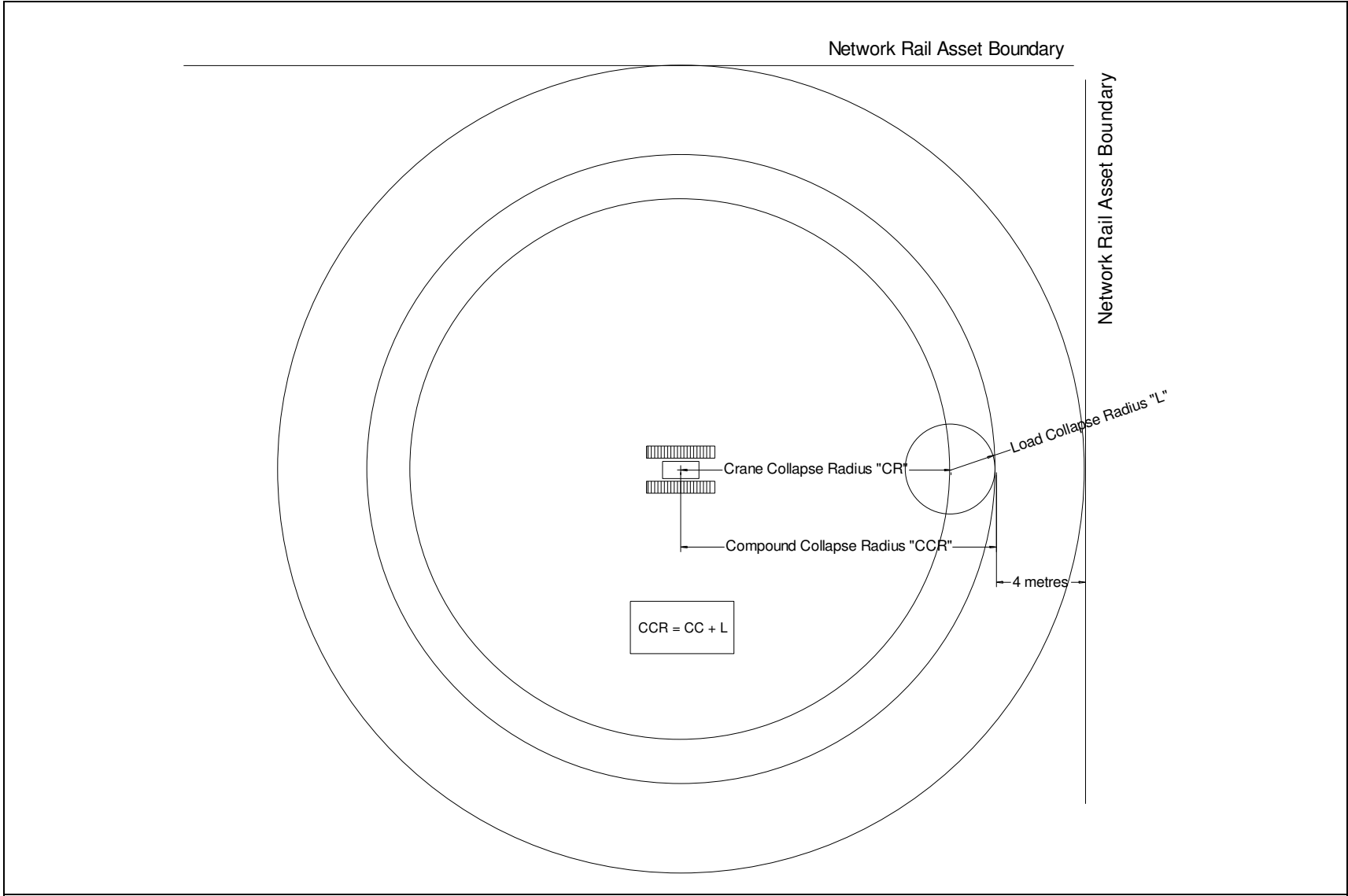


Figure 9- Examples of Load Collapse Radius "L" (longest overall dimension)





**Figure 10 - Compound Collapse Radius "CCR"**

## **Annex A – Documents to be held on site for Network Rail inspection**

- Approved Network Rail F002/F003 for temporary works covering mobile crane base/foundation(s);
- Rigging Method Statement;
- Outline de-rigging plan;
- In-service lift plan;
- Network Rail non-objections to rigging method statements and in-service lift plans;
- Complex foundation and pile drawings and construction photographs;
- Cube and pile test results (continuity) (if applicable);
- Complex foundation design and construction records (inc check certificates);
- Notification to airfields (if required);
- Notification to CAA (if required);
- Build configuration of crane and load charts;
- Drawings for zoning, radius and slew limiting systems;
- Certificate of setting of zoning, radius and slew limiting systems;
- Records of checking of daily zoning, radius and slew limiting system settings;
- Records of periodic checks of crane base;
- Lifting team training and competence assessment;
- Records of near miss investigations;
- Reports of thorough examinations (crane and lifting accessories);
- Maintenance schedule and records.

**Annex B - Mobile Crane Base Form**

<b>Mobile Crane Complex Foundation Pre-rigging Inspection Report</b>							
<b>Site:</b>							
<b>Mobile Crane No/Location:</b>		<b>Make:</b>			<b>Model:</b>		
<b>Fly jib angle:</b>		<b>Jib Length:</b>					
<b>Outrigger base dimensions:</b>		<b>Counterweight:</b>					
<b>Base Type:</b>							
<b>Items Checked</b>		<b>Measurement Results</b>	<b>As Specified?</b>			<b>Inspected By</b>	<b>Date</b>
			<b>Yes</b>	<b>No</b>	<b>n/a</b>		
<b>All Foundations</b>	Compliance with design drawings/specification		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Level check - Within tolerance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Concrete</b>	Correct grade		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Sufficient maturity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Rebar- grade, diameter, quantity and position prior to pour		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Piles</b>	Satisfactory pile tests		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Reinforcement bond length		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Steelwork</b>	Steel grade		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Weld quality		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Bolts – grade, torque, tightness, quantity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>Spreader Pads/Mats</b>	Specified size of pad/mat		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Specified thickness of pad/mat		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Ground preparation as specified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Location as specified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Documents against which foundation has been checked (drawing nos./document references):</b>							
<b>Notes and Observations:</b>							
<i>I confirm the crane foundation has been constructed to the specifications and that a satisfactory post construction inspection has been carried out.</i>							
<b>Name:</b>		<b>Signed:</b>			<b>Date:</b>		
<b>Position:</b>		<b>Company:</b>					

## **Annex C - Additional Information**

### ***Legislation and Approved Codes of Practice***

Health and Safety at Work etc. Act 1974. London: The Stationery Office.

The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

The Provision and Use of Work Equipment Regulations 1998 (PUWER).

The Construction (Design and Management) Regulations 2015.

The Work at Height Regulations 2005.

L113 *Safe use of lifting equipment*, HSE Books (free download from [www.hse.gov.uk](http://www.hse.gov.uk)).

L22 *Safe use of work equipment*, HSE Books (free download from [www.hse.gov.uk](http://www.hse.gov.uk)).

### ***Standards***

BS 5975:2008 + A1:2011, *Code of practice for temporary works procedures and the permissible stress design of falsework*.

BS 7121-1:2016, *Code of practice for safe use of cranes — Part 1: General*.

BS 7121-2-1:2012, *Code of practice for the safe use of cranes, Part 2-1: Inspection, maintenance and thorough examination – General*.

BS 7121-2-3:2012, *Code of practice for the safe use of cranes, Part 2-3: Inspection, maintenance and thorough examination – Mobile cranes*.

BS 7121-3:2017, *Code of practice for safe use of cranes — Part 3: Mobile cranes*.

BS EN 62305-1:2011, *Protection against lightning, General principles*.

### ***Other Publications***

*Best Practice Guide on the Maintenance, Inspection and Thorough Examination of Mobile Cranes*, Construction Plant-hire Association (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Good Practice Guide on Ground Conditions for Construction Plant*, SFfC Plant Safety Group (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Good Practice Guide on Medical Fitness to Operate Construction Plant*, SFfC Plant Safety Group (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Good Practice Guide on Safe Use of Telehandlers*, SFfC Plant Safety Group (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Good Practice Guide on Lifting Operations with 180° and 360° Excavators*, SFfC Plant Safety Group (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Requirements for Tower Cranes Alongside Railways Controlled by Network Rail*, Construction Plant-hire Association (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

Mobile Crane Technical Information Note series, Construction Plant-hire Association (free download from [www.cpa.uk.net](http://www.cpa.uk.net)).

*Crane Stability on Site*, 2003. CIRIA C703. Construction Industry Research and Information Association.

*RIS-1700-PLT, Rail Industry Standard for Safe Use of Plant for Infrastructure Work*, Rail Safety and Standards Board (free download from <http://www.rssb.co.uk/railway-group-standards>).

*Influence of wind on crane operation*, Liebherr-Werk Ehingen GmbH (free download from [http://www.liebherr.com/AT/en-GB/default\\_at.wfw/measure-metric/tab-94354](http://www.liebherr.com/AT/en-GB/default_at.wfw/measure-metric/tab-94354)).

## Annex D - Working Group Membership

<i>Member</i>	<i>Employer</i>
Neil Berry	Berry Cranes
Steve Bradby	Select Cranes
Paul Milgate	Network Rail (High Speed)
Jake Sharlotte	Select Cranes
Ian Simpson	Health and Safety Executive
Bob Watts	Network Rail (High Speed)
Gavin Wilson	Select Cranes
T P Watson - <i>Editor</i>	CPA

**The Working Group would like to thank the NRIL Routes Senior Asset Protection Engineers forum for their reviews and comments.**

*NOTE: The above list includes all those who have kindly given freely of their time and expertise to work on the any of the versions of the guidance document and does not necessarily reflect the current membership of the Working Group.*



## Working in Partnership

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