



# BCSA Guide to Work at Height during the Loading and Unloading of Steelwork

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The British Constructional Steelwork Association Ltd.,  
4, Whitehall Court, Westminster, London SW1A 2ES.  
Telephone: (0) 20 7839 8566 Fax: (0) 20 7976 1634.  
E-mail: [postroom@steelconstruction.org](mailto:postroom@steelconstruction.org)  
Website: [www.steelconstruction.org](http://www.steelconstruction.org)

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## SUMMARY

This document is a guide for Steelwork Contractors responsible for the loading and unloading of steel and steelwork prior to fabrication, after fabrication and at site locations. It also provides guidance to Clients and Principal Contractors. It describes the management procedures and methods to be adopted for access and working at height during loading and unloading and is intended to serve as a standard reference when drafting site- and project-specific method statements.

The aim of this guidance document is to improve health and safety during loading and unloading of steelwork from lorries and trailers that takes place either at the steelwork factory or on sites. The guide aims to ensure that a consistent approach is taken to health and safety by those planning for, in control of, or undertaking such work.

This document is intended to aid compliance with the *Health and Safety at Work etc Act*, the *Management of Health and Safety at Work Regulations* and specifically the *Work at Height Regulations*.

## ENDORSEMENTS

### HEALTH AND SAFETY EXECUTIVE

Falling from vehicles is a significant cause of workplace transport injuries. Whilst work at height should be avoided where possible, it is sometimes difficult to achieve during the loading and unloading process. Where access is needed to sling a load the work at height aspects of this task need to be properly planned and managed.

The British Constructional Steelwork Association recognises that this is an important issue and, with the production of this document the BCSA is helping to develop and collate some solutions to assist all those in the construction industry to reduce the risks of falling from vehicles. The HSE welcomes this document and recognises it as a good starting point for industry in controlling work at height during loading and unloading. Further work will now be needed on the practicability of such methods of work at a range of sites and on methods of loading and unloading which avoid or reduce the need for people to work at height.

### CONSTRUCTION CONFEDERATION

This guide is endorsed by the Construction Confederation as a source of good practice in the management of work at height.



CONSTRUCTION CONFEDERATION

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# 1 INTRODUCTION

## 1.1 OBJECTIVES

The objective of this guide is to provide practical and safe guidance on work at height during loading and unloading operations to/from lorries and trailers (both referred to as trailers throughout the guide). A further objective is to establish best practice within the steel fabrication and erection industry. This requires the safe positioning of personnel and the provision of safe access arrangements for the loading and unloading of transported steelwork.

## 1.2 BACKGROUND

Many serious and fatal accidents are caused when work is required to be carried out above the ground. Work at height is work in any place, including a place at, above or below ground level, where a person could be injured if they fell from that place. Access and egress to a place of work can also be work at height.

This document has been prepared to assist in the identification of the appropriate means of protecting personnel from falls by using collective measures before personal systems are used, as described in the *Work at Height Regulations*.

The *Work at Height Regulations* rely on risk assessments to be used to enable the best practice to be established and used for personnel involved in working at height. The assessment should also avoid putting more people at personal risk while installing and dismantling the fall protection measures. For example, installing nets to a cantilever before installing the decking could put two people at considerable risk for a longer period than it would to put a person on a restraint system to complete the work.

The Health and Safety Executive's injury data for 2002/03 recorded five fatal and 793 major injuries attributed to vehicles and plant and falls from height. The Steel Construction industry has developed many innovations as a result of the introduction of the *Work at Height Regulations* and examples are given in this document, however it is acknowledged that no one system is suitable for all circumstances.

## 2 RECOMMENDED PRACTICE

### 2.1 SAFETY OBJECTIVES

The principal safety objectives when loading and unloading steelwork are:

- Stability of the load at all stages;
- Safe handling, lifting and placing of steel components;
- Safe access and working positions.

The most serious accidents that occur during loading and unloading are generally caused by falls from height, either from working positions or while gaining access to them. Other serious accidents can occur because of instability of the load while handling, lifting and placing components, and also during subsequent transport activity. Failure to establish safe procedures and to implement them through effective management can create unnecessary hazards, leading to risks being taken and hence to accidents.

### 2.2 COMPETENCE AND SUPERVISION

The single most important step that contributes towards safe practice is to ensure that competent persons are mobilised. This is because such persons will observe the following precautions concerning the work in general and tasks in particular:

#### **PRECAUTIONS**

**Do not commence work until it is clear what needs to be done.**

**Do not undertake work outside the limits of your competence.**

**Do not undertake tasks without the necessary tools and equipment.**

**Be clear about the arrangements for supervision in terms of the chain of command.**

**Do not deviate from what has been planned without checking with those in the chain of command.**

**Ensure that the area around the work is kept clear of hazards.**

**Watch out for hazardous activities being undertaken by other operatives.**

**Ensure that others not involved in the task do not encroach into an exclusion zone around the work area.**

In terms of unloading at the construction site, selection of a competent Steelwork Contractor is a necessary precondition towards ensuring that competent persons are mobilised to undertake the unloading work – whether these be employed by the Steelwork Contractor directly or by a specialist steel erection subcontractor. The Steelwork Contractor must observe the following preconditions:

## **PRECONDITIONS**

**Ensure that the scope of work is within the limits of competence of the firm.**

**Develop suitable method statements for the work in general and work instructions for specific tasks as necessary.**

**Agree the chain of command for site work with the Principal Contractor.**

**Provide appropriate supervision to manage the work on site.**

**Provide the necessary resources of manpower, plant and equipment.**

**Agree how exclusion zones should be operated to keep others away from hazards arising from unloading operations.**

## **2.3 SAFETY HAZARDS**

### **2.3.1 General**

Those in charge of loading/unloading operations and those undertaking the work need to be aware of the main hazards associated with the work. This section of the guide identifies the following hazards associated with loading and unloading of steel and steelwork:

- Trapping;
- Falling or jumping down from trailers or loads;
- Stacked steel or steelwork collapsing or moving;
- Trailers overloading and overbalancing;
- Site conditions.

In addition, there is a need to use suitably trained, briefed and equipped personnel, and this is considered in a following section.

### **2.3.2 Trap Points**

One of the more frequent causes of injury is personnel becoming trapped or crushed between the material being loaded or unloaded.

No load strapping or ties should be removed or lifts commenced until all personnel are in a “position of safety”. Those in charge of the operation need to identify positions for operators that, should something go wrong, are not “in the line of fire” – ie a potential trap point. This is not just for the positioning of the whole body, but includes the hands and arms etc that are often used to assist the load whether being landed or removed.

### 2.3.3 Falls

A fall from height usually results in a fatal or serious injury, due to landing on steel materials or the solid grade surface or due to the material following the faller and landing on top of them. With falls from lower heights fatalities are usually caused where the main impact is to the head or neck.

Temporary edge protection to BS EN 13374 is the preferred system and should be employed wherever practicable. However, the loading and unloading of trailers takes place in such a wide variety of locations that it will not always be possible to provide the edge protection to this standard. In this case other safeguards should be employed and the operatives briefed on their use.

### 2.3.4 Stack Stability

Palletised or large loads that can be loaded or unloaded by use of a fork lift truck will greatly reduce the risk to personnel as limited or no access onto the trailer will be necessary in most cases.

In cases where access onto the trailer is necessary the operatives should have means of access as close to their work position as possible. Their work position should be at the end of the load and not in the centre, and in all cases in a location where they can make a step away to a safe place if control of the load is lost.

Larger loads should be stacked on timber (preferably hardwood) to enable access for the forks of a lift truck or the lifting equipment without carrying out additional lifts to separate materials before removing from the trailer.

Loads can also be made up using independent lifting frames that stay with the load for the journey and then return and are used for the next load. This means that the lifting frame can be loaded at ground level before being lifted onto the trailer. At site the whole load is removed from the trailer before individual items are removed from the frame.

Tubular steel bars should always be loaded onto trailers that are fitted with side posts or within a cradle or lifting frame that is secured to the trailer before transportation. This should prevent the load rolling from the trailer when the load bond is removed. Smaller sections of tubular steel should be bundled and strapped together prior to loading.



*Example of side posts in use*

Side posts can also be used on open steel sections during loading as a means of ensuring the load is parallel with the edge of the trailer and they help eliminate uncontrolled load swing.

### 2.3.5 Overloading and Overbalancing

The overall load on the trailer must not exceed its rated capacity. Ideally the weight of each item loaded onto a trailer should be known and the total load calculated to ensure the trailer is not overloaded. The load calculation needs to consider lifting frames, containers and packing materials if the load is close to the operational load of the trailer.

All loads should be placed or removed in a sequence that does not cause the trailer to become unstable. This should also be a consideration for transporters that will be off-loading at a variety of different locations.



*What can happen if you get the offloading sequence wrong*

### 2.3.6 Site Conditions

As loading and unloading of trailers takes place in a wide variety of locations it will not always be possible to be in a fully controlled environment. The risk assessment for the work needs to consider any adverse weather conditions that may affect the work.

In addition consideration should be given to the provision of adequate lighting to complete the work safely. Snow and ice may need to be removed with de-icing equipment to reduce the risk of slips. High winds and heavy rain can postpone loading and unloading operations as the visibility and control of the necessary plant and equipment used can be affected.

Most importantly, the ground conditions must be suitable for the trailers and for the plant used for loading/unloading operations. Persons in charge of the operations must not allow them to be commenced until they are satisfied that the ground conditions are suitable.



*How poor ground conditions can affect loaded trailers*

## 2.4 MANAGEMENT

### 2.4.1 Planning

The work associated with loading and unloading during steel fabrication and erection should be given due consideration during all stages of planning from concept onwards.

Clients and Principal Contractors should be alerted to their responsibilities in this regard under the Construction (Design & Management) Regulations. A safe system of loading and unloading and storage facilities needs to be established and then adopted for the duration of the contract work. The poor practice associated with leaving the "problem" to be managed on an ad hoc basis must be avoided.

Early identification of traffic management, holding areas and loading/unloading facilities that are required will establish the safety management leadership to support good practice throughout what is acknowledged as an operation with the potential for serious or fatal injury.

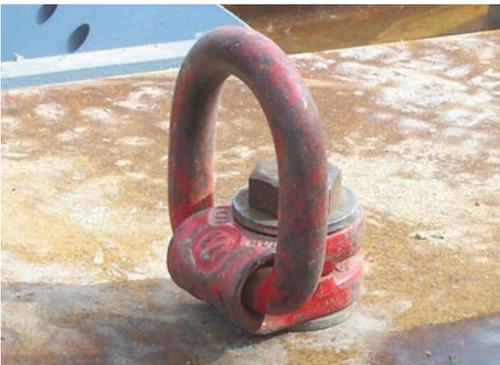


*Load ready for unloading at a city centre site*

An open site in a previously undeveloped area may give a better opportunity to establish a loading/unloading facility compared with a site that is located in a busy city centre where all loads are fed from a live traffic lane. In such cases the following questions need to be addressed during the planning:

- Is it feasible to build a loading bay into the design for some or all of the work?
- Can trailers be stored safely before loading/unloading?
- Can the trailers be delivered within the boundary of the work site?
- Can sufficient craneage be made available to remove loaded lifting frames or containers promptly?

The use of positive lifting aids (such as shackles) can facilitate the loading and moving of fabricated materials as the chains will not need to be wrapped around the load. However these will need to be engineered during the preparation phase of the fabrication to enable extra holes to be drilled for the lifting eyes etc. It should be noted that the alternative of welding fixed lifting eyes can restrict or significantly alter the stacking process for transport.



*Lifting aid bolted to steelwork*

### 2.4.2 Risk Assessment

All work place activities need to have risk assessments carried out and, in most cases, documented before work commences. The risk assessment process needs to be practical and it should include routine and non-routine activities. The level of detail in a risk assessment should be proportionate to the risks and its outcomes should influence the safe system of work adopted for the activity. Information provided to employees about the safe system of work should be short, simple and easy to understand. Further information on risk assessment is available in the HSE's free publication INDG 163 *Five steps to a risk assessment*.

Whilst the level of serious injuries reported by BCSA members for loading and unloading of vehicles is much lower than national reports, it is a routine activity for which there is a risk of serious injury. The following table gives information on the common hazards associated with loading and unloading vehicles and may be used to prompt the risk assessment process.

<b>Hazard</b>	<b>Injury potential</b>	<b>Likelihood (without control measures)</b>	<b>Issues to resolve</b>	<b>Possible control measures</b>
Slip or fall when getting on/off trailer	Major or fatal injury	Medium to high	Why is it necessary to climb onto the flat bed?	Provision of access ladder platform. Training by instruction in correct methods.
Trip or fall when moving over normal flat bed trailer	Over 3 day absence injury or major injury	Low	Can the load be chained down from the ground?	Inspect trailer bed for damage. Remove debris (eg old dunnage). Careful sequencing of load placement. Consider use of fall arrest device. Consider palletised loads if feasible.
Trip or fall when moving over extendible flat bed trailer (possible fall through gap in trailer)	Major or fatal injury	Use of extendible is rare but when used likelihood is medium to high	Why is an extendible being used?	As above, plus ... Place barrier across and around gap in bed during loading. Only use extendible trailers if essential.
Slip or fall down gap between trailer and loading bay	Major injury	Medium	Is the trailer suited to the loading bay?	Place barrier across and around gap during loading. Consider use of fall arrest device.
Deliberate jumping off trailer	Major injury	Medium	Are only trained persons allowed access onto the trailer?	Access only by recognised methods. Consider palletised loads if feasible.
Shifting or toppling of load when being grappled for access	Major or fatal injury	Medium	How does the slinger attach or detach the lifting hook? What plant is used to unload at site?	Careful sequencing of load placement. Provide access ladder. Consider use of fall arrest device. Consider palletised loads if feasible.
Fall from the top of the load	Fatal injury	High	Does anyone need to be on top of the load?	Consider use of temporary platform. Mitigate distance and consequence of fall using PPE or soft landing systems.
<b>NOTE:</b> Other general hazards (eg arising from slinging or vehicle movement) are NOT addressed here.				

If abnormal or unusual conditions are found then standard work instructions would need modifying using a task specific method statement and associated risk assessment to consider the specific detail.

The conclusions of the risk assessment should be recorded and revised in accordance with the company risk assessment procedure. Work instructions should be communicated to operatives and these need to address any residual risks that exist following the introduction of the control measures. Operatives need to be provided with properly maintained plant and equipment for the task.

Finally it is important that arrangements for rescue and recovery of injured persons are considered and noted in work instructions as appropriate.



*Poorly maintained trailers should not be used*

### **2.4.3 Risk Transfer**

It is important to avoid transferring risk by putting more people at personal risk while installing and dismantling any fall protection measures if the work can be carried out with less risk than the work required to install the protective measures. This can apply if the actual work is expected to be of short duration, for example installing scaffolding around trailers could put two people at considerable risk for a longer period than it would to put a person on a restraint system to complete the loading/unloading work.

### 2.4.4 Hierarchy of Measures

In planning the necessary measures, the hierarchy below can be used as a guide to selecting the appropriate protection for working at height. Using whatever system is the “reasonably practicable” solution to the working needs, then it is necessary to be able to demonstrate why the more desirable solutions could not be used if one of the systems lower down the hierarchy is selected. Noting this, and that “Collective Protection” is preferred over “Personal Protection” for an individual alone, then the top left is the most desirable option and the bottom right is the least desirable option.

Description	Collective protection	Personal protection
Existing work place	Gantry with guards	n/a
Work equipment that prevents falls	Guard rails, mobile access towers [MATs] and MEWPs	Work restraint system
Work equipment that minimises height and consequences of fall	Nets at high level, or soft landing systems	Fall arrest system with suitable rescue plan
Work equipment that minimises consequences of fall	Soft landing systems or nets at low level	Injury reduction system
Work equipment that does neither	Ladders, step ladders, trestles without guards	Such training, instruction and supervision or other additional measures as are necessary

## 2.5 SAFE SYSTEMS OF WORK

### 2.5.1 General

A safe system of work must eliminate or reduce the identified risks whilst not introducing risks that are equal to or greater than the original concern.

If the safe system of work requires the use of additional personal protective equipment [PPE], such as full body harness and lanyard, then its method of use should address how and where can it be attached and, if a fall occurs, how it can be arrested before the operator strikes the loaded steel or the pendulum effect swings the operator back into the trailer or load. Careful consideration must be made of the most suitable PPE for the specific risks – i.e. fall arrest or a work restraint system.

If harnesses or lanyards are provided for restraint or fall arrest then they will need to be attached to suitable anchorages that comply with BS EN 795. This may be proved by physical proof testing or by design calculation.

Individuals using PPE need to be assessed to ensure that the PPE fits correctly and they need to be trained in the use and maintenance of the equipment. Care needs to be taken that individuals do not relax their practices and attention to risks because they are using PPE.

Some examples of safe systems of work are given below, although there is no single solution for all occasions such practices should be considered during the planning stage of the work to reduce the risks associated with falls from loading and unloading activities.



*Telescopic handrail*

### **2.5.2 Telescopic Handrail System**

- Can be assembled without the use of additional plant;
- Provides “collective protection”;
- Can be easily moved up or down with the loading/unloading activity.



*Running line*

### **2.5.3 Demountable Running Line**

- A flexible fall arrest system that is available at works and on site;
- Loading and unloading can be effected from either side;
- Operatives at sites will already be equipped with necessary harnesses and lanyards.



*Scaffold*

### **2.5.4 Special Gantries**

- A raised loading/unloading gantry can provide safer access alongside or even all round the trailer during loading;
- Another idea is a purpose made gantry that can serve as a pick up point for a running line, but this may introduce a hazard during use of overhead cranes;
- Consider the additional risks to personnel that erect and dismantle the gantries.



*Neat load*

### 2.5.5 Bundled and Palletised Loads

- Pre-slung loads can be useful for large unit loads (eg trusses) and bundled or palletised items;
- Bundles and pallets are practicable and useful – not just for smaller items;
- Total load needs to be kept within capacity of crane on site.



*Air bags*

### 2.5.6 Whole Load Containers

- Being developed with application in a limited number of cases;
- Requires considerable initial investment and is reliant on suitable conditions on site;
- Problems would occur on city centre sites;
- Suited to special sites such as nuclear facilities where loads are received and held in a generous dispatching area before release into construction.



*Nets*

### 2.5.7 Soft Landing Systems and Nets

- Soft landing systems (including air/bean bags) can be easily transported and stored;
- Can be inflated on site and secured to vehicle;
- Soft landing systems will mitigate the distance and consequence of a fall;
- Nets can be used as edge protection.

## 2.6 TRAINING AND BRIEFING OF PERSONNEL

### 2.6.1 Training

The use of “competent personnel” is paramount for loading and unloading of trailers and the measure of “competence” is given in the *Management of Health and Safety at Work Regulations*. The person is regarded as competent if they have “sufficient training and experience or knowledge and other qualities to properly assist the employer to meet his safety obligations”.

Thus operatives must be assessed for their ability to load and unload materials from trailers as it is all too common for injuries to be sustained following a “keen pair of hands” having climbed on board a trailer to assist. Briefing during safety induction must highlight that the trained personnel are the only ones to carry out such work.

Other specific training will be required to cover such operations as:

- Slinging and mechanical lifting;
- Working at height;
- Manual handling;
- Any task specific methods arising from specific risk assessments.

All training should be recorded and regularly updated with refresher training when changes take place to practices, procedures or following incidents or accidents that expose a potential problem.

### 2.6.2 Plant Operators

Whether loading or unloading the operators of cranes, telescopic handlers or fork lift trucks should always be aware of who is involved in the operation and who is responsible for given signals or instructions, as the many moves required by machinery to carry out the work can bring additional hazards to the operation.



*Plant operators may need signallers to guide them around services etc*

Plant operators should check their working area and should not carry out an operation that they feel is not safe to commence, ie if personnel are in a position of danger or are likely to be so during the operation or lifting activity.

### **2.6.3 Haulage Drivers**

The driver must be satisfied a load is within the safe limits of his vehicle and the stability and security of the load can be safely maintained throughout the journey prior to taking the responsibility of taking the load onto a public highway.

It is common for independent hauliers to deliver steel into the Steelwork Contractor's factory and components directly onto site. In such cases, it is important to establish the respective point at which responsibility passes from the haulier to the Steelwork Contractor or to the specialist steel erection subcontractor. The National Association of Steel Stockholders and UK Steel have collaborated to prepare guidance notes for companies and individuals involved in the delivery and unloading of steel. This guidance should be followed.

The responsibility for the loading or unloading should be clearly identified during the procurement process. It should not be assumed that the delivery part of the process has been completed when the delivery vehicle has arrived at the address. Unless agreed otherwise, the haulier should park the loaded vehicle where directed by the Steelwork Contractor who then assumes responsibility for unloading. Special care should be taken when initially releasing the load restraining straps.

Drivers should always follow the directions and instructions of the host company to which they are providing the service. The appropriate PPE requirement should also be made known to the driver. This should also include directions to a safe place to wait during the loading/unloading operation (not inside the vehicle cab). Unless drivers identify sufficient causes to affect the safe operation of their vehicles they should make use of the safe systems of work employed by the host company.

If the fabricated steelwork is to be delivered to site by an independent haulier, the haulier must be satisfied that the load assembled by the Steelwork Contractor is suitably stable for the restraining straps to be applied and for the subsequent journey.

If the destination is reached prior to site opening or at a time when the unloading/loading cannot take place the driver should report to the company at the earliest opportunity, but should not attempt to prepare the load in any way (eg by removing load strapping, wedges or packing) until assistance is available and an assessment is carried out to ensure the safe operation.

Haulage vehicles can also be used to transport steel and components around factory premises and sites. In such cases suitable restraining straps should be used to secure the load in transit unless a risk-assessed procedure has been developed. This is only likely to be possible for sites with even and firm ground conditions together with a low site speed limit that is strictly observed.

#### **2.6.4 Personal Protective Equipment [PPE]**

It is normal for Steelwork Contractors to provide the following PPE for their operatives working on construction sites:

- Safety helmets;
- Safety footwear with steel toe caps;
- Gloves;
- Hi-visibility vest or jacket;
- Goggles;
- Ear defenders/plugs;
- Safety harness and lanyard.

Operatives should be reminded during briefings that the proper use of this PPE is as important during loading or unloading operations as it is during erection and other site work.

## REFERENCES

The following documents were considered in the compilation of this guidance document:

### Regulations:

- *Construction (Design & Management) Regulations* [CDM Regs]
- *Construction (Health, Safety & Welfare) Regulations* [CHSW Regs] (being superseded)
- *Health and Safety at Work, etc Act* [HSW Act]
- *Lifting Operations and Lifting Equipment Regulations* [LOLER]
- *Management of Health & Safety at Work Regulations* [MHSW Regs]
- *Manual Handling Operations Regulations*
- *Personal Protective Equipment at Work Regulations* [PPE Regs]
- *Provision and Use of Work Equipment Regulations* [PUWER]
- *Work at Height Regulations*
- *Workplace (Health, Safety & Welfare) Regulations*

### Publications produced by the BCSA:

*Code of Practice for Erection of Low Rise Buildings*

*Code of Practice for Erection of Multi-Storey Buildings*

*Code of Practice for Metal Decking and Stud Welding*

*Guidance Notes on the Safer Erection of Steel-Framed Buildings*

*Practice Note PN/HS/1/01 Loading/Unloading Steelwork*

### Other publications:

BS EN 13374 *Temporary edge protection systems – Product specification, test methods*

BS EN 795 *Protection against falls from a height – Anchor devices – Requirements and testing*

HSE – INDG163 *Five steps to a risk assessment*

HSE – INDG199 *Workplace transport safety: An overview*

National Association of Steel Stockholders – *Load Safety*

National Association of Steel Stockholders – *Safe Delivery and Unloading of Steel Products*

CONSTRUCT – *Safety in Storage and Handling of Formwork and Falsework*

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