INTRODUCTION

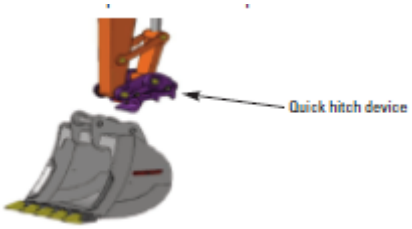
Quick Hitch Devices are typically used to secure an attachment to the dipper arm of an excavator with two pins. They may either pick up a standard attachment using the original pins or have a dedicated system that only fits specific attachments with matching engagement lugs. Quick hitch devices can be manual, semi-automatic or fully automatic (refer to table 1 for further details).

In the past 10 years these devices have become increasingly common and now many large excavators and some mini-excavators are fitted with quick hitch devices.

Quick hitch devices are not usually made by the excavator manufacturer, although some are identified with the excavator manufacturer's name and are supplied by them. Care must be taken to ensure the quick hitch devices are compatible with the machine. There are a large number of devices on the market, with approximately 20 different manufacturers worldwide, most of whom have several different designs.

The requirements of this Standard apply where quick hitch devices are available or are used (e.g. on many machines greater than 6 tonnes).

This Standard does not apply for machines with permanently secured direct attachments, although many of the requirements set out here are transferable to other similar activities and should be reviewed for inclusion into local processes e.g. the use of a safe operational envelope see Planning section below.



SCOPE, APPLICATION AND RESPONSIBILITY FOR IMPLEMENTING THESE REQUIREMENTS

The Balfour Beatty Expectations for Managing Health & Safety set out the overall arrangements and approach required within Balfour Beatty for managing health and safety.

This standard sets out the minimum requirements to be applied throughout Balfour Beatty to ensure that risks to health and safety from using quick hitch devices are effectively managed. Additionally, all requirements set by local legislation and/or regulation must be complied with.

Where good practices which surpass the minimum requirements of a Balfour Beatty standard are already in place, these must be formally maintained. Examples of Group wide good practices can be located and shared via the Balfour Beatty Best Practice and Knowledge Shares webpage (Internal).

The minimum requirements of this standard apply to all Strategic Business Units/Business Units (SBU/BU) and to all joint ventures, partnerships and associated companies in which Balfour Beatty has a controlling interest or where, with the agreement of our partners, the Zero Harm Vision, the Balfour Beatty Expectations for Managing Health & Safety and the Company Business Management System are adopted (referred to as Organisations throughout this document).

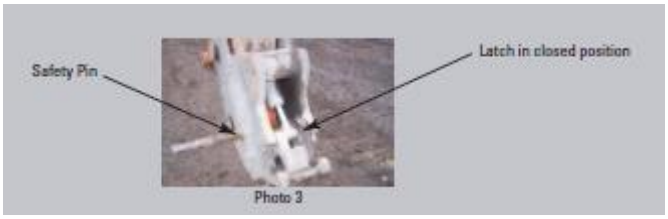
Each Organisation is responsible for ensuring that the requirements of this document are incorporated into their health and safety management system or standard operating procedures. Each Organisation is also responsible for communicating the requirements of this document throughout their supply chain, and ensuring that they are implemented appropriately by designers, subcontractors and suppliers.

TYPES OF QUICK HITCH DEVICES

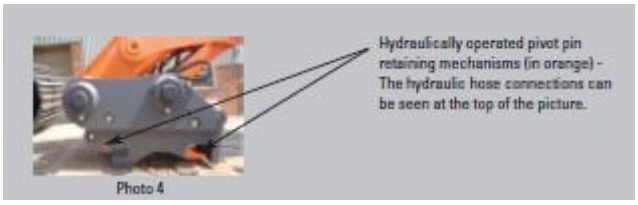
Manual Quick Hitch Devices require the operator to change the attachment by either using a bar to open a spring actuated latch (photo 1) or by winding a screw thread to open and close a latch (photo 2). Although faster than conventional methods of attachment change, this method is relatively slow and cannot generally be done from the excavator cab. Manual quick hitch devices are prohibited on all Balfour Beatty Sites.

Automatic and Semi-Automatic Quick Hitch Devices use a hydraulic ram to move the latch to retain the attachment.

Semi-automatic Quick Hitch Devices (photo 3) require the operator to leave his cab after operating the quick hitch latch to insert a retaining pin in the hitch as additional security. This pin usually works by locking the latch in its closed position; this is often referred to as the “safety bar” or “safety pin” and it is not a load bearing part of the hitch. The safety pin cannot usually be inserted in its correct location unless the latch is fully closed position. Semi-automatic quick hitch devices prohibited on all Balfour Beatty Sites.



Fully Automatic Quick Hitch Devices (photo 4) can be operated entirely from the cab and usually have an independent locking system which functions automatically. Fully Automatic systems must have a method where the operator can verify that the hitch is locked from the cab, although the operator must still leave the cab to verify engagement. Fully automatic systems are acceptable within Balfour Beatty but only with a secondary locking arrangement.



A fully-automatic quick hitch system can therefore be operated entirely from within the machine cab, while the other two systems require some kind of human intervention outside of the machine to complete the engagement process.

Table 1: Summary of the main characteristics of the three types of quick hitch devices

Type of quick hitch device	Typical Method of Engaging an attachment	Typical locking/security system
Manual	Manually retained e.g. by sprung latch operated with a lever	Manually inserted safety pin or other locking device
Semi-automatic	Hydraulically operated retaining latch mechanism	Manually inserted safety pin
Fully-automatic	Hydraulically operated retaining latch mechanism	Hydraulically operated safety mechanism (may incorporate hydraulic, gravity and/or sprung safety system).

RISKS

The main risk arising from the use of a quick-hitch device is that the attachment, for example, an excavating bucket, becomes disconnected and as a result works loose and falls from the machine.

The main reason for attachment disconnection results from the quick hitch safety pin not being inserted. Therefore, these incidents tend to be associated with manual and semi-automatic types of quick hitch devices, which typically rely on manual safety pin locking mechanisms.

Fully-automatic quick hitch devices, while not requiring a manual locking pin to be inserted, can still be prone to accidents involving unintentional disconnection. In such instances disconnection is generally due to a mechanical failure associated with the device, for example, a loss of hydraulic pressure, rather than omission to apply a locking mechanism. There is also the risk of stones or debris becoming lodged within the socket mechanism of the device preventing the hydraulic ram from closing fully home. This can cause the device to inadvertently disconnect.

Approximately 13% of all accidents investigated on excavators are attributed to the bucket detaching from a quick hitch device and injuring a ground worker. These are mostly fatal and major injuries. (Source: UK Health and Safety Executive (HSE) Sector Information Minute (SIM) 02/2007/01 Version 2) However, there may be many more incidents that occur when an attachment detaches unintentionally from the device, but without injury because no one is underneath at the time. This indicates that quick hitch device detachments maybe relatively common, although injuries are less so.

Although incidents have occurred with automatic quick hitch devices, accident statistics suggest that the majority of incidents occur on semi-automatic systems where a manual safety pin should be inserted, but where the operator failed to do so.

An additional risk is that if an attachment comes loose it could swing dispersing the load.

PLANNING

Where there is a requirement to change an attachment on an excavator, all quick hitch devices (that pick up and retain via the attachment pins) on Balfour Beatty sites must either be manual or fully automatic with a secondary locking arrangement.

Fully automatic quick hitch devices must incorporate front and rear closing latches with a secondary independent locking system that prevents the attachment from detaching from the excavator in the event of a loss of hydraulic power.

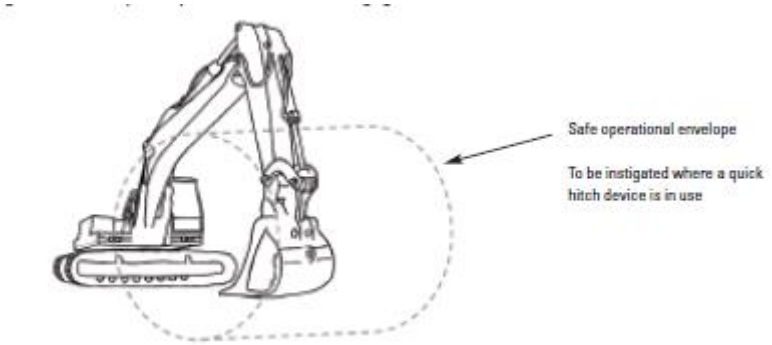
Table 2 summarises the Balfour Beatty quick hitch device requirements.

Manual No hydraulic interaction	**PROHIBITED**
Semi Automatic Hydraulic (with safety pin)	
Fully Automatic Hydraulic single pin latching capture	
Fully Automatic With secondary locking arrangement	**Acceptable** but **must** be capable of preventing the excavator attachment from releasing in the event of partial or total failure of the power supply or when the operator stops operating the machine.

All activities involving excavators with quick hitch devices must be planned so that personnel are not required to conduct activities within the safe operational envelope (4m) of the attachment whilst it is in use.

Activities must be planned so that personnel are prevented from working directly beneath an excavator attachment.

The only exceptions to the above are when access to the excavator attachment is required for maintenance or during routine inspection. During maintenance tasks the excavator attachment must be stationary and placed on the ground with any safety devices in the cab engaged.



PEOPLE

Managers and supervisors who oversee plant/machines operations with quick hitch devices

Managers and supervisors must ensure all quick hitch devices under their control (either direct or subcontract) comply with the Balfour Beatty requirements.

Managers and supervisors must ensure all operators (either direct or subcontract) are demonstrably competent (as defined in this standard) in the use of the specific quick hitch devices in operation.

Managers and supervisors must ensure the appropriate processes and controls as defined by this standard as well as the specific safe systems of work with regards to quick hitch devices are fully followed.

Managers and supervisors must ensure that thorough examination and maintenance plans are in place and that they comply with both manufacturers' requirements and local legislation.

Managers and supervisors must not allow people to work in or access the safe working operational envelope whilst the machine in is use in accordance with HSF-RM-0047a People, Vehicle and Plant Interface Zones.

Machine operators of plant/machines with quick hitch devices:

Machine operators must be able to demonstrate that they are trained and competent in the use of each type of quick hitch device they use. This must include:

- the appropriate certification for the plant/machine they are operating
- awareness of the risks associated with using quick-hitches and how they arise
- safe working practices for the use of the quick hitch device including procedures for connecting and disconnecting attachments
- conducting visual inspections of the quick hitch equipment
- compliance with the maintenance and testing of the quick-hitch equipment
- compliance with the manufacturers' instructions.

Machine operators must take responsibility for the safe use of the quick hitch device. This extends to changing attachments and making sure that they are fitted correctly after each change.

Although a fully-automatic quick hitch device can be operated entirely from the cab, machine operators must physically leave the cab to confirm that both front and rear closing latches are fully closed (as per the manufacturer's instructions) after each change of attachment and before use.

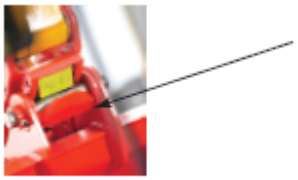


Photo 5

Machine operators must check that the quick hitch device locks independently (mechanically) on both front and rear closing latches so that no swinging of the attachment can occur through being locked on a front pin only.

Machine operators must not swing an attachment over or near other workers, such as slewing a bucket of gravel over ground workers to discharge it into a trench.

Machine operators must not move or slew the machine when an attachment is fastened by the front lock only.

Machine operators must stop work and lower the quick hitch device if people encroach or plan to encroach the safe operational envelope of their machine.

PLANT AND EQUIPMENT

For quick hitch devices that are permanently attached to the machine, a thorough examination must be undertaken at a minimum of once per year by a Competent Person or more frequently if required by the manufacturer or local legislation.

For quick hitch devices that are not permanently attached to the machine, a thorough examination must be undertaken at a minimum of once every 6 months by a Competent Person or more frequently if required by the manufacturers instructions and/or local legislation.

If the quick hitch device is used for lifting it must be designed to do so and the weight of the device must be deducted from the safe working load of the excavator.

Damaged or defective equipment must not be used and must be instantly taken out of service prior to being replaced or repaired.

Attention must be paid to safety alarms. Tests must be carried out on these systems prior to using the quick hitch and periodically thereafter to ensure the alarm functions correctly.

Extreme care must be taken when carrying out maintenance procedures on quick hitch devices.

On hydraulic models care must be taken to ensure that competent maintenance personnel do not place any part of their body on or into the device before first ensuring that the hydraulic circuit is de-activated.

When installing, replacing or maintaining a quick hitch device the manufacturer's instructions must be followed and the machine and the quick hitch device must be compatible.

When attaching lifting slings to the hooking device or lifting point, the operator must

- be trained in safe lifting operations
- remove any attachment before attempting a lift
- ensure that the slings and their attachments are able to hang free at all times (photos 6-7).


Photo 6


Photo 7

Safe working loads must be clearly marked on the plant and ancillary equipment and must not be exceeded.

PROCESS

Operations using quick hitch devices must not be permitted to commence unless a risk assessment specifically addressing the features of the quick hitch device has been carried out and a safe system of work is in place.

The safe system of work must consider all activities where injuries to individuals could occur, including:

- keeping personnel outside the safe operational envelope of the machine
- ensuring that there are controls in place to stop anyone from working or walking beneath the machine attachment
- the risk of an attachment becoming detached
- the process for attaching and detaching the quick hitch device
- the training and competence requirements of those involved in the activity
- the formal inspection and maintenance process
- the process for inserting safety pins (manual quick hitch devices only)
- visual checking requirements
- security check processes for testing the quick hitch device before use
- processes to control the quick hitch device when the power is switched off (fully automatic devices only).

Before any operations involving quick hitch devices can begin all personnel involved must be fully briefed on the risk assessment and the safe system of work related to the activity.

SELECTED DEFINITIONS

Accident

An unplanned event, which results in harm to people, property or the environment.

Attachment

Bucket or other device which can be attached to the dipper arm of an excavator, either directly or via a quick hitch device.

BB Expectations

The Balfour Beatty Expectations for Managing Health and Safety.

Competent Person

An individual with sufficient knowledge of the specific tasks to be undertaken and the risks which the work will entail, and with sufficient experience and ability to carry out the duties in relation to the task, to recognise their own limitations, and to take appropriate action in order to prevent harm to those carrying out work, or those affected by the work.

Incident

Any unplanned event which results in harm, or potential harm to people, property or the environment. In this context, incident includes both accidents and near misses.

Organisation

Balfour Beatty Strategic Business Unit/Business Unit (SBU/BU), joint venture business, or other business in which Balfour Beatty has a controlling interest or where, with the agreement of our partners, the Zero Harm Vision, the Balfour Beatty Expectations for Managing Health & Safety and the Company BMS are adopted.

Must

Mandatory requirements of the document.

Quick hitch device

Device to facilitate the efficient connection and removal of attachments to excavators' equipment. Also known as Quick hitches, Quick Hitch Couplers, Quick Couplers, Couplers or Attachment Brackets.

Safe operational envelope

A zone which excludes all personnel from the area into which an excavator attachment can fall.

Should

Indicates that the primary intent is to comply with the document, however local conditions may necessitate an alternative approach. This alternative can be used provided it does not dilute the intent of the document and is approved by the Organisation.

SSW

A safe system of work defines how to do an activity safely and is based on a systematic examination of all the hazards. Includes, for example, method statement and job hazard analysis etc.

Thorough examination

The examination by an independent competent person in such depth and detail as the competent person considers necessary to enable them to determine whether the equipment or plant being examined is safe to continue in use.