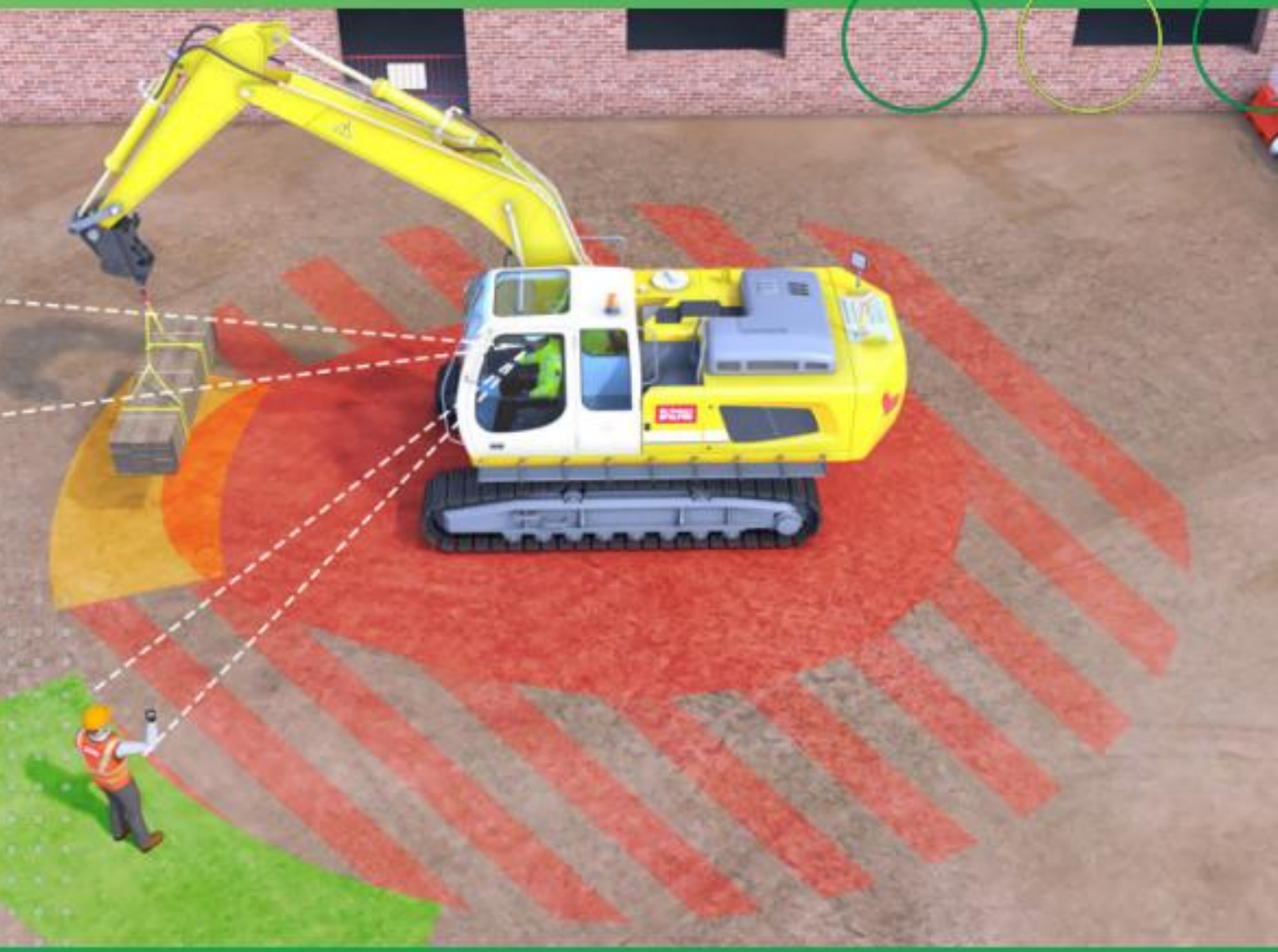


Excavator Lifting Operations

A practical template guidance

Sir Robert McALPINE

Hands OFF
Step AWAY
Safe SPACE

A Practical Guidance to Excavator Lifting

Introduction:

This document has been produced to not only assist and provide guidance on industry accepted methodologies for excavator lifting operations but also to provide a simple benchmark template that is easy to complete, containing all required information for a lift plan attending to lifting operations with excavators.

Pages 4 through 16 to are a template that will be issued separately and will be freely available for use, either in its in entirety or parts thereof, to assist in preparing lift plans for to excavator lifting operations.

Special note:
The following is not intended for excavator lifting operations where fork tines are utilised.

Guidance notes are provided within the text and should be referenced while completing the separately issued template.

Please be aware that this document is not intended to replace appropriate planning of lifting operations by an appointed person. All lifting operations must be planned and managed by a competent person. The document is only to be used by people who have the appropriate training and competence for lift planning operations

Additionally, sector specific working restrictions have not been considered, e.g. exceptional hazard sites (nuclear, petrochemical etc.), working adjacent to railways etc.

Appendix A provides graphical versions of the recommended hand signals included in the OPERC VCOP 'Hand signals for 'When Excavators are used as Cranes' document here

Appendix B consists of '*bite size'* overviews of guidance to assist when authoring a lift plan.

For further information please see the links below to industry documents attending to excavator lifting operations:

- https://www.cpa.uk.net/downloads/3/SFPSG-Guidance-on-Lifting-with-Excavators.pdf
- https://www.cpa.uk.net/downloads/110/SFPSG-Guidance-on-Ground-Conditions.pdf
- https://www.cpa.uk.net/downloads/112/SFPSG-Guidance-on-the-Safe-Use-of-Quickhitches.pdf

Appendix C details a comprehensive but generic '*Benchmark*' procedure.

This procedure is includes ***'Hold points'*** that align with the industry wide 'Hands Off -Step Away -Safe Space' initiative and provides guidance on how to apply the 'Hands Off' principles when using excavators in lifting operations.
These 'hold points' are highlighted with the use of the 'Hands Off' logo as an icon

A video resource, available online, attending to 'Lifting with Excavators' can be found here

---

Please note:
This document has been provided by Sir Robert McAlpine Limited. It has been checked to the best of our ability but may contain unintentional errors. As per BS 7121-1:2016, CDM 2015 and LOLER, it is the user's responsibility to verify that they understand and have made their own checks before using this document.

The user shall ensure that they properly risk assess and plan their own lifting operations to discharge their legal requirements.

No liability will be accepted for any incidents that result of those using this document

Lift Plan Details:			
Lift Plan Title:	*Lifting operations with _____ Excavator*		
Lift Plan No.:	*Enter lift plan number here*	Revision No.:	*Enter rev. no. here*
Prepared By:			
Where applicable, the lift plan must be prepared and reviewed by a trained and competent person. *The author must be recognised and appointed in writing in accordance with project appointment procedure [if applicable] and BS 7121 – Code of Practice for Safe Use of Cranes.*			
Name:	*Enter name here*	Job Title:	
Signed:		Date:	
Accreditation details:	*Insert a copy of card front and back*		
Reviewed By: (if applicable)			
Name:	*Enter name here*	Job Title:	
Signed:		Date:	
Accreditation details:	*Insert a copy of card front and back*		

Revision Details:			
Revision No.:	Changes made:	Revision by:	Issued date:
	Give overview of changes for the revision i.e. Schedules added etc.		

Contents:	
Section:	Heading:
i.	Safe zone considerations when working around excavators
The template guidance:	
1.	Supporting Safe System of Work
2..	Location of Lifting Operation
3..	Lifting appliance completing operation
4.	Ground conditions and anticipated loadings of excavator
5.	Competencies and training
6.	Primary communications
7.	Proximity hazards Identified or known to the project
8.	Weather conditions
9.	Lifting procedure
10.	Schedule of common lifts
11.	Change Management & Variations to Lift Plan
12.	Briefing / Communication Record
Appendix A	Hand signals
Appendix B	Overview of lifting with Excavators – Considerations when planning the operation
	I. Slewing with a load
	II. Accessory length
	III. Pick and carry
	IV. Slopes and gradients
	V. Wheeled Excavators
	VI. Attachment to Quick Hitch/Attachment point
	VII. Ground Loading calculation
	VIII. Lift Category - Complexity of the lifting operation
Appendix C	Good practice lifting procedure – A benchmark resource

i. Guidance note: Safe zone considerations when working around excavators.

The graphic opposite shows a suggested example of the restricted access/exclusion zones and areas of danger that should be considered when working with excavators.

They are shown by coloured overlays.

Special note:
'Restricted access' zones are areas that only the slinger-signaller(s), lift supervisor or appointed person can enter with certain conditions being met prior to entry.

'Exclusion' zones are no entry areas to all persons unless certain conditions are met prior to entry.

Key:

Designated safe space : *Either identified in the lift plan or from a POWRA*

Area of danger: *Formed by position of load with allowance for load swing. Area can only be accessed by lifting team members when load is stationary and grounded or stationary and at such a height to allow safe retrieval of tagline [if required], or handle load when stationary at waist height*

Restricted access zone: Can only be accessed by lifting team members with confirmation of entry by the excavator operator. Any load on the excavator must be lowered to the floor and machine isolated prior to anyone entering the area.

Exclusion zone: *Can only be accessed by lift team members when excavator is stationary, there is no load on the quick hitch and lowered to the floor with the excavator isolated. Confirmation of entry into this area must be given by the excavator operator*

1. Supporting Safe System of Work:	
Associated drawings, Risk Assessment & Method Statement[s]:	*Enter any associated risk assessment number(s) here* *If issued separately, enter the associated schedule of common lifts document number [with Rev. no.] here.* *Any associated RAMS the excavator will be utilised in attending to the lifting operation.* *Reference any drawing numbers that you've used in the lift plan here.*
Other Relevant Documentation:	*This could be Industry standards that are pertinent to the lifting operation, could be a high risk review reference - delete if not required*

2. Location of Lifting Operation	
Project Address:	*Enter project address here*

This might be made up of a plan view, a general arrangement drawing or photographs of working area with areas of interest marked.

Highlight any features that are relevant to the excavator lifting operations i.e., slopes, excavations, exclusion zones, pedestrian, or traffic access routes etc.

Include any pinch points for the excavator body or difficult to access areas where a load is being placed.

3 . Lifting appliance completing operation			
Make and Model:	*Enter make and model of the excavator here*	Owner/Hirer:	*Enter the hirer/owner details here*
Wheeled or tracked:	*Is the excavator wheeled or tracked – enter details here?*	Stabilisers / blade:	*Describe any stabilizing components of the machine utilised in the lifting operation*
Configuration & main boom length:	*Describe the excavator boom/arm configuration here i.e., Mono-boom c/w 2.4m arm*	Counterweight:	*What counter-weight does the machine have?*
Overload warning device, Rated capacity indicator & load moment limiter:	*Describe the overload warning device(s)* *Enter details of the RCI and/or LML*	Check valves:	*These must be installed on arm and boom*
		Quick Hitch weight and WLL [*if applicable*]:	*Enter the weight and WLL of the Quick hitch on the excavator*

Excavator duties charts:

Add relevant chart from manual for the specific machine. Beware of using glossy brochures as they are unlikely to match the machine's actual configuration.

Note:
Excavator duty charts are usually for static duties only (unless stated otherwise), with the machine on flat and level ground.

Machines undertaking pick and carry duties shall have their rated capacity reduced. This shall be to a minimum of 50% of the excavator's rated capacity. The appointed person may wish to reduce this further.

Show any adjusted duty charts in this part of the table as relevant to the operation.

Check charts to confirm that reduction of duties for hydraulics have been included.
These are usually found as a note above or below the duties chart.

Excavator report of thorough examination:

Excavator plant/serial no.:	12 monthly report reference no.:	Expiry date:	6 monthly quick hitch report reference no.:	Expiry date:

Note:
Some excavator RoTE's will have the quick hitch (if applicable) entered upon the 12 monthly certification. If this is the case, then the serial number and WLL of the quick hitch should be entered upon the certificate with the certificate being dated within a 6-month period of arrival to project.

If the certificate is dated within a 12-month period of arrival to project, then a valid RoTE for the quick hitch must be obtained prior to lifting operations beginning unless the quick hitch is a permanent attachment.

Note that where the manufacturer's designed load lifting attachment point is located on the arm or on the back of the bucket, then these should be marked.

4. Ground conditions and anticipated loadings of excavator			
Ground conditions:	*Describe the ground conditions*	CBR test required:	*if yes reference the test document no. or TW's document no. if applicable*

Wheeled Excavator: *delete box as applicable*			
Excavator base set up:	*Wheel centre to wheel centre length and width*	Area provided by the base set up of the excavator:	
Point loadings including weight of load at radius or max. anticipated weight at max radius	*Provide evidence of calculated bearing pressure front / diagonal and side in the appendix.*	Permissible ground bearing pressure of work area / work platform:	

Tracked Excavator: *delete box as applicable*			
Excavator base set up:	*Width and length of tracks from centre of roller to centre of roller*	Bearing area provided by the tracks:	
Max. ground bearing pressure including weight of load or max. anticipated weight:	*Enter the calculated ground bearing pressure – See 'Ground loading calculation'*	Permissible ground bearing pressure of work area / work platform:	

Excavator dimensions:
Copy and paste the dimensions of the excavator from the specification sheet/operator's manual or relevant brochure here *When using product brochures some are unlikely to match the machine's actual configuration - Check prior to inclusion*

5. Competencies and training

The table below is included as an 'at a glance' reference for current industry accreditation that aligns only with Build Uk requirements - See 'Guidance note on 'Certificating Competency'

Lifting supervisor :	CPCS A62 – Crane Supervisor NPORS N405 - Crane Supervisor *(CSCS hologram)*	A62 ☐	N405 ☐
Slinger-signaller :	CPCS A40a - 'All Types All Duties' incl. of 'Pick and Carry' operations. CPCS A40b – 'All Types Static Duties' for static operations only CPCS A40d – 'Slinger Signaller – Excavator ' for excavator only incl. 'Pick & Carry' operations NPORS N402 - Slinger Signaller *(CSCS hologram)*	A ☐	D ☐
		B ☐	N402 ☐
		Below 10 t	Above 10 t
Excavator operator :	CPCS A58a - Excavator tracked 360 below10 tonnes CPCS A58b - Excavator wheeled 360 below 10 tonnes CPCS A58c - Lifting with Excavators	58a ☐	59a ☐
	CPCS A59a - Excavator tracked 360 above 10 tonnes CPCS A59b - Excavator wheeled 360 above 10 tonnes CPCS A59c - Lifting with Excavators	58b ☐	59b ☐
		58c ☐	59c ☐
	NPORS N202 - Excavator 360 *(CSCS hologram)* NPORS N100 - Excavator as a Crane *(CSCS hologram)*	N202 ☐	N100 ☐
Vehicle Marshall:	A73 - Vehicle Marshall NPORS N403 - Vehicle Marshal *(CSCS hologram)*	A73 ☐	N403 ☐

Role:	Name:	Qualification(s):
Crane/Lifting Supervisor:		
Lorry Loader Operator:		
Slinger-Signaller:		
Ancillary lift team members: *i.e. Vehicle/Traffic marshals etc.*		
Other:		

Guidance note on 'Certificating Competency':

For all roles, individuals should meet the requirements of instruction and training for the role and any additional activities e.g. suspended loads handling as defined within official guidance to LOLER and PUWER. In addition, a plant competence-based card bearing a category relevant to the role should be held and supported by the appropriate NVQ or industry-approved alternative or in the process of being achieved.

The definition to be considered as competent[1] means having attained sufficient experience in accumulating the relevant skills and supporting knowledge whilst carrying out the full scope of the required activities and be confident and able to do so, requiring minimal supervision – or none as in the case of the supervisor role.

This accumulation should be measured through a pre-defined process of standard-based assessment and certification, milestones and ongoing work-place assessments and typically would likely take a number of years.

6. Primary communications:	
Communication procedures:	*Describe the communication system being utilised in the lifting operation.* *See Appendix A for hand signals explaining their purpose and stance required*

7. Proximity hazards Identified or known to the project:	
The following hazards are generic in nature and are only supplied as a suggested list of the most common hazards associated around work areas when performing lifting operations with excavators. *The responsibility rests with the lift planner to ensure that all contained information is specific, accurate, and relevant to the unique scope and environment of the planned lifting activities.*	
Hazard Type: *delete or add rows as applicable*	
Ground conditions:	*Any associated hazards with the ground conditions perhaps the excavator is operating on a suspended slab or basement?*
Access/Egress – Site restrictions:	*Any associated hazards with getting to the work area?*
Proximity to Railway or Tramway:	*Network Rail's downrating restrictions of 25% need to be considered if the collapse radius of excavator and load are within 4m of the boundary of Network Rail property.* *Slew restrictors may also be required.*
Proximity to other moving plant or vehicles:	*Is the lifting area close to other site vehicles or vehicles on a public highway?*
Proximity to pedestrian access/egress:	*Any requirements for temporary closure of any pedestrian walkways or thoroughfares?*
Proximity to excavations:	*Any adjacent excavations, slopes including formed batters?*
Proximity to underground services:	*Any / manholes / road scars / other voids?*

[1] *The definition of competence is referenced within the Plant Safety Group's publication 'Competence to Operate Construction Plant' - https://www.cpa.uk.net/safety-and-technical-publications/plant-safety-group*
Further information of employers' requirements for training and certification can be referenced within the Plant Sector Representative Organisation's (PSRO) Competency Framework – www.psro.org.uk

7. Proximity hazards Identified or known to the project:	
The following hazards are generic in nature and are only supplied as a suggested list of the most common hazards associated around work areas when performing lifting operations with excavators. *The responsibility rests with the lift planner to ensure that all contained information is specific, accurate, and relevant to the unique scope and environment of the planned lifting activities.*	
Hazard Type: *delete or add rows as applicable*	
Proximity to overhead obstruction:	*'Goal posts'/bridged structures to be travelled under? Overhead electrical cables/power lines?*
Proximity to permanent or temporary structures:	*Buildings, scaffolding etc.*
Proximity to Street furniture, lighting columns etc.:	*Any lighting columns etc. in the vicinity of the lifting operation or work area?*
Slew restrictions required:	*Any slew restrictions arising from previously mentioned parameters?*
Load path & visibility:	*Describe the visibility of the operator in relation to the lifting operation* *Are cameras installed? If yes describe the type of camera i.e. 270 deg. etc.*
Adequate lighting:	*If the lifting operation is to be undertaken at night supplementary task lifting may be required.*
Access to load for attaching / detaching lifting accessories:	*Is there a safe access route for members of the lifting team to get to and from the area where the load is to be lifted?* *Consideration for working at height for accessing safe attachment of loads. I.e. MEWPS. Scaffold towers, fall arrest / harness systems, etc.*
Permits required:	*Check with client/project for any permits required prior to setting up the excavator i.e. permits to load or lifting the load i.e. tag systems prefabricated reinforcement cages etc.*
Other:	*Any other hazard not included above ?*

8. Weather conditions:	
Maximum wind speed:	*General guidelines and manufacturer's guidance should be reviewed* *Dependant on the load being lifted, operations may cease at a lower wind speed due to area/weight of load.* I. *All lifting operations should be assessed at the time of operations by the appointed person (if available), lifting supervisor(if required) , excavator operator and slinger-signaller.* *Assessment should be based on load being lifted, windsail area and local parameters (i.e. is the work area of the excavator in an open exposed area or is it in an enclosed area where wind conditions are muted.)* II. *Lifting operations must stop during storms or when there is a risk of lightning strikes.* III. *Indicate how the wind speed will be monitored. e.g., handheld anemometer or Beaufort scale assessment.*

9. Lifting procedure:

See a suggested 'benchmark' lift procedure in Appendix C

The procedure is comprehensive but generic in nature and is included as a series of prompts to assist in defining a clear sequence of operation(s).

10. Schedule of common lifts:			
Schedule no.	Load to be lifted	Schedule no.	Load to be lifted
1.		2.	
3.		4.	
5.		6.	
7.		8.	
9.		10.	
11.		12.	

Duplicate rows for schedules as required.

When assessing the 'Lifting Category' please see guidance in Appendix B - Lift Category - Complexity of the lifting operation

Load description 1: *Enter description of load here i.e. Ply pack (duplicate box for additional schedules)*			
Insert a graphic methodology of the lift showing the slinging arrangement.	Slinging methodology: I. *Give a 'step by step' guide of the slinging arrangement and attachment to the excavator*		
Lift Category:	Basic	Intermediate	Complex
Dimensions of load:	*??* mm [l] x *??* mm [w] x *??* mm [h]	Maximum radius lift with a load point height of *?* m	
Weight of Load inclusive of Quick Hitch [if applicable]:	Quick hitch @ *??* kg [if applicable], Load weight @ *??* t	*??* m over the front *(along)* with a *??* % utilisation	*??* m over the side *(across/360)* with a *??* % utilisation
Lifting accessories used with weights of accessories:	From Quick hitch [if applicable]: *List the accessories from the quick hitch [if applicable] being utilised giving length [if applicable], weight and WLL of each accessory.* Gross weight inc. 10% FOS: *??* t	WLL x Mode Factor *Enter the configuration for each accessory utilised in the lifting operations with the relevant mode factors. i.e.,* *Quick Hitch @ WLL 8 t used as per design - 8 t* *Bow shackle @ WLL 9.5t used as per design – 9.5 t* *Swivel Hook attachment @ WLL of 9.5 t used as per design - 9.5 t* *2 no webbing slings @ 2 t ea. – 2 used as a set in a double wrap choke configuration = (2 x 1.4) x .8 = 2.2 4t over the 2*	Resulting SWL *??* t over all accessories stated for static duties *Give the lowest SWL of the accessories in previous column*
Safe lifting considerations:	I. *Describe the safe lift considerations specific to the lift*		

11. Change Management & Variations to Lift Plan:

Variation to a Lift Plan should be notified to the authoring or nominated Appointed Person before proceeding with the lift.

Lift Supervisor and author should review the Lift Plan and detail all changes on the change log and re-brief the lifting team.

12.Briefing / Communication Record:		
Delete the sections below that do not apply to the lifting operation		
Appointed Person: *I have checked the training & competency of the excavator(s) operator(s), crane/lift supervisor(s) (if applicable) and slinger-signaller(s) and I am satisfied with their ability to undertake & control the lifting operation detailed in this plan.* *I have briefed / communicated to the excavator operator(s), lift supervisor(s) [if applicable] and slinger-signaller(s) of the contents of this lift plan and risk assessment.*		
Name:	Signature:	Date:
Crane/Lifting Supervisor: *I am aware of the lifts for which the use of this excavator is authorised, and any limitations imposed. I will ensure that to the best of my ability the excavator is not used outside these limits..* *I have briefed / communicated the excavator operator and slinger / signaller(s) of the contents of this lift plan and risk assessment.*		
Name:	Signature:	Date:
Excavator Operator: *I am aware of the lifts for which the use of this excavator is authorised, and any limitations imposed. I will ensure that to the best of my ability the excavator is not used outside these limits.*		
Name:	Signature:	Date:
Slinger-signaller: *I am aware of the lifts for which the use of this excavator is authorised, and any limitations imposed. I will ensure that to the best of my ability the excavator is not used outside these limits.*		
Name:	Signature:	Date:
Other (*insert title – delete note prior tom issue*): *I am aware of the lifts for which the use of this excavator is authorised, and any limitations imposed. I will ensure that to the best of my ability the excavator is not used outside these limits.*		
Name:	Signature:	Date:

Appendix A: Hand signals

START

Purpose:
To notify the operator to commence operations and follow signalling instructions.
Stance:
Fully extend both arms horizontally to the side of the body at shoulder height: hands closed into fists, palms facing forwards

STOP

Purpose:
To stop all motions, stop an individual motion or punctuate between motions.
Stance:
Raise right arm to shoulder height at the side of the body, elbow bent at 90° with forearm pointing upwards: hand open, palm facing forwards. Hold left arm down against the side of the body.

END

Purpose:
To notify the operator to end operations, to stop following signalling instructions and isolate the machine
Stance:
Place both hands together in front of the body at chest height, elbows bent

DANGER

Purpose
Cease all operations IMMEDIATELY and isolate the machine. ANYONE can give this signal if they observe a dangerous situation arising.
Stance:
Raise both arms horizontally to the side of the body at shoulder height, elbows bent at 90° with forearms pointing upwards: hands open, palms facing forwards

DEAD SLOW

Purpose:
To perform the operation or move the machine at a dead slow pace.

Stance:
Place both hands together in front of the body at chest height, elbows bent, hands open, palms facing each other. Rub palms together in a circular motion.

Appendix A: Hand signals

SMALL MOVEMENT

Purpose:
To indicate a small movement of either the travelling machine or of the slewing / movement of the arm geometry

Stance:
Hold left arm down against the side of the body: hand open, palm flat against the hip. Raise right arm to shoulder height at the side of the body, elbow bent at 90° with forearm pointing upwards: hand closed, palm facing forwards. Repeatedly open and close right hand.

LOWER STEADY

Purpose:
To lower the load/equipment at a steady rate – hoist down.

Stance:
Extend right arm at 45° to the side of the body: hand closed, index finger pointing downwards. Hold left arm down against the side of the body.
Make small circular movements with the right forearm in a 'cone like' fashion. The speed of the hand rotation will vary the lowering speed of the excavator

LOWER SLOW

Purpose:
To lower the load/equipment at a slow rate

Stance:
Extend left arm diagonally across the front of the body: hand open, palm facing upwards, motionless. Raise right arm to shoulder height at the side of the body, elbow bent with forearm pointing downwards: hand closed, index finger pointing downwards at left hand.

RAISE STEADY

Purpose
To raise/lift the load/equipment at a steady rate

Stance:
Raise right arm to shoulder height at the side of the body, elbow bent at 90° with forearm pointing upwards, hand closed, palm facing forwards, index finger pointing upwards. Hold left arm down against the side of the body. Make small horizontal, circular movements with the right forearm 'cone like'

Appendix A: Hand signals

MOVE LEFT

Purpose:
To travel or slew to the operator's left direction
Stance:
Fully extend right arm horizontally at shoulder height to the side of the body: hand open, palm flat and facing downwards. Bend left arm and place hand on body at chest level: hand open, palm flat against body

MOVE RIGHT

Purpose:
To travel or slew to the operator's right direction
Stance:
Fully extend left arm horizontally at shoulder height to the side of the body: hand open, palm flat and facing downwards. Bend right arm and place hand on body at chest level: hand open, palm flat against body.

VERTICAL DISTANCE

Purpose:
To indicate the vertical distance that the load or equipment must be raised or lowered
Stance: *(Turn body slightly to the side)*
Extend both arms horizontally in front of the body: hands open, palms flat and facing each other. Position arms so that the distance between the palms reflects the vertical distance

HORIZONTAL DISTANCE

Purpose:
To indicate the horizontal distance that the machine or arm geometry needs to travel
Stance:
Extend arms at the front of the body at chest height: hands open, palms facing each other. Position arms so that the distance between the palms indicates the horizontal distance.

DIPPER ARM RETRACT

Purpose:
To retract the dipper, telescope in.

Stance:
Fully extend both arms in front of the body at shoulder height: hands closed into fists, palms facing DOWNWARDS with thumbs extended and pointing TOWARDS from each other.

Appendix A: Hand signals

DIPPER ARM EXTEND

Purpose:
To extend the dipper, telescope out.

Stance:
Fully extend both arms in front of the body at shoulder height: hands closed into fists, palms facing UPWARDS with thumbs extended and pointing AWAY from each other.

LOWER BOOM

Purpose:
To indicate that the boom must be raised in towards the body of the machine.

Stance:
Extend right arm upwards and place hand on head: hand open, palm flat on head. Fully extend left arm horizontally to the side of the body at shoulder height: hand closed into a fist, thumb extended and pointing downwards. Make small downward movements with the thumb

RAISE BOOM

Purpose:
To indicate that the boom must be raised in towards the body of the machine.

Stance:
Extend right arm upwards and place hand on head: hand open, palm flat on head. Fully extend left arm horizontally to the side of the body at shoulder height: hand closed into a fist, thumb extended and pointing upwards. Make small upward movements with the thumb.

TRAVEL FORWARDS

Purpose:
To travel forwards towards the marshall. Applicable to both wheeled or tracked motions.

Stance:
Place both arms at the side of the body, elbows bent hands open, palms facing upwards. Move forearms together in slow vertical up and down movements towards the body. Repeat until the travel destination is reached

Appendix A: Hand signals

TRAVEL BACKWARDS

Purpose:
To travel backwards away from the vehicle marshall. Applicable to both wheeled or tracked motions

Stance:
Place both arms at the side of the body, elbows bent: hands open, palms facing downwards. Move forearms together in slow vertical up and down movements away from the body. Repeat until the travel destination is reached.

CROWD IN

Purpose:
To indicate that the dipper (or stick) should move in and towards the machine.

Stance:
Hold right arm down against the side of the body. Fully extend left arm horizontally in front of the body: hand closed into fist, thumb extended. Rotate arm to move thumb from horizontal position to pointing upwards.

CROWD OUT

Purpose:
To indicate that the dipper (or stick) should move out and away from the machine.

Stance:
Hold right arm down against the side of the body. Fully extend left arm horizontally in front of the body: hand closed into fist, thumb extended. Rotate arm to move thumb from horizontal position to pointing downwards

TRAVEL – ONE TRACK

Purpose:
To travel forwards or backwards on one track to move the positioning of the machine to the left or the right.

Stance:
Raise left or right arm (to indicate the side of the track which should be locked) to shoulder height at the side of the body, elbow bent at 90° with forearm pointing upwards: hand closed, palm facing forwards. Place the other hand in front of the body at chest height: hand closed into fist, palm facing body. Rotate fist in front of chest (forwards or backwards) to indicate the direction of travel on the other side of the track

Appendix A: Hand signals

TRAVEL – BOTH TRACKS

Purpose:
To travel forwards or backwards to continue operations.

Stance:
Place both hands in front of the body at chest height, elbows bent hands closed into fists, palms facing body. Rotate fists (forwards or backwards) to indicate the direction of travel

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Overview:

An Excavator's primary purpose is excavation NOT lifting.
If no alternative lifting equipment can be selected, then the following points should be considered when using an excavator and are explained in this document:

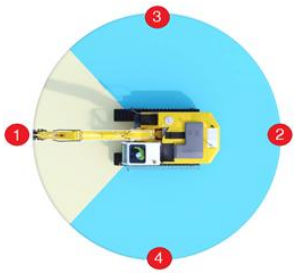
I. Different lifting directions affect the capacity of the machine.
II. The height of the lifting point above the ground.
III. Whether the excavator is travelling with the load.
IV. The effect of a slope.

A lift plan must be completed for all attachments other than when a bucket is being used to handle natural unprocessed / dug materials.

i. Slewing with a load:

When slewing with a load ensure that the excavator operates within its rated capacity as shown on the duty chart.

Where a load is picked up from the 'front' of the machine and slewed directly to the rear, it will pass through the 'over the side' duties, which in most cases will be less than the duties over front and rear of the machine, especially at large radius. Refer to the utilised excavator duties charts for confirmation of 'Over the side' duties - *See example graphic opposite*



For the excavator to pick a load from point 1 and deliver to point 2, then it must slew through either points 3 or 4 dependant on direction of slew.

The load that can be lifted for this operation cannot be greater than the rating over the side or '360 degrees' duty shown in Blue - *See example duties chart below*

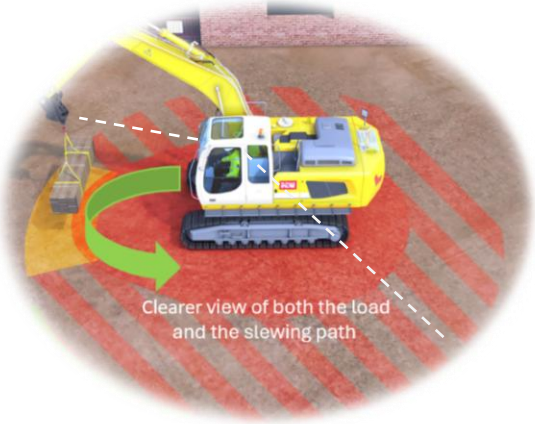
Rating over-front | Rating over-side or 360 degrees | Unit : kg

Conditions	Load point height m	Load radius m										At max. reach		
		3.0		4.5		6.0		7.5		9.0				
														meter
H-Boom 7.0 m H-Arm 3.4 m Counterweight 9 080 kg Shoe 600 mm	7.5							*11 560	10 300			*7 710	*7 710	8.64
	6.0							*12 150	10 050	*10 680	7 420	*7 570	6 850	9.41
	4.5			*20 430	*20 430	*15 620	13 510	*13 180	9 640	*11 770	7 240	*7 660	6 170	9.89
	3.0			*24 960	18 930	*17 810	12 630	*14 350	9 180	11 840	7 000	*7 970	5 800	10.1
	1.5			*15 420	*15 420	*19 460	11 920	15 250	8 770	11 580	6 770	*8 520	5 670	10.1
	0 (Ground)			*18 160	17 400	*20 170	11 500	14 910	8 480	11 390	6 600	*9 410	5 770	9.91
	-1.5	*13 070	*13 070	*25 000	17 380	*19 860	11 340	14 760	8 340	11 320	6 530	10 580	6 140	9.45
	-3.0	*21 470	*21 470	*23 670	17 570	*18 500	11 390	*14 640	8 370			*11 830	6 910	8.70
	-4.5	*24 850	24 850	*19 860	17 980	*15 700	11 660	*11 760	8 630			*11 480	8 510	7.59

It is also advantageous to plan the direction of slew toward the operator's cab side.

This provides the operator with a clearer view of both the load and the slewing path, improving awareness of clearances, obstructions, and the position of people within the work area.

If slewing toward the *'blind'* side is unavoidable, then additional control measures may be required, such as 270 or 360 cameras, HFR (Human Form Recognition) systems, enhanced supervision, effective signalling, or repositioning of the excavator to maintain visibility and control.

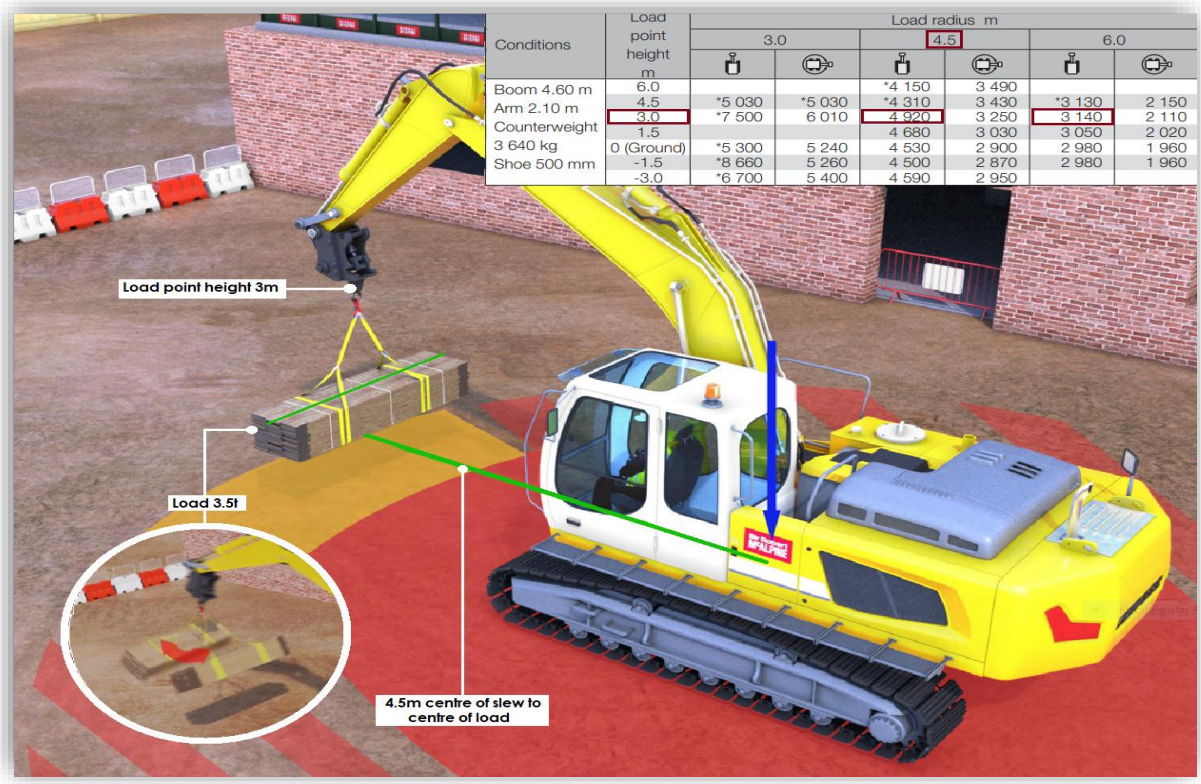


Please note:
The controls identified above are not stand-alone measures and should be used in combination to achieve a safe lifting operation.

ii. Accessory length:

When selecting lifting accessories, minimise their length as far as is practicable.
As the height of the lifting point increases, so the excavator's rated capacity reduces.
Be careful to obey the mode factor effects on the lifting accessory capacities, so do not set any chain angles too steep in order to make an operation work for the excavator but then overload the chains.
Excessive length in lifting accessories increases the likelihood of load swing as the excavator slews or travels with the load.

Additionally, 'unnecessary' accessories in turn adds weight to the gross load which then increases the utilisation of the excavator.

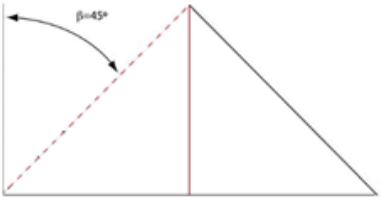


Conditions	Load point height m	Load radius m 3.0		4.5		6.0	
Boom 4.60 m	6.0			*4 150	3 490		
Arm 2.10 m	4.5	*5 030	*5 030	*4 310	3 430	*3 130	2 150
Counterweight	3.0	*7 500	6 010	4 920	3 250	3 140	2 110
3 640 kg	1.5			4 680	3 030	3 050	2 020
Shoe 500 mm	0 (Ground)	*5 300	5 240	4 530	2 900	2 980	1 960
	-1.5	*8 660	5 260	4 500	2 870	2 980	1 960
	-3.0	*6 700	5 400	4 590	2 950		

In the example above if there were to be a swing in load due to excess length of accessories or moving the arm of the excavator too quickly then there is a possibility of the excavator lifting out of duties.

- The Quick Hitch is at a height of 3m, which is the 'Load Point' height.
- The 3.54 t load being lifted is at a 4.5m radius
- Duties of the excavator at 4.5m radius with the 3m load point height is 4.92 t,

With the above, if the operator were to move the arm too quickly or come to a sudden stop at this radius then the subsequent swing would only need to be 1.5m (5') to overload the machine to 115% of its duties not including the dynamic forces created by the pendulum effect.



Please note:
Always ensure that the angle of the accessory is within the 0 to 45 deg. excluded angle

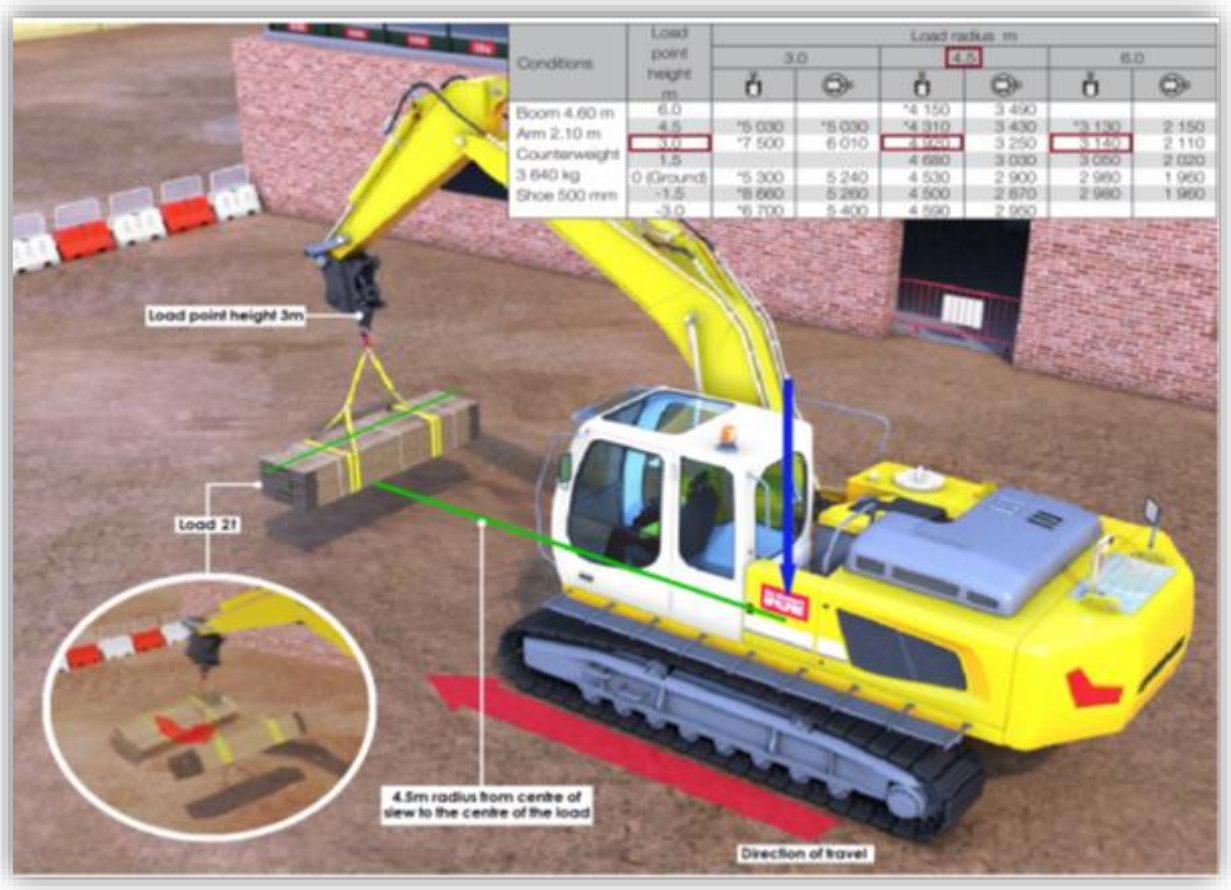
iii. Pick and carry:

Excavator duty charts are only given for lifting whilst stationary on level ground. This is due to potential risk of overturning when a suspended load is being handled.

Where the excavator is required to track / move with a suspended load, the lift plan and risk assessment must clearly identify how this will be managed.

Reduction of duties:

A majority of excavator duty charts will not give 'Pick and Carry' duties. In these cases, Industry practice is to reduce the lifting duties of the excavator by a minimum of 50%. This industry practice MUST be adhered to.



In the example above if there were to be a swing in load due to excess travel speeds or length of accessories, then, as previous page, there is a possibility of the excavator lifting out of duties.

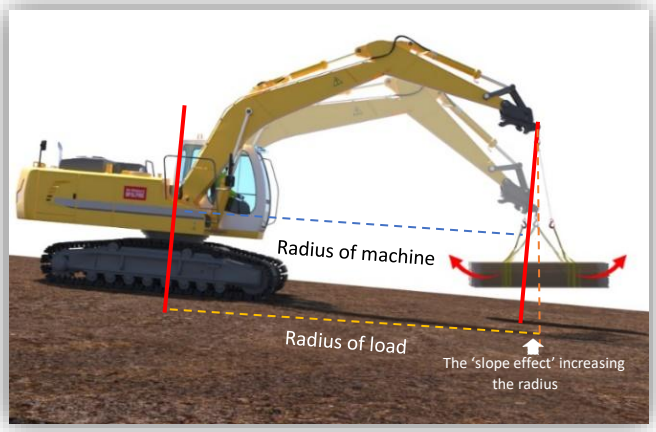
- The Quick Hitch is at a height of 3m, which is the 'Load Point' height.
- The 2 t load being lifted is at a 4.5m radius
- Duties of the excavator at 4.5m radius with the 3m load point height is 4.92 t, but as the excavator is tracking with the load i.e., 'Pick & Carry', the duties are reduced by 50%, which means the excavator is limited to 2.46 t.

With just a swing of 1.5m (5'), as previously stated the excavator can quite easily be lifting at 128% of its duties, not including the dynamic forces created by the pendulum effect.

iv. Slopes and gradients:

Whenever practicable, avoid lifting on slopes as the lifting capacities of the excavator is based on lifting with tracks static and on firm, level, ground.

Always obey the manufacturer's instructions as to which direction to travel the machine 'up' or 'down'

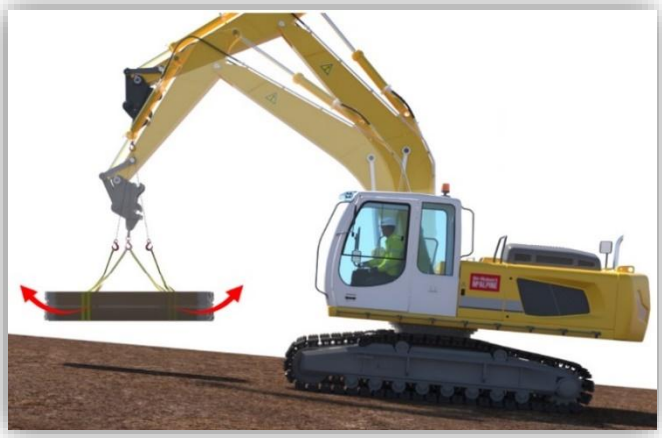


Be mindful that although excavators are generally able to work on slopes of up to 70% this is unsuitable for lifting.

When travelling with the load down slopes then great care must be taken.

Even with the excavator travelling in a controlled manner, an increase in radius of the load is unavoidable.

The radius of the centre of gravity of the load needs to be within the capacity of the excavator.



When travelling up slopes the opposite will happen - the radius will naturally decrease, and the load has the potential to strike the excavator.

Be aware that an increase in radius will happen if travelling or moving in an erratic manner.

The radius of the centre of gravity of the load needs to be within the capacity of the excavator.

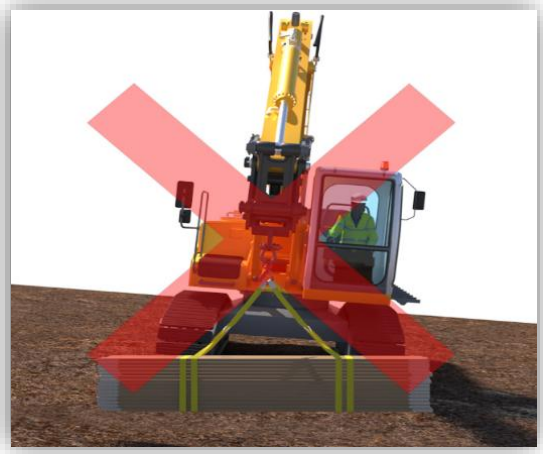
In both scenarios travel with the load in front of the excavator and avoid travelling with loads parallel to the gradient as the stability of the excavator will be greatly reduced.

Avoid slewing with a load on a slope

The accessories will need to be as short as possible in their configuration so to allow safe travel of load and reduce additional dynamic forces that may be caused by the load swinging when in motion.

The load is to be kept as close to the ground as possible while still allowing unhindered movement of the excavator.

Consider applying an increased factor of safety to the static duty charts, potentially of 3, *i.e. maximum of 33% of the published duty charts.*



Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

v. Wheeled Excavators:

Static duties

Ensure that the lift plan identifies the exact configuration the excavator is to be maintained in.

Ensure that the operator maintains axle lock set to 'on' and understands how the safety devices work, especially where the machine will automatically disable the axle locks. Some machines have this safely feature set at 5km/h. This should be checked in the operator's manual.

Operators of wheeled excavators must only lift loads over the fixed axle unless stabilisers, axle locks and dozer blade are employed.

Before lifting operations commence, stabilisers should be lowered so that the machine's weight is taken off each tyre but with the tyres touching the ground.

The excavator is to be levelled by adjusting stabilizers up or down as required. A wheeled excavator will be more stable and have better lifting capacities with the axle locked or the outriggers/blade deployed.

Operators of wheeled excavators **must only lift loads over the fixed axle** unless stabilisers, axle locks and dozer blade are employed.

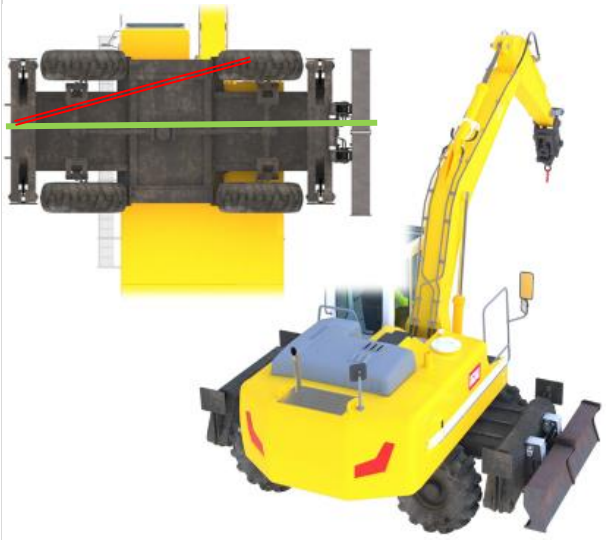
Please note:
When setting the axle lock to 'on' this may require a manual over-ride as many wheeled excavators automatically turn axle locks off at a set speed to provide a smoother ride for the operator.

Ensure that the 'over the side' duties for the excavator are used to calculate its maximum safe lifting capacity.

In the following images you'll see how the deployment of axles locks, blades and stabilizers has a significant effect on the rated capacity of the excavators.

Key: shows tipping point of the excavator while represents the geometric centre of the excavator.

Example duties below are for a typical 18t machine.
(Check the duty chart for your proposed machine)



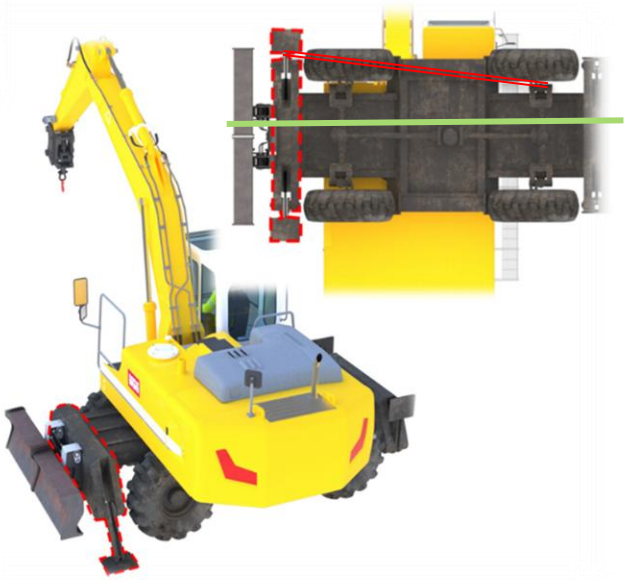
Configuration: Free on Wheels – No axle lock
Rated capacity: None

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Configuration: Free on Wheels – Axle locked
Rated capacity: 3.7 t

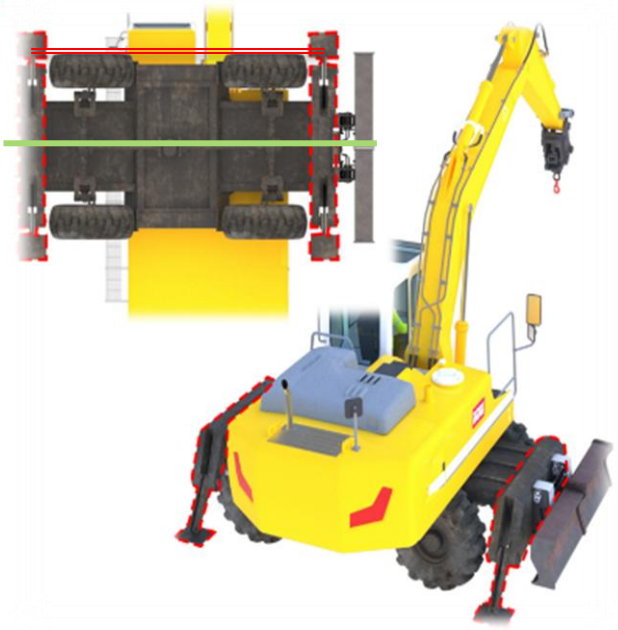
Configuration: Blade down- Axle locked
Rated capacity: 5.1 t

Configuration: One set of stabilisers down – Axle Locked
Rated capacity: 5.4 t



Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Configuration: Stabilisers down and blade down
Rated capacity: 7.8 t



Configuration: Two sets of stabilizers down
Rated capacity: 10.4 t

Please note:
Excavators with a front dozer blade have additional stability when the blade is lowered to the ground and taking the weight of the front of the machine but with tyres just touching the ground.

In some cases, manufacturers will specify that the blade is tilted or in the down position.
Operators must check what configuration is required for their machine.

Failure to lower the blade decreases stability as axle oscillation allows the chassis to rotate on the axle.

Tyres:

Tyres play a vital part in the stability of 360° wheeled excavators and 180° backhoe loaders.

Stability and load carrying capacity can be adversely affected by issues such as:

- Incorrect tyre pressure
- Differences in diameter of tyres on the same axle due to differential wear
- Differences in diameter of tyres on the same hub for twin wheel machines
- Incorrect ply rating
- Use of tyres which are not of the required performance specification
- Tyres with identical nominal sizes being of different physical size
- Poor tyre repairs

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

vi. **Pick and Carry**:

When undertaking pick and carry operations, as far as is practicable, avoid selecting wheeled excavators unless absolutely necessary.

Attachment to Quick Hitch/Attachment Point:

Shackles:

When lifting with excavators it is impossible to guarantee a 'straight' or 'in line' lift from load point through to the load, therefore connection of the lifting arrangement to either the quick hitch or the attachment point must be made via a suitably sized bow shackle.

The rounded bowl (Crown) enables slings to sit safely and pull at angles although with a reduction to the safe working load.

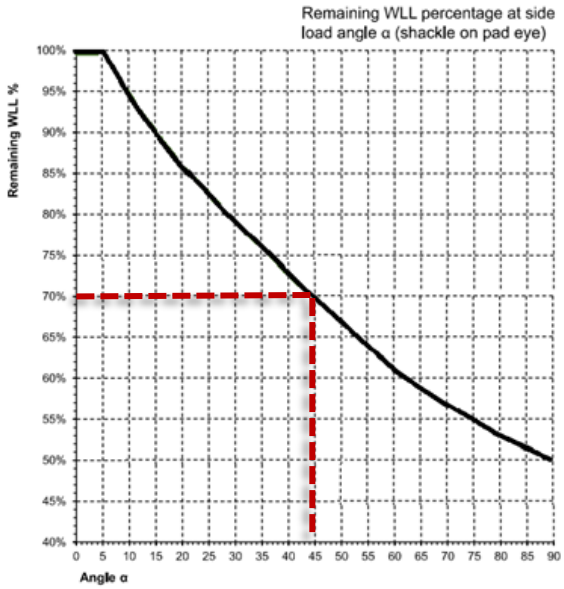
Fixed Nut Shackle

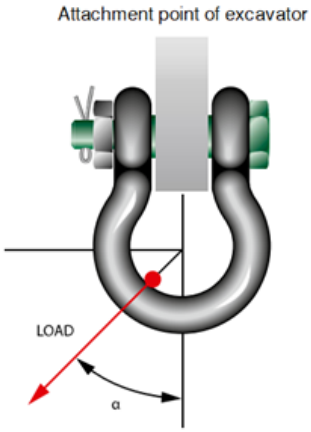
Note:
The bow shackle should have a nut and split pin or similar, so that tools are required to remove it.

This utilisation of this type of bow shackle is because the movement of the excavator boom when slewing with loads, and in pick and carry operations, will cause the pin of a standard shackle to loosen.

Side loads

See table below for reduction of WLL of the bow shackle in relation to angle of load on the crown of the bow shackle





Example:

If using a 5 t. shackle with a swivel hook that is expected to move around on the shackle by up to 45 deg. then the shackles SWL = 5 (t) x 0.7 = 3.5 (t)

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Swivel Hooks:

Utilisation of a swivel hook in the lifting arrangement will assist in any configuring required *i.e., turning, or spinning of the load*

There are two different types of swivel hook available:
Swivel hooks **with a nut** at the top generally have a brass bushing and are only designed to allow swivelling **before** the load is applied; **these are not suitable** for lifting with excavators.

Swivel hooks **without a nut** at the top generally have ball bearings and are designed to swivel once the load **has been** applied; **these are suitable** for lifting operations with excavators.

Please note:
Always consult manufacturer's data sheet for safe use instructions.

viii. Ground Loading calculation:

Excavator specification sheets or brochures will sometimes give you a table stating operating weights and ground pressures.

Please note that these tables refer to an excavator operating as per its designed use - excavating and are not to be referenced when performing lifting operations.

When working out bearing pressures for tracked excavators the following calculation is to be used:

Special note:
Some manufacturers provide options to lift from a prepared lifting point on the back of the bucket. If this is being used, ensure the bucket weight is allowed for in your calculations.

Lifting over the front/rear	
Calculation	*Calculation note*
P = total load on each track = ½ x **W**	**W** = *total weight of excavator and load*
A = area of each track = **L** x **B**	**L** = *length of track between end rollers,* **B** = *track width*
M = overturning moment = **P** x **e**	**e** = *eccentricity of combined COG from centre of track. COG assumed to be in middle 1/3 of track, i.e. maximum value of* **e** =**L**/**6**
z = plastic section modulus = (**B** x **L**^{2})/**6**	*This calculates the "height" of the sides of the triangle above the rectangle*
Bearing pressure (front) = (P/A) + (0.75 x M/z)	*0.75 represents not exceeding 75% of tipping point*

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Lifting over the side	
Calculation	*Calculation note*
Bearing pressure (side) = (3/4 x W) / A	*Bearing pressure is calculated as 75% of total load of excavator and load acting as a UDL on each track.*

Lifting diagonally over one end of a track (approx. 45 degrees)	
Calculation	*Calculation note*
Bearing pressure (diagonal) **Qmax = (4/3 x Q)**	Find the largest of the two previously calculated bearing pressures and use a 'Q' in the formula. **Qmax** = Using the largest of either bearing pressure (front) or bearing pressure (side)

Special note:
Always ensure track pressures are calculated by a competent person.

ix. Lift Category - Complexity of the lifting operation

The category into which a particular lift will fall depends on the assessment of the hazards associated with both the **environment** in which the lift is to be carried out and those associated with the **load and lifting equipment.** As part of the planning process for the lifting operation, the environmental and load/lifting equipment complexities should be evaluated and categorised as either 1 *(low)*, 2 *(medium)* or 3 *(high)*.

This will then enable the complexity of the lift to be established as shown in the examples in the tables below.

*Environmental complexity [**E** in tables following]*			
3	Complex	Complex	Complex
2	Intermediate	Intermediate	Complex
1	Basic	Intermediate	Complex
	1	2	3
	*Load/Lifting equipment complexity [**L** in tables following]*		

Please note:
Increases in either or both environmental or load complexity will lead to the lift being allocated a higher category.

Having identified the hazards associated with a particular lift, a hierarchy of control measures should be applied to eliminate or control those hazards.

Table 1. Shows an example of an increasing environmental complexity while the load/equipment complexity remains low.

Complexity variables and constants	Lift category		
	Basic	Intermediate	Complex
Increasing environmental complexity	The operator has clear sight of the load path, and the load is to be placed on the ground.	The load is to be placed over an obstruction such that the operator might not have clear sight of the landing area from the control position	The load is to be placed in a trench behind a bund, without line of sight, and with proximity hazards, such as scaffolding or overhead power lines
Constant low load/lifting equipment complexity	A load of known weight with designated top lifting points and central centre of gravity. The load does not contain fluids, is not fragile and is inherently stable when landed.		
	E = 1 & **L** =1	**E** = 2 & **L** = 1	**E** =3 & **L** =1

Table 2. Shows an example of an increasing load/equipment complexity while the load/equipment complexity remains low.

Appendix B: Overview of lifting with Excavators – Considerations when planning the operation

Complexity variables and constants	Lift category		
	Basic	Intermediate	Complex
Increasing load/lifting equipment complexity	A load of known weight with designated top lifting points and central centre of gravity. The load does not contain fluids, is not fragile and is inherently stable when landed.	A load of estimated weight with an estimated centre of gravity and without designated lifting points. The load does not contain fluids, is not fragile and is inherently stable when landed.	A load of estimated weight and centre of gravity and without designated lifting points. The load contains fluids, is fragile and is not stable when landed.
Constant low environmental complexity	The operator has clear sight of the load path, and the load is lifted to and from the ground		
	E = 1 & **L** = 1	**E** = 1 & **L** =2	**E** = 1 & **L** =3

Tables and content contained within all of the above are referenced in greater detail on pages 13 & 14 of the Strategic Plant Forum Guidance document available here

Appendix C: Good practice lifting procedure – A benchmark resource

First arrival to project:

Operatives:

All lifting team members will arrive to site to attend a project induction, including a briefing of the sites rules and requirements.

Checks will be made to confirm that all operatives involved in lifting operations for the excavator have the correct accredited competencies to perform the planned lifting operations and are in possession of an in date safety critical medical.

Check that the excavator operator has been familiarised in the use of the machine proposed for the lifting operation.

Copies will be taken, and details recorded in the appropriate documentation.

Checks will be made to ensure that operatives are supplied with the correct PPE to align themselves with project PPE & any lifting specific protocols.

For this project the PPE requirements are: [List the PPE requirements in the bullet points below]

- *Hard hat c/w chin strap [if applicable]*
- *Hi vis clothing required*
- *Gloves*
- *Glasses*
- *Footwear*
- *Hearing protection*

Excavator:

Review of excavator certification will be carried out to ensure that the machine has:

- A 12-monthly, valid and in date, RoTE (report of thorough examination) for the appliance (excavator)
- A 6-monthly, valid and in date, RoTE (report of thorough examination) for the quick hitch where fitted.

Please note:
Some excavator RoTEs will have the quick hitch (if applicable) entered upon the 12 monthly certification. If this is the case, then the serial number and WLL of the quick hitch should be entered upon the certificate with the certificate being dated within a 6-month period of arrival to project.
If the certificate is dated between the 6 month to 12 month period, then a valid RoTE for the quick hitch should be obtained prior to lifting operations beginning unless the quick hitch is a permanent attachment.
Note that where the manufacturer's designed load lifting attachment point is located on the arm or on the back of the bucket, then these should be marked.

Briefing of the lift plan and RAMS:

Once induction(s) are complete, the appointed person or lifting supervisor [where briefed by the appointed person previously] shall make themselves known to all operational personnel and conduct a briefing on the lifting plan & associated schedule of common lifts prior to commencing operations.

When satisfied that the lift plan and associated schedule of common lifts have been briefed and understood, the appointed person, if briefing, will then hand over to the lifting supervisor who will then take the lift team members to the operational area:

Daily activity briefing(s) & toolbox talk(s):

Prior to works commencing a daily activity briefing will be held to communicate works being carried out, anticipated deliveries, significant 'other' plant movements, restricted access and exclusion zones, pedestrian walkways etc. to the lifting team. If applicable a toolbox talk will also be carried out to communicate any anticipated or historic issues that will have/or have had an influence on safe lifting operations etc.

Appendix C: Good practice lifting procedure – A benchmark resource

The work area set up:

The working area must be cleared to allow the excavator lifting operations to take place in a safe manner without endangering miscellaneous personnel not directly involved in the lifting operations.

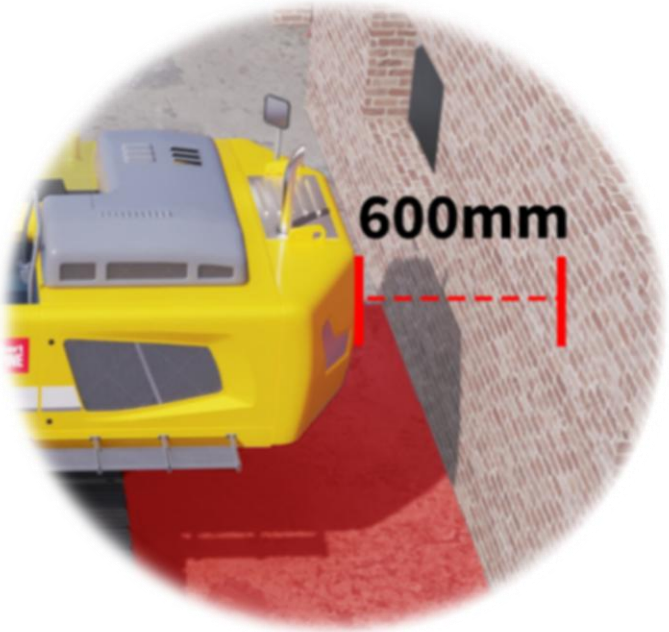
Area(s) of excavator lifting operation(s), set up and delivery areas (if applicable) will be cleared of any obstructions that could impede on any part of the anticipated lifting operation.
Restricted access zones & exclusion zones, as required will be erected around working areas, this is inclusive of all delivery/unloading areas that are required.

Where practicable physical barriers will be utilised around lifting, travelling & loading areas complete with appropriate signage.

Any positional restrictions for the excavator i.e., stop-blocks to control proximity to the edge of an excavation by the machine etc. will be placed as required.
Checks to be made to rear swing radius of the machine to identify any possible 'crush' points.

Hold Point:
Where an excavator is being used on a working platform or stockpile then a competent person i.e. Temporary works coordinator/supervisor is to ensure that the adequacy of the ground has been assessed.

Please note:
There is a requirement for a min. 600mm clearance between the counterweight/rear swing of the excavator and any adjacent temporary/permanent structures.



Pre-start checks:

The excavator operator will carry out the daily pre-start checks relevant to the excavator model as per manufacturer's operating manual.

Hold point: If the excavator is to be unattended for any reason it shall be left in a safe condition:

- No load or lifting equipment to be left on the quick hitch.
- The engine/power source shall be shut down and isolated as per manufacturer's instructions, and excavator will be secured and locked.
- The keys will be removed from the equipment when exiting the working cab.

Checking the quick hitch [if applicable] or accessory attachment point:

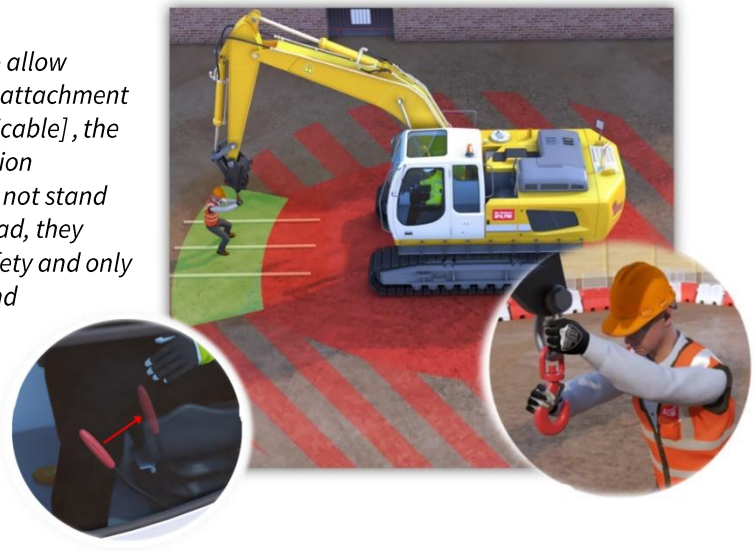
The slinger-signaller will stand clear and instruct the excavator operator to lower the boom to such a height to allow visual checks of the quick hitch [if applicable] or accessory attachment point to be carried out in a safe manner.

Appendix C: Good practice lifting procedure – A benchmark resource

Hold point:

When lowering the boom to allow inspection of the accessory attachment point or quick hitch [if applicable] , the slinger-signaller must position themselves, so that they do not stand directly under boom of the excavator. Instead, they should place themselves in a position of safety and only approach the boom when it is stationary and at a height to be safely inspected.

Prior to approaching the attachment point the excavator operator should apply the 'dead man's' handle.



Checks to include:

Quick hitch [if applicable]:

- Ensure that the quick hitch coupler is compatible with the machine, lifting accessories and slung loads.
- Examine the quick hitch coupler for any visible damage, such as cracks or excessive wear.
- Check that the coupler's locking mechanism is functioning correctly to secure the lifting accessories.

Attachment point:

- Ensure that the attachment point is compatible with the lifting accessories and slung loads.
- Examine the attachment point for any visible damage, such as cracks or excessive wear

<u>Checking the accessories:</u>

Special note:
When attaching accessories to the quick hitch/attachment point, good practice is to utilise a swivel hook between the bow shackle at the point of attachment to the quick hitch/attachment point & the accessories attached to the load.

If utilising this type of arrangement, then check with the manufacturer/supplier prior to purchase/hire, that the swivel hook is designed to swivel once the load has been applied

Appendix C: Good practice lifting procedure – A benchmark resource

Hold point:

When using accessories with excavators, if there are mobile/crawler/tower cranes etc. working in the vicinity then good practice is that the accessories should be clearly marked for 'excavator use only' to minimise the chance of the accessory [accessories] being used by other appliances that lift overhead.

See example opposite of a tag utilised by Sir Robert McAlpine

Prior to attaching lifting accessories to the quick hitch [if applicable] or attachment point & load, the slinger-signaller will check:

- The accessory/accessories has been suitably identified with a serial number & WLL and has a current colour coded tag attached with details of accessory entered upon it. If no in date RoTE is available for the accessories they shall not be used.
- The accessory/accessories for any signs of damage and to ensure they are in a safe condition and fit for use - Any defects will be noted, and accessories not used if defects found. Obey quarantine and marking procedures for damaged items.

Please note:
Some items for delivery may be pre-slung before arrival - checks are to be made to all lifting accessories to ascertain that they have the correct certification prior to unloading - Copies MUST be made available for project records.

Where loads are pre-slung the slinger-signaller will check that the accessories are attached to the load as per the associated schedule of lifts.

Checking of manual load control equipment (taglines/ push-pull poles):

Prior to attachment or use of any load control measures checks will be made to ensure integrity of use.

Taglines will be checked for:

- The tagline is of a suitable length to assist the slinger-signaller in remaining in a safe position away from the load when controlling it, but not of a length that entanglement in the tagline is a risk.
- Any knots, as knots cause entanglement or can become snagged on any permanent or temporary structures.

Push-pull poles will be checked for:

- Integrity of pole structure – bends, or folds/creases
- Hook end complete

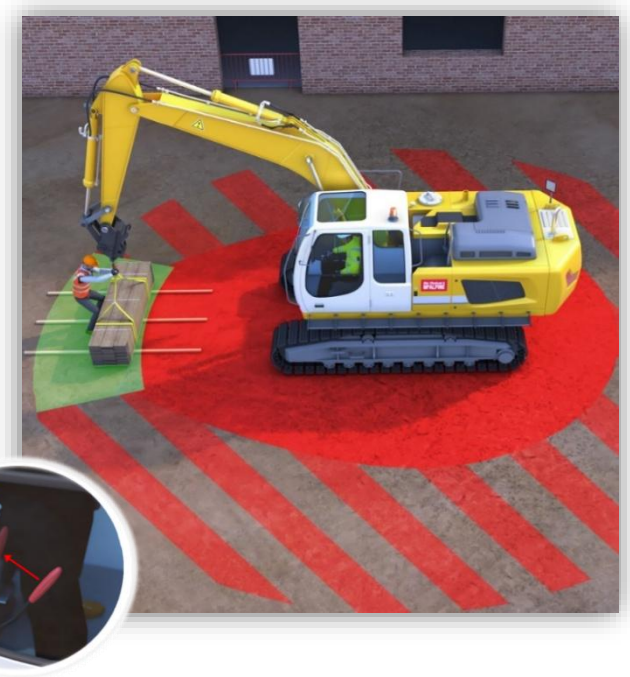
The lift:

The excavator will travel into position as set out for the operations anticipated under the control of vehicle marshal /slinger-signaller (pick & carry operations).

Checks will be made for any operatives within the immediate area and audible warning will be given via verbal direction/instruction or electronic warning devices i.e., electronic whistles etc.
Once area is clear of personnel not associated with lifting operations, the lift can proceed

Attachment of the load:

Accessories as required for safe lifting of the load can now be attached to the load and attachment point on the excavator boom as laid out in the associated schedule of lifts document



Hold point:

If ancillary accessories are being utilised around the load i.e., webbing slings around ply being attached to chain slings etc., then the boom of the excavator will be held at such a position, so the primary accessories attached i.e., chain slings, do not interfere with the slinger-signaller's movement around the load and the safe attachment of the ancillary accessories.

When lowering the boom to allow accessory attachment to the excavator, the slinger-signaller must position themselves, so they do not stand directly under the boom of the excavator.

Instead, they should place themselves in a position of safety and only approach the boom when it is stationary, controls isolated and at a height to be allow safe attachment of the accessories.

Prior to approaching the attachment point, the excavator operator should apply the dead man's handle.

The trial or test lift:

After the attachment of the load to the attachment point the slinger-signaller will attach any manual load control equipment i.e., taglines etc., that maybe required to aid the final positioning of the load during the initial raising and final lowering of the load.

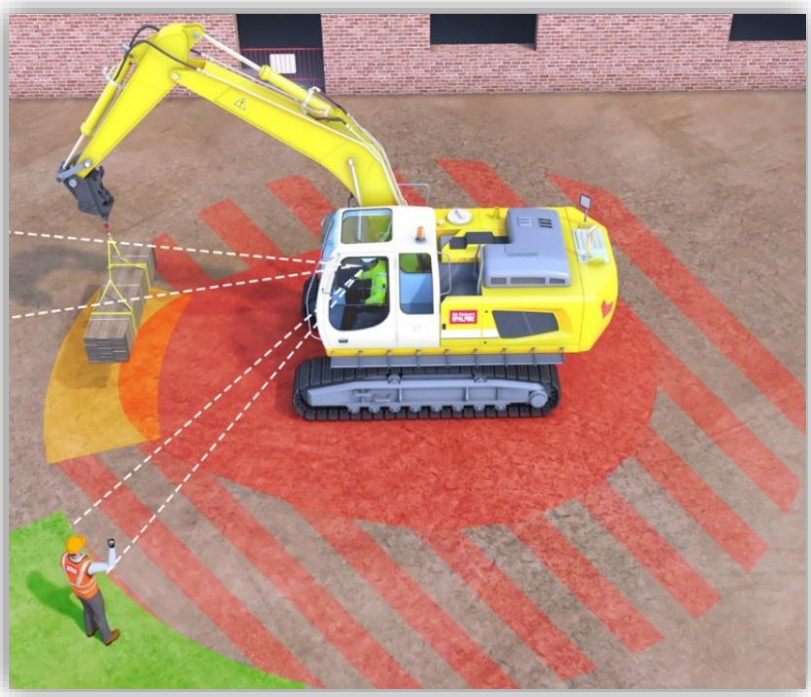
Hold point:

When attaching tagline[s] to a load, best practice is to attach to the load and not the accessories. Where this can't be achieved then tagline[s] can be attached to the accessories but only if the integrity of the accessory attachment isn't affected and a safe positioning of the controlling operative is confirmed.

- Taglines will not be wrapped around any body part or structure to assist control or stability.
- Taglines and other manual control measures should only be handled by the slinger-signaller during the initial raising and final lowering of the load and **NOT** while the excavator is slewing or travelling with the load.
- If the load configuration needs to be controlled whilst in motion, then this should be suitably risked assessed.

The slinger-signaller will now step away to a safe space where they are in full vision of the load.
The excavator operator will be instructed to slowly raise the boom to take the slack out of the accessories, and raise item to a height of no more than 500mm to complete a trial lift to allow the slinger-signaller to check the following:

- Load is balanced – correct centre of gravity found
- Accessories are sitting correctly – have not shifted once weight has taken
- Load is still as secure as it was on the ground – nothing can come loose from load
- Load control equipment (if utilised) is/are positioned correctly.
- Any accessory protection is still in place and providing adequate safeguarding



Hold point:

If any adjustments are to be made, then the load shall be lowered to the floor whereupon the slinger-signaller can then approach the load to attend to any issues found.

Final raising of the load:

Once happy with the load, the slinger-signaller will then, again, step away to a position of safety and instruct the excavator operator to raise the load clear of any obstructions.
Audible warnings will again be given to notify of the lift being lifted.
The slinger-signaller will then guide load to required delivery/landing area.

Please note:
The quick hitch lifting eye is designed for straight lifts only.
Therefore, the quick hitch must e positioned at the appropriate angle to achieve this.
Constant adjustment will be required during the lift to ensure this is maintained.

Pick and Carry:

Before commencing pick and carry operations, site management should consider if there is a different lifting appliance available that is able to travel the loads, e.g. a telehandler lifting a palletised load.
Additionally, the distance to be travelled should be minimised, so as to negate the risk of the machine overturning or injuring any adjacent slinger-signallers.

Once all checks are completed and the lift is deemed safe to proceed, raise the load as required until clear of any obstructions.

Slinger-signaller will instruct the excavator operator to slew the load (if required) to the 'front' of the machine in the 'forward' position. Avoid travelling with the load over the side of the machine, as this is the excavator's least stable direction of lift. Always complete the slewing motion before commencing any tracking.

Please note:
Where fitted, 270° or 360° camera systems should be used to assist the operator's all-round visibility during slewing and tracking, helping to identify obstructions, adjacent plant, structures, and persons, and thereby reducing the risk of collision.

Slinger-signaller will instruct the excavator operator to travel with the load along the agreed path to the agreed landing area whilst always keeping the load a clear distance from the Excavator tracks

Appendix C: Good practice lifting procedure – A benchmark resource

Hold point:

All travelling movements are to be carried out with the load as close to the ground as possible without impeding safe travel, and with the excavator operating at reduced speeds.

The slinger-signaller is to remain visible to the excavator operator throughout the tracking and must remain in a position of safety, paying attention to nearby structures & other plant that may become potential crush zones.

Should the excavator be handling large area light weight loads then an assessment of the wind speed and stability of load shall be undertaken. Consideration shall also be given to the segregation of the lifting and travel route to prevent unauthorised access to the operating area. Where visibility is restricted, available machine-mounted vision aids (such as 270° or 360° camera systems) should be utilised to enhance the operator's awareness of surrounding plant, structures, and persons during slewing and tracking.

Special note:
When pick and carry operations are anticipated ensure that all operatives within the adjacent areas of tracking path are informed of the route the excavator will take to ensure they keep clear. This includes operatives who may walk out from openings that are blind to the machine operator. The size of the load may obscure the vision of the operator, so careful load height positioning is required. It is also important to verify the rated capacity has the required down rating relative to the weight of the load. This should be recorded in the lift plan.

Where possible brief the segregated 'tracking' route to the workforce in the morning dabs prior to works commencing.
Utilise additional vehicle marshals (if required) to ensure the safety of all involved in the tracking of the excavator with load.

<u>Landing the load:</u>

Again, checks will be made for any operatives within the immediate area and audible warning will be given via verbal direction/instruction or electronic warning devices i.e., electronic whistles etc.

Once the area is clear of personnel not associated with the lifting operation, the lift can then be lowered.

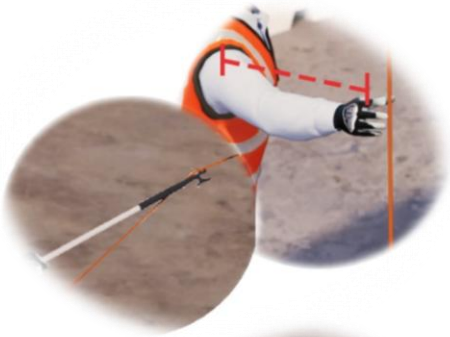
The slinger-signaller will identify and safely position themselves into a position of safety where they can see the load in its entirety while remaining in visual contact with the excavator operator.

When the load is at the required delivery area, the slinger-signaller will then instruct the excavator operator to begin lowering the load

Appendix C: Good practice lifting procedure – A benchmark resource

Hold point:

As the load lowers the slinger must not stand or position themselves, or place any body part, between a fixed or temporary structure where a potential crush or entrapment can happen.



If utilising load control equipment, then the slinger-signaller will instruct the excavator operator to hold the load in such a position so that the equipment can be either retrieved (tagline) or employed (push-pull pole).

Hold point:

The slinger-signaller should never retrieve the tagline while the load is in motion.
When retrieving taglines, the slinger-signaller will keep an arm's length away so as not to position themselves near the load. Good practice here is to retrieve the load via grab stick.

The load should then be orientated to allow a safe landing without walking under the boom.

If the slinger-signaller needs to approach the load at this point, they can do but the load must be at waist height

If the slinger-signaller needs to handle the load at this point this should be done, if practicable, by using the flat of their hands to control the load.
They must be mindful of placing hands, fingers, and feet in any potential crush points, and be aware of placing themselves under the boom of the machine.
The load can now be lowered to the final delivery/landing position.

<u>Removal of accessories:</u>

Hold point:

Due to the natural movement of excavator boom, the load can shift considerably so special attention is required to ensure that the load can be landed safely. It is exceptionally difficult to just lower the load vertically without the boom radius increasing.

Ensure, when landing the load, that the load can be left in a safe manner and without causing harm when left unattended. To ensure integrity of bundled loads i.e., the load cannot collapse or fall over after accessories are removed, then a securing ratchet strap or similar may be required around the load.

Once landed, the position of load is to be checked for:

- *Integrity of load after accessories have been removed – i.e., load won't move or collapse.*
- *Securing bands or straps are still tight around the load and haven't loosened during the movement through the lifting operation.*
- *If utilising chocks or spacers to land the load on, ensure that they are of a suitable size and stability to allow safe removal of accessories.*
- *There is sufficient room around the load for to allow for safe access and re-slinging if required.*
- *Positioning of the load in relation to pedestrian walkways/access routes – Not infringing on to a defined pathway.*
- *When landing bundled loads timber wedges or similar are placed to negate the load spreading once the accessories and any securing banding strap(s) are removed.*

Sir Robert McALPINE

Proudly building Britain's future heritage

Sir Robert McAlpine Ltd
Eaton Court | Maylands Avenue | Hemel Hempstead
Hertfordshire | HP2 7TR

+44 (0) 333 566 3444
information@srm.com

www.srm.com