Construction Skills Certification Scheme

Safe Operation of Earthmoving Plant

360º Excavator

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Receipt

I have received a copy of the CSCS Safe Operation of Earthmoving Plant – 360 Degree Excavator notes and agree to read it carefully and comply with all the guidance and advice on safety and good working practices which it contains.

Signature	
Full Name	
Date	

Name of Company or Organisation	
Address	

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Acknowledgements

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Introduction

This guide for the safe operation of 360 Degree Excavators has been produced for plant operators. It sets out to provide guidance in an easy to read form, paying particular attention to the duties of the 360 Degree Excavator operator. It covers a wide range of operating conditions and activities, and aims to promote safe working practices which comply with current legislation and the precautions to be taken if accidents are to be avoided.

Specific sections on the preparation and operation of 360 Degree Excavators contain readily accessible information in a checklist format with a simple **Do's** and **Don'ts** message.

This guide complements manufacturers' instructions and recommendations with regard to:

- general safety legislation and safe operating procedures for 360 Degree Excavators
- safe and efficient use of 360 Degree Excavators
- basic operator maintenance.

Manufacturer's operating manuals must always be used for the relevant machine and referred to as and when required. The manufacturer of the machine has no direct control over the operation of the machine – *it is the responsibility of the operator to work safely at all times.*

This guide does not attempt to try to cover every aspect of working conditions when using 360 Degree Excavators and does not cover every make and model of 360 Degree Excavator available.

1. Safety, the law and you

This section provides guidance for employers, employees and the self-employed who use mobile plant equipment. Minimum legal requirements are outlined which relate to the safe use of mobile plant. Various Acts of the Oireachtas and statutory requirements, examples of which are listed below, provide the definitive legislation to be followed.

Legislation

Legislation to be followed includes the Safety, Health and Welfare at Work Act 2005 (SHAWWA). Parts of the Act and other regulations connected with the operation of plant include:

- *General Duties of Employer*
- *General Duties of Employee and Persons in Control of Places of Work*
- Protective and Preventive Measures
- Safety Representatives and Safety Consultation
- The Health and Safety Authority
- Offences and Penalties

All Health and Safety rules also apply to self-employed persons.

Regulations and Codes of Practice

Regulations made under an Act of the Oireachtas are mandatory

Safety, Health and Welfare at Work (Construction) Regulations 2013 S.I No. 291 of 2013 include

- Design and Management
- General Duties of Contractors and others
- General Safety Provisions
- Excavations, Shafts, Earthworks, Underground Works and Tunnels
- Cofferdams and Caissons
- Compressed Air
- Explosives
- General Health Hazards
- Construction Work on or Adjacent to Water
- Transport, Earthmoving and Materials-Handling Machinery and Locomotives
- Demolition
- Roads
- Construction Site Welfare Facilities
- SCHEDULE 4 - Safety Awareness Scheme
- SCHEDULE 5 - Construction Skills Certification Scheme
- SCHEDULE 6 - Procedure for Selection of Site Safety Representatives
- SCHEDULE 7 - List of Machinery

- **The Safety, Health and Welfare at Work (General Application) Regulations 2007 S.I. No. 299** include:
- Workplace and Work Equipment
- Use of Work Equipment
- Personal Protective Equipment
- Manual Handling of Loads
- Display Screen Equipment
- Electricity
- Work at Height
- Control of Noise at Work
- Control of Vibration at Work
- Safety Signs at Places of Work
- First-aid
- Explosive Atmosphere at Places of Work

The introduction of the above legislation, which protects people at work and those who may be affected by their actions, has helped to improve our working environment.

The legislation concerns employers, employees and the self-employed, and makes people responsible for their actions, as well as their omissions, including others affected by their actions.

Regulations made under an Act of the Oireachtas are mandatory and may be supplemented by an Approved Code of Practice (ACoP), which advises organisations and their staff on how to comply with the law.

If the advice of the ACoP is followed then generally you are meeting the requirements and complying with the law. If you, or your organisation, are prosecuted for breaking a health and safety law and it is proven you did not follow the advice in the ACoP, you must prove you have complied with the law in another way.

Penalties can be imposed on persons who are found guilty of a Health and Safety Offence (on summary conviction), which may include:

- a fine
- a term of imprisonment.

Penalties may be imposed for:

- Contravening any of the relevant statutory provisions
- disobeying a Prohibition notice
- unauthorised disclosure of information
- a breach of the conditions of a licence.

Duties of personnel

It is in the interest of every employer and employee involved in the use of mobile plant and equipment to promote safety within their workplace.

Legal duties of employers

*'Every employer shall ensure, so far as is reasonably practicable, the safety, health and welfare at work of his or her employees.' **

Employers have a duty to**:**

- provide a safe working environment that is without risk to health
- provide and maintain safe plant and equipment and ensure it has been designed, constructed, tested and examined to be safe
- carry out risk assessments and provide their employees with clear and appropriate information on any risks that exist in the workplace and how they intend to reduce those risks
- prepare a safety statement based on the risk assessment
- Provide suitable protective clothing and equipment (PPE) to ensure the health and safety at work of their employees. 'Every employer shall ensure that any measure taken by him or her relating to safety, health and welfare at work do not involve financial cost to his or her employees' *****
- provide employees with any necessary information, including legal requirements, adequate instruction, training and supervision *'in a form, and manner and, as appropriate, language that is reasonably likely to be understood by the employee concerned' **
- obtain the services of a competent person for Health and Safety purposes
- provide adequate welfare facilities

Legal duties of employees

In general terms, the law says that you must:

- be responsible and as safe and careful as possible in your work, so as not to put the health and safety of yourself or others at risk, including members of the public
- co-operate with and assist your employer or any other person, as far as necessary, to enable them to carry out their legal duties in health and safety
- not interfere with or misuse any safety devices or equipment
- not intentionally or recklessly interfere with anything provided in the interest of health, safety and welfare
- follow your employer's procedures and the manufacturer's instructions which apply to the care and safe operation of the machine you are responsible for
- inform your employer, without unreasonable delay, of any work situation that you are aware of which presents a risk to the health and safety of yourself and others
- report (without delay) any defects in plant and equipment which might endanger safety.

All Health and Safety rules also apply to self-employed persons.

***Source**: Safety, Health and Welfare at Work Act 2005*

2. Accident prevention and control

Accidents are unplanned, unwanted events which can injure or kill people. Industry also pays a price with loss of working hours, loss of production and damage to plant and equipment and extra costs.

Remember that **you,** as an operator of plant equipment, **are the key to safety**: good safety practices not only protect you but also protect others around you.

Accidents can be caused by unsafe working practices and attitudes of people in the workplace. By following a safety programme and adopting safe working practices, unsafe conditions can be avoided. This contributes to improving safety in the workplace.

Prevention can remove or reduce the likelihood of an accident by following some basic rules, for example:

Do

- Protect yourself – wear all protective clothing and personal safety equipment issued to you or required by your working conditions
- Follow a safety programme – understand and follow safety procedures when working on site and using plant and work equipment
- Assess your ability to do the job – ensure you are fully aware of the job requirements and how they need to be carried out
- Stay alert – know where to get help. Know the first aid and emergency procedures
- Make yourself aware – study the manufacturer's operator's manual for using your plant and equipment. If the manual is not provided, ask your supervisor or the suppliers of the plant/equipment to supply one
- Report faulty/unsafe plant or equipment and any dangerous occurrences and incidents
- Travel the plant equipment safely so as not to affect its stability
- Be careful – human error is caused by carelessness, fatigue, preoccupation and lack of concentration. Ensure you watch out for others who are affected by your actions
- Ensure all personal injuries, no matter how slight, are reported and entered in the accident book (or equivalent)
- Take advantage of any training programme offered by your employer or contractor. You are never too old to learn new practices or techniques.

Don’t

- Use plant or work equipment that you have not been trained to use
- Overload any plant or work equipment either by lifting or loading
- Operate plant and work equipment unsafely or at unsafe speeds
- Throw or drop objects from plant or work equipment
- Attempt to carry out work on moving parts of plant or work equipment with the safety guards removed
- Indulge in horseplay on plant or work equipment
- Attempt to operate any type of plant or work equipment if you are under the influence of drugs, alcohol or any other substance which affects your health or judgement
- Ignore warning instructions or safety signs.

3. Safe use of 360 Degree Excavators

If you are an operator of a 360 Degree Excavator you are legally required to be responsible for your own safety and that of others who are working nearby.

Common sense plays a major part in the safe operation and working of a 360 Degree Excavator. All operators should be aware of dangers and hazards, which could injure them or other site workers nearby, or cause damage to the machine.

Operators of 360 Degree Excavators are responsible at all times for the safety of their machine and its load.

Simple measures taken by yourself, your employer and by following some basic rules can reduce the possibility of risk. For example:

Do

- Comply fully with instructions given by site managers and supervisors
- Follow the manufacturer's instructions (operator manuals) for the specific 360 Degree Excavator you are operating
- Take safety precautions when using your machine prior to, during and after work
- Operate within the machine's capabilities.

Don't

- Operate any machine unless you have received appropriate training and are authorised to do so
- Ignore hazards
- Misuse, tamper or interfere with your machine and any associated safety equipment provided to you
- Endanger your own health and safety, or that of anyone else, through being negligent.

Before use

- Always check that the 360 Degree Excavator is serviceable and safe to use
- Carry out daily checks and maintenance
- Check working areas for hazards and obstacles, which could affect the operation of the 360 Degree Excavator.

During operation

Do

- Look out for people working and hazards such as trenches, potholes and cables
- Face the machine and use the steps and handholds when getting on or off. Ensure you maintain three points of contact
- Wear the seat belt.
- Ensure when loading vehicles that they park in the most appropriate ‘position’ to enable the slew movement to be kept to a minimum
- Ensure when loading vehicles that the load is evenly distributed and does not overload the vehicle
- Keep the drive sprockets to the rear whenever possible (particularly when working near deep excavations)
- Place excavated material clear of the excavation to prevent the weight of the material collapsing the sides and to prevent spillback
- Keep a safe distance from other plant or vehicles
- Ensure all cab doors are closed or are locked in the open position
- Extend the dipper attachment uphill when travelling up a steep slope
- Keep the dipper attachment close to the machine when travelling downhill. Keep the bucket low to the ground and face downhill
- Before leaving the machine unattended: drive clear of the working area; stop and apply brakes; disengage drive and controls; stop engine and remove ignition key
- Keep your boots as clean as possible in wet/muddy conditions. Brakes become less effective in these conditions. Wet/muddy boots can cause your feet to slip off the foot controls at vital moments.

Don’t

- Allow anyone to hitch a ride in the cab
- Allow anyone to be lifted in the bucket
- Allow anybody to work under any raised attachments
- Work or drive too close to banks or trenches where there is danger of collapse
- Indulge in games or horseplay
- Reverse the machine any great distance – slew around and face the direction of travel when travelling with the 360 Degree Excavator
- Run the engine in an enclosed area for long periods
- Leave the machine unattended with the engine running.

After use

- Park on firm, level ground; apply handbrake; ensure drive and controls are disengaged
- Stop engine and shut down in accordance with the manufacturer's recommendations
- Clean out any material from the track assembly
- Top up the fuel tank.

Additional precautions to be followed for 360 Degree Excavators

Do

- Communicate regularly with your work colleagues and others, and keep them informed of what you will be doing
- Ensure that if signals are to be used to communicate they are approved and understood by everybody involved (see appendix A for illustration)
- Ensure the area where you will be working has been checked for the presence of any buried live services before commencing any excavations
- Ensure you work within the minimum clearance required for working beneath overhead power cables. Check with site management and the local electricity supplier
- Take extra care when travelling across a slope. If the slope is too steep your machine could roll over
- Make yourself aware that due to the design characteristics of 360 Degree Excavators it is possible to excavate underneath the machine and thereby affect its stability
- Take extra care when travelling up and down hillsides and on embankments. Ground conditions can change dramatically due to weather conditions
- Set the rear view mirrors to give you a close view behind the machine when you are correctly seated
- Use the services of a signaller/banks person to assist you if visibility is restricted or there are obstructions in the vicinity
- Ensure that when you are installing/changing an hydraulically operated attachment your machine is correctly set up to suit the attachment
- Ensure the engine speed is pre-set to suit an hydraulically operated attachment
- Ensure when changing buckets all pins are greased and all locking devices are sound and secure. If you are using a quick hitch device, ensure all retaining devices are secure. Operate your machine's dipper and bucket rams several times to check that the bucket is secure before attempting to use it
- Take into account that cold weather can affect ground conditions, causing the tracks of your machine to freeze solid to the ground. Take effective measures to counteract the possibility of this happening.

Don’t

- Undercut an excavation face below or above your work position
- Swing the bucket of your machine over a vehicle cab
- Overload skips, hoppers or vehicles
- Load vehicles with a driver in the seat unless a FOPS cab is fitted
- Overload your machine – this can damage it and make it unstable
- Attempt to use attachments that are unsuitable to use with your machine
- Rely on the spoken commands, sites can be noisy. Follow approved signals
- Attempt to tip/push materials into excavations where there is no edge protection (stop block or berm)
- Operate too close to banks or excavations

Note:
As an operator of a 360 Degree Excavator you should be aware that there are regulations concerning the use of excavators used as cranes or lifting appliances. Your machine and the lifting gear you use may require certification to carry out certain lifting duties. The regulations are quite clear on what items require certification. You or your company may be requested by your client to produce this certification before you commence work or during work activities on site. You should always comply with this request. If you are unsure what to do in this situation consult your supervisor for further guidance (see Appendix B for statutory certification requirements)

4. Operator servicing and maintenance duties

The Operator's contribution to maintenance of the machine is of prime importance.

It is essential that adequate time and facilities are provided to carry out maintenance of your machine. Supplies of materials and substances (oils, greases, coolants etc.) should always be to hand, with suitable provision for storing them.

All maintenance should be carried out in accordance with the manufacturer's recommendations and your company's procedures.

Whatever system of maintenance and servicing is used, all operators have the responsibility to ensure the machine is in a safe condition for work.

Pre-use checks: It is estimated that the recommended pre-use checks of many manufacturers would include the checking and adjustments of the following:

- fluids – engine oil, coolant, transmission, brake, hydraulic
- tyres – rims, wheel nuts, wall and tread, pressures
- hydraulic pipe/hose condition, security leakages
- hydraulic rams condition, security, leakages
- lights, warning and safety appliances, such as reversing devices, horn protective guards
- ROPS/FOPS, seat and seat belts, driving position, mirrors
- controls, gauges, warning lights and other types of safety devices.

Running checks

- Hot/Cold starting methods
- Function of steering/brakes/hydraulic/electrical and mechanical systems
- During cold weather and extremely hot conditions always be aware of the operating temperature of the machine.

Maintenance and servicing schedules

Apart from daily pre-start checks, servicing schedules are usually based on machine running hours, therefore regular checks need to be kept on the machine's hour-meter reading.

Operators are likely to carry out only basic servicing on their machine in accordance with the manufacturer's recommendations and company procedures. In addition to pre-start and running checks, operators would usually be responsible for:

- cleaning air filter dust bowls
- draining water and sediment/fuel/water separators
- replenishing coolants, lubricants and fluids
- greasing all greasing pins and pivot points
- checking battery levels and condition of their terminals and cables
- carrying out minor adjustments.

You should only carry out the servicing on your machine if you have been trained and have been authorised to do so.

***Do not** attempt any major maintenance, repairs or adjustments to your machine which you are not authorised to carry out. This must be done by a suitably qualified and competent person!*

Do

- Ensure the machine is on firm and level ground before attempting to carry out any operator maintenance
- Where practically possible, place signs on the machine to prevent accidental start up before carrying out your operator maintenance duties
- Carry out regular visual checks for any defects, damage, leaks
- Keep footplates and steps clean and free from mud, dirt, oil, ice and snow etc.
- Complete daily/weekly maintenance/defect sheets if your company issues them to you. All faults/defects should be reported immediately and corrected before the machine is used.

Don’t

- Attempt to carry out any operator maintenance on a machine with a hot engine
- Attempt to inspect or clean the machine with the engine running
- Attempt to refuel or top up lubricants and fluids while the engine is running
- Remove the hydraulic tank filler cap or cover plate while the engine is running, stop the engine and release the pressure
- Remove the radiator cap when the engine is hot
- Add coolant to a hot engine
- Overfill the engine oil or fuel tank.

5. 360 Degree Excavator safety checklist

Safety starts with you. Remember! You, as a 360 Degree Excavator operator are the key to safety. You are legally responsible for your own safety and that of others working nearby.

Accidents are unplanned, unwanted events, which can injure or kill people. Simple measures taken by your employer and yourself can reduce the risk of them happening.

Fines can be imposed on your employer and yourself for breaching Health and Safety Regulations (in some instances it can also lead to imprisonment).

Ensure you wear all protective clothing and equipment and personal safety equipment (PPE) issued to you or required by your working conditions.

Only operate a 360 Degree Excavator that you have been trained to use and are familiar with.

Passengers should not be carried on your machine (even for the shortest of journeys).

Enlist the services of a signaller/banksperson to assist you if your vision is restricted or there are obstructions in the vicinity. Ensure there is edge protection when tipping materials into excavations.

Report all accidents (no matter how slight), faulty/damaged plant and equipment and any dangerous incidents. Stay alert, know where to get help, know the emergency procedures on site.

Always drive your 360 Degree Excavator with due consideration for others and adjust your speed to suit weather and site conditions.

Travel your 360 Degree Excavator safely, so as not to affect its stability. Take extra care when travelling on slopes or on hillsides.

Inspect your machine and working area at regular intervals before use to spot any defects, hazards or distractions. Take nothing for granted!

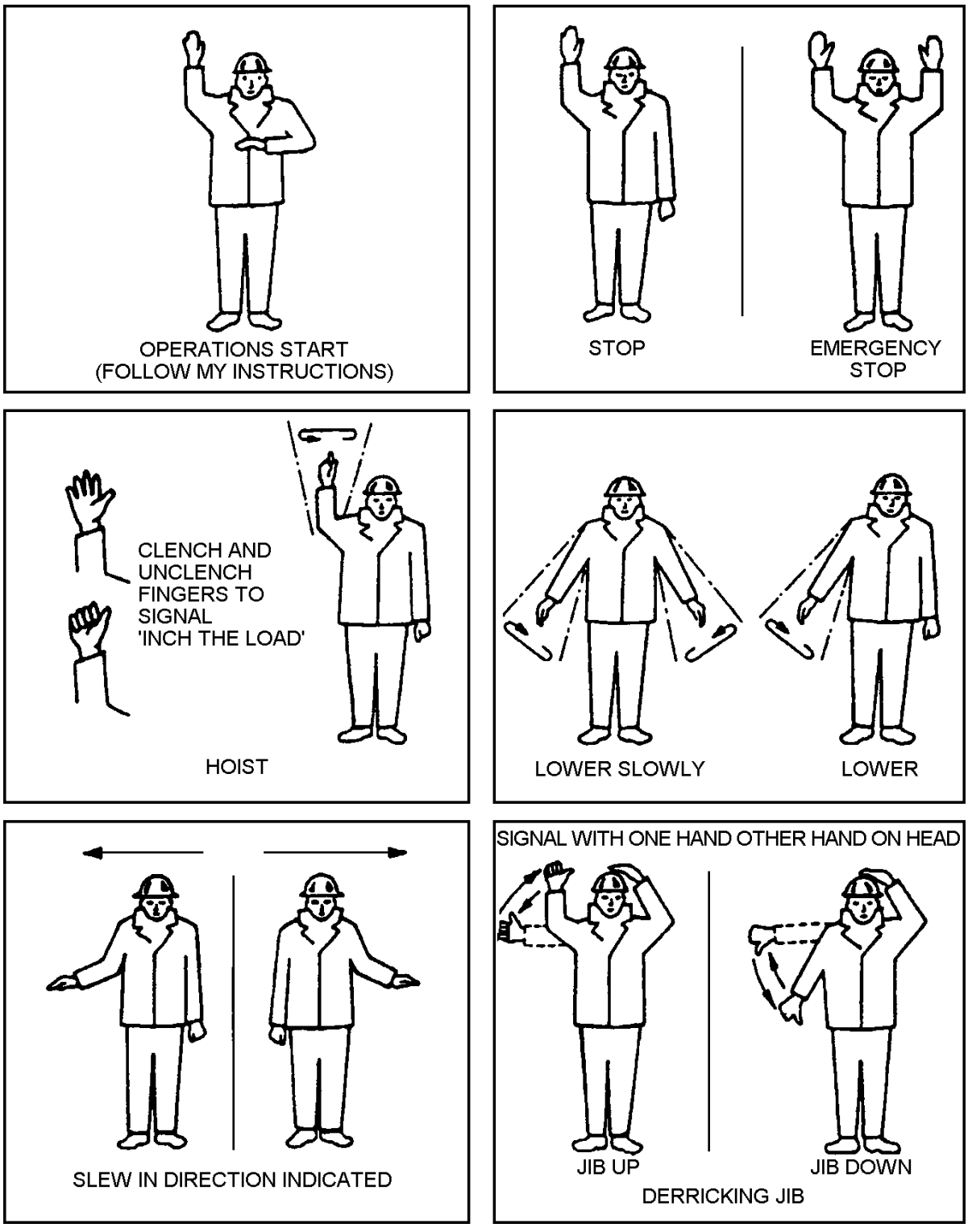
Observe all warning/safety signs and traffic regulations on site.

Never carry out a manoeuvre with your 360 Degree Excavator if it is likely to endanger yourself and others (even if your work colleagues request it to try and cut corners on a job). If in any doubt seek guidance from your supervisor.

Shut down, secure and isolate your 360 Degree Excavator in accordance with the manufacturer’s recommendations and your company’s procedures.

APPENDIX A

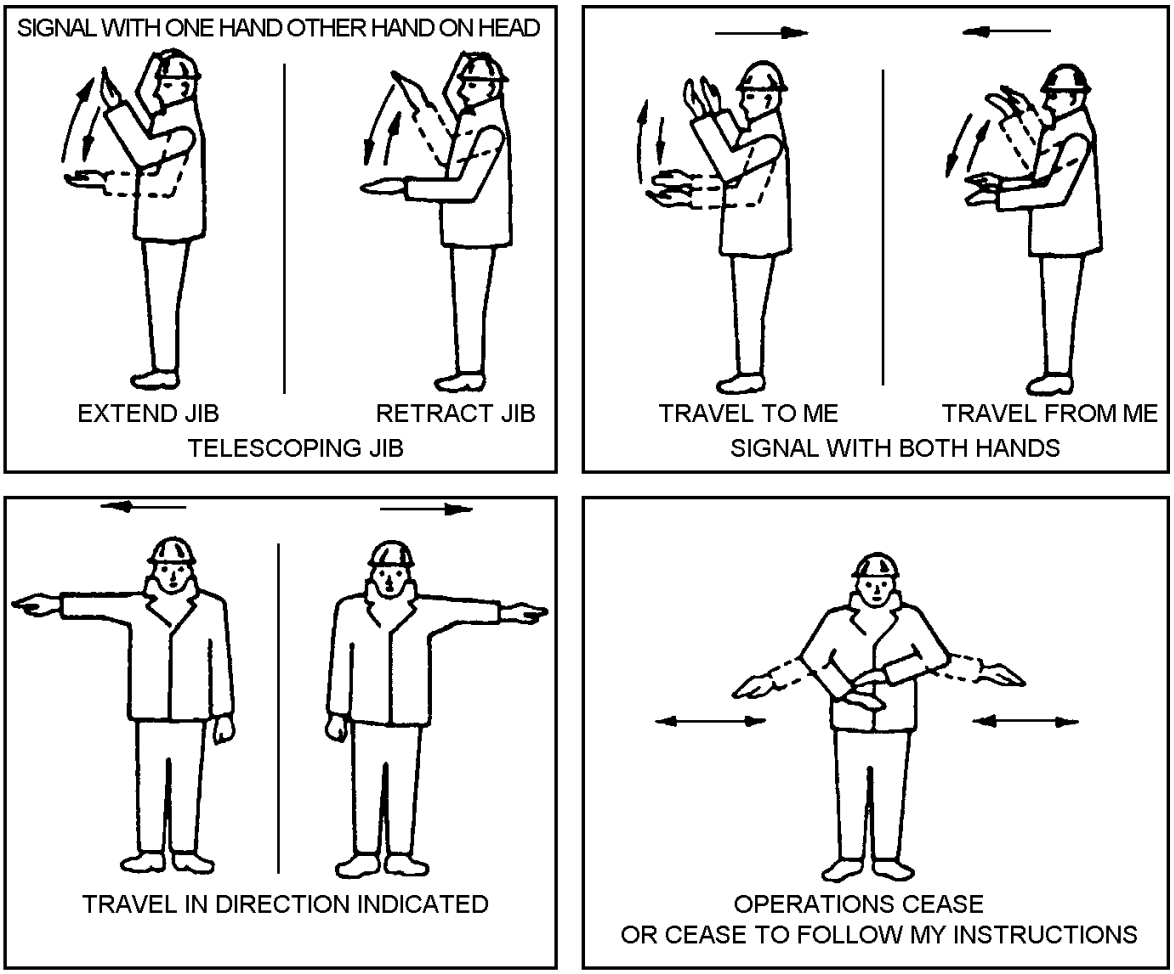
Recommended signals



Note:

The signaller should stand in a secure position where he/she can see the load and can be seen clearly by the driver and should face the driver if possible. Each signal should be distinct and clear.

Recommended signals (continued)



Appendix B Statutory Certification Required for Excavator

- Safety Health and Welfare at Work (General Applications) Regulations 2007 came into operation on 1st November 2007 and are quite clear on what items of plant require certification.
- Forms for recording Tests/Inspections are no longer prescribed. Any form can be used provided it contains the information specified in Part E of Schedule 1 of the Regulations

Excavator used as a Crane

Regulation No	What is it	Who completes it	When is it required
55. [2] (a) [ii]	Certificate of Safe Working Load.	Competent Person.	Before machine is first used as a Crane or after substantial alteration /repair.
55. [2] (j)	Report of results of thorough examination.	Competent person	Every 12 months or after substantial alteration/repair.
43. [1])f)	Report of results of weekly inspection	User/Operator	Weekly
43. [2]	Report of the results of test and thorough examination	Competent person	After any substantial alteration or repair affecting its strength or stability.

Notes:

- An Excavator or Loader which is hydraulically-operated must be fitted with check valves on the cylinders used for lifting. (Except for machines with a maximum rated lift capacity of 1000kg or less.)
- Unless a machine is fitted with a Safe Load Indicator the Safe Working Load shall be the same for all radii at which the Jib or boom is operated and shall not be greater than the load which the machine is in its least stable configuration is designed to lift with that jib or boom.

Lifting Accessories (Chains, Ropes and lifting gear)

Regulation No	What is required	Who completes it	When is it required
57. [1] (a) (v)	Certificate of Test & Examination.	Manufacturer / Supplier.	When supplied and while Lifting Gear is in use.
57. [1] (a) (v)	Report of Results of thorough examination	Competent Person.	Every six months.
57. [1] (i)	Report of annealing or appropriate heat treatment.	Competent Person.	When Heat Treated and at intervals as specified by the Competent Person.

Notes:

- Lifting accessories include: chains, chain slings, rope slings (except a fibre rope sling), or similar gear, rings, links, hooks, plate clamps, shackles, swivels and spreader beams etc.
- A Certificate of Test and Examination is not required for a fibre rope or a fibre rope sling. Regulation 57 states “in the case of a fibre rope or a fibre rope sling, information from the manufacturer on its safe working load is available” and “it is marked in plain legible figures and letters with a Safe Working Load and a means of identification.