LAMANVA TRAINING CENTRE

360 Excavator

TRAINING MANUAL

Health and Safety at Work act 1974

The health and safety at work act 1974 is designed to protect people and the environment from workplace activities. It places certain duties and responsibilities on employers, employees, self-employed, designers and manufactures.

Employees Duties:

- Take reasonable care for **themselves** and **others** who may be affected by their actions.
- **Co-operate** with the **Employer**
- Do **not interfere** with **Health** and **Safety issues.**

Good timekeeping, being polite, being safe and doing a good job are all ways of ensuring repeat business with a client or principal contractor.

Employers Duties:

Employers must ensure workplaces under their control are safe and free from hazards. Ensure the safety of employees, visitors, trespassers and the general public who could be affected by the work. Everything they **provide** for use, tools, plant and equipment must be well **maintained** and **safe** without risk and the personnel are trained to use it.

- Provide a safe place of work with safe access and egress.
- To provide adequate welfare facilities.
- To provide adequate information, instruction, training and supervision

Health and Safety Legislation places the responsibility for the safety at work on everyone on the premises or site.

The levels of sanctions that can be applied (by employers and judicial bodies) to plant operators who do not comply with, or follow legislation and regulations are **verbal warning, written warning, dismissal, prosecution.**

When getting prosecuted there are three outcomes, they are **case dismissal, fine** or **imprisonment.**

In general plant operators are regarded as ‘safety-critical’ workers, which mean their **actions with the machine** that have **significant health & safety Consequences on themselves and others.**

Work equipment must be suitable for the purpose for which it is used.
This applies not only to complex machinery, but simple items such as hand tools

Work equipment must be maintained in a safe condition. This will require control systems to be in place to check on the condition of work equipment and take corrective action as required.

Users must be given **information, instruction and training** as appropriate. What is appropriate depends on the risk associated with the equipment and the level of competence required to keep those risks at an acceptable level. Workplace risk assessments highlight the hazards and level of risk.

Controls and their functions must be easily identifiable. The aim is to ensure that the wrong controls are not used by mistake.

Machines must be capable of being isolated from the power source.

This may be a simple function (e.g. on/off) or a high voltage source that requires special arrangements for isolation

Machines must be stable in use; machines have been known to fall over. ROPS & FOPS, (Rolling Over Protective Structures) & (Falling object Protective Structures) this is to provide **some protection** to the operator in the event of the machine **over turning** or from small falling objects.

Equipment must be capable of being maintained safely. Accidents occur during maintenance thus the risks encountered during such maintenance must be reduced.

Method Statements

The purpose of a Method Statement when on site is to document given specific instructions on how to SAFELY perform a work-related task and it is the plant operator's responsibility to COMPLY with the method statement.

LOLER Lifting Operations and Lifting Equipment Regs

This is an amendment to the European regulation which deals with all aspects of lifting and has specific requirements including;

- Trained and competent people doing their job
- Plant and equipment tested and certificated
- Work is **Planned** and **Supervised**
- SWL (safe working Load) WLL (working load limit) are clearly marked on All equipment
- Examination – all plant used for lifting must be examined and certificated by a **competent authorised** person. If the plant is used for lifting personnel, then it must be tested every 6 months if it not used for lifting personnel then it is tested every 12 months. The purpose of the examination is to check for structural damage.
- Lifting accessories – must be suitable for the job (SWL not exceeded), tested, certificated, and in good condition.
- Lift plan – is a detailed description of how to carry out a lift. An appointed person produces the lift plan, a lift supervisor implements the plan and supervised the job
- Contract lift – with a contract lift the crane company provides the lift plan, the equipment, all the personnel to carry out the lift (lift supervisor and slinger/ signaller) and the insurance. They are in control of every aspect of the lift assume responsibility of the lift.
- LOLER Register – operators should complete the LOLER register weekly. Pre- use inspection should be carried out as per the manufacturer's instructions. Record in a daily/ weekly inspection sheet and report any faults/ defects immediately.

Hazards and Risk Assessment

The definition of a hazard is where there is a **potential threat** (or risk) to life, **health, property** or the **environment.** Potential risk on site; trenches, soft ground, overhead power lines, buildings, people etc. For this reason, it is important that a risk assessment is carried out before any ask on site by a competent person.

The purpose of a risk assessment is to IDENTIFY and PLACE control measures on hazards.

In general when starting work on a new site you will undergo a site induction which includes:- Access and egress, accident reporting, confined spaces, buried services, contamination, welfare facilities, electricity, emergency procedures, reporting structure, lifting operations, working from/at height, reporting procedures, reporting structures, restricted/prohibited areas, safety signs and signals, site layout, waste disposal, smoking, toilet, traffic routes etc.

360 excavators above 10t tracked

- Rotate the upper structure 360 degrees
- Tracks good for travelling and operating on a variety of terrains
- Sizes from 10t upwards

360 excavators wheeled

Used widely in roads and on finished surfaces. Comes with or without legs and a blade for the stability of the machine when operating.

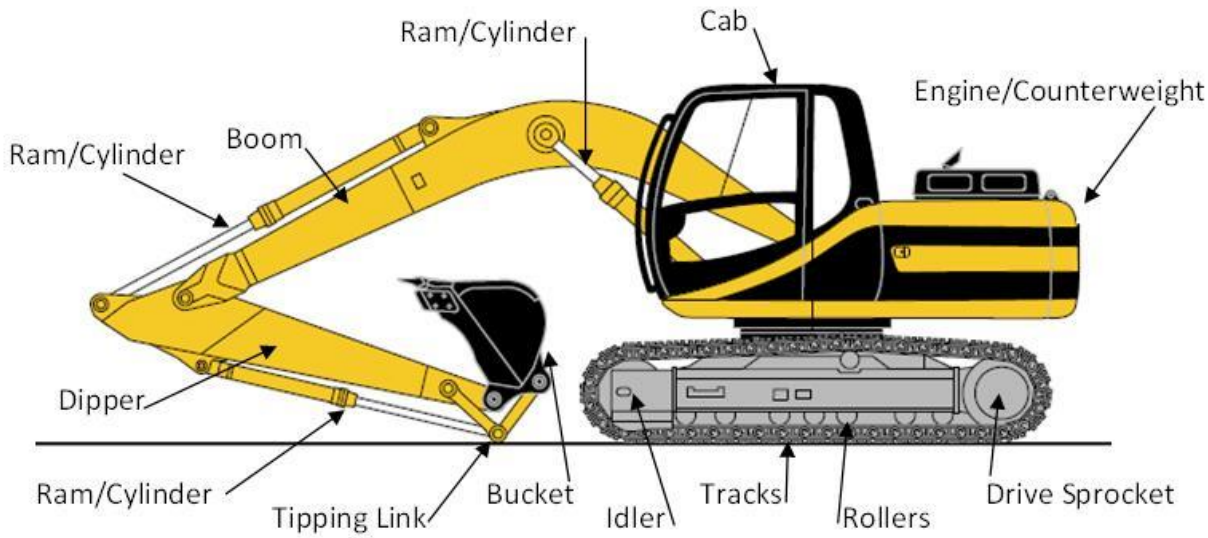
360 Excavator under 10t (mini digger)

- Size from ¾ t – 10t
- Suitable for work in a confined space
- Comes with a blade at the front for stability

Many models are now available as **zero tail swings** – when slewing the machine, the counterbalance do not go out beyond the edge of the tracks reducing the risk of hitting anything.

Face Shovel

Designed for bulk excavations in the quarry industry



Daily Checks

Pre-start Checks: Using the operator's manual

First walk round the excavator checking for any damage to the machine making sure there are no leeks or damage, making sure the tracks are the correct tension, all rollers, idler, and drive sprocket are in good working order with no damage or debris. Check that all the lights are in good condition and clean.

Engine compartment check:

- Engine oil level
- Hydraulic oil level
- Coolant level
- Fuel level
- Air filter indicator

Mirrors – make sure they are **clean** with **no damage** and they are **adjusted** to see out of them when in the driving seat.

Running Checks

Unlock the door get in and put on the safety belt and adjust seat as needed.
Start the engine and let it warm up for about 2 to 5 minutes. Check that all the lights and the horn is working, check that the operating controls, steering, breaking, slewing and movement of the excavator is in good working order so the excavator is able to carry out its task safely and efficiently, filling out the daily check sheet as you go.

Quick Hitch Coupler System

Quick hitches are designed to allow the fast and effective changing of attachments. Although they improve the performance and efficiently, they have been involved in many serious and fatal accidents in recent years. The systems are safe but if not used properly or maintained they will fail.

- **Manual quick hitch** – no hydraulic system fitted, and it is activated by hand. Locking devices to prevent accidental release is always a safety pin and clip

- **Semi-Automatic quick hitch –** the functions of the coupler are activated from the cab, hydraulic rams open and release the attachment and then close to secure a new attachment. The locking device is manually activated at the coupler and is mostly a safety pin and clip.

- **Automatic Quick Hitch –** all the functions are carried out from the cab including the secondary locking systems.

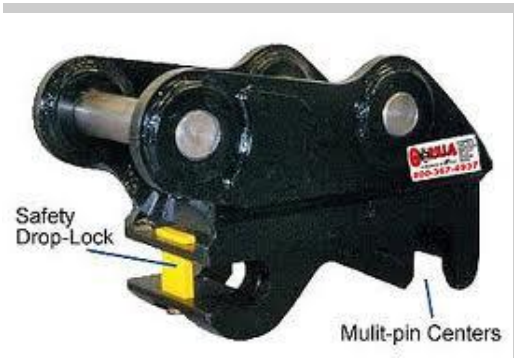
Pre-use inspection of the Quick Hitch

1. Check for any damage
2. Check for cracks
3. Oil leaks
4. Pins and clips are in
5. All fits correctly

After changing the attachments there are 2 ways of checking the attachment is secure;

1. Put the attachment through its full working range

2. Put the attachment onto the floor and try and rotate out



Always use safety strut or support when carrying out any work under or near a raised boom. Safety bar are normally coloured red.

Ensure you are trained to operate the plant & equipment, Qualifications & Certificates offer credibility, proof of skills, employment prospects and promotional prospects.

Always read the operators manual, the manual should be on the machine or easy access to it if you need to find something out. Other personnel that may need to use the manual are supervisors, planners, and maintenance staff, low loader drivers, if removed replace as soon as possible.

Always face the machine using three points of contact (two feet and one hand) when climbing on or off. **Never jump.**

If loading a dumper, make sure the operator is clear of the machine before you start as to stop possible injury to the driver by hitting them with the bucket or loose material.

A hard hat on construction sites must always be worn unless you are sitting in an enclosed cab that meets the falling objects protective structure (FOPS) criteria.

Wear the seat belt if fitted as in the event of a roll over keeps the operator within the confines of the operating seat which ***may*** MINIMISE injury by not being flung around.

Do not carry passengers on the machine unless a seat is provided.

CAT (Cable Avoidance tool) can detect a variety of berried services but have limitations in detecting plastics

If a yellow coloured marker tape is unearthed during excavating this could mean that there is gas or electric cables bellow.

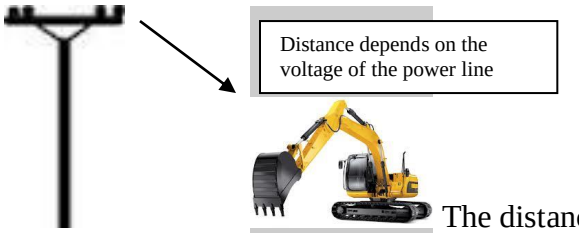
Be aware of people entering the working area of the machine.

Never leave machine unattended with the engine running.

It’s important that the bucket is lowered to the ground and engine to switch off before the operator exits the cab to stop unintentional movement.

If the excavator needs to move backwards in a confined space and can’t see, then a banksman is needed.

When excavating a trench make sure the spoil is more than the depth of the trench away (2m trench, stay 2m away) because if not it could cause the sides of the trench to collapse.



The distance you must be away from the powerlines will be determined by the voltage of the electrical lines. This can be determined by its support, if it's on wooden posts or metal pylons. This is important because certain weather conditions electric can arc (jump).

Working at heights- any place you can fall from and get injured is considered working at height. Getting in/out of the machine, carrying out daily checks, servicing etc.

Confined space – anywhere there is a restriction on operating area can be considered a confined space. There is a greater risk of accidents or damage. The minimum distance which should be maintained between a fixed obstacle and the machine is 600mm (this is deemed to be the smallest distance a person can go through without injury). If this distance can't be maintained, then the area should be fenced off and signs erected. Fumes, noise, lack of visibility and insufficient room to manoeuvre are all hazards associated with confined areas.

When slewing whenever possible slew to the left because this is the best side for vision as the cab is on the left and the boom restricts the vision on the right.

Brown Field Sites – This is ground that has already been uses/ dug up before. Hazards on brown field sites are soft ground, old workings or contaminated ground

When lifting over the side on the machine compared to lifting over the front or rear the weight has to be reduced this is because there is less stability.

Excavating

- To ensure the sides of the trench remain vertical when digging make sure the excavator is level
- As a rule, make sure the spoil is placed at least the same distance away as the depth of the trench
- Ensure permits are in place
- Know the specification of the trench
- Have a banksman
- Safe area
- Correct size bucket on
- Risk assessment and method statement are in place
- Check for underground services

Shoring – is a safe way to keep the sides of the trench from collapse and is used depending;

- On the types of ground
- Depth of the ground
- If people are going to go into the trench
- Weather

If lowering or moving a drag box into a trench, make sure the trench is clear and no personnel.

Open trench
At the end of the task/ day you must barrier off the trench with signage and if possible, cover trench to prevent anyone falling in.

If excavating near gas pipes you must not dig any closer, then 500mm.

Types of equipment used to measure the depth/ position of the trench

- Laser level
- Site level
- Travellers and boning rods
- GPS

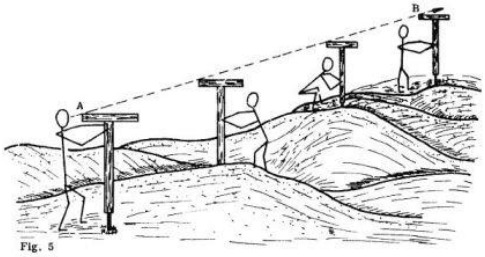
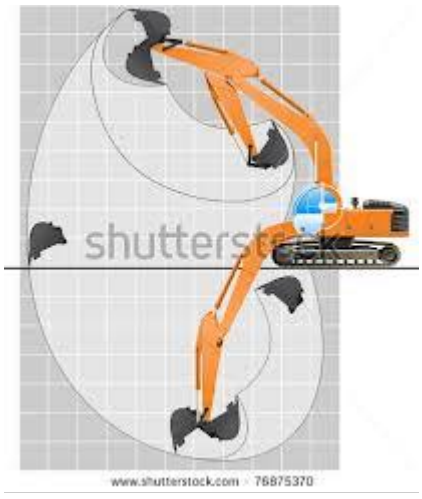


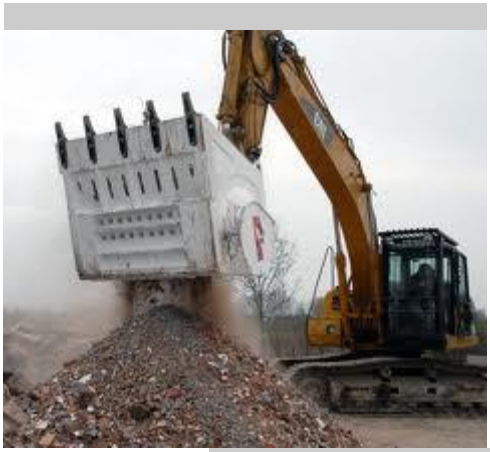
Fig. 5

If excavating using its fall working range take care not to undermine the machine



Excavator digging envelope/ working range chart

Attachments



Use the correct attachment for the task, do not use the attachment for any other purpose than it is intended for.

If you use a bigger bucket than specified then it could take longer to do, cost more money, have more spoil and more backfill needed.

Travelling on slopes

Always drive the machine forward (track motors at the back of the machine)

Travel up

- Extend out the boom and dipper arm out and keep low to the ground
- When bucket gets too high or low stop tracking, reposition the arm and carry on up the slope.
- Take care when going over the pivot point of the ground when going from the slope to the level top.

Travel down slope

- Bring the boom low and dipper in and keep the bucket low to the ground
- When bucket gets too high or low stop tracking, reposition the arm and carry on up the slope.
- Take care when going over the pivot point of the ground when going from the level top to the slope.

Avoid driving across the slope as there is an increased risk of overturning

Stability

Possible causes of making the excavator to tip over

- Load out to far
- Lifting/ digging over the side of the trench
- Uneven load
- Overloaded
- To steep slopes or driving across slopes
- Uneven ground/ trenches, potholes in the ground
- Soft ground

Soft, wet clay/ground
This could cause the excavator to lose grip, slide and even turn over

Lifting Operations

Lifting accessories must only be attached to approve lifting points, if this is not followed then it could damage the machine, the load could fall off or the lifting accessories could get damaged.

Check valves and a rated capacity/ load movement indicator are required when lifting loads over 1000kg.

Manufactures will determine the lifting capacity of the machine, which will then be displayed in the machine and in the operator's manual.

Weight of the load to be lifted includes

- Load
- Lifting accessories
- Bucket
- Quick hitch

If the bucket is not part of the weight to be lifted, then removing it will help with visibility and can lift more weight

If using a hook to lift loads make sure it's in good working order, no damage, the SWL is known and the catch is working safely.

If a load is to be connected, then the controls must be isolated and the revs down to stop unintentional movement which could injure the slinger.

If the lifting capacity chart is not available for reference, then you must not use the machine to lift.

If lifting on a slope, then there is a chance of the machine tipping over as the radios of the load in increased due to gravity pushing the load out.

If using a multi-leg chain sling to lift loads, then the SWL of the load only applies when the chains are the same length and with an angle of 90 degrees.

If the load accidently lands when moving stop and check that the load and lifting equipment are safe before continuing.

Checks to be made to the lifting eye on a quick hitch attached to the machine

- Damage
- Pins and clips are in
- SWL
- All secure

When lifting the radius of the machine is measured from the centre of the slew ring to the lifting equipment.

If the load starts to swing it could make the machine unstable and possibility to tip over or make the load swing into the cab.

When slewing with the load the operator should always be looking in front of the load to see where its going.

Operating in pedestrian areas

Before working in a pedestrianised area make sure there is an alternative route for the pedestrians with signs and barriers. Considering the machines movements, fumes and noise.

Shut down procedures

On completion of the working day make sure the excavator is refuelled to prevent condensation building up in the tank.

- Park excavator in a safe place
- Bucket/ attachment safely down on the ground
- Let engine cool down before switching off engine
- Remove key, lock door and isolate the machine
- Climb off machine (facing dumper 3 points of contact)
- Walk round the machine checking for any damage

Most excavators have turbo charged engines and need to be run down for several minutes before switching off the engine. If this is not carried out it could damage and shorten the life of the turbo.

Do not park the excavator on pedestrian walkways, near trenches, emergency exits or on slopes

Highways

If the machine is being travelled or working on a public highway the road traffic act applies:

- UK driving licence, class B + H
- Aged 18 years for vehicles between 3.5 and 7.5 tonne
- Aged 21 years for machines exceeding 7.5 tonne

Loading and Unloading from a Transporter

Before loading or unloading check:

- The transporter can take the weight of the machine
- Firm, level ground for the transporter
- Safe area round the transporter (no personnel walking round)
- No overhead power lines
- Excavator is clean
- Ramps of the transporter are in line with the tracks of the excavator
- Banksman to guide operator on

The loading operations is the responsibility of the transporter driver but if the operator is to load the excavator on behalf of the transporter driver, they must make sure the excavator is in the agreed position on the bed of the transporter, with the handbrake on, in neutral, keys out and door locked