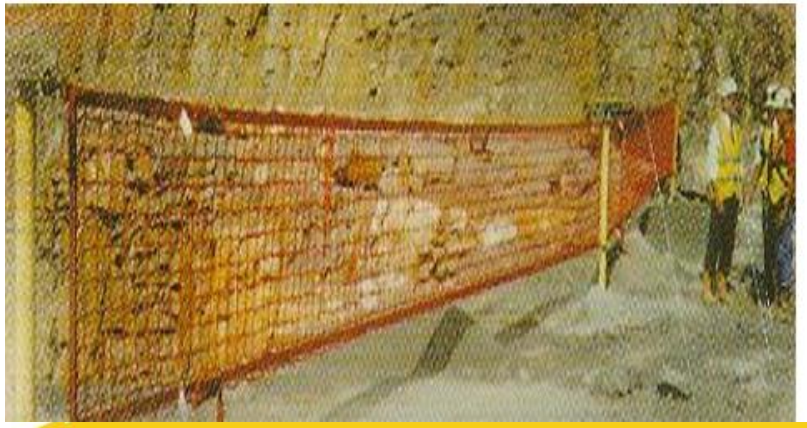

CLIVE KELLY SAFETY
LTD.
SPRING QUARRY
SAFETY CAMPAIGN
2021
1ST - 12TH MARCH 2021
IRISH CONCRETE FEDERATION
Set for life
H&S A
HEALTH AND SAFETY AUTHORITY
#BESEEN&BESAFE

Health & Safety Committee

Represented today by

Clive Kelly



I was a machine operator in Quarries and Roadworks from a young age and for the past 19 years I have worked in Health and Safety.

I am a member of the Irish Concrete Federation, Health and Safety Committee for the past 13 years.

Clive Kelly Safety's main line of work is in Quarry Safety and Roadworks Safety.

Topics discussed today:

1. Lifting Equipment Safety.
2. All round Vision, Blind Spot Survey, Metre Stick Rule.
3. Brake Testing Requirements.

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Module 1

- Lifting Equipment Safety.

Check your GA1 Inspectors have relevant insurances and qualification

The fitters repair sheet is proof that defects are closed. Some companies have electronic systems for these.

GA1

Report of Thorough Examination

NOTE:
This form may be used to record the thorough examination and testing of Lifting Equipment, as set out in the Safety, Health and Welfare at Work (General Application) Regulations, 2007. This form was produced by the HSA to facilitate the recording of information, as per Schedule 1 Part E of these regulations. This is not an approved or statutory form. Reports of Thorough examination may be produced in other formats.

Date: Reference:

Name and address of employer or owner for whom the thorough examination was made:

Address where thorough examination was made:

Particulars identifying the lifting equipment:

Type of lifting equipment:

Serial Number: Date of manufacture:

Safe Working Load	Configuration(s)

Note: Each configuration should reflect the working arrangements, for example length of jib; fly jib; radius; angle; ballast; number of rope falls; height under hook. Please detail the safe working loads for all configurations, as per manufacturer's instructions. Use additional sheets if more than three configurations.

○ Testing ○ Thorough Examination

Purpose of thorough examination and/or testing:

Particulars of tests carried out:

Latest date for next thorough examination:

Health and Safety Authority: Form GA1 Page 1 of 2

Fitters Safety Repair Sheet

Plant Description	Issues arising from Weekly Checks and Fault Sheets	Comments
eg EXCAV 12	Convex Mirror needed left side	Urgent

Issued to Fitter/Mechanic by:

Date Issued:

Returned By (Fitter/Mechanic):

Date Returned:

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GA2

Report of Weekly Examination

NOTE:
This form may be used to record the weekly examination of Lifting Equipment used on construction sites, as set out in the Safety, Health and Welfare at Work (General Application) Regulations, 2007. This form was produced by the HSA to facilitate the recording of the weekly examination as per these regulations. This is not an approved or statutory form. Reports of Weekly examination may be produced in other formats.

Name and address of contractor or owner for whom the weekly examination was made:

Address where weekly examination was made:

Description of lifting appliance and means of identification	Date of inspection	Result of inspection (state whether in good order, see note below)	Name of persons who made the inspection (use BLOCK CAPITALS)

Note: Result of inspection should state if all working gear and anchoring or lifting plant or gear is in good working order, including, where required the automatic safe load indicator and the derricking interlock.

Component	Inspected		Good working order		Action Required
Rated capacity indicator / limiter	Yes	No	Yes	No	
Wire rope and chain systems	Yes	No	Yes	No	
Limit switches (e.g. hoist, derrick limit)	Yes	No	Yes	No	
Ropes positioned on their sheaves	Yes	No	Yes	No	
Structure (major damage)	Yes	No	Yes	No	
Hooks & other load lifting attachments	Yes	No	Yes	No	
Hydraulic systems	Yes	No	Yes	No	
Electrical systems	Yes	No	Yes	No	
Fuel lines	Yes	No	Yes	No	
Brakes and clutches	Yes	No	Yes	No	
Operator's cab	Yes	No	Yes	No	
Operator's controls	Yes	No	Yes	No	
Anemometer, where provided	Yes	No	Yes	No	
Other matters (manufacturer / user)	Yes	No	Yes	No	

Truck Mounted CRANE PRE - WORK INSPECTION

Driver/Operators name :

Date :

Machine make/model /

Yes = √ No = X
NA = Not applicable

		M	T	W	T	F	S
1	Flashing Beacon						
2	Reverse Siren						
3	Mirrors / Reverse Camera						
4	Controls						
5	Slewing Mechanism						
6	Lights						
7	Horn						
8	Securing Bolts						
9	Steps						
10	Hand Rails						
11	Emergency Stop						
12	Hand Brake						
13	Brakes						
14	Base of Crane						
15	Rams						
16	Wear on slew ring						
17	Outrigger and shims.						
18	Wear in King Pin						
19	Hydraulic tank and Indicator/hoses						
20	Tyres						
21	Hook with safety clip Pins for wear.						
22	Shims in Legs						
23	Base Plates under jack leg						
24	Boom and extensions						
25	Cracks /Defects /Damage						
26	Extendable arms						
27	Machine fully greased						
28	Chains and Crane GA1 inspection in date						
29	Visual / Audible warning device						
30	Overload system working.						

Operator signature :

Notes :

All sections of this form MUST be completed before handing to your supervisor
REPORT SERIOUS DEFECTS IMMEDIATELY.

The Safe Working Load and identification numbers of lifting equipment and accessories must be legible.

- Certification :-
  - Lifting equipment used for lifting materials must be certified at least **every 12 months**.
  - Lifting equipment and attachments used for lifting persons, must be certified at least **every 6 months.**
  - **(See HSA website re truck mounted cranes BS7121 8 yr and over – 6 monthly).**
  - Lifting accessories – Slings/Chains/Shackles/Harnesses must be certified at least **every 6 months.**

Organising a Lifting Operation. DO A LIFTING PLAN

- Daily pre start checks.
- Qualifications of operator (excav, telep, crane) and slinger signaller. QSCS.
- Determine Weight of Load.
- Establish Balance of Load.
- Select Lifting Accessories.
- Check Condition and Certification.
- Inspect Route / Tag line.
- Risk assess and LIFT PLAN

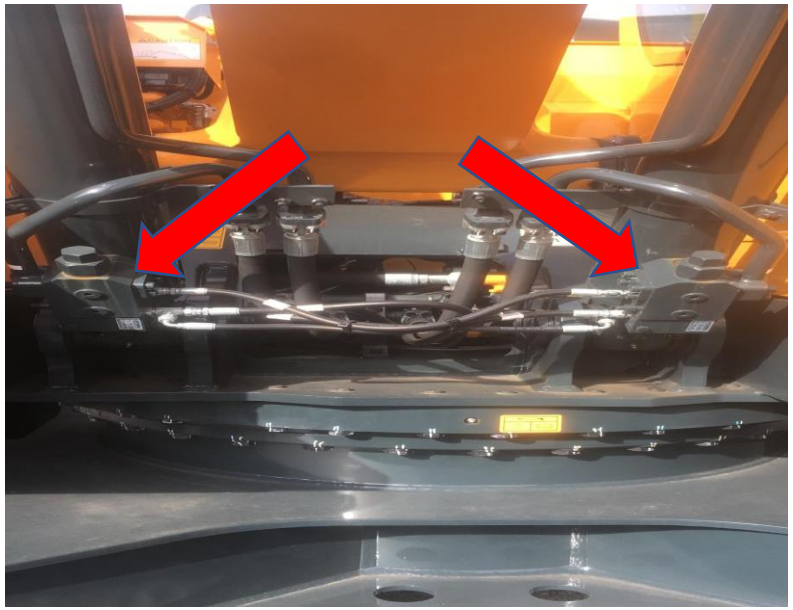
LIFTING FACTOR LIFTING MODE	Vertical x 1	Choke x 0.8
COLOUR	Tonnes	Tonnes
BLACK	500kg	400kg
VIOLET	1.0	800kg
WHITE	1.5	1.2
GREEN	2.0	1.6
YELLOW	3.0	2.4
GREY	4.0	3.2
RED	5.0	4.0

Many Forklifts are plated at 500m and 600mm load centre.
Forklift Safe Working Load to be plated to accommodate attachments.

Lifting

- When an excavator is being used as a crane CHECK VALVES must be fitted!(Two in the boom and one in the dipper arm)
- This is to prevent the load from falling in the event of a pipe bursting.
- never leave a load suspended for any length of time!

Many excavators are fitted with the audible device function, (better known as the hook button) but this needs to be calibrated and match the SWL marked on the boom, by setting the hydraulic pressures in the machine. This can be completed by the Manufacturer/Dealer in Ireland. Are your company using the excavators for object handling – lifting.



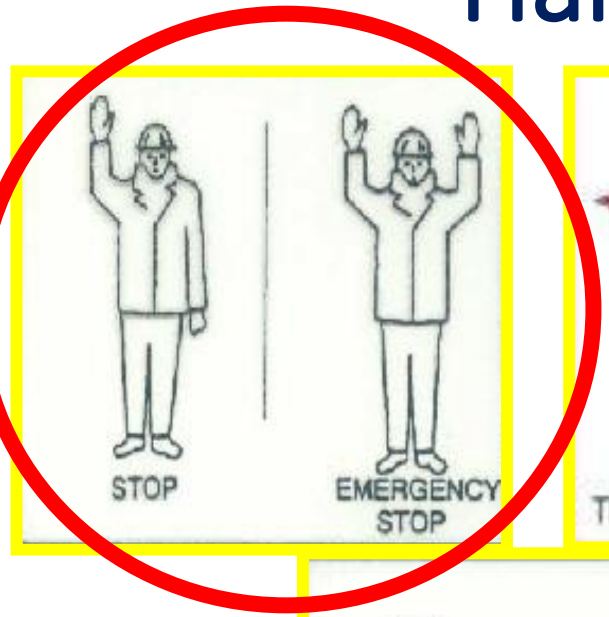
- **SINCE MARCH 2020**.Note: machines with a maximum rated lift capacity at a minimum lift point radius as specified by the manufacturer of **greater than or equal to 1,000kg or 40,000Nm** are fitted with - (i) **check valves (three) on the cylinders** used for lifting or by another means to prevent a gravity fall of the load in the event of a hydraulic failure, and (ii) **an acoustic or visual warning device** that indicates to the operator when the rated lift capacity or corresponding load moment is reached. Audible warning device needs to sound at SWL identified.
- To Calculate the 40,000Newton Metres, multiply the SWL by 10 and multiply answer by reach of excavator.

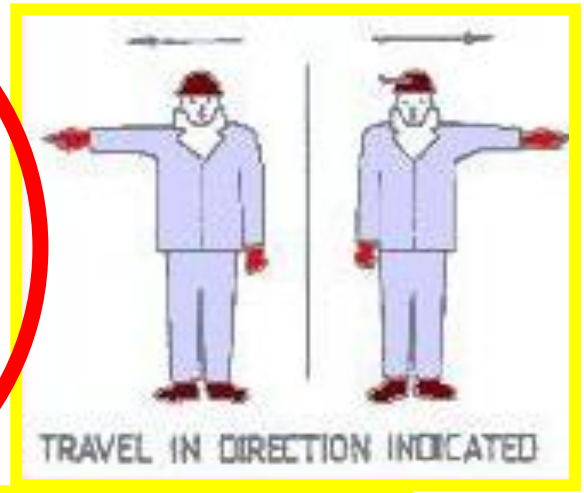
Safety Requirements for typical lifting equipment used in a quarry.

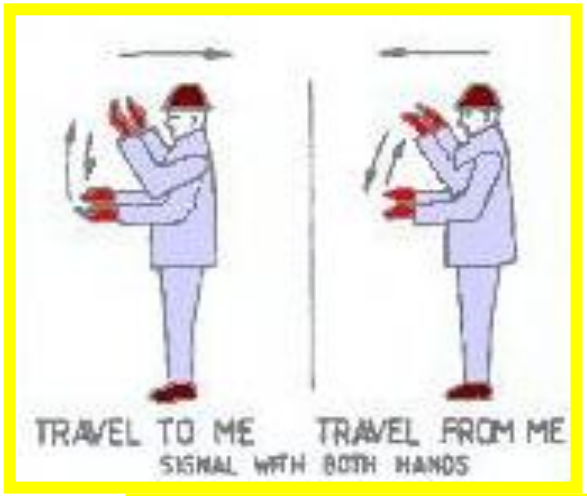
- Mobile Crane. QSCS TRAINING and GA1 Crane, GA1 Accessories, GA2/Pre Start Check.
- Truck-mounted Crane with safety hook. Training and GA1, GA2/Pre Start Check.
- Gantry Crane with safety hook. Training and GA1, GA2/Pre Start Check.
- Excavator with pad eye and shackle. QSCS and GA1, GA2/Pre Start Check.
- Telescopic Handler with safety hook. QSCS and GA1, GA2/Pre Start Check.
- Forklift with lifting attachment/safety hook. Forklift Course and GA1, GA2/Pre Start Check.

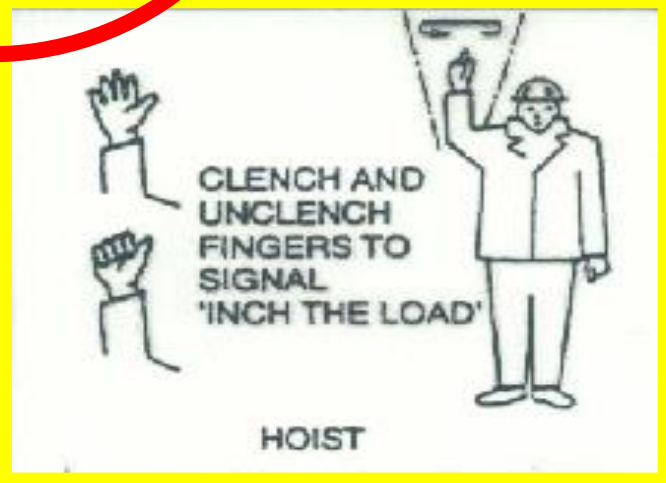
- Lifting machines or any attachments must not be used for lifting people or as a means of access. The exception to this is a **certified integrated** man basket on certified machines.
- Mobile Elevating Working Platforms can be used. GA1 6 Months.
- For teleporters the controls must be in the basket.
- Reminder : GA1 - 6 monthly for **teleporter, and mobile crane when lifting people** with a work platform/basket.
- Do not attach chains or slings directly to forks or buckets for lifting purposes. Use appropriate certified lifting extensions or jibs.

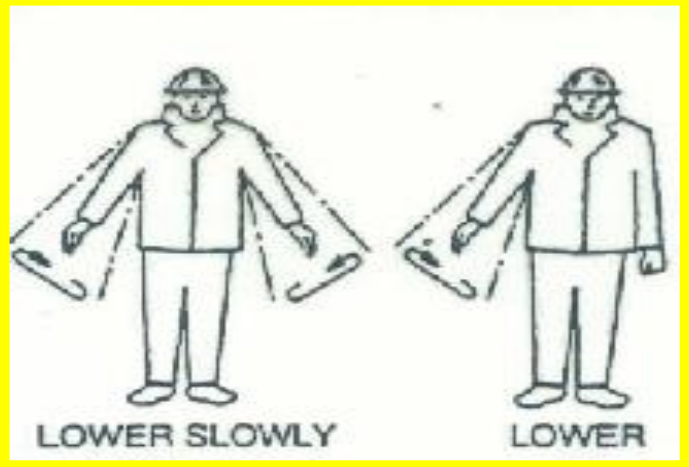
Hand signals











The excavator bucket should be removed when carrying out lifting operations.

Hydraulic (Semi Automatic) Quick Hitch systems that require safety pins are not acceptable since 2017.
see - www.hsa.ie

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Module 2

- Visual aids, all round vision and the metre stick rule.
- Blind spot surveys.

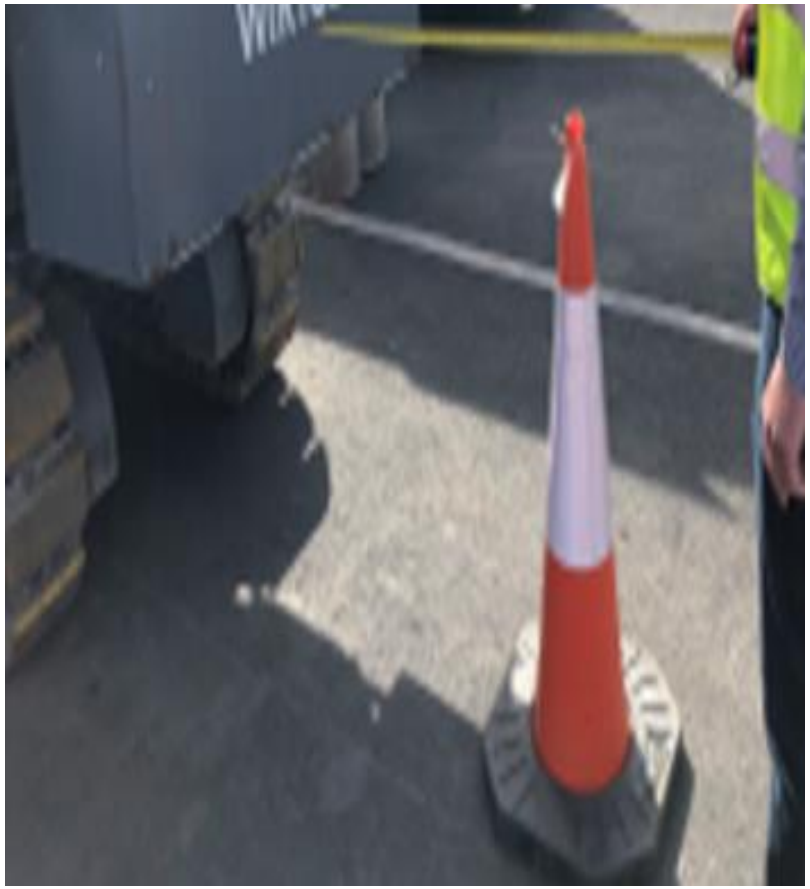
Sample From - SHAWW Quarry Regulations 2008. Very Specific. Metre Stick Rule.

SCHEDULE 2 (See Regulation 23(2))

VEHICLES REQUIRING AUXILIARY DEVICES AND VISUAL AIDS

Machine Type	Reversing and visual aids required
Off-road dump trucks (trailer to rear of driver) – payload greater than 7 tonnes	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both to allow vision from the driver's seat of all points more than 1 metre high and 1 metre from the machine at each side and at the rear of the driver
Dumpers (front tip) no cab	Reversing alarm and flashing beacon
Dumpers (front tip) with cab	Convex mirrors; reversing alarm and flashing beacon
Wheel loaders (loading shovels), including skid steer loaders	Reversing alarm and flashing beacon with CCTV or convex mirrors or a combination of both to allow vision from the driver's seat of all points more than 1 metre high and 1 metre from the machine at each side and at the rear of the driver
Backhoe loaders (JCB type machines)	Convex mirrors; reversing alarm and flashing beacon
360° excavators	Movement alarm and flashing beacon with CCTV or convex mirrors or a combination of both to allow vision from the driver's seat (without slewing) at all points more than 1 metre high and 1 metre from the machine

Consider carrying out Blind Spot Surveys in your company. Clean and Focus the Mirrors Daily. These surveys assist Operators and Management. Some side-mirror brackets need to be reviewed.



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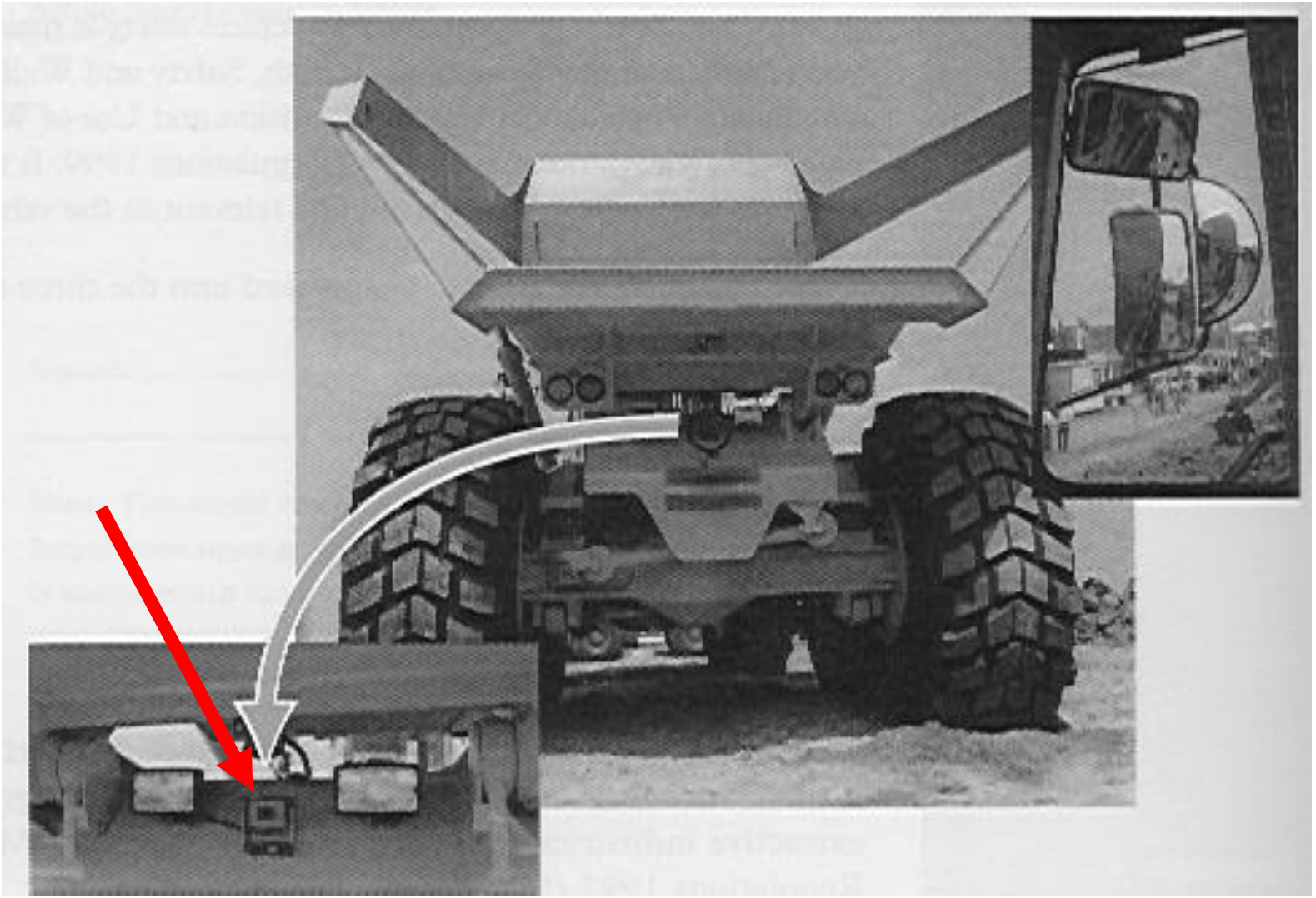

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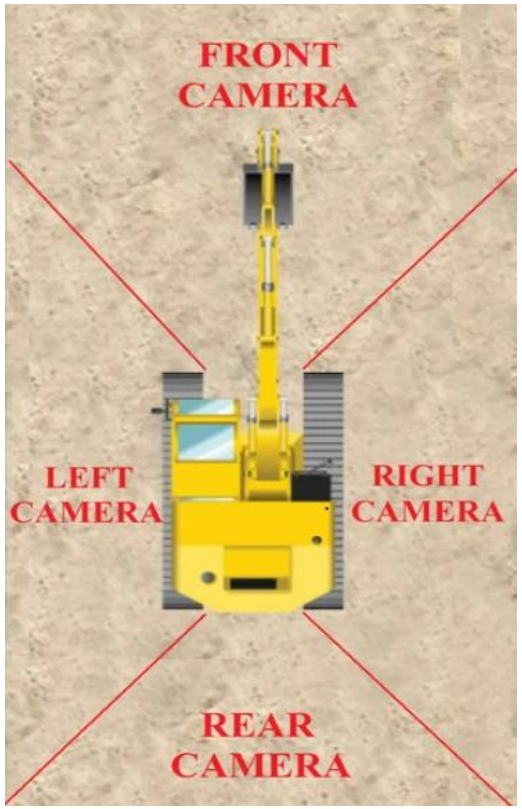
Risk assess for the best solution for your machine operator.
All round vision is required. Cameras V Convex mirrors.
The AAVM – All Around Vision Monitor Camera System is very effective.



▶ 5 types of camera views


View from the front camera


View from the rear camera


View from the left camera


View from the right camera


View 4 camera images in a split screen

HYUNDAI


FINLAY
HYDRAULIC PUMP
MOULD VIB. No. 1
MOULD VIB. No. 2
MOULD VIB. No. 3
ecco
MOULD VIBRATION
START
STOP
HYDRAULIC PUMP
START
STOP
TAMPER HEAD VIBRATION
START
STOP


UNIVERSAL

TOOL BOX TALKS should be carried out with employees and contractors to encourage/remind persons of potential - Hazards/Risks and Controls that would maintain a safe work environment.

Get drivers attention before stepping out in front of vehicles.
Bottom of bucket max height should be half the height of the wheel and rolled back when driving.

Reversing Sensors also assist the operator and seem to be getting popular.

Inform your Operatives to use a Spotter where necessary.

- PPE – Consider Full High Vis - Top and Bottom.
- Safety awareness training.
- Communication

(i.e. line of sight or 2 way radio, or Secondary Spotter)

- Spotter must be alert.

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Module 3

- Updated - Brake Testing requirements at quarry locations.
- Revised by Health and Safety Authority. JUNE 2019.
- Brake **Test** Quarterly, Brake **Check** Daily.

June 2019

Quarry Vehicle Brakes Maintenance And Testing

Information Sheet

Brakes & Braking

Quarry vehicles are very large and can cause significant damage and injury if they cannot be brought safely to a stop or controlled during operation or when parked on an incline. The quarrying environment and operations can impact on a vehicles braking performance particularly when working on a gradient and where there are tight bends and turning circles. The design and layout of quarry roads should involve minimum gradients with gradual corners. Where possible, long-term haul roads should be hard surfaced and all other road surfaces should be regularly maintained.

Vehicle parking/service brakes should be capable of holding the vehicle on the steepest gradients that the vehicle is expected to negotiate when it is fully loaded.

Before commencing work with the vehicle:

1. Check brake fluid / air gauges are at the correct operating pressure
2. Check the service and emergency brakes when setting off and again when loaded
3. Check the parking brake when stopped and facing downhill near the bottom of the steepest incline in use
4. Report any defects immediately

Emergency Slip Roads

Emergency slip roads (i.e. gravel or sand traps) should be provided where they are necessary on long or steep declines or tight bends.

Brake Inspection & Testing

A suitable inspection scheme is required to ensure brakes are in good condition on all loading shovels, dumper trucks and some other rubber tyred vehicles such as tractors operating in the quarry. Monitoring the braking capabilities of a quarry vehicle is an essential part of vehicle safety and is closely allied with brake maintenance. Any monitoring system must start with the participation of vehicle drivers, who should carry out a series of simple checks at the start of the working day or shift and record their observations in a daily vehicle inspection book or sheet.

Brake Maintenance

The driver's daily reports reflect the condition of the vehicle braking system at that moment in time and immediate action should be taken to rectify any faults brought to light by the driver.

The testing of the service brake only checks the effective use of the brakes. It may not identify other faults in the braking system. It is for this reason that maintenance of the whole of the braking system should be carried out in accordance with the manufacturer's recommendations.

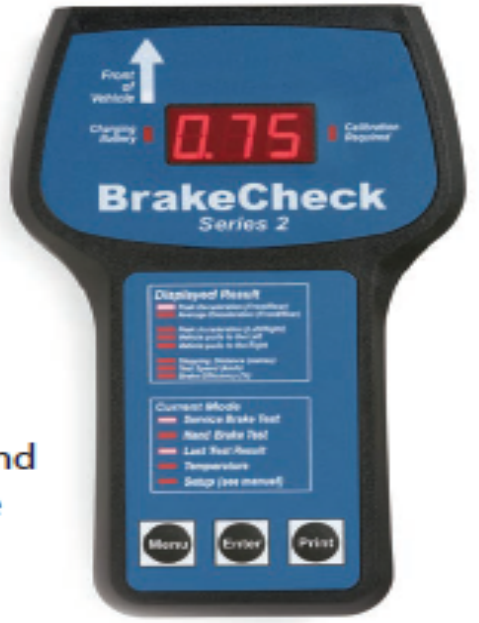
Brake maintenance schedules will not only include adjustment, fluid levels, pressures etc., they will also contain the replacement of seals and other vital components in accordance with the manufacturer's recommendations.

Emergency steering and emergency braking systems should also be included in regular inspection and testing programmes. Contractors' vehicles working in quarries should be subject to the same brake testing schemes.

Brake Testing Area

The Operator should provide a clearly signposted Brake Testing Area where vehicles can be tested on a daily basis. The test area must have "Brake start" marker post and distance marker posts so that Operators have a clear indication of the stopping distance achieved during the daily test with a final post marking the limit of acceptable 'over-run' before adjustment or brake replacement is required. The test area should be selected with consideration given to safe stopping. Different acceptable stopping distances will be necessary for dumper trucks and loading shovels.

Electronic Brake Testing



Total reliance on the driver's daily check is not a sufficient control measure, it must be supported by regular instrumented tests completed by a competent person using an electronic brake efficiency meter. Quarries are difficult working environments and consequently brake performance will deteriorate in service. The braking ratio required for a vehicle depends upon the vehicle type and local conditions such as the gradient of the haul road, the condition of the haul road and any bends that the vehicle must negotiate. When travelling down a gradient the vehicle must overcome the weight acting on the gradient in addition to the normal braking effort in order to come to a stop.

Establishing the Expected Brake Ratio of the Vehicle

If it is a new vehicle then the manufacturer must provide adequate information including the expected brake ratio. For older vehicles where there is little or no information on braking efficiency then an electronic brake tester can be used to determine the optimum brake ratio by carrying out a number of tests following servicing of the braking system and obtaining an average value. Then a lower action level is determined at which the vehicle braking system will require further assessment or servicing.

Periodic Brake Testing Of Vehicles

Electronic brake testing is a procedure for periodically checking that a vehicles brakes are maintained (working) at a level that does not put people at risk. The electronic brake tester determines braking efficiency by measuring the rate of deceleration until the vehicle comes to rest. Electronic brake testing is recommended to be carried out every 500 hours of vehicle use or every three months, whichever comes first, and the results recorded to identify any deterioration or sudden reduction in braking performance*. Usually this means:

1. ideally that the level of performance has not significantly reduced below the expected brake ratio; or
2. at the very least, that the level of performance exceeds that required for safe working under the most onerous site conditions of speed, load and gradient.

Although electronic brake testing devices are self-compensating and have built in tolerances, results can vary with different testing surfaces and weather conditions. If possible, tests should be carried out on the same or a similar surface and comparable weather conditions.

The braking capabilities of a dumper truck or loading shovel should also take account of any arduous site conditions such as gradients, road layouts and the road surface that it may operate on.

The brake ratio values given in ISO 3450 are a minimum standard for manufacturers, not a maintenance standard and may be only 50% of the expected brake ratio of some vehicles and is not acceptable as generic pass or fail criteria.*

As a rule of thumb doubling the brake ratio halves the braking distance, doubling the speed increases the stopping distance by approximately 4 times.

*This supersedes the recommendations on page 38 of the Safe Quarry Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008

Further Information and Guidance:

Visit our website at **www.hsa.ie**, telephone our contact centre on **1890 289 389** or email **wcu@hsa.ie**
Use BeSMART, our free online risk assessment tool at **www.besmart.ie**
Check out our range of free online courses at **www.hsalearning.ie**

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Key Points:

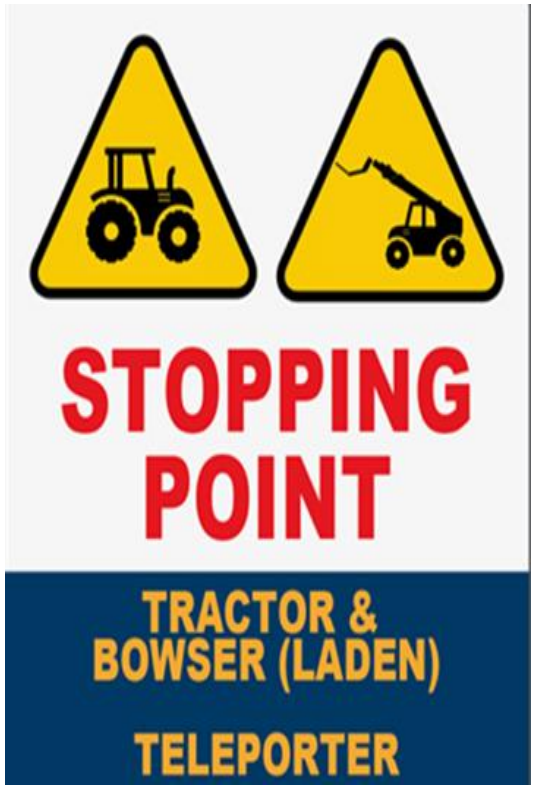
- Electronic brake testing using a calibrated brake test meter – **every 3 months**.
- BS EN ISO 3450 1996, **is no longer the standard** to follow. We used to follow brake efficiency ~~of 28% for a loading shovel and 19% for laden rigid and articulated dumpers.~~ 
- If you cannot get an **operators manual/brake test information** for the vehicle and there is little or no available information on braking capability, **then a brake testing instrument can be used** to determine the maximum achievable brake ratio. This is achieved in a series of tests (ideally following a thorough overhaul of the braking systems) after servicing the brakes. See sample brake test chart below.
- Each location must have a **minimum of one brake check area** for daily brake checks. A simple stopping test may be marked out. See photos below.
- The brake check area should be selected with consideration given to safe stopping.

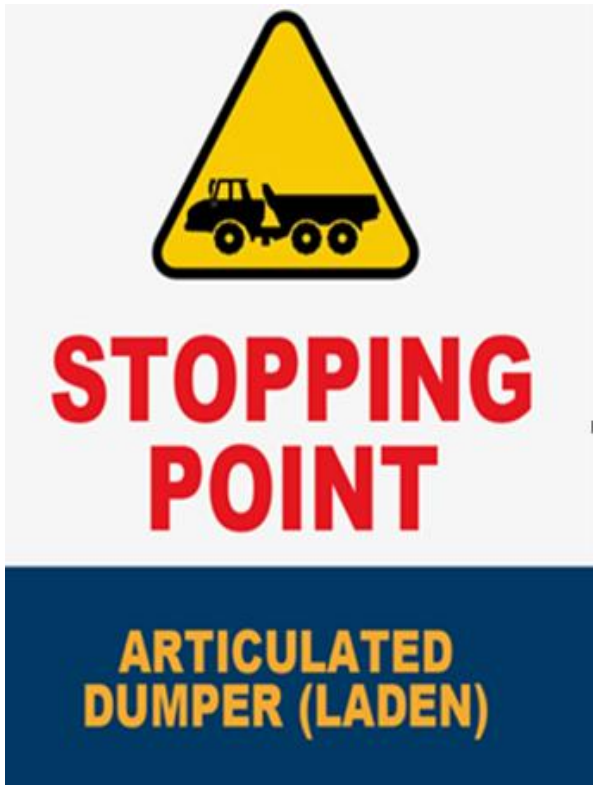
How to calculate how far apart these signs should be at your location.

This is guidance only.

- Some companies have gone back through old brake test printouts and made notes of stopping distances and percentages of high brake efficiency results.
- If for example - a Loading shovel's brake test results are an average of 38% and the average stopping distance was 6.5 metres for Loading shovels then this is good information to start with. Please remember when we do the quarterly brake test, we really press hard on the brakes on the machine.
- **The daily brake check** should not be as severe, therefore a 7 or 8 metre spacing for these signs may be appropriate. Each company can set their own results to suit their own equipment.


APPLY
BRAKES NOW


STOPPING
POINT
TRACTOR &
BOWSER (LADEN)
TELEPORTER


STOPPING
POINT
ARTICULATED
DUMPER (LADEN)


STOPPING
POINT
LOADING SHOVEL
RIGID DUMPER
(LADEN)

Signage can be easily moved with teleporter and forks when put on a suitable base or concrete blocks can be moved with a grab.

Record brake TEST results. Compare with other sets of results.
Best time to get a reading is after servicing the brakes on the machine.

	Make	Model	Machine	Plant ID	Year	Serial No.	Mid May 2020 Brake Efficiency (% g)	Mid Aug 2020 Brake Efficiency (% g)	Mid Nov 2020 Brake Efficiency (% g)	Mid Feb 2021 Brake Efficiency (% g)
1	.....	.....	Rigid Dump Truck	.....	1998	.....	22%	23%	26%	25%
2	.....	.....	Forklift	.....	1994	.....	36%	35%	33%	35%
3	.....	.....	Tractor	.....	2008	.....	54%	52%	54%	52%
4	.....	.....	Forklift	.....	1997	.....	37%	34%	22%	34%
5	.....	.....	Forklift	.....	2020	.....	29%	31%	31%	29%
6	.....	.....	Loading Shovel	.....	2018	.....	39%	32%	45%	46%
7	.....	.....	Forklift	.....	1999	.....	31%	32%	34%	33%
8	.....	.....	Articulated Dump Truck	.....	1997	.....	40%	38%	41%	38%
9	.....	.....	Loading Shovel	.....	2001	.....	57%	56%	54%	52%

Thank you for listening.

Clive Kelly Safety Ltd ***www.clivekelly.ie*** ***087 2196988***