

CLOCS Handbook: Assessment for on-site ground conditions



Construction
Logistics and
Community Safety



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Please note: users are responsible for the correct application of the information provided in this guide.

Terminology

CLOCS Standard - a national Standard that requires all stakeholders in construction to take responsibility for health & safety **beyond the hoardings**.

Its mission - to ensure the safest construction vehicle journeys.

Primary goals:

- zero collisions between construction vehicles and the community
- improved air quality and reduced emissions
- fewer vehicle journeys - less congestion
- reduced reputational risk

Certain terms are used within the CLOCS Standard and in this guide:

CLOCS Champion - has co-invested in the programme and is responsible for actively implementing and ensuring compliance to the requirements within the CLOCS Standard. Where it is not possible to actively implement the CLOCS Standard straight away, the CLOCS Champion is responsible for communicating the organisation's intentions to implement together with related timescales and a dedicated point of contact.

Info: www.clocs.org.uk/page/Membership

CLOCS stakeholders:

- **Regulator** - a transport, city or local authority that sets policies and planning conditions.
- **Client** - an organisation that procures the construction or operation of a site which requires commercial vehicle journeys; will typically employ a principal contractor to manage site operations.
- **Principal Contractor** - an organisation that is responsible for all site operations; will typically employ specialist sub-contractors.
- **Fleet Operator** - an organisation or part thereof which operates one or more commercial vehicle(s) to deliver procured services.



Vulnerable road user (VRU) - pedestrians, particularly children, older or disabled people, cyclists, motorcyclists and horse riders.

Direct Vision Standard - measures how much an HGV driver can see directly through their cab windows.

Heavy Goods Vehicle (HGV) - commercial vehicles over 3.5 tonnes gross vehicle weight including abnormal and indivisible loads and engineering plant.

HGV categories:

On-road (N3) - a vehicle designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes

Off-road (N3G) - a vehicle designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tonnes with off-road capabilities

Low Entry Cab (LEC) - a vehicle with enhanced safety features including large panoramic windscreens, cross cab vision and provision for external cameras and sensors. A variant of category N3, LEC vehicles have reduced ground clearance capability compared with the other vehicle categories.

Introduction

1.1 Purpose of this handbook

This handbook is designed to help you assess and regularly review ground conditions on-site to ensure compliance with the **CLOCS Standard**.

It focuses on the four main ground condition categories that are the most important factors in determining which vehicles types can operate on sites safely.

This handbook provides a simple methodology to rate the ground conditions of construction, supply and waste sites. These CLOCS site ratings (1-5) provide a benchmark to monitor during operation.

The **CLOCS Standard** requires principal contractors to ensure that the ground conditions of the site are suitable for those vehicles servicing the site, particularly those fitted with safety features as detailed in the FORS Standard described as Silver:

'Principal contractors shall carry out regular reviews of the ground conditions of the site and where necessary implement diversions as the site ground conditions change.

Sites should also be:

- *suitable for access by low entry vehicles with increased direct vision*
- *assessed and rated using the CLOCS Handbook for on-site ground conditions.'*

Regular assessment of site conditions, use of the CLOCS site ratings, and communication with suppliers supports implementation of the **CLOCS Standard** through the supply chain and all stages of development.



1.2 Who should read this handbook?

Principal Contractors: It is important for them to understand the implications of poor site conditions and identify where improvements can and need to be made.

Suppliers: When they know what the site rating is, they can refer to the handbook and respond by deploying the most appropriate vehicle type.

Fleet operators: Can use the handbook and ratings to help their customers better understand the challenges presented by poor site ground conditions.

1.3 How do I get started?

The first step is to read through the **CLOCS Standard** which will give you an understanding of its scope and stakeholders - specifically the role of principal contractors and fleet operators.

The second step is to use this handbook to determine how to go about assessing your site(s).

For further advice or access to the CLOCS Standard, visit:
www.clocs.org.uk

Assessing and rating site ground conditions

2.1 Why assess and rate ground conditions?

Ground conditions are an influential factor in determining which category of HGV fleet operators will specify and purchase.

Variations in on-site conditions across construction sites have resulted in fleet operators purchasing off-road vehicles as the norm to cope with the conditions that may be encountered. As such, fleet operators often use off-road or N3G specified construction and waste vehicles which are designed to operate in severe off-road conditions. Research has identified that these vehicles have greater blind spots that adversely affect driver vision and are significantly over-represented in fatal collisions involving VRUs.

Vehicles with low entry cabs (LECs) and improved driver direct vision have a proven safety benefit in urban operations, but they require on-site ground conditions to be appropriate to their capability.

The on-site ground conditions assessment allows site personnel to identify the categories of vehicles (LEC, N3, N3G or site plant only) that can operate on their site. The ratings should form part of the overall health and safety manual for sites and inform any improvement plan.

If ground conditions on-site were guaranteed to be suitable for LEC and on-road (N3) HGVs, further adoption of these vehicles could take place. As these vehicles have improved driver direct vision compared to N3Gs, collisions involving HGVs and VRUs should be reduced.



Additional benefits of improved ground conditions include:

- safe working platforms
- safe tipping areas
- less vehicle damage
- reduced towing and damage of stranded vehicles

2.2 The assessment

The assessment is formed of five CLOCS ratings (1-5).

A **CLOCS 5 rated site** is an exemplar site and will be suitable for vehicles designed to operate safely on urban roads. Lower ratings represent poorer ground conditions, based on the assessed criteria (see section 3). A **CLOCS 1 rated site** will be suitable for some N3G variants and site plant only.

Vehicles on site may be required to traverse all ground condition types assessed. Therefore, once the assessment is complete, **the CLOCS rating will be determined by the most severe conditions encountered.**

For example, if three out of four ground conditions assessed score a **CLOCS 4** but one ground condition scored a **CLOCS 3**, your **overall site rating shall be a CLOCS 3.**

2.3 Conducting the assessment

Principal contractors/site operators shall complete this assessment on a regular basis.

The assessment should be conducted within the trafficked areas of the site.

The assessment shall be completed in accordance with the guidance provided in section 3.

All of the assessed criteria shall be completed accurately and impartially.

2.4 CLOCS ratings for on-site ground conditions



Site ground conditions suitable for all vehicle types including LECs (in all weather conditions)



Site ground conditions suitable for all vehicle types including LECs (weather permitting)



Site ground conditions suitable for most vehicle types including on and off-road capable HGVs (not LECs)



Site ground conditions suitable for off-road capable HGVs only (in all weather conditions)



Site ground conditions only suitable for plant machinery and, weather permitting, may be suitable for off-road capable HGVs



Section 3

Applying the onsite ground conditions assessment

The site assessment is based on four ground condition categories. These categories have been identified as the most important factors in determining which vehicle types can operate on sites safely.

Ground condition 1: **Approach angle**

The maximum angle of a ramp onto which a vehicle can climb from a horizontal plane without interference.

Ground condition 2: **Material type**

The surface condition that determines the likelihood of loss of traction.

Ground condition 3: **Ruts and bumps**

The depth and profile of the ground surface that impacts on tyre penetration.

Ground condition 4: **Water**

The presence and depth of surface water that impacts the ground material (see Ground Condition 2) and affects vehicle traction.

The ground conditions are assessed in a way that requires limited background experience of the site.

How to use the ground condition tables on pages 13-16:

- In the following pages, use the third and fourth column to best identify your site. Visual examples are also there to help in the second column.
- The first column will give you the site CLOCS rating for that specific ground condition.

The **overall CLOCS site rating** is based on the lowest of the four rated ground conditions.

Weather can considerably impact site conditions and alter the outcome of the site rating. The assessment for on-site ground conditions takes this into consideration.



Ground condition 1:

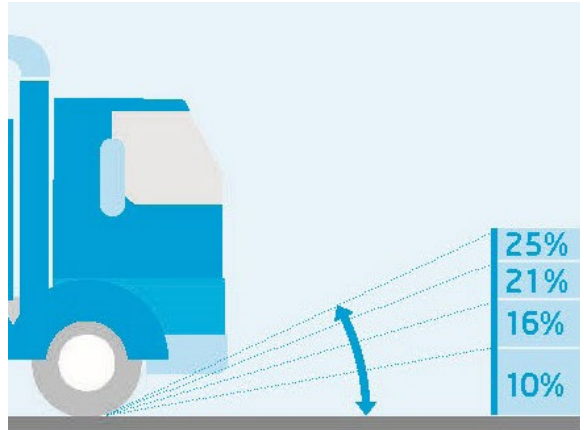
Approach angle

Approach angle

The approach angle is the maximum angle of a ramp onto which a vehicle can climb from a horizontal plane without interference.

It is defined as the angle between the ground and the line drawn between the front tyre and the lowest hanging part of the vehicle

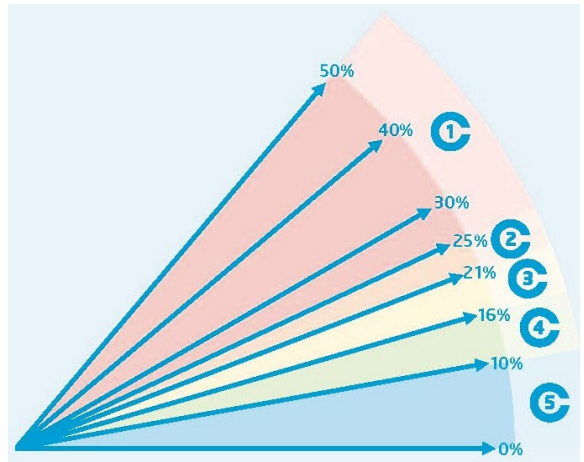
at the front overhang. LEC vehicles have a lower approach angle than off-road capable vehicles therefore it is necessary to quantify any change in gradient on site that may limit vehicle access.



Gradient






The gradient can be measured using an inclinometer, however many smartphones now have similar functionality using built in gyroscopes.

If required refer back to the diagrams listed under 'example' (p13) to find the relevant rating for gradients on your site.



Many construction, supply and waste sites will be host to gradients in the trafficked area. This may take the form of access to an elevated area of construction, tipping material atop a spoil heap or to gain access to weight bridges and wheel washes.

The approach angle of a particular vehicle may limit access to a gradient where there is a significant change in slope between the surface and incline. *Rating is based on the greatest change in gradient encountered on any part of the trafficked area.*






Rating	Example	Approach angle	Change in gradient
5		LEC unencumbered by change in gradient.	Should not exceed 10°
4		N3 or LEC unencumbered by change in gradient.	Between 11° - 16°
3		N3 unencumbered by change in gradient.	Between 17° - 21°
2		N3G or N3 unencumbered by change in gradient.	Between 22° - 25°
1		Will require N3G or site plant.	In excess of 25°



Ground condition 2:

Material type






A range of material types can be encountered on-site. This will affect the type of vehicle that can operate. The material type determines surface condition and the likelihood of loss of traction. *Rating should be based on worst conditions encountered on the trafficked area of the site.*

Rating	Example	Material type	Loss of traction
5		Concrete or asphalt surface in good condition. Suitable for LEC.	Not likely. Surface material not affected by weather conditions.
4		Concrete or asphalt surface in poor condition/unbound hardstanding in good condition. Suitable for LEC and N3.	Unlikely. Localised puddles in potholes with wet material capable of bearing load.
3		Surface of granular material with fines. Suitable for N3.	Localised loss possible. Some soft spots on the surface may occur in wet conditions.
2		Surface made of fine material with some granular. Suitable for N3G.	Localised loss likely. Soft spots on the surface will occur in wet conditions.
1		Surface made of predominantly fine material (cohesive). Suitable for some N3G types or site plant.	Highly likely. Material will soften with an increase in water content.

Ground condition 3:

Ruts and bumps

Ruts and bumps will often be encountered on sites where the surface material is unbound and traffic levels are high. Certain LEC and N3 vehicles can be equipped with air suspension able to increase the chassis height. Daily grading of ruts can help reduce tyre penetration of the surface and also prevent ruts and bumps from worsening. *Rating should be based on the deepest profile encountered on a trafficked area of the site.*






Rating	Example	Surface	Ruts & bumps
5		Concrete or asphalt surface with no rutting present. Suitable for LEC.	None witnessed
4		Tyre tread prints visible on trafficked surface. Suitable for LEC and N3.	Less than 50mm
3		Small ruts and bumps visible on the trafficked surface. Suitable for N3.	Between 51mm -100mm
2		Medium sized ruts and bumps present on trafficked surface. Suitable for N3G.	Between 101mm -150mm
1		Large ruts and bumps visible on the trafficked surface. Suitable for some N3G types or site plant.	In excess of 150mm



Ground condition 4:

Water

Well-drained sites should allow surface water to drain rapidly. In the worst case scenarios, where drainage is not adequate, the surface will liquefy. *Rating should be based on the largest area of ponding encountered on a trafficked area of the site.*

Rating	Example	Ponding	Water
5		Surface is well drained over the entire site. Suitable for LEC.	No surface water present. Water drains rapidly after precipitation.
4		Site is mostly drained. Localised puddles forming in un-trafficked locations. Suitable for LEC and N3.	Shallow puddles may be present but disperse within a short time frame.
3		Localised ponding present in trafficked area. Suitable for N3.	Water ponding on hardstanding areas.
2		Large ponding of water in trafficked area. Suitable for N3G.	Water ponding on firm to soft material. Depth difficult to gauge.
1		Ponding and slurry present in the trafficked area. Suitable for some N3G types or site plant.	Surface has liquefied.