highways england
driving forward

The Delivery Hub health, safety and environment

Raising the bar 7

Overhead structure and services protection

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Contents

Objective

To standardise measures for the protection of overhead structures and services whilst working on Highways England's projects.

Background

There are many variations to protecting overhead structures and services from impact during construction activities.
The purpose for this best practice standard is to ensure the hazards of overhead services, and other temporary and permanent fixed overhead items, the latter hereafter referred to as other fixed overhead hazards, are considered and a consistency is met in mitigating the associated risks on all Highways England projects.

There have been a number of incidents where overhead structures, overhead services and other fixed overhead hazards have been hit; it is considered that a standardised approach to overhead hazard identification and risk reduction will help to reduce such events.
There is little guidance on the protection of overhead structures and other fixed overhead hazards; however, the protection of overhead services is subject to many requirements, most notably contained within the Health and Safety Executive publication GS6.

Whilst this best practice standard is intended to raise the bar in terms of overhead structures, services and other fixed hazard protection, it should not replace any existing legal and / or industry required practises. In addition, protection should be compatible for use with temporary traffic management schemes in place.

Minimum requirement

All overhead structures, services and other fixed hazards must be assessed prior to works and a suitable safe system of work must be established and documented to prevent mobile plant equipment and vehicles striking any overhead structures, services and other fixed hazards.

A hierarchy shall be adopted, with the avoidance of carrying out works or inspections under and adjacent to overhead structures, services and other fixed hazards, being the first consideration.

Controls should also consider the trafficking of high-sided vehicles beneath overhead structures, services and other fixed hazards.

For the purposes of this document, high-sided vehicles refer to those of height greater than motor cars and light commercial vehicles.

Where this is not reasonably practicable, a sufficient system of controls appropriate to the work activity must be adopted, supervised and communicated at induction and briefings.

Production and development of controls should include surveying the heights of all existing overhead hazards for each scheme or work location, to determine safe passing and safe working heights, prior to commencing any works.

The process should be repeated for any new overhead hazards introduced through construction and commissioning phases.

Survey information

Should be used to establish minimum "air gaps" when working and minimum "air gaps" when travelling beneath overhead cables

This includes travelling and tracking of mobile plant equipment, travelling of vehicles, and erection, use and dismantling of temporary works systems etc. This may be achieved by use of "Permit to Pass" and "Permit to Work" systems

For existing overhead cables can be obtained by contacting the cable owner (Statutory provider), who will provide a “GS6 Safe Clearance Assessment Report” for each overhead cable location

At request, Statutory providers will also provide guidance of the minimum “air gaps” when working and travelling beneath 11kV (11,000v), 33kV (33,000v), 66kV (66,000v) and 132kV (132,000v) overhead power lines

The same process should be adopted to establish controls for working and travelling adjacent to and beneath overhead structures and other fixed overhead hazards

By use of information obtained from the survey of heights of overhead hazards, and to avoid confusion, adopting a single “maximum” passing height beneath all overhead hazard locations should be considered by each scheme / work location.

Goal posts that span traffic routes and provide a physical barrier to vehicles that may impact with overhead structures and services must be used in accordance with Health and Safety Executive publication GS6.

It should be noted that a height marker or hangman’s crook is no longer considered sufficient protection to reduce the identified risks associated with overhead structures, services and other fixed hazards.

If height markers are to be used, typically due to lateral working width restraints, they should be used in conjunction with a safe system of work produced for each specific work location (i.e. incorporating key elements of GS6 and relevant Raising the bar documents)

Incidents involving mobile plant equipment and vehicles striking existing overhead hazards after exiting construction areas have been reported and continue to be a potential risk.

As an additional control, and where practicable, sets of goal posts, together with blue coloured road cones and combination safety signage, should be placed at the end of construction areas.

This will serve to provide driver/operators with an addition visual message “reminder” of the need to ensure that boom/body/accessories are stowed correctly prior to leaving the construction area. Refer to Raising the bar 1 for further details relating to mobile plant and equipment.

All mobile plant and equipment in use, irrespective of location, must be modified, where practicable, to physically restrict the extension of booms and jibs etc to a height lower than the heights of overhead services and other fixed hazards, and the soffits and above of overhead structures.

continued

Where mobile plant equipment such as excavators, lorry loader cranes, dumpers and concrete extrusion machines etc, and high-sided vehicles, including tipper trucks and vehicles fitted with a removable canopy, have potential to travel when part of their body / accessories exceeds that maximum travelling height determined by each overhead hazard. A warning device must fitted to provide an audible and visual warning to the driver/operator, that is triggered when the mobile plant equipment / vehicle is moved without its boom/body/accessory being stowed correctly. Refer to Raising the bar 1 for further details regarding mobile plant and equipment.

If used in construction areas, any item of mobile plant equipment or vehicle, with an overall traveling height exceeding 3m must have the maximum travelling height limits displayed in the cab/vehicle as per the road vehicles (construction and use) amendment regulations 1997.

To create a higher visual standard and to restrict the width to that needed to create a safe passage for mobile plant equipment and vehicles through the danger area, and safe operation of mobile plant equipment in that area, then;

- At overhead structure and cable locations, 750mm high (minimum height) blue coloured road cones spaced 18m either side of the obstruction, at 3m centres, must be placed on both sides of the haul route / road
- At “other fixed overhead hazard” locations, an assessment of risk should be undertaken, with 750mm high (minimum height) blue coloured road cones placed either side of the hazard, at 3m centres
- At locations where lateral width is restrictive (narrow) and the construction area is separated from live motorway traffic by use of a temporary vehicle restraint system barrier
- Blue coloured road cones required adjacent to the temporary vehicle restraint system barrier may be substituted by the fitting coloured warning markers and/or sleeves across the top section of the temporary vehicle restraint barrier / system
- Markers and sleeves must be compatible for use with the temporary vehicle restraint barrier system, and be of colours to match road cones in place at each respective location, as required by this Raising the bar document
- Where warning markers and/or sleeves are used in lieu of blue coloured road cones, vertical goal posts located in the construction area adjacent to the temporary vehicle restraint barrier, must be highlighted (visual identification) by the use of blue coloured road cones in position at either side
- Blue coloured road cones, and vertical goal posts and their foundation support, located in the construction area adjacent to the temporary vehicle restraint barrier system, must be in position to reflect safe operating guidance of that system (i.e. not inside the recommended safety no-go zone)
- Blue coloured road cones provided at overhead hazard locations must not be taken and used for another purpose without authorisation from site management

Signs must be installed warning on-coming traffic of the danger ahead and informing drivers of the maximum travelling height beneath each overhead hazard

In addition, measuring devices to enable the checking of heights of vehicles and loads should be used for high sided vehicles
The protection system must be inspected daily by supervisors.

Consideration must also be given to any change in working widths or site boundaries. For example, if the site is normally a hard shoulder closure during the day, but possession of the live carriageway is taken at night, the continued protection of the overhead hazard must be maintained.

Implement appropriate permit to work systems for (1) travelling beneath and (2) working in close proximity to - overhead structures, services and other fixed hazards.

continued

Desirable

Creating a higher visual standard

When working near overhead hazards consideration shall be given to providing supplementary lighting to ensure to ensure adequate visibility is provided.

In addition, the presence of blue coloured road cones should be emphasised by using a series of steady lamps, especially where work is to be undertaken at night or during periods of low light.

A lamp placed on the first cone and then every 6m thereafter will ensure the cones are suitably highlighted.

The default sleeve colour of blue coloured road cones should be white with black lettering stating ‘Caution overhead structures’.

However to distinguish between overhead structures / other fixed hazards, and overhead services, consideration shall be given to replacing the white sleeve of the cone with a yellow ‘Danger overhead cables’ sleeve.

continued

Connecting the cones using blue and white chain/rope is also an effective visual option.

In addition, other controls to be considered, for posting, marking or installation prior to the start and after the end of each overhead service protection zone, includes as follows;

- Post - “Overhead clearance” warning signboards to identify location, safe working height and overhead cable owner
- Post - temporary road signs c/w text “Safe passing height, Site traffic only”

- Mark - “OH cable” on carriageway surface, using white lining techniques (see photo below)
- Install - Yellow coloured speed ramps, marking their location with “Ramp” temporary road signs
- Display - Safe passing and working heights using both “metric” and “imperial” measurements
- Use of – Goal posts and rigid cross bar made of insulated material
- Use of – Illuminated high level bunting

Electronic visual and audio warning systems

Painting a structure in some circumstances could make the structure more conspicuous. However, careful consideration is required as any colour used would have to be appropriate for all weather and site conditions. Additionally TAA (Technical Approvals Authority) approval will be required and care taken to ensure any applied coatings can be completely removed when work has been completed.

Risks/controls

A site-specific risk assessment to identify the most appropriate form of control must be undertaken in the first instance prior to the commencement of any work near overhead structures, cables and other fixed hazards.
Persons preparing risk assessments should review previous risk assessments undertaken for similar activities.
Points to consider within any risk assessment should include but not be limited to:

- Overhead obstructions – these include cables; bridges, gantries, speed camera columns, power lines, cantilever post electronic variable message signs, lighting columns
- Clearance – the safe clearance required beneath the overhead lines should be ascertained from the owner of the asset as well as an on-site check
- Modifications – plant such as cranes and excavators should be modified by the addition of suitable physical restraints so that they cannot reach beyond the safe clearance limit
- Additions – cranes with telescopic or fly jibs may need additional restraining devices to prevent alteration in length of jib or angle of fly jib
- Supervision – access for plant and the working of plant should be under the direct supervision of a suitable person appointed to ensure that safety precautions are observed
- Engagement with structure/services owners – diverting and isolation of cables, diversion of traffic routes etc
- Visibility – effect of weather on visibility causing shadow etc on working/ traffic surfaces
- Safe operation and use of - temporary vehicle restraint systems

Legislation and guidance

The Construction (Health, Safety and Welfare) Regulations 1996
The Electricity at Work Regulations 1989
The Provision and Use of Work Equipment 1998

http://www.hse.gov.uk/pubns/books/gs6.htm
http://www.hse.gov.uk/electricity/information/overhead.htm

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