

BURIED SERVICES PROCEDURES

During October 2011 a staggering **31** safety alerts were uploaded onto the One Safety Hub website.

This number, on the one hand, shows the growing interest of companies and individuals to alert co-workers of hazardous circumstances by posting safety alerts on the website thus achieving a greater audience; on the other hand this is a reminder to all workers of how hazardous work environments can be.

It is my opinion that some of the accidents/ incidents/ near misses reported could have been avoided with a more careful planning of works.

As a CDM Coordinator I would like to focus my attention on the hazards posed by underground existing services and utilities on sites as this appears to be a reiterating occurrence during the Thames Water AMP 5 project and in construction works in general.

Workers who have to carry out excavation work can potentially come across any, or all, of the various kinds of buried services and equipment and because they are usually laid within footpaths and roads, then workers who excavate on or near the highway are arguably at greatest risk from them. Note however, that this does not mean that other land, for example open land, will not have services buried within it.

The risks normally occur after physical contact has been made with a service, such as might result if an electric cable were struck by the bucket of a mechanical excavator or a water pipe were punctured with a pickaxe. Other kinds of damage to buried services may occur as a result of penetrating the ground with a gas sniffing bar or a road pin.

A service might also become damaged if it moves under its own weight, such as could happen if soil is removed from beneath a steel pipe.

Services that are buried in concrete carry similar risks because if the ground supporting the heavy concrete is removed or disturbed, then the concrete may move under its own weight and fracture the service within it, resulting in significant risks – especially if the service is an electric cable or a gas pipe of any kind.

Many accidents occur during excavation work as a result of a discovered service being wrongly identified and, therefore, its real risks not being taken account of.

My general advice for achieving safe working near underground services can be summarised in the following steps:

Planning the Work Before Starting

The best way to avoid or minimise risks in any work activity is to plan carefully before starting.

Of great importance in planning for work near underground services is the accurate identification of the location of all underground service equipment, in order to avoid both damage to the equipment and injury to people.

There are of course some situations where time for planning is limited, for example, when excavating to make an emergency repair on a service.

However, even in such cases *some* form of planning must take place.

In all cases a suitable and sufficient **risk assessment** of the proposed work should be carried out. Based on the findings of that, a plan of work aimed at removing or minimising any hazards identified should be designed.

This might include doing things like:

- designing formal evacuation or emergency procedures;
- installing traffic management systems;
- ensuring protection of the public from the work;
- placing earthwork support to excavations;
- highlighting services at ground level, and
- placing barriers/protection to prevent damage when mobile plant or vehicles operate in the work area.

The work can be further controlled by operating a '**permit-to-work**' system procedure in areas where underground services are present, and completed strictly in accordance with the conditions of the permit as a means of controlling it (particularly in terms of health and safety).

Asking for Information on Underground Service Locations

As far as possible, all the relevant owners and / or operators of services should be contacted to obtain reliable service location information, which is normally in the form of **location plans**.

These plans should be clear to read and up-to-date and ideally show both the position and depth of the services and their associated equipment.

However, plans should only be used as an indication of where the services may be found as they are not always accurate. This may be due to various reasons, such as not having been drawn precisely to scale or the services having been marked on them in convenient straight lines (when in reality they will not follow such perfect straight lines in the ground!).

Personal or **local knowledge** of a particular site or area of land (for example involving the site representative), can help to establish the existence of any underground service equipment that might not otherwise be documented.

Certain **features of the workplace** can also give an indication as to where services might be located. Things to look out for include:

- street lighting (electric cables);
- highway lighting, illuminated signs and traffic control systems;
- inspection chamber covers;
- drainage access points and rodding eyes;
- roadside cabinets (as used by most telecommunications providers); and
- roadside (verge) marker posts (these usually indicate the approximate distance from the post to a service).

You should not assume, however, that services do not exist in an area, simply because features such as those listed above cannot be seen.

Remember: *always expect that services will be present, regardless of where you are excavating.*

Confirming the Exact Location of Underground Services

When it is not known whether services exist within the ground (for example, where accurate records do not exist or in the case of emergency excavation work) or when the exact locations of known services are being confirmed on site, then specialist **service location equipment** should be used.

Note that this equipment must only be operated by someone who is fully trained and competent in its use.

Some types of locating equipment that might be used include:

- hum detectors – to detect the magnetic field radiated from a live electricity cable;
- radio frequency detectors – for identifying metallic pipes and electricity cables;
- transmitter-receivers – where a generator induces a signal into a cable or pipe and a receiver detects it;
- metal detectors – which can identify most metallic objects hidden underground (not suitable therefore for detecting plastic services); and
- specialist ground penetrating radar systems – which build up a ‘picture’ of the substrata to help identify services or other objects such as buried tramlines etc.

One particular service locating device that combines many of the above features is a **Cable Avoidance Tool (CAT)**; often used in conjunction with a signal generator.

Once the service locations have been identified by the equipment, they may be marked-up on the ground either by using (biodegradable) paint or other waterproof markings on the highway, or by using marker pegs and lines on softer or open ground.

However, **trial holes** should still be dug, using hand tools only, to confirm the exact position of the services. This is particularly important for locating plastic pipes which may not have been found by the type of location device used.

Excavating Using Safe Digging Practices

Safe working practices should always be strictly followed when undertaking excavation work. These will include:

- excavating under permit control;
- taking extra care when it is known that digging is taking place near to a service;
- not using mechanical excavators or hand-held power tools near to underground services and following the appropriate advised specific guidelines on the safety margins from each type of service;
- always assuming an exposed service is live until it is confirmed that it has been disconnected and it has been proven to be safe at the point of work; and
- never using exposed services as hand-holds, foot supports or for any other kind of physical support, such as to prop-up tools or equipment or as 'steps' for helping to climb out of an open excavation.

If a service is found encased in concrete then an alternative excavation route should be found or the service provider contacted to confirm that the service within the concrete is dead or has been isolated.

Special care should also be taken with the **tools and equipment** you use when hand digging, including:

- using insulated tools, such as shovels with non-metallic shafts, to stop electricity travelling up them in the event of striking an electrical service (ask your supervisor about these kind of tools if in doubt);
- using flat-edged tools (such as spades or shovels) in preference to pointed tools (such as bars, picks and forks);
- not throwing or spiking any tool into the ground; and
- applying only gentle hand or foot pressure to a hand tool, when encouraging it to penetrate the soil that is being dug.

Once excavation work has been completed, then **reinstatement and backfilling** near to any service should also be done carefully, to maintain safe practices. This includes:

- working in accordance with any specific requirements of the service owner or operator (such as covering the service with a layer of sand before backfilling with soil – specific utilities will advise of any such requirements);
- backfilling carefully, for example, by not allowing large boulders to roll into the excavation or to fall against services; and
- by carefully reinstalling marker systems such as warning tape or tiles.
- If buried services, which were not identified on drawings, are found, mark up drawings to ensure that they are up to date.