Safe Digging: Let's Make a Difference; HSG47

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HSE

Health and Safety Executive

Avoiding danger from underground services

HSG47 (Third edition), Published 2014

This guidance is aimed at all those involved in commissioning, planning, managing and carrying out work on or near underground services. It will also be of use to the owners and operators of such services.

It outlines the potential dangers of working near underground services and gives advice on how to reduce any direct risks to people's health and safety, as well as the indirect risks arising through damage to services.

It explains the three basic elements of a safe system of work during excavation:

- Planning the work
- Locating and identifying buried services
- Safe excavation

This third edition brings the guidance up to date, but the basic requirements remain the same.

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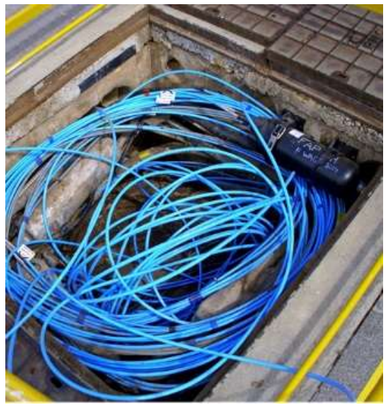
Buried Utility

- **Gas**
- **Electricity**
- **Water and sewer**
- **Telecoms/Fibre/Broadband**
- **Other utilities:**
  - **Traffic lights/ Street lights**
  - **Oil/Gas Pipelines**
  - **District Heating Networks**

482,000 km buried electricity cables

Difficult to estimate but could be up to **2m km** of buried cable



396,000 km water supply mains

353,000 km sewers (England and Wales only)

275,000 km buried gas pipelines

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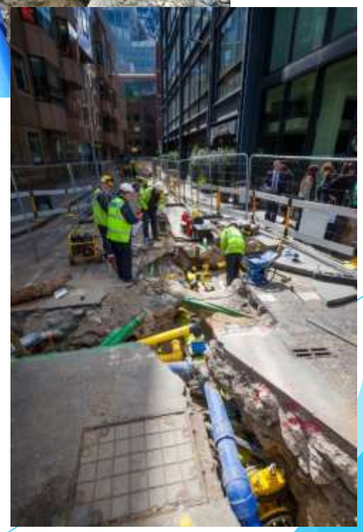
Excavations in locations where services may be encountered must be consistently carried out safely.



Then……Now…….

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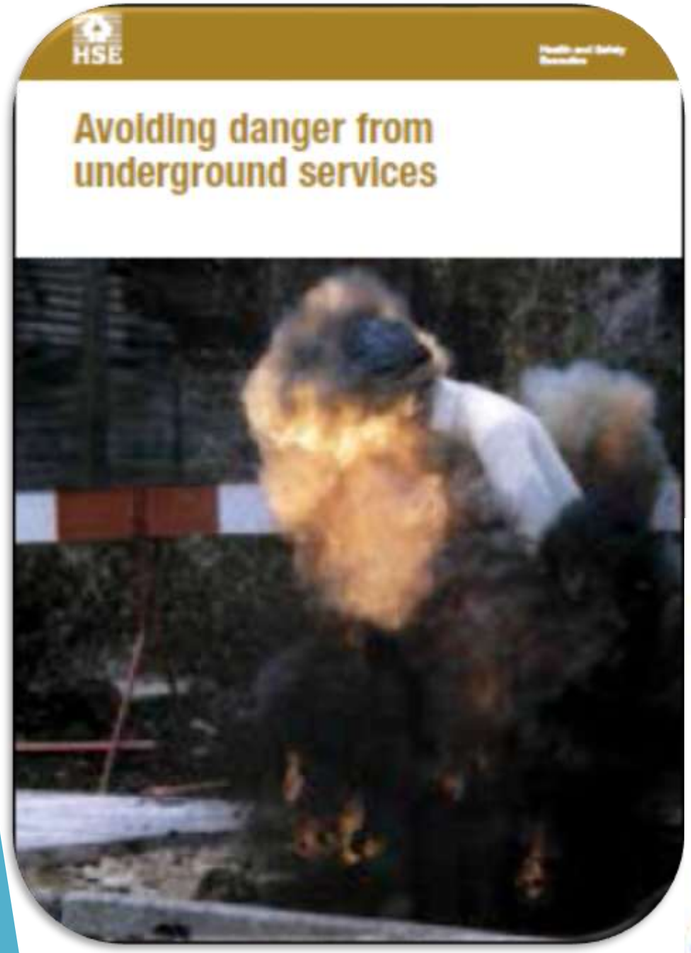

The guidance is aimed at all those involved in commissioning, planning, managing and carrying out work on or near underground services.

It is also of use to the owners and operators of such services.

It outlines the potential dangers of working near underground services and gives advice on how to reduce the risks. It deals principally with risks to health and safety rather than damage to services.

It explains the three basic elements of a safe system of work during excavation:

- **Planning the work**
- **Locating and identifying buried services**
- **Safe excavation**

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Planning the Work

All construction projects are subject to risks.

- Risk assessment and risk management will not necessarily prevent risks from occurring; however, they should enable the consequences of the occurrence of a risk to be planned for and minimised.

- **Two key definitions are:**

HAZARD – Is something with the potential to cause harm (substances or machines, methods of work, and other aspects of work organisation)

RISK – Is the likelihood of the potential being realised and the consequences in terms of severity and number of persons affected, if it is (realised), Risk is therefore the combination of the likelihood of harm occurring and the resulting severity and scale if it does.

2 HV Cables, 1 LV Cable, Street light Cable, BT duct and drain pipe under reinforced concrete

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The Assessment of Risk:

The main purpose of risk assessment is to protect workers and others from harm caused by hazards at work

There are no fixed rules for undertaking risk assessments

A number of alternative risk assessment methods exist, though most follow the same format:

- Identify the hazards
- Decide who might be harmed and how
- Evaluate the risks and decide on precautions
- Record your findings and implement them
- Review your risk assessment

Whatever procedure is followed it must incorporate the HSE’s **General Principles of Prevention**

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General Principles of Prevention - provides a framework to identify and implement measures to control risks on a construction project. (see Man H&S at Work Regs 1999)

In summary they are:

- Eliminate risks where possible
- Evaluate and reduce those risks that cannot be avoided and
- Put in place proportionate protective measures that isolate or control them at source
- Provide appropriate instructions to employees

https://www.youtube.com/watch?v=xyANahuhGs0

HSE's Health & Safety Risk Assessment and Management Video

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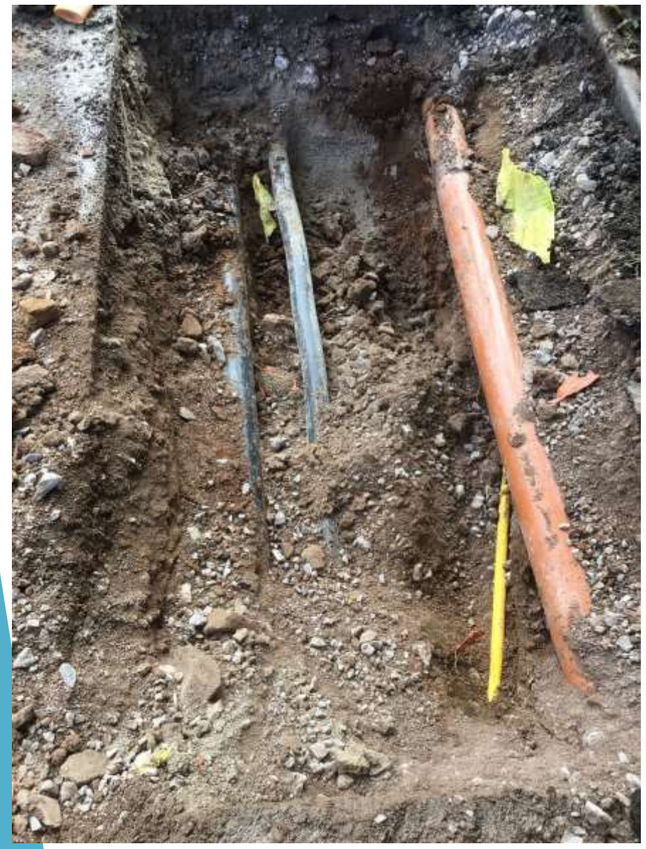

In Summary

Identify clearly the extent of the works area and find out what underground services are within the area before considering whether they are likely to be disturbed:

- Obtain service drawings from utility companies and other organisations with relevant information about the site.
- Survey the site to identify the services and other underground structures. Record the location of any services.
- Review/assess the planned work to avoid disturbing services where possible.
- Allow sufficient time and provide sufficient resource to so the work safely.
- Emergency work still requires planning and assessment of the risks arising from the work. A precautionary approach must be taken when breaking ground.

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Locating and identifying buried services

In summary

Locate the services identified at the planning stage survey as being in the work area.

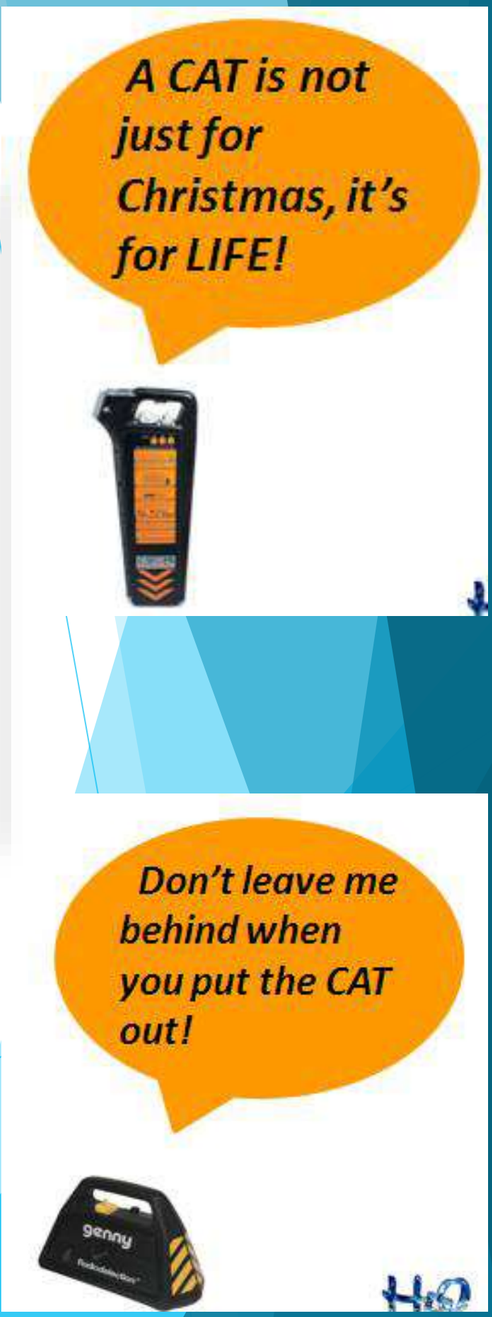
Make sure those involved in detecting and identifying services are competent in the proper use of survey tools and detecting devices as well as reading/interpreting plans.

Once detected, identify and mark the services and confirm their status – ie whether electricity cables are live, whether gas pipes are pressurised – and then record their location.

Competence & Common Sense

vs

Compliance & Control



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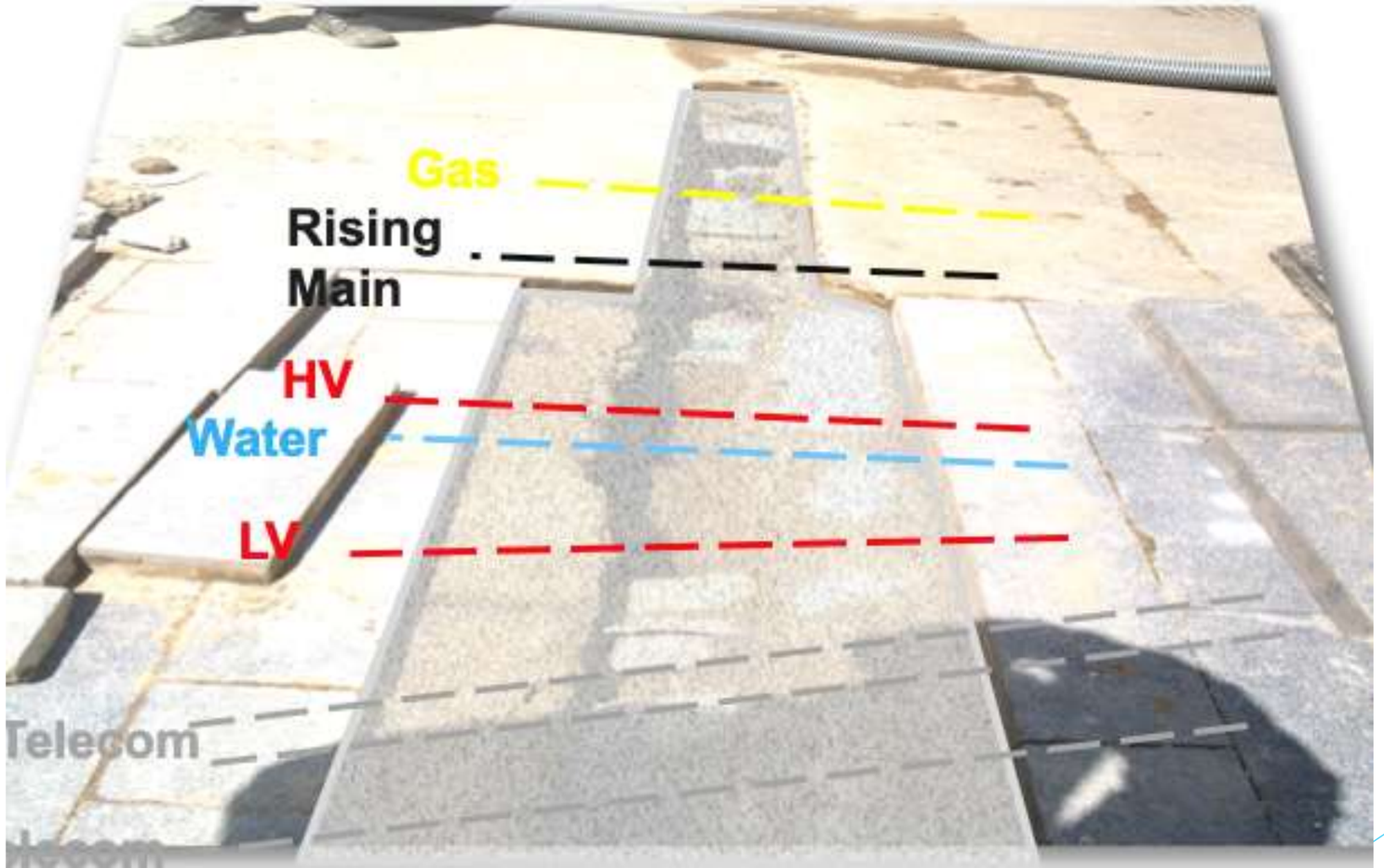
Locating & Identifying Services

On hard landscaping mark all utilities with colour-coded waterproof crayon, chalk or paint



http://streetworks.org.uk/wp-content/uploads/2018/11/VOL-1-reviewed.pdf

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Permits

A *Permit to Break Ground* forms part of the safe system of work for ground-breaking operations.

Permits for breaking ground must be produced by a formally appointed and competent person eg Site Manager.

Everyone involved in breaking ground must be briefed on a Permit to Break Ground.

Excavation supervisors must review permits daily to ensure that ground-breaking operations are compliant with the permit requirements.

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Safe Excavation Practices

When breaking ground within an exclusion zone:

- Assume all utilities are ‘live’
- Anyone likely to be exposed to fire or explosion must wear flame retardant clothing, including gloves
- Workers must only use electrically insulated tools
- A Cable Avoidance Tool (CAT) and signal generator (Genny) must be used to re-scan for utilities as an excavation progresses
- You must employ non-contact methods such as vacuum excavation and / or air picks to loosen and remove soil from around utilities
- Utilities encased in concrete **MUST** be isolated **BEFORE** being exposed; if possible

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Consequences of Striking Utilities

Direct and Indirect

- **Fatalities**
- **Fire or explosion**
- **Electrical shock**
- **Serious injuries**
- **Injuries to third parties / public**
- **Loss of earnings / fines**
- **Delays on site**
- **Inconvenience / delays to road users**
- **Loss of service to local homeowners**
- **Damage to equipment and machinery**
- **Flooding of excavation (drowning or collapse or environmental damage)**

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WHAT DO UTILITY STRIKES REALLY COST?

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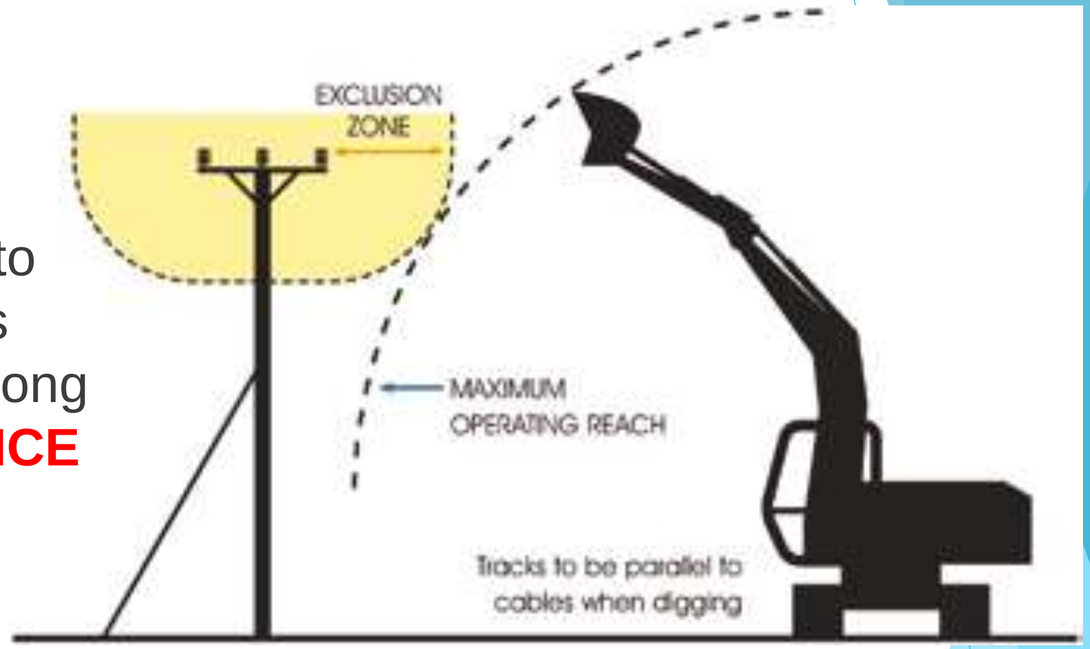
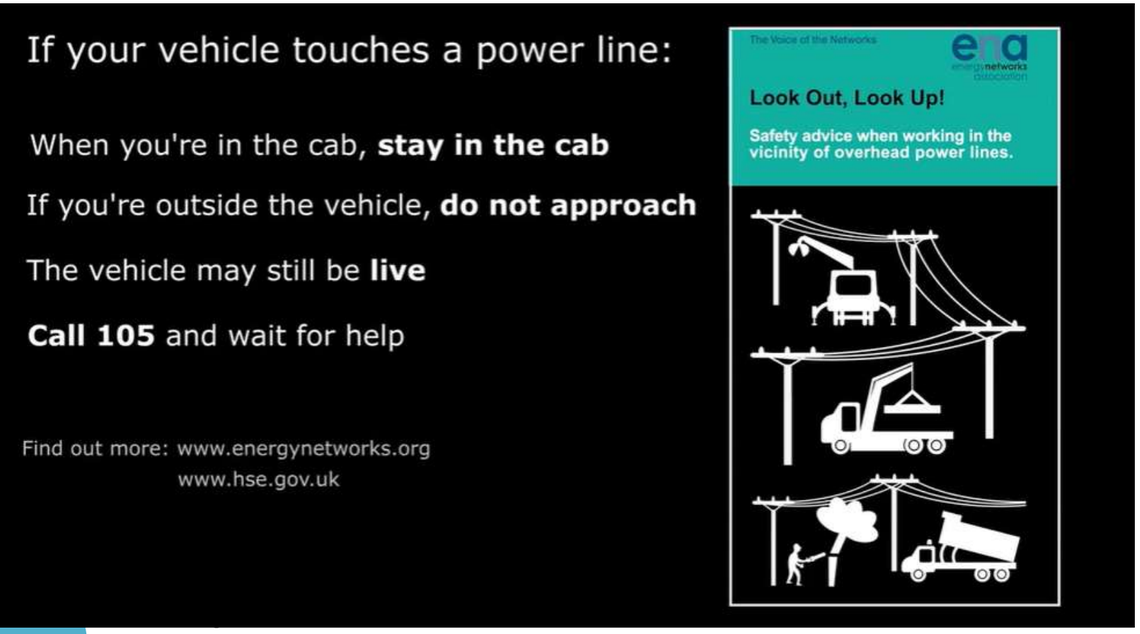
Overhead Electric Power Lines

If a mechanical excavator is being used to dig parallel to an overhead line, it is good practice to position the excavator with the tracks or wheels parallel to the line, so as the machine moves along the excavation the **SAFE STAND OFF DISTANCE** is easily maintained.





https://www.energynetworks.org/campaigns/look-out-look-up

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Good Practice – what does it look like?

Before work starts - Including design, planning, mapping, location, Genny & CAT, Risk Assessment, Ground Penetrating Radar – latest technology etc Augmented Reality Trial.

During the works – Follow your process, procedures and Safe Systems of Work, HSG47, trained and competent site teams, use of Vac Ex, Lances, Compressors, PPE. **Stop** if anything changes

After completion - As builts, changes to what was found, who to advise, how to advise etc.

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SUMMARY

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- ❑ You must be competent to undertake ground-breaking tasks
- ❑ Refer to issued utility plans and any other issued information
- ❑ Genny and CAT; use before and during the work
- ❑ Always assume utilities are ‘live’
- ❑ You must comply with exclusion zone rules
- ❑ A Permit to Break Ground to accompany every ground-breaking operation
- ❑ Everyone involved must be briefed on the Permit
- ❑ You must use the safest excavation methods near live utilities
- ❑ Do not expose live utilities encased in hard material; unless you have an approved safe system of work in place
- ❑ You must wear protective clothing
- ❑ Use insulated tools