Health and safety in engineering

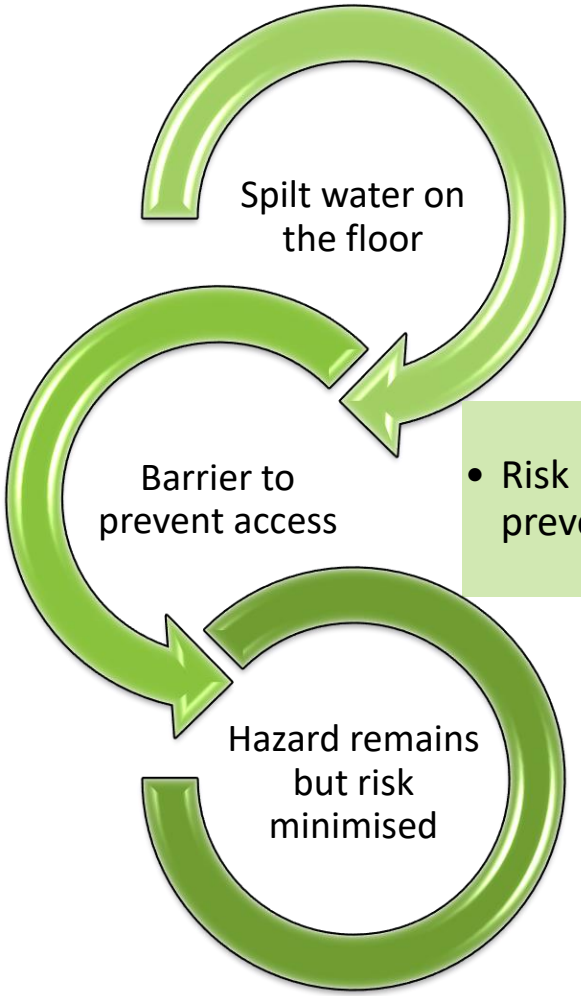
What is a hazard?

Key term: A hazard is anything with the potential to cause harm or adverse health effect on a person or persons

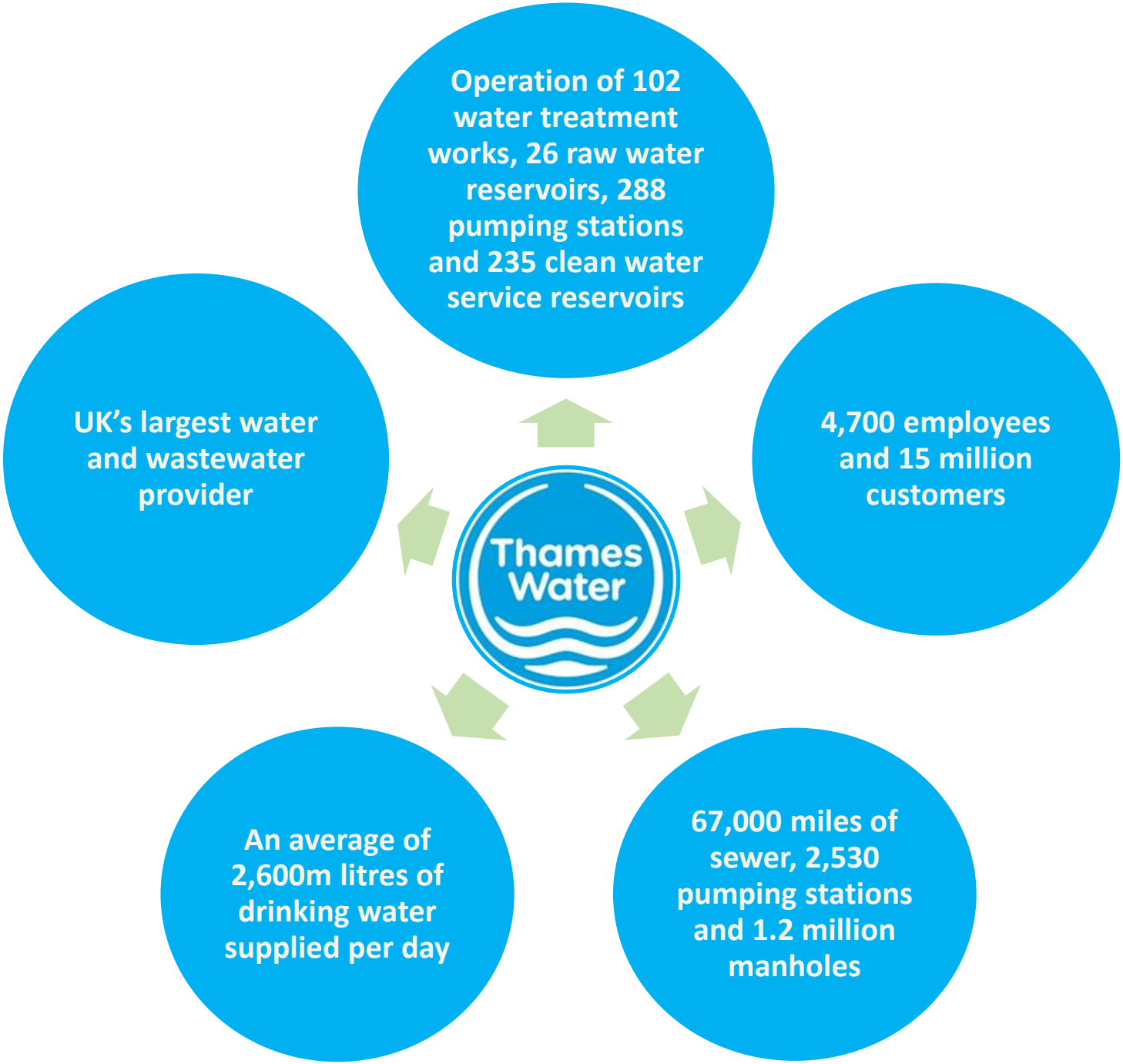
What is a risk?

Key term: A risk is the likelihood that a person or persons may be harmed or suffer adverse effects if exposed to a hazard

Relationship between the two



- Hazard
- Risk prevention
- Risk minimised


Operation of 102 water treatment works, 26 raw water reservoirs, 288 pumping stations and 235 clean water service reservoirs
UK's largest water and wastewater provider
4,700 employees and 15 million customers
Thames Water
An average of 2,600m litres of drinking water supplied per day
67,000 miles of sewer, 2,530 pumping stations and 1.2 million manholes

Question

Question:

What potential hazard considerations do you think a Thames Water technician needs to think about when visiting a customer with a blocked drain?

Hazard considerations

Are there weather conditions to take into account?

Is the area clear / safe for members of the public to pass while you work?

Is the machinery / equipment being used well maintained and in good working order?

Do you have the correct PPE for the job?

Do you have safe access to the area?

Is the area tidy and free from trip hazards?

Personal Protective Equipment (PPE)

PPE is defined in the *Personal Protective Equipment at Work Regulations* as:

'All equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work which protects them against one or more risks to their health and safety'.

The law

Wherever there are risks to health and safety that cannot be adequately controlled in other ways, the Personal Protective Equipment at Work Regulations 1992 require PPE to be supplied.

Source: http://www.hse.gov.uk

Personal Protective Equipment (PPE)

The Regulations also require that PPE is:

- properly assessed before use to make sure it is fit for purpose;
- maintained and stored properly;
- provided with instructions on how to use it safely;
- used correctly by employees

Source: http://www.hse.gov.uk

Personal Protective Equipment (PPE)

Affected area	Hazard	Types of PPE
Eyes	Chemical or metal splash, dust, projectiles, gas and vapour, radiation	Safety spectacles, goggles, face screens, faceshields, visors
Head and neck	Impact from falling or flying objects, risk of head bumping, hair getting tangled in machinery, chemical drips or splash, climate or temperature	Industrial safety helmets, bump caps, hairnets and firefighters' helmets
Ears	Noise – a combination of sound level and duration of exposure, very high-level sounds are a hazard even with short duration	Earplugs, earmuffs, semi-insert/canal caps
Hands and arms	Abrasion, temperature extremes, cuts and punctures, impact, chemicals, electric shock, radiation, vibration, biological agents and prolonged immersion in water	Gloves, gloves with a cuff, gauntlets and sleeving that covers part or all of the arm

Source: http://www.hse.gov.uk

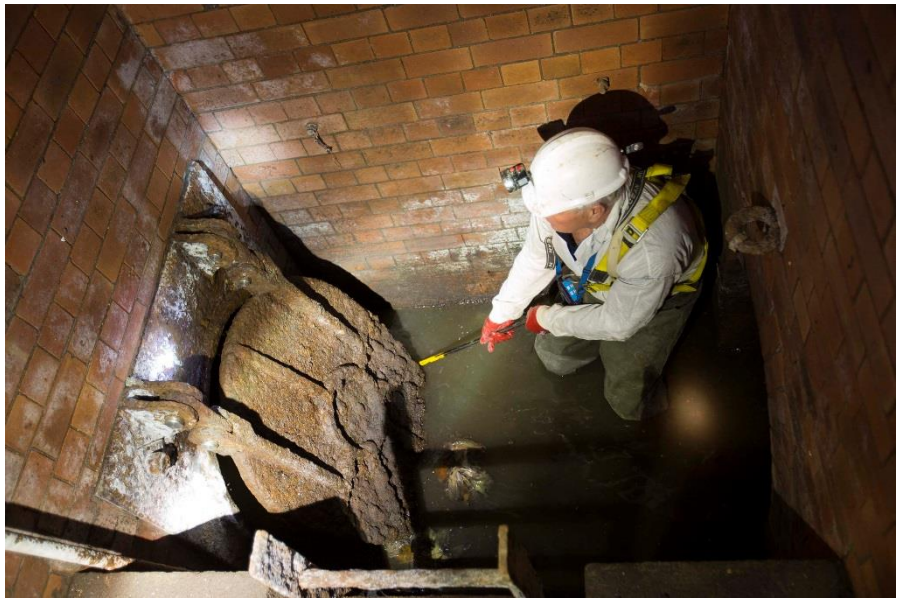
Personal Protective Equipment (PPE)

Affected area	Hazard	Types of PPE
Lungs	Oxygen-deficient atmospheres, dusts, gases and vapours	Respiratory protective equipment (RPE)
Whole body	Heat, chemical or metal splash, spray from pressure leaks or spray guns, contaminated dust, impact or penetration, excessive wear or entanglement of own clothing	Conventional or disposable overalls, boiler suits, aprons, chemical suits
Feet and legs	Wet, hot and cold conditions, electrostatic build-up, slipping, cuts and punctures, falling objects, heavy loads, metal and chemical splash, vehicles	Safety boots and shoes with protective toecaps and penetration-resistant, mid-sole wellington boots and specific footwear, eg foundry boots and chainsaw boots

Source: http://www.hse.gov.uk

Personal Protective Equipment (PPE)

Picture A



Picture B

What is a risk assessment?

In order to manage the health and safety requirements within a workplace, businesses need to control any potential risks to staff or visitors. To do this they need to think about what might cause harm to people and decide whether they are taking reasonable steps to prevent this harm.

This is known as a risk assessment and is something companies are required by law to carry out.

When considering a risk assessment, an employer needs to think about:

- **Hazards** (anything that may cause harm, such as chemicals, electricity, working at height, sharp implements etc)

- **Risks** (the chance, high or low, that somebody could be harmed by these and other hazards, together with an indication of how serious the harm could be)

Steps of a risk assessment

Writing a risk assessment

1. **Decide what might cause harm** to someone in the work environment e.g. are there hazards from equipment? Hazards from infections? Hazards in the physical environment in which you are working? Hazardous substances?

2. **Identify who might be harmed and how**. This could be you as an employee, external visitor to the site, colleagues or members of the public etc – any particular groups at risk

3. **Assess the risks and take action.** This step involves evaluating the risks and deciding on the appropriate control measures - taking into account the controls you already have in place

4. **Recording your findings.** Detail the significant findings; what the risks are, what you are already doing to control them and what further action is needed.

5. **Reviewing and updating your assessment.** This stage requires you to review your risk assessment at a set date in the future or as and when requirements change – whichever comes first

Fighting the fatbergs with Thames Water

getreading

Alongside engineer Daryl Eastman, we were watching the screen intently but still couldn't see anything despite the engineer feeding just over 10 metres of fibre optic cable down the sewer pipe - the blockage was nowhere to be seen.

We were investigating a blocked drain a few hours after Thames Water received a call from a concerned Chineham resident, who had tissue paper and poo spilling on to her front lawn. But it still took Daryl nearly half an hour to figure out where the underground foul pipe runs and which manhole he could use to access it.

Thames Water

Fighting the fatbergs with Thames Water

getreading

This is because much of the elaborate pipework beneath Reading it is not mapped. When he managed to pinpoint the narrow pipe, Daryll slowly slid nearly 14 metres of the £6,200 camera cable down into the sewer before it hit a fatberg - a solid lump of fat, wet wipes and other pieces of non-degradable waste.

The non-human waste, known as rag, was wrapped round tree roots which had broken through the sewage pipe.

Thames Water

Fighting the fatbergs with Thames Water

getreading

Disappointingly, the sewers outside of London are roughly the diameter of a cricket ball so you can't walk inside and scoop out the blockage. However, there is plenty of room for a very powerful hose.

Daryl removed the camera and blasted water down at 3,000 psi, which is enough to take the skin off your fingers. It annihilated the blockage, but wore away the inside of the pipe too.

This is why the company are urging people to avoid throwing anything other than urine, excrement and toilet paper down their drains and toilets - non organic material frequently blocks pipes and clearing these fatbergs costs Thames Water £1 million every month.

Thames Water