CONTINUING PROFESSIONAL DEVELOPMENT 2017

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Details of the work this licence holder is entitled to carry out are available at www.pgdb.co.nz
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Continuing Professional Development (CPD) 2017

Topic 1: Reducing risk to your health in the workplace
Topic 1: Reducing risk to your health in the workplace

Topic 1 of Continuing Professional Development (CPD) 2017 for plumbers, gasfitters and drainlayers focuses on reducing risk to your health in the workplace.

This topic covers the following:

- Practical ways of reducing risk to your health in the workplace.
  - General advice.
  - Asbestos.
  - Acetylene.
  - Duram solvent.
  - Duzall soldering flux.
  - UPVC priming fluid.
  - UPVC pipe cement (type N).
- Reducing the risk of disease through exposure to biohazards in the workplace.
- Reducing the risk of hearing damage in the workplace.
- Health and safety responsibilities.
- The health and safety manual.
  - Health and safety policy statement.
  - Health and safety plan.
  - Responsibilities.
  - Safety equipment.
  - Health and safety procedures.
  - Emergency procedures.
  - Hazard register.
  - Accident/Near miss register.
» Notifiable incidents.
» Task analysis worksheets.
» Particular hazardous work notifications.
» Employee induction training material.
» Training register.
» Contractor management.
» Codes of practice and guidelines.

- Further advice.
Practical ways of reducing risk to your health in the workplace

Hazardous substances that we may come into contact with in our industry include asbestos, adhesives, solvents, solder, lead, sulphur dioxide and other toxic or carcinogenic substances.

The following general information will help you to reduce your health risk at work.

You should always follow these tips to help keep yourself, your workmates and other people safe at a worksite.

- Make sure you are familiar with any hazards present at a site you are working at.
- Always follow company health and safety policies and instructions, including hazard reporting protocols.
- Get/provide training on the potential hazards at the work site where you/your workers are assigned.
- Safety data sheets (SDSs) can be used to confirm the chemical properties, health hazards, and required personal protective equipment (PPE) that are needed when dealing with different hazardous substances. Make sure you get hold of, and read, the data sheet for the products you are working with.
- Use appropriate PPE for the task at hand. For example, gloves, masks etc.
- Always think before you act.

In the next sections of this topic we will now look at ways of protecting your health when working in an environment containing asbestos and when working with some of the commonly used products: acetylene; Duram solvent, Duzall soldering flux, UPVC priming fluid and UPVC pipe cement (type N).
Asbestos

Asbestos is New Zealand’s number one killer in the workplace. Around 170 people die each year from asbestos-related diseases.

Due to its strength, durability and resistance to fire and water, asbestos was widely used in building products and materials up until the 1990s. Buildings constructed before then are likely to contain asbestos-containing materials (ACMs). ACMs may also be present in buildings built later too.

These materials are not dangerous if they are in a good condition and remain undisturbed, but any tradesperson or other person who works on the fabric of a building may be at risk of disturbing asbestos and exposing themselves to the fibres, which is dangerous for health.

The Asbestos Regulations 2016

The Asbestos Regulations 2016 are designed to protect as many people as possible from exposure to asbestos fibres.

Regulations around working with asbestos changed on 4 April 2016:

A licensing system for the removal of asbestos has been introduced (a licence is now required when more than 10m² of non-friable asbestos or ACM is being removed), and associated duties and responsibilities have changed.

For more information, visit: http://www.worksafe.govt.nz/worksafe/information-guidance/guidance-by-hazard-type/asbestos

Asbestosis and mesothelioma

Asbestosis and mesothelioma have the same cause: exposure to asbestos. Asbestosis develops from asbestos fibres lodging in the alveoli (the lung’s air sacs). Mesothelioma develops from asbestos fibres lodging in the lining of the lungs.

Asbestosis and mesothelioma share many of the same symptoms which typically include the following: shortness of breath, persistent cough, chest pain and weight loss. It can take 10 to 40 years after exposure for both asbestosis and mesothelioma to develop.

Mesothelioma is a form of cancer and patients are generally given a prognosis of 4 to 12 months. Asbestosis is not cancer and has a much better outcome. There are, however, long-term complications involved with asbestosis and there is currently no cure.

The information that follows provides guidance to help you reduce your asbestos-exposure risk in the workplace.
Areas of industrial and residential buildings where materials containing asbestos were commonly used during construction

The list and diagrams that follow show areas of industrial and residential buildings where materials containing asbestos were commonly used during construction.

<table>
<thead>
<tr>
<th>Industrial building</th>
<th>Residential house</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Roof ventilators</td>
<td>• Vinyl flooring</td>
</tr>
<tr>
<td>• ‘Super Six’, ‘Super Eight’ roof sheeting</td>
<td>• Cladding, including baseboards</td>
</tr>
<tr>
<td>• Skylight and manhole frames</td>
<td>• Wet area lining substrate</td>
</tr>
<tr>
<td>• Asbestos cement vent pipe and capping</td>
<td>• Electrical meter board</td>
</tr>
<tr>
<td>• Fluted ridge capping used on plain roll, fluted saddle ridge, sawtooth ridge</td>
<td>• Compressed sheeting (asbestos containing material)</td>
</tr>
<tr>
<td>• Fluted ridge capping and ventilating ridge</td>
<td>• Soffits</td>
</tr>
<tr>
<td>• Window moulding and louvre blades</td>
<td>• ACM roofing panels, e.g. Super Six</td>
</tr>
<tr>
<td>• Barge moulding</td>
<td>• Exterior window flashing</td>
</tr>
<tr>
<td>• ACM sheeting or ceiling tiles used in the office area, kitchen, toilet walls or</td>
<td>• ACM toilet seat and cistern</td>
</tr>
<tr>
<td>• mezzanine area</td>
<td>• ACM bath panel</td>
</tr>
<tr>
<td>• Compressed sheet flooring</td>
<td>• ACM hot water cupboard lining</td>
</tr>
<tr>
<td>• ‘Super Six’, ‘Super Eight’ or architectural designed wall cladding</td>
<td>• ACM water tank</td>
</tr>
<tr>
<td>• ACM wall sheeting or compressed sheeting</td>
<td>• ACM ceiling tiles</td>
</tr>
<tr>
<td>• ‘Super Six’ awning</td>
<td>• Textured ceiling</td>
</tr>
<tr>
<td>• Vinyl floor tiles or sheet vinyl floor coverings</td>
<td>• ACM interior window panel</td>
</tr>
<tr>
<td>• Compressed wall sheeting used for toilet partitions</td>
<td>• Gutters and downpipes</td>
</tr>
<tr>
<td>• Moulded telecommunications pit or electrical pit</td>
<td>• ACM surrounding fireplace</td>
</tr>
<tr>
<td>• DT surrounds (disconnecter trap)</td>
<td>• ACM clad garage</td>
</tr>
<tr>
<td>• Textile in the fuse holders</td>
<td>• ACM fence panels</td>
</tr>
<tr>
<td>• ACM backing to the switchboard and internal lining</td>
<td>• ACM stormwater trap</td>
</tr>
<tr>
<td>• Asbestos cement downpipes</td>
<td>• ACM stormwater and sewage piping</td>
</tr>
<tr>
<td>• Side flashing</td>
<td>• Loose fill insulation</td>
</tr>
<tr>
<td>• Window moulding and louvre blades</td>
<td>• ACM partition wall</td>
</tr>
<tr>
<td>• Rainwater heads</td>
<td></td>
</tr>
<tr>
<td>• Door mouldings</td>
<td></td>
</tr>
<tr>
<td>• Gutters</td>
<td></td>
</tr>
<tr>
<td>• ACM woven fencing product</td>
<td></td>
</tr>
</tbody>
</table>

WHERE ASBESTOS CAN BE FOUND IN A NEW ZEALAND INDUSTRIAL BUILDING

ACM stands for asbestos-containing material. Buildings constructed before 2000 are likely to contain asbestos materials. The diagram shows areas where materials containing asbestos were commonly used during construction. These materials are not dangerous if they are in a good condition and remain undisturbed.

ACM stands for asbestos-containing material.
WHERE ASBESTOS CAN BE FOUND IN A NEW ZEALAND RESIDENTIAL HOUSE

www.business.govt.nz/worksafe/asbestos

ACM stands for asbestos-containing material. Buildings constructed before 1990 are likely to contain asbestos materials. The diagram shows areas where materials containing asbestos were commonly used during construction. These materials are not dangerous if they are in a good condition and remain undisturbed.
Good practices to follow when drilling holes in asbestos-containing board

The following information describes good practices to follow when drilling into board that contains asbestos (ACM board). This might happen when you want to attach fittings or pass through cables or pipework.

Prepare the work area

- Make sure there is safe access to the work area.
- Restrict access – reduce the number of people present.
- Close doors opening into the work area. Use tape and notices to inform others why the area is restricted.
- If it is possible, also restrict access to the area behind the ACM board.
- Let other people know the area is contaminated.

Keep dust down

- Use a thick paste, like wallpaper paste or shaving foam, to contain drilling debris.
- Only use power tools set at the lowest speed so you do not create a lot of dust. Use dust collection equipment if it is available.
- Use plastic sheets to cover your work area to help stop the spread of dust. They will also make cleaning up easier.

Use the right protective equipment

<table>
<thead>
<tr>
<th>Wear a mask</th>
<th>Wear overalls</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Not all masks protect from asbestos.</td>
<td>• Disposable overalls will stop the tiny asbestos fibres getting on your clothes.</td>
</tr>
<tr>
<td>• A disposable P2 mask with a valve is the minimum needed for this work. P1 or ‘nuisance dust’ masks will not provide the protection you need.</td>
<td>• Don’t re-use disposable overalls.</td>
</tr>
<tr>
<td>• Don’t re-use disposable masks.</td>
<td>• Wear the overalls one size too big as it will help prevent ripping at the seams.</td>
</tr>
<tr>
<td>• Make sure your mask fits properly. Facial hair and stubble make it almost impossible to get a good seal between your face and the mask.</td>
<td>• Make sure you put the legs of the overalls over the top of your footwear – don’t tuck them in as it lets in dust.</td>
</tr>
</tbody>
</table>
Procedure

• Put on mask and overalls and make sure they fit properly.

• Protect nearby surfaces from contamination.

• Cover the drilling point and the rear (if accessible) with masking tape to prevent the edges crumbling.

• For cable and pipework, make the hole slightly bigger than required.

Method 1:

• Cover the drill entry and, if accessible, exit points, with a generous amount of paste, foam or a proprietary device.

• Drill through the paste, foam or device.

• Clean off the paste, foam and debris with damp rags. Or remove the device and clean the surface. Clean the back surface with damp rags, if accessible.

• Rags and paste or foam contain dust and fibres. Dispose of as asbestos waste.

• Seal the drilled edge with sealant.

• Insert a sleeve to protect the hole’s edges.

Method 2:

• Place a plastic enclosure over the drill point. Put the drill bit or cutter through the enclosure opening.

• Use a vacuum with a type of filter designed to capture fine particles like asbestos. Attach the hose of a vacuum cleaner to the plastic enclosure. Turn it on.

• Drill the hole.

• Vacuum the drilled hole, and the rear of the board if accessible.

• Seal the drilled edge with sealant.

• Insert a sleeve to protect the hole’s edges.

Clean up properly

It’s really important to clean up properly so that you safely remove and dispose of the asbestos waste.
The work area and tools

- Clean up as you go to stop waste building up.
- Use a damp cloth to wipe down tools and surfaces to remove asbestos fibres. Do not re-use the cloth. It must be disposed of as asbestos waste.
- Do not sweep up because this will spread asbestos fibres into the air.
- Do not use domestic vacuum cleaners to clean up asbestos dust. Use a vacuum with a type of filter designed to capture fine particles like asbestos.

Personal clean-up

- Dispose of disposable masks and overalls safely after you have finished the job. The mask and overalls are asbestos waste.
- Don’t take overalls home or wear them in vehicles. This will prevent people at home being exposed to asbestos fibres.

Disposal

- Make sure all waste, including masks, overalls, cloths and plastic sheets are double-bagged in heavy-duty plastic bags, sealed with tape and marked as asbestos waste.
- Dispose of the asbestos waste at an authorised disposal site. Contact the local tips in your area to find one that accepts asbestos waste.

Finishing the job

- Visually inspect the area to make sure it has been cleaned properly.


Management and removal of asbestos

WorkSafe New Zealand has published an Approved Code of Practice for the management and removal of asbestos, setting out WorkSafe’s expectations about how to comply with asbestos health and safety law.

Questions

Answer the following questions.

1. Under the Asbestos Regulations 2016, what is the maximum amount of non-friable asbestos or ACM that is permitted to be removed before a licence is required?

2. What was the last decade that buildings were commonly constructed using asbestos-containing materials (ACMs)?

3. Any tradesperson or other person who works on the fabric of a building may be at risk of disturbing asbestos and exposing themselves to the fibres which is dangerous for health.
   Give two examples of common activities performed in our industry where exposure to asbestos risks may occur.

4. Who provides good practice information to follow when drilling holes in asbestos-containing board?
**Acetylene**

Acetylene is an asphyxiant gas – this means it can replace oxygen in the inhaled air and cause asphyxiation (suffocation). Hazardous by-products may be produced when this gas/gas mixture is used in welding, cutting and associated processes.

When exposed to air too high in acetylene and low in oxygen, typically pulse rate and rate and volume of breathing will speed up. The ability to maintain attention and think clearly and muscular coordination may be negatively affected.

In more severe cases, nausea and vomiting may occur and the ability to move may be lost. Convulsions and unconsciousness can follow and permanent brain damage may result even after resuscitation. Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death will follow in a few minutes.

Acetylene is highly flammable. Heating to decomposition produces acrid smoke and irritating fumes. Acetylene reacts with copper, copper alloys (>70% copper), silver & mercury to form explosive acetylides. It may decompose violently at high temperatures and/or pressures or in the presence of a catalyst. Acetylene may undergo exothermic decomposition to carbon (soot) and hydrogen gas.

**Safe work practices**

When using acetylene, it is important to do the following:

- Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, petrol engines, heaters, naked lights, pilot lights, mobile phones, static electricity (such as from plastic materials or synthetic clothing) etc.

- Maintain adequate ventilation. Confined areas (e.g. tanks) should be adequately ventilated or gas tested. Remember that flammable/explosive vapours may accumulate quickly in poorly ventilated areas.

- Wear safety boots, cotton or leather gloves and safety glasses. Where an oxygen-deficiency risk exists, wear an air-line respirator. If undertaking welding operations, the appropriate personal protective equipment should be worn. Clothing must be 100% cotton or fire-resistant (e.g. proban, nomex) rather than synthetic materials which can generate enough static electricity to cause an ignition and also can melt onto the skin at flame temperatures.

- Do not store near sources of ignition, oxidising agents, poisons, flammable liquids or combustible materials.
• Cylinders should be stored: upright, prevented from falling, in a secure area; below 45°C, in a dry, well ventilated enclosure constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

• Post ‘No Smoking or Open Flames’ signs in the storage areas.

• Refer to applicable legislation on flammable storage quantity restrictions.

• Never transfer acetylene to another cylinder or other container.

• Refer to the Safety Data Sheet (SDS) for Acetylene for more information.
Duram solvent

This product has the potential to cause acute and chronic health effects.

Duram solvent can be an eye irritant. Contact may result in weeping eyes, pain, redness and conjunctivitis. Prolonged contact may result in corneal burns and possible permanent damage.

When inhaled, over exposure may result in irritation of the nose and throat, coughing, nausea, headache, fatigue, loss of appetite and vomiting. High level exposure may result in dizziness, breathing difficulties, pulmonary oedema (fluid on the lungs) and unconsciousness. Chronic exposure may result in kidney, liver and damage to the blood and central nervous system.

Contact with skin may result in drying and defatting of the skin, rash and dermatitis. It may be absorbed through the skin with harmful effects.

Ingestion may result in nausea, vomiting, abdominal pain, fatigue, loss of appetite, dizziness, drowsiness and diarrhea. Ingestion of large quantities may result in liver and kidney damage, unconsciousness, circulatory collapse and possibly death.

Duram Solvent is flammable. Vapours may form explosive mixtures with air. Toxic gases (carbon oxides, hydrocarbons) may form when it is heated to decomposition. It is incompatible with oxidising agents (eg. hypochlorites), acids (eg. nitric acid), heat and ignition sources.

Safe work practices

When using Duram solvent, it is important to do the following:

- Use safe work practices to avoid eye or skin contact and vapour generation/inhalation.
- Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling. Earth containers when dispensing fluids.
- Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended.
- Remember that flammable/explosive vapours may accumulate in poorly ventilated or confined areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back.
- Maintain vapour levels below the recommended exposure standard.
- Wear splash-proof goggles, viton (R) or PVA gloves, coveralls and a Type A (Organic vapour) respirator. If spraying, wear an Air-line or a Full-face Type A-Class P1 (Organic gases/vapours and Particulate) respirator.
• Store in a cool, dry, well ventilated area, preferably a purpose built flammables store, away from direct sunlight, heat and ignition sources, oxidising agents (e.g. peroxides), acids (e.g. nitric acid) and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Large storage areas should have appropriate fire protection and ventilation systems.

• Refer to the Safety Data Sheet (SDS) for Duram solvent for more information.

Study Notes
Duzall soldering flux

Duzall soldering flux is slightly corrosive and can be an irritant. It is non flammable. Safety issues relate to toxic gases/fumes (i.e. metal oxides, chlorides and hydrogen chloride) released during brazing, soldering or fluxing operations.

When heated during soldering, the fumes/vapours involved may result in eye irritation, weeping eyes and conjunctivitis.

If inhaled, fumes/vapours may cause mucous membrane irritation of the nose and throat. Freshly formed metal fumes may cause metal fume fever (a flu-like illness – symptoms typically appear 4-12 hours after exposure). Very high exposures may cause pulmonary oedema (fluid on the lungs). Metals may accumulate within the body causing toxic effects.

Skin exposure to fumes involved may cause irritation and discolouration. Duzall may be absorbed through skin with toxic effects.

Duzall soldering flux is incompatible with oxidising agents (e.g. hypochlorites) and acids (e.g. nitric acid).

Safe work practices

When using Duzall soldering flux, it is important to do the following:

- Use safe work practices to avoid direct eye and skin contact and fume inhalation.
- Individuals with pre-existing respiratory impairment should avoid exposure.
- Do not inhale fumes. Use in well ventilated areas. In poorly ventilated areas, mechanical extraction ventilation at source is recommended. Maintain fume levels below the recommended exposure standard.
- Wear leather gloves and safety glasses.
- With extended use, localised fume extraction is recommended where practicable.
- When using large quantities or where heavy contamination is likely, wear coveralls.
- Where an inhalation risk exists, wear a Class P2 (Metal fume) mask.
- Store in a cool, dry, well ventilated area, removed from oxidising agents, acids and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use.
- Refer to the Safety Data Sheet (SDS) for Duzall soldering flux for more information.
UPVC priming fluid

UPVC priming fluid is highly flammable, moderately toxic and can be an irritant.

Contact with eyes may result in irritation, weeping eyes, pain, redness, conjunctivitis. May result in burns with prolonged contact.

If inhaled, over exposure may result in mucous membrane irritation of the nose and throat, coughing, loss of appetite, nausea and vomiting. At high levels; breathing difficulties, dizziness, drowsiness, chemical pneumonitis (lung inflammation caused by an irritant), pulmonary oedema (fluid on the lungs). and unconsciousness.

Skin exposure may result in drying and defatting of the skin, rash and dermatitis. May be absorbed through skin with toxic effects.

Ingestion may result in nausea, vomiting, abdominal pain, diarrhea, fatigue, dizziness and unconsciousness.

The risk of nerve damage (peripheral neuropathy, with weakness in hands and feet) may increase when used in combination with certain other solvents (e.g. n-Hexane).

Vapours may form explosive mixtures with air. Toxic gases (carbon oxides, hydrocarbons) may build up when it is heated to decomposition.

UPVC priming fluid is incompatible with oxidising agents (e.g. hypochlorites, peroxides), acids (e.g. nitric acid), heat and ignition sources. It is also incompatible with alkalis (e.g. sodium hydroxide).

Safe work practices

When using UPVC priming fluid, it is important to do the following:

- Use safe work practices to avoid eye or skin contact and vapour inhalation.
- Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling. Earth containers when dispensing fluids.
- Do not inhale vapours. Use only in well ventilated areas. In poorly ventilated areas, mechanical explosion proof extraction ventilation is recommended.
- Remember that flammable/explosive vapours may accumulate in poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Maintain vapour levels below the recommended exposure standard.
- Wear splash-proof goggles, butyl gloves and coveralls. Where an inhalation risk exists, wear a Type A (organic vapour) respirator. At high vapour levels, wear an air-line respirator.

- Store in a cool, dry, well ventilated area, removed from oxidising agents (e.g. hypochlorites), acids (e.g. sulphuric acid), heat sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate ventilation systems. Also store removed from alkalis.

- Refer to the Safety Data Sheet (SDS) for UPVC priming fluid for more information.
UPVC pipe cement (type N)

Used as a pipe-jointing compound, this product is highly flammable, moderately toxic and can be an irritant.

Contact with eyes may result in irritation, weeping eyes, pain, redness, conjunctivitis. Burns may occur with prolonged contact.

If inhaled, over exposure may result in mucous membrane irritation of the nose and throat, coughing, loss of appetite, nausea and vomiting. At high levels, breathing difficulties, dizziness, drowsiness, chemical pneumonitis (lung inflammation caused by an irritant), pulmonary oedema (fluid on the lungs) and unconsciousness may occur.

Contact with skin may result in drying and defatting of the skin, rash and dermatitis. It may be absorbed through skin with toxic effects.

Ingestion may result in nausea, vomiting, abdominal pain, diarrhea, fatigue, dizziness and unconsciousness.

The risk of nerve damage (peripheral neuropathy, with weakness in hands and feet) may increase when used in combination with certain other solvents (e.g. n-Hexane).

Vapours may form explosive mixtures with air. Toxic gases (carbon oxides, hydrocarbons) may build up when it is heated to decomposition. It is also incompatible with oxidising agents (e.g. hypochlorites, peroxides), acids (e.g. nitric acid), heat and ignition sources.

Safe work practices

When using UPVC pipe cement – (type N), it is important to do the following:

- Use safe work practices to avoid eye or skin contact and vapour inhalation.

- Eliminate all ignition sources including cigarettes, open flames, spark producing switches/tools, heaters, naked lights, pilot lights, mobile phones etc. when handling. Earth containers when dispensing fluids.

- Do not inhale vapours. Use only in well ventilated areas. In poorly ventilated areas, mechanical explosion proof extraction ventilation is recommended.

- Remember that flammable/explosive vapours may accumulate in poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Maintain vapour levels below the recommended exposure standard.

- Wear splash-proof goggles, butyl gloves and coveralls. Where an inhalation risk exists, wear a Type A (organic vapour) respirator. At high vapour levels, wear an air-line respirator.
• Store in a cool, dry, well ventilated area, removed from oxidising agents (e.g. hypochlorites), acids (e.g. sulphuric acid), heat sources and foodstuffs. Ensure containers are adequately labelled, protected from physical damage and sealed when not in use. Check regularly for leaks or spills. Large storage areas should have appropriate ventilation systems.

• Refer to the Safety Data Sheet (SDS) for UPVC pipe cement (type N) for more information.
### Questions

Answer the following questions.

5. Read the following statement and tick the products that the statement relates to.

   This product is flammable. All ignition sources must be eliminated when using it.

- [ ] Acetylene
- [ ] Duram solvent
- [ ] Duzall soldering flux
- [ ] UPVC pipe cement (type N)
- [ ] UPVC priming fluid

6. Read the following statement and tick the products that the statement relates to.

   It is important to make sure there is adequate ventilation when using this product.

- [ ] Acetylene
- [ ] Duram solvent
- [ ] Duzall soldering flux
- [ ] UPVC pipe cement (type N)
- [ ] UPVC priming fluid

7. What PPE should you use when working with **acetylene**?


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8. What PPE should you use when working with **Duzall soldering flux**?

9. What PPE should you use when working with **Duram solvent**?

10. What PPE should you use when working with **UPVC priming fluid**?

11. What PPE should you use when working with **UPVC pipe cement (type N)**?
Reducing the risk of disease through exposure to biohazards in the workplace

Biohazards that we may come into contact with in our industry include raw sewage (when working on sewage pipes or septic tank outlets), contaminated soil (when laying new pipes in soil), mould, and potential infection from bird or rodent droppings.

- Make sure you are familiar with any biohazards that are present at a site where you are working and always follow company health and safety policies and instructions.

- Human pathogens from soil and raw sewage can enter the body through the nose or mouth, particularly by touching contamination and then touching your mouth or nose. Exposure can also occur through open wounds or by inhalation.

- Keep vaccinations up to date.

- Never eat or drink while working in a potentially contaminated area. Always wash your hands before meals.

- Avoid exposure to biohazards by wearing appropriate PPE. For example, gloves, overalls, rubber boots, eye protection.

- When you finish work, wash immediately with antibacterial soap and water. Avoid using solvents to wash your hands as the solvents can cause irritation that may lead to skin infections.

- Always decontaminate your equipment after use if working at a site where biohazards are present.

- Change out of work clothes before leaving the work site. If any sewage gets on your clothes, change them right away. Soiled work clothes should be sealed in a plastic bag and laundered separately from other clothing. Wash your hands thoroughly after handling the clothing.

For more information, visit: http://www.worksafe.govt.nz/worksafe/information-guidance/guidance-by-hazard-type/biological-risks
Reducing the risk of hearing damage in the workplace

Exposure to too much noise is a leading cause of hearing loss.

Damaged hearing cannot be repaired but it can be prevented. There is no medical treatment for noise-induced hearing loss.

The Health and Safety in Employment Act requires hazards such as workplace noise to be controlled or reduced to a safe level. All people should make it their business to ensure that noise does not damage hearing.

The following points give guidance on some of the things you can do to reduce the risk of noise-induced hearing loss when working.

- Wear the appropriate hearing protection when working around noisy equipment.
- Place warning signs in areas of excessive noise (above 85 decibels).
- Check noisy tools to ensure they are well maintained.
- Where possible other workers on a site should be separated from noisy activities.
- If you cannot hear a person talking to you without shouting, you need to wear hearing protection.
- If you are exposed to loud noise, you may notice a ringing in your ears or some deafness. A quiet period of 12-16 hours will assist in the recovery of your hearing. Staying in a noisy place will delay this recovery and the hearing loss could become permanent.
- If you are regularly exposed to a noisy workplace, you need to be having regular health monitoring which would include checks for any loss of hearing.

For more information, visit: http://www.worksafe.govt.nz/worksafe/information-guidance/guidance-by-hazard-type/noise
Questions

Answer the following questions.

12. Give four examples of biohazards that affect our industry.

13. Name four pieces of PPE equipment that can help reduce the risk of exposure to biohazards.

14. It is important to reduce the risk of disease through biohazard contamination. When finishing work at a site where biohazards are present, what should you do to reduce the risk?

15. What steps can be taken in the workplace to help prevent noise-induced hearing loss?
Health and safety responsibilities

The primary duty of care

A PCBU means a ‘person conducting a business or an undertaking’. This usually refers to a business/company/organisation. A self-employed person is also a PCBU.

The PCBU must, so far as is reasonably practicable, ensure:

- the health and safety of workers who work for the PCBU, while they are at work in the business or undertaking
- the health and safety of workers whose activities in carrying out work are influenced or directed by the PCBU, while they are carrying out the work
- the health and safety of other persons is not put at risk from work carried out as part of the conduct of the business or undertaking.

This means organisations should consider and plan for the health and safety of employees, contractors, sub-contractors, visitors, customers and people whose health and safety could be affected by the organisation’s work.

PCBUs must, so far as reasonably practicable:

- provide and maintain a work environment, plant, structures and systems of work that are without risks to health and safety
- ensure the safe use, handling and storage of plant, structures and substances
- provide adequate facilities at work for the welfare of workers, including ensuring access to those facilities
- provide information, training, instruction or supervision necessary to protect workers and others from risks to their health and safety
- monitor the health of workers and the exposures at the workplace for the purpose of determining the effectiveness of control measures.
Engaging with workers

Engaging with workers is an important element of health and safety management. The Health and Safety at Work Act 2015 (HSWA) recognises this by requiring PCBUs to engage with workers on health and safety matters. If a matter might affect workers' health and safety, then the PCBU will need to engage with them about it.

Engagement means giving workers information about the decision being considered or made, or the issue that being resolved, and a real chance to provide input into the decision-making process.

This includes giving workers the opportunity to raise health and safety concerns about that issue. Workers’ views need to be taken into account and then workers need to be advised of the outcome in a timely manner.

Worker participation practices

PCBs must have practices that provide reasonable opportunities for workers to participate effectively in improving workplace health and safety, on an ongoing basis. Participation practices can be flexible – the PCBU and its workers should choose a participation model that works for the business.

Worker participation practices can be agreed on directly with the workers or through representation. Electing health and safety representatives and forming health and safety committees are two well-established methods of representation that may work for a business and its workers.

If you’re running your own business, chances are you know it’s your responsibility to keep your people safe, but what exactly does that mean?

Put simply, health and safety is about keeping people safe by identifying and managing the risks in your business – the things that, hopefully won’t, but could, go wrong.

Lead from the front

The highest tier of leadership in a business (whether it’s a board or a management team, or the owner-operator), plays a crucial role in establishing good health and safety in the business.

If you’re running your own business, it is up to you, and your leadership team if you have one, to create a positive culture. Establish clear procedures that help your workers to know ‘how we do things around here’. For health and safety procedures to be effective, your workers need to know about them and understand them.

You need to engage your workers in the development of these procedures (health and safety representatives and committees can have a particular role in this).

All businesses should have a workplace health and safety plan, regardless of their size and structure. If you are an officer (for example, a director), you are also responsible for ensuring that the plan is effectively implemented and reviewed.
How a company can commit to best practice health and safety

- Develop a health and safety plan that is easy to understand.

- If you already have a plan, ask your workers what they think of it. Is it still relevant? Is it meaningful to them? Does it work to keep them safe? Does it support your company culture? If not, take it back to the drawing board.

- Identify how your plan will be monitored and measured. How will you know you are on track?

- Share your plan with all new workers. As a person in charge at work, you’re responsible for the safety of all people working there, including contractors, and for visitors to your workplace.
The health and safety manual

Every business should have a health and safety manual. The employer is mostly responsible for its content.

If you are running your own business, good health and safety practices give you peace of mind. This is crucial for all businesses, and especially smaller companies, as they may find it hard to recover from serious health and safety incidents.

Health and safety manual contents

A health and safety manual should include, but is not limited to, the following components:

- Procedures for identifying workplace risks and plans for eliminating, or minimising them (including the involvement of workers and their representatives).

- Procedures for monitoring your workers’ health and exposure to risks that cannot be eliminated.

- Training records that show that everyone knows what risks they might be exposed to, and how they can keep themselves safe.

- A process for engaging workers on health and safety matters that may affect them.

- Opportunities for workers to participate in health and safety decision making.

- Information on what to do in an emergency, including workplace incidents and natural disasters.

- Procedures for recording and investigating workplace injuries, near-misses and work-related ill health.

- A process for reporting notifiable events to WorkSafe.

- Health and safety inductions for all new workers.

- A process to review health and safety procedures at least once a year or if a major safety-related event happens.
Health and safety manual (sample)

For the purpose of this training, we will refer to a health and safety manual that has been prepared by Top Drawer Training. The subject matter covered in the sample manual can be adapted (as necessary) to meet the needs of different businesses.

The sample manual we will refer to has been split into the following sections:

1. Health and Safety Policy Statement
2. Health and Safety Plan
3. Responsibilities
4. Safety Equipment
5. Health and Safety Procedures
6. Emergency Procedures
7. Hazard Register
8. Accident/Near miss Register
9. Notifiable Incidents
10. Task Analysis Worksheets
11. Particular Hazardous Work Notifications
12. Employee Induction Training Material
13. Training Register
14. Contractor Management
15. Codes of Practice and Guidelines

We will now work through each of these sections and their contents in the order they are presented in the sample manual.
Health and safety policy statement and policies

All health and safety manuals should contain a **policy statement** at the beginning of the document. The statement sets out the business's commitment to managing health and safety in its places of work – it is a pledge to employees.

The policy statement is followed by **health and safety policies** which will include information on people’s responsibilities and how the risks of hazards in the workplace will be eliminated or reduced.

The purpose of the policy statement is to state how the business will manage its health and safety responsibilities.

The statement should include how the company will do the following:

- Comply with legal requirements.
- Consult with the employees on matters affecting their health and safety.
- Ensure that all employees are competent to do their job safely.
- Provide training where necessary.
- Review and revise the policy where necessary at regular intervals.

Health and safety policies should be practical and auditable.

The policy should be dated and signed by the senior executive of the workplace. As with all parts of the manual, you should edit and customise the policy statement to best suit your individual situation.

Health and safety plan

Health and safety planning involves setting goals and objectives and working out what steps need to be taken to make improvement strategies happen.

If you are running a business, you may already have a plan, or just know the way that things are generally done, however, it is time well spent to get your team together and involve them in identifying the **hazards** and **risks** in your business. Get them to think about how to manage them and how to continuously improve safety.
Types of workplace hazards and risks

<table>
<thead>
<tr>
<th>Physical hazards</th>
<th>Environmental hazards</th>
<th>Hazardous substances</th>
<th>Biological hazards</th>
<th>Social hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Things that can cause physical harm, like moving machinery, falls from heights or lifting heavy objects. Some of these hazards may cause injury very slowly like equipment with poor ergonomics.</td>
<td>Things in the environment that could cause injury or ill health, like hot or cold temperatures, poor lighting, or uneven ground.</td>
<td>Things such as asbestos or chemicals that could cause health issues such as cancer, fertility problems and even death.</td>
<td>For example, bacteria and viruses that cause ill health.</td>
<td>Such as work-related stress, overwork, long hours, inadequate breaks, or bullying.</td>
</tr>
</tbody>
</table>

You can start by asking these types of questions:

- Could anyone be injured or become ill if something goes wrong from the work we do?
- What hazards could harm our workers, suppliers, customers or other people?
- Do we have any workplace risks that have a low probability of occurring but would harm our people or other people if they did occur?
- What processes do we currently have to eliminate or minimise these risks? Do we monitor how effective our processes are?
- Are we good at recording and investigating work-related injuries, ill health and near-misses to find out how they were caused and ensure they don't happen again?
- Have we contacted our industry body or union for advice about health and safety legislation, regulations and best practice that relates to our business?
- Have we considered the types of emergencies that could affect our workplace? Have we developed plans for how to manage in an emergency?

The sample health and safety manual includes an example agenda for monthly meetings where all staff can meet to discuss strategies and any occurrences relating to the health and safety of the company. There are also listed topics that should be covered on yearly and at three monthly intervals.

Suggested topics are listed which may be a good idea to try and include into your meetings. Remember that the agenda should be customised to suit your company.
Actioning the health and safety plan

A health and safety plan is just a piece of paper unless management and the team commit to it. For managers, that means demonstrating your commitment and leading by example so that your people also know and care about it. If you have workers, involving them in managing health and safety will help to embed it into your company culture. The effectiveness of your plan rests with you and the people in your business who are out there doing the work on the front line.

There is no point having a health and safety plan unless all management and staff act on it. The plan needs to become a part of everyday business practice and be followed by everyone. It helps to have achievable and measurable health and safety targets that will help management and workers to stay on track.

How to put your plan into action:

• Lead by example.

• Have clear targets that everyone understands, such as reducing the number of injuries or near-misses.

• Run regular activities to keep health and safety at the front of everyone’s mind. For example, safety training courses or having a practice emergency drill.

• Keep accurate health and safety records such as risk registers, incident investigations, notifiable events and training records.

• Act quickly if there are signs of health or safety issues.

• Involve your team – give people reasonable opportunities to participate in health and safety.

• Include health and safety in regular meetings. Review and update your plan regularly.

Keeping on top of things

Monitoring health and safety goals and reporting issues will help to effectively manage risks. Directors, managers and owners in a business should receive regular reports on the following:

• Injuries, incidents and work-related ill health.

• Newly-identified hazards and associated risks.

• Absence rates due to general sickness (often an indication of stress or fatigue).

• Injury and ill health leave related to work.

• Results of exposure monitoring such as noise levels or chemical exposure.
It is important to identify the root causes of incidents and put an effective response in place. When looking for root causes, look closely at systemic factors such as training, workload or performance stress. Involve your workers in this process.

**Responsibilities**

As we discussed earlier, employers have legal responsibilities to ensure a safe and healthy workplace.

Employees also have rights and responsibilities for their own wellbeing and that of colleagues and other people in the workplace.

Businesses need to ensure that all people are informed of their own responsibilities and the PCBUs responsibilities in regards to health and safety.

Businesses needs to ensure that workers are supervised adequately or have specific knowledge and skill, and are adequately trained for any situation they are likely to encounter in the workplace.

The responsibilities of workers and the PCBU are covered in the appropriate section of the health and safety manual.

**Safety equipment**

This section of the health and safety manual lists the safety equipment the business will provide, workers’ responsibilities in regards to correct care of safety equipment and reporting loss or damage to the company.

This section also describes when the workers are expected to use different safety gear.

It is most likely that businesses will own different safety gear or PPE than what is listed in this section of the sample health and safety manual.

Once again it is intended that this section is customised to best suit the individual situation.

**Health and safety procedures**

Safe work procedures are directions on how work is to be carried out safely. They help identify hazards and clarify what must be done to eliminate or minimise risks.

New procedures should be developed in consultation with workers so a good understanding is present when the procedure is introduced. Workers may require further training in the new procedures so they understand the steps and equipment they must use to work safely.
In general, written procedures are needed for the following:

- Any hazardous task.
- Complicated tasks, so that important steps do not get missed.
- Frequently performed tasks.
- Less common tasks, so workers can be reminded of the hazards.

Written safe work procedures help minimise the risks of hazardous tasks.

The process of writing a new procedure for any task should include the following steps:

- Determine the overall task that requires a procedure.
- Break down the task into its basic steps.
- Identify the hazards associated with each step, and ways to eliminate or minimise the risks from these hazards.
- Write the procedure showing the actions that workers must do when performing the task.

Remember to review procedures regularly to ensure they are accurate. If a task or piece of equipment changes, the procedures that relate to this change must also be updated.

The procedures in the sample health and safety manual have been written as examples of tasks that may be encountered during a usual work day by workers on a job site.

These procedures should be customised to suit the needs of the business.
The issues that the procedures included in the sample health and safety manual relate to are listed below:

<table>
<thead>
<tr>
<th>Personal Protective Equipment</th>
<th>Working on Used Sanitary Fixtures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amenities and Facilities</td>
<td>Roof-work</td>
</tr>
<tr>
<td>Using Electrical Equipment</td>
<td>Working at Height</td>
</tr>
<tr>
<td>Locating Services</td>
<td>Excavations</td>
</tr>
<tr>
<td>Protecting the Public</td>
<td>Working with Solvents</td>
</tr>
<tr>
<td>Tools and Machinery</td>
<td>Using Scaffolds</td>
</tr>
<tr>
<td>Manual Handling and Lifting</td>
<td>Hazardous Substances</td>
</tr>
<tr>
<td>Loading and Unloading of Goods</td>
<td>Traffic, Vehicles and Plant</td>
</tr>
<tr>
<td>Using Ladders</td>
<td>Fatigue and Workloads</td>
</tr>
<tr>
<td>Working around Noise</td>
<td>Work in Confined Spaces</td>
</tr>
</tbody>
</table>
Emergency procedures

To comply with legislative requirements an emergency procedure form has been included into the sample health and safety manual.

Emergency procedure details are unique to every workplace and must be completed to suit the business using them.

Other procedures must also be created for emergency and rescue plans for other on-site situations that are identified in the risk assessment process. This includes, but is not limited to, trench collapse, fall from height or confined space emergency.

Information that staff should be provided with before an emergency occurs includes the following:

- Essential phone numbers.
- Names and contact details of wardens.
- Names of first aiders.
- Locations of firefighting equipment.
- Whom accidents should be reported to, depending on the type of emergency.
- The evacuation procedures.
- Where any Civil Defence equipment is and when it was last checked.

Hazard register

All staff have a responsibility to be on the lookout for hazards.

All concerns must be listed in the hazard register so action can take place to address the identified hazards.

All hazards should be discussed with staff during safety meetings to ensure that all staff are aware of risks and that all new hazards are brought to their attention.

How to manage hazards

As with all health and safety activities, the hazard management process is most effective when workers are involved, and managers are adequately trained to lead it.

If we all put an effort into managing potential hazards it can reduce the number and seriousness of workplace injuries.
To manage hazards and injury factors, it is important to do the following:

- Identify and prioritise hazards, and assess their impact on the business.

- Measure effectiveness of the control actions.

- Record all hazard management activity in a register and update it regularly. Use an electronic spreadsheet or a paper register. Describe the hazard and its location, the action or control, and monitoring required. Note the date, required budget, and resources and staff allocated to the task.

- Ensure all workers have information about the hazards they are exposed to, and the controls they must use to manage them.

- Make sure workers know and follow safety rules or safe working procedures.

**Accidents and near miss register**

Any injury or sickness that occurs at work; even small things, are required to be reported to the appropriate supervisor. If not addressed immediately, some conditions can become serious if they are not taken care of earlier.

**Note:** Where a serious injury has occurred, the injured person should not be moved until medical attention has been given by appropriately trained personnel.

Any time an accident, incident or near-miss takes place an Accident/Incident/Early Reporting Form should be completed. All completed forms should be kept for future reference.

A copy of an Accident/Incident/Early Reporting Form is included in the sample health and safety manual, and can also be downloaded from the ACC website.

**Investigating accidents**

When an accident or near-miss has occurred the company should investigate the incident to identify what hazards attributed to the event to determine what controls would help prevent a similar event from occurring in the future.

All incidents and events should be discussed with staff during safety meetings to ensure that all staff are aware of risks and possible new hazards.

When any accident has taken place and an investigation is carried out, an accident investigation form should also be completed.

All completed accident investigation forms should be kept for future reference.
Notifiable incidents

A notifiable incident is an unplanned or uncontrolled incident in the workplace that seriously exposes, endangers or threatens the health and safety of workers or others to a serious risk arising from immediate or imminent exposure to any of the following:

<table>
<thead>
<tr>
<th>Notifiable Incident</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A substance escaping, spilling, or leaking</td>
<td>Gas or steam escaping</td>
</tr>
<tr>
<td>An implosion, explosion or fire</td>
<td>The collapse or partial collapse of a structure</td>
</tr>
<tr>
<td>The interruption of the main system of ventilation in an underground excavation or tunnel</td>
<td>The collapse or failure of an excavation or any shoring supporting an excavation</td>
</tr>
<tr>
<td>A pressurised substance escaping</td>
<td>The inrush of water, mud, or gas in workings in an underground excavation or tunnel</td>
</tr>
<tr>
<td>Electric shock (from anything that could cause a lethal shock, for example it would not include shocks due to static electricity, from extra low voltage equipment or from defibrillators used for medical reasons)</td>
<td>Damage to or collapse, overturning, failing or malfunctioning of any plant that is required to be authorised for use under regulations</td>
</tr>
<tr>
<td></td>
<td>A collision between two vessels, a vessel capsize, or the inrush of water into a vessel</td>
</tr>
<tr>
<td>The fall or release from height of any plant, substance, or thing</td>
<td>Any other incident declared in regulations to be a notifiable incident.</td>
</tr>
</tbody>
</table>

Notifiable incidents also include incidents which may have only resulted in minor (non-notifiable) injuries but had the potential to cause serious injury, illness or death.

People may be put at serious risk even if they were some distance from the incident (for example, in the case of a gas leak).

Notifiable incidents do not include controlled activities that form part of the business or undertaking (for example, the controlled release of water from a dam).

After a notifiable incident, you should:

- investigate what happened
- work out what you can do to stop this happening again
- Make changes.
Actions that must be taken immediately after a notifiable incident
The following actions must be taken immediately after a notifiable incident:

- Preserve the site.
- Notify WorkSafe New Zealand.
- Keep records.

Preserve the site
The person who manages or controls the workplace must take all reasonable steps to ensure that the site of the notifiable incident is preserved and not disturbed until a WorkSafe Inspector authorises you to do so.

The site may only be disturbed in the following situations:

- You need to remove an injured person.
- To remove a deceased person.
- It is essential to make the site safe or minimise the risk of someone else being hurt or killed.
- If you are directed to do so by the Police.
- If permitted by WorkSafe or a WorkSafe Inspector.

To ensure the site is not disturbed, consider the following:

- The work set-up should not be changed.
- Any plant, substances or other things involved in the incident should stay where they are.
- Work that could interfere with the site should stop. Work may continue in other parts of the workplace.
- No alterations should be made to the plant, vehicles, or structures involved.

Notify WorkSafe New Zealand
If a serious workplace incident occurs, then you must notify WorkSafe as soon as possible after you become aware that an incident has occurred.

- You must notify WorkSafe using the fastest means available to you. You can do this by:
  - phoning 0800 030 040
  - completing an online notification form
  - downloading and completing the Notifiable Incident Form
  - Note: You can use the Notifiable Incident Form found in the sample health and safety manual.
• The notification must be made even if Emergency Services attend.

• Only one notification is required for each notifiable incident.

• If there are multiple businesses involved with the work, then one of the businesses should be nominated to contact WorkSafe. Note that all businesses are responsible for making sure that the notification is made by the nominated business.

• Provide WorkSafe with as much detail as possible about what has happened.

**Keep records**

Records of all notifiable incidents must be kept for at least five years from the date of the incident.

**Task Analysis**

A **task analysis** should be used to help identify hazards that may be present in situations when a job which is not often undertaken by a worker is being completed, or when a more familiar task is being completed in a new situation.

A **task analysis worksheet** should be completed when planning to perform a hazardous job just prior to the task being performed so that the hazards at the time can be considered while completing the worksheet.

Important factors to consider include the following:

• How skilled are the workers performing the task?

• Break the job down into steps to help understand the risks better

• What obvious or potential hazards are present?

• What possibly could go wrong?

• What steps could be taken to eliminate or minimise the potential hazards?

• What PPE will be required?

A task analysis is not necessary where a job is performed on a regular basis by people that are trained to do it, but if an incident were to occur, a completed task analysis worksheet can be good evidence that the hazards were being considered before the task was undertaken.

A copy of a task analysis worksheet is included in the sample health and safety manual, and can also be downloaded from the WorkSafe website.
**Particular hazardous work notifications**

Some types of work have been identified having a higher level of risk and an increased chance of resulting in an accident causing harm. This type of work is known as **particular hazardous work**, and may also be referred to as **notifiable work**.

Worksafe New Zealand requires notification that this type of work is being undertaken. This is done by completing the notification of particular hazardous work form. They will then decide whether or not to send an inspector to assess that the work is being done in an appropriate and safe manner.

**Types of work to be notified to Worksafe New Zealand**

The types of work that must be notified to the Worksafe New Zealand are defined in the Health and Safety at Work (General Risk and Workplace Management) Regulations.

These regulations cover the following:

a. Any restricted work, as defined in the Health and Safety at Work (Asbestos) Regulations 2016.

b. Any commercial logging operation or tree-felling operation.

c. Any construction work of one or more of the following kinds:
   
   i. Work where workers could fall 5 m or more, excluding work on a two-storeyed house, or work on a power or telephone line, or work carried out from a ladder only, or maintenance or repair work of a minor or routine nature.

   ii. The erection or dismantling of scaffolds from which a person could fall 5 m or more.

   iii. Every excavation which is more than 1.5 m deep and which is deeper than it is wide at the top.

   iv. Any form of tunnel or drive where workers work underground, irrespective of timbering or support.

   v. Those excavations where the excavated face is steeper than 1 horizontal to 2 vertical.

   vi. Any construction work where explosives are used or stored.

   vii. Work such as diving, where construction workers breathe air or any other gas that has been compressed or is under pressure.

   viii. Any construction work in connection with asbestos fibres.

A copy of the notification of particular hazardous work form is included in the sample health and safety manual, and can also be downloaded from the WorkSafe website.

When completed, the form should be sent to the Worksafe New Zealand office nearest to the location at which the work is being carried out.
A list of addresses and fax numbers is supplied with the notification form.

The form should be posted or faxed to the Worksafe New Zealand office to arrive at least 24 hours before the work is due to start.

Someone at Worksafe New Zealand may contact you if they have any queries regarding the work or the form. However, if you are not contacted you are free to start work on the date you intended.

If you have completed the work by the date you estimated on the notification form you do not need to take any further action, however if the work has taken longer than expected, it is recommended that a further notification form be completed and sent to the Worksafe New Zealand office.

**Employee induction training**

It is important that employees are informed of their own, and their employer’s responsibilities in relation to health and safety in the workplace.

Training should be conducted by a knowledgeable and experienced person.

Induction training should include the following topics:

- Hazards and how to avoid them.
- How and when to use safety equipment.
- Use of specialist plant and machinery.
- First aid equipment and procedures.
- Emergency procedures.

**Training Register**

Businesses must ensure that employees are adequately trained in the safe use of all plant, objects, substances and protective clothing and equipment they are required to use.

On-going training is required for all staff to keep everyone up to date with changed procedures and new equipment.

A record of the training given to employees needs to be kept showing the skills they have attained and what further training may be needed. This record must be signed by the employee.
Contractor management

From time to time, a business may be responsible for management or control of a project/site where other PCBUs are also working. Collaboration on health and safety is required to ensure the health and safety of all workers engaged on the project by the various PCBUs.

Other PCBUs engaged on the project should be required to advise of the hazards and risks that may be present due to their activities and the required controls to eliminate or minimise risks to workers' health and safety.

Other PCBUs on site should be advised to report any incident or accidents that occur as a result of their work while on the project/site, this includes any notifiable injuries, illnesses, incidents or events.

Codes of practice and guidelines

Codes of practice are approved methods of compliance with Acts and Regulations.

Worksafe New Zealand publishes ‘Approved Codes of Practice’ for performing many different types of work.

Although it is not mandatory to follow the guidelines, if an accident or damage was to occur and you had followed the guidelines, you could defend your work as being carried out or completed in a way that was agreed best practice.

WorkSafe also publishes many fact sheets, good/best practice guidelines and guides for many activities which may be undertaken by staff at various times.

The LPGA (Liquid Petroleum Gas Association) has published codes of practice which relate to locating and installing LPG cylinders these should be followed when performing this work.

It is a good idea for businesses to keep codes of practice and guides in the health and safety manual so all workers have easy access to the information.

Further advice

For more specific and detailed advice, it is a good idea to look at the guidance prepared by WorkSafe on how to manage risks in our industry. You can also seek the help of a professional health and safety practitioner.

Study Notes
Questions

Answer the following questions.

16. Health and safety is solely the responsibility of a company and its owners.

True  False

17. When an **accident, incident or near-miss** takes place an Accident/Incident/Early Reporting Form should be completed. Why should all completed forms be kept for future reference?

18. Workplace hazards and risks that should be considered when health and safety planning include **physical hazards**, **environmental hazards**, **hazardous substances** and **social hazards**. What is the other type of hazard that should be considered?

19. A **notifiable incident** is an unplanned or uncontrolled incident in the workplace that seriously exposes, endangers or threatens the health and safety of workers or others. When should notifiable incident be reported to WorkSafe?
20. A task analysis should be used to help identify hazards that may be present in situations when a job which is not often undertaken by a worker is being completed, or when a more familiar task is being completed in a new situation.

A task analysis worksheet should be completed when planning to perform a hazardous job just prior to the task being performed so that the hazards at the time can be considered while completing the worksheet.

True False

21. Particular hazardous work (notifiable work) is work that has been identified as having a higher level of risk and an increased chance of resulting in an accident causing harm. Worksafe New Zealand requires notification that this type of work is being undertaken.

True False
Continuing Professional Development (CPD) 2017

Topic 2: Building related topics
Topic 2: Building related topics

Topic 2 of Continuing Professional Development (CPD) 2017 for plumbers, gasfitters and drainlayers focuses on building related topics.

This topic covers the following:

• The Building Act and the Building Code.
• Complying with the Building Code.
• When is a building consent needed?
• Acceptable solutions and verification methods.
• Alternative solutions.
• Are AS/NZS standards acceptable solutions, verification methods or alternative solutions?
• Plumbing and drainlaying work that is exempt from requiring a building consent.
• Common reasons why completed work fails to get a Code Compliance Certificate (CCC).
• Producer statements.
Overview

Building Act

Building Regulations (BUILDING CODE)
Objective
Performance
Functional Requirement

Alternative Solutions
Methods to demonstrate Compliance:
- Producer Statements
- Deviations from Acceptable Solutions
- Previously approved Alternative Solutions

Acceptable Solutions
Verification Methods
- Cited Documents
- Product Certification

Standards
Alternative Methods

Cited Standards
Deemed to Comply
**The Building Act and the Building Code**

Building work in New Zealand is regulated by the Building Act 2004 and the Building Code. The legislation is administered in the following ways:

- Nationally – by the Ministry of Business, Innovation and Employment (MBIE), and;
- On a local basis under building consent processes – by the relevant Building Consent Authority (BCA) (this is usually the local council).

**Note:** Most sections of the old building regulations have been revoked (the information in the regulations has now been incorporated into the Building Act). The only parts that remain are the Building Code clauses and the requirement to comply with them.

**Complying with the Building Code**

Work you complete must comply with the objectives, functional requirements and the performance criteria stated in the Building Code.

You can use **pre-approved methods** as provided in ‘acceptable solutions and verification methods’; however, these methods are not mandatory and other methods ‘alternative solutions’ can be designed and used if the situation requires it.

**When is a building consent needed?**

Some new installations and renovations need to be approved by the BCA before work can begin. This means a building consent is needed.

Some work can be completed without informing the BCA and without needing to obtain a building consent. This is called ‘exempt work’.

Either way, all work must meet the objectives of the Building Code. Also, whether or not a consent is required, the person completing the work must be suitably qualified, registered, licensed and supervised (if required).

If you are carrying out work that requires a building consent, and you choose to follow the pre-approved ‘acceptable solutions and verification methods’, the Building Consent Authority (BCA) must grant a building consent for work to commence, and must provide a Code Compliance Certificate (CCC) once work is completed to confirm the consented building work complies with the Building Code.
If you are carrying out work that requires a building consent, and you use an ‘alternative solution’, you will need to provide the BCA with evidence that the objectives, functional requirements and performance criteria will be met.

If the BCA are not satisfied with the evidence supplied, they can refuse to grant a building consent for the work to commence.

**Note:**

Exempt work is described in the Building Act 2004.

It is covered in Schedule 1 *Building work for which building consent not required*, Part 2 *Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006*.

We will look at what is defined as exempt work later in this topic.

We will also look at common reasons why complete work may fail to get a Code Compliance Certificate (CCC) later in this topic.
Acceptable solutions and verification methods

MBIE publishes pre-approved ‘acceptable solutions and verification methods’ which are deemed to comply with each clause of the Building Code.

These documents are downloadable free of charge and can be found at [www.building.govt.nz](http://www.building.govt.nz).

What are they?

‘Acceptable solutions’ give specific details of how commonly used building materials, systems and methods can be constructed or used to achieve the requirements of the Building Code.

‘Verification methods’ can include calculations; laboratory tests (sometimes to destruction) on prototype components and systems; or tests-in-situ, which may involve the examination of plans and verification by tests, where compliance with specified numbers, dimensions or locations is required (non-destructive tests, such as pipe pressure tests, are also included).

How are they referred to?

Acceptable solutions and verification methods are referred to by the Building Code clause and unique identification number.

For example:

- The Verification Methods for Clause G13 Foul Water is G13/VM1 (for sanitary plumbing), G13/VM2 (for drainlaying) and G13/VM3 (for on-site sewage disposal).

A copy of the relevant clause of the Building Code is included at the front of most acceptable solution/verification method documents so that you can easily reference the objective, performance and/or functional requirement that the acceptable solution or verification method will fulfil.

**Note:** Document information is updated from time to time, so it is important to check that you are using the most recent version.

You can also register to be notified when the documents you are interested in have been amended.
Alternative solutions

Not all building work is provided for through acceptable solutions and verification methods. Many building projects, particularly renovations or upgrades to existing buildings, and more complex projects, need alternative solutions.

What are they?

Where a building design differs completely or partially from an acceptable solution or verification method, an ‘alternative solution’ can be used to demonstrate how the building work complies with the Building Code.

For example:

- Where the material, component or construction method required is different in some way from those given in the acceptable solutions or verification methods.

- When a building owner wants something that looks different or performs better, is more cost effective, or overcomes a specific site problem.

By allowing for the possibility of using an alternative solution, the Building Code enables innovative solutions and designs to be used. This allows for uniqueness and technological advancement so that the best outcome for the project can be achieved.

An alternative solution may require specific design and input from suitably qualified people, such as architects or engineers.

When can they be used?

Alternative solutions have been accepted for entire projects or parts of a building and have included, for example, composting toilets, handrails, barriers, fire escape plans, water supplies, effluent disposal, eco-houses and rammed-earth houses.

Designers and BCAs have important roles to play in the use of alternative solutions. Discussions early in the design process will clarify expectations. The designer needs to know what information and evidence the BCA will expect, and the BCA needs a clear understanding of what the building consent applicant is seeking to achieve.
You can use your design solution, as long as the BCA is satisfied “on reasonable grounds” that your proposed work will meet the requirements of the Building Code.

**Demonstrating that an alternative solution complies**

The BCA must be provided with evidence to show how the proposed work will meet the performance requirements of the Building Code. Only then will a building consent be issued.

1. **Scope the project**

Determine which parts of the project are not covered by an acceptable solution or verification method. These parts require an alternative solution.

2. **Identify the Building Code clauses**

Include the specific performance requirements for each relevant Building Code clause.

3. **Provide evidence**

Your documentation must contain sufficient evidence to show the identified performance criteria of all relevant clauses will be met.

You may need to provide a lot of evidence, depending on the complexity of the project.

You can use quantitative (measured in quantity) or qualitative (descriptive) information to show compliance.

For example:

- **Calculation or test method:** Calculations, test results, models, simulations not contained in the acceptable solutions or verification methods.

- **Comparison with acceptable solutions or verification methods:** Acceptable solutions or verification methods provide one means to show how the proposed work will comply. For example, if you change some of the steps to show different materials or detailing, you need to show how the changes are compensated for, or are otherwise justified. In many cases, Acceptable solutions and verification methods provide good guidance for assessing an alternative solution.

- **Comparison with a product previously accepted by a BCA:** For example, some building methods not covered by acceptable solutions and verification methods may have been previously accepted by a BCA on a comparable building.

- **Comparison with a determination made by MBIE:** Is there a decision on a similar proposal? Although determinations are case-specific and therefore have a very limited application, they do give guidance on interpretation of the Building Act and Building Code at a particular point in time.

- **Trade literature:** Is it a registered, trademarked product? The manufacturer’s literature may contain technical data that supports the proposal.
• **Appraisal:** Is there a current appraisal certificate that describes how compliance with the Building Code is achieved?

• **In-service history:** Is there proof that arises from in-service history? For example, has the proposed material been used in a similar application on a similar site? Overseas evidence can be used, but be mindful of New Zealand conditions, such as seismic activity, ultra violet light, and exposure to salt-laden winds and wind-driven rain.

• **Assessment of actual conditions on site:** Is there any relevant evidence that relates to local environmental conditions? For example, a very sheltered site that is supported by meteorological or horticultural evidence.

• **Expert evidence:** Is there collaborative expert support? This could be peer review of the proposed solution or opinions obtained from credible organisations.

4. **Present your evidence**

Provide a strongly argued case to the BCA by including as many of the above tools as possible. Be sure to state exactly what Building Code clauses and performances are being addressed. The clearer the supporting documentation, the easier the evaluation of it will be.

5. **A building consent application is accepted when compliance is clearly established**

All of the evidence, as described above, is assessed. Note that outside help may be sought by the BCA in assessing all, or specific aspects, of a proposed alternative solution.

**Are AS/NZS standards acceptable solutions, verification methods or alternative solutions?**

In some cases, standards (AS/NZS or others) are referenced in the acceptable solution documents as ‘further acceptable solutions’.

For example:

In the G13 Foul Water document along with G13/AS1 references to sections of AS/NZS 3500 Part 2 are included as G13/AS3 making those sections one of the 3 separate pre-approved acceptable solutions for complying with the Building Code Clause G13.

However, in the G12 Water Supplies document sections of AS/NZS 3500 Part 1 are included in G12/VM1 making those sections of AS/NZS 3500 Part 1 approved verification methods.
It doesn’t really matter whether you think of AS/NZS 3500 as an acceptable solution or a verification method. If you complete the work to comply with the referenced sections of AS/NZ 3500 you will met the objectives of the code. If a consent is required, the BCA must approve work designed and completed using these methods as complying with the Building Code.

If a section of a standard is not referenced in the acceptable solution/verification method document provided by MBIE, then using that method would be an alternative solution. If you wish to design or install your work using an unreferenced standard, it could be included in your evidence that a proposed alternative solution will meet the Building Code requirements.
Questions

Answer the following questions.

1. When using an ‘acceptable solution or verification method’, what do you need to provide to the BCA?

2. A building consent is needed for all work unless it falls into what category?

3. Who can tradespeople register with to be notified when amendments to ‘acceptable solutions or verification method’ documents have occurred?

4. What should be used for jobs where a material, component or construction method required is different in some way from those given in the acceptable solutions or verification methods, or when a building owner wants something that looks different or performs better, is more cost effective, or overcomes a specific site problem?
5. If a section of a standard is not referenced in the acceptable solution/verification method document, using that method would be an alternative solution. If you design or install work using that unreferenced standard, it could be included in your evidence that your alternative solution will meet the Building Code requirements when applying for a building consent.

True  False
Plumbing and drainlaying work that is exempt from requiring a building consent

Exempt work is described in the Building Act 2004.

It is covered in \textit{Schedule 1 Building work for which building consent not required, Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006}, sections 32-38.

\begin{center}
\textbf{Schedule 1 Building work for which building consent not required}
\end{center}

\textbf{Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006}

\textbf{Plumbing and drainage}

\textbf{32 Repair, maintenance, and replacement}

(1) The repair and maintenance of any sanitary plumbing and drainage in or associated with a building, provided that comparable materials are used.

(2) Replacement of sanitary plumbing and drainage in or associated with a building, provided that—

(a) a comparable component or assembly is used; and

(b) the replacement is in the same position.

(3) However, subclauses (1) and (2) do not include the following building work:

(a) complete or substantial replacement of a specified system; or

(b) repair or replacement (other than maintenance) of any component or assembly that has failed to satisfy the provisions of the building code for durability, for example, through a failure to comply with the external moisture requirements of the building code; or

(c) repair or replacement of any water heater (unless permitted under clauses 36 to 38).
What section 32 means

- The exemptions under (32) allow a range of work relating to the repair, maintenance and replacement of sanitary plumbing or drainage to be carried out without a building consent, as long as it is done by an authorised person.

- For repairs and maintenance, comparable materials must be used.

- For replacement work, comparable components or assemblies can be used providing the replacement is in the same position.

<table>
<thead>
<tr>
<th>Examples of where a section 32 exemption could apply</th>
<th>Examples where building consent is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacing an existing sanitary fixture with another comparable fixture in the same position (e.g. a vanity with a vanity, or replacing a toilet pan and cistern with a close-coupled toilet suite).</td>
<td>A commercial building owner needs to replace a backflow preventer (reduced pressure zone device). As an automatic backflow preventer is a specified system and the work involves a complete replacement, a building consent is required.</td>
</tr>
<tr>
<td>Repairing a septic tank effluent disposal system.</td>
<td>Replacing a leaking potable (drinkable) water supply pipe which has failed to meet its Building Code durability requirements.</td>
</tr>
<tr>
<td>A section of glazed earthenware foul water drain is damaged in an earthquake and requires replacement. The drainlayer proposes to replace the damaged section with uPVC. This is considered to be a comparable component.</td>
<td></td>
</tr>
<tr>
<td>Repairing a valve associated with a hot water system or replacing it with a comparable valve.</td>
<td></td>
</tr>
</tbody>
</table>

Reference:

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
Schedule 1 Building work for which building consent not required

Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006

Plumbing and drainage

33 Drainage access points

The opening and reinstatement of any purpose-made access point within a drainage system that is not a NUO system or part of a NUO system.

What section 33 means

- This exemption covers work to drains via a purpose-made access point and carried out by an authorised person.

<table>
<thead>
<tr>
<th>Examples of where a section 33 exemption could apply</th>
<th>Examples where building consent is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>A drain is blocked by a back-up of waste material within the drainage system. The blockage was caused by a child flushing a hand towel down the toilet. The problem is solved by opening a purpose-made access point, removing the towel, clearing the blockage and reinstating the access point.</td>
<td>A motel complex with multiple connected dwellings has a blocked drain and no access points can be found. The owner is informed that several access chambers will need to be installed for future access. As this involves more than opening and reinstating access points (i.e. it is outside the scope of this exemption) and since it is not considered minor drain alterations (i.e. it is also outside the scope of exemption 34 – minor alteration to drains), a building consent is required.</td>
</tr>
</tbody>
</table>

Reference:

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
**Schedule 1 Building work for which building consent not required**

**Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006**

**Plumbing and drainage**

34 Minor alteration to drains

Alteration to drains for a dwelling if the alteration is of a minor nature, for example, shifting a gully trap.

Subclause (1) does not include making any new connection to a service provided by a network utility operator.

**What section 34 means**

- This exemption only relates to dwellings and enables an authorised person to alter existing private drainage without needing a building consent. This sort of building work usually occurs during alterations to existing bathrooms, kitchens, laundries or toilets.

- New connections to public drainage are specifically excluded from this exemption.

<table>
<thead>
<tr>
<th>Examples of where a section 34 exemption could apply</th>
<th>Examples where building consent is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>A homeowner instructs the plumber to relocate the kitchen sink to an adjacent wall (refer to exemption 35 – Alteration to existing sanitary plumbing (excluding water heaters)). The existing gully trap servicing the kitchen needs to be shifted a short distance to receive the discharge from the repositioned sink wastepipe.</td>
<td>A dwelling’s branch drain is intended to be extended 16 metres. This will trigger the requirement for venting under Building Code clause G13 – Foul water, as the branch drain will exceed 10 metres. The length and venting requirements of the drain are more than a minor alteration, so a building consent is required.</td>
</tr>
</tbody>
</table>
### Examples of where a section 34 exemption could apply

- A toilet pan has been repositioned in an existing dwelling’s bathroom (refer to exemption 35) and is reconnected 1 metre downstream from the previous drain connection.
- Installing a new access or rodding point for unblocking drains.
- Capping a branch drain following the removal of sanitary fixtures from an outbuilding associated with a dwelling.
- A NUO has provided a new sewer lateral connection at the boundary of an existing dwelling and capped the previous lateral. The owner’s drainlayer reroutes a 2 metre length of drain to reconnect to the new NUO lateral.

### Examples where building consent is required

- A motel owner plans to reconfigure his laundry by adding a new tub. As a consequence, the main drain will need to be extended by several metres around the perimeter of the building. Although the drain extension is minor, the installation of an additional sanitary fixture (i.e. the laundry tub) is outside the scope of exemption 35. Furthermore, as the building is not a dwelling. It is not covered by this exemption and a building consent is required.
- The owner’s drainlayer proposes to reposition a dwelling’s drain connection into the NUO drain which traverses the property and is covered by an easement on the title. A building consent will be required as this is a new connection to a NUO drain.

### Reference:

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
Schedule 1 Building work for which building consent not required

Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006

Plumbing and drainage

35 Alteration to existing sanitary plumbing (excluding water heaters)

(1) Alteration to existing sanitary plumbing in a building, provided that—
   (a) the total number of sanitary fixtures in the building is not increased by the alteration; and
   (b) the alteration does not modify or affect any specified system.

(2) Subclause (1) does not include an alteration to a water heater.

What section 35 means

- This exemption enables an authorised person to carry out alterations to sanitary plumbing. However, this is only as long as these alterations do not increase the number of sanitary fixtures within any existing building and they do not modify or affect any specified system.

- ALERT: If you are not sure if this exemption applies to your proposed building work, we recommend that either you seek an exemption 2 from the council or you apply for a building consent. This will ensure work is not completed without prior approval when required.

- Alterations to water heaters are specifically excluded from this exemption. However, there is still some building work in relation to water heaters which does not require a building consent. This is covered in the next three exemptions (exemptions 36, 37 and 38).

- ALERT: Any plumbing work under this exemption must be carried out by an authorised person. Where sanitary plumbing work could adversely affect the structural performance of structural elements such as floor joists or wall framing, this work may require a building consent. If you are not sure, we recommend seeking professional advice first (e.g. from a licensed building practitioner, chartered professional engineer, registered architect, building consultant, registered building surveyor or accredited building consent authority).
### Examples of where a section 35 exemption could apply

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repositioning or replacing sanitary fixtures (e.g. a bath, bidet, wash hand basin, shower or toilet pan) within an existing bathroom in a dwelling.</td>
</tr>
<tr>
<td>Moving a toilet pan from a toilet compartment into an adjacent existing bathroom in a dwelling.</td>
</tr>
<tr>
<td>A home owner proposes to remodel an existing kitchen within the same space, leaving the kitchen sink in the same position.</td>
</tr>
<tr>
<td>An existing laundry tub in a dwelling will be moved to a new location within the adjacent kitchen.</td>
</tr>
<tr>
<td>Relocating, removing or shifting an existing hose tap.</td>
</tr>
<tr>
<td>Removing a bath with a shower over it, and replacing this with a new proprietary shower enclosure and a new bath within the existing bathroom space. As the existing bath/shower arrangement has two sanitary fixtures, each fixture can be replaced and relocated without the need for a building consent.</td>
</tr>
</tbody>
</table>

### Examples where building consent is required

<table>
<thead>
<tr>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing a tiled wet area shower will require a building consent. This is because it will involve critical building work that is not sanitary plumbing, such as carpentry and installing waterproof membranes.</td>
</tr>
<tr>
<td>Moving a vanity, bath and shower within an apartment of a multi-level building. This building work involves new penetrations through a fire separation, which is a specified system.</td>
</tr>
<tr>
<td>An ensuite is proposed which includes the addition of a shower, hand basin and toilet. These sanitary fixtures are additional to those that already exist in the building, so a building consent is required.</td>
</tr>
<tr>
<td>A restaurant owner decides to increase the number of sanitary fixtures to allow for increased customer capacity. This building work will require a building consent.</td>
</tr>
<tr>
<td>Installing a new testable backflow prevention device in a building (that is not a dwelling). As this device is a specified system, a building consent is required and the compliance schedule will also need to be amended.</td>
</tr>
</tbody>
</table>

**Reference:**

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
Schedule 1 Building work for which building consent not required

Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006

Water heaters

36 Repair and maintenance of existing water heater

The repair or maintenance of any existing water heater using comparable materials, comparable components, or a comparable assembly.

What section 36 means

- This exemption enables an authorised person to repair and maintain water heaters associated with buildings. Any repair work must use comparable materials, comparable components or a comparable assembly. To replace or reposition an existing water heater refer to exemptions 37 and 38.

Examples of where a section 36 exemption could apply

- Repairing a leaking open-vented water storage heater.
- Repairing a valve-vented water storage heater.
- Replacing sacrificial anodes.
- Repairing valves associated with water heaters (refer to exemption 32 – repair, maintenance, and replacement).
- Repair or maintaining solar collectors.

Examples where building consent is required

- While repairing his existing (open-vented) storage water heater, the homeowner decides to replace the existing wood burner and wetback system. As replacing the wood burner and wetback is not considered to be repairs or maintenance, the building work requires a building consent.

Reference:

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
Schedule 1 Building work for which building consent not required

Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006

Water heaters

37 Replacement of open-vented water storage heater connected to supplementary heat exchanger

The replacement of any water-storage heater connected to a solid-fuel heater or other supplementary heat exchanger if the replacement—

(a) is a comparable open-vented water storage heater; and

(b) is fixed in the same position, and uses the same pipework, as the replaced water storage heater.

What section 37 means

• This exemption enables an authorised person to replace open-vented water storage heaters associated with existing supplementary heat exchangers (e.g. wetbacks or solar collection panels). The replacement water storage heater must be comparable and in the same position.

Examples of where a section 37 exemption could apply | Examples where building consent is required
--- | ---
• Open-vented water storage heater with solar collection Replacing an open-vented water storage heater with an open-vented water storage heater (e.g. electric to electric, gas to gas, electric to gas, or gas to electric) in the same position, using the same pipe work and connected to solar collectors. | • Replacing an open-vented water storage heater with a valve-vented water storage heater. As the water-storage heaters are not comparable, a building consent will be required.

• Replacing and relocating an open-vented water storage heater and reconnecting it to the existing wood burner with a wetback. As the replaced water storage heater will not be fixed in the same position, a building consent is required.
<table>
<thead>
<tr>
<th>Examples of where a section 37 exemption could apply</th>
<th>Examples where building consent is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Open-vented water storage heater with wetback Replacing an open-vented water storage heater with another open-vented water storage heater in the same position, using the same pipe work and connected to a solid-fuel heater wetback.</td>
<td>• Replacing an open-vented water storage heater and adding a wetback where there was no wetback before.</td>
</tr>
<tr>
<td>• Open-vented water storage heater with heat pump Replacing an external water storage heater with a heat pump water storage heater (e.g. replacing an open-vented water storage heater with another open-vented storage heater) in the same position, using the same pipe work and connected to a heat pump.</td>
<td>• Adding a roof-mounted solar collection panel which will be connected to an existing open-vented water storage heater.</td>
</tr>
</tbody>
</table>

Reference:
‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.

Study Notes
### Schedule 1 Building work for which building consent not required

#### Part 2 Sanitary plumbing and drainlaying carried out by person authorised under Plumbers, Gasfitters, and Drainlayers Act 2006

**Water heaters**

**38 Replacement or repositioning of water heater that is connected to, or incorporates, controlled heat source**

The replacement of any water heater (including the repositioning of an existing water heater) if the replacement water heater is connected to, or incorporates, a controlled heat source or, if connected to or incorporating more than 1 heat source, 2 or more heat sources all of which are controlled.

### What section 38 means

- This exemption enables an authorised person to replace and/or reposition an existing water heater (of any type), as long as all the heat sources of the replaced or repositioned water heater are controlled. This exemption will not apply if a water heater has a heat source that is not controlled (e.g. a wetback connected to a solid-fuel heating appliance, or a solar thermosiphon system). A controlled heat source has controls or devices that ensure the water temperature in the storage tank is no greater than 90°C.

- **ALERT:** If the proposed scope of the building work is outside the scope of this or any other exemption (e.g. adding solar collectors to an existing water storage heater, which has provision for solar connection and is not being replaced or repositioned), we suggest that you consider applying to the council for an exemption 2. The council can then decide whether or not it will require a building consent. Before doing this, we recommend that you talk to the council to gauge whether or not it is prepared to exercise its discretion under exemption 2 on your project.

- Any repair or maintenance of part of a water heater (which may include the replacement of a component of the water heating system) falls outside the scope of this exemption. Exemption 36 deals with repairs or maintenance of part of a water heater.

- Replacing a hot water cylinder which is connected to an existing wetback falls outside this exemption (refer to exemption 37 for open-vented systems).
### Examples of where a section 38 exemption could apply

<table>
<thead>
<tr>
<th>Water storage heaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Replacing an existing valve-vented water storage heater with a thermostatically controlled valve-vented water storage heater (e.g. electric to electric, gas to gas, electric to gas, or gas to electric).</td>
</tr>
<tr>
<td>• Repositioning an existing valve-vented water storage heater that has a controlled heat source.</td>
</tr>
<tr>
<td>• Replacing an existing open-vented water storage heater with a valve-vented water storage heater that has a controlled heat source.</td>
</tr>
<tr>
<td>• Repositioning an open-vented water storage heater, when in the new position it is connected to a controlled heat source.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solar water storage heaters</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Replacing and/or repositioning an existing water storage heating system comprising a water storage heater that includes controlled solar collectors.</td>
</tr>
<tr>
<td>• Replacing or repositioning an existing electric or gas water storage heater with a water storage heater system that includes controlled solar collectors.</td>
</tr>
</tbody>
</table>

### Examples where building consent is required

| • Adding a solar collector to an existing water storage heater (even if the existing water storage heater has provision for solar connection). A building consent is required because this exemption only covers replacement or repositioning of existing water heaters. |
| • Adding a wetback (not a replacement wetback) connected to a water storage heater. A building consent is required because this exemption only covers replacement or repositioning of existing water heaters. Also the wetback is an uncontrolled heat source. |
| • Adding a split heat pump (not a replacement split heat pump) to an existing water storage heater. A building consent is required because this exemption only covers replacement or repositioning of existing water heaters. |
### Examples of where a section 38 exemption could apply

<table>
<thead>
<tr>
<th>Heat pump water storage heaters</th>
<th>Examples where building consent is required</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Replacing a water storage heater with a heat pump water storage heater.</td>
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</tr>
<tr>
<td>• Replacing and repositioning an internal water storage heater with an external heat pump water storage heater.</td>
<td></td>
</tr>
<tr>
<td>• Replacing an external water storage heater with an external heat pump water storage heater.</td>
<td></td>
</tr>
</tbody>
</table>

**Instantaneous water heaters**

- Replacing or repositioning an instantaneous water heater that is thermostatically controlled.
- Replacing an existing storage water heater with a gas instantaneous water heater.

### Reference:

‘Building work that does not require a building consent’ Part 2 of the MBIE Guidance document.
Common reasons why completed work fails to get a Code Compliance Certificate (CCC)

The following common reasons for failure to get a CCC for completed work are covered in this section:

- Tradesperson does not have a current licence.
- Lack of minor variation documentation.
- Cheap plumbing fittings not up to standard.
- Failing a pre-line pipework inspection.
- Terminal vents not having a vent cowl.
- The designer of drainage systems not reading the contour plans resulting in insufficient or no coverage.
- Retention tanks not being taken into consideration at design phase and higher density housing meaning tighter sites.
- Undersized cesspits for the size of the catchment area.
- Inadequate flashings around service penetrations.
- Poorly protected under-slab pipework (in preparation for pouring of concrete).
- Non-compliance issues with relief pipes from a HWC discharging into a safe tray within cupboards.
- Lack of backflow prevention devices on outside taps.
- No haunching on the gully trap (dish).
- Lack of signage to identify non-potable water.
- Failure to take account of the line of inference between slab and drain.
Tradesperson does not have a current licence

Anyone who carries out or supervises restricted building work must make sure that he or she is authorised in the class required to carry out or supervise that restricted building work.

Your authorisation needs renewing every year and you should do the paperwork during February or March so that you are fully licensed by the 1st April. Remember it is your responsibility to hold an authorisation to carry out restricted work. Even if you work for an employer, you should be filing out the forms etc. to make sure your authorisation is current by 1st April.

Lack of minor variation documentation

Sometimes installations cannot go ahead as designed and consented. This might happen, for example, because of an issue with available space, a structure that wasn’t noticed in the drawing/planning stage being in the way, or the customer changing their mind about a fixture, a material type, or some other aspect of the building.

If such changes need to be made, the BCA should be notified and supplied with documentation about the proposed changes. The proposed changes need to be accepted and the consent application updated before work is carried out to avoid any problems later on with the issuing of a CCC.

Cheap plumbing fittings not up to standard

As included in the product selection topic for CPD in 2016, all products that you install must comply with the building code and be fit for purpose.

Failing a pre-line pipework inspection

One of the more commonly occurring reasons for a building to fail an inspection is incorrect drilling and notching of timber framing to run pipework.

New Zealand Standard 3604 Timber-framed buildings (NZS 3604) is the acceptable solution for complying with New Zealand Building Code clause B1 Structure.

NZS 3604 is a very large document which includes all of the requirements that must be met when erecting a building with a timber frame. Part of those requirements are the maximum diameters and allowable locations for any holes to be drilled or notches the made in the framing.
The gas standard AS/NZS 5601 Part 1 also contains a section outlining installation of pipes in wooden joists, plates and studs which is, at this time, consistent with the requirements of NZS 3604. AS/NZS 5601 is easily accessed and available through your PGDB log on providing you have a current licence.

There is also some information in AS/NZS 3500 Part 4 Heated water services; however, the information in this document differs slightly from the requirements of NZS 3604 and therefore would not comply with the acceptable solution B1/AS1. The BCA may accept AS/NZS 3500 Part 4 as an alternative solution however this would need to be agreed to before work commences.

The photograph above shows a notch that has been made in the top of a timber joist. This practice is non-compliant with the building code acceptable solution B1/AS1 and in turn with NZS 3604.
Terminal vents not having a vent cowl

G13/AS1 section 5.7 gives the acceptable locations and requirements for the termination of open vent pipes.

5.7.2 (b) states that the vent terminal must: Incorporate a means to prevent the entry of birds and vermin and has to have an open area not less than 80% of the cross-sectional area of the vent pipe they serve.

This was achieved many years ago by fitting a ball shape of chicken wire mesh to the top of a galvanised steel vent pipe. It is now more common to fix a purpose made uPVC vent cowl to the terminal of a uPVC vent pipe.

It can be easy to forget to go back and do this, especially if a roofing company is responsible for sealing the penetration. It is a good idea to have a check list where little jobs can be ticked off on completion to ensure all tasks necessary are done before the inspector arrives.
The designer of drainage systems not reading the contour plans resulting in insufficient or no coverage

When deciding the depth to excavate a drain, reference should be made to the contour of the site, in terms of any rises or dips in the ground level.

On a plan, lines are drawn showing all the points on the land that are at the same level. If the numbers are increasing as the contours become smaller, it shows a hill (the higher number shows that the height above sea level is increasing).

If the number decreases as the contours become smaller, it shows a depression or valley. The closer together the lines are, the steeper the slope.

Care needs to be taken to ensure that the gradient required for the pipework is achieved and that the ground level in the area will still provide adequate coverage.
Retention tanks not being taken into consideration at the design phase and higher density housing meaning tighter sites

Each Territorial Authority (TA) or BCA will have their own requirements regarding the disposal of surface water from a site.

Some TAs will provide curb and channel or surface water drain connection points for the surface water from a property to be conveyed to the network utility sewer. However, in some areas due to the load placed on the sewer, properties are now required to manage their surface water on site. This is done through the installation of soak pits or retention tanks.

Each TA will have required distances from boundaries and structures that must be met for the location of soak pits and retention tanks to prevent any damage or subsidence occurring to and around the structure.

Due to oversights during the design of a building and the location of that building within the site boundaries, it can occur that no suitable placement for a soak pit or retention tank of the required capacity can be found where the minimum distances from the boundaries and structures can be achieved.
Undersized cesspits for the size of the catchment area

Once a suitable location for a soak pit or retention tank has been identified, it is important to make sure the dimensions of the pit or tank are going to provide enough volume to cope with the expected amount of water.

Once the size of the catchment area and the likely rain fall in the area is known, the volume of surface water can be calculated. Taking this information into account, along with the soakage rate of the soil, will determine the required capacity of the soak pit or retention tank.

Building Code Clause document E1 Surface Water contains a verification method which shows how to calculate the size to comply with the Building Code. Alternatively, a suitably qualified engineer could be contracted to complete the design.
Inadequate flashings around service penetrations

There is an acceptable solution for Building Code clause E2 External Moisture (E2/AS1) that contains information about acceptable ways to seal penetrations both through the roof and through external walls of a building.

To seal a penetration through a roof that has a pitch between $10^\circ$ and $45^\circ$, where the penetration has a diameter up to 85 mm, a rubber boot flashing is all that is required. However, if the penetration is of a larger size a soaker flashing will be needed.

The requirements for the dimensions of a soaker flashing will change depending on the weather patterns in the area, especially expected wind speeds. Check the information specific to the area you are working in and adjust the dimensions of the flashings and seals as necessary.

There are different options for sealing a penetration through an external wall as shown in the diagram Figure 68 from E2/AS1. Note that, in any case, the pipe must slope downwards to outside to allow any moisture to track down to the end of the pipe and to prevent pooling or entry around the penetration.
Poorly protected under-slab pipework (in preparation for pouring of concrete)

Pipework installed under, or through, concrete must be protected from damage due to contact with hard surfaces. Space must be provided for the pipework to expand and contract, due to temperature differences, without becoming stressed and cracking or breaking.

G13/AS2 requires that 50mm of clearance be provided between the top of the pipe and the underside of the slab and that the pipe is sleeved or wrapped in a durable and flexible material to allow for expansion and contraction.

The photos below show two installations that do not meet those requirements.

It is arguable that bubble wrap is sufficiently durable to offer long term protection from friction caused by expansion and contraction. In any case, the wrap does not extend down far enough to protect the pipe for the full distance that it will be in contact with the concrete as it is poured.
**Non-compliance issues with relief pipes from a HWC discharging into a safe tray within cupboards**

One of the requirements for the installation of a relief drain to comply with G12/AS1, and therefore with the Building Code, is as follows:

**6.7.2 Relief valve drains shall:**

d) Discharge in a visible position which does not present a hazard or damage to other building elements (except when used in association with free outlet storage water heaters)

A BCA may decide that discharging relief drains into a safe tray do not comply when:

1. The drain discharges within a cupboard and is therefore not visible.

2. The valve could potentially be discharging very hot water at a rate at which the safe tray drain is unable to cope with causing a hazard.

3. The relief drain will discharge during every heating cycle of the cylinder. This will increase the moisture content in the cupboard on a regular basis, causing damage to the walls, ceiling etc. of the cupboard. The moisture can also become trapped between the cylinder base and the tray causing corrosion.

4. The Building Code acceptable solution requires TPR drains to be run in copper tube. Most safe tray drains are plastic or some other material.
Lack of backflow prevention devices on outside taps

This is most common in a residential dwelling situation when the outside taps are used to supply water by hose to a swimming or paddling pool or if they feed an irrigation system.

Hose union vacuum breakers are a specific type of atmospheric vacuum breaker design for this situation and connect directly to the 20mm BSPT thread on the outlet of a standard hose tap.

Study Notes
No haunching on the gully trap (dish)

Section 3.3 of NZBC G13/AS2 gives a list of requirements to be met in the installation of a gully trap. Included in the list is a requirement for the gully to be adequately supported by bedding and backfilling.

Including

i) concrete no less than 75 mm thick surrounding the entire gully dish and which is separated from the building foundation, where the gully trap is likely to be damaged.

For example, if the gully dish is located in a driveway or some other high traffic area where it is likely that it could be damaged, haunching around the dish to prevent it from breaking due to impact should be installed.

Study Notes
**Lack of signage to identify non-potable water**

All non-potable (non-drinkable) water supply outlets must be identified using the non-potable water sign. The sign must be located adjacent to the outlet and in a position that will not be obscured when the outlet is used.

Where non-potable and potable water supplies are reticulated around a building, the potable and non-potable pipelines must both be identified.

G12/AS1 references NZS 5807: 1980 *Code of practice for industrial identification by colour, wording or other coding* as an acceptable method of providing that identification. This standard applies to above ground pipework, conduit only.

NZS 5807 requires that pipework be identified either by the colour of the pipe, or other indications. There are some options to achieve this.

Identification can be provided by:

- manufacturing or painting the entire surface of the pipe in the appropriate colour, or
- by painting stripes or wrapping adhesive tape or clip on bands of the required colour at regular intervals on the pipe.

Identification should be provided at all junctions and on both sides of any valves in the pipework, at service appliances, bulkheads and wall penetrations as well as any other place that ID may be required. In any case, identification should be provided at least every 8 metres of pipe run.

The direction of flow should also be indicated on the pipe work.

NZS 5807 provides the following guidance for colours to be used for pipe work.

- Fresh potable water – Auxiliary Blue with green
- Water in a liquid state – Forest green
- Other liquids – Black
Failure to take account of the line of inference between slab and drain

When excavating near a building, the stability of the building can be compromised.

Also, as the soil around the building absorbs the pressure of having the extra weight of the building pushing down, the soil will move over time. This movement can cause any pipes buried in that soil to also move and it is possible for those pipes to be pushed out of alignment or become damaged.

For these two reasons restrictions are in place on how close to a building a trench may be excavated and a drain laid.

G13/AS2 provides the following acceptable solution to prevent these two occurrences.

5.6 Proximity of trench to building.

5.6.1 For light timber framed and concrete masonry buildings constructed to NZS 3604 or NZS 4229 in accordance with B1/AS1 pipe trenches which are open for no longer than 48 hours shall be located no closer than V to the underside of any building foundation, as shown in Figure 8. Where the trench is to remain open for periods longer than 48 hours the minimum horizontal separation shall increase to 3V in all ground except rock.
Producer statements

A producer statement is a document provided by an approved expert that may be accepted by a BCA as evidence that a design or building work complies, or will comply, with the Building Code.

A producer statement is not a product warranty or guarantee of compliance. It is a professional opinion of the author that the design or work (depending on the type of statement) is compliant with the building code.

There are 4 different types of producer statement (PS) numbered 1 to 4

- **PS1**: Are completed by a designer or engineer to confirm that in their opinion the design provided complies with the Building Code.

- **PS2**: In some cases (for instance when a design is very complex or the results of a mistake could be very serious) a design may need to be checked or peer reviewed to ensure that no mistakes in the design have been made. The person completing the review of the design will complete a PS2 if they are also happy that the design complies with the building code.

- **PS3**: A PS3 is completed by the installer, it is a statement to say that the installation and construction was carried out using the materials, methods etc. as required by the design. A PS3 is the statement that is most commonly supplied by a plumber, gasfitter or drainlayer.

- **PS4**: At the completion of an installation project the designer may check that the work has been completed as per the design. The designer will then complete a PS4.

Who can provide a PS3?

Different BCAs have different requirements which must be met before they will accept a PS3 instead of completing an inspection. Check with your local BCA for their requirements before you start any construction work.

Depending on the region, requirements about who can provide a PS3 could include the following:

- The contractors or installers must have prior approval by the BCA to provide a PS3. Some BCAs will assess the experience and track record of a person or company wishing to provide a PS3 and ensure they have enough experience and competence in the required skill.

- Some BCAs’ policies allow for persons with relevant qualifications and current licence(s) to be acceptable providers of PS3s.

- The BCA may require the contractor or installer to carry a certain level of professional indemnity/public liability insurance.
Does a tradesperson have to supply a PS3?

The short answer is no, unless the building consent requires it or they have been contracted by the customer to supply one.

A PS3 may save some time (and possibly some costs) waiting for an inspector to complete an inspection, and arranging for the test to be carried out whilst the inspector is on site; however, a BCA cannot insist that the contractor supply a producer statement.

The installer can, however, insist that the BCA inspects the work at each stage required.

The BCA can also refuse to accept a PS3 and insist on inspecting the completed work.

What must a PS3 contain?

A BCA should be able to provide you with a PS3 form to complete when providing a PS3.

This form will usually require the following information.

The details of the author: Name
Address and contact details
Registration number and licence expiry date

Location of completed work: Address
Owners’ details
Building consent number

Description of work: Type of work completed
Building Code clause applicable to the work.
Testing procedure used

Declaration: Statement that the work has been completed as per the consented plans.

Pressure test memorandums are not producer statements

In some cases, a BCA may accept a written declaration that the pipework installed has passed a pressure test.

This is useful if the test has been carried out at a time when the BCA inspector was not on site to witness the test.

Remember that there are restrictions on who can test for verification purposes (sign off).
In the past, tradespeople and BCAs have used a PS3 to show this information; however, this is not the correct use of a PS3, as pipework can pass a test without being installed as per the design or in compliance with the Building Code.

A pressure test memorandum is the correct document to use in this instance.
Questions

Are the following statements TRUE or FALSE?

6. A PS4 is the statement that is most commonly supplied by a plumber, gasfitter or drainlayer.
   True [ ] False [ ]

7. Different BCAs have different requirements which must be met before they will accept a PS3 instead of completing an inspection. It is therefore important to check with your local BCA for their requirements before you start any construction work.
   True [ ] False [ ]

8. An installer can insist that the BCA inspects the work at each stage required if they think it is necessary.
   True [ ] False [ ]

9. A PS3 should be completed to give a declaration that pipework installed has passed a pressure test.
   True [ ] False [ ]
Continuing Professional Development (CPD) 2017

Topic 3: AS/NZS 3500, AS/NZS 5601 and demarcation between plumbing and drainlaying
Topic 3: AS/NZS 3500, AS/NZS 5601 and demarcation between plumbing and drainlaying


This topic covers the following:

- Demarcation between plumbing and drainlaying.
AS/NZS 3500.1:2015 and AS/NZS 3500.2:2015

These Standards are part of a series for plumbing and drainage.

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<tr>
<th>AS/NZS</th>
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The objective of AS/NZS 3500.1:2015 is to provide installers with solutions to comply with the following:

(a) the National Construction Code of Australia (NCC), Volume Three, Plumbing Code of Australia (PCA); and,

(b) the New Zealand Building Code (Clause G12, Water Supplies).

The objective of AS/NZS 3500.2:2015 is to provide installers with solutions to comply with the following:

(a) the National Construction Code of Australia (NCC), Volume Three, Plumbing Code of Australia (PCA); and,

(b) the New Zealand Building Code (Clause G13, Foul Water).
Recognition and use

AS/NZS 3500.1:2015 and AS/NZS 3500.2:2015 were cited by the New Zealand Building Code (NZBC) in January 2017. This means that the 2003 versions of AS/NZS 3500 should no longer be used when designing and installing plumbing and drainage systems.

Up-to-date copies of these standards can be accessed for free using the link from your Plumbers, Gasfitters and Drainlayers Board webpage log in.

Water services

Some sections of AS/NZS 3500.1:2015 are referenced in G12/VM1 and G12/AS1 and are therefore those sections are also pre-approved ways to complete the design and installation of water supply systems.

G12/AS2 relates to the installation of solar water heaters and references AS/NZS 3500.4:2015 Plumbing and Drainage – Heated Water Services, allowing this standard to be used in conjunction with G12 for designing and installing solar water heaters.

Sanitary systems

The building code provides us with an acceptable solution for above ground waste water plumbing which is NZBC G13/AS1 Sanitary Plumbing. This document can only be applied to buildings/systems that are a maximum of 3 storeys high and does not include information relating to some specialised systems such as hospital and laboratory fixtures.

The building code provides another acceptable solution, NZBC G13/AS3 Plumbing and Drainage, which allows the use of AS/NZS 3500.2:2015 (with some modifications as required by clauses in NZBC G13/AS3) as an Acceptable Solution.

AS/NZS.3500.2:2015 does not have the height and other restrictions that apply in G13/AS1.
Foul water systems

One of the acceptable solutions provided to comply with the building code for foul water systems is G13/AS2 Drainage. This acceptable solution can be applied to foul water drains up to 150mm in diameter that use gravity to convey the waste water through the system.

Another acceptable solution is NZBC G13/AS3 Plumbing and Drainage, which allows the use of AS/NZS 3500.2:2015 (modified by clauses in NZBC G13/AS3) as an acceptable solution. This solution can be applied to the same situations as G12/AS2 and also provides solutions for larger diameter pipework and pumped systems.
Questions

Answer the following questions.

1. The objective of AS/NZS 3500.1:2015 is to provide installers with solutions to comply with which part of the New Zealand Building Code?

2. The objective of AS/NZS 3500.2:2015 is to provide installers with solutions to comply with which part of the New Zealand Building Code?

3. AS/NZS 3500.1:2015 and AS/NZS 3500.2:2015 are cited by the NZBC.

   True [ ] False [ ]
AS/NZS 5601.1:2013 and AS/NZS 5601.2:2013


The objective of 5601.1:2013 is to provide essential requirements and deemed to comply solutions, and to promote uniform standards of gas installation.

The objective of AS/NZS 5601.2:2013 is to provide essential requirements and deemed to comply solutions, and to promote uniform standards of gas installation and to provide a stand-alone standard for LP gas installations in caravans and boats for non-propulsive purposes.

AS/NZS 5601.1:2013

AS/NZS 5601.1:2013 includes the mandatory requirements and means of compliance for the design, installation, and commissioning of gas installations associated with the use or intended use of fuel gases such as natural gas, LP Gas, or biogas.

For New Zealand, these requirements cover gas installations downstream of the point of supply (as defined in the Gas (Safety and Measurement) Regulations 2010).

The standard does not apply to the following:

- Portable or mobile gas appliances (such as barbecues or patio heaters) that are connected directly, or by hose assembly, to an LP Gas cylinder.

- Automotive CNG compressors and refuelling stations.

- Installations in vehicles for automotive use.

- Caravans and boats (these are covered in AS/NZS 5601.2).

New Zealand legislative changes in 1992 removed the responsibility for inspection and certification of gas installations from the gas suppliers and introduced a regime of gas certification by a person authorised under the Plumbers, Gasfitters, and Drainlayers Act 2006. It is intended that only the performance requirements of section 2 (performance-based design and other essential requirements) will be mandatory in New Zealand.

Section 2 covers the various aspects of a gas installation that contribute to its safety. It includes performance criteria for compliance with legislative requirements for the safety of gas installations. Sections 3 to 6 provide more detailed information as a means of compliance with the performance criteria. The means of compliance in sections 3 to 6 are not the only means of compliance with the performance criteria of section 2.
The key changes from AS/NZS 5601.1:2010 include the following:

- Exclusion of 1st family gases (for example, tempered liquefied petroleum).
- Temperature limitations for press fit connectors.
- Revised Appendix F for pipe sizing in relation to increased flow capacities where supply and equipment pressure permits.
- Revised Appendix G for the method in calculating breather vent orifice sizes.
- New informative Appendix O for gas appliance commissioning.
- New informative Appendix P for symbols used in gas control system diagrams.
- New informative Appendix Q comprising a gas installation checklist.
- New normative Appendix R for spillage testing of combustion products.

**AS/NZS 5601.2:2013**

AS/NZS 5601.2:2013 covers the mandatory requirements and means of compliance for the design, installation, and commissioning of LP Gas installations in caravans and boats for non-propulsive purposes.

The requirements cover caravans, mobile holiday homes, campervans and motor homes, trucks and trailers incorporating fixed gas installations, boats, houseboats, floating restaurants (whether fixed or mobile), and catering vehicles (whether self-propelled or towed).

The standard does not apply to the following:

- The use of LP Gas as a fuel for automotive or propulsion purposes.
- Installations in transportable homes and mobile classroom units.
- Installation of commercial catering equipment.

Section 2 covers the various aspects of a gas installation that contribute to its safety. It states performance criteria for compliance with legislative requirements for safety of gas installations. Sections 3 to 9 provide more detailed information as a means of compliance with the performance criteria, but are not the only means of compliance with the performance criteria in section 2.
The key changes from AS/NZS 5601.2:2010 include the following:

- Clarification of drainage and ventilation requirements for LP Gas cylinder compartments and lockers.
- Clarification of refrigerator installations.
- Guidance on increase in ventilation area where mesh is installed.
- New warning label for vents.
- Mandatory requirements for consumer instructions in Appendix G.
- New informative Appendix I for gas appliance commissioning.
- New informative Appendix J for symbols used in gas control system diagrams.
- New informative Appendix K with a gas installation checklist.

Questions

Are the following statements TRUE or FALSE?

4. AS/NZS 5601.1:2013 includes the mandatory requirements and means of compliance for the design, installation, and commissioning of gas installations associated with the use or intended use of fuel gases such as natural gas, LP Gas, or biogas.

For New Zealand, these requirements cover gas installations downstream of the point of supply (as defined in the Gas (Safety and Measurement) Regulations 2010).

<table>
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<th>False</th>
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5. AS/NZS 5601.2:2013 covers the mandatory requirements and means of compliance for the design, installation, and commissioning of LP Gas installations in caravans and boats for non-propulsive purposes.

The requirements cover caravans, mobile holiday homes, campervans and motor homes, trucks and trailers incorporating fixed gas installations, boats, houseboats, floating restaurants (whether fixed or mobile), and catering vehicles (whether self-propelled or towed).

<table>
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<th>True</th>
<th>False</th>
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Demarcation between plumbing and drainlaying

Demarcation in terms of waste water disposal

Prior to the Building Act coming into effect, it was very clear where sanitary plumbing ends and drainlaying began because there was only one means of meeting building compliance and that was through the Drainage and Plumbing Regulations 1978. These regulations made it very clear where the point of demarcation between the two trades was.

With the introduction of the Building Act and the use of performance-based compliance documentation, however, the traditional demarcation lines between sanitary plumbing and drainlaying have become harder to define. This is particularly evident with the use of performance-based solutions such as AS/NZS 3500.2:2015 Plumbing and drainage.

When the Plumbers, Gasfitters, and Drainlayers Act 2006 (“the Act”) came into force on 1 April 2010, the PGDB determined that it needed to review all legislation to identify the demarcation point. In doing so it took legal advice which assisted it to determine:

"that the definition of drain in the Act includes pipes normally laid underground and generally external to a building for the conveyance of foul water to an outfall”.

The illustration below identifies where the demarcation point exists.
The demarcation point when ribraft or pod style floor systems are being used

This type of floor construction has increased the number of foul water systems that are installed within the building footprint and in the ground proper to avoid affecting the polystyrene pods.

The view of the PGDB is that the demarcation line for this type of system is the building footprint. The building footprint is taken as a line matching the external cladding of the building passing continuously down through the ground.

If the pipework is installed within the building footprint, then it is sanitary plumbing. The work outside the footprint is drainlaying.

While the diagram below is not to scale, it provides guidance information relating to the footprint of a building.

Where AS/NZS 3500.2 is selected as the means of compliance, all pipework and fittings must be installed according to the version current at the time of installation, including minimum/maximum heights for risers.
Questions

Answer the following questions.

6. What does the definition of ‘drain’ in the Act include (as determined by the PGDB)?

7. According to the PGDB, the demarcation point when ribraft or pod style floor systems are being used is the building footprint. The building footprint is taken as a line matching the external cladding of the building passing continuously down through the ground.

If the pipework is installed within the building footprint, then it is sanitary plumbing. The work outside the footprint is drainlaying.

[True/False]
PGDB & Mico 2016
CPD Training Roadshow
Topic 4: Additional issues
Topic 4: Additional issues

Topic 4 of Continuing Professional Development (CPD) 2017 for plumbers, gasfitters and drainlayers focuses on some important additional issues affecting the industry.

This topic covers the following:

- Registered plumbers and gasfitters carrying out roofing work.
- LPG cylinder placement.
- The new journeyman class of registration and licence.
Registered plumbers and gasfitters carrying out roofing work

Registered plumbers and gasfitters are deemed to be ‘licensed building practitioners’ in roofing under the ‘metal profile roofing and cladding’ class.

This means that registered plumbers and gasfitters are allowed to carry out some types of roofing work that is classed as ‘restricted building work’. For example, making and installing flashings on penetrations for any roof type or installing lightweight metal profiled roofing as part of their work.

Registered plumbers and gasfitters are allowed to carry out this restricted work because they are registered under the Plumbers, Gasfitters, and Drainlayers Act 2006 (PGD Act) and are considered trained to carry out this type of roofing work.

Plumbers and gasfitters registered under the PGD Act are, however, not registered under the licensed building practitioners scheme. If they want to carry out other restricted building work (for example, installing concrete tile roofing, membrane roofing or putting in concrete foundation walls), they need to be authorised to do so by the Licensed Building Practitioners’ Board.

As with all work, the overarching principle is that even though a registered plumber or gasfitter may be authorised to carry out the work, if they are not competent in it, they are expected to upskill until they become competent before undertaking the work.

Roofing is not restricted sanitary plumbing or gasfitting work. Should a registered plumber or gasfitter find themselves in trouble over a roofing issue it will not be dealt with by the Plumbers, Gasfitters, and Drainlayers Board. An exception to this might be a complaint to the PGDB regarding flashings related to vents, pipes or flues. However, each complaint is dealt with case by case.

Note: Drainlayers are not deemed ‘licensed building practitioners’ as the work usually associated to drainlaying is not defined as restricted building work under the licensed building practitioners’ scheme. Drainlaying does, however, remain restricted work under the Plumbers, Gasfitters, and Drainlayers Act 2006.
Questions

Are the following statements TRUE or FALSE?

1. Registered plumbers and gasfitters are allowed to carry out some types of roofing work that is classed as ‘restricted building work’ without needing additional authorisation to do so from the Licensed Building Practitioners’ Board. For example, making and installing flashings on penetrations for any roof type or installing lightweight metal profiled roofing as part of their work.

   True [ ] False [ ]

2. If registered plumbers and gasfitters want to carry out other restricted building work (for example, putting in concrete tile roofing or concrete foundation walls), they will need to be authorised to do so by the Licensed Building Practitioners’ Board.

   True [ ] False [ ]

3. Drainlayers are not deemed to be ‘licensed building practitioners’ as the drainlaying work they carry out is not defined as restricted building work under the ‘licensed building practitioners’ scheme.

   True [ ] False [ ]
LPG (Liquefied Petroleum Gas) cylinder placement

Characteristics of LPG

LPG is made up of mainly propane and butane gases. The mix of these gases can vary throughout the year and is dependent on the availability of propane.

The mix of the gas can vary from 80% - 20% to 50% - 50% and can sometimes affect the operation of some equipment and vaporisation of gas in some areas.

LPG is 1.5 times heavier than air. Being heavier than air makes it harder to dissipate into the atmosphere should a leak occur. This often means that leaking LPG will pool around low areas. This can be of concern in areas near drains which may collect leaked gas and also on boats where any leakage may gather in the bottom of the boat.

LPG is not visible in itself, though when large volumes of gas is escaping, a haze can be seen.

LPG has no natural odour. Odorant is added to give the gas an unpleasant smell.

The flammability limits of LPG are 2% - 10%. This is a narrow range, however, due to the chances of liquid petroleum gas pooling in low areas, it can still pose a significant risk. Natural gas is considered somewhat safer as it is less likely to pool, and will disperse more readily.

LPG Storage Cylinders

LPG is most commonly stored in cylinders. The size of the storage cylinder can vary from as small as a butane lighter or cooker canisters (not restricted gasfitting work), up to large bulk tanks serving reticulated suburbs or industrial sites. The most commonly seen are 9kg or 45kg cylinders and, increasingly, 200 kg in situ tanks and small bulk storage tanks for commercial users.

Capacity of Cylinders

How much does a cylinder hold?

A 9kg Cylinder has a water capacity of around 21 litres.

The cylinder is designed to be filled to 85% capacity and liquid LPG weighs less than water.

At 85% of capacity the liquid LPG will weigh 9kg
The calculation
- 9kg of LPG liquid is about 18 litres (LPG Liquid weighs about ½kg per litre).
- 18 litres of liquid converted to vapour is 18 × 250 (expansion rate) = 4500 litres of vapour or 4.5m³.
- For every cubic meter of gas burnt 25m³ of air is required for combustion.
- 4.5m³ of gas requires 112.5m³ of air to burn.
- Add the gas and air together and you have an explosive mix of 4.5 + 112.5 = 117m³
- And that is just from a 9kg cylinder!

Energy
- 1kg of LPG liquid is about 50MJ of gas.
- That means that a 9kg cylinder holds 9 × 50 = 450MJ of LPG.

Questions
Answer the question below.

4. Follow the process described above to calculate the approximate explosive mixture from a 45kg cylinder.

45kg of LPG liquid is about 90 litres

(a) Amount of vapour in m³

(b) Amount of air required m³

(c) The explosive mix (volume of gas and air combined)

(d) How many MJ of LPG gas does a 45kg cylinder hold?
Relief valve

In extreme situations, when pressure within the cylinder increases due to being overfilled or exposed to fire or heat, gas can be relieved through the relief vent.

When placing cylinders, it is important to make sure the relief is pointing away from buildings and obstructions.

Note:

- The relief usually operates at 2MPa (mega-Pascal).
- The relief will close once enough pressure has been released.

AS/NZS 5601.1 is a cited acceptable solution for G11 Gas as an Energy Source

AS/NZS 5601.1 appendix J gives informative guidance with regard to locating LPG cylinders on a property.

Cylinder placement requirements are covered under the Hazardous Substances and New Organisms Act 1996 (HAZNO Act).

Cylinder installation clearances

LPG cylinders require two sets of clearances to be met when being positioned (clearances to openings and clearances from ignition sources).

Clearances to openings

Up to 100kg

The measurements in the illustration show minimum required clearances from the top of the cylinder valve and from the sides of the cylinder. Measurements do differ for in-situ fill (filled on site) cylinders.

Examples of openings:

- A door
- An opening window
- A vent or opening in the building
- A surface water drain
- Where downpipes enter the surface water drainage system
Make sure that you are aware of any mechanical air inlets for fans. Remember to ensure the clearances include openings into neighboring buildings as well.

**Gully traps**

Although a gully trap could be considered an opening, the required water seal in the trap would stop the passage of gas into the sewer system.

**Clearances to ignition sources**

The measurements in the illustration show the minimum required clearances from the top of the cylinder valve and from the centre line of the cylinder.

Measurements do differ for in-situ fill (filled on site) cylinders.

A vehicle is not regarded as being an ignition source while it is entering or leaving a hazardous zone.

**J3.2 Prohibited locations**

Any cylinder and its associated equipment should not be installed in any of the following locations:

a) Within a building, except where permitted by AS/NZS 1596.

b) Under a stairway.

c) In a location with restricted access, where inspection, refilling or exchange of the cylinder is restricted, obscured or hazardous to the operator.

d) Where nearby constructions, fences, walls or vapour barriers could prevent cross-ventilation.

e) Under a building, except where permitted in Paragraph J3.5.

f) Where the cylinder, or an incident involving the cylinder and its contents, could obstruct egress from a building.

g) Buried in the ground, unless the cylinder and gas installation have been specifically designed for such a location.

Any cylinder and its associated equipment should not be installed where damage is likely to occur, unless adequate protection is provided.
Appendix J also lists specific requirements in regards to installing LPG cylinders which include the following:

- On a veranda.
- In an enclosure or recess.
- Under a building.
- In public locations.

Also listed are general installation requirements for LPG cylinders, these include the following considerations:

- A firm, level base.
- Seismic restraints.
- Protection from damage.
- Ventilation requirements.
- Disconnection of the cylinders.

**Site location certificate**

Installations with less than **100 kilograms** of LPG are covered by the certificate of compliance issued by a certifying gasfitter at time of installation. Note: Remember the certifying gasfitter is not certifying the cylinder but rather the gasfitting work downstream of the outlet of the cylinder. Liquid petroleum gas storage under 100kg does not require certification with a location certificate.

When storing over **100kg** (more than **2 × 45.0kg** cylinders) for longer than **18 hours** a ‘site location certificate’ is required to be issued by an EPA appointed ‘test certifier’. The test certifier will ensure the installation is compliant before issuing the location test certificate.

Where a site has multiple locations, each with less than 100kg, a location test certificate may not be required. For example, at a domestic residence, a farm or campground or other type of commercial facility where there are separate buildings and each has less than 100kg.

Buildings are often considered to be sufficiently far apart if they are separated by 5m or more and there is no combustible material (for example, a pile of wood) in between them. However, where there may be multiple individual installations raising the storage to over 100kg, the site may need a location certificate. For example, separate units more than 5m apart.

It is the responsibility of the person in charge of the installation (usually the person who uses the gas) to obtain the location test certificate. These are renewed annually although there is provision for a certificate to be issued for up to a 3-year period. This is dependent on the test certifier. For clarification EPA should be consulted.

A list of test certifiers is available of the EPA website: [http://www.epa.govt.nz](http://www.epa.govt.nz).
100kg to 300kg

The measurements in the illustration show minimum required clearances from the top of the cylinder valve and from the sides of the cylinder.

Measurements do differ for in-situ fill (filled on site) cylinders.

Between 100 to 300 kg can be installed within 2 metres of a building (up against the wall) provided the walls of the building behind the cylinders and 2 metres either side of the cylinders are vapour tight and constructed of fire resisting material.

300kg to 1000kg

Between 300 to 1000 kg can be installed within two metres of a building (up against the wall) provided the walls of the building behind the cylinders and 2 metres either side of the cylinders are vapour tight and are constructed of 60/60/60 fire resisting material.

There must be no openings in the building below the top of the cylinders or within two metres from the sides of the cylinders.

Additional information can be found on the EPA website

http://www.epa.govt.nz/Publications/lpg%20in%20the%20home.pdf

Study Notes
Questions

Answer the questions below.

5. What document is required when more than 100kg of LPG is to be installed on a site?

6. When choosing the location for an LPG cylinder bank, what two things are clearances required from?
Over pressure protection

Regulators used on gas installations must have over pressure protection devices included.

Some BBQ regulators do not have over pressure protection devices and should not be used on any gas installation.

Imagine if some debris became lodged on the seat of one of these regulators. What would happen downstream? Potentially, the internal pressure of the cylinder could enter the installation. This is highly dangerous as the installation is not designed to maintain such pressures.

Relief vent

A relief vent is usually present on most two-stage valves even though they can sometimes be difficult to see. All of these regulator assemblies will have over pressure protection integrated into the design and most will be relief vents.

The relief vent of the regulator requires additional clearances. These clearances are often larger than the clearances required by the cylinders.

NZS 5601.1 requires that a vent of up to 50mm Ø has a clearance from openings and ignition sources (as shown in Figure 1).

These measurements apply only if there is nothing located in the exclusion zone indicated, such as cylinders or walls. This would be a common installation as usually the change-over regulators are installed on the wall and just above the cylinders.

What if something is located in the exclusion zone?

When this occurs use the clearances shown in Figure 2, which requires a minimum clearance of 1500mm from the relief vent of the changeover valve to openings or ignition sources in any direction.

What if you can’t meet these clearances?

Some regulators permit attachment to the relief vent so a vent line can be run to a more suitable location.
Mechanical air inlets

Clearances are required between relief vents and mechanical air inlets (into a building) of 3m.

When we think of mechanical air inlets we think of ventilation systems but don’t forget mechanical air inlets supply for appliances, in particular, central heating units and continuous flow water heaters which use fans to draw air in for combustion.
The new journeyman class of registration

On 6 December 2016, a new class of registration, the Journeyman class, was made available to tradespeople.

Who does this new registration class apply to?

This new registration class was created to recognise and regulate people working in the industry who have completed a relevant trade qualification but who, for a variety of reasons, have not sat or passed their theory tradesman exam.

Together with the Tradesman and the Certifying classes of registration, the Journeyman class allows for a 3-tier registration regime, where each tier differs in the supervision requirements imposed on them and the scope of work to be carried out by the people registered in each class.

What can a registered and currently licensed Journeyman do?

A registered and currently licensed Journeyman can carry out any sanitary plumbing, gasfitting or drainlaying work – depending on the trade(s) the registration and licence had been issued for – under the supervision of their Certifier.

There is no legal requirement that they work under the direct supervision of their Certifier for a specific length of time (unlike what happens with exemption under supervision holders).

The restricted work carried out by a Journeyman is not subject to mandatory testing by their Certifier or their nominated person; although testing of the work (or direct supervision) might still be deemed appropriate by their Certifier in certain circumstances.

A Journeyman gasfitter, different to an exemption under supervision holder, is entitled to work on pipes and/or appliances connected to a gas supply, under the supervision of their Certifier.

How does the new Journeyman class fit with supervision?

A Journeyman cannot be a nominated supervisor, nor can they verify, or, in the case of gasfitting, commission or issue gas certificates.

The supervision guidelines as discussed in Topic 1 of the 2016 CPD, still apply.

Further information

For the complete legislation, see the relevant Gazette notice: http://www.pgdb.co.nz/legislation-policies/legislation.html
Questions

Are the following statements TRUE or FALSE?

7. A registered and currently licensed Journeyman can carry out any sanitary plumbing, gasfitting or drainlaying work under the supervision of their Certifier.
   - [ ] True
   - [ ] False

8. A Journeyman must work under the direct supervision of their Certifier for a specific length of time.
   - [ ] True
   - [ ] False

9. All restricted work carried out by a Journeyman is subject to mandatory testing by their Certifier or their nominated person.
   - [ ] True
   - [ ] False

10. A Journeyman gasfitter is entitled to work on pipes and/or appliances connected to a gas supply, under the supervision of their Certifier.
    - [ ] True
    - [ ] False

11. A Journeyman cannot be a nominated supervisor, nor can they verify, or, in the case of gasfitting, commission or issue gas certificates.
    - [ ] True
    - [ ] False
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Jonathan Smith
- Certifying Plumber
- Tradesman Gasfitter
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Details of the work the licenced holder is entitled to carry out are available at www.pgdb.co.nz

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