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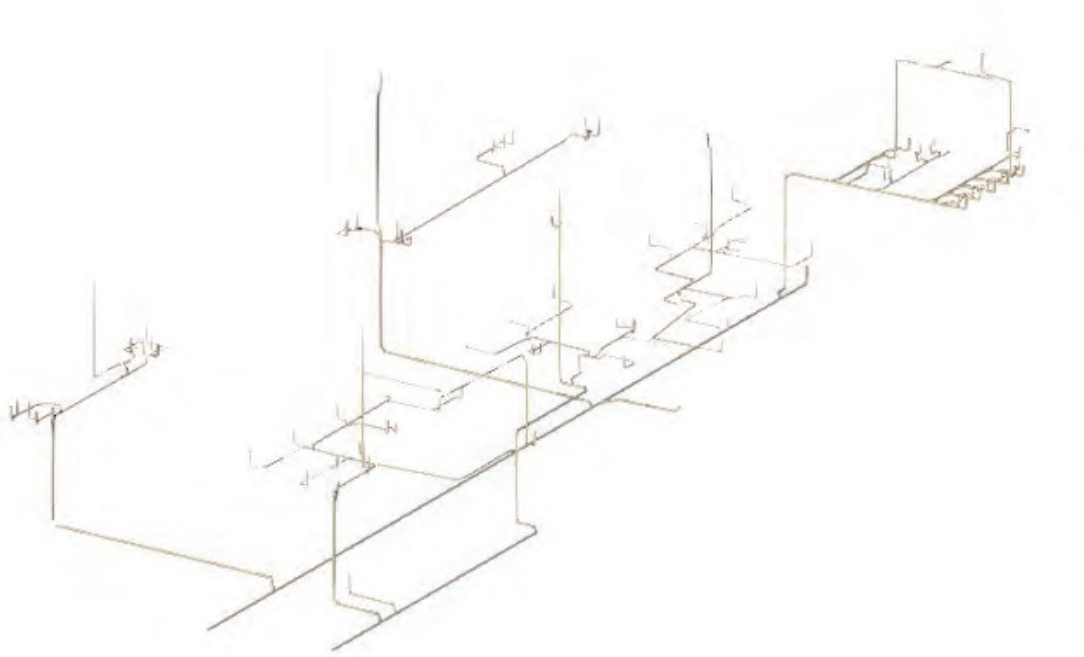
01

Topic 01:
Junctions on Grade

Continuing Professional Development

Incline junctions on drains are often done incorrectly.

JUNCTIONS ON GRADE
15 ° INCLINE AND 10 MM SOFFIT RULES



Incline junctions on drains are often done incorrectly

The main role of a plumbing and drainage system is to transport fluids and other waste safely to an outfall. The waste which enters the system from sanitary fixtures, and appliances must make it to the outfall without leaking, cross contamination or blockages!

November 2020 saw some NZ Building Code updates come into place, and changes were made to G13/AS3 to help reduce the likelihood of drain blockages.

This topic looks at the reasons for the changes and what those changes might mean to your work.

CORRECT INSTALLATION IS THE KEY TO A WELL PERFORMING AND FUNCTIONING SANITARY DRAINAGE SYSTEM

On a day-to-day basis the drainage and ventilation systems have to deal with the unsteady flow of water from the discharge points to the outfall, being the utility connection at the property boundary or an on-site wastewater treatment/disposal system.

The actual fluid flow through the drainage system is purely dependant on the random operation of the sanitary fixtures/fittings/appliances in the building, each of which has different discharge characteristics. We have listed some examples below:

- Discharge volume (in litres)
- Discharge time (in seconds)
- Discharge length
- Discharge head
- Unwanted solids removal including modern items such as "flushable wipes"
- Kinematic viscosity of water (resistance to flow, simply put how syrupy is the liquid)
- Discharge temperatures
- Pipe roughness (internal bore roughness)

Plumbing and drainage codes and standards throughout the world have been developed and based on flows from older style fixtures and fittings. Think of the modern toilet, how much water does that use compared to say a toilet installed in 1975?

- Modern day toilet flush – 3 - 4.5 litres (WELs 4-star toilet)
- Older style toilet flush = 10 - 11 litres



Figure 1 WELS example

Looking at the above example modern toilets use approximately 60% less water.

That is 60% less flushing water volume running down the drainage line, tapware and dishwashers etc are all similar in respect to decreased water volumes.

Water efficiency and water conservation plays an important role in the modern-day plumbing and drainage system.

What has this got to do with the 15° inclines? Plenty.

As part of the November 2020 NZ Building Code update, changes were made to G13/AS3 to reduce the likelihood of drain blockages with the increasing use of water efficient fixtures.



Those changes were intended to support updates made to AS/NZS 3500.2:2018, specifically Clause 4.9.1 Junctions installed at grade



Lets look at the clause within AS/NZS 3500.2 below:

4.9 Junctions in Drains

4.9.1. Drains installed at grade

The connection of any drain to a graded drain shall be by means of a junction with an upstream angle not greater than 45°. The Connection shall conform to the following.

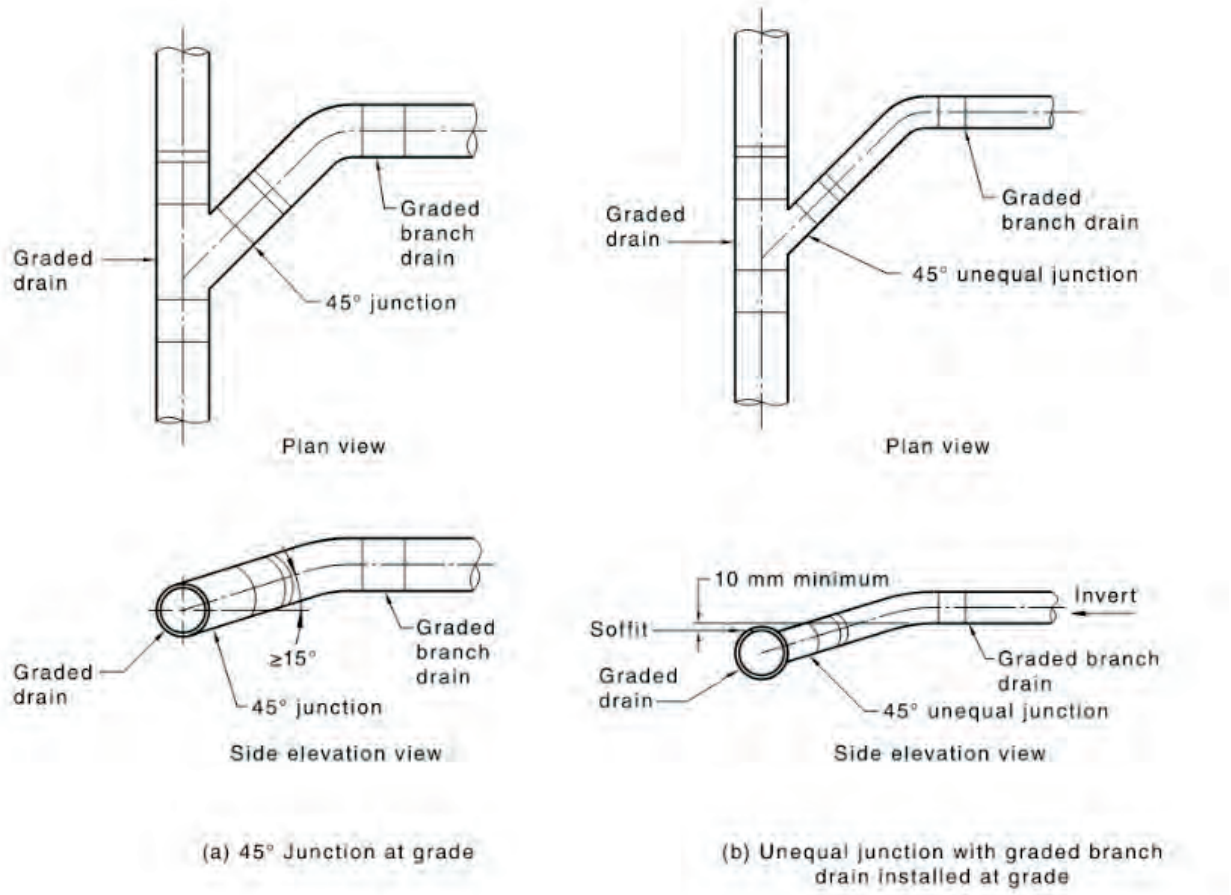
a. Double 45° junction shall not be used

b. Where a junction is used to make the connection of a branch drain to a main drain of the same size, the entry level of the branch drain may be on grade.

c. Where unequal junctions are used the invert of the branch drain shall be at least 10 mm higher than the soffit of the drain to which it connects.

NOTE: For a typical arrangement of drains joined at grade, see figure 4.9.1.

Figure 4.9.1 (a) is shown below:



Extract of AS/NZS 3500.2.2018 Figure 4.9.1 (source)

Figure 2 - Typical Arrangement for Graded Branch Drains Entering Main Drain.

Essentially, the use of an 88° sweep junction (or 'curved square' junction) is no longer permitted for use in any position along a graded drain as a Deemed-to-Satisfy Solution under the 2018 edition of AS/NZS 3500.2.

Under AS/NZS 3500.2.2018 the only acceptable method of construction to connect a graded branch drain to a graded main drain is to use a 45° junction, a maintenance shaft or an inspection chamber. The projected areas of the graded branch drain and the opening to the graded main drain must not overlap.

This requirement extends to unequal junction sizes as well (for example, where a DN 65 meets a DN 100) and must continue to provide for the main drain soffit 10mm lower than the invert of the branch drain.

Notice AS/NZS 3500.2.2018 allows grade on grade connections if the branch and main drain are the same size, refer 4.9.1 (b).

Then why has there been literature floating around telling everyone to install those connections with 15° inclines?

WHEN USING AS/NZS 3500.2 AS AN ACCEPTABLE SOLUTION REFER TO THE "MODIFICATIONS" WITHIN G13, NAMELY AS/3 (ACCEPTABLE SOLUTION 3)

Many plumbers and drainlayers may work directly off AS/NZS 3500.2 without realising there are NZ modifications which may differ slightly to what is written with AS/NZS 3500.2, the 15° incline and 10 mm soffit rules are one of those.

Let's look at AS/3:

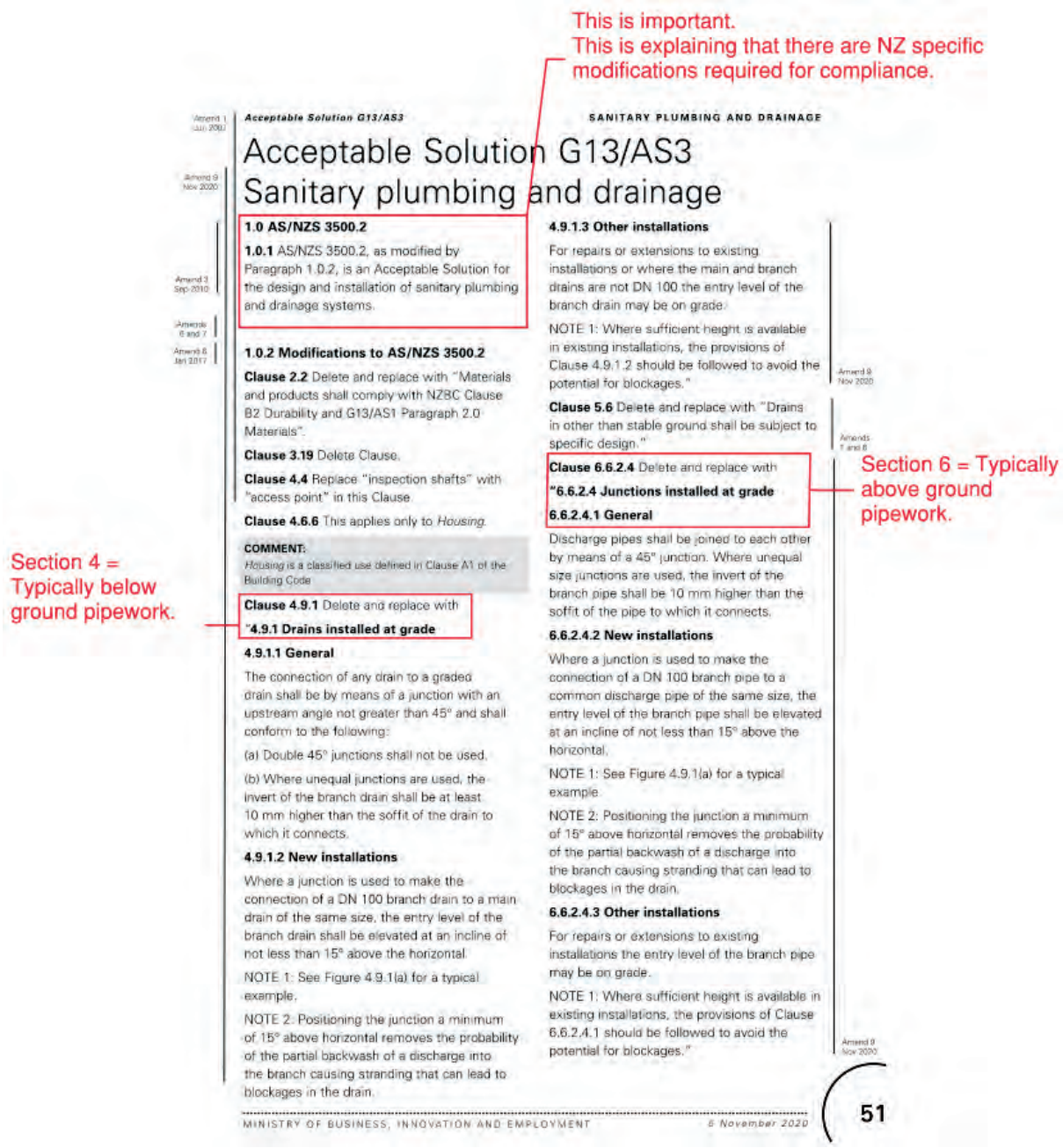


Figure 3 - Modifications to AS/NZS 3500.2 (NZ only)

In short, with these New Zealand specific modifications:

- For a new installation (below and above ground) the junction is required to be orientated at a 15° angle when installing equal junctions.
- For unequal junction connections (below and above ground) the invert of the connecting branch pipe is to be 10 mm higher than the pipe it connects.

AS/NZS 3500.2.2018 even though implies a 15° connection is required when reviewing figure 4.9.1 there is no mention of it in any text throughout the standard.

MBIE recognised that and embedded it into the modifications for NZBC G13/AS3.

LET'S LOOK AT A COUPLE OF DIAGRAMS
TO HELP PUT THIS INTO PRACTICE

The images below are of a below ground drain, the image to the left shows the drain being installed correctly with an incline (minimum of 15°), whilst the image on the right is a non-conforming connection know as grade on grade.



Branch junction with a 15° Incline ***Branch Junction on grade***

Figure 4 – Branch Drain Connection Examples (Source MBIE)

WHAT DOES THE STANDARD SHOW?

AS/NZS 3500.2.2018 provides a diagram to demonstrate the correct installation.

Remember the modifications from NZBC G13/AS3?

For New Zealand the figure above applies to **above ground junctions** as well.

Below are some modelled examples what a typical installation would like, the angles modelled are slightly greater than 15° for visual purposes only.

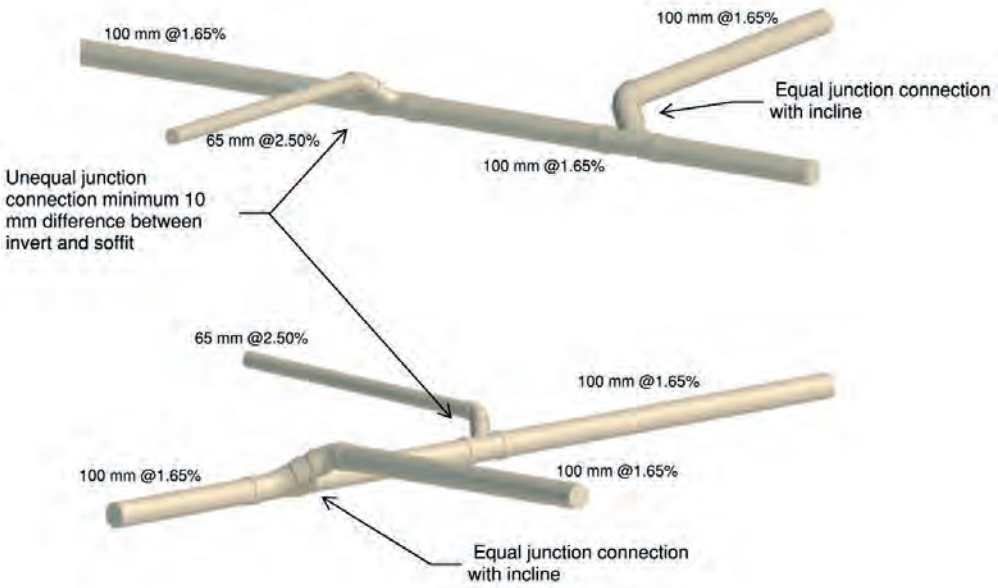


Figure 5 – 3D view of typical connections

Are there any onsite issues with incorporating these rules?

Yes….notice the hight difference.

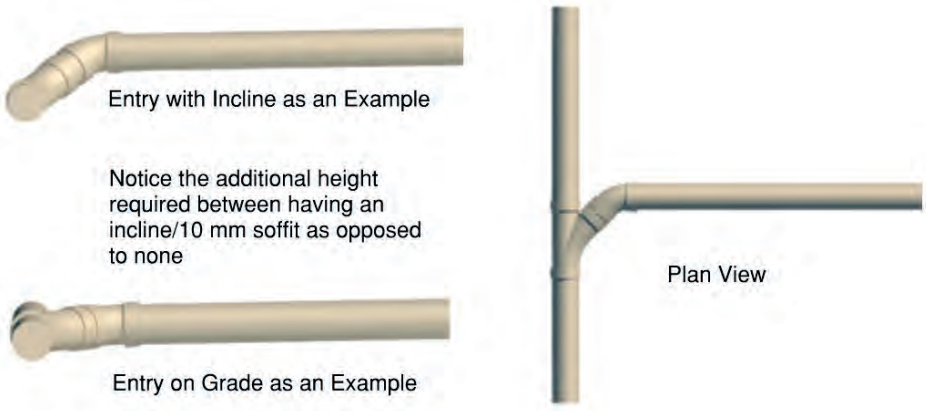


Figure 6 – Height Difference

As you can see from the example above, increased depth is required to accommodate the pipework configuration, up to 70 – 80 mm extra height maybe required, dependant on the incline and pipe orientation.

70 mm – 80 mm is a lot of real estate to a developer and valuable architectural space to an architect.

Careful planning is required especially for above ground pipework installations where the increase in depth may have an impact on structural elements of the building as well as ceiling heights etc.

Look at an residential example below. There is physically no allowable room to enable the correct junction jointing methods, the joists are shallow and the structural engineer has penetration rules around what and where penetrations can go. The plumber is caught between a rock and a hard place in many residential situations, the design has been completed as consented with the plumber (or drainlayer when below ground) being left to try and make it fit all compliantly onsite.

Figure 7 highlights the situation discussed above. A plumber simply cannot install a fully compliant system when space and structural constraints do not allow for it.



Figure 7 - Residential example of space restrictions

Good design early on is key to enable plumbers and drainlayers to install the pipework system correctly.

If the plumber or drainlayer is engaged with the company undertaking the design this would be a good opportunity to suggest amongst other things:

- The shifting of fixtures to reduce branch runs
- Shift the joist orientation to enable less penetrations through the structure
- Provide boxed out risers to enable a straight vertical stack
- Create bulkheads for horizontal runs

These are just a few suggestions to help with the coordination conversation.

It is easier to work out the pinch points early on and not during construction where the build programme is usually tight. Any delay can end up costing in penalties depending on the contract.

WHAT ABOUT
STACK CONNECTIONS?

Stacks run vertically up the building, so the connection is from a horizontal pipe into a vertical pipe.

Should a branch, discharge or fixture pipe connect to a stack, the use of a square, sweep, 45°, aerator, ball or double 45° / sweep is still permitted. (Example to the right shows an 88 and 45 connection).

Restricted entry zones as shown are generally opposite and downstream of the discharge point, with the distance varying depending on:

- Stack size
- Discharge pipe size

Refer Table 6.7.3.2 in AS/NZS 3500.2:2018

It is important to note that:

- using square junctions in a drain must still meet AS/NZS 3500.2:2018 (4.9.3)

- a concrete support base (min. 100 mm thick) is still required under all risers brought to the surface, underneath square junctions and under any 45° junction, rising to the additional 45° junction

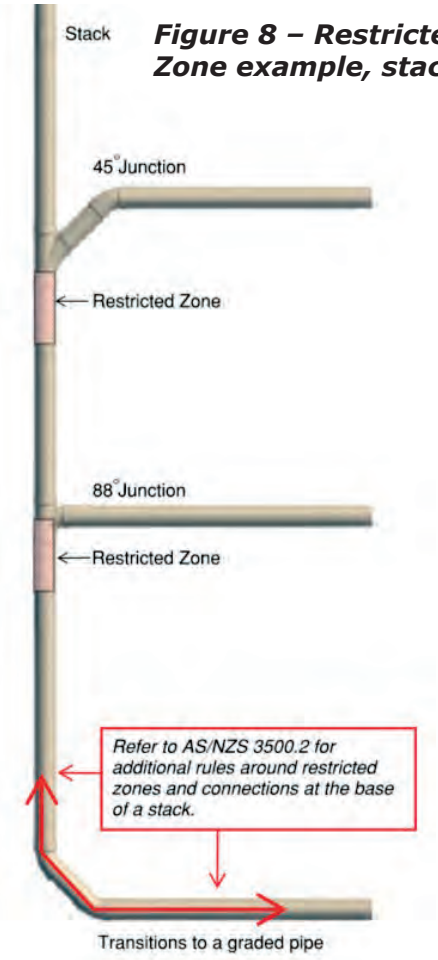


Figure 8 – Restricted Zone example, stacks

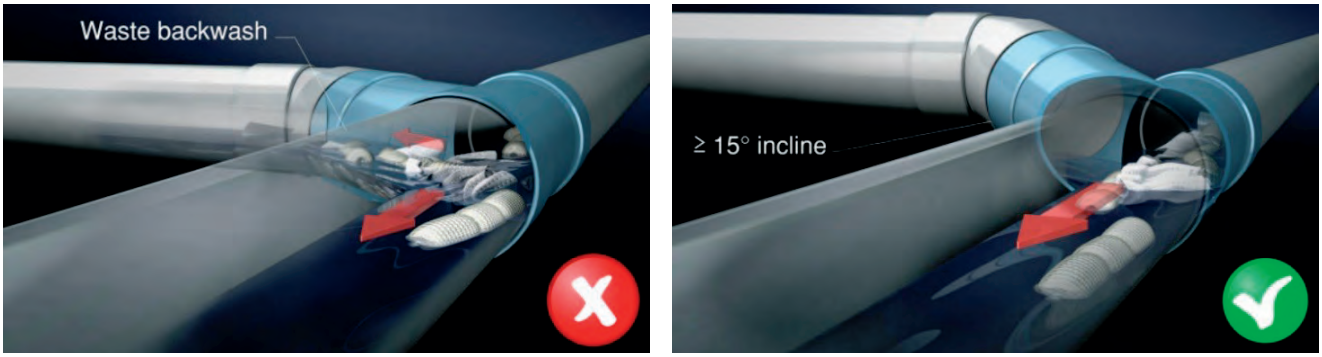
WHAT ARE THE BENEFITS
OF THESE INSTALLATION RULES?

The height configurations help reduce the likelihood of drain blockages occurring in graded discharge pipes by:

- Removing the probability of partial backwash of a discharge into branches
- Minimising stranding of solids and paper in junctions and branch lines
- Improving solid waste transportation efficiency within the drainage network by maintaining discharge volumes
- Aid in the airflow through the soffit of the pipe network

WHAT IS
PARTIAL BACKWASH?

Typically when two flows are running and at the junction there is quite simply a roadblock, the main drain line waste passes across the junction where it can prevent/obstruct any flows from the branch connection causing "stranding of waste matter", if the installed drain still has cut burrs, unsmooth internal pipe bore, excessive glue build up or popped rubber rings assists in exacerbating the stranding situation aiding in the build-up of waste matter.



Figures 9 = Partial Backwash Example (source MBIE)

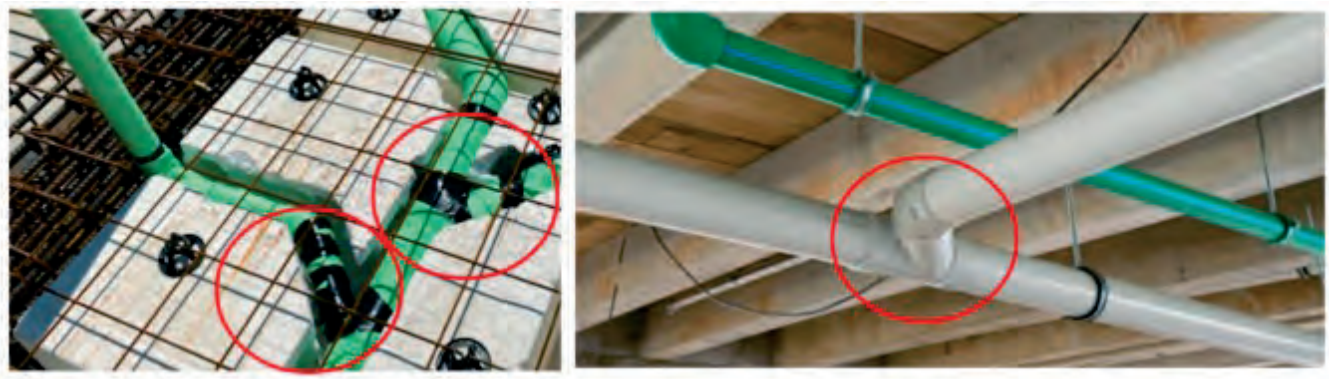


Figure 10 - Example of incorrectly installed Junctions.



Figure 11 - Example of stranding + flat spot in the sewer

WHAT GOES DOWN THE DRAINAGE SYSTEM?

HOW FAR DOES THE WATER ACTUALLY FLOW DOWN A PIPE?

Just about anything you can think of if it fits will go down the drainage system! Unfortunately, many people do not follow the simple "3Ps"

- Pee
- Poo
- Paper (being toilet paper)

Let's look briefly at toilet paper, flushable wipes, paper towels and sanitary products, four of the common material causes of stranding and blockages.

Item	Flushable	Comment
Toilet Paper	Yes	Toilet paper is designed and manufactured to degrade within set limits of immersion, basically once they get wet, they start to instantly break down. Usually 3 types single, double and triple ply What's the difference? The more ply the more volume of paper = the greater chance of blockage.
Flushable Wipes	[1]No	Great cause of debate with practitioners who attend blockages and find the "flushable wipe" as the root cause of the blockage. Watercare in Auckland spend $5.5 million each year cleaning up wastewater overflows caused by wet wipe blockages.
Paper Towels	No	As the name suggests, it is a towel, do we flush towels down the toilet? No. Paper towels are designed and manufactured to absorb water whilst remaining intact, these will not breakdown when flushed like toilet paper does.
Sanitary Products (e.g.tampons)	No	Tampons and sanitary pad should always be disposed of in the bin provided and never flushed down the toilet. These items cannot disintegrate in water and can ravel around other solids in the sewer causing a major blockage.

1 Are flushable wipes flushable? They are physically flushable, but in the same way that everything that fits through the outlet of your toilet bowl is. A toothbrush, plastic toys that your toddler puts in there, orange peels, golf balls and the list goes on, they are all flushable.
But just because something can be flushed, doesn't mean it should be. Flushable wipes as they stand are not flushable. Earlier this year AS/NZS Flushable Products was released finally providing some rigor around the products being marketed as "flushable". By May 2024 products that can be flushed will have a special symbol on their packaging so the consumer knows it is drain friendly, i.e it will contain no plastics and will disintegrate within the standards.

SO HOW FAR DOES THE WASTEWATER ACTUALLY GO
IN A DRAINAGE SYSTEM BEFORE IT RUNS OUT OF STEAM?



There have been in situ experiments conducted over the years with manufactures researching performances of their sanitary fixtures, many factors come into play, how far the fluid travels are dependent on numerous factors which was discussed earlier, including the available head, so there are varied results ranging from 5 metres up to 50 metres dependant on the test rig set up.

Figure 12 -Image of the McDermott test rig set up for measuring water distance flows of a WC [2]

Hydraulic modelling conducted by John Swaffield, (Swaffield, J. A., n.d. Multistorey Building Drainage Network Design An Application of Computer Based Unsteady Partially Filled Pipeflow Analysis) who has undertaken multiple research projects on sanitary drainage systems, including transient airflows in building drainage systems, came up with the findings shown in the table below for 100 mm pipework and toilet clean water flushes on a straight pipeline
(no junctions, bends etc).

Note:

- The drop in travelling distance when the lower volume flush is modelled, what would happen to the distance travelled when bends, junctions and solid matter is incorporated?
- The additional distance travelled when the grade is increased to 1:40 (2.5%)

Simulation Results for 6 Litre Flush		
Pipe Diameter (mm)	Pipe Gradient	Max Travelling Distance (m)
100	1:40 (2.50%)	56
100	1:60 (1.65%)	44
100	1:100 (1.00%)	19

Simulation Results for 4 Litre Flush		
Pipe Diameter (mm)	Pipe Gradient	Max Travelling Distance (m)
100	1:40 (2.50%)	40
100	1:60 (1.65%)	25
100	1:100 (1.00%)	10

Table 2 - Simulated distances of water flow from a WC

2 McDermott, R., Strong, A. and Griffiths, P., 2019. Solid Transfer in Low Flow Sewers, the Distance Travelled So Far Is Not Enough.

SELF-CLEANSING
VELOCITIES

Pipe grades amongst other factor are derived to enable self-cleansing flows which is known as velocity.

Self-cleansing velocity is just that, the velocity of water flowing through the pipe has enough momentum/force to self-cleanse as it flows through the drainage system.

It is worth noting however fixture units are not directly related to flow.

There is nothing within AS/NZS 3500.2 or the NZBC that specifically states a minimum self-cleansing velocity number.

The 2021 edition of AS/NZS 3500.2 however does provide a definition below:

"Velocity of a flowing liquid in a pipe or channel, necessary to prevent the deposition of solids in suspension".

Solids in suspension in plain terms.

Are the solids being flushed down the drainage pipe being surrounded by/supported by the flowing water, once the flowing water has passed the solids are no longer in suspension but stranded until the next volume of water passes through.

It is assumed that if the designer and installer comply with the standard (AS/NZS 3500.2) then self-cleansing flows will be achieved based on correct fall/grades and pipe sizes.

That is why it is also important not to oversize pipework to try and accommodate a lesser grade or install an entire pre-slab in 100mm because of convenience as it negatively impacts the hydraulic performance of the self-cleansing velocities creating a higher likelihood of stranding and blockages.

Self-cleansing velocities that Hydraulic consultants/engineers work to are typically around a minimum of 0.7 m/s, this figure is based on Buildings Services Industry guidelines and Infrastructure standards.

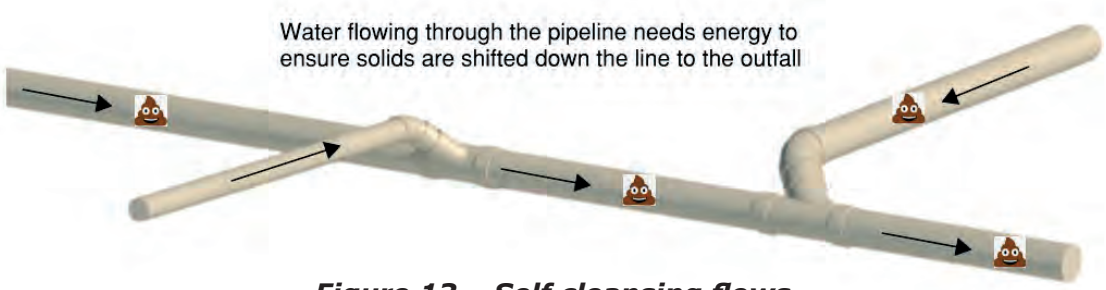


Figure 13 – Self cleansing flows

What has that got to do with 15° inclines?

Pipe installation rules like the 15° incline, 10 mm soffit/invert rule, restricted zones, connections at the base of a stack, vent sizes, minimum grades and the list goes on, the rules are not made to make the installers life hard but are there for a reason –

- To ensure when properly installed to the standard the sanitary drainage system will function and perform to ensure good safe movement of the solids/liquids through the pipeline to the outfall and also to ensure good ventilation throughout the system.

The 15° incline and 10mm rule are just two installations rules (out of many) that assist in a correctly functioning sanitary drainage system.

The additional height that these rules provide aid in the elimination of partial backwash, aid in the continuation of self-cleansing flows and aid in the ventilation of the system.

Of course, not forgetting, correct installation techniques will go a long way to aiding the flow of water and solids through the drainage system.

Basic techniques are listed below (not exhaustive)

- Remove all pipe burrs
  (always an easy catch point with pipe burrs!)
- Chamfer the pipe 15°
- Correct Bedding and backfilling
- Correct bracketing
- Correct pipe grades
  (do not oversize to enable a lesser grade)
- Correct jointing procedures as per manufacturer's instructions
- Correct junction connections
- Correct connections within restricted zones
- Correct falls across access chambers
- Correct pipe and fitting selection
- Ensure solvent cement is used correctly, not large amounts creating catch points.



Figure 14 -
Example pipe burrs

We have been looking at the 2018 version, why is the 2021 version available on my trade login?

The AS/NZS 3500 suites of standards have recently been revised and published, the 2021 editions.

Although not cited in the NZBC as yet it is important to note that in this revision Standards have taken on board the low flow volumes, and which fixtures (focus is on the toilet) provide the most likelihood of blockages and installation practicalities.



Let's look at some of the changes to the incline and soffit rules.

Important Note:
The 2021 Edition has not been cited in the NZBC; the 2018 edition (with the G13/AS3 modifications) remains in effect.

Interesting fact, it appears the Australians have followed the New Zealand example, well our AS/3 modifications to be exact in respect to the 15° incline rule being applied below and above ground.

The 2021 edition splits the drainage installation out into three sections:

1. General (same as the 2018 edition)
2. New Installation (new section)
3. Other Installations (new section)

4.9.1.1 General (remains the same as the 2018 edition)

The connection of any drain to a graded drain shall be by means of a junction with an upstream angle not greater than 45°.

The Connection shall conform to the following.

- Double 45° shall not be used.
- Where unequal junctions are used the invert of the branch drain shall be at least 10 mm higher than the soffit of the drain to which it connects .

What does this mean for the installer/designer?

No change from current practice with regards to the modifications within NZBC G13/AS3.

What is new then?

Looking more closely at the new sections there are some key points to note, particularly in "New installations" and "other installations".

4.9.1.2 New Installations

Where a junction is used to make the connection of a DN branch drain to another DN 100 drain, the entry level of the branch drain shall be elevated at an incline of not less than 15° above the horizontal.

What does this mean for the installer / designer?

Although new to AS/NZS 3500.2.2021 for New Zealand there is no change from current practice with regards to the modifications within NZBC G13/AS3.

4.9.1.3 Other Installations

The entry level of the branch drain may be on grade

a. For repairs or extension to existing installations

b. Where WC pans are not connected upstream; or

c. Where the main branch drains are not DN 100.

NOTE: Where sufficient height is available in existing installations to avoid the potential for blockages, it is recommended the provisions of Clause 4.9.1.2 be followed.

What does this mean for the installer / designer?

Again, very similar to the modifications in G13/AS3, with two extra elements added in:

- Where WC pans are not connected upstream; or
- Where the main branch drains are not DN 100.

So, when designing a layout, it may be worthwhile looking at the location of the toilet in relation to the other fixtures, especially when height clearances are an issue. Effectively the incline and 10 mm rule do not apply upstream of the WC connection.

- Upstream = Water flow/fittings after the WC connection
- Downstream = Water flow/fittings before the WC connection

Plus, where the main and branch drains are not 100 mm, means for example, a 150 mm main drain with a 150 mm branch drain.

Of course, good installation practice to help in the negation of partial backwash would be to continue to use the 15° incline rule where height is available.

What about the above ground plumbing?

In the 2021 edition, the exact same rules apply for above ground plumbing, basically a copy and paste of the text.

Remember: *The 2018 Edition of AS/NZS 3500.2 is still in force, the 2021 edition is yet to be cited in the NZBC.*

For acceptable solution compliance still use the 2018 version with the G13/AS3 Modifications.

If the 2021 version is used that will be considered an "Alternative Solution".

TOPIC
SUMMARY

Sanitary plumbing and drainage systems are complex, many years of research, installations and experiments via trial and error have come up with the plumbing and drainage standards that we know and work from today.

Most of those standards were based on fixtures and fittings which accommodated higher volumes of water flows.

Now days with water conservation a constant with all our plumbing fixtures it has become well known the less water flowing through the drainage systems the increased likelihood of blockages forming.

The AS/NZS 3500.2 series has taken lower water volumes on board and implemented changes to try and at least minimise the potential chances of blockages whilst ensuring smooth air flow through the system.

Key points to note in this section were:

- The use of 15° inclines when connecting drainage/plumbing pipe
- Ensuring there is a 10 mm difference in height between the smaller connecting branch pipe invert to the 100 mm main pipe soffit.
- G13/AS3 contains modifications to AS/NZS 3500.2.

Without a doubt as researchers and installers worldwide being to understand how the lower water volumes are affecting the transport of the sewerage through the plumbing, drainage system there will be continual changes to the standards we know and use.

Remember, always keep up to date with any changes, subscribe to Building Performance (MBIE) and get regular updates of what is happening with our Building Codes.

Link Building Performance





TEST YOUR KNOWLEDGE
ON THIS TOPIC:

If you are connecting a 100 mm branch drain, to a 100 main drain on a new installation you need to:

Select one answer:

a. Use an 88° Junction

b. Ensure they connect grade on grade

c. Connect with a 45° and a minimum 15°incline branch connection.

You are to connect a 65 mm common discharge branch pipe into a 100 common main discharge pipe for a new installation, you need to:

Select one answer:

a. Connect with a 15° Incline

b. Use a double Y junction

c. Connect ensuring the invert of the branch pipe is 10mm higher than the soffit of the main pipe.

EXTRA NOTES:

02

Topic 02:
Fitness to Practice

Continuing Professional Development

This year the Board has introduced a requirement for all registered people to provide information about their fitness to practice when renewing their licenses.

This section will explain the changes and how these changes will be managed by the Board.

FITNESS TO PRACTICE IS ABOUT
PROTECTING PUBLIC HEALTH AND SAFETY

The reason people who do sanitary plumbing, gasfitting, and drainlaying are regulated is to ensure they are competent to do this work so that the health and safety of the public is protected.

Competence is not limited to just technical competence. Many plumbers, gasfitters, and drainlayers work on people's properties and inside people's homes, often when the homeowner is not there. This is a position of high trust so a person must also be a fit and proper person to carry out this work.



BEING A FIT AND PROPER PERSON
IS A LEGAL REQUIREMENT

The Plumbers, Gasfitters, and Drainlayers Act 2006 (Act) requires any person registering, being issued with a practicing licence, or renewing their practicing licence, to be a fit and proper person. This is not a requirement of the Board's. It is a requirement of the law.

The Act (section 36) says that a person is entitled to be registered if they meet certain requirements. One of those requirements is "that he or she is a fit and proper person to be registered under [the Act]".

For a number of years now the Board has required all people applying to be registered to provide a Ministry of Justice Convictions History Report. The Board uses this report to help decide whether the person is a fit and proper person to be registered.

FITNESS TO PRACTICE IS NOT A ONE-OFF REQUIREMENT THAT PEOPLE MUST ONLY MEET TO BE REGISTERED

From 2023 onwards all registered people applying to renew their practicing licences must provide information about their ongoing fitness to hold a licence.

Fitness to practice is an ongoing requirement. The Act (section 44 and section 51) require a person to be fit and proper to be issued with a licence and to have their licence renewed.

THE QUESTIONS YOU WILL BE ASKED ABOUT YOUR FITNESS TO PRACTICE

The Board now requires people to answer five questions when they apply to renew their licences relating to their fitness to practice.

The questions which will be asked are:

1. Have you been investigated by the Police or have any charges been laid against you by the Police in New Zealand or overseas since you last renewed your practicing licence?
2. Have you been convicted of any criminal offences in New Zealand or overseas since you last renewed your practicing licence?
3. Have you been convicted of any disciplinary offence in relation to plumbing, gasfitting or drainlaying in New Zealand or overseas since you last renewed your practicing licence?
4. Has your plumbing, gasfitting, or drainlaying registration or licence been cancelled, suspended, or restricted, or have you been disqualified from doing any kind of plumbing, gasfitting, or drainlaying in New Zealand since you last renewed your practicing licence?
5. Have you developed a health condition (mental or physical) since you last renewed your practicing licence which could affect your ability to do plumbing, gasfitting, or drainlaying safely?

The questions are aimed at identifying anything which had arisen over the previous year which could raise concerns about that person's ability to interact safely and appropriately with the public. The questions cover matters that have arisen both in New Zealand and overseas. Where a person has been unlicensed for more than a year, they must answer the questions in relation to the period they were unlicensed.

ANSWERING YES DOES NOT MEAN
A PERSON CANNOT RENEW THEIR LICENCE

A yes answer means that the Board will consider their application before deciding whether or not to renew their licence.

CONSIDERING AN APPLICATION
MEANS WE WILL GATHER MORE INFORMATION

Any application with a yes answer will be put on a hold and a number of steps will occur:

- Someone from the Board will speak to the person about their application
  - The Board will want to know what it is the person is declaring and find out what it is about. The person may be asked to provide further information about what happened.
  - The kinds of information the Board will ask for will depend on what they are declaring. If it is a criminal conviction for example, they could be asked to provide the Police summary of facts or the Court's sentencing information. If it is a disciplinary offence, the Board will review the decision issued in the case.
- The Board may also talk to the person about speaking to their employer and/or supervisor if they have one.
  - The Board may seek the employer's or supervisor's views on the matter and find out what impact they think it may have, if any, on the person's fitness to practice. For example, it may help to know if the person is only doing new builds or commercial work where they will not have to go into people's homes.
- Once the Board has gathered all the information it needs, it will form a view of the seriousness of the matter and what implications it could have for that person in relation to their work. The Board will then discuss this view with the person. If the Board has concerns about the person's fitness to practice, they may talk to them about any possible steps they could take to address those concerns. For example, the Board may seek an assurance from the employer that the person will not work alone if they are working in a person's home.
- After discussing it with the person and putting in place any safeguards the Board considers appropriate, the Board will make a final decision to renew the person's licence or decline their application.

Wherever possible, the Board will work with the person (and their employer and/or supervisor if appropriate) to try and ensure the person can continue to work.

THE BOARD'S EXPECTATIONS OF PRACTITIONERS ARE REALISTIC AND REASONABLE

The Board does not expect people to be perfect, to never make a mistake, or to never get things wrong.

The Board's standards for assessing whether a person is fit to practice are realistic, reasonable, and appropriate. The Board knows that declining to renew a person's licence deprives them of their ability to make a living. The Board will only do this if it considers that it is necessary in the interests of public health and safety.

THE KINDS OF CRIMINAL OFFENDING THAT MAY CONCERN THE BOARD

What will or won't make a person unfit to practice will depend on the individual circumstances in each case. Even with criminal charges or convictions, only some will concern the Board. Minor criminal offending such as driving convictions or public order offences (eg. breach of the peace, breaching a liquor ban) are unlikely to mean a person cannot renew their practicing licence.

With more serious criminal offending, it will depend on what the charge or conviction is for and whether it has implications for the work that person does and how they carry it out.

Below are some examples of more serious criminal offending that may be of concern to the Board:

- Serious drug-related offending such as procuring, possessing, or supplying illegal drugs
- Serious offending against people such as threating behavior, assault, violence or sexual offending
- Property offending such as theft, burglary, shoplifting, or willful damage
- Dishonesty offending such as fraud or obtaining by deceit
- Weapons offending such as possession of an offensive weapon or firearms.

THINGS THE BOARD
WILL TAKE INTO CONSIDERATION

Even some of these serious types of offending will not necessarily mean a person is unfit to practice. When considering what impact a criminal charge or conviction has in relation to a person's fitness to practice.

The Board will consider a number of other things as well, such as:

- What kind of work the person does
  (eg. Residential, new builds, commercial, industrial)
- Where that work is carried out
  (eg. In people's homes, in dairy sheds, in factories, in new developments only)
- How the person works
  (eg. Do they work alone, are they an employee, do they have a supervisor)
- Whether the person would be exposed to any risks relating to their charge or conviction while working (eg. Access to items which could be stolen or money).
- Only when the board has considered all the circumstances in a person's case will a decision be made about their fitness to practice.

THE KINDS OF HEALTH CONDITIONS THAT MAY
CONCERN THE BOARD

The Board recognises that health information is very personal and private. The Board has no interest in prying unnecessarily into this aspect of people's lives. However, there have been cases where a practitioner's health has impacted on their ability to do plumbing, gasfitting or drainlaying work safely and correctly. Asking a person about their health is relevant to assessing whether they are fit to continue to practice.

The Board only wants to know about any kind of health condition that could affect a person's ability to work safely. Working safely includes both that the person is safe while doing the work and that their work is compliant and correct.

The kinds of health conditions that may affect a person's ability to work safely are likely to be limited. **Some examples of things we want to know about are:**

- dementia
- cognitive impairment (eg. from a head injury or a stroke)
- severe and unmanaged mental illness (but only if it impacts on the person's work).

Even where a person has any of these conditions, they do not necessarily mean the person will be unfit to practice. They just mean the Board must seek further information and work with the person (and others as appropriate) to determine whether or not they are fit to carrying on working safely.

The Board recognises that it may not have the expertise to make some health-related assessments about a person's fitness to practice. In consultation with the person, the Board would therefore seek any expert advice it required to ensure it has the best information to carry out an assessment of someone's fitness to practice if they have a significant health issue. The the Board does not want to deprive a person of their ability to work unless it is necessary to protect the public.

ANY HEALTH INFORMATION DISCLOSED TO THE BOARD WILL BE KEPT SAFE AND CONFIDENTIAL

Any health information the Board receives or collects in relation to an assessment of a person's fitness to practice will be kept safe and confidential. It will only be held for as long as necessary for the purpose of assessing the person's application to renew their licence. Access to sensitive health information will be restricted and once the information is no longer required, it will be permanently deleted.

SELF-DISCLOSURE OF FITNESS TO PRACTICE INFORMATION IS A TRUST MODEL

The Board is relying on people to be truthful in disclosing any information that may impact on their fitness to practice.

If a person fails to disclose information that they should have or if they disclose information that is false, they could be charged with a criminal offence (section 121 of the Act). Conviction under section 121 may result in a fine of up to $10,000.

A person who doesn't disclose information or discloses false information could also face a disciplinary charge of improper conduct (s89). The result of a conviction under section 89(i) could be the cancellation or suspension of the person's registration and/or licence.

THERE ARE OPTIONS IF A LICENCE IS DECLINED ON FIT AND PROPER GROUNDS

A person whose application to renew their practicing licence has been declined on fitness to practice grounds has options for challenging that decision.

A person can ask for a review of the decision in writing to the Board. They should explain why they think the decision was wrong. The Board will consider the person's request along with all the information used to make the initial decision. The Board may decide to uphold the decision or overturn it and renew the person's licence.

The other option is to appeal a decision declining to renew a licence to the District Court. Any appeal must be brought within 20 working days of receipt of the decision.

TEST YOUR KNOWLEDGE ON THIS TOPIC:

What will the Board take into consideration when reviewing a criminal disclosure?

EXTRA NOTES:

03

Topic 03:

New Products and Technology

Continuing Professional Development

In every industry things change as new technology is developed, or improved ways of completing tasks are discovered.

NEW PRODUCTS
AND TECHNOLOGY

In every industry things change as new technology is developed, or improved ways of completing tasks are discovered.

Manufacturers and suppliers are constantly developing and sourcing more products that may be the industry changers of the future.

These products may be radical in their approach to solving an issue within the industry, or the changes may be subtle allowing for quicker installation times or reducing the cost of the product whilst maintaining performance.

Keeping informed of new products will ensure that you are aware of what is happening should the industry make a shift towards a new way of doing things.

THE RINNAI INFINITY
N-SERIES

These appliances are 32 litre, condensing, continuous flow water heaters

The N-Series is designed to replace the older HD Series water heaters.

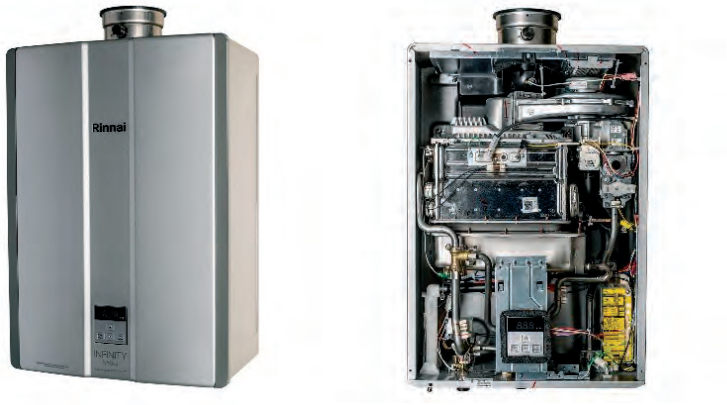
These water heaters are suitable for both large residential and commercial applications.

The N-Series is available in both internal and external models which are basically the same unit, with a different flue system.





N56kWe external



N56kWi internal

Both models have an hourly gas consumption of 16 to 209MJ/h

Due to the two-stage condensing heat exchanger they boast an efficiency of 97%. This allows the N-Series to provide an output of 55.5 kW

Other models of water heaters which we are familiar with, have usually been denoted by how many litres per minute, at a 25°C temperature rise they will supply.

Due to designers often preferring to specify heating systems based on kW rate rather than litres per minute, the model numbers of the N-Series refer to the kW output of the water heaters.

DESIGN FEATURE
DOWNWARD FACING BURNER

Conventional continuous flow water heaters will often utilise a burner style burner located below the heat exchanger. The N-Series utilises a surface plate, fan forced burner which fires the heat downwards into the primary heat exchanger.

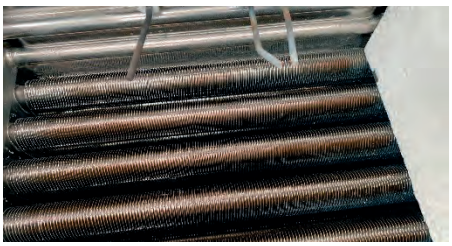
This style burner allows the whole burner surface to remain evenly alight regardless of the input rate. This means that rather than only one section of the heat exchanger receiving heat while the water heater is on turn down or low burn scenarios, the surface plate burner helps ensure that the heat is delivered evenly onto the heat exchanger at a decreased rate.

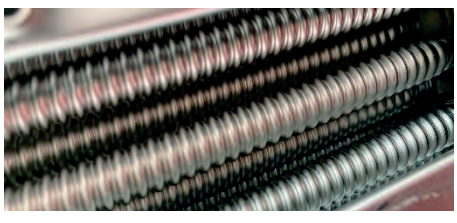
These situations can arise when a hot tap is turned on at a low rate for an extended period of time, or a ring main is drawing hot water slowly top up the temperature of the water in the pipework.

This functionality helps prolong the life of the heat exchanger by utilising it more evenly.



DESIGN FEATURE
HEAT EXCHANGER DESIGN



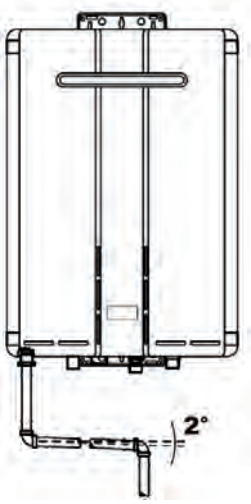


N-Series water heaters do not use Copper in the heat exchanger construction, due to the condensing nature of the unit. Heat exchangers for these models are constructed of stainless steel. Condensate can be acidic and shorten the life of a heat exchanger if it was made of copper.

The heat exchangers consist of both a primary, and secondary heat exchanger. This is to increase the efficiency of the water heater by utilising as much heat as possible from the burner.

By the time the combustion products exit from the secondary heat exchanger, the flue gases have cooled significantly, so much in fact, that the flue is able to be constructed of plastic.

DESIGN FEATURE
CONDENSATE



High efficiency gas fired appliances do generate a significant quantity of condensate during operation which needs to be considered.

Condensate is known to increase when the unit operates at low rates for extended periods of time.

Internal units require the connection of a condensate drain which needs to be piped using uPVC pipe, to a suitable location.

When installing an external unit, consideration must still be given as to the placement of the appliance due to the condensate which will drip from the flue outlet

DESIGN FEATURE
CONTROLLERS

The N-Series water heaters have inbuilt controllers which enable programming and viewing of service information.

When connecting additional controllers to the PCB a specific plug is required. These plugs are supplied with the unit.

Note:

The plugs are provided in a small bag included in the unit packaging. Many installers will dispose of the packaging without realising the plugs are in there which means when anyone goes to add a controller they will require additional plugs for Rinnai.

If you are installing an N-Series, ensure to take the plugs, even if you are not using them, place them inside the cabinet of the unit for future availability.

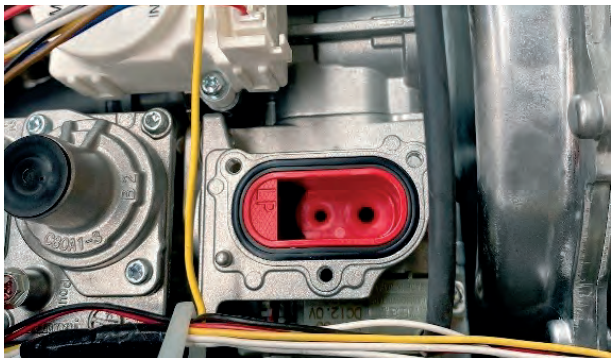
DESIGN FEATURE
GAS TYPE

Natural gas and LPG units are basically the same unit. The only difference is the mixing orifice which is located inside the proportional gas valve.



Changing the gas type on a unit only requires:

- Replacing the orifice
- Changing the PCB settings to recognise the different gas type
- Checking for adequate supply pressure
- Changing the gas type markings on the appliance



DESIGN FEATURE
FLUE OPTIONS

Maximum standard flue lengths of up to 20 metres is quite substantial, with options available from Rinnai for even greater lengths.

Due to lower flue temperatures, flues for the N-Series are constructed of polypropylene. This helps keep costs down and makes installation easier.

Even though you can attach an N-Series unit straight to an existing metal flue when retrofitting an appliance, the plastic flues cannot be used on the older HD units as they are not as efficient as the N-Series and have significantly higher flue temperatures.

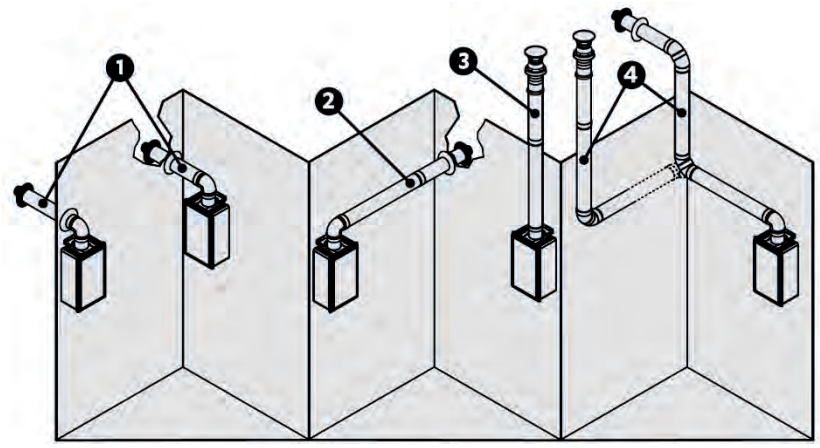
Use of a plastic flue on an HD unit would create a hazardous situation and should not be attempted.

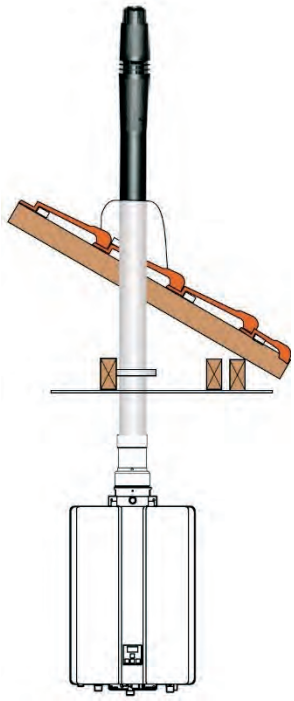
Flue terminations The Rinnai N56kWi must be installed with a Rinnai approved flue system.

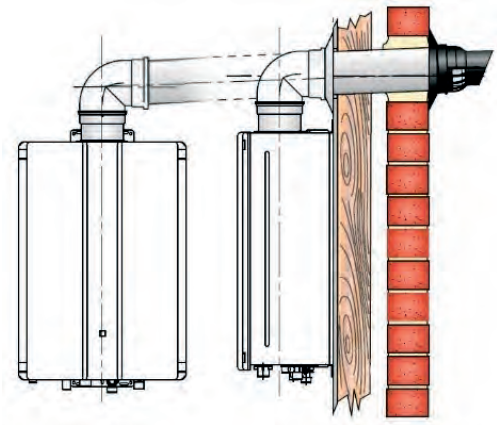


DESIGN FEATURE
VARIED FLUE DESIGN CHOICES

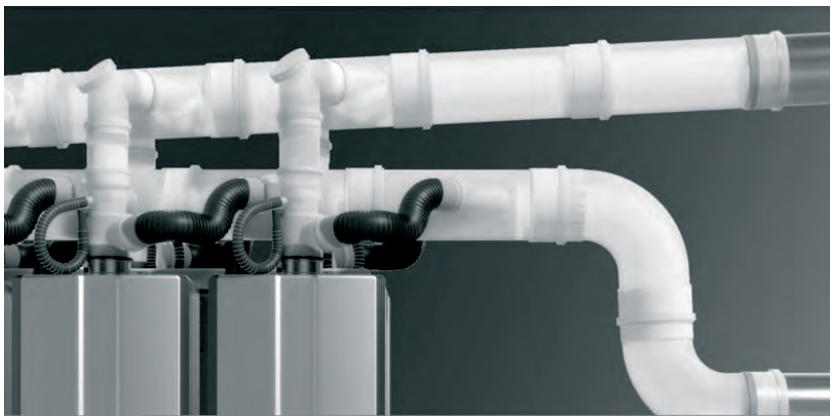
1. Direct
2. Horizontal extension
3. Vertical
4. Combination

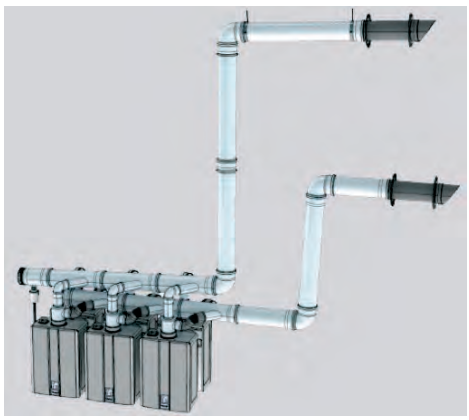






Common flueing options are also available to suit many configurations





DESIGN FEATURE
VARIED FLUE DESIGN CHOICES - *CONTINUED*



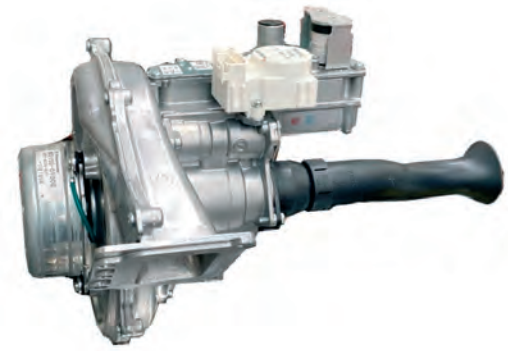
Room air flueing

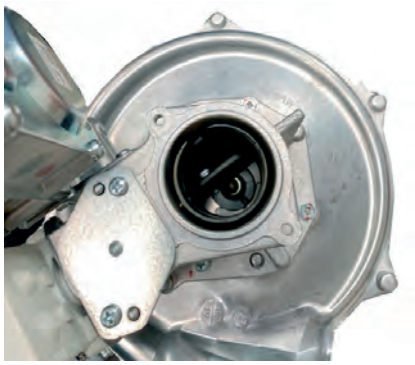


Outdoor air flueing

Servicing Note:

In areas subject to sand, dust or extreme salty beachside situations the air proportion butterfly valve within the air intake can become crusty and have trouble operating freely.





DESIGN FEATURE
TECHNICAL SPECIFICATIONS

Gas type
Natural Gas or LPG, specify at the time of purchase

Factory preset temperature
55°C can also be preset to deliver up to 85°C

Hot water capacity
1.5-37 litres per minute. Nominal water capacity is 32 litres per minute at a 25 ºC rise (1920 L/h)
The N Series water heaters are not suitable as a spa or swimming pool heater, or for hydronic applications

THE ORC
OVERFLOW RELIEF CAP

Anti-infiltration overflow-relief device

From:

ENVIRODRAINZ

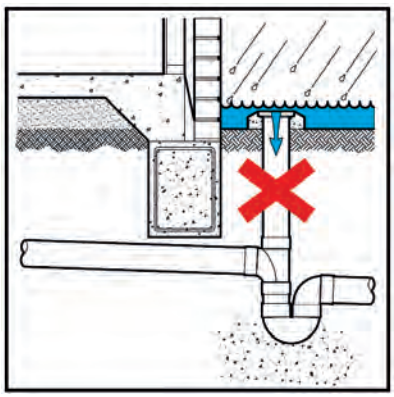
Infiltration of stormwater into sewer drains has long been recognised as a problem for sewerage treatment infrastructure.

This can have a major impact on the environment if systems fail and untreated sewage is released.

It is estimated up to 40% of stormwater infiltration is attributed to non-conforming overflow relief gullies (ORG's).

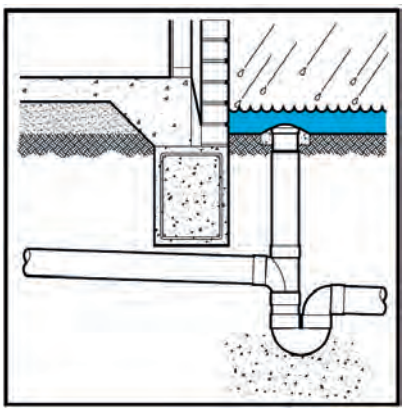
The Overflow Relief Cap (ORC) is an anti-infiltration device, which seals against stormwater infiltrating sewer drains during flood conditions, whilst primarily providing effective vent and overflow relief functions.



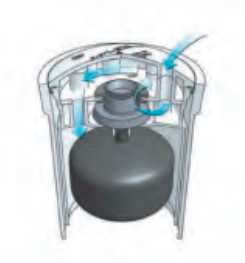


Typical ORG Failing to prevent water ingress

ORC preventing floodwater ingress



DESIGN FEATURE
VENTING, SEALING AND OVERFLOW



VENTING

In normal operation the ORC device acts as a vent to prevent water syphoning out of the trap.



SEALING

The ORC device provides a water tight seal against infiltration in flood prone areas.



OVERFLOW

In the event of a surcharge the ORC device will eject from the gully riser allowing free relief as per a conventional ORG.

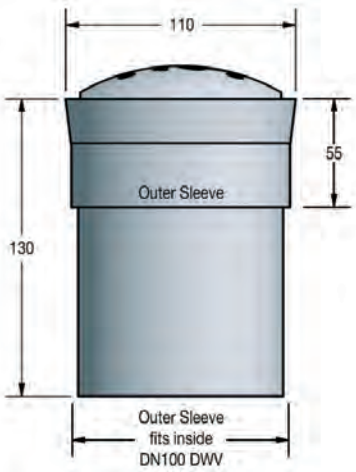
ORC OVERFLOW
RELIEF CAP

ADVANCED PLUMBWARE
A TRADING ENTITY OF ADVANCED PLUMBING PRODUCTS LTD

09 522 1140
paul.downey@advancedplumbware.co.nz

WaterMark

AUSTRALIAN MADE



WIRELESS TANK
LEVEL SYSTEMS





Features

- Multiple touchscreen displays can be added to the system
- The system learns your water usage to predict your time to empty
- Convenient timers to remind you of tank maintenance requirements
- Custom alerts and alarms for full visibility of system status
- Name your tanks and pumps for ease of identification
- Up to 12 tanks can be monitored on a single system
- Fully automatic wireless pump control functionality
- Up to 12 pumps can be managed on a single system
- Solar powered tank unit with high power Lithium-ion power source
- Stainless steel industrial grade water level sensor
- Set the density for measurement of different fluids
- Easy to use with simple DIY installation



These systems have a huge range which enables the monitoring of tanks located long distances form the controller.

When in line of sight this can allow for a range of up to 10km

On sites where there is rough terrain, obstructions, or extreme long distance an Active Repeater will ensure system stability and performance.
It's a plug and play unit, so you can just turn it on and it will connect to the system offering even greater range.

Up to three active repeaters can be use on the network giving you greater flexibility and control.

The Smart Water mobile app allows you to manage up to twelve tanks and twelve pump controllers from your phone.

SMART WATER
STARTER PACK

The Starter Pack comes with everything you need to get up and running:



09 278 6430
0800 40 14 14

www.smartwateronline.com

HYDROGEN GAS
IN NEW ZEALAND

Hydrogen gas for use in the domestic market is still in its infancy in New Zealand. Although hydrogen is already well regulated for its traditional uses, the existing regulatory systems are not well set up to support new hydrogen technologies and applications.

MBIE is assessing whether New Zealand's regulatory settings for hydrogen are fit-for-purpose. This work involves a working group of key regulatory agencies and will result in a report outlining the steps needed to ensure New Zealand's hydrogen regulatory settings support wider uses of hydrogen in the economy.

Standards New Zealand has completed a scoping study outlining a suite of standards adoption recommendations to enable the use of hydrogen across New Zealand's energy landscape. An implementation strategy is currently in development.

WorkSafe has established a working group to ensure the risks to health and safety in adopting new hydrogen technologies are adequately managed, identify regulatory gaps, and establish whether there are regulatory barriers to industry adopting new hydrogen technologies.

WHAT IS
HYDROGEN?

Hydrogen is the most abundant chemical element, estimated to contribute 75% of the mass of the universe.

Here on earth, hydrogen atoms are mainly contained in water, plants, and animals. Even though it's commonly found in molecules it's very scarce as a gas.

Hydrogen can be produced from a variety of resources, from natural gas, biogas, or from splitting water into hydrogen and oxygen using electricity. This electricity can come from traditional sources and renewable power like solar and wind. The biggest challenge is harnessing hydrogen gas on a large scale to fuel our homes and businesses.

Methane is the main constituent of natural gas and we have continued to use natural gas because it's a readily available resource, it's cost effective and it's a cleaner alternative to coal.
When natural gas is burnt, it provides heat energy and releases mostly water vapour and carbon dioxide. Burning hydrogen still releases water vapour but not carbon dioxide. This makes it an attractive possible alternative to other fuels.

Hydrogen is already being used as a fuel in vehicles overseas. China has the highest number of hydrogen fuelling stations for road vehicles worldwide, where you can fill up just as you would with petrol or diesel and in the same time frame as a traditional fuel car. Fuelling stations are also becoming more common in Japan, South Korea, Germany and the US.

For hydrogen to be a viable alternative to methane, it has to be produced economically and at a large scale.

Currently New Zealand does not have the infrastructure to supply 100% hydrogen through the existing pipe network. This means that our existing infrastructure would need to be adapted before this were to be utilised.

RINNAI
DEVELOPMENTS

Rinnai **INFINITY** units already accept 20% hydrogen and Rinnai engineers in Japan have developed a Hydrogen Hot Water Heater that produces 0% carbon emissions.



While Rinnai have developed 100% hydrogen combustion technology for water heaters, our existing infrastructure would need significant modifications before this were to be an option on a large scale.

We can however expect to see progress on this front in the future as the Government looks to define a gas transition pathway for New Zealand.

Even though we won't see 100% hydrogen water heaters in New Zealand homes just yet, this is an exciting development which is likely to help shape the future of the industry.

WATER
SAVING AND REUSE

According to the 2012 United Nations World Water Development Report, 80 percent of the world's wastewater is not collected or treated.
Severe freshwater shortages in some areas are driving governments to develop water recycling programs that produce water that is clean enough to reuse.

HYDRALOOP

The easiest and most efficient way to reuse water is to clean it right where you use it.
A Hydraloop device cleans greywater from shower, bath, and washing machine, as well as condensation water from tumble dryer, heat pump, and air conditioning.
This water can be reused for toilet flushing, washing machines, garden irrigation, and topping up swimming pools.

Hydraloop 300

For single-family housing with 4-5 persons – 540 ltrs per day

Hydraloop 600

For larger communities up to 10 persons – 1,000 ltrs per day

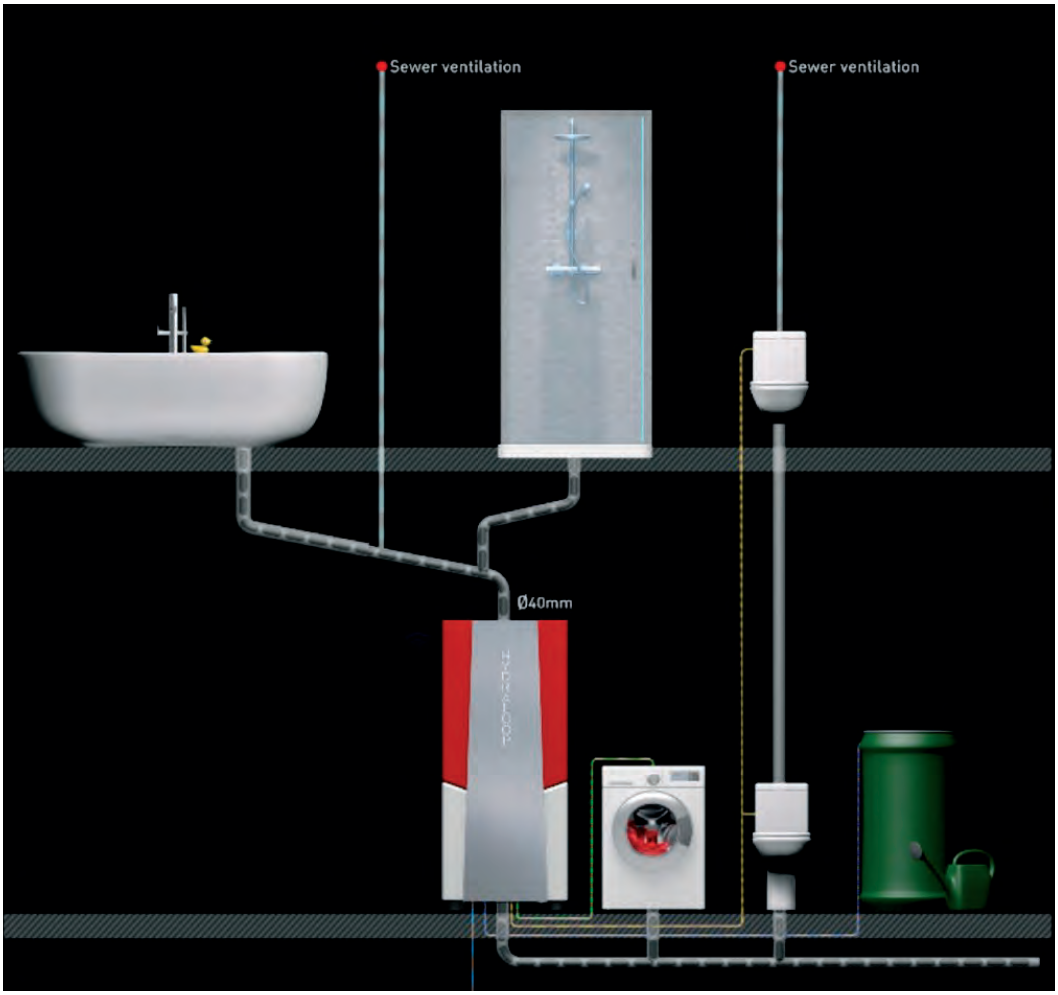
Hydraloop Concealed

For multi-family housing and apartments. Easy plumbing for retrofit situations





HOW
HYDRALOOP WORKS



Collect lightly contaminated greywater from bath and shower, condensation water from dryer, heat pumps and air conditioners & optionally washing machine – 3rd flush

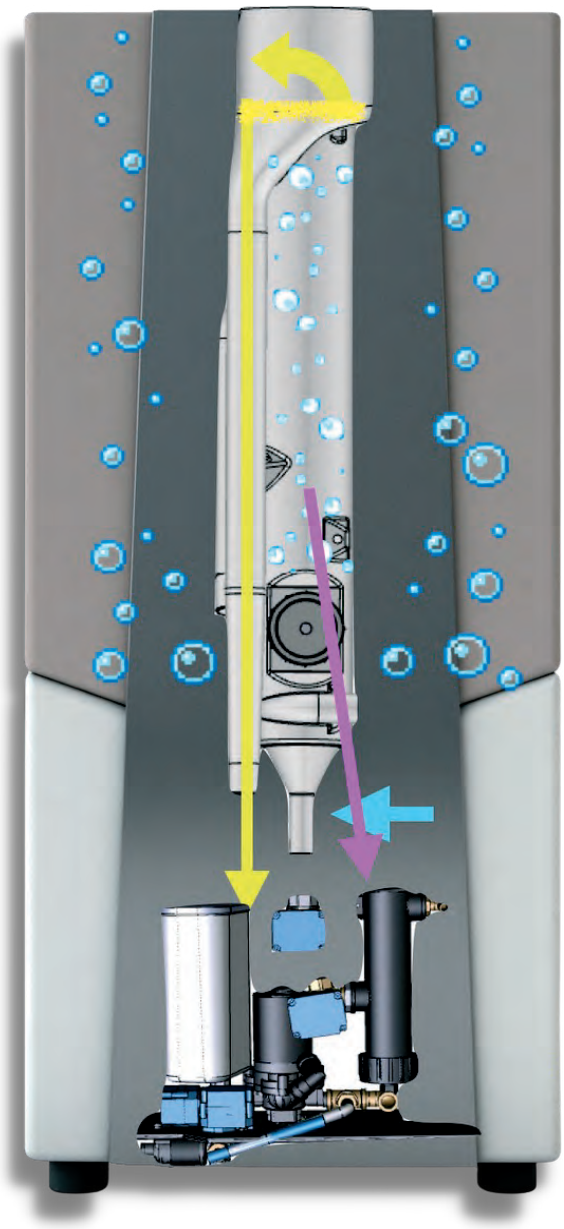
Clean the greywater at the source
Treat the greywater in six cleaning steps, resulting in clean, clear, safe, and disinfected water for non-potable use.

Reuse the cleaned water
The treated water is redistributed to toilets, washing machines, and optionally for garden irrigation and/or topping up swimming pools.

PATENTED
TREATMENT PROCESS

Without the use of chemicals, filters or membranes.

Controlled by central processor and smart use of air pressure, to stimulate the law of communicating vessels.



The following sequential treatment processes apply:

1. **Sedimentation**
   Sediment is collected at the bottom of tank

2. **Floatation**
   Floating dirt (hair, soap) is purged via central skimmer into the sewer

3. **Dissolved air floatation**
   Tiny air bubbles will travel upwards, collecting small particles

4. **Foam fractionation**
   Soap and suspended solids are skimmed off

5. **MBBR**
   Biological treatment by aerobic bioreactor

6. **UV disinfection**
   Every 4 hour by UV-light

HYDRALOOP
EASY TO USE

- Fully automatic
- Self-cleaning
- Low maintenance requirements
- Easy to install
- Monitored online 24/7
- User-friendly smartphone app
- Detailed online functionality analysis



Also Available

Hydraloop Cascade for commercial real estate and larger operations such as hotels, office buildings, shopping centres, student housing, sports clubs, airports, and more

Hydraloop Cascade is Modular and scalable, made-to-measure



EXTRA NOTES:

04

Topic 04:
Good Supervision

Continuing Professional Development

Good supervision has many positive impacts. It leads to better tradies, safer work and a good reputation for the profession.

This topic will cover the importance of supervision, the responsibilities of the supervisor and how to be a good supervisor.

SUPERVISION IS ABOUT
PROTECTING THE PUBLIC

Supervising is one of the key ways the health and safety of the public is protected. It ensures that people who have less experience in the trades work under the supervision of experienced practitioners who can teach and guide them. Supervisors are responsible for making sure work is done safely and correctly.

ONLY CERTAIN PEOPLE
CAN BE SUPERVISORS

The only people who can supervise are:

- Licensed certifiers
- People authorised to supervise certain gasfitting work under section 20 of the Act.

PEOPLE WHO MUST BE
SUPERVISED (SUPERVISEES)

All people carrying out restricted work other than certifiers must work under supervision.

That includes:

- Tradesmen
- Journeymen
- Provisional licence holders
- Limited certificate trainees (trainee)
- People working under exemptions (exempt person).

SUPERVISION
IS ABOUT CONTROL AND DIRECTION

Under the Act, supervision is defined as control and direction. Work undertaken under supervision must be under the control and direction of the supervisor.

The control and direction must be sufficient to ensure that the work is done competently, safely, and compliantly.

COMPULSORY
SUPERVISION REQUIREMENTS

There are some compulsory requirements around supervision that are set out in the Board's registration and licensing Gazette notices

https://www.pgdb.co.nz/about-us/legislation/

These requirements are terms and conditions of every practitioner's practicing licence and it is a disciplinary offence for a person to fail to comply with the terms and conditions of their licence.

Compulsory supervision requirements Continued on next page

COMPULSORY
SUPERVISION REQUIREMENTS

The terms and conditions of certifiers' licences relating to supervision are:

- The certifier must tell the Board the name, address, and telephone number of every exempt person they are supervising and ensure that the required fee is paid.
- The certifier must tell the Board in writing if they stop supervising any person. A certifier will remain responsible for all work done by a person under their supervision until they notify the Board that they are no longer supervising them.
- The certifier must make sure all work that is done by a person under their supervision is:

    1. Performed competently
    2. Subject to appropriate safety measures
    3. Complies with the requirements of any regulations that apply to the work (eg, Building Code, Gas (Safety and Measurement) Regulations)

- The certifier must make sure a person they are supervising is:

    1. Competent to perform the tasks they undertake
    2. Adequately supervised while carrying out work
    3. Complies with all relevant regulations
    4. Can produce their Board authorisation card on demand

- The certifier who supervises an exempt person doing gasfitting must make sure they do not work on live gas.
- The certifier can nominate another licensed certifier or tradesman to provide physical supervision of any person they are supervising but they remain responsible for all work undertaken by their supervisee.
- If the certifier is physically supervising someone on behalf of the supervisor, they must tell the supervisor of any concerns they have about the person or the safety measures used by that person.
- The certifier must make sure a trainee only works in their presence or the presence of someone they have nominated for the first 12 months while working.
- The certifier must make sure an exempt person only works in their presence or the presence of someone they have nominated for the first 24 months while working.

The terms and conditions of tradesmen's licences relating to supervision are:

- The tradesman must work at all times under the supervision of a certifier.
- The tradesman must notify the Board of the name and registration number of their supervising certifier.
- If the tradesman is physically supervising someone on behalf of the supervisor, they must tell the supervisor of any concerns they have about the person or the safety measures used by that person.

DETERMINING WHAT LEVEL OF
CONTROL AND DIRECTION IS REQUIRED

The level of control and direction that will be needed to ensure work is done safely and compliantly will vary from supervisee to supervisee, and from job to job. The supervisor is responsible for assessing what is needed in terms of control and direction in each and every case.

Where the work is being carried out by a trainee in their first 12 months or an exempt person in their first 24 months, the level of control and direction has been set by the Board. Regardless of what kind of plumbing, gasfitting or drainlaying work they are doing, they can only work in the presence of their supervisor.

For any other supervisee (or for trainees after 12 months and exempt people after 24 months), the supervisor must make an assessment of the level of control and direction they will need.

This will vary depending on three factors:

1. the experience of the person doing the work
2. the work involved, and
3. any job-related factors.

The kinds of questions a supervisor needs to ask themselves to determine what level of control and direction will be required are:

About the person

- Have they done this work before?
- Have they had any problems doing work of this kind before?
- Would they know how to deal with any problems if they arise?
- Am I confident they will contact me if they have a problem?

About the work

- Is the job complicated or tricky in some way?
- Is the scope of the job clear?
- Could the scope of the job change unexpectedly?
- Are there any particular risks associated with the job?

About any job-related factors

- Do they understand the health and safety requirements of the job?
- Are they any unusual or significant health and safety risks with this work or this site?
- Can I trust them to follow all appropriate health and safety processes?
- Are there any other things which could make this job more difficult?
- How quickly could I get to the site if needed?

Having considered these things, a supervisor can decide the type and level of supervision needed to ensure the work will be done correctly and the person (and others) will be kept safe.

SUPERVISORS HAVE OTHER RESPONSIBILITIES TO THEIR SUPERVISEES

A supervisor's responsibilities are not limited to just assessing a person's competence to do a particular job. A supervisor is also responsible for assessing, monitoring and developing their supervisee's general trade competence as well.

Supervisor's should meet regularly with their supervisees to assess their wider trade knowledge and skills. They should be having regular work debriefs and discussions with them, guiding and training them, and looking for appropriate courses to send them on to help grow and develop their knowledge and understanding.



GOOD PROCESSES AND A GOOD RELATIONSHIP ARE KEY TO GOOD SUPERVISION

Above all other things, the two most important aspects of supervision are:

1. having a good supervision relationship; and
2. having the right systems and processes in place to record and monitor how supervision is being carried out.

A supervisor is responsible for the supervision relationship and having a good working relationship will protect both them and their supervisee. The supervisor should be clear with their supervisee about what they expect of them, what they can and cannot do (including the consequences if they do things they shouldn't), and how the supervision relationship will work. They should have regular discussions with their supervisee about how the relationship is going and give them feedback on how they are progressing. Most importantly, a supervisor should be approachable and available to their supervisee.

Having good systems and processes for managing supervision and keeping good records of what is happening will also help protect both the supervisor and the supervisee. A supervisor should record things like the length of time the supervisee has been working, the types of work they have done, their level of competence and confidence with the different types of work, any formal training they have done, any areas of concern, and any areas for development. Records should also be kept of the discussions the supervisor has had with the supervisee and the things they talked about. And if the supervisor and supervisee are not in an employment relationship, there should be a written supervision agreement between them as well.

Good supervision records will allow the supervisor to have a better understanding of their supervisee's capabilities and reduce the likelihood that they will be sent to a job without the right level of supervision and support. Records will also help if the supervisor is ever required to show how they are carrying out supervision and meeting their supervision responsibilities.

Go to the supervision page on our website to find the relevant spreadsheets which can help you keep track of your supervisees and match the right person with the right job.

NOMINATING OTHERS TO SUPERVISE ON YOUR BEHALF

A supervisor can nominate another licensed certifier or tradesman to provide physical supervision of one of their supervisees for them. This applies even if the person is still required to work only in the presence of their supervisor.

Before nominating someone to physically supervise for them, a supervisor should check the person they wish to nominate agrees to supervising for them. They should also make sure the person understands what is expected of them, will carry out their supervision responsibilities properly, and will let them know if there are any problems with the way the supervisee does the work.

Nominating someone else to supervise should be done on a job-by-job basis and should not be long term or ongoing. A supervisor cannot avoid their responsibilities as a supervisor by nominating someone else to carry out supervision for them. Even where they have nominated someone else, the supervisor always remains responsible for the work their supervisee carries out. And nominating someone to provide physical supervision does not extend to the supervisor's other supervision responsibilities such as the supervision relationship and general monitoring, training and supporting the supervisee.

A person who is nominated to supervise on behalf of the supervisor must make sure they tell the supervisor if they have any concerns about the competence or capability of the supervisee. They should tell the supervisor as soon as possible so that the supervisor can address the concerns with their supervisee.

USING TECHNOLOGY WHEN SUPERVISING

There is nothing in the Act or the Board's registration and licensing Gazette notices which prevents a supervisor from using technology as part of their supervision. However, technology is not a substitute for in-person supervision and should be used only in appropriate circumstances.

A supervisor should understand that using technology for supervision comes with risks. A person who must work under supervision may not have the knowledge and experience to know what pictures or videos to send to their supervisor, may not show the full installation in photos or videos, or may not show critical parts of an installation.

For example, a supervisee who doesn't know to install an appliance regulator is not necessarily going to take a photo or video of the appliance in a way that will show their supervisor that that have not installed the appliance regulator. And even experienced tradesmen miss things and make mistakes. A supervisor who relies too much on technology and does not visit and inspect an installation risks missing things.

SUPERVISING TOO MANY PEOPLE

The Board does not place a limit on the numbers of people a single supervisor can be supervising at any one time. This is because it is difficult to determine an appropriate maximum number that would apply in all situations.

There are many factors which can influence how well supervision can be carried out, even where a single supervisor is responsible for a large number of supervisees (eg, the number of certifiers and tradesmen working for that supervisor who can be providing physical supervision on their behalf). However, the more supervisees a supervisor has, the more important it will be that they have good and comprehensive supervision systems and processes in place to track and keep good records of how they are carrying out supervision in each and every case.

SUPERVISING REMOTELY

While not prohibited, the Board does not support supervision arrangements where the supervisor and supervisee are in different locations. Even with the best systems in place, things can go wrong and it is important that a supervisor can easily meet with their supervisee in person to deal with any problems. Regular face to face engagement is also an important part of teaching, monitoring and guiding supervisees. Modern technology is useful but is no substitute for being with another person and truly getting a sense of their competence and capabilities.

SITUATIONS WHERE THE SUPERVISOR AND SUPERVISEE DON'T WORK TOGETHER

There are greater risks around supervision where the supervisor and the person they are supervising do not work together. In such situations, the right systems and processes will be critical to ensuring supervision is carried out properly and that both the supervisor and the supervisee are protected.

Non-work supervision arrangements should be covered by a written agreement which clearly sets out the expectations and obligations of each party and the processes that will be followed to carry out supervision. This should cover not only how the supervisor will determine what level of supervision will be required for each job, but all the other aspects of the supervision relationship as well such as how monitoring, support, guidance and training will happen.

LEARNINGS FROM DISCIPLINARY HEARINGS
RELATING TO SUPERVISION

Supervision comes up regularly in disciplinary hearings before the Board. Some of the causes of supervisions failings in disciplinary cases have been mistakes on the supervisor's part, poor decision-making, ignorance of supervision responsibilities, and disregard for supervision responsibilities.

Here are some key learnings from recent disciplinary cases dealing with supervision:

- A supervisor cannot rely on a supervisee telling them what work they are doing. It is the supervisor's responsibility to know what work their supervisee is doing and ensure they are only doing work that is within their competency.
- It is not a defense to a charge of failing to properly supervise for a supervisor to say they did not know their supervisee was doing the work.
- A supervisor must have proper systems and processes in place to manage supervision. They must be able to show what these systems are and how they demonstrate the supervisor is carrying out their supervision responsibilities properly.
- Supervisors must be aware of when trainees they are supervising are still within their first 12 months of working and exempt people are still within their first 24 months and can therefore only work in their presence.
- Supervisors cannot nominate or allow a trainee or exempt person to supervise others on their behalf.
- Gasfitting supervisors cannot rely on tests results from trainees to certify a gas installation. They must either be present and observe the trainee carrying out the testing or repeat the testing themselves.
- Supervisors need to ensure their supervisees have current licences and authorisations.

TEST YOUR KNOWLEDGE
ON THIS TOPIC:

What 3 things does a supervisor need to consider before sending a supervisee to a job?

What are the benefits of good supervision?

EXTRA NOTES:

05

Topic 05:
Passive Fire Protection

Continuing Professional Development

Passive fire protection is an important method of fire control to protect the safety of the public.

In this topic we will cover when passive fire protection is needed, the different types of passive fire protection and who can install it.

WHAT IS
PASSIVE FIRE PROTECTION?

Passive fire protection is a method of fire control. It uses construction elements within a building to contain fire and smoke in its area of origin and delay its spread to other parts of the building or adjacent buildings. These areas within buildings can be described as individual firecells.

Passive fire protection also helps preserve structural components of buildings from fire, to delay or prevent buildings from collapsing.

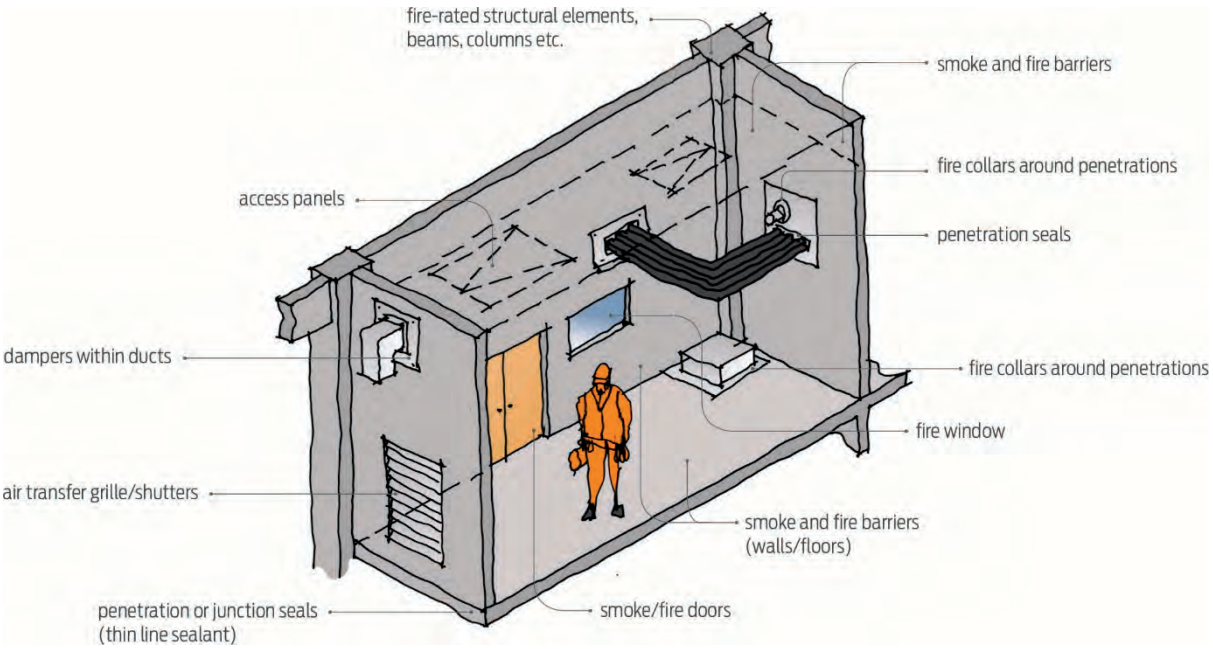
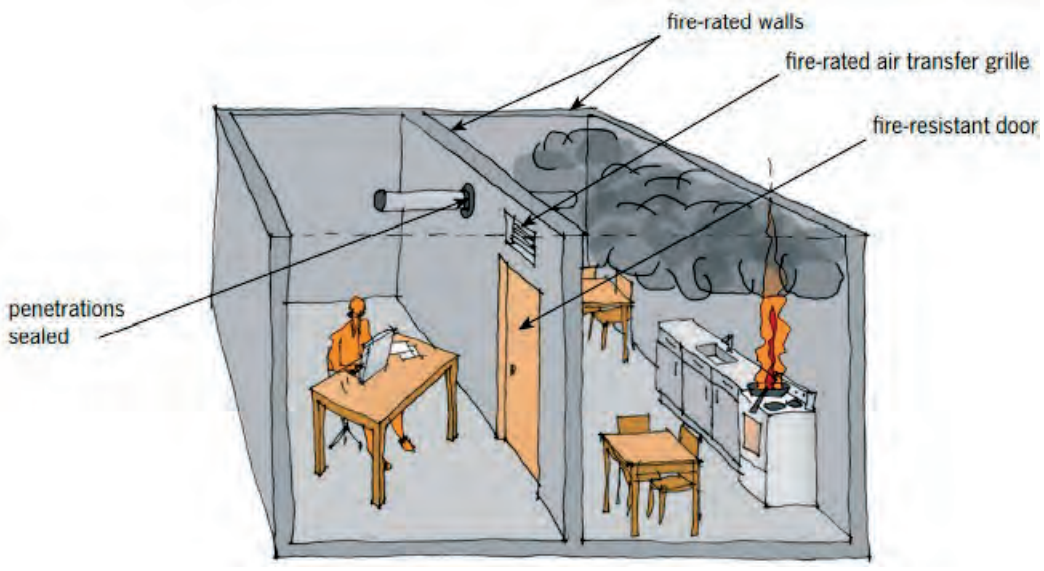


Image: Example of a firecell with different passive fire protections in place



Images: Example of a firecell stopping spread of fire and smoke (from Branz guide to passive fire protection) (BRANZ Reproduced with permission)

Passive fire controls are things like:

- fire rated plasterboard wall linings
- intumescent sealants filling gaps
- fire and smoke control doors
- fire collars/wraps around penetrations through walls and floors.

In our industry, you are likely to encounter times when your pipes will need to be fitted with such collars.



Image: Fire collars installed on concrete slab where pipes penetrate a fire cell (from Allproof fire technical manual)

HOW DOES
PASSIVE FIRE PROTECTION WORK?

Different forms of passive fire protection work in different ways:

- Fire rated plasterboard on walls is designed to withstand high temperatures and burn slowly. Intumescent sealants fill gaps and small holes to stop smoke passing through.

- Fire collars and wraps are designed to expand when exposed to high temperatures, sealing the penetration through the firecell made by a pipe or wires passing through. The volume of the intumescent material inside the collar expands with significant pressure to crush the object passing through as it burns away, and then plug the penetration against fire and smoke.

WHEN IS
PASSIVE FIRE PROTECTION REQUIRED?

Passive fire protection affects our industry when pipes pass through different firecells in a building, such as an inter-tenancy or fire wall, or through the floors of a multi storey building. Whenever a penetration is made through a firecell, that penetration will need to be sealed with a fire rated sealant, and fitted with an appropriate passive fire control such as a fire collar.

Although it is mostly found in commercial construction, it can also be required in residential buildings. Such a time could be when a building or dwelling is built very close to an adjacent building, or on a property boundary, and the penetrations through an exterior wall need to be fire rated to stop the spread of fire and smoke from one building to the other.

Knowing when you are working within a firecell is important, as you need to know when a penetration through that firecell will require passive fire protection.

Things to look out for that tell you passive fire protection may be needed include:

- Different floors on a multi storey building
- Different tenancies or dwellings that have a shared wall (Inter-tenancy wall)
- Moving from one area to another inside a building, for instance from a common hallway into a stairwell or a private dwelling
- Going into or coming out of service ducts within a building

Penetrations of walls or floors that are inside the same fire cell do not need to be protected.

DIFFERENT TYPES OF
PASSIVE FIRE PROTECTION FOR PIPEWORK

There are a range of brands and types of fire collars and wraps that are designed for plumbing type applications, and available for use in New Zealand. All collars used must be tested and shown to comply with AS 1530.4.14, and AS 4072.1.5. They must also comply with NZBC B2 Durability. Always check that the product you are installing clearly states compliance with these standards.

When installing passive fire protection around pipework it is important that the right method of control is used. Not every product will suit different applications.

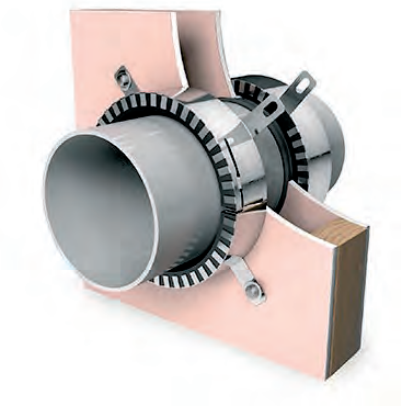
Factors that should be considered when selecting the appropriate control method include:

- If the control method is to be installed before or after a concrete slab is poured
- The material that the control method will be attached to/installed within (Plasterboard, concrete, timber)
- The material that the control is being installed around (PVC, Pex, HDPE)
- The depth of a concrete slab
- The environment in which the control is installed.

EXAMPLES OF DIFFERENT TYPES OF CONTROL METHODS INCLUDE:

- Face fixed collars

Image: a face fixed collar (from Allproof website)



These are probably the most common and versatile of the collar options. They can usually be fitted to the underside of concrete floors, to concrete and plasterboard walls, and to plasterboard ceilings.

- Fire wraps

Image: Fire wrap (from Hilti NZ website)



Fire wraps can usually be used in concrete floors and walls, and some can be used in plasterboard walls. It is important that the hole in the wall or floor is the right size relative to the pipe passing through it for the correct amount of fire wrap to be installed around the pipe.

DIFFERENT TYPES OF
PASSIVE FIRE PROTECTION FOR PIPEWORK

- In-slab collars

Image: in-slab collar (from Allproof website)



In-slab collars are, like their name, installed in concrete floors/slabs. These can be quickly and easily installed from floor level when you have many penetrations through a slab that need fire protection. Important factors in use of these collars are the size of the penetration through the slab relative to the pipe that is going through it, and the depth of the slab.

- Cast in slab collars

Image: cast in slab collar (from Allproof website)



These collars can be used in concrete slabs/floors, and are installed before the concrete is poured. One large advantage of these collars is that they remove the need to core holes through the slab after it is poured, reducing time between the slab being poured and the installation of pipework, and guaranteeing that structural steel within the slab is not damaged during the hole coring process. The flipside of this is that you need to be very precise with your installation, as you cannot change their position once the slab is poured.

Most control methods also require sealing with an intumescent fire rated sealant. This works in conjunction with the collar or wrap to stop smoke and gases passing through the penetration. As with the installation and selection of the fire control installed, the selection and installation of the intumescent sealant must be done per the manufacturer's installation instructions. It is important to use the right type of sealant specified by the manufacturer of the fire control, as this is what will have been used in their testing. Although sealants may seem similar, you may be voiding your product warranty by substituting a different sealant.

Remember!

Not every brand of collar is designed for the same applications.

There are often differences in the selection and installation of similar collar types across brands.

Always follow the manufacturer's selection and installation instructions.

If in doubt, ask!

THE IMPORTANCE OF PASSIVE FIRE PROTECTION
TO PROTECT THE SAFETY OF THE PUBLIC

Currently in New Zealand more and more multi-unit and multi-storey dwellings are being constructed to help meet the increasing demand for housing. With the construction of these buildings there is a large amount of passive fire protections being installed throughout the country. At the time of construction, it can be easy to overlook the importance of passive fire protections that are being installed, as unless the building has a fire break out their operation is not seen. But remember, if that does happen, passive fire protection is essential to the safety of the building occupants. To date in NZ we are fortunate to have not had any major fires in these buildings, but fires do happen.

In October 2022 in Auckland, a fire broke out in a unit at the Auckland City Mission building. The building is 11 storeys high and contains 80 apartments. The fire, located on the sixth floor, set off fire alarms and sprinklers. The emergency services arrived quickly and were able to put the fire out within 10-15 minutes. Luckily the fire and smoke did not spread beyond the unit that it started in. This is a great example of fire protection working well. Both active protections such as alarms and sprinklers, and passive protections like we have talked about so far worked to contain the fire and smoke, and stop it spreading.

Over the past decade there have been fires in multi-storey buildings around the world involving flammable cladding. The worst of these was the Grenfell tower fire that claimed the lives of 72 people. Similar fires have happened in Australia and Dubai. In November 2022, a fire at a 35 storey building in Dubai burned up the entire building. It managed to get inside some apartments around halfway up, but did not manage to spread from those units into others on the inside of the building. Luckily, no lives were lost in this fire. Again, this would have been contained as a result of both active and passive fire protection systems.

EXAMPLES FROM AROUND THE WORLD OF THE TERRIBLE OUTCOMES WHEN FIRE CONTROLS FAIL

In January 2022, 17 people lost their lives in an apartment fire in New York City, USA. The fire started on the second floor and was mostly confined to one apartment. However, smoke managed to spread through all 19 floors of the building and victims were reported to have been found throughout the building. It is believed that the smoke was able to spread after 2 fire doors, the passive fire controls, failed to close.

In December 2022 there was a fire at an 8 storey apartment block in Lyon, France, which claimed 10 lives. The fire started on the ground floor and then managed to spread up the building to engulf the top 3 storeys. Passive fire controls should keep fires like this contained long enough for emergency services to arrive, so that the fire can be extinguished before spreading up the building.

These are only a small number of examples of what can happen when fire breaks out in buildings. Whenever passive fire protections are required it is very important that they are selected and installed correctly, so that in the event they are required they function properly to help avoid disasters.

FIRE PENETRATION SCHEDULE			DATE: JULY 2016			
Project name			Pyro Apartments			
Project address			Firehouse Lane, Fawkes Bay			
Consent number			BE – 1234567/1			
Level 1, Unit 1						
INSTALLATION REF UNIT #		SERVICE #	SEPARATION	PRODUCT USED	FIRE RATING (MINUTES)	SERVICE DESCRIPTION
Drainage						
101	D	1	Floor	FireAway pipe wrap	-/120/120	100 mm (WC)
101	D	2	Floor	FireAway pipe wrap	-/120/120	40 mm (WHB)
101	D	3	Floor	FireAway pipe wrap	-/120/120	40 mm (FWG)
101	D	4	Floor	FireAway pipe wrap	-/120/120	40 mm (shower)
101	D	5	Floor	FireAway pipe wrap	-/120/120	50 mm (sink)
101	D	6	Floor	FireAway pipe wrap	-/120/120	40 mm (WM)
101	D	10	Block wall	FireAway pipe wrap	-/120/120	100 mm drain
Sprinklers						
101	S	1	Block wall	Ashes 'NoFlame'	-/60/60	25 mm diameter steel sprinkler pipe
Water supply						
101	P	1	Block wall	FireAway fire collars	-/120/120	25 mm hot and cold water supply (2 No.)
Mechanical						
101	M	1	Block wall	BlazeGo XYZ sealer	-/120/120	150 mm supply – fire damper
Electrical/data and fire alarm cabling						
101	E	1	Block wall	PyroSeal ABC silicone	-/30/30	power and alarm cables
101	E	2	Block wall	PyroSeal ABC silicone	-/30/30	data cables
Note: Products listed are for illustrative purposes only and are not actual products.						

Example of a fire penetration schedule from: Branz guide to passive fire protection. BRANZ Reproduced with permission

WHO CAN INSTALL
PASSIVE FIRE PROTECTION?

At this time passive fire protection is not a registered trade, so installation can be done by any competent person. You can complete a New Zealand certificate in passive fire installation, which is a level 3 qualification, but it is not currently a requirement for installers to hold any qualifications. When installing passive fire controls, you must ensure that the installation of products is done to the manufacturer's installation instructions. Some manufacturers offer training on the installation of their products.

Be aware that there are sometimes specific building consent conditions around installation of passive fire controls. Some councils around the country are now specifying that passive fire protection as part of a building consent will need to be done by Fire Protection Association of New Zealand (FPANZ) members, or people holding the New Zealand certificate in passive fire installation.

In larger construction settings there may be a specialist fire engineer involved in the project. They may have specific requirements around who is able to install the passive fire controls, and which type of product is installed. FPANZ are currently working towards their own certification process for passive fire protection installers. Soon, more councils and fire engineers may begin specifying that installers have some form of qualification or accreditation to be able to undertake installation of passive fire control.

When installing passive fire protection, you must always consider personal liability.

Remember, that just because you believe you can install something, that does not necessarily make it a good idea. For things like this that may be outside the scope of your usual work activities, it is always a good idea to speak with your insurer to check that you will be covered for the work. With passive fire control you will never know if it is working until something burns down, and you do not want to be left liable and uninsured if this happens!

There are many companies around New Zealand that specialise in installation of passive fire controls. When in doubt, it may be best to employ these specialists to make sure that everything is done correctly.

On jobs where passive fire protections are required, most councils/fire engineers will require a penetrations schedule to be provided by the installer. This schedule will detail every penetration through a firecell in the building, and the type of passive fire control installed. They will need to be documented to correspond to the penetration they are installed on, and may need to be photographed as part of the schedule.

TEST YOUR KNOWLEDGE
ON THIS TOPIC:

What is the purpose of installing passive fire protection around services?

What type of sealant should be used alongside a fire collar?

Select one answer

a. Roof and gutter silicon

b. MS type silicon sealant

c. Intumescent/fire rated sealant

d. Any sealant with UV and mould resistance

EXTRA NOTES:

06

Topic 06:

Understanding your Competence

Continuing Professional Development

We have the competence required to do our work most of the time. But we need to know our limits and recognise if we are operating outside of our ability.

This section will focus on how to help you to identify what you are competent in, what are the boundaries of your expertise and what you can do if you don’t have the skills to do a job safely.

COMPETENCE IS SOMETHING
YOU ARE WELL-QUALIFIED TO DO

Competence is the knowledge, skills and experience required for a person to undertake their work successfully.

If you have competency in something, you're well-qualified to do it, whether it's plumbing, drainlaying, gasfitting, or skateboarding.

Although competency means "capability" we also use it to describe when someone has the appropriate qualification to perform a required task.

Most jobs require you to demonstrate competency, either through certification, or on-the-job performance.

Competencies for Plumbing, Gasfitting and Drainlaying

All three of our trades have been designed using the same qualification structure **New Zealand Certificate in Plumbing, Gasfitting or Drainlaying (Level 4).**

Note: The Tradesman electronic examinations administered by the Plumbers, Gasfitters and Drainlayers Board are incorporated within the New Zealand Certificate.

Trainees are provided with materials and guides to prepare for their assessments which will allow them to complete the required Unit Standards both;

- Off-site at a training institute, and
- On-site assessments at their worksites

Depending on the course followed these Unit Standards include topics such as:

- First Aid
- Heights Training
- Workplace Safety, including confined Space and asbestos training
- Ethical considerations, patterns, and tools
- Roofing
- Storm water
- Wastewater
- As-Built drawings
- Foul water
- Inspection chambers
- Trade waste
- Pumps
- Water supply pipework
- Hot water supply
- Weather tightness, fire penetrations
- Backflow
- Solar
- Ducted heating
- Gas testing control and safety
- Gas appliances
- Gas installation
- Gas pipework
- LPG

Representatives from industry selected these topics are required to be learned and assessed for a candidate to complete their New Zealand Certificate in plumbing, drainlaying and gasfitting. In addition to the unit standards obtained on-job and from other training each candidate is required to sit and successfully pass the tradesman examination for each trade.

TRADESMAN
EXAMINATION COMPETENCIES

The Tradesman examination competencies were decided by industry representatives and are available on the Plumbers, Gasfitters and Drainlayers Board website.

Note: Each of the areas of competence shown below, include additional information which is not shown in this workbook for practical purposes.

For example, Section (d)

1. The installation, testing, commissioning, fault-finding and maintenance of water services for sanitary plumbing including but not limited to:

- Pipe sizing principles;
- Hot and cold-water reticulation systems;
- Water storage systems;
- Rainwater harvesting;
- Pumps
- Sanitary appliances and fixtures (backflow prevention;
- Heating systems that relate to sanitary plumbing, including hot water systems, and solar water heating; and alternative water supplies.

TRADESMAN
PLUMBER

The tradesman plumber examination 9192 is set by the Board.

To pass the exam applicants must demonstrate knowledge, and the experience and practical ability to install, test, commission, fault-find, and maintain sanitary plumbing systems through possessing competencies in the areas of:

1. Trade calculations and trade sciences
2. Limitations in and the application of material used in sanitary plumbing
3. Drawings and specifications for sanitary plumbing
4. The installation, testing, commissioning, fault-finding and maintenance of water services for sanitary plumbing
5. The installation, testing, commissioning, fault-finding and maintenance of foul water systems for sanitary plumbing systems
6. The ability to access and apply relevant documentation relating to sanitary plumbing to meet compliance requirements, and an understanding of the regulatory environment
7. The effect of the installation of sanitary plumbing systems, or their components, on the integrity of structures, including weather tightness considerations as they relate to penetrations of the building envelope
8. Responsibilities relating to health and safety

TRADESMAN
DRAINLAYER

The tradesman drainlayer examination 9198 is set by the Board.

To pass the exam applicants must demonstrate knowledge, and the experience and practical ability to install, test, commission, fault-find, and maintain drainlaying systems through possessing competencies in the areas of:

1. Trade calculations and trade science
2. The installation, testing, commissioning, fault-finding, and maintenance of foul water and stormwater systems for drainlaying
3. Limitations in and the application of materials used in drainlaying, including Drawings and specifications for drainlaying
4. The ability to access and apply relevant documentation relating to drainlaying to meet compliance requirements, and an understanding of the regulatory environment
5. Responsibilities relating to health and safety
6. Limitations on persons who can do, or assist in doing, drainlaying.

TRADESMAN
GASFITTER

The tradesman gasfitter examination 9193 is set by the Board.

To pass the exam applicants must demonstrate knowledge, and the experience and practical ability to install, test, commission, fault-find, and maintain gasfitting systems through possessing competencies in the areas of:

1. Trade calculations and trade sciences
2. Limitations and applications of materials used in gasfitting, including material protection and jointing methods
3. The installation, testing, commissioning, fault-finding, and maintaining of gas installations
4. Types, uses, characteristics, composition, and safe storage and handling of fuel gases
5. The principles of space and water heating
6. Drawings and specifications for gasfitting
7. Electrical and electronics work as it applies to gasfitting within the limitations under the Electricity Act 1992.
8. The ability to access and apply relevant documentation relating to gasfitting to meet compliance requirements, and an understanding of the regulatory environment
9. The effect of the installation of gasfitting systems, or their components, on the integrity of structures, including weather tightness considerations as they relate to penetrations to the building envelope
10. Responsibilities relating to health and safety
11. Limitations on persons who can do, or assist in doing, gasfitting.

Upon completion of the New Zealand Certificate in Plumbing, Drainlaying or Gasfitting the candidate must apply for Tradesman Registration in the appropriate trade and is then required to work under the supervision of a Certifier in the same trade for two years.

The two-year requirement was put in place to ensure additional experience was obtained by the candidate to enable each trades person to gain more competence in various areas of their trade.

CERTIFYING EXAMINATION COMPETENCIES
PLUMBER

The certifying plumber examination 9195 is set by the Board.

To pass the exam applicants must demonstrate the ability to design, manage the installation of, and verify sanitary plumbing systems through possessing competencies in the areas of:

1. Trade calculations and trade science used in the design and installation of sanitary plumbing systems

2. The selection of materials; their properties, applications, and how they are used in the design and specification of sanitary plumbing systems

3. The drawings and specifications for sanitary plumbing

4. The design, specification, and verification of water services for sanitary plumbing systems

5. The design and specification of foul water systems for sanitary plumbing

6. The ability to access and apply relevant documentation relating to sanitary plumbing to meet compliance requirements, and an understanding of the regulatory environment

7. Management of the effect on the integrity of structures relating to the design and installation of sanitary plumbing systems; including weather tightness considerations as they relate to penetrations to the building envelope and the coordination with other services

8. Responsibilities relating to managing health and safety

9. Responsibilities relating to the supervision of persons who do, or assist in doing, sanitary plumbing

CERTIFYING
DRAINLAYER

The certifying plumber examination 9198 is set by the Board.

To pass the exam applicants must demonstrate the ability to design, manage the installation of, and verify drainage systems through possessing competencies in the areas of:

1. Trade calculations and trade science used in the design and installation of drainage systems

2. The specification of materials; their properties, applications, and how they are used in the design and specification of drainage systems

3. The ability to access and apply relevant documentation relating to drainlaying to meet compliance requirements, and an understanding of the regulatory environment

4. The design and verification of foul water and stormwater drainage systems for drainlaying

5. Management of the effect on structures and sites relating to the design and installation of drainage systems, and coordination with other services

6. Responsibilities relating to managing health and safety, Including, but not limited to, health and safety systems, and the preparation of safety plans

7. Responsibilities relating to the oversight and/or supervision of persons who do, or assist in doing, drainlaying

CERTIFYING
GASFITTER

The certifying gasfitter examination 9196 is set by the Board.

To pass the exam applicants must demonstrate the ability to design, manage the installation of, and verify gasfitting systems through possessing competencies in the areas of:

1. Trade calculations and trade science used in the design and installation of gasfitting systems

2. Drawings and specifications for gasfitting. Including, but not limited to preparing plans and specifications

3. The selection of materials; their properties, applications and how they are used in the design and specification of gasfitting

4. The design, specification and verification/certification of gasfitting installations and system components

5. The ability to access and apply relevant documentation relating to gasfitting to meet compliance requirements, and an understanding of the regulatory environment

6. Management of the effect on the integrity of structures relating to the design and installation of gasfitting systems, including weather tightness considerations as they relate to penetrations to the building envelope and coordination with other services

7. Responsibilities relating to managing health and safety. including, but not limited to health and safety systems, and preparation of safety plans

8. Responsibilities relating to the supervision of persons who can do, or assist in doing, gasfitting

KNOW THE BOUNDARIES OF YOUR COMPETENCE TO REDUCE RISK

The Board expects that all practitioners are competent in our trades. We should have the ability to identify what aspects of our trades we are competent in, and where we are less proficient.

If you decide to do work that you are not totally familiar with, you risk working outside your competence.

Working outside of your competence can:

- Cause damage to a client's property
- Endanger the health and safety of the public
- Damage your reputation or the reputation of your business
- Result in a complaint being made about your work.

We all have a responsibility to understand what our individual competencies are, and if we wish to work in an unfamiliar field of work, we need to ensure that we are sufficiently trained.

Many of us completed our training being very skilled in a lot of our competencies. There are, however, areas within our trades where a lot of us are only just proficient.

For example, a trainee that specialises in domestic maintenance plumbing may not have had the opportunity to gain much experience in commercial plumbing installations.

It would be a very bold tradesperson who would claim to be a specialist in every portion of our trades. Remember, that the pass mark for our trade examinations is set at 60%, to allow for the fact that we all have differing workplace experience.

BE AWARE OF YOUR AREAS OF EXPERTISE

You may be a currently licensed certifying gasfitter and will attempt to fix that gas heater, but if you are not competent in that task, you could end up making it unsafe if you get it wrong.

Many of us work within different fields, dependant on what work we are exposed to. Many trades people will be well trained in the most common disciplines.

For Example:

- Plumbing in new homes
  (Installing water heaters, toilets, handbasins, laundry tubs, kitchen fixtures, water and waste water pipework)

- Drainage for new builds
  (Installing foul water drains, surface water drains, soak pits, and on-site waste water treatment systems)

- Gasfitting in new homes
  (Installing gas water heaters, space heaters, decorative fires, hobs, LPG cylinder stations, flues, and gas pipework)

- Domestic plumbing alterations, repairs, and maintenance
- Domestic drainlaying alterations, repairs, and maintenance
- Domestic gasfitting alterations, repairs, and maintenance
- Roofing installations and repairs
- Commercial plumbing installations and repairs
- Commercial gasfitting installations and repairs
- Commercial drainlaying installations and repairs

As well as some of the above "general" areas of work many of us gain experience in more specialised fields

For Example:

- Installing, altering, and repairing multi storeyed waste water stacks
- Commercial hydraulic and mechanical pipe work
- Water reticulation for large sites
- Backflow installation, alterations, maintenance, and repairs
- Trade waste system installations and repairs
- Stormwater retention and detention systems
- Specialised grease traps
- Advanced effluent disposal systems
- Hydronics and radiator heating
- Installing and repairing specialist roofing materials

IT IS IMPORTANT TO RECOGNISE WHEN YOU DON'T HAVE THE SKILLS TO DO WORK SAFELY

Many of us have found ourselves in a position where a customer has called us to site and once work has begun, we realise that the work requires a tradesperson who has expert knowledge in that discipline.

No one likes getting to the job and then having to admit that they cannot fix a product. In these situations, you should admit to the customer that a specialist tradesperson is required for this work, and even recommend someone who should undertake the work.

Performing specialist work without training can lead to unsafe situations and expensive mistakes.

CASE STUDIES OF WORK THAT WAS DONE WITHOUT THE CORRECT KNOWLEDGE

Many of the following examples are based on actual events where the trades people did not have adequate knowledge to undertake the work. The jobs were attempted even though each of them was aware that they lacked the competence to safely perform the work. (No real names are used for these examples).

CASE STUDY 01

John is a certifying gasfitter and supervises several employees. A building company asks if John can send someone around to repair a faulty electronic gas water heater at a property.

John and his employees are not familiar with repairing the gas appliance, but kind of understand how they work. John sends his most senior gasfitter Steve, to look at the appliance. Steve checks for adequate gas supply and power and soon decides that he does not know what is wrong with the water heater. Steve thinks that they should get someone who is familiar with the appliance, but John does not want to risk other gasfitters doing work for the building company and possibly losing some of his contract.

John gets Steve to replace the water heater with a new one even though there was only a minor fault.

What should have happened:

In this situation Steve or John could have should have called the service rep for the water heater and worked with them to repair the water heater. Instead, they replaced the entire appliance which cost the customer around $1200. If they had replaced the part (which cost around $200) it would have saved their customer money.

CASE STUDY 02

Mike went to attend a job with a dripping kitchen tap at an old office building. He opened the tap up and there was no jumper inside the tap at all. He fitted a new jumper and the dripping stopped so he packed up and got ready to leave.

Just before he left, he noticed water coming out from under the kitchen cupboard. He had a look and noticed that the under-sink water heater was plumbed in a confusing manner. He contacted another plumber friend who identified that the under-sink water heater was a push through system and the cylinder now required replacement.

What should have happened:

Having no jumper in the tap with water dripping instead of fully flowing should have caused Mike to ask a question of anther plumber before carrying out any work. Many experienced plumbers will know immediately that the missing jumper is a sign of a push-through water heater which uses the tap as an open vent.

CASE STUDY 03

Nigel was asked to do the gasfitting in a caravan his mate Dave was building. Nigel hadn't worked on caravans before and would normally turn this type of work down, but he wanted to help Dave out, so he agreed to do the work.

About a year after building the caravan Dave decided to sell it. The new owner had another gasfitter come to service the installation who found it was an accident waiting to happen. There was no high-level ventilation, the gas fridge was not properly sealed, and multilayer gas pipe was used throughout.

What should have happened:

- Nigel could have turned the work down
- Nigel could upskill in Caravan gasfitting before carrying out the work
- Nigel could offer to work with another gasfitter who is experienced in in caravans.

CASE STUDY 04

Kate usually specialised in domestic plumbing work even though she was a qualified drainlayer. Kate didn't perform much drainlaying work at all, and was asked to install a grease trap just outside a new café. There were limited places to install the grease trap but Kate found a location for it to fit. It looked like a straight forward job and the money was good so she installed the grease trap and associated pipework.

The café called Kate after a few weeks and complained that the drain kept blocking.

She would go to site and clear the fat away only to be called back again a few weeks later again.

Eventually the café owner engaged another drainlayer. It was found that the gully was over three metres from the grease trap and there was a gully trap included in the installation, both of which allowed grease to gather and solidify in the drain.

What should have happened:

- Kate could have turned the work down
- Kate could upskill in the requirements when installing grease traps before carrying out the work
- Kate could offer to work with another drainlayer who is experienced in in Grease traps.

TEMPORARY WORK FOR YOUR CUSTOMERS CAN BE RISKY

One of the biggest pitfalls for tradespeople is doing favours for customers who want temporary work performed so they can continue using their property while they complete alterations or repairs.

Even if the installation was only for a few days, it does not reduce the possible safety issues that may potentially be a result of non-compliant installations. Any temporary work must be completed with understanding that there is the possibility, it may stay in use for many years to come.

The following examples are based on similar actual events:

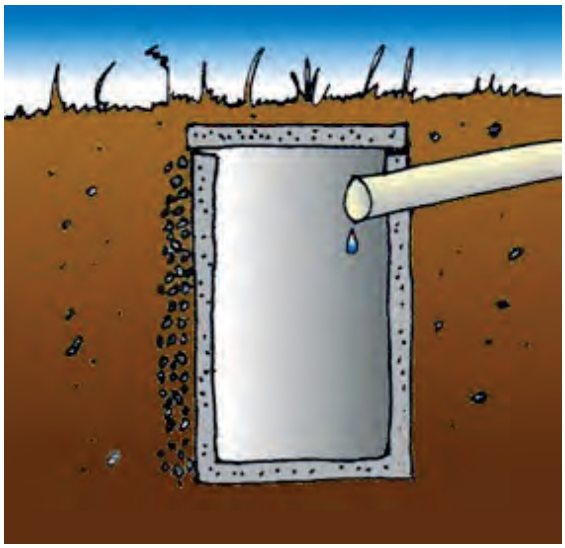
(No real names are used for these examples)

Dave is a certifying drainlayer and attends a property to look at an effluent field problem. After inspecting the site, it was evident that the effluent field required replacement. Dave informed the customer, and they are very upset. It was a large expense and there was only one week until Christmas.

Dave suggested that he could install a temporary holding tank, to give the client a few weeks before he would start installing the new effluent field. The customer agreed and told Dave that they would contact him after the Christmas break, to get the work done.

The customer never called Dave back, and on-sold the property to another person.
The temporary fix developed into a large problem for the new owner and Dave.





Second example on next page

The following examples are based on similar actual events:

(No real names are used for these examples)

Matt is a certifying gasfitter and attends a property to look at moving two 45kg LPG cylinders and the changeover regulator to a different wall on a property during a renovation.

Matt informs the customer that the new position is not suitable due to the proximity of an openable window and other openings into the building within the exclusion zone for the cylinders and regulator.

The owner agrees to fix the window closed and seal the openings as part of the renovation, but needs the gas back on today, so he can have hot water.

Matt installs the cylinders and turns the gas back on. He figures that this is only a temporary situation and is happy that the customer has agreed to remedy the openings.

Four years later the opening window and other openings had not been addressed by the customer, the illegal installation is referred to the PGDB.



DOING MORE TRAINING CAN IMPROVE YOUR COMPETENCE

You become competent by completing:

- On - job training at the workplace
- Off - job training and testing at a teaching institution
- Training and testing included in specialised private training courses
- Skills assessments which usually include a practical test or simulation.
- Electronic learning and testing

There are many additional qualifications and training courses that are available for tradespeople wishing to specialise in varied areas of our trades.

Training can range from supplier lead product training to training which provides successful learners with recognised NZQA Unit Standards and qualifications.

EXAMPLES
OF FURTHER TRAINING

Backflow IPQ

Being a Certifying plumber does permit you to install backflow devices, but if you wish to test and repair them you will need to complete a suitable training course to receive:

- NZQA Unit Standard 2117 - Install, test, and maintain water supply backflow prevention devices.

You will then be able to register with local Councils and become an IQP (Independently Qualified Person) certified in Backflow prevention.

Courses are available across the country and will include theory and practical components to ensure that candidates are familiar with:

- Test sheets and testing procedures
- Testing of a selection of backflow devices
- Applicable areas of the Building Act
- Compliance schedule handbooks
- IQP defect report sheets
- AS/NZS 2845.1 water supply-backflow prevention devices
- AS/NZS 3500.1 plumbing and drainage – water service
- The EPA cross connection control manual 2003

ASSOCIATED TRADESPERSON
REGISTRATION

Registered plumbers and gasfitters who specialise in maintenance often are required to service and maintain a selection of electrical equipment related to plumbing and gasfitting, **for example:**

- Water heating equipment
- Waste disposals units
- Pumps
- Gas appliances
- Gas safety control devices
- Package burners

The appropriate Electrical Workers Registration Board (EWRB) current practicing licence is required by all plumbers and gasfitters wishing to engage in this type of work.
The Associated Tradesperson Registration is for electrical work only in relation to their associated trade and only for work, where their competency has been satisfactorily demonstrated to the EWRB.

This normally includes work like:

Connection or disconnection of fittings to or from a power supply, for ratings not greater than 250 volts and 16 amperes.

Testing their own prescribed electrical work (PEW)

Courses are available across the country and will include theory and practical components to help candidates meet the requirements for registration.

To become an Associated Tradesperson, you must:

- Be registered as a certifying or tradesperson plumber or gasfitter with the Plumbers, Gasfitters and Drainlayers Board (PGDB)
- Have passed an EWRB approved Associated Tradespersons' coursework and written examination (relevant to your PGDB licence)
- Have passed an EWRB approved Associated Tradespersons' practical assessment (relevant to your PGDB licence), and
- Completed approved safety training within the prescribed time frame.

If you have completed your qualifications, and the above requirements, you may be ready to apply for registration and your practising licence.

PRODUCT SUPPLIER AND
INDUSTRY FACILITATED TRAINING

Supplier and industry training can vary in quality and level of complexity, depending on the product, and the scope of work that the tradesperson is expected to cover.

A training session could range from installation recommendations for positioning of tapware or become as complex as maintaining gas fired package burners or design requirements for specialised on-site wastewater treatment systems.

Even though many supplier courses are often not NZQA recognised qualifications, suppliers will often require that the only people who can perform the work with their product, must have completed appropriate in-house training.

Examples of supplier and industry lead courses:

Aquatherm NZ Ltd polypropylene welding certified installers training course.

- Training and upskilling courses for trades people in socket welding, electrofusion, butt welding for plumbing, HVAC, fire, hydronic heating, and general pipe fitting.

Master Plumbers Training courses:

- Design and Installation of buried HDPE Stormwater Tank Systems and Urban Rainwater reuse pump systems
- Contract Law Made Simple
- Gasfitting Refresher Workshops
- PE-Polyethylene Electro-Fusion Technician
- Including CFT identification card/numbers and will be deemed competent against industry unit standards US 25610 and US 10980

Rinnai NZ training courses:

- Various models of Infinity water heater installation courses
- Hot water cylinder courses
- Space heater installation and commissioning courses
- Infinity maintenance courses

Trade Lab training courses:

- Tradesman exam refresher courses
- Certifier exam refresher courses
- Backflow IPQ refresher courses

Rheem training courses:

- Residential Gas and Electric Water heating featuring tankless/hybrid
- Commercial water heating featuring Triton
- Tankless Gas Technical
- Water heater 101

WSP training courses:

- Backflow prevention
- Introduction to chlorination
- Principles and trends wastewater treatment
- PE pipe electrofusion and buttwelding course

TEST YOUR KNOWLEDGE
ON THIS TOPIC:

What are some risks of doing temporary work?

What are some benefits of admitting that you are NOT the right person for a job?

EXTRA NOTES:

07

Topic 07:
Journey of a Complaint

Continuing Professional Development

Each year the Board receives complaints about both registered practitioners and those who are carrying out work without a licence. The Board investigates these complaints to make sure public health and safety is not being compromised.

The focus of this topic is a case study of a registered practitioner who had a complaint laid against him and how the Board dealt with it. Think about how you would have managed this complaint and what you think the outcome should have been.

BOARD'S
COMPLAINTS JURISDICTION

Under the Plumbers, Gasfitters, and Drainlayers Act 2006 (Act), the Board can receive complaints about registered people and provisional licence holders.

The Board must investigate these complaints to determine whether the registered person or provisional licence holder has committed a disciplinary offence.

The Act sets out the conduct that will be a disciplinary offence. It includes:

- Negligent or incompetent work
- Non-compliant work (work that is contrary to an Act or regulations)
- Work that creates a risk of serious harm or significant property damage
- Failing to comply with a term or condition of the person's registration or licence
- Doing work the person is not allowed to do
- Deceiving a person who tests or certifies work
- Failing to provide a return required under an Act or regulations, or providing a false or misleading return (this covers gas certificate but does not apply to building consent documentation)
- Employing, directing or permitting an unauthorised person to do work
- Being convicted of an offence relating to work under the Health Act 1956, Gas Act 1992, or regulations made under those Acts or the Plumbers, Gasfitters, and Drainlayers Act
- Improper or incompetent conduct in carrying out work or charging for it that makes the person unfit to be registered or licensed.

The Act sets out the process the Board must follow when it receives a complaint. Below is an example of a complaint and the process it would go through.

The Board receives a complaint from a member of the public, who says:

- Two months ago they had the old earthenware drain from their bathroom replaced with a new PVC drain to the w.c. and a gully
- The work was done by two guys from XYZ Plumbing and Drains (XYZ)
- Within a few days of the work being completed they noticed the shower and handbasin were slow to drain and didn't drain cleanly and the toilet was filling with water each time it was flushed
- They contacted ABC Drains (ABC) to investigate the problem. ABC put a camera down the drain and found it didn't have any fall. They dug the drain up and found:
  - sections of the drain were flat
  - the drain had been laid on clay with no supporting material underneath
  - there was no bedding material around the drain
  - there were bits of the broken earthenware pipe and rocks in the backfill
- ABC tells the homeowner they should make a complaint to the Board about the work.

The homeowner goes on to the Board's website and makes a complaint.

CONSIDERATION
OF THE COMPLAINT

The Board's complaints officer receives the complaint. The first thing they have to decide is whether it is a complaint the Board can consider.

In order to be something the Board can consider:

- The complaint must involve sanitary plumbing, gasfitting, or drainlaying work
- They must be able to identify whether the person who did the work was a registered person or provisional licence holder.

Is the work drainlaying?

Whether the work is drainlaying is a legal question not a technical one. It is whether the work comes within the definition of drainlaying in the Act.

"Drainlaying" is defined in section 4 of the Act as:

- Laying a drain
- Altering, reconstructing, extending, repairing, opening-up or renewing a drain or a fitting connected to a drain
- Fixing or unfixing a drain to or from a sewage tank
- Fixing or unfixing a gully-trap or other trap in connection with a drain or sewage tank
- It is also necessary to consider the definition of "drain" in the Act because the Board doesn't have authority over all drains.

"Drain" is defined as (also in section 4):

- A pipe or series of pipes constructed or laid for the conveyance of foul water, storm water or industrial liquid waste

However, the following are excluded from the definition of drain:

- A pipe or series of pipe vested in or under the control of or maintained by the Crown or a local authority
- An open jointed or perforated drain for the collection and removal of ground water or a downpipe for the conveyance of water from a roof

The complaints officer is satisfied the work involves a drain the Board has authority over and the work that has been carried out is drainlaying under the Act.

WAS THE PERSON REGISTERED
OR A PROVISIONAL LICENCE HOLDER?

The complaints officer next needs to find out who did the work.

They send the complaint to XZY and ask for their response to the complaint. They specifically ask XYZ to identify who did the work. The owner of XYZ writes back saying the work was done by Apprentice 1 and Apprentice 2. The owner is a certifying plumber and certifying drainlayer and both apprentices work under his supervision. He says he is not aware of any problems with the work his apprentices did at the address and he has not been contacted by the homeowner about any problems since the work was finished.

The complaint's officer looks the certifying drainlayer and apprentices up on the Board's practitioner database:

- Apprentice 1 holds limited certificates as a trainee plumber and trainee drainlayer and has held his limited certificates for just over 3 years. The database confirms the owner is his supervisor

- Apprentice 2 also holds limited certificates as a trainee plumber and trainee drainlayer and has held his limited certificates for just under 10 months. The owner is also his supervisor

- The owner is a certifying plumber and certifying drainlayer and holds current practicing licences in both trades.

While the apprentices are not registered people, the owner is. The complaints officer now knows that there is a registered person involved with this work.

The final check the complaints officer makes is to consider whether the issues with the work are serious enough to require a full investigation. They check with the Board's technical advisor who says they are serious enough so the complaints officer prepares a memo for the Registrar recommending they appoint an investigator. The Registrar approves the recommendation, appoints an investigator and issues them with a Warrant of Authority to conduct the investigation.

THE INVESTIGATION

The investigator begins by considering what information they have and what further information they think they need.

Gathering more information

The investigator contacts the homeowner and asks:

- Were there problems with the old earthenware drain?
- Why did he choose XYZ to do the work?
- Was he there when the work was carried out?
- Did he talk to Apprentice 1 or Apprentice 2 about the work?
- Did he see the apprentices doing the work?
- Did anyone else do any work beside the apprentices?
- Did he take any photos of the work?
- How long had the job taken?
- Was there anything else he could say about the complaint?

The investigator contacts the owner of XYZ and asks:

- What had the job involved?
- Did he have any photos of the work?
- Had the apprentices had any problems with the job?
- What did he have to say about the defects the remedial drainlayer had found with the work?
- Why had he chosen Apprentice 1 and Apprentice 2 to do the job?
- What supervision had he provided for Apprentice 1 and Apprentice 2?
- Did his company employ any other registered drainlayers?
- What systems and processes did he have in place to manage supervision in his company?
- Was there anything else he wanted to say about the complaint?
- Finally, the investigator contacts the remedial drainlayer at ABC and asks:
- How did he get involved?
- What did he do?
- Did he still have the camera footage from inside the drain?
- Did he have any photos of the drain when he dug it up before he re-laid it?
- Did he take any photos of the drain as he had re-laid it?

The investigator also asks the Board's technical advisor to provide a written technical assessment of the work carried out.

What the investigator finds

The homeowner responds to the investigator's questions:

- He replaced the old earthenware drain because it had become blocked a couple of years earlier and the drain cleaners who had unblocked it had told him the drain was aging and needed replacing
- He chose XYZ because he had rung a number of drainlayers in his area but only XZY had come back to him. The owner of XYZ had come around and discussed the job with him and provided a quote. He had accepted the quote
- He had been at home when the work was carried out because he worked from home most of the time following COVID
- He had spoken to Apprentice 1 and Apprentice 2 when they first arrived at the property and they had talked about the job. He hadn't spoken to them after that until they came to tell them the job was finished and they were leaving
- He hadn't seen anyone else at the property other than Apprentice 1 and Apprentice 2
- He hadn't taken any photos of the work
- Apprentice 1 and Apprentice 2 had been at the property for 3 days

The remedial drainlayer responds to the investigator's questions:

- The homeowner had rung ABC saying his old bathroom drain had been replaced and he was now having problems with water draining from all the bathroom appliances
- He had gone around to the property to have a look
- He had put a camera down the drain and it appeared to have no fall. He told the homeowner it looked like the drain had not been laid correctly. The homeowner asked him to dig up some areas of the drain to get a better look. When he did, he found little to no fall in a number of places, no bedding material under or around the drain and inappropriate material used for backfill
- The homeowner asked him to dig up and re-lay the whole drain
- He provided the in-drain camera footage and photos he had taken of the drain when he dug it up and as he had re-laid it

The owner of XYZ responds to the investigator's questions:

- The homeowner contacted him about wanting to replace the old drain from their bathroom as it was not in good shape. He had gone around to the property and quoted for the work. The homeowner accepted the quote
- The job involved digging up and replacing around 15 metres of earthenware drain with PVC
- He sent Apprentice 1 and Apprentice 2 to do the work because it was a straightforward drain replacement job and the site access was good. He thought it would be good experience for Apprentice 2 and he was confident that Apprentice 1 could handle the job and would contact him if he had any problems
- The job had been straightforward. He had not gone to the property while Apprentice 1 and Apprentice 2 were there because they never called him about any problems
- He didn't have any photos of the work
- He didn't accept the remedial drainlayer's description of the work. He did not agree the fall was not correct because they had laid the new drain where the existing drain had been laid so it had the required fall
- He was confident that Apprentice 1 and Apprentice 2 had used the proper bedding material under and around the drain
- He accepted there was a piece of earthenware pipe and a couple of small stones visible in the backfill in one of the photos the investigator had provided, but didn't accept that all of the backfill had been like that
- He said Apprentice 1 knew the requirements around backfill and laying drains and he believed him when he said they had used proper bedding material and clean soil for backfill
- He only sent apprentices like Apprentice 1 and Apprentice 2 to jobs that he was confident they could handle. Apprentice 1 had been working for him for over 3 years and he was confident in his abilities. Apprentice 2 was still 'learning the ropes' but was a hard worker and worked well with Apprentice 1. He had sent Apprentice 1 and Apprentice 2 to quite a few jobs together and they had never had any problems
- He employed a tradesman drainlayer, two tradesman plumbers and one other plumbing and drainlaying apprentice who had around 3 years' experience
- He assessed every job that came in and determined who he would send based on their skills and experience with work of that kind. He knew Apprentice 2 couldn't work alone so always made sure he was with either one of the tradesmen or one of the more experienced apprentices. He was also clear with all his staff that they should ring him if anything went wrong

In their assessment, the Technical Advisor concludes:

- the work was drainlaying as defined in section 4 of the Act
- the drain was not laid in such a way as to meet the minimum grade requirement, which did not comply with paragraphs 13.3.2(a) and 3.5.1(a), 3.5.2 and 3.5.3 of G13/AS2
- the lack of appropriate bedding material below, around and over the drain did not comply with paragraphs 13.3.2(b), 5.3.1, 5.5 and Figure 7 of G13/AS2
- the use of backfill containing rocks and pieces of broken pipe did not comply with paragraph 13.3.2(b), 2.1.1(a) and 2.1.1(b) and Figure 7 of G13/AS2
- the defects with the work were moderately serious given the homeowner had reported ongoing difficulties with water draining from bathroom fixtures.

THE CONSIDERATION

The investigator considers all the information they have gathered.

They went back to the remedial drainlayer and asked him how much of the backfill he had removed had contained rocks and broken pieces of pipe. The remedial drainlayer responded that there hadn't been a lot of the broken pipe, but there had been quite a few rocks in the backfill throughout the whole length of the drain.

PRELIMINARY
INVESTIGATION REPORT

The investigator prepares a preliminary investigation report. It covers:

- The issues raised in the complaint
- What the homeowner had said
- What the remedial drainlayer had said
- The technical assessment
- What the owner of XYZ had said
- The information the investigator had gathered (such as the invoices, photos and database entries for the practitioners involved)
- Their preliminary findings
- The investigator sends the preliminary report to the homeowner and the owner of XYZ for their comments.

FINAL
INVESTIGATION REPORT

The investigator considers the comments they receive from the homeowner and the owner of XYZ in response to the preliminary investigation report.

The homeowner agrees with what the investigator has written and has nothing new to add. The owner of XYZ repeats that he doesn't accept the drain lacked the appropriate fall. He also comments that the remedial drainlayer has accepted that the backfill wasn't full of pieces of broken pipe as he had first claimed and this shows he was also exaggerating about the lack of fall on the drain too.

The investigator prepares a final investigation report which concludes:

- Apprentice 1 and Apprentice 2 had done drainlaying work
- The owner of XYZ, as their supervisor, had been responsible for the work Apprentice 1 and Apprentice 2 had done
- The work had not complied with the New Zealand Building Code
- Apprentice 2 was in the first 12 months of carrying out drainlaying under his limited certificate and was required to work only in his supervisor's presence or the presence of another certifying or tradesman drainlayer nominated by the supervisor
- Apprentice 1 was not able to supervise Apprentice 2
- Apprentice 2 had therefore not been properly supervised while doing the work

The investigator recommends that the complaint is considered by the Board.
They send their final investigation report to the homeowner and the owner of XYZ.

THE
DISCIPLINARY HEARING

Because the investigator has recommended the complaint is considered by the Board, the Act requires the Board to hold a hearing to consider whether or not the owner of XYZ has committed disciplinary offences in this case. The Act sets out how that hearing must proceed.

THE
NOTICE OF DISCIPLINARY CHARGES

The investigator will be the person bringing the disciplinary charges against the owner of XYZ. The investigator instructs a lawyer to act for them in the hearing and the lawyer prepares a Notice of Disciplinary Charges (Notice) setting out the charges in this case.

NOTICE OF DISCIPLINARY CHARGES

Section 101 of the Plumbers, Gasfitters and Drainlayers Act 2006

REGISTERED PERSON

Name:	Certifying Drainlayer
Address:	123 Right Street Auckland
Registrations:	Certifying Plumber, Certifying Drainlayer
Registration number:	12345

BACKGROUND

1. On [date], the Plumbers, Gasfitters, and Drainlayers Board received a complaint from Homeowner about drainlaying work carried out at 456 Left Street, Auckland.

2. On [date], the Registrar of Plumbers, Gasfitters, and Drainlayers appointed Investigator to investigate the complaint.

3. As a result of their investigation, the investigator believes you have committed disciplinary offences.

4. The Board will now hold a hearing to consider this matter and determine whether or not you have committed disciplinary offences.

DISCIPLINARY OFFENCE/S CHARGED

5. The charges are laid under the Plumbers, Gasfitters, and Drainlayers Act 2006 (Act) and are as follows:

Charge 1 – causing negligent or incompetent drainlaying

6. You caused drainlaying to be carried out in a negligent or incompetent manner, which is a disciplinary offence under section 89(a)(i) of the Act. In particular:

a. Between [date] and [date], Apprentice 1 and Apprentice 2 carried out drainlaying work at 456 Left Street, Auckland (property).

b. The drainlaying work involved removing approximately 15 metres of earthenware drain and replacing it with a PVC drain.

c. As their employer and supervisor, you caused Apprentice 1 and Apprentice 2 to carry out the drainlaying work.

7. The drainlaying work carried out by Apprentice 1 and Apprentice 2 was negligent or incompetent because:

a.the drain was not laid in such a way to meet the minimum grade requirement which did not comply with paragraphs 13.3.2(a), 3.5.1(a), 3.5.2, and 3.5.3 of G13/AS2

b.there was a lack or appropriate bedding material below, around and over the drain whichd did not comply with paragraphs 13.3.2(b), 5.3.1, 5.5, and Figure 7 of G13/AS2

c.the backfill used contained rocks and pieces of broken earthenware pipe which did not comply paragraphs 13.3.2(b), 2.1.1(a), 2.1.1(b) and Figure 7 of G13/AS2.

Charge 2 – failing to comply with term of condition of registration or licence

8. You failed to comply with a term or condition of your registration or licence, which is a disciplinary offence under section 89(c) of the Act. In particular:

a. You are Apprentice 2's supervisor

b. Under the Plumbers, Gasfitters, and Drainlayers Board (Drainlaying Registration and Licensing) Notice 2016, it is a term or condition of your licence that you must ensure that during the first 12 months of holding a limited certificate to do or assist in doing drainlaying, a trainee drainlayer under your supervision must work at all times in your presence or the presence of a certifying drainlayer or tradesman drainlayer you have nominated to supervise them

c. At the time Apprentice 2 carried out drainlaying work at the property he was within the first 12 months of holding a limited certificate as a trainee drainlayer

d. You did not ensure that Apprentice 2 worked in your presence or the presence of a certifying drainlayer or tradesman drainlayer nominated by your while doing drainlaying work at the property.

HEARING

9. The nominal date for your disciplinary hearing is [date] at the offices of the Plumbers, Gasfitters and Drainlayers Board, Level 8, 70 The Terrace, Wellington. The date and time for your hearing will be confirmed at the pre-hearing teleconference.

BEFORE THE HEARING

10. If you intend to appear at the Board hearing of this matter, then you must notify the Board of that in writing within 10 working days of service of this notice.

Date: 10 April 2022

[signed]

Chairperson

Plumbers, Gasfitters and Drainlayers Board

The investigator's lawyer also prepares a draft summary of the facts setting out what they say are the facts in this case:

SUMMARY OF FACTS

In the matter of a disciplinary hearing in respect of CERTIFYING DRAINLAYER
Under subpart 1 of Part 3 of the Plumbers, Gasfitters, and Drainlayers Act 2006

PEOPLE INVOLVED

1. [Name] is the owner of a property at 456 Left Street, Auckland (property).

2. Certifying Drainlayer is a registered and licensed certifying plumber and certifying drainlayer. He is the owner of XYZ Plumbing and Drains (XYZ), and the supervisor of Apprentice 1 and Apprentice 2.

3. Apprentice 1 holds a limited certificate as a trainee plumber and trainee drainlayer. He has held his limited certificates for 3 years. Apprentice 1 can work without direct supervision.

4. Apprentice 2 holds a limited certificate as a trainee plumber and trainee drainlayer. He has held his limited certificates for 10 months. Apprentice 2 may only work in the presence of Certifying Drainlayer or another licensed certifying or tradesman plumber and drainlayer nominated by Certifying Drainlayer.

5. Remedial Drainlayer is a registered and licensed certifying drainlayer. He is the owner of ABC Drains.

FACTS OF THE CASE

6. On [date], homeowner engaged XYZ to replace an earthenware drain on the property.

7. Between [date] and [date], Apprentice 1 and Apprentice 2 from XYZ went to the property

and:

dug up 15 metres of earthenware drain from the bathroom to the sewer main at the property boundary

removed the earthenware drain
laid 15 metres of PVC drain where the earthenware drain had been
re-filled the trench.

8. Within days of the work, the homeowner noticed the shower, handbasin and toilet in the bathroom were not draining properly.

9. On [date], Remedial Drainlayer came to the property and camera-ed the bathroom drain. He found that there did not appear to be any fall on sections of the drain. Remedial Drainlayer dug up the drain and found it lacked fall, the drain was not sitting in or on any bedding material and the backfill had rocks and pieces of broken earthenware pipe in it.

10. On [date], Remedial Drainlayer returned to the property and re-laid the drain with the required fall using appropriate bedding material below and around the drain and clean soil to backfill the trench.

11. On[date], the homeowner made a complaint to the Board about the work carried out by XYZ.

CAUSING NEGLIGENT OR INCOMPETENT DRAINLAYING

12. The drainlaying carried out by Apprentice 1 and Apprentice 2 was negligent or incompetent because:

a. the drain did not meet the minimum grade requirement, which did not comply with paragraphs 13.3.2(a) and 3.5.1(a), 3.5.2 and 3.5.3 of G13 of G13/AS2

b. there was no appropriate bedding material below, around or over the drain, which did not comply with paragraphs 13.3.2(b), 5.3.1, 5.5 and Figure 7 of G13/AS2

c. the backfill in the drain contained rocks and pieces of broken pipe, which did not comply with paragraph 13.3.2(b), 2.1.1(a) and 2.1.1(b) and Figure 7 of G13/AS2.

13. Certifying Drainlayer was Apprentice 1 and Apprentice 2's employer and supervisor at the time they carried out the work at the property. Certifying Drainlayer had control over how the work was carried out.

14. Certifying Drainlayer caused the drainlaying to be carried out in a negligent or incompetent manner because he did not ensure it was done correctly and compliantly.

FAILING TO SUPERVISE

15. Certifying Drainlayer was responsible for supervising Apprentice 1 and Apprentice 2 while carrying out the drainlaying work.

16. Apprentice 2 was required to work only in Certifying Drainlayer's presence or the presence of another licensed certifying or tradesman drainlayer Certifying Drainlayer had nominated to supervise Apprentice 2 on his behalf.

17. Certifying Drainlayer had not gone to the property while the work had been carried out and no other certifying or tradesman drainlayer had been at the property while the work was carried out.

18. 18. Certifying Drainlayer failed to supervise Apprentice 2 as required.

The investigator's lawyer sends the Notice and draft summary of facts to the Board's hearings manager. The hearings manager sends the Notice to the Board Chair to approve and sign. The hearings manager then schedules the hearing, puts a nominal hearing date into the notice and sends it to the Certifying Drainlayer.

PREPARING
FOR THE HEARING

A few weeks after sending out the Notice, the hearings manager holds a teleconference with the investigator's lawyer and the Certifying Drainlayer to discuss the arrangements for the hearing, including:

- Whether the Certifying Drainlayer will have a lawyer representing them at the hearing
- What the Certifying Drainlayer's response is to the charges and draft summary of facts (agree with the charges and facts, agree with parts, or disagree)
- What kind of hearing it will be (defended if they don't agree with the charges or not defended if they do agree)
- Who the witnesses will be (it if is defended)
- Whether the Certifying Drainlayer or the investigator's lawyer will make any applications in relation to the hearing (eg. having a witness appear by audio-visual link rather than in person)
- Whether the Certifying Drainlayer requires any special assistance (eg. an interpreter if English isn't their first language)
- What the timetable will be for getting all the material to the Board it will need to consider as part of the hearing
- Finalising the date for the hearing.

The Certifying Drainlayer decides to defend the charges because he doesn't agree that the drains did not have the minimum fall required and that proper bedding material and backfill was not used.
Before the hearing, the investigator's lawyer and the Certifying Drainlayer must send the hearings manager all the material they want the Board to consider during the hearing. This includes:

- Written statements of what the witnesses will say
- Any evidence they wish to rely on to support their case such as photos, invoices, job sheets
- Written submissions about why the investigator says the Certifying Drainlayer has committed the disciplinary offences or why the Certifying Drainlayers says they haven't committed any disciplinary offences in this case.

The material the investigator wants the Board to consider is provided to the Certifying Drainlayer before the hearing so he can comment on it. The Certifying Drainlayer's material is also provided to the investigator's lawyer before the hearing so they can comment on it. All the material is then gathered together in a bundle of documents which will be used in the hearing.

THE HEARING

The hearing is held at the Board's offices in Wellington. Five members of the Board sit on the hearing panel to consider the charges, four practitioners and one lay person. The hearing is run by the Board Chair. Sitting with the Board is a legal advisor who will advise the Board on any questions of law or matters of procedure that arise during the hearing. The Board's hearings manager is also present, along with a hearing support person. The hearing is recorded, but not filmed. Board hearings are held in public so members of the public can attend unless the Board directs the hearing should be held in private. However, no members of the public are present at the Certifying Drainlayer's hearing.

The investigator's lawyer is present at the hearing and so is the Certifying Drainlayer who has chosen not to have a lawyer.

The Chair begins the hearing with introductions of all the people present and explains the process for the hearing.

The investigator's lawyer then presents the investigator's case:

1. They introduce the investigator's case setting out what the Certifying Drainlayer has been charged with and what evidence the investigator will present to show that the Certifying Drainlayer has committed the offences of causing negligent or incompetent drainlaying work to be carried out and breaching a term or condition of their licence by not supervising Apprentice 2 as required.

2. The homeowner gives evidence telling the Board how he engaged XYZ, what they did, who did the work, what happened after the work was finished, how he contacted ABC Drains, what the remedial drainlayer found and why he had the drain re-laid.

3. The remedial drainlayer tells the Board how the homeowner contacted him because of problems he was having with his bathroom drain, how he put a camera down the drains and what he found, why he dug up the drain and what he found, and how he re-laid the drain. He provides the Board with the footage from inside the drains, photos of the work done by XYZ and photos of the remedial work he had done.

4. The Board's technical advisor tells the Board that the work is drainlaying under the Act and that it does not comply with the Code because the drain did not have the minimum required fall, there hadn't been any bedding material below and around the drain, and the backfill contained rocks and bits of broken earthenware drain.

5. The investigator tells the Board about their investigation, what they had done and what they had found.

6. After each of the investigator's witnesses has given evidence, the certifying drainlayer can ask them questions about their evidence and put opposing views to the witness for their comment. For example, the certifying drainlayer may challenge the remedial drainlayer's views about the fall on the drain or what the backfill was like. Or they may challenge the technical advisor about whether the work was really contrary to G13/AS2.

7. The Board may also ask questions of all the witnesses.

8. The investigator's lawyer then sums up the investigator's case telling the Board why the evidence proved the Certifying Drainlayer had committed the disciplinary offences.

The Certifying Drainlayer then presents their case:

1. They tell the Board that they are not guilty of any disciplinary offences because there was sufficient fall on the drain and the correct bedding material and backfill had been used.

2. Apprentice 1 gives evidence telling the Board how he and Apprentice 2 had dug up the earthenware drain at the property, how they had laid the new PVC drain in the cradle left by the old earthenware drain to ensure it had the correct fall, the bedding material they had around and on top of the drain, and the soil they used to backfill the trench.

3. The Certifying Drainlayers tells the Board about Apprentice 1 and Apprentice 2's experience with replacing drains such as the homeowner's, why there was the required fall on the drain, why the bedding and backfill used was appropriate, how he supervised his apprentices, and why it was acceptable for him to send Apprentice 2 to this job with Apprentice 1.

4. The investigator's lawyer and the Board can question Apprentice 1 and the certifying drainlayer about what they have said.

5. The Certifying Drainlayer then tells the Board why he has not committed any disciplinary offences in this case.

DECIDING
ON THE CHARGES

After hearing from everyone, the Board sits in private to decide whether or not the certifying drainlayer is guilty of the offences he has been charged with. The Board has to decide whether it is satisfied that it was more likely than not that the drainlaying work Apprentice 1 and Apprentice 2 had done was negligent or incompetent and the certifying drainlayer had caused the work to be done in that way.

With regard to the charge of causing negligent or incompetent drainlaying, **The Board concludes:**

- The evidence of the remedial drainlayer and the technical advisor show that the work had not complied with the G13/AS2 because of the lack of fall on the drain and the lack of proper bedding material and backfill
- The certifying drainlayer was the supervisor of Apprentice 1 and Apprentice 2 and therefore had control over the way they did the work at the property
- The certifying drainlayer was responsible for the way the work had been done in this case and had therefore caused the drainlaying to be done in a negligent or incompetent way
- Charge one was made out

With regard to the charge of failing to comply with a term or condition of his licence in relation to his supervision of Apprentice 2, **The Board concludes:**

- It is a term or condition of his licence that the certifying drainlayer must only allow Apprentice 2 to do drainlaying work in his presence or the presence of another certifying or tradesman drainlayer he has nominated for the first 12 months of Apprentice 2 holding his limited certificate
- Apprentice 2 was within the first 12 months of holding his limited certificate when he did the drainlaying work at the property
- The certifying drainlayer had not been present when Apprentice 2 had done the drainlaying work and had not nominated another certifying or tradesman drainlayer to be present
- The certifying drainlayer had therefore breached a term or condition of his licence in relation to his supervision of Apprentice 2
- Charge two was made out

Having concluded that the certifying drainlayer was guilty of the disciplinary offences in this case, the Board invites the investigator's lawyer and the certifying drainlayer back into the room. The Board tells the certifying drainlayer they have found him guilty of both of the disciplinary offences.

THE PENALTY

Having found the certifying drainlayer guilty of disciplinary offences, the Board must now decide what penalty to impose on him.

The penalties the Board can impose include:

- Cancelling his registration or licence
- Suspending his registration or licence
- Restricting the work he can do
- Disqualifying him from doing certain types of work
- Requiring him to do some training
- Requiring him to pay a fine
- Formally reprimanding him
- Imposing no penalty

The Board invites the investigator's lawyer to say what penalty they think should be imposed on the Certifying Drainlayer in the circumstances.

The investigator's lawyer tells the Board the investigator considers the certifying drainlayer's conduct in this case is moderately serious. The poorly laid drain had already caused problems for the homeowner through poorly draining bathroom appliances and this could have gotten worse if the drain had not been re-laid correctly. In addition, the Certifying Drainlayer had allowed an apprentice in their first 12 months to work without being supervised by him or another nominated certifying or tradesman drainlayer. The lawyer suggests the lack of properly supervision likely contributed to the work being done incorrectly. The lawyer refers to other disciplinary cases the Board has considered involving similar conduct to the certifying drainlayer's and the penalties the Board has imposed in those cases. They suggest the certifying drainlayer should be fined $2,500 and be ordered to do some training on his responsibilities as a supervisor. The lawyer also believes the certifying drainlayer should have to pay some of the costs of the investigation and hearing, which came to $12,600.

The certifying drainlayer tells the Board that he accepts he made some mistakes in this case but doesn't think he should have to pay a fine. He had not deliberately caused the work to be non-compliant. He had also believed it was ok to allow Apprentice 2 to work with Apprentice 1 because he had assessed the job and the work conditions and believed it was safe and within their capabilities to do the work together. The certifying drainlayer said he would be willing to do some training on supervision if the Board required him to.

Having heard what the investigator's lawyer and the certifying drainlayer have to say, the Board asks some questions of each person before closing the hearing to decide what penalty to impose.

The Board begins by considering how serious it thinks the certifying drainlayer's conduct was in this case. The Board concludes it was low to moderate. The Certifying Drainlayer had not supervised his apprentices properly and this had resulted in them doing work that was negligent or incompetent. Had the drain not been re-laid, it could have blocked causing problems for the homeowner.

The Board does not think the Certifying Drainlayers offending is serious enough to cancel or suspend his registration or licence, restrict the work he could do, or disqualify him from doing certain kinds of work. These penalties are appropriate for very serious or repeated offending and this is the first time the certifying drainlayer has committed a disciplinary offence.

The Board decides the appropriate penalty is a fine of $2,000 and an order that the certifying drainlayer do some training around supervision which he must complete before he can relicense in the next licensing year. The Board also orders the certifying drainlayer to pay $6,300 towards costs which is half of the costs of the investigation and hearing.

AFTER
THE HEARING

The Board's hearings manager notifies the certifying drainlayer of the Board's decision on penalty by email in the days following the hearing. A couple of months after the hearing, the Board issues a formal written decision which sets out the Board's decision, the reasons for its decision, and the penalty orders it imposes on the certifying drainlayer. The decision is sent to the certifying drainlayer and they are told of their right to appeal the Board's decision in the District Court if they are unhappy with the outcome. The Certifying Drainlayer has 20 working days from the date of receiving the decision to appeal it. If no appeal is brought, the fine and training orders come into effect meaning the certifying drainlayer must pay the fine and costs and do the training.

WHAT IF THE
CERTIFYING DRAINLAYER HAD PLEADED GUILTY

If the Certifying Drainlayer had agreed that the work Apprentice 1 and Apprentice 2 had done was not compliant and that he should not have let Apprentice 2 work with Apprentice 1 on this job, he could have chosen to plead guilty to the charges.

If the certifying drainlayer pleaded guilty, the investigator's lawyer would have then sent him a copy of the Notice and an agreed summary of facts for him to sign to show he was pleading guilty to the charges. The Certifying Drainlayer may also have asked for his comments to be added to the summary of facts to explain his position.

Registered person's comments

19. Certifying Drainlayer accepts that the work carried out by Apprentice 1 and Apprentice 2 at the property was not compliant. However, he states he was not aware that the work had been done in this way and would not have allowed it be done in a non-compliant way had he known. He also says he would have remediated the work for the homeowner free of charge if he had known.

20. Certifying Drainlayer accepts that Apprentice 2 was in his first 12 months of holding his limited certificate in drainlaying and should only have been working in his presence or the presence of another certifying or tradesman drainlayer he had nominated. However, he says he assessed the work as being within Apprentice 2's abilities and had been available at any time to come to the site if required.

Once he had signed the documents pleading guilty, the investigator's lawyer would have prepared written submissions about what penalty the investigator thought the Board should impose in this case. The certifying drainlayer would get to read those submissions and put something in writing about what penalty he thought the Board should impose. The hearings manager could provide the certifying drainlayer with a form to fill in about penalty if this would assist him.

The certifying drainlayer could then decide whether he was happy to let the Board consider what penalty to impose on him based on the written submissions from the investigator and himself.

Or he could choose to speak to the Board as well if he wanted to. He could do this by appearing before the Board in person in Wellington, by phoning into the hearing, or by joining the hearing by audio-visual link. He could then offer any explanation he wished to make to the Board and the Board members could ask him any questions they may have about what had happened and what changes he might have made to his processes to ensure he didn't make the same mistakes again in the future.

Once the Board had heard from the investigator's lawyer and the certifying drainlayer, it would close the hearing and decide on penalty in the same way as for a defended hearing.
If a person pleads guilty to a disciplinary offence, the Board can take their guilty plea into account in determining what penalty to impose. If the penalty is a fine for example, the Board may reduce the fine to recognise that the person had accepted they had done something wrong. Pleading guilty also means there is no need to hold a full hearing and this saves time and money for everyone involved. As well as being able to take a guilty plea into account when imposing a penalty, the Board can also take it into account when determining how much the person should have to pay towards the costs of the investigation and hearing.

AFTER
THE HEARING

After the hearing is over, the hearings manager waits 20 working days to see if the certifying drainlayer appeals the decision. If he doesn't, the hearings manager puts the written decision on the Board's decisions database on the website and adds information about the certifying drainlayer having been convicted of disciplinary offences on the public register. The Board is required to do this under the Act.

The certifying drainlayer also receives a letter from the Board's finance manager about paying the fine and costs, and information from the hearings manager about the training he is required to do.

EXTRA NOTES:

08

Topic 08:
Health and Safety

Continuing Professional Development

The Board and Construction Health and Safety New Zealand (CHASNZ) bring you this topic on how to prevent strains and sprains.

HOW TO PREVENT STRAINS AND SPRAINS
IN PLUMBING, GASFITTING AND DRAINLAYING



Plumbers,
Gasfitters and
Drainlayers Board

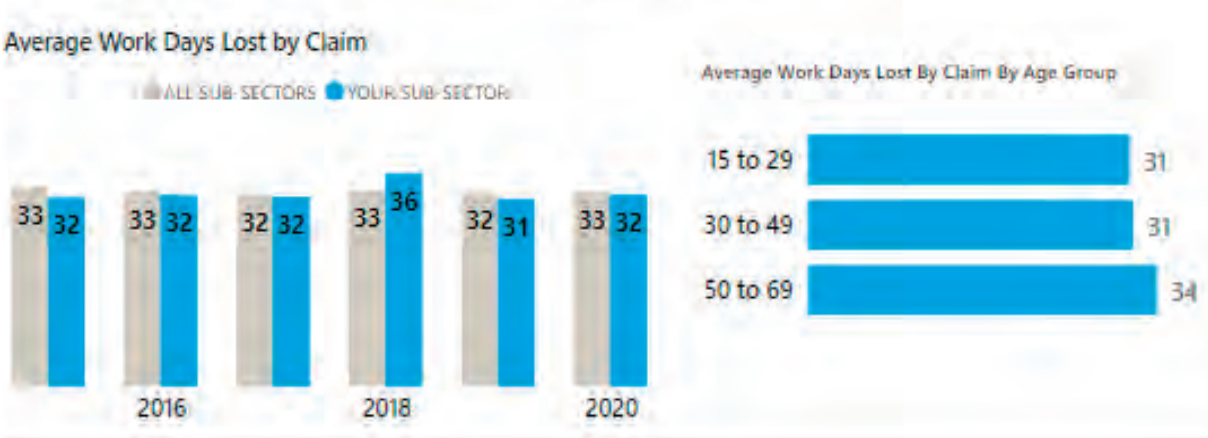
The Board and Construction Health and Safety New Zealand (CHASNZ) bring you this topic on how to prevent strains and sprains.

STRAINS AND SPRAINS ARE THE RESULT
OF WEAR AND TEAR ON YOUR BODY OVER TIME

There are a lot of physical demands in our trades that cause wear and tear.

STRAINS AND SPRAINS ARE THE LEADING CAUSE OF INJURY AND TIME OFF

THE SECTOR LOST 39,129 TOTAL WORKDAYS DUE TO INJURIES. THIS NUMBER IS INCREASING EACH YEAR.



THE INJURIES THAT CAUSE THE BIGGEST IMPACT ARE:



NEW ZEALAND PLUMBERS TOLD US WHAT THEY THOUGHT CONTRIBUTED TO STRAINS AND SPRAINS

Physical factors

Heavy loads - Plumbers are prone to back and shoulder sprains and strains because of the way they handle heavy loads. Often there's a lack of help or equipment to lift and move things.





Ground level work

We are more at risk of sprains and strains to our backs and knees because of how much work we do at ground level.

Awkward postures

Tasks like precision work, intensive tool tasks or underfloor work can mean plumbers, gasfitters and drainlayers work in awkward positions for long periods of time. Plus, this work often also includes overhead work and over reaching.



ORGANISATIONAL FACTORS:

Working alone: Most plumbers, gasfitters and drainlayers work alone or in very small teams, putting you at risk of sprains and strains because there is often no one to help you.

Shift work: Working shift or after hours on top of a normal workday can leave you fatigued and stop you from getting the rest and recovery time you need.

SOCIAL FACTORS:

Workplace support: Sole traders and small businesses can easily be isolated from support, help with problem solving, or help with heavy tasks. Having a good network of mentors and additional workers can help reduce the risk of sprains and strains.

SOCIAL FACTORS:

Fitness and wellbeing: A long, injury free career requires a commitment to keeping fit and flexible outside of work hours. Plumbers, gasfitters and drainlayers need to learn the importance of rest and recovery as well as develop strategies and habits to integrate his into their life outside of work.

Age: The workforce is aging, and sprains and strains can force these older workers out of the industry if left unmanaged. Although older workers aren't at more risk of sprains and strains, they do have a bit of extra 'wear and tear' that needs to be managed.

TOP TIPS TO
HELP TO PREVENT STRAINS AND SPRAINS

We asked NZ plumbers gasfitters and drain layers what their top tips were.

This is what they said:

Get work up off the ground
Use a trolley, sawhorse, portable bench, three step ladder or even the tailgate or tray to avoid working bent over.

Get closer to the task
Reduce the need to work with your arms raised, by using ladders, work platforms and scaffolding.

Take regular breaks
Rest, stretch and straighten up regularly if you're working in awkward positions.

Lighten your toolkit or consider using a trolley to help move your gear
Change the contents of your toolkit to match the task you're doing and keep your main supply of tools nearby.

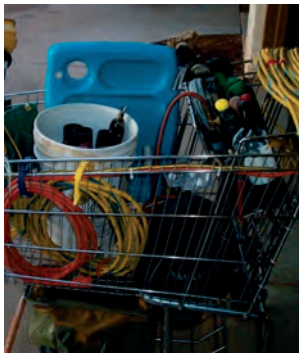
Use a trolley
A trolley keeps your gear in one place, makes it easy to move and gives you a raised working surface, saving time and effort.

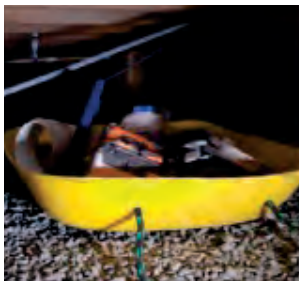
Organise the back of your van or ute
It saves time and effort when packing and unpacking.

Stay hydrated while working
Keep a water bottle in your trolley. Your pee should be light yellow!

Wear good footwear
That includes with boot inserts. You should chance your footwear when it becomes worn out or after six to 12 months of continuous use.







Go for lightweight tools
Aim to work with tools that weigh under 1.5kg and that are powered rather than manual.

Communicate well
By managing client expectations, working and planning together as a team and having an open approach to making work easier for everyone on the job, you can avoid many of the risks linked with sprains and strains. As a manager, it's important to lead by example and show that sprains and strains are an important concern at work.

Use a tray
When working under a floor space, store your tools and other gear in something like a wheelbarrow tray. You can drag it around to where you're working with a rope.

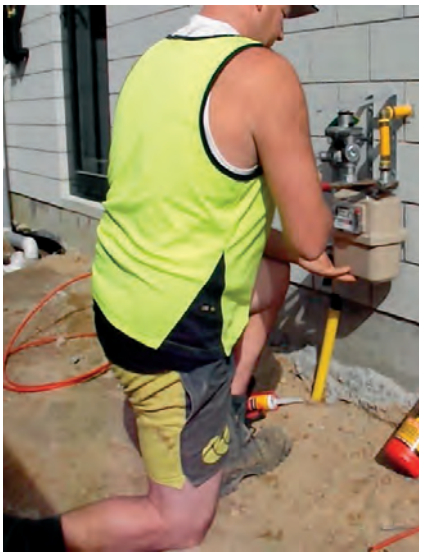
HOW TO PROTECT YOURSELF
WHEN WORKING ON THE GROUND



Avoid stooping and bending



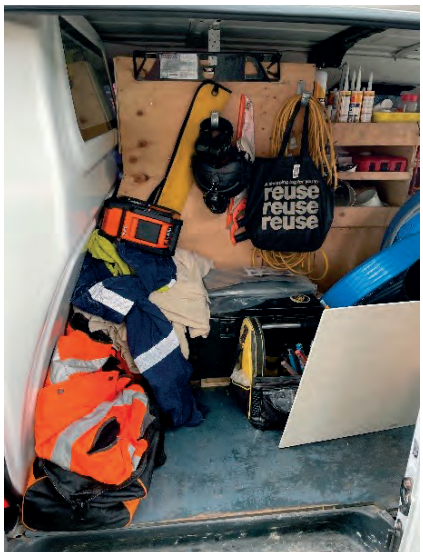
Look for chances to sit or squat



Next best option is to kneel for short periods



Get work off the ground where possible



Keep your main tools off the ground



Prepare yourself to make underfloor work easier

IDEAS FOR REDUCING
HAZARDS WHEN WORKING AT GROUND LEVEL

- Rest often. Take a one-minute break after every 10 minutes of ground work.
- Wear knee pads to give you the option of kneeling while working.
- Hamstrings and quad muscles need stretching and flexibility.
- Wear a head torch when working underfloor to keep your hands free.

WHERE TO GO
FOR MORE INFORMATION:

Work Should Not Hurt for Plumbers Gasfitters and Drainlayers
Website: https://www.chasnz.org/wsnh-trades/plumbing-gas-drain

SOS-Save Our Spines-Ideas for pain free plumbing in NZ
Facebook group https://www.facebook.com/groups/1286711711773359

CODES OF PRACTICE AND GUIDELINES
USEFUL CODES OF PRACTICE

Codes of Practice are approved methods of compliance with Acts and Regulations

Worksafe 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.

Some codes of practice that are particularly useful to people in the plumbing, gasfitting and drainlaying trades are outlined below:

- Asbestos - Management and Removal of Asbestos - Approved Code of Practice
- Manual Handling (ACOP)

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

Some of these guides are listed below:

- Be safe working on roofs
- Caution – ceiling battens do not provide fall protection
- Edge protection (Fact sheet)
- Electrical safety on construction and demolition Sites (Fact Sheet)
- Excavation safety - Good Practice Guidelines
- Height - Best practice guidelines for working at height in New Zealand
- Mobile elevating work platforms - Best practice guidelines
- Roofs - Best practice guidelines for working on roofs
- Safe use of safety nets - Best practice guidelines
- Safe working with ladders and stepladders (Fact sheet)
- Scaffolding - Best practice guideline for scaffolding in New Zealand
- Short duration work at height
- Silica dust in construction (fact sheet)
- Temporary work platforms (Fact sheet)
- Underground services - Guide for safety with underground services
- Roof restoration and maintenance
- Noise in construction
- Preventing and responding to bullying at work
- Working safely with boilers and other pressure equipment

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

- Installation and maintenance of twin 45 kg LPG cylinder systems
- Installation and maintenance of LPG multi-cylinder systems
- Groups of cylinders installed for use Cylinder and tank security Signage
- Fibre external terminal points (ETP's) and hazardous areas around LPG cylinders

http://www.gasnz.org.nz/lpg-association-of-new-zealand/lpga/codes-of-practice

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 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

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

These regulations cover the following:
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.
The erection or dismantling of scaffolds from which a person could fall 5 m or more.
Every excavation which is more than 1.5 m deep and which is deeper than it is wide at the top.
Any form of tunnel or drive where workers work underground, irrespective of timbering or support.
Those excavations where the excavated face is steeper than 1 horizontal to 2 vertical.
Any construction work where explosives are used or stored.
Work such as diving, where construction workers breathe air or any other gas that has been compressed or is under pressure.
Any construction work in connection with asbestos fibres.

A particular hazardous work form can be accessed from the WorkSafe website.

http://www.business.govt.nz/worksafe/notifications-forms/particular-hazardous-work/particular-hazardous-work-notification.pdf

When completed, the form is submitted online only. That's right It is no longer possible to notify WorkSafe via email or posted PDF forms. The online notification form has been updated to reflect all the particular hazardous works that must be notified to WorkSafe.

Someone at Worksafe 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 Worksafe.

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:

Any of the following:	
A substance escaping, spilling, or leaking	Gas or steam escaping
An implosion, explosion or fire	The collapse or partial collapse of a structure
The interruption of the main system of ventilation in an underground excavation or tunnel	The collapse or failure of an excavation or any shoring supporting an excavation
A pressurised substance escaping	The inrush of water, mud, or gas in workings in an underground excavation or tunnel
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)	Damage to or collapse, overturning, failing or malfunctioning of any plant that is required to be authorised for use under regulations A collision between two vessels, a vessel capsize, or the inrush of water into a vessel
The fall or release from height of any plant, substance, or thing	Any other incident declared in regulations to be a notifiable incident.

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.

Action 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

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

- 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.

A REMINDER
ABOUT 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 anyone who works on a building may be at risk of disturbing asbestos and exposing themselves to the fibres, which is dangerous for health.

A REMINDER
ABOUT ASBESTOS

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

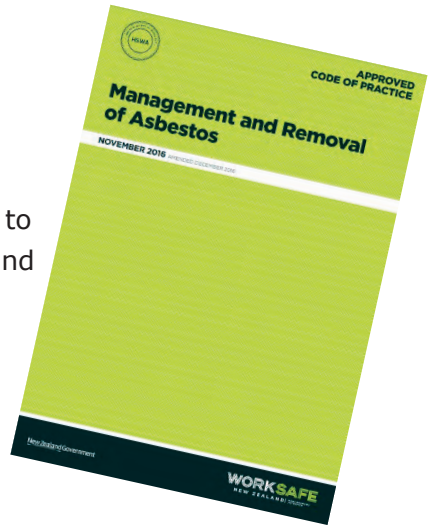
ASBESTOSIS
AND MESOTHELIOMA

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.



The Approved Code of Practice 'Management and Removal of Asbestos' is a comprehensive document which describes how to comply with New Zealand's asbestos health and safety laws and the Health and Safety at Work (Asbestos) Regulations 2016.

This Code of Practice contains information covering:

- Identifying ACM in the workplace
- Training of staff
- Removing ACM without a licence
- Working where asbestos is present
- Renovations of older properties
- Adequate PPE
- Cutting and drilling asbestos
- Decontamination
- Disposal of ACM's

Areas of industrial and residential buildings where materials containing asbestos were commonly used during construction

Industrial buildings

- 'Super Six', 'Super Eight' roofs and cladding
- Asbestos cement vent pipes
- Barge mouldings
- ACM sheeting or ceiling tiles used in the office area, kitchen, toilet walls or mezzanine areas
- Vinyl floor tiles or sheet vinyl floor coverings
- DT surrounds (disconnector trap)
- Textile in the fuse holders
- ACM backing to switchboards
- Asbestos cement downpipes
- Flashings
- Rainwater heads
- Door mouldings
- Gutters

Residential houses

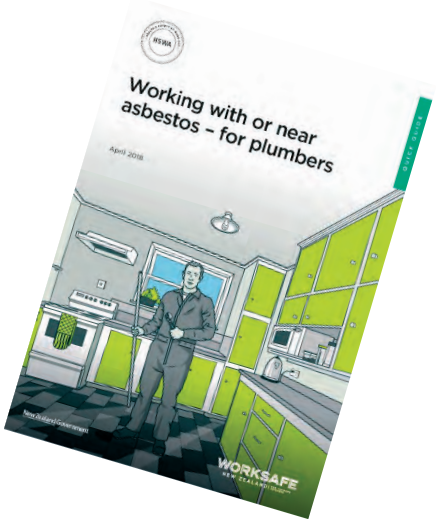
- Vinyl flooring
- Cladding, including baseboards
- Wet area lining substrate
- Electrical meter boards
- Soffits
- Roofing panels, e.g. Super Six
- Exterior window flashings
- Wall linings
- Water tanks
- Ceiling tiles & Textured ceilings
- Gutters and downpipes
- Stormwater and sewage piping
- Loose fill insulation
- Fireplace surrounds

A new set of quick guides were released by WorkSafe as well including one especially designed for plumbers

https://www.worksafe.govt.nz/topic-and-industry/asbestos/working-with-asbestos/asbestos-quick-guides-for-tradespeople

It covers a brief overview of things like:

- The risks from asbestos
- Places where you are likely to come across ACM
- What you should do if you think there is asbestos in a building
- What you should do before working around asbestos
- How you work around asbestos
- What PPE you need
- Decontamination procedures
- Correct disposal methods for ACM's



TEST YOUR KNOWLEDGE
ON THIS TOPIC:

What are the top three strain and sprain sites in plumber's gasfitters and drainlayers?

What are three factors that contribute to strains and sprains in the trade?

What are three things we can do to prevent strains and sprains?

EXTRA NOTES:

09

Topic 09:
Knowledge Test Answers

Continuing Professional Development

Knowledge test questions and answers.

TOPIC 1:
JUNCTIONS ON GRADE

If you are connecting a 100 mm branch drain to a 100 main drain on a new installation you need to:

Answer:

- Connect with a 45° and a minimum 15°incline branch connection

You are to connect a 65 mm common discharge branch pipe into a 100 common main discharge pipe for a new installation, you need to:

Answer:

- Connect ensuring the invert of the branch pipe is 10mm higher than the soffit of the main pipe.

TOPIC 2:
FITNESS TO PRACTICE

What will the Board take into consideration when reviewing a criminal disclosure?

Answers - all 4 are correct answers:

- what kind of work the person does
  (eg. residential, new builds, commercial, industrial)
- where that work is carried out
  (eg. in people's homes, in dairy sheds, in factories, in new developments only)
- how the person works
  (eg. do they work alone, are they an employee, do they have a supervisor)
- whether the person would be exposed to any risks relating to their charge or conviction while working
  (eg. access to items which could be stolen or money).

TOPIC 4:
GOOD SUPERVISION

What 3 things does a supervisor need to consider before sending a supervisee to a job?

Answers:

- The experience of the person doing the work
- The work involved
- Any job-related factors

What are the benefits of good supervision?

Answers:

- Safer work
- Good reputation for the profession
- Competent and better tradies

TOPIC 5:
PASSIVE FIRE PROTECTION

What is the purpose of installing passive fire protection around services?

Answer:

- To help preserve structural components of buildings from fire, to delay or prevent buildings from collapsing.

What type of sealant should be used alongside a fire collar?

Answer:

- Intumescent/fire rated sealant

TOPIC 6:
UNDERSTANDING YOUR COMPETENCE

What are some risks of doing temporary work?

Answer:

- The work is not likely to be completed compliantly

What are some benefits of admitting that you are not the right person for a job?

Answers - all 4 are correct answers:

- You can concentrate on the work that you are familiar with
- You are not going to start a job and find that you cant finish it.
- You are not risk going to cause customers unnecessary expense
- You may start a job that you wish you never got involved in.

TOPIC 8:
HEALTH AND SAFETY

What are the top three strain and sprain sites in plumbers, gasfitters and drainlayers?

Answers - all 3 are correct answers:

- Back
- Shoulder
- Wrist

What are three factors that contribute to strains and sprains in the trade?

Answers - all 4 are correct answers:

- Organisational factors
- Individual factors
- Psychological factors
- Physical factors

What are three things we can do to prevent strains and sprains?

All things listed are correct:

- Get work up off the ground
- Get closer to the task
- Lighten your toolkit or consider using a trolley to help move your gear
- Take regular breaks
- Use a trolley
- Organise the back of your van or ute
- Stay hydrated
- Go for lightweight tools
- Communicate well
- Use a tray

EXTRA NOTES:

EXTRA NOTES: