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AUTUMN 2019

A HOLISTIC APPROACH TO PIPING PROBLEMS

- IS THIS THE ANSWER TO SOLVING
AGE-OLD ISSUES?

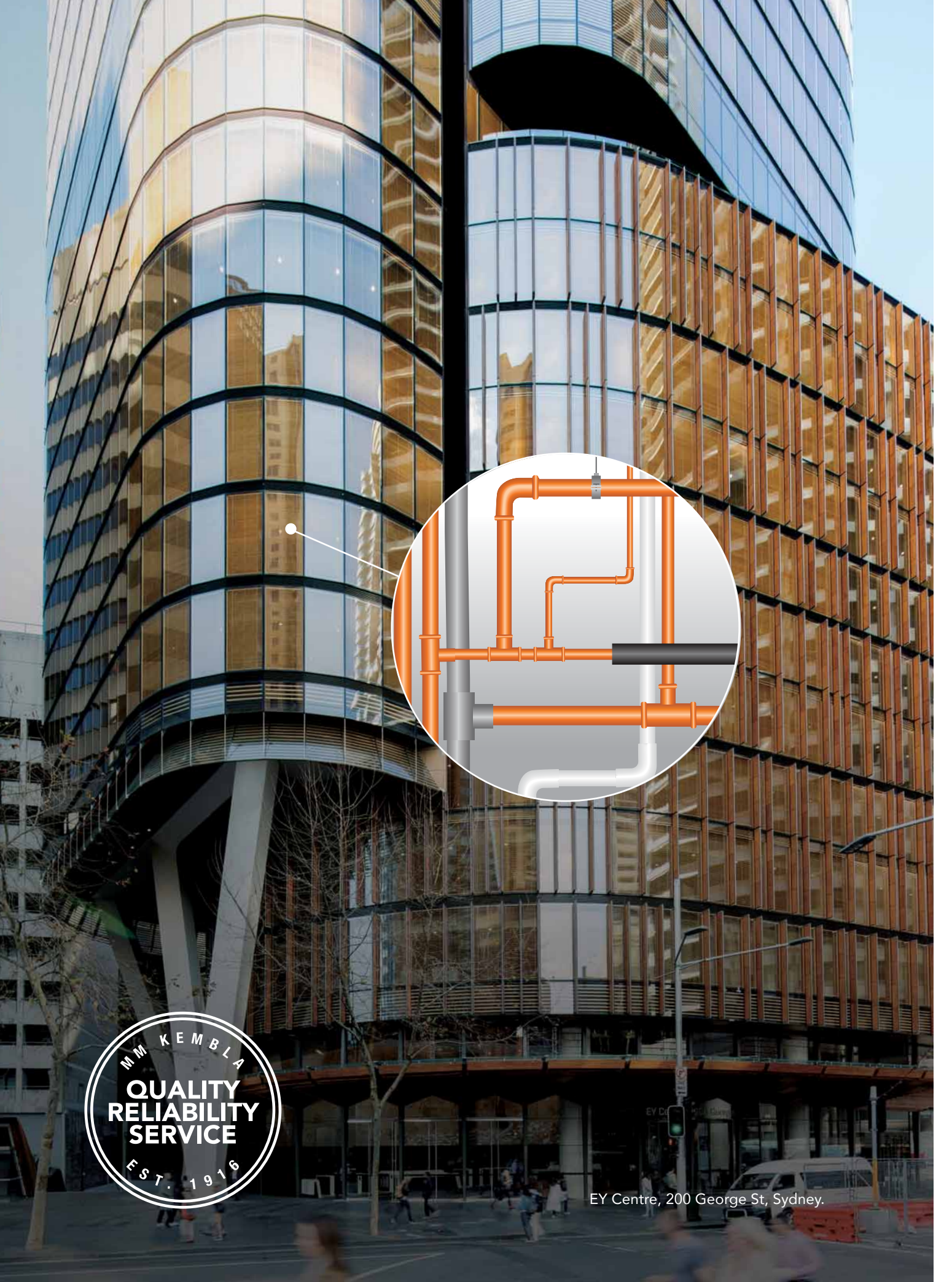
INSIDE:

THE INTERNET OF TOILETS (IOT)

WORLD WIDE WAKE UP CALL:
THIRD WORLD SANITATION NEEDS

FIT FOR PURPOSE: MANDATORY
CO TRAINING

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SIPHONING THE KNOWLEDGE

The desire to do and learn everything by oneself, whether ingrained or implanted, typically does more harm than good when it comes to business.

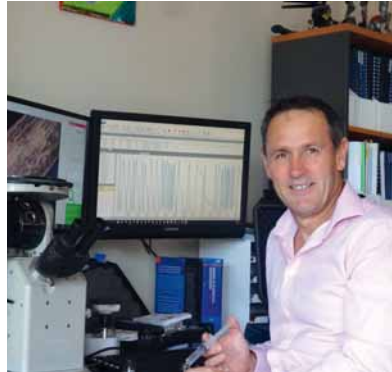
Truth is: we don't have all the answers. And it is okay to ask for help. The thing is, when it comes to finding said answers, there's a good chance they exist in the minds of a more experienced head. This is where mentorship can be invaluable. And if it's something you've considered in the past, there's certainly merit in learning from someone who has the hindsight you're missing.

Another way to acquire such knowledge is via publications such as this. And in this particular issue we've siphoned knowledge from some seriously wise individuals. The fact they are willing to share their wisdom with the masses is testament to their character. At the end of the day they all want to better the industry. And for that we should all be grateful.

Don Ledingham is the co-founder of the Association of Hydraulic Service Consultants Australia. It's been 30 years since we last touched based with Don, in regards to a story. He chats to Brihony Tulloch about the current state of plumbing and the road ahead.

After six decades in the industry and already bearing witness to drastic changes in policy, design and materials, it's hard to imagine what else could be in store, but Don believes things are only going to improve in the plumbing industry. This is largely due to technology and new ways of thinking.

Phil Woodhouse is incredibly passionate about discovering, what he believes, are the reasons for material failures within plumbing



Plumbing consultant Phil Woodhouse is on a mission to change the way the industry approaches problems.

systems, and he's on a mission to make things right. In short, he wants to convince the plumbing industry to totally rethink its practices with regards to the system itself and adopt 21st century thinking based on science.

David Creasey is in his early eighties and still razor sharp when it comes to transferring knowledge to paper. He pens an article on the desperate need to improve third world sanitation. We could likely fill the whole magazine with his musings, such is the knowledge he is willing to share on the topic.

So, in a time when innovation and forward thinking are both highly regarded to keep up with the times; perhaps it's worth a moment or two to learn from those more experienced than ourselves. After all, hindsight is a beautiful thing.

Enjoy the read

Jeff Patchell

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FEMALE LEADER AWARDED FOR ACHIEVEMENTS IN THE CONSTRUCTION INDUSTRY

Master Plumbers' Association of Queensland [MPAQ] executive director Penny Cornah has been awarded the ADCO Constructions Award for Achievement as a Business Woman at the National Association of Women in Construction Queensland Awards.

The award was presented to Penny in front of over 500 industry peers who came together to celebrate the excellent work performed by women in the construction industry. This award recognises Penny as a leader in Queensland's construction industry.

MPAQ represent over 1,300 contracting members across Queensland, which equates to around 4,000 plumbing professionals.

Penny identifies her key responsibility as heading the organisation that is the conduit between protecting community



health and the environment. She has developed strong relationships within the Queensland Government ensuring the industry's voice is heard at the highest levels.

"With her positive attitude, hard work and dedication, and drive to make a greater difference, Penny is an inspiration not only to the women in the construction industry but also to everyone that has the pleasure of working with her," MPAQ president Kent Vickers says.

Penny is actively working towards increasing the number of qualified female plumbers in the sector.

NEW VICTORIAN PLUMBING REGULATIONS THREATEN FIRE SAFETY AND JOBS

The Victorian Government's recent amendment to the Plumbing Regulations 2018 will threaten the jobs of thousands of Victorians and the fire safety of the state's buildings.

From 19 November 2018 routine service on fire hydrant systems and fire hose reel systems must be carried out by registered plumbers. Only a small segment of registered plumbers currently holds units of competence relevant to fire hydrant and hose reel routine servicing. Filling this gap in people with both appropriate training and the now-required registration could take decades.

"Fire Protection Association Australia [FPA Australia] is extremely disappointed and concerned that these new regulations will increase the life safety risk of Victorians," said FPA Australia chief executive Scott Williams.

"There aren't enough competent people to go around under the new regulations, and some Victorians

may miss out on having the systems that protect them from fire properly maintained."

"The changed regulations also put in jeopardy the jobs of thousands of Victorians, many of whom have been providing high-quality fire protection services for decades. This will have a downstream economic impact on thousands of businesses."

While the Plumbing Regulations 2018 have been positioned as a continuation of the status quo, the main criticism is they're based on an incorrect assumption that plumbers currently conduct the majority of routine service on fire hydrant systems and fire hose reel systems in Victoria.

Under the new Plumbing Regulations 2018, routine service work on fire sprinkler systems is also required to be conducted by individuals holding a sprinkler fitting registration. This has not changed from previous regulations. FPA Australia supports Victoria's requirements for sprinkler service to be conducted by qualified sprinkler fitters.

CALL FOR SHAKE-UP OF RESIDENTIAL SOLAR WATER HEATING INDUSTRY

A paper published by a research team led by Dr Urmee and Professor Parisa Bahri outlines the case for further developing the solar water heating industry in Australia and calls for improved customer service to help combat negative perceptions among householders.

"In a nation that has an abundance of sunlight, there are vast opportunities to further develop this industry," Tania says.

"Replacing electricity and gas hot water systems with solar water heating systems in residences throughout Australia would significantly reduce fossil fuel consumption and associated greenhouse gas emissions in Australia, however, the uptake remains low."

Hot water supply accounts for up to 30% of an Australian household's energy use, equating to about 10kWh per day. Electrical hot water systems are the most common method of water heating used, followed by mains gas, LPG tanks and then by solar heating, which is gas or electricity-boosted. In line with the rest of the nation, the number of installations of solar hot water systems on homes in WA has been in decline, after a peak period in 2010.

The research found that the upfront costs of installing a solar water heater were a strong barrier for customers, especially when installation, plumbing and roof strengthening costs were taken into consideration.

"The maintenance and repair costs, especially for pumps, valves, connectors and tanks can be perceived to be high. There is also a lack of knowledge of the benefits and usage of solar water heating.

"Providing a simple way for householders to compare the overall costs of solar water heating to other water heating systems; as well as offering a temporary hot water supply to residents during installation of the system, could improve matters."

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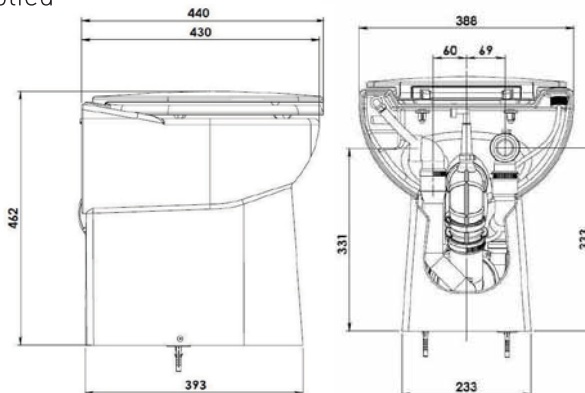
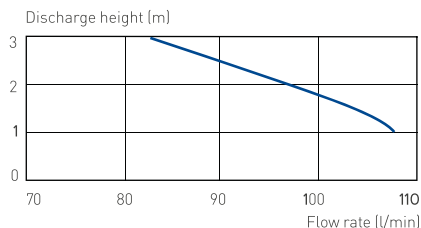


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RHEEM RECEIVES COVETED CANSTAR BLUE AWARD

Rheem Australia has been named number one for customer satisfaction in the hot water systems category for 2018 by comparison site Canstar Blue.

Each year, Canstar Blue asks Australians about their experiences with purchased products and services.

These shoppers then rank their satisfaction level with their brand of choice, on a sliding scale from 1 to 10.

In the Hot Water Systems category, Rheem ranked the highest for 'Overall Satisfaction'.

"This award is a wonderful recognition of the Rheem brand, which Australian families have come to know and trust for over 80 years," says

Rheem Australia Marketing Director John Collignon.

"Our water heaters are built tough for Aussie conditions with the latest technology.

"We offer industry-leading warranties of 10 and even 12 years, and we're at the forefront of energy-efficient water heaters with our solar options and our range of 6 Star continuous flow gas water heaters."

In its research, Canstar Blue found that gas is the most popular form of heating [44%], closely followed by electric [37%], with 13% of

respondents choosing solar.

"We manufacture water heaters to suit all requirements – from gas continuous flow, electric and gas storage to solar water heaters," says John.



2019 NCC SEMINARS COMING FEBRUARY AND MARCH

The 2019 NCC Seminars will be presented by the ABCB and Standards Australia in February and March.

Representing the culmination of the first three year amendment cycle, the Seminars will inform practitioners involved with designing, approving or constructing buildings about important changes included in the latest edition of the NCC.

Presentations will be held in all capital cities and this is your opportunity to hear about BCA focussed changes – don't miss out!

Standards Australia will also outline details of changes to Australian Standards that are referenced in the NCC.

At the conclusion of the Seminars, two webcasts will be available; one covering amendments to the BCA and the other on amendments to the PCA.

DATES AND VENUES FOR THE 2019 SEMINARS ARE:

| CITY | DATES | VENUE |
|-----------|--|--|
| Canberra | 12 February | National Convention Centre |
| Perth | 19 & 20 February | Perth Convention and Exhibition Centre |
| Darwin | 26 February | Darwin Convention and Exhibition Centre |
| Brisbane | 28 February & 1 March | Brisbane Convention and Exhibition Centre |
| Sydney | 5 & 6 March (two sessions on 6 March) | International Convention Centre Sydney |
| Hobart | 8 March | Hotel Grand Chancellor |
| Melbourne | 13 & 14 March (two sessions on 13 March) | Melbourne Convention and Exhibition Centre |
| Adelaide | 15 March | Adelaide Convention Centre |

UPDATED RESIDENTIAL AIR CONDITIONING EFFICIENCY STANDARDS RELEASED

AS/NZS 5141:2018, *Residential heating and cooling systems – Minimum applications and requirements for energy efficiency, performance and comfort criteria* has been published following the work of industry representatives, consumer advocates, regulators, and technical experts.

"There are countless schemes in place to guide energy efficient products in our homes, but none look at the installation and design of air conditioning and its impact on overall energy efficiency," said Standards Australia chief executive Dr Bronwyn Evans.

This Standard specifies the requirements for design, selection, installation, commissioning and maintenance of residential heating and cooling climate control systems.

"Over the last two decades, equipment energy efficiency programs such as Energy Labelling and MEPS [Minimum Energy Performance Standards] have driven air conditioning equipment manufacturers to dramatically improve the energy efficiency of their products," said Standards Australia technical committee chair Robert Beggs.

"However, these efficiency gains [which have come at a cost to the manufacturer and ultimately the consumer] can be blown away with poor application or installation.

"This Standard now introduces minimum requirements for the selection and installation of the equipment and system components to ensure that the installed system can operate at optimum efficiency. Other important consumer requirements such as noise levels, system reliability, serviceability and workmanship are also addressed by this Standard."





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INSIDE KNOWLEDGE

WHEN IT COMES TO SOLVING AGE-OLD
ISSUES IN THE PLUMBING INDUSTRY,
PHIL WOOLHOUSE BELIEVES A HOLISTIC
APPROACH IS NECESSARY. ROSS
MCGRAVIE REPORTS.

Against a general tide of apathy, Perth-based plumbing consultant Phil Woodhouse has developed an interest in discovering what he believes are the real reasons for material failures of piping within commercial and household plumbing systems.

So much so that after a seven-year quest to provide the answers to the eternal question of 'why?', Phil believes he has acquired the know-how and data to explain the root causes and effects of plumbing issues that create enormous headaches and equally large repair bills.

"Plumbing water system operation has become so highly technical despite the ease in which all the modern materials are clipped together," Phil explains.

"But I believe the industry has become too focused on individual problems and has not looked holistically at how all these individual changes can affect the fluid dynamics within the entire system.

"As a plumbing industry, we haven't really understood what happens in our systems and these dynamics have crept in over the years and have been eating away like a cancer for a long period of time.

"For instance, have you thought or looked at how a tempering valve works with different types of hot water systems, or how a pressure-reducing valve reacts on a pumped system, or how a pressure drop caused by a backflow valve can change the dynamics of all of these valves and pipework instantaneously and how this factor is intensified again if it is on a pumped system?

"Do we teach our apprentices about disinfectants, such as chlorine chloramines and chlorine dioxide? Do they know how to test the water supply for these chemicals to see if the pipe work that they are installing is suitable? Do they understand what happens in the heating process of these

chemicals, or what can happen if there is high organic load in our water pipes and fresh chlorinated water enters the system?

"Some of these situations can cause irreparable damage to a new metal or plastic system in a matter of weeks, but the consequences may take five to seven years to show up.

"And there's so much more. Unfortunately I don't believe this knowledge is being passed onto the industry and it is something I want to help change."

In short, Phil wants to convince the plumbing industry to totally rethink its practices with regards to the system itself and adopt 21st century thinking based on science.

"Most of the problems are generated from basic laws of physics and some of these have been known since the 1600s, yet in these modern times we appear to have forgotten or ignored many of these fundamental principles," Phil says. ➤

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"What is now becoming very apparent is how much the plumbing industry is in the dark when it comes to knowing what is happening within pipes. We install more monitoring equipment within a \$20,000 motor vehicle, measuring its operational performance, than we install in a \$1 million plumbing system. And in those very rare buildings that do have some plumbing measuring devices, most of the people in control of the data do not know what they are looking at."

Phil believes that the operation of plumbing systems is well overdue for scientific research. This will not only help avoid costly mistakes but there are also many energy efficiencies that can be achieved.

Joking that he "must almost have a degree in Google or YouTube by now", Phil has educated himself about chemistry and algebra through the Kahn Academy, becoming familiar with the Joukowski Equation, Boyle's Law, Albert Einstein's love of plumbing, Graham's Law, thermodynamics and Henry's Law among other things.

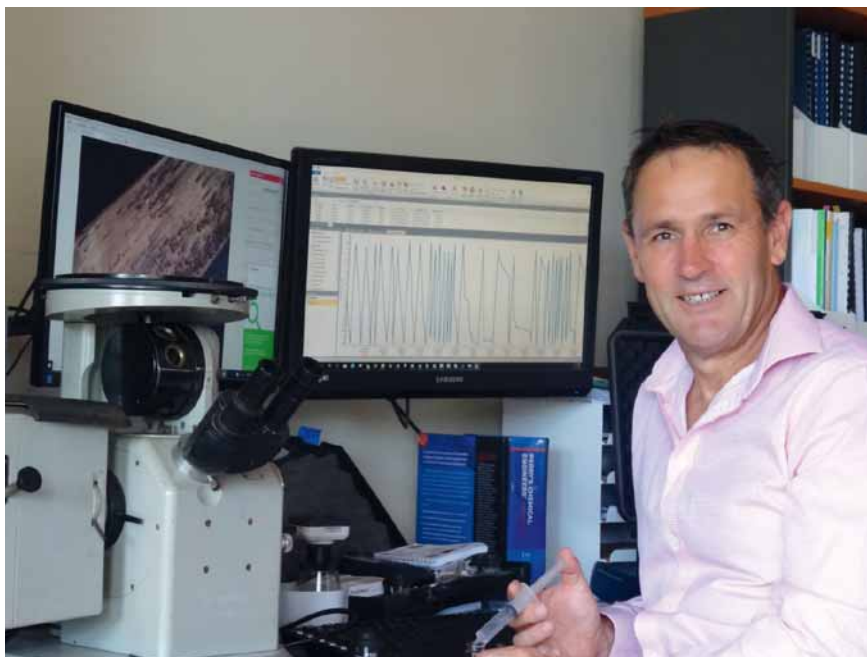
Not bad for someone who left school at 16 with no qualifications other than a driver's licence.

Now armed with the knowledge acquired from his investigations over many years, Phil is keen to take the next step of partnering with esteemed research institutions to back up his hypotheses with scientific fact.

"I have spent too much time and effort and have come way too far not to see this journey to the end," Phil says.



Phil's research has piqued the interest of his 10 y.o daughter. She took this photo after they played with some pool chlorine... they won't tell mum that bit.



To understand how plumbing really works you need to take a diverse approach in all related aspects. Microscopes, chemistry books and university white papers are all tools that Phil uses to discover why something occurs.

"I started this expedition because I didn't know why something was happening. I wanted to find the root cause and no one I spoke to was interested in trying to work out the answer. I felt the reasons we were being told about the failures within our industry were not quite right; there had to be more to it and there was."

THE MAIN ISSUES

Determined to keep it simple, Phil says countless changes and innovations had changed the dynamics in our plumbing systems over the past 25 years.

"This is meant to be the 21st century. We should be able to turn on our tap with confidence that the water we drink will not poison us, the water we bathe in will not scald us, and the simple act of breathing while standing in the shower will not kill or give us a nasty pneumonia-type illness," he says.

"We are trying so hard not to harm the end user. We have overcomplicated the entire system without taking a holistic point of view of how all these individual safety devices and mechanisms that we use to protect us are actually working together, generating new problems.

"Whether it's pressure generation,

backflow prevention, water harvesting and reuse, temperature control, disinfection, velocity and hot water generation – typically all of these components needed within a plumbing system are addressed by individual industry experts, yet most are only specialists in their given fields. I believe it is this lack of understanding on how all of these things work together that is the major contributor to many of the problems we are experiencing.

"I know that is a pretty big statement, but it is one that I can back up with facts and data that I have collected over the past seven years."

Phil identifies through a process of elimination what is causing the problem, always keeping in mind that "there is no perfect material – they all have their strengths and weaknesses – but there are perfect dynamics".

"The plumbing industry is no different to most others in these modern times. If something breaks, we quickly replace it. But why did it break? What caused it to fail? I usually find [with plumbing issues] it's not one thing on its own. It's always a combination of multiple things working together that causes these problems."

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Focusing on what is happening inside the pipes; Phil uses his sophisticated equipment to measure the entire dynamics, including temperature, pressures and flows, to create a complete data profile over several days.

In doing so, he believes he has refined the cause of plumbing issues down to various factors that include: cavitation – the pressure stability that causes cyclic fatigue; temperature – a key driver in corrosion; water hammer – induced by pressure and air changes and fast-acting valves; velocity – low and high are both problematic; and oxidisers [chlorine, coppers, oxygen].

“If you’re going to do one thing with your plumbing, try and design the air out of your system,” he says. “Think of it as a Coke bottle and the air pockets created when you turn it upside down. Try and get rid of the air pockets. And if you do that, that’s the first step that will probably make the biggest difference.”

Another part of the problem, Phil explains, are the outdated standards based on rule of thumb rather than engineering calculations.

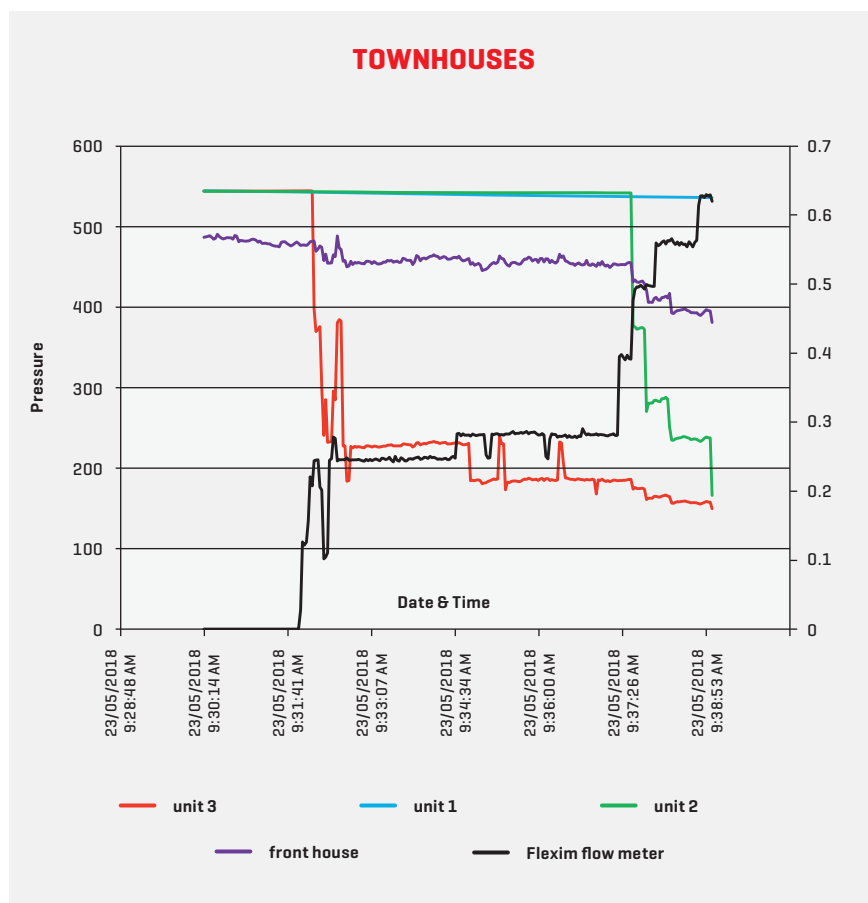
“If we go back to the fundamental principles of how often a plumbing system is used, we’ve almost got to go back to a guy called Hunter, who was engaged by J. Edgar Hoover back in the 1940s after the invention of the elevator when they realised they didn’t have a calculation to work out plumbing for high-rise buildings and how many people are likely to turn on their taps,” he says.

“We’ve been using a similar theory, with a couple of modifications, ever since then.”

Phil says our design standards, such as the probable simultaneous flow [how much water do we need to allow under plumbing standards for the maximum amount of everyone turning on the taps at the same time] is out of sync with modern uses.

For example, the maximum flow rate required for one hundred apartments is almost eight litres per second is, on average, at least four times greater than what Phil has measured. In practical terms, this means the pipes are too big and using equipment that is too powerful.

“It’s quite farcical when you look at



Recording data on a system is one thing, interpreting what it actually means is a whole new ball game. It has taken the best part of 5 years for Phil to recognise common traits or problems and how they present within the data. He says that once you understand this part, locating the sensors and equipment become critical to best capture the dynamic or problem you are looking for.

these things over and over again. You see the same problem creating the same issue.”

Phil says he was indebted to many of his collaborators, such as Professor Graeme George from QUT [understanding polymer, chemistry] and Professor Martin Lambert at the University of Adelaide in South Australia [hydraulics] for improving his understanding of complex subjects.

But the repeated failures he encounters and increased trend towards apartment living highlights why the need for research is paramount.

“We need to invest in research on plumbing because these things that are occurring are not only in Australia. They’re in New Zealand and the same issues are happening in the US and elsewhere,” Phil says.

“This is an industry problem and it’s not just limited to plumbing designers. It encompasses the education of our plumbers, the way we install things, our plumbing regulators, the way we commission and the way we maintain. Overall, we just don’t know enough about what’s happening inside pipes.” ■

INSIDE KNOWLEDGE

With such a vast amount of knowledge and research under his belt, Phil has agreed to write a regular column for *Plumbing Connection* magazine. His column will explore a range of industry issues and problems, and potential remedies or alternative ways of thinking about how to overcome them. Stay tuned for the first of his regular columns in the winter issue.

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LEGIONELLA WITHOUT BORDERS

Legionella does not discriminate when it comes to spreading its potentially fatal wings. As a result, various countries have been forced to manage all facets of the bacteria, including its cause and effect. Kelvin Slade is leading the charge to ensure Australia raises the bar when it comes to managing Legionella in our own backyard. And he has a number of recommendations for the industry.

It's hard to believe there's no formalised training available in Australia to adequately educate plumbers and facility managers on Legionella detection and management. When you consider the serious nature of the potentially fatal infectious disease that is Legionnaires, it begs the simple question, "Why?"

Thankfully, steps are being taken to rectify this situation. And one individual in particular, is flying the flag for us down under.

In 2016 Slade Bros business director, past-president of Master Plumbers' Association of Queensland and Legionella Management Advisory Group chairperson Kelvin Slade, was one of 106 talented Aussies chosen to receive a Churchill Fellowship.

The Winston Churchill Memorial Trust is a company limited by guarantee that was established in 1965 after the death of Sir Winston Churchill. It was formed with the principal objective of perpetuating and honouring Sir Winston's memory by the awarding of Memorial Fellowships to be known as 'Churchill Fellowships'.

Kelvin received The Park Family Churchill Fellowship to research Legionella training with the goal of implementing a course to educate plumbers on infrastructure treatment.

As an industry trainer that delivers licence endorsement courses throughout Queensland for Master Plumbers' Association Queensland, it became evident to Kelvin, via the Thermostatic Mixing Valve course, that there's a knowledge gap in the plumbing industry about the bacteria and the disease. His business also services aged care and healthcare facilities where they have treated systems infected with Legionella.



Kelvin Slade with president PathCon Laboratories Dr Brian Shelton.

"I found the research needed to appropriately educate myself to be frustrating. This eventually led to me apply for the Churchill Fellowship," says Kelvin.

"The purpose of the fellowship is to allow ordinary Australians like myself to conduct research in their chosen field, in the Northern Hemisphere and other parts of the world where it is not readily available back home. Upon our return, we set about putting that research into practice, with the aim of making a difference to the wider Australian community."

Kelvin's journey took him to Atlanta, Belfast, Manchester, Bradford, Leeds, Halifax, Liverpool, Bristol, Rome, London and Singapore. The focus of his travels was to research international legislation, policy, codes

of practice in managing, monitoring and treating *Legionella* bacterium in complex water supply systems within buildings.

Let's take a brief look at some of his key findings.

"I started in the US at the American Society for Heating, Refrigeration and Air Conditioning (ASHRAE). It publishes a library of standards and guidance for the built environment and is very much seen as the premiere organisation in the States."

It jointly published the voluntary *ANSI/ASHRAE Standard 188-2015 Legionellosis: Risk Management for Building Water Systems*.

"One of the key things that came out of my visit to ASHRAE was the importance of disseminating information to the public in a language that the non-scientific community can understand and absorb."

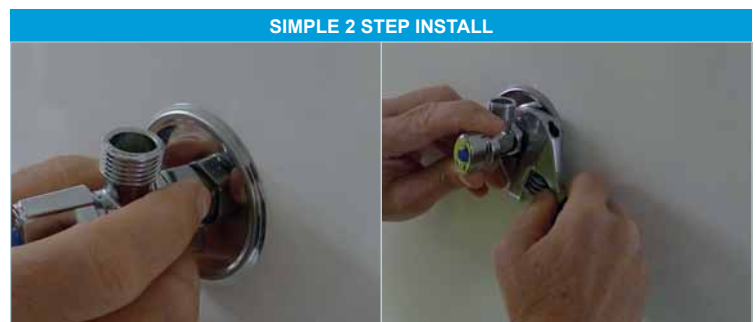
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This photo clearly shows a potential pseudomonas/Legionella infected infrared basin spout and aerator.

The next stop was the Centre for Disease Control [CDC] in Atlanta.

"The purpose of my visit to the CDC was to get a holistic picture of how Legionella management and control is dealt with nationally in the States.

"I consider myself extremely fortunate to have had access to such highly qualified and experienced professionals. This included the likes of a biologist, epidemiologist and a microbiologist; all of whom specialise in the field of Legionella," says Kelvin.

Similarly to Kelvin's discovery at ASHRAE, the CDC explained that the public can't be left in the dark.

"The public needs to be further educated on the subject. They want to know specifics, but as the CDC explains, there is nothing specific about the Legionella bacteria. Government agencies simply need to better understand how to communicate with the public."

Another common theme that seems to have come about during Kelvin's travels was the issue of training and the fact it is regarded as paramount for all involved.

As part of his time in the States, Kelvin also visited Pathcon Laboratories

where he was hosted by its president, Dr Brian Shelton. It was the first laboratory to offer Legionella testing services to the private sector.

One comment that stood out in particular was this: "We should not blindly adopt a standardised approach to all systems as each building, its system design, use and geography is

individual," said Dr Shelton.

The UK leg of Kelvin's journey included visits to Belfast, Manchester, Bradford, Leeds, Halifax, Liverpool, Bristol and London.

"One of the first things that surprised me during my time at Belfast Health and Social Care Trust was that they don't just hold one person responsible for water safety. Instead they have a group," says Kelvin.

"There is actually a team in Belfast who goes around sampling for Legionella daily. In fact, they lift 3500 samples a year. And they follow a descriptive flowchart when various counts of readings are found. It's definitely something I believe we need to adopt here in Australia as it minimises the risk of error."

It is worth noting the standard used by laboratories in the UK and the EU for sampling and testing Legionella is the International Standard, which stipulates sampling and reporting on one litre of water per test, which is referenced in the three [3] band approach used in the flowchart.

During his time in Manchester and the Midlands, Kelvin observed that Legionella and Pseudomonas are equally recognised and treated. Risk assessments are seen as vital and water hygiene training is quickly becoming a pre-requisite for any

KELVIN'S RECOMMENDATIONS FOR LEGIONELLA MANAGEMENT IN AUSTRALIA

The following recommendations are formulated on my evidence based research. Each item has been considered against current proven practices in place in the UK and the EU. I recommend the adoption and implementation of the following items nationally in Australia:

1. Ban the use of aerators on tap spouts and outlets in high risk patient / resident areas
2. Introduce the mandatory periodical cleaning of aerators and shower roses in high risk areas
3. The use of removable tapware and spouts should be encouraged in high risk areas
4. Point of use thermostatic tapware should be encouraged in healthcare
5. TMV blended pipe length limitations should be regulated
6. Reconsider the application of WELS in health care
7. Training should be mandatory for anyone involved in Legionella control or water safety
8. Legionella training should be a licence endorsement for plumbers
9. Adopt AS/NZS 4032.3 nationally. This will align the risk acknowledged in the requirements mandated in AS/NZS 3500.4 Cl 1.9.2
10. Building water system design principals should be reconsidered in health and aged care alike. Water flow rates in healthcare should be reconsidered
11. The adoption of a National Approved Code of Practice for Legionella Control
12. enHealth Legionella Control Guidelines should be amended to be more descriptive
13. Develop and adopt definitions of dead legs and capped ends
14. Water Risk Management plans should be mandatory in all aged care facilities
15. Entities, consultants or people undertaking water risk assessments should not undertake any required remedial work to avoid conflict of interest
16. Alignment of WH&S regulatory obligations with Legionella guidelines should be introduced.

contractor working on building water systems.

In the UK particular focus has been directed toward hospitals, whereby bottled water dispensers have become outlawed in the UK for patient use due to surprising test results from bottled water. Scoop ice machines have also been outlawed in hospitals due to presenting a *Pseudomonas* risk.

Kelvin says his research would not have been complete without investigating the training available in the UK.

"There is a wide scope of training available which is facilitated by a number of organisations. I chose Eastwood Park for three reasons, reputation, trainer experience, and course availability. The chosen course was Practical Water Safety for Healthcare Premises, which lasted five days.

"The course was intense but did not disappoint, giving me maximum exposure and insight into the regulatory

framework for water safety," says Kelvin.

Another big component of the trip was the 9th International Conference on Legionella in Rome. The International Conference on Legionella is held every four years in various countries and brings together the international community to showcase current research, scientific developments and practices.

Speakers from around the globe came together to inform delegates of the practices, statistics and regulations pertaining to Legionella control in their respective countries.

The following are extracts from Kelvin's final report – *Legionella training to educate plumbers on infrastructure treatment*. We believe really highlight the issues we're facing in Australia when it comes to Legionella.

'There is little doubt that Australia is sadly lacking in water risk management practices in health care and aged care

facilities when compared to the U.K and some European countries. My research indicates that Australia is some 15 years behind the U.K, in recognising the Legionella risk, regulating an appropriate Approved Code of Practice and management measures. The Legionella risk profile in Australia is higher than the UK, similar to Germany and the USA, when our temperate climate is taken into consideration.'

'When comparing the recommendations within the enHealth Guidelines to international codes and guidelines, the enHealth Guidelines are open to misinterpretation and insufficient application. In other words, they are not descriptive enough for the nontechnical, inexperienced, untrained user they are written for.'

The Legionella Awareness Course will be facilitated through the Master Plumbers Australia network in most states. It is anticipated the courses will begin in February or March. ■

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THE INTERNET OF TOILETS (IOT)

As in the electricity sector, intelligent metering of water offers resource efficiency and cost savings. Paul Skelton reports on Caroma's Smart Command toilet technology.

The smart phone is an everyday example of what clever engineering and technological savvy can lead to.

And technology is spreading. Cars are becoming electrified and, in some instances, are driving themselves. Artificial intelligence, virtual reality and augmented reality are starting to appear in 'real world' applications.

At an infrastructure level, the electricity grid is being revolutionised through the introduction of smart meters, and the NBN continues to be rolled out around the nation.

Technology, it seems, is affecting every aspect of our lives except, strangely, when it comes to water. This is despite the fact that water supply and management is primed for technological disruption.

That said, technology is not entirely absent from plumbing; rather, it is lagging behind the electrical sector.

Professor Stuart White is head of the Institute for Sustainable Futures [ISF] at the University of Technology Sydney. He says this is partly due to the industry being old and conventional.

"We've been creating conventional gravity sewers and water loggers for eons. The designs have improved in sophistication and performance from a mechanical perspective, but it's been

much slower from an electrical, digital and control point of view.

"The plumbing industry has lagged behind the electricity industry in terms of digitalisation, particularly technology for providing user feedback. Part of that is because it's harder and more expensive to install sensors and control systems in plumbing fixtures and fittings than it is for electricity."

However, *The Bathroom of the Future – Prospects for Information and Control*, prepared by the ISF for the GWA Bathrooms and Kitchens Group, contends that certain technologies have come a long way.

The report says government and utility water-efficiency initiatives in Australia advanced rapidly during the drought of the 2000s, in terms of the breadth of end users and sectors, and the scale of problems.

"It is this history of plumbing product innovation and a familiarity with digital metering, together with the push for sustainable urban water management, that primes Australia for the next generation of fixture-driven water efficiency."

Technology that provides more frequent, higher-resolution and remotely accessible data allows information-driven change and intelligent control.



“Developments in intelligent water metering technology have evolved to a large extent from the energy sector, in which smart electricity and gas meters and communications infrastructure have been more widely introduced.”

Water utilities are increasingly considering intelligent metering as a way of enhancing water supply security, minimising waste and controlling costs [e.g. less meter reading] as well as transforming the customer-utility relationship.

By providing more information on water use that can be converted into meaningful information for the user/customer, intelligent metering can improve water literacy in the community.

“Advances in mobile applications are facilitating fast and simple management of personal and household activities, but the success of these applications depends on access to relevant and useful information while also acknowledging the sensitivity of such information.

“The increased availability of data in conjunction with the emergence of the ‘internet of things’ and long range wide area networks is shifting cultural expectations of the convenience, detail and accessibility of consumption information.” ➤

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Connecting devices helps to provide a deeper understanding of how they operate individually as well as synergistically.

However, there are several challenges.

"As in the energy sector, residential consumption patterns have historically garnered most interest, and little research has been done to understand the water end-use patterns in commercial buildings. The absence of data signifies a real gap in the knowledge required for optimising operational processes and planning for network improvements."

Further, the roll-out of electrical smart meters has not been without issues.

"It has been a bit mixed. The experience in Victoria indicates that it's quite important how you do it, and what the messaging is," Stuart says.

"Some areas have avoided concerns that this is just about getting more revenue, so it is possible to do it well."

"We spoke about how utilities could, in principle, send SMS alerts if someone's system gets a leak. You could also look at demand pricing, monitoring water restrictions or determining what water is being used for what purpose, to enable research."

"The biggest benefit we've seen in the electricity industry is giving consumers the ability to control and improve their use."

THE INTERNET OF TOILETS?

The term 'internet of things', or IoT, has been in use for some time. It covers the gathering data from a wide range of sources (phones, thermostats, security systems, etc) and translating it into a 'common language'.

"By connecting all these devices, data is shared and transmitted between devices, providing a deeper understanding of how these operate individually as well as synergistically," the ISF report states.

In a building setting, this could mean that appliances communicate with each other co-operatively via wireless.

"For example, the HYDRAO shower in Europe lights up with different colours for different volumes of water use, with the aim of encouraging users to have shorter showers – especially during peak usage periods, at a gym for example."

"A tap with similar properties could be used to elicit different hand-washing behaviours in high-risk areas such as childcare, hospitals, schools and food preparation areas [e.g. red for 'too short'; orange for 'nearly there'; green for 'you are done']."

"Another 'nudge' application could be the lighting up of a tap after the toilet has been flushed as a prompt to encourage hand washing."

"There is potential for digital fixtures to revolutionise the management of fixtures and the collection of valuable data to change a range of behaviours."

In Australia, bathroom product designer Caroma is leading the charge with the introduction of Smart Command, an intelligent bathroom management system that harnesses the IoT to enable real-time remote monitoring, management and control of water use in commercial bathrooms.

Caroma Smart Command allows building owners to make smarter decisions to conserve water and reduce maintenance costs while improving hygiene and wellbeing, and increasing facility uptime.

Data collected continuously in real-time through Smart Command can be accessed locally within the bathroom from a mobile app. It can also be integrated with existing building management systems (BMS) or to a Caroma cloud platform to enable remote monitoring of the entire building, faster fault diagnosis and accurate cleaning schedules.

Caroma innovation director Dr Steve Cummings developed the Smart Command system.

"As inhabitants of the driest inhabited continent on earth, we need to keep innovating to conserve water as our most precious resource," he says.

"Advances in smart technology have transformed our ability to monitor and manage other critical resources and functions in digital buildings – such as power, lighting and ventilation – similar opportunities in commercial water management have not been unlocked ... until now."

The expected benefits of a connected system such as Smart Command include real-time detection and remedy of problems, and improved facilities management. The IFS report nominates water loss and breakages, pressure management and energy savings through hot water optimisation.

Stuart says Smart Command could represent a turning point.

"I think we've reached a breakthrough with the Smart Command technology, which I think will open up the market quite a lot because people will see what can be done."

"Smart Command has the potential to take off very quickly, especially where there is a demonstrated advantage. It will absolutely be disruptive but not necessarily in the way you think – like an iPhone or LED lighting – because it won't affect the consumer sector."

Steve says it is a natural progression for the industry.

"Electronics have been a part of the plumbing industry for

35 to 40 years, but in the early days it was problematic. Over the past 20 years electronic bathroom products have been progressively refined and improved in operation. During this time we produced highly sophisticated water saving urinal system technology.

"About five years ago I was working on a project in Melbourne. We had to troubleshoot a problem with the plumbing system that required the removal of urinals from the wall to conduct tests. While highly sophisticated in operation, the urinals did not provide any information back on flush volumes or malfunctions. They were the best on the market. So we started looking at better ways of identifying any problems, with one idea of having a LED light integrated into the urinal that went on if there was a issue.

"We looked at the software in our smart urinals but it was not possible to produce a solution using the existing software, so we had to completely redesign the electronics. That was the start the technology development for Smart Command.

Beyond sustainability efforts, the accurate understanding of bathroom use can benefit users in retail complexes, airports, workplaces and other large facilities. Remote, accurate real-time information on bathrooms gives managers what they need to ensure bathrooms are cleaned, restocked and performing optimally.

In addition, developers, architects and city planners can

make smart decisions about where bathrooms should be, the provision for males or females, and the fixtures to be included. Queues could be greatly reduced, or even eliminated.

There are thousands of commercial properties in Australia, and the installed base of toilets and bathroom fixtures is immense. Can Smart Command be retrofitted?

"The taps are easily interchangeable, and they just need power," Steve says.

"If it's a Caroma cube urinal, we can just switch the electronics out to make it Smart Command capable.

"Plumbers won't need to do any electronic work. They just install the fixtures, as they normally would, and the facilities manager or system integrator will connect it all to the BMS.

"The opportunities that this system provides are significant, not just in relation to cleaning and maintenance but also water conservation, monitoring, flow control and importantly, leak detection at a fixture level."

The ISF says the greatest savings from a system such as Smart Command would be in leak repairs, flow regulators for taps and low-flow shower fittings.

"A related aspect of leak management is pressure management. Water pressure can fluctuate with reservoir levels and, when high, the risk of leakage may increase.

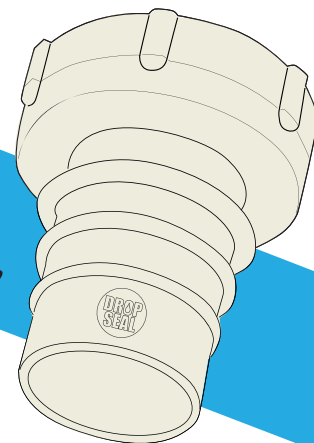
"Intelligent metering can be employed to understand and manage network pressure and mitigate leakage through



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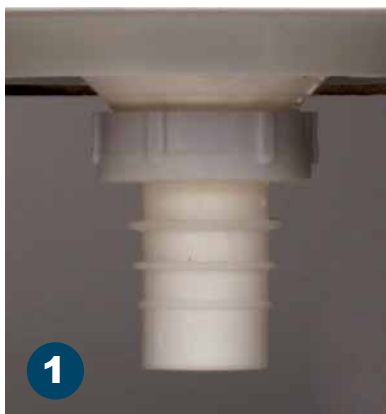


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National Manager intelligent bathrooms Bruce McIntosh with innovation director GWA Group Dr Steve Cummings at the launch of Caroma's Smart Command in Melbourne.

pressure reduction during periods of low flow.

"Other elements of network efficiency have been identified, such as efforts to improve response times to non-compliance (illegal use), particularly during times of water shortage.

"Monitoring asset condition is also integral to network efficiency, and intelligent metering can provide data on performance and failure, and broader network operations.

"Smart fixtures may be able to receive signals about peak demand and shut off non-critical appliances in return for bill savings, as has been done to some extent in the energy sector.

"Smart bathroom fixtures could be used in a similar manner to optimise building management practices. Automated control of public access could be linked to a type of fault identified through the data, restricting access if required.

"For street lighting, automatic outage detection and remote monitoring allows operating and maintenance costs to be reduced by reporting exactly where faulty lights are, while also improving safety for pedestrians and vehicular traffic.

"For building managers, knowing exactly the type of fault would allow for correct maintenance reporting and more efficient repairs. For example, a leak due to a faulty solenoid would need to be repaired by an electrician rather than a plumber.

"For facilities managers with geographically dispersed facilities – for example, councils – being promptly alerted to changes in usage or faults would assist in maintenance and cleaning."

Data from bathroom fixtures in an A-Grade commercial

development in Australia has been collected in a trial of Caroma's Smart Command. Analysis as part of the ISF research has provided preliminary insights to the opportunity presented by the technology.

"Pilot data has revealed that real-time performance management ensures that faults can be identified accurately and rectified effectively, minimising water leakage and improving water conservation efforts," Stuart says.

Steve says there are many opportunities to be explored that can have a big effect on water usage. ■

WATER FACTS

- According to the BBC, global water demand will have increased by 55% from the year 2000 to the year 2050.
- A tap that drips once per second wastes 30L of water daily.
- One 'sydharb' is the amount of water in Sydney Harbour – about 500GL. This unit of volume is used in Australia to describe the amount of water in large water bodies such as lakes and dams.
- Australia uses about 25,000GL of water a year, which is equivalent to 50 sydharbs.
- Flushing a toilet can use between 3L and 26L of water.
- The Water Efficiency Labelling and Standards (WELS) scheme has calculated that using efficient systems could save Australians more than \$2 billion by 2030, an average of \$175 per household each year.
- 65% of these savings are from reduced electricity and gas costs associated with water heating.
- 35% are from reduced water bills.

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WORLD WIDE WAKE UP CALL

Dave Creasey explores the desperate need for widespread use of safely managed, sustainable sanitation services across the globe, and reveals how an ex-tech giant is leading the charge.

My eyes were first opened to sewerage disposal during my childhood while growing up in the UK. From 1940-1945 my education was subjected to interruption by the renovation program, donated free of charge, first by the Luftwaffe (Nazi air force), and later by some interesting unmanned rockets launched from a place called Peenemunde.

While living in London, my sister and I spent our nights sleeping first in the cleaned out coal cellar located under the stairs to the home unit above, and later in an Anderson shelter in the backyard.

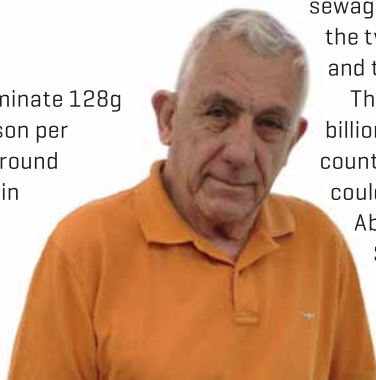
We were eventually evacuated to Peaslake, a wonderful sleepy village near Guilford. The WC was a portable timber job located in the garden which could be moved, like a sedan chair. It was located over a sizeable hole in the earth; a mound of excavated earth was the supply to cast over the 128g, or whatever you might deposit in the pit.

This arrangement provided rich soil and a staggering crop of tomato plants, which I would eat much like an apple on my way to school; this might be considered as my first practical experience of environmental science.

While basically crude, the Peaslake sanitary system was a labour intensive, simplistic 100% sustainable, practical system. Few, if any, outbreaks of rampant disease occurred while these systems were the norm too. And it seems modern science has recognised the fact.

POTTY TALK

On average humans eliminate 128g of fresh faeces per person per day with a pH value of around 6.6. Fresh faeces contain around 75% water and the remaining solid fraction is 84-93% organic solids. This means each person



David Creasey.



Bill and Melinda Gates started its Reinvented Toilet Challenge in 2011 to develop a next-generation toilet that doesn't need to be hooked up to a sewer grid.

who uses a modern plumbing system produces 32g of solid material each day which translates to 1kg/1000 people using the system.

Human faeces have historically been used as fertiliser for centuries in the form of night soil, faecal sludge, and sewage sludge, depending on the type of collection system and treatment process.

There are over 1.5 billion people in developing countries; to this number we could add many Australian Aboriginal and Torres Strait Islander people.

So why am I telling you all of this?

Because there's an important lesson to learn. And some powerful people are leading the way when it comes to implementing change.

FROM TECH TALKS TO SANITATION SERMONS

Bill Gates isn't afraid of potty talk. In November he got onstage at the Reinvented Toilet Expo in Beijing, China, in front of global business leaders, investors, and government officials and unveiled what he politely referred to as a 'little exhibit'. It was a glass jar filled with human faeces.

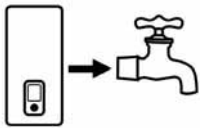
"It's good to be reminded, in this sample, that there could be over 200 trillion rotavirus particles, 20 billion ➤

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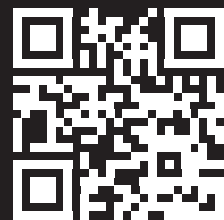
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Shigella bacteria, and 100,000 parasitic worm eggs,” said Bill.

The jar of human waste was used to make a point. Around the world, in places without proper sanitation or sewage systems, to the disgrace of the modern world, there’s much more than a jars worth of unsanitary human waste sitting around.

“That’s what kids, when they’re out playing, are being exposed to all the time,” said Gates, noting the link between bad sanitation and disease, death and malnutrition.

To address that problem, the Bill and Melinda Gates Foundation started its Reinvent the Toilet Challenge in 2011. The initiative funded \$US200 million in grants for universities around the world to develop a next-generation toilet. The goal: develop a waste-processing system that doesn’t need to be hooked up to a typical sanitation and sewer grid.

The systems developed with those grants convert what we put in the toilet into fertiliser, energy or recycled water – some of which is good enough to drink.

The Gates Foundation now intends to invest an additional \$US200 million into research that can yield additional ways to deal with human waste at the source. In 2015, the World Health Organisation (WHO) estimated that just 39% of the world’s people were using a ‘safely managed’ toilet or a decently clean latrine.

Living without a good toilet can be unsafe. People who come in contact with faecal matter face a risk of deadly infections and chronic health problems, since human faeces carry pathogens like E. coli, Streptococcus, hepatitis A and E, and more that can cause pneumonia and diarrhoea; the top two killers of kids around the world. It is estimated that illness from poor sanitation costs the world over \$US223 billion per year in lost wages and extra healthcare.

“Unless we do something, the cycle of disease will actually be accelerated,” said Bill.

He doesn’t think it’s practical to expect the entire world to connect their homes to yet-to-be-built conventional sewer systems and wastewater-treatment plants. That’s why he has



This type of public sanitation in India has the potential to infect users with deadly infections and chronic health problems.

been on a quest to do for toilets what he argues Microsoft did for computing: get the business off a centralised mainframe system.

Bill started by asking engineers at universities around the world a simple but unanswered question: “Could you leapfrog the long-accepted ‘gold standard’ of sanitation? A decade ago, I didn’t think I would be able to tell you so much about human waste,” said Bill.

INVESTMENT = INNOVATION

After seven years and \$US200 million of investment, the first batch of products from the Reinvent the Toilet Challenge is

being tested in locations around India, Africa and China.

One of the first new toilets is the solar-powered Eco-san system which is based on technology developed at Cal Tech. the Eco-san extracts clean water from human waste and reuses it for future flushing. Other models are also in the works from companies and universities around the world.

The University of South Florida’s NEW generator treatment system runs on solar energy and can be hooked up to any existing toilet. It uses a Nano-membrane filter [kind of like a coffee filter] with faeces-digesting anaerobic

bacteria inside to filter clean water out of the waste.

Another toilet from Cranfield University in the UK comes equipped with a little trap-door odour barrier and scraper that means water isn't required for flushing. Clean water is filtered out of waste via a large, orange screw in the tank, and solid waste is burned inside the toilet's combustor, which converts the waste into ash and energy.

There are others too. It will be interesting to see where these developments and innovations lead.

Consistent with most changes in established engineering solutions though, none of these sewer-free toilets are currently at a price that's feasible for individual homes, however this equation changes when the conventional infrastructure cost is included in a unit cost comparison.

For now, the new toilets are going to be used at schools, apartment complexes and community bathroom



Bill Gates is leading the charge to ensure better sanitation is achieved.

areas. Bill said his eventual goal is for off-grid toilets to be used in homes around the world.

He told the crowd in Beijing that he's ready to spend an additional \$US200 million developing the technology for those next-generation toilets. But Bill hopes someday the private sector will start developing sewer-free home toilets and compete to provide those toilets to the 4.5 billion people around

the world who don't have them now.

"We estimate that by 2030, the opportunity here is over \$US6 billion a year," said Bill. He is also interested in the Omni Processor, which is essentially a much smaller version of a waste-treatment plant.

The small plants, one of which is already on the ground in Dakar, Senegal, can serve 5,000-100,000 customers and are completely self-powered. They take in toilet waste, kill pathogens in the sewage, and convert it into products with commercial value - like clean water, electricity, and fertiliser.

It's a lot like what astronauts do on the International Space Station - turning their urine into clean, drinkable H₂O. Bill is so enthused about the Omni Processor's clean, recycled water that he once drank it himself. "It tasted great," he told the Beijing crowd. "I'd be glad to do it again, any time."

Bill Gates should be made an honorary member of the Plumbing Hall of Fame. ■

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WORLD PLUMBING DAY

March 11 marks World Plumbing Day. It represents a chance to celebrate our industry and the contribution it makes in all different ways. **Emily Hardwick** explains.

Inadequate sanitation is estimated to cause 280,000 diarrhoeal deaths annually and is a major factor in several neglected tropical diseases, including intestinal worms, schistosomiasis and trachoma. Poor sanitation also contributes to malnutrition.

844 million people lack even a basic drinking-water service, including 159 million people who are dependent on surface water.

By 2025, half of the world's population will be living in water-stressed areas.

There is nothing more important than clean drinking water and good basic sanitation to keep the world and the people who inhabit it healthy.

World Plumbing Day is an international event held on 11 March every year, initiated by the World Plumbing Council (WPC) to unite the global plumbing industry and promote the vital role that plumbing plays in the health, safety and sustainability of our communities.

The plumbing industry in Australia may appear well removed from such huge health and environmental issues as addressed above. Yet, the industry contends with issues that have extremely serious health implications every day, along with the ever-present threat on this dry continent of simply running out of water.

The plumbing industry in Australia is, in many respects world leading, particularly when it comes to water re-use, rainwater harvesting and water efficiency.

World Plumbing Day is about promoting good quality plumbing as a genuine solution to many of these problems, global and local. After all, it is all very well to want to save water, or to have more toilet access for people, but who is implementing the systems to make that happen?

World Plumbing Day is a chance to celebrate our industry and the contribution it makes in all different ways. In 2018, the occasion was marked by plumbing industry organisations and companies throughout Australia in a range of creative ways including placing a full-page editorial-style advertisement in The West Australian addressing the importance of plumbing to the community. Industry hosted breakfasts and lunches held all around the country along with trade shows and skills contests.

The distribution of t-shirts to plumbers working onsite by major industry retailers and family businesses sharing knowledge of World Plumbing Day with their customers in person and via social media.

Whichever way you choose to do it, make sure that this World Plumbing Day – 11 March, you get involved and spread the word far and wide about this great industry. ■

For more information and resources, visit www.worldplumbing.org and follow the World Plumbing Council on Twitter, Facebook and LinkedIn.



Celebrations were well attended across the country, including a breakfast hosted by Master Plumbers Queensland.



School children celebrating the Community Plumbing Challenge in Indonesia.



PICAC World Plumbing Day celebrations included an apprentice skills contest.

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RAINING TROUBLE

What if a trusted handbook gets rainhead requirements wrong? **Russell Kirkwood, Rowan Gregory and Richard Kingston**, all of Dam Buster, collaborate to challenge past theories.

Roof plumbers are entitled to think they can't go wrong if they follow the clear requirements of the Australian roofing standards and the Australian standard hand books.

However, Dam Buster believe SA HB 39-2015, Section 5, 5.7.3 – offered as a compliant option for rainhead installation – is hydraulically unsound. It contravenes many of the primary principles of AS/NZS 3500.3 box gutter and overflow design.

To ensure adequate overflow provision, the design in Figure 5.7.3 relies on the top of the rainhead being no higher than 50% of the flow depth of the box gutter.

In theory, this type of installation still allows water to flow over the top of the rainhead itself [then escape to the ground] should the rainhead and/or the overflow provision slot be inadequate or become blocked.

On paper it looks like it might work – and at low flow rates it may well – but as soon as you apply significant flow rates the problems begin. More on this later.

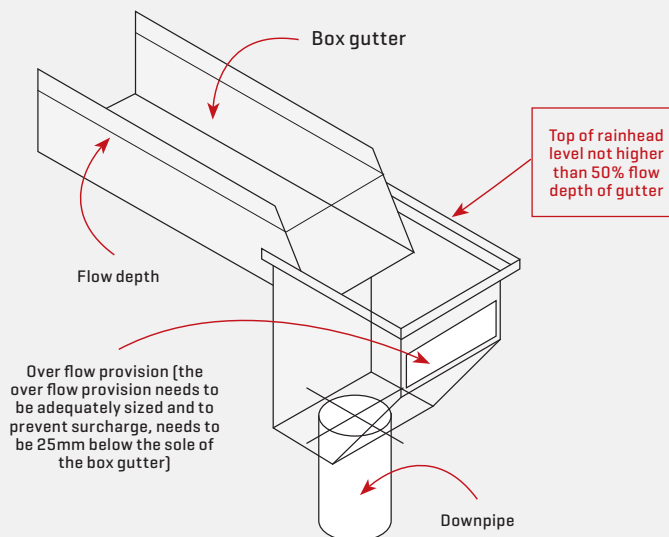
The design also indicates that the box gutter overhangs into the rainhead for a considerable distance.

However, such an installation will



As much as the industry lauds HB39, Section 5, 5.7.3 is being challenged by some segments.

FIGURE 5.7.3 RAINHEAD



cause interference with the operation of the 'nappe projection' as water flows out the end of the box gutter into the rainhead.

Water will then flow out of the front overflow slot at far less than the 'one in 100 years' average recurrence interval (ARI) flow rates. If the front slot becomes blocked, water must back up into the box gutter then flow over the top of the rainhead.

This brings into question the operation of the seal between box gutter and rainhead – which would be very difficult to implement with this design.

Therefore, water would most likely enter the building under the box gutter sole before any over-topping of the rainhead, as the rainhead is to be set higher than the sole.

The team at Dam Buster have never seen a rainhead installed in accordance with Figure 5.7.3, that is, with the top

of the rainhead no higher than 50% of the gutter flow depth. What we see are distorted versions.

HISTORY FORGOTTEN

To a large extent Figure 5.7.3 seems based on a very old [and hydraulically sound] English and European design as illustrated in Image 1.

The image shows an English rainhead design on an Industrial Revolution era cotton mill in Manchester.

It incorporates a step down from the box gutter sole, then a small weir to direct low rainfall into the rainhead below.

But if the volume of water is great enough, or the rainhead/downpipe system blocks up, the water crests the weir and flows freely outside the building.

You can see the damp mark on the wall of the box gutter chute where water has recently overflowed across the weir.

The step down from the box gutter sole prevents water from flowing back into the building, and even debris such as leaves will not stop the system from operating. It's certainly not pretty, but it works.

The visual problem with the old English design is obvious from the image, as you can see right into the building.

Instead of following Figure 5.7.3 to the letter, plumbers usually fit the rainhead completely over the end of the box gutter so that the top of the rainhead is even higher than the top of the box gutter.

This type of installation ensures that the box gutter cannot be seen, nor can the internal 'works' of the roof. As a consequence, it is the preferred and accepted option cosmetically for plumbers, builders, owners and architects.

The trouble is that fitting the rainhead in this way – obscuring the box gutter and parapet opening – prevents



An old English rainhead design that incorporates a step down from the sole of the box gutter behind.

water from flowing over the top if the primary overflow slot is obstructed or overwhelmed as described in Figure 5.7.3.

It therefore defeats the entire purpose of that design.

Most installations across Australia have the rainhead covering the entire front of the box gutter, making them non-compliant.

Images 2, 3 and 4 show typical installations in which the rainhead covers the entire face of the box gutter opening.

The installing plumbers have considered the overflow slots (round or rectangular) to be sufficient for the overflow – which they are not.

WHY DO THEY PASS?

Regulators conducting audits have been passing installations as being compliant and in accordance with Figure 5.7.3 (even if they sometimes require the overflow hole or slot to be bigger).

The simple fact is they are not compliant with either SA HB 39-2015 Figure 5.7.3 or any of the general methods as detailed in AS/NZS 3500.3. ➤

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As demonstrated further below, the set-up in Figure 5.7.3 does not work, and there is no guidance in either of these documents on how this type of rainhead should be designed and sized.

So it's no real wonder that regulators have been approving many different interpretations of Figure 5.7.3.

However, it's very concerning that some regulators have been approving the installations on the basis that the rainheads have an overflow hole – of any shape or size.

Typically, the regulators ignore the requirement for the top of the rainhead to be no higher than 50% of the box gutter flow depth.

After a quick look at Figure 5.7.3 you could be forgiven for thinking an installation such as that shown in Image 2 is compliant. But as soon as you home in on the 50% height restriction, it's obviously not right. It always pays to read the fine print.

HYDRAULIC CHAOS

Modelling of the Figure 5.7.3 design by engineers in the Dam Buster team has shown that the design is hydraulically unsound.

Also, it cannot be correctly sized because there are no calculations or formulas to suit this design in SA HB 39-2015 or AS/NZS 3500.3.

The broad picture, as drawn by the Dam Buster engineering team, is shown in Figure 1.

In this example a nominal roof catchment area of 100m² has been adopted, and the 100-year ARI rainfall intensity of 187mm per hour is for Melbourne.

Due to the lack of guidance it has been necessary to make a few assumptions.

The maximum flow depth is the design minimum box gutter depth less the 25mm freeboard (ie: $115 - 25 = 90\text{mm}$)

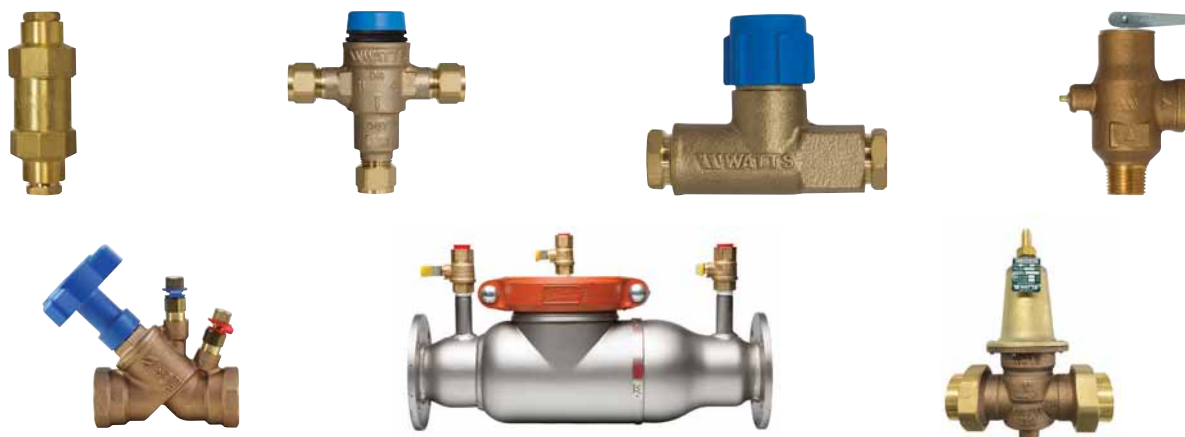
Let's say there is 25mm of metal above the overflow opening (anything less would look odd and would not meet the intent of Figure 5.7.3).

If the top of the rainhead is set at 50% of the maximum flow depth, then there is only 45mm remaining for the overflow opening. This is less than the design ➤



Shown above are some typical installation examples where the rainhead covers the entire face of the box gutter opening. The overflow slot (small round or rectangular hole) has also been considered by the installing plumber as being sufficient for the overflow – which it is not.

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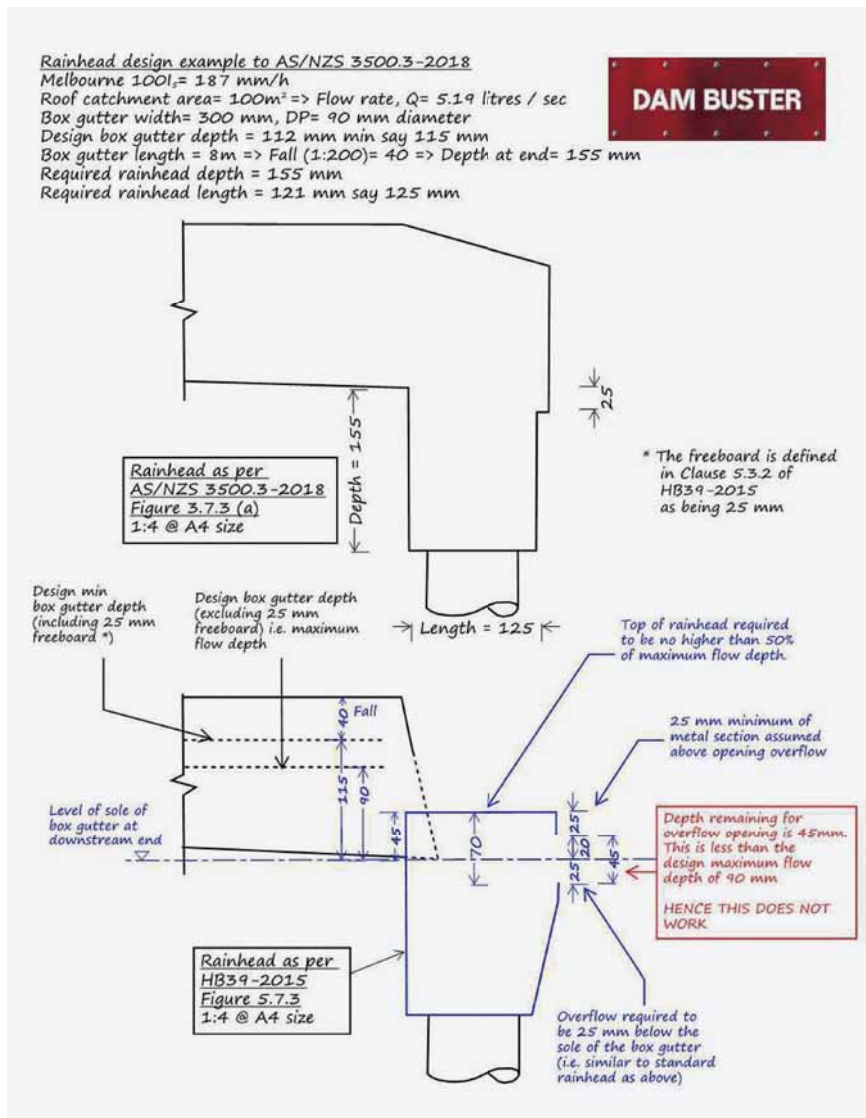
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maximum flow depth of 90mm, and hence does not work.

In summary, a rainhead complying with Figure 5.7.3 does not exist, and so cannot be constructed. This is clearly demonstrated by the simple calculations above.

* Note the freeboard is stated as 25mm in HB39-2015, yet this is now specified to be 30mm in AS/NZS 3500.3-2018.

Consider now a rainhead complying with Figure 5.7.3 but not meeting the requirement that the overflow weir be set at 25mm below the box gutter sole. This would result in a modified version of Figure 5.7.3, as shown in Figure 2.

Much of the water flowing out of the box gutter would go straight out the overflow instead of into the lower chamber of the rainhead and the downpipe. This is due to the nappe projection not being accommodated in the rainhead.

This would circumvent any normal operation of the building's stormwater system and cause local inundation of nearby areas even with modest rain.

In many conditions, the nappe projection would directly impact with the front face of the rainhead.

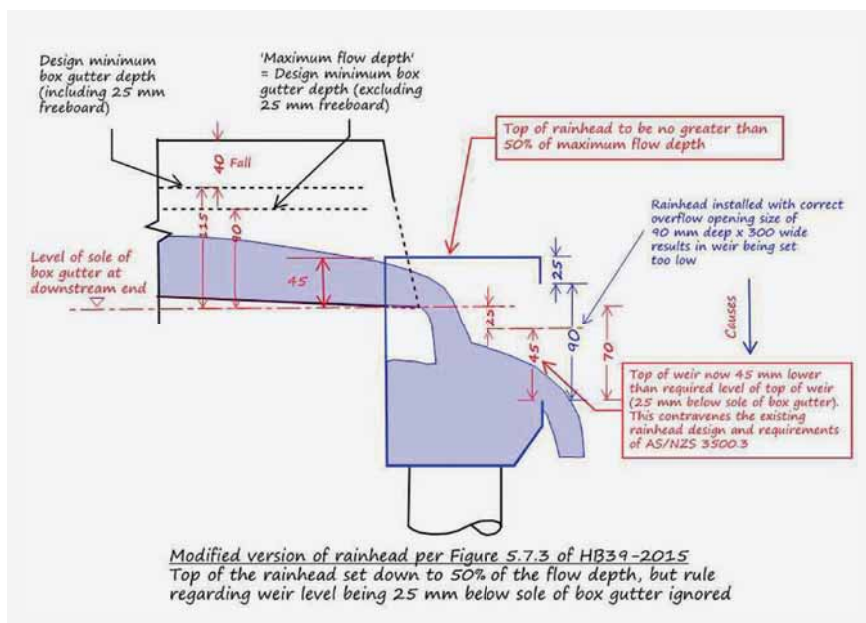
These major problems would lead to what can be described in layman's terms as 'hydraulic chaos' for any water not flowing into the rainhead.

The extent and effect of this hydraulic chaos cannot generically be modelled. It depends on numerous factors, including:

- flow rate;
- flow into the box gutter from the roof;
- box gutter dimensions [hence depth of flow];
- box gutter projection into the rainhead;
- where the nappe impacts the rainhead; and
- rainhead dimensions.

In summary, the outcome of this cannot be predicted or modelled except in relation to specific sites, rainheads and rainfall.

Thus it is impossible to certify compliance of the overflow provision or overall performance of the rainhead and downpipe combination.



Any plumber who did provide a compliance certificate for such an installation would be taking a substantial risk.

The installation could not be considered to meet the 'deemed to satisfy' provisions in AS/NZS 3500.3, as there is no specific guidance for the design of a rainhead as in Figure 5.7.3 in this code.

In general our experience indicates that AS/NZS 3500.3 has been well researched over the years, but it seems that nobody has paid particular attention to the installation method in SA HB 39:2015 Figure 5.7.3.

If this method had ever been prototyped and tested, the deficiencies would have been exposed.

Unfortunately, most plumbers (and regulators) have misinterpreted Figure 5.7.3 when installing (or approving) rainheads that bear little resemblance to the 'deemed to satisfy' rainhead specified in AS/NZS 3500.3.

In particular, on almost every rainhead viewed by the Dam Buster team, the overflow provision is non-compliant and inadequate.

This results in an unnecessarily high risk of box gutter failure, causing internal inundation and damage to the building.

CONCLUSION

Figure 5.7.3 creates conflict and confusion when viewed in light of the otherwise clear requirements of AS/NZS 3500.3 regarding rainhead sizing and design requirements.

Dam Buster unequivocally denounces the rainhead shown in Figure 5.7.3 and would like to see it removed in its entirety from HB39 as soon as possible.

Roof plumbers should immediately consider abandoning any attempt to install rainheads based on Figure 5.7.3, otherwise they will risk substantial liabilities for defective work, and also for any resultant damage.

If push comes to shove, they will not have a leg to stand on – no matter which way anybody looks at it. ■

SUMMARY

AS/NZS 3500.3 only specifies three (3) x acceptable overflow devices for discharging water from a box gutter – one of which is a rainhead incorporating a full width weir which is open at the front and sized according to the tables. The other two methods relate to sumps.

According to Russel Kirkwood of Dam Buster, the configuration shown in Figure 5.7.3 of HB39 is fundamentally flawed and requires removal as soon as possible.

If you are looking to bring a building's performance up to spec, it is recommended you consider the Dam Buster rainhead range. It is AS/NZS3500.3 certified by the AHSCA Research Foundation for their overflow provision and also have internal dimensions that fully meet the code requirements (for each specified flow rate and downpipe combination).



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FIT FOR PURPOSE

Following a number of incidents of carbon monoxide (CO) poisoning in Victoria, the Victorian Building Authority, Energy Safe Victoria and Master Plumbers' have begun looking into mandatory CO training for gasfitters. **Adelle King** reports.



The Carbon Monoxide Safety Program provided expert advice to registered and licensed gasfitters and Type A servicing plumbers on the latest techniques to accurately test for carbon monoxide spillage and identify negative pressure situations.

Carbon Monoxide [CO] produced from the partial oxidation of carbon-containing compounds, is often referred to as 'the silent killer' because it's odourless, invisible and tasteless, and can cause significant health problems. According to Energy Safe Victoria [ESV], in Australia there were 12 carbon monoxide poisoning fatalities resulting from gas appliances between 2006 and 2016. ESV says most fatalities and serious injuries resulting from the use of gas are caused by a lack of maintenance, installation or appliance defects, and intentional or unintentional misuse by consumers.

Plumbers and gasfitters have an important role to play in checking and testing gas appliances but it appears many are not undertaking the continued professional development needed

to keep up with new technologies. Specifically, at present, gasfitters do not need ongoing training to remain registered despite practices and technologies around CO testing continually evolving.

This issue came to a head recently when the coronial inquest into the 2017 death of Sonia Sofianopoulos from CO poisoning found plumbing contractors employed by the Victorian Department of Health and Human Services [DHHS] carried out non-compliant CO testing on the open flued gas space heater two years before her death.

It seems that this is not an isolated incident either.

According to the Victorian Department of Land, Water and Planning in its Plumbing Regulations 2018 Regulatory Impact Statement

[RIS], 10% of gasfitting work requiring Compliance Certificates was found to be non-compliant, out of 48,578 audits conducted between 2010 and 2017. The most common reasons given for non-compliance were:

- Incorrect clearances
- Work not conducted in good and workmanlike manner
- Incorrect minimum industry standards
- Unacceptable appliance fluing
- Unapproved appliance

The Department's RIS recommends a two year experience requirement be applied to gasfitting, while the coroner's report, which was released in August 2018, recommended up-to-date training be mandatory for all gasfitters to remain registered. During the inquest, coroner Jacqui Hawkins also raised concerns that some gasfitters were unable to correctly describe or perform the tests for CO spillage on open flued gas space heaters.

As per the coroner's recommendations, the VBA moved quickly to consult with relevant stakeholders and, in partnership with ESV and Master Plumbers', launched an extension of the free Carbon Monoxide Safety Program. These seminars have been run every year since 2011 in the lead up to winter but this year an additional 19 sessions were held across the state between 6 August and 28 August. They provided expert advice to registered and licensed gasfitters and Type A servicing plumbers on the latest techniques to accurately test for carbon monoxide spillage and identify negative pressure situations which are particularly relevant to open flued gas appliances.

"During each session, participants receive step-by-step training showing them how to accurately conduct a carbon monoxide spillage test, ➤



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The Victorian Building Authority received a positive response from relevant stakeholders to its Carbon Monoxide Safety Program in 2018.

identify and resolve negative air pressure, and ensure the safe operation of a gas appliance,” says VBA technical manager Matt Wilson.

“They also learn about minimising their exposure to carbon monoxide, the correct use of testing equipment and the installation of appropriate ventilation to overcome negative air pressure.

“This knowledge is vital for ensuring households are not at risk from carbon monoxide poisoning.”

These free training sessions complement the mandatory online training module and examination that the VBA has developed.

Practitioners had until 1 November 2018 to review the training module and complete the exam to ensure their license or registration would be able to be renewed in the future. In other words, the training has been set-up as a condition of being able to renew the gasfitting registration.

At this stage, the module is a one-off but the VBA, ESV and Master Plumbers’ are currently reviewing the national training packages for construction and plumbing, including gasfitting.

“The notion of continued professional development is being considered as

part of the national training packages moving forward,” says ESV manager of Type A gas appliance and component safety Enzo Alfonsetti.

“This would mean that in the future, there would be a mechanism by which people licensed in the gasfitting space would continue to receive ongoing training over the years rather than the current situation where basically once you’ve got your qualification you don’t need to undergo any further training.”

In the meantime, ESV has published three new gas information sheets to help assist gasfitters with understanding their responsibilities – gas information sheet 57 Your Obligations under the Gas Safety Act, gas information sheet 58 The Quality and Adequacy of Air Supply and gas information sheet 59 Inspecting and Servicing Type A Appliances.

Additionally, the VBA undertook targeted audits into open-flued gas space heaters in 100 homes across Victoria to further understand the installation faults common to these appliances. The audits found common faults include failure to install appliances in accordance with the manufacturer’s installation instructions and failure to comply with AS/NZS

5601.1:2013 Gas Installations – General Installations in regards to the appliance flueing.

Although Victoria is gaining the most attention in regards to gasfitter competency, it’s an issue that affects the whole country and Enzo explains it’s something that was brought up at the Gas Technical Regulators Committee meeting at the end of last year.

“There will be a lot of focus on the findings of the coronial inquest and we’ll obviously have a discussion with other jurisdictions as to whether they’re doing anything in the space in terms of continued professional development.

“We’re also revising the standard for Type A gas appliance servicing, AS 4575:2005 Gas appliances – Quality of servicing to include a test procedure in line with that in AS/NZS 5601.1:2013. We’re looking at hopefully publishing that standard in early 2019 and then our intention is to make it a mandatory document as part of the training for gasfitters who want to undertake Type A servicing.” ■

CARBON MONOXIDE LEARNING MODULE

The Victorian Building Authority wants all Victorians to be confident that their gas heating appliances are installed correctly and operating safely. So, the VBA is asking gasfitters to complete the Carbon Monoxide Learning Module as soon as possible.

The Learning Module is a great and effective way to make sure you know the latest techniques to use when testing for carbon monoxide spillage and negative air pressure. It is important to the VBA that all gasfitters can carry out this work with great confidence.

More than 14,000 gasfitters successfully completed the module in 2018.

All registered or licensed practitioners have been sent a link so they can complete the module on their phone, laptop or device.

If you want to maintain your current classes of gasfitting at your next renewal, remember to complete the Learning Module as soon as possible. For more information about the Learning Module please go to vba.vic.gov.au/training

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WHAT ARE YOU REALLY WORTH?

As any seasoned small business owner will tell you, there's a mountain of stuff to get your head around in order to be successful. One small, but incredibly important detail, is knowing what to charge. *Plumbing Connection* has taken the guesswork out of the equation with its charge out rate calculator.

As the backbone of Australia's economic success, small business owners must be recognised for their passion and purpose. As any one of these individuals will attest though, it isn't all rainbows and butterflies.

Cash flow, staff acquisition and retention, growth and compliance are all key things to consider. Then there are those other important things like family and work/life balance.

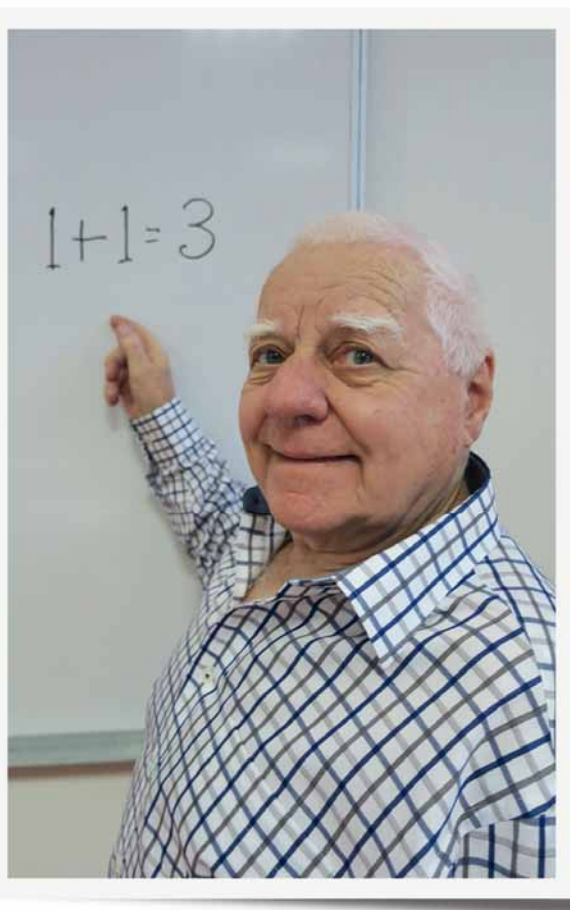
Plumbing, electrical, carpentry and various other trade services are often undervalued by the public, who fail to appreciate the real cost of doing business these days.

They don't differentiate between a skilled tradesperson who has gone through four-years of training or, for example, a company-employed washing machine repairer who has done a two-week training course that relies on multiple choice service answers from a manufacturer's app.

But part of the blame also lies with the trade sectors themselves, when they fail to deliver good value to the consumer [written quotes, on-time, good work, good communication], who doesn't have the same problems when dealing with many other business sectors.

If you are charging market rates to the consumer, they should rightfully expect good service and value.

The media loves to beat-up the trade industry. Publicity-seeking online job-referral companies like HiPages, One Flare, Service Seeking, etc. don't help either, especially when they get themselves on TV to announce what plumbers are charging per hour, without any clarification.



Resident estimating expert Brian Seymour says you need to cover your bases or you'll end up working for discounted wages.

Inexperienced or start-up contractors coming into the market also cloud the situation by offering ridiculously low quotes, either through ignorance or deliberately.

Published in November 2018, the *Westpac Small Business Report* in collaboration with Deloitte revealed some statistics that highlight some of the issues business owners face when it comes to paperwork, compliance and cash flow.

Some of these include:

- Small businesses spend up to eight

hours on average each week chasing invoices for payment.

- More than 16% of small and 10% of medium businesses say they need to improve cash flow to achieve their financial goals.
- Small businesses spend 12 hours on average each week completing paperwork to comply with government regulation.

It becomes apparent fairly quickly then, that charging the right amount in the first place is vital to the success of any small business.

As there is little in the way of compulsory business training to guide new industry start-ups on how to run a fledgling enterprise, we thought we'd help ease the burden by creating a charge-out rate calculator for a sole trader, which is often the starting point.

It's important to understand that there's a difference between estimating a job and a charge-out rate.

To estimate a project, businesses need to consider labour and material costs, as well as the price of plant/excavation works. These elements are used to create a library of standard rates, which are the catalyst for estimating.

As a sole proprietor things are a little different. You need to factor in the likes of hours, your required salary and all of the overheads you need to pay in order to keep your business ticking along.

While this calculator makes no account of hiring support staff or charging extra for night/weekend call outs, we hope it can improve the likelihood of new businesses surviving the first year and minimising damage to the overall sector.

SETTING THE SCENE

The aim of this exercise is to demonstrate how to logically arrive at a charge-out rate calculation, for a typical first year contractor starting out.

In this example, Gary has served his apprenticeship with a local trade contractor. He reckons he's a good tradesman and gets on well with clients. Three years after finishing his time, Gary completes the exams and gains a contractor's licence.

At the age of 27, Gary is ready to take on the world and be his own boss, just like the guy he worked for over the past seven years.

He doesn't have a sophisticated marketing plan but believes there are

enough potential customers for the work he's accustomed to doing.

Domestically, Gary has one child to his partner Sarah, who works part-time but much of what she earns goes into

baby-sitting. Gary spends the first \$30,000 of their after tax income on rent and has family living costs much the same as most others.

He hasn't saved a lot, in spite of having a company van and completing a fair bit of overtime with his previous employer.

He'll need some funds for cash flow, as he

knows a lot of people don't pay on time and he needs to buy materials ahead of client invoicing.

Over time he hopes to earn a credit account with his main wholesaler.

It's important to understand that there's a difference between estimating a job and a charge out rate.

To create the right impression with customers and be reliable, Gary's decided to finance a new van but he doesn't believe he needs an office and can work on quotes/accounts from home and claim a home-office tax deduction.

He's accumulated a reasonable tool kit including computer and software over the years and will opt to hire/rent any specialised equipment and charge it back on jobs. The world wishes Gary good luck with his new venture, in the knowledge that some 50% of small businesses fail in their first year.

To give Gary's business every chance of survival, let's see what his real costs are and then consider what he should charge his time out at. ■

To get an experienced view, Plumbing Connection invited expert estimating trainer Brian Seymour to make some comments on the way through the exercise. ➤



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|---|----------------------------|-------------------------|-------------|
| A. HOURS | | EXAMPLE | YOUR RATE |
| Estimate the number of ordinary hours you work per year | | Fill out your rate here | |
| Weeks in the year | | 52 weeks | |
| Less: | Annual Leave | 20 days | |
| | Public Holidays | 10 days | |
| | Sick Leave | 2 days | |
| | Inclement weather | 2 days | |
| | Lost time/Training courses | 2 days | |
| Effective working weeks | | 45 weeks | |
| Ordinary working hours per week | | 38 hours | |
| Total available working hours per year | | 1,710 hours | |
| Less lost hours [1.5 effective hours lost a day*] | | 338 hours | |
| Total Available Hours [Available hours are different to chargeable hours. You probably won't reach 1,372 in your first year] | | 1,372 | |
| *You lose time travelling, buying materials, providing quotes, chasing up debts, finding new clients] | | | |
| B. SALARY | | \$ PER YEAR | \$ PER YEAR |
| Decide how much pre-tax income you need to earn annually? | | | |
| For this exercise we've used \$83,900, that's the average salary of all male workers throughout Australia. Just remember you are taking a significant risk working for yourself, as the majority of those earning the average salary work a 9-5 job for Government or a private enterprise. | | | |
| Weekly pay rate \$1,613 x 52 | | 83,900 | |
| Superannuation @ 9.5% | | 7,970 | |
| Total salary cost for you | | \$91,870 | |
| Brian says - Students often tell me these figures are bull\$#!t, until I point out to them that their existing wage is only 73% of what it costs the boss to employ them (they forget to consider holidays, super, etc...). They need to include them in their charge-out or they will be working for discounted wages. | | | |
| C. OVERHEADS | | \$ PER YEAR | \$ PER YEAR |
| Other costs involved in running your business | | | |
| Personal sickness and accident insurance | | 800 | |
| Public liability insurance (compulsory) | | 650 | |
| Contractor licence fee | | 650 | |
| Electricity/gas (working from home) | | 500 | |
| Van lease (3 years/30%/\$38,000 vehicle) | | 9,500 | |
| Van servicing (Year 1 of ownership) | | 650 | |
| Van registration/3rd party insurance | | 600 | |
| Van comprehensive insurance | | 1350 | |
| Petrol (~\$60 per week) | | 3,000 | |
| Phone/internet plan plus business apps | | 960 | |
| Bank fees | | 300 | |
| Accounting fee | | 1000 | |
| PPE/clothing | | 400 | |
| Standards/Codes for reference | | 500 | |
| Postage/stationery etc... | | 400 | |
| Replacement of tools (per annum) | | 1000 | |
| Contractor association membership | | 850 | |
| Material waste | | 500 | |
| Contingency (5%) | | 1000 | |
| TOTAL OVERHEADS | | 24,610 | |
| Brian says - In my training courses, I use the average figure of \$25,000 as a sole trader's overhead, but I also suggest including some 'direct costs' for the first year (i.e. stock, etc...). If Gary is working from home, he needs to ask the question - 'If my boss asked me to use my spare room as an office and my garage as a store, would I charge him?' If the answer is YES, then he should include this cost in his overheads or he is making an unappreciated donation to his customers. | | | |
| (B+C) ÷ A = Your charge-out rate | | | |



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HOT WATER FROM THIN... WATER?

Rheem technical marketing manager **David Micallef** provides an in-depth analysis of the features, benefits and applications of hot water heat pumps.

There is not a plumber around who doesn't know what a heat pump is. Ask anybody to explain the technology and invariably you will get answers like, "It's like an air conditioner for your water heater" or "It's like a fridge in reverse".

This type of analogy is a great way to describe what is, for most people in the plumbing industry, a bit of an enigma product in that ambient air, sometimes as low as 5°C or even lower can be used to produce hot water up to 65°C or higher.

What is missing from this description is that these products are *air sourced*, or *air to water* heat pumps. That is, they draw the energy required for heating from the atmosphere.

But there is a variant on this technology which can use the energy contained in water to produce hot water, known as *water to water* heat pumps.

The technology is not new, and many readers would be familiar with geo-thermal heat pumps, a similar technology, which extract heat from the ground to either heat a building or produce hot water. The big difference is that water to water heat pumps can be used in applications where sinking a whopping great hole in the ground is impractical.

Above: Rheem Australia W2W heat pumps have been installed at Sydney Opera House.

HOW DOES THIS WORK?

The most practical use for a water to water heat pump is to produce hot water for showering purposes (domestic hot water) by extracting the waste heat from a building's air conditioning system.

In most large buildings, chilled water at around 7°C is circulated around the building to cool (or more accurately extract heat from) the rooms or offices. As it cools the space, the water in the circuit rises to around 12°C. The chiller operates like a heat pump, but in reverse, and cools this water down to 7°C by 'rejecting' this heat to the atmosphere where the cycle begins again.

The water to water heat pump takes a portion of the returning 12°C water and uses this as the energy source for its refrigeration cycle to produce hot water. In the process, it cools the water down to 7°C before returning it to the chiller circuit.

EFFICIENCY ON EFFICIENCY

Commercial grade heat pumps operate with an efficiency of around 400%, more commonly known as Co-efficient of Performance or a COP of 4. That is for every kW used to run the compressor and pump or fan, it produces 4kW of heat. It is these efficiency boosts that make heat pumps an attractive energy reduction selection. ➤



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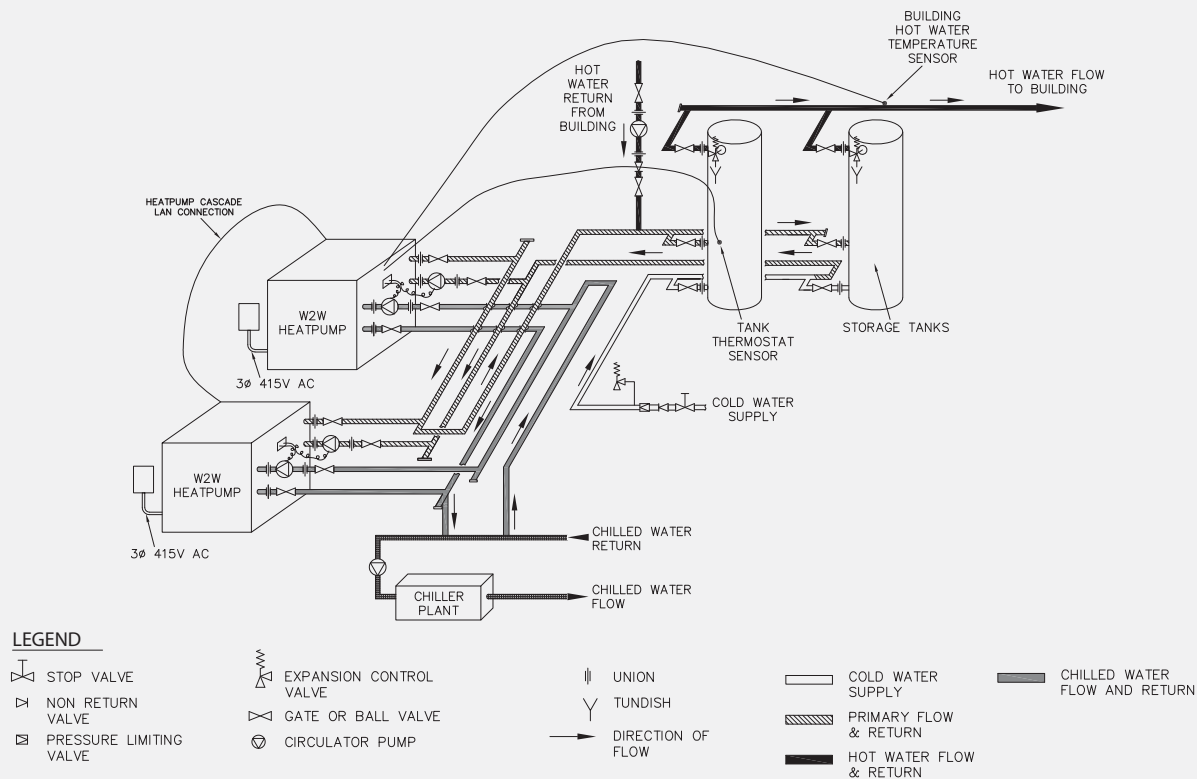
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TYPICAL W2W HEAT PUMP INSTALLATION WITH RECIRCULATION



The truth is, heat pumps have two COP's – one for heating and one for cooling. In air to water heat pumps, the cooled air is vented to atmosphere and generally lost. The water to water heat pump extracts energy from the chilled water circuit before the chiller and returns pre-cooled water. This is work that the chiller no longer needs to do. The heat pump cools water with a COP of around 3, using the same energy [to run the compressor and pump] that it used to produce water with a COP of 4. This means that the combined COP is $4 + 3 = 7$. This is not some mathematical trickery, but real energy saving that reduces a building's carbon footprint and running costs.

APPLICATIONS

The Building Code of Australia [BCA] has requirements for building energy efficiency. Naturally, as plumbers, we are interested in the efficiency that relates to that of heating hot water, but the heating and cooling of a building are even bigger users of energy.

Further, schemes such as National Australian Built Environment Rating System [NABERS] and Greenstar put an emphasis on holistic energy reduction. This not only relates to the actual energy consumed by a building, but the impact that building can have on reducing energy in other parts of life.

Enter end of trip facilities or EOTs. An EOT is a part of a building that facilitates the reduction of carbon in the way people travel to and from work by providing a place to store

bikes and to shower at the 'end of the trip'. For practical reasons, these are typically located in the basement of the building which is below ground level and it is considered counter-productive to circulate hot water to the basement for the express purpose of supplying hot water to a zone that will typically be used once per day.

Further to this, it is difficult to obtain fresh air and convey products of combustion for gas water heaters in the basement. The same applies to air sourced heat pumps which, without a ready supply of fresh air, will quickly cool the room down to a point where they can no longer heat the water.

Using an electric water heater with an effective COP of 1 goes against the entire philosophy of reducing carbon [unless of course it is supplied with solar or wind generated electricity, but that's another story] and so a water to water heat pump provides an excellent solution by tapping into the available waste heat energy freely flowing around the buildings chilled water circuit and helping to reduce the buildings chilling load.

OTHER APPLICATIONS

Wherever a relatively constant source of energy is available in water, this energy can be used to provide hot water.

Two examples include North Sydney swimming pool and the Sydney Opera House using Rheem Thermal [formerly Accent Air] commercial water to water heat pumps. The former uses Sydney Harbour as the energy source to heat the pool ➤



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IN HOT WATER - DAVID MICALLEF

to a constant and comfortable temperature all year round. The latter uses the harbour's water to provide hot water for showers, toilets and catering for the Sydney Opera House.

Another application supplied by Solahart International [a division of Rheem Australia] uses river water to provide hot water to the Sun City Hotel in South Africa.

FEATURES AND BENEFITS

Rheem has been producing a WaterMark certified commercial air to water heat pump for over 10 years. The release of the water to water heat pump will be accompanied by an upgrade to the whole range. The new range includes circa 15kW and 35kW air to water and water to water heat pumps.

On top of this, the Rheem iQ control system is added across the range. Rheem iQ takes heat pump monitoring and control to a whole new level. Up to 10 sensors are used to provide feedback on the operating condition of the water heater, which can be readily viewed on the system monitor or via the central BMS system.

On the water side, monitoring includes hot water temperature and chilled water temperature in and out of the heat pump, tank temperature and building hot water flow temperature.

On the water to water heat pump the chilled water circuit is also monitored for water flow and outlet temperature and will shut down the heat pump should either of these not meet operational requirements. On the air to water heat pump, the ambient air and evaporator coil temperature are monitored and either initiate a de-ice or auxiliary boost function, depending on user selection.

On the refrigerant side, pressure transducers provide real time information on the suction and discharge pressures and the suction superheat temperature, without the need to fit pressure gauges. The benefits this has in terms of product life and maintenance costs can easily be realised as the system can be remotely monitored for operational parameters and alarm trips.

Another feature is the ability to cascade control up to four heat pumps without any external controls. The cascading allows the minimum number of heat pumps to operate to maintain building heat losses, but ensures all units are available when serious heating is required. The heat pumps then rotate so the wear is evenly distributed. These features work to extend the overall plant operational life.

VALUE FOR MONEY

A heat pump is a relatively slow means of heating hot water and therefore its benefit is realised by having enough stored hot water available to meet the peak demands and then letting it slowly recover over say 4 hours in readiness for the next peak.

The combination of the heat pump and bulk storage make it a higher cost option, kW for kW, than a high efficiency gas water heater system. However, when considering the COP of 7 for a water to water heat pump versus the ever rising cost of gas with an efficiency of typically 83%-84%, the payback period can be as low as 1 ½ years, making a water to water heat pump a very attractive offering for a variety of high water use applications where chilled water is also used. ■

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HOW TO SACK A CUSTOMER

A business relationship needs to be mutually beneficial; one that benefits the contractor as well as their customer. If it isn't, you need to know when (and how) to walk away. **Steve Keil** explains.

Conventional marketing is not quite applicable anymore. Today's modern and most advanced marketing techniques require you to not only know your customer, you should also understand their needs and behaviours. This makes it easy for you to understand exactly what a customer wants so you can market your products and services in a way that will meet their levels of expectation.

Understanding customers also makes it easy for us to continuously amend our products and services, ensuring we cater to current market needs. Clustering similar customers, or even products and services, means we are now understanding market segments, enabling us to develop standard and efficient processes to market to them in order to target them with the type of things that data suggests they desire.

This is not just true for businesses that sell tangible products, but also holds true for those in the services industry. Plumbing contractors are no exception. We operate in a highly fragmented market with plenty of competition out there, and lots of opportunities. As such, you need to be able to market yourselves, keeping customers in perspective.

Sometimes a better understanding of your market and how it is segmented helps you to know your customers and type of work that you enjoy doing. You know, the stuff that keeps you jumping out of bed in the morning and getting excited about solving people's problems. The flip side is you also identify the work that saps your energy and the customers you don't want to be working for.

By applying a financial filter, you'll also understand the most (and least) profitable customer segments of your business, with the ideal delta point being the most profitable segments that energise you and that you also enjoy doing.



Not understanding your customers from a segmentation and financial bias is fraught with danger. Ignorance may well be bliss, but it can also bring pain. Let me share a real example from a few years ago.

SACKING A CUSTOMER

A friend who I'll call Jimmy (simply because I'm currently reading *Working Class Boy* by Jimmy Barnes) operates a plumbing contracting business. The business has grown well over the past few years and at the time, employed 11 site workers. Yet profits were dropping to the extent that it was a major stress

point for Jimmy as it was threatening the future viability of the business.

Additionally, a major customer of his, a new home builder that I'll call Builder X, was putting enormous pressure on him to reduce rates even further. The squeeze by Builder X had been going on for several years, and Jimmy had complied and reduced his rates. This put the business in a pincer of reduced rates while wages and product prices increased.

Upon analysis, the business had moved from a balanced portfolio of markets, being consumers, B2B service and maintenance and new residential ►

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construction, to 70% new residential construction, coming from five builders.

Ordinarily that would be fine, particularly for a business setup for this type of work. However, a quick financial analysis found that work from four builders was profitable and with respectful relationships with those builders. However, the relationship with his largest customer, Builder X, was neither profitable nor was he treated with any respect, especially around payments.

Builder X made up over half the volume of his new home construction market segment. More importantly, Jimmy's business made a loss on every job completed for Builder X, once you factored in all his costs and overheads. Let that land for a moment.

Before you judge, it's not unusual for non-profitable customer data to be lost in a total monthly summary P&L. You have to be wired to analyse your business in this detail and if you're not, it's important that you get someone who is, whether that be a trusted accountant, bookkeeper or business coach.

On a positive note, the stress point for Jimmy also became the easiest way to fix the profitability of his business. That is, get the customer profitable or sack them. Additionally, invest time and effort to attract more business from the profitable segments that you most enjoy doing the work for.

My conversation with Jimmy went something like this.

Me: "You need to put your rates up to Builder X."

Jimmy: "I can't; he won't accept them."

Me: "Then stop working for him, he'll send you bankrupt - sack this customer."

Jimmy: "I can't, I need the volume."

Me: "You don't need the volume, mate; you're paying him to plumb his houses! You'd be better off standing on the corner of Collins St, handing out \$100 notes to everyone who passes by. At least they'd be nice to you and like you. This guy treats you like crap."

Jimmy: "Ok... ok, so how do I sack him?"

It is a constant point of frustration for me that our highly skilled industry undervalues the services we bring to the community. As plumbing contractors, we tame a life threatening element that we're all reliant on for the day-to-day comforts of the 21st century. We spend several years training to do so skilfully. Those with an entrepreneurial spirit take even higher risks by starting their own businesses, ultimately providing jobs and taking responsibility for the safekeeping and economical security of those employees and their customers. Rant over.

Part of the discussion with Jimmy prior to suggesting he sack Builder X was highlighting that his consumer work was highly profitable, as was his B2B service and maintenance segment. Jimmy shared with me that he loved doing that part of his business, as did his team, due to the diversity of work that came through these segments.

He enjoyed the new home market, too, as it did provide a solid foundation of core ongoing work, albeit at lower margins.

The strategy was set that working with builders had to be on agreed terms, not on those set by Builder X. Jimmy set up a checklist for what a business relationship with a builder should look like. It was a partnering and co-dependent one, where each party respected the other's expertise and services. It included agreeing on rate schedules that valued the skills and high level of services Jimmy's team provided.

CUSTOMERS AREN'T ALWAYS EQUAL

I'm an advocate for the contractor/customer relationship being a partnering one, built on trust and mutual respect. There are some customers, though, that believe in a win/lose relationship. When confronted with such customers, the best way to manage them is by controlling

the relationship tightly and ensuring such customers understand strict expectations, including payment terms.

CONCLUSION

And that's how Jimmy sacked Builder X. He met with him and highlighted his new rates, payment terms, the way he expected work to be distributed and other factors needed for the business relationship to work successfully.

Jimmy confirmed that he'd be more than happy to work for Builder X, but it would have to meet his business' criteria.

Not surprisingly, Builder X didn't agree to these terms, effectively stopping Jimmy from doing his work.

Lines were drawn. Jimmy moved on and successfully rebuilt a balanced portfolio of profitable work, while retaining a selection of boutique home builders that valued

his services.

I received a call from Jimmy about 18 months later. He highlighted that Builder X had called him and asked whether Jimmy would honour the rate schedule provided 18 months earlier. Jimmy politely declined but highlighted that he'd be happy to work with Builder X on his new rate schedule and payments terms, which were now 14 days from invoice.

Builder X accepted the terms. Apparently, he struggled to find a contractor in the area who could provide the quality of service that Jimmy's business did. ■

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Steve Keil has spent his career in trade-related businesses, first as a contractor then with an electrical wholesaler. In 2004, he founded Laser Plumbing & Electrical.





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ISH ABOUT THAT TIME

Jeff Patchell is fortunate to have attended the world's greatest plumbing event more than a dozen times over the past 30 years and if you've always yearned to go, he suggests you make 2019 the year to do it.

The only global plumbing exhibition that matters, ISH 2019, takes place March 11-15 in Frankfurt, Germany. Now's the time to get your travel and ticketing sorted.

Knowing what's going on around you is important in any business and the plumbing game is no exception.

There is one international event of note that takes place in Germany every alternate year and if time and budget allows, I suggest you make every effort to attend – it really is the absolute show stopper in terms of industry exhibitions.

Believe me, there is nothing of similar proportion or importance in the US, UK, Europe or elsewhere that will bring you face to face with so many new ideas and technologies. I am of course talking about ISH [it stands for International Sanitation & Heating].

As I've told you on a number of occasions, the enormity of this event will blow your mind.

It runs for five days and this year the organisers have changed the sequence of days to run Monday-Friday. You can expect to share the experience with more than 200,000 plumbers, consultants, suppliers and merchants from the plumbing/heating trade the world over.

Don't be frightened by those numbers though, the Frankfurt Fairgrounds are enormous and the daily crowds of around 50,000 are scattered among a number of multi-level buildings. And in typical German precision, everything works with minimum fuss.

Turning up to ISH for the first time can be daunting, especially on your own, so we've compiled a few 'smarts' that might ease you into the experience.



01 GET YOURSELF ORGANISED (BEFORE YOU GO)

There's nothing better than planning ahead, otherwise you'll likely pay through the nose for flights and accommodation. There is plenty of information on the event website <https://ish.messefrankfurt.com> to read on the flight over, to help you prepare for your visit.

02 FLIGHTS

Your flight into Frankfurt will land you about a 15-minute train ride away from the fairgrounds/city centre. Best you get in the day before to accustom yourself with the region and climate. Included as part of your entry ticket are use of the city's trams and suburban trains.

03 CLIMATE

Don't be surprised if it is snowing on the tarmac upon your arrival. With that in mind, take a thick jacket for the odd times you won't be indoors. Other than for a few outside displays, the huge ISH venue is nicely heated.

04 ACCOMMODATION

This is the tricky one. The hotels within a ~10km radius of the event hike their rates to extraordinary levels – something like three times the normal – so \$500-\$750 a night won't buy you all that much (unless you are on the corporate credit card).

Check out Airbnb but you still might have to stay in the suburbs. My suggestion is that you take a 30-40 minute train ride or cab to one of the outer towns like Wiesbaden, Mainz or Hanau where the hotel rates are much more reasonable and you get to experience more of the German daily life.

05 GETTING TO THE FAIR

The public transport infrastructure around Frankfurt is excellent. There is a platform right under the fairgrounds or if you come in from further out, the main train station is not far away and you can catch a tram-car right out front which drops you at the fairgrounds. If it isn't snowing, it's a brisk, yet pleasant walk.

06 PAYING TO GET IN

A multi-day entry ticket to ISH will cost you around \$75, depending on the currency exchange at the time. That will get you in for all event days. You can order that online at the event website. As mentioned previously, the ticket also includes free local public transport which is detailed on the ISH website, as well as a host of other useful information.

07 PLAN YOUR DAYS

On the ISH website you'll find a map of all the multi-storey buildings and levels which highlights the main products displayed in each area. They separate the piping systems from the sanitation goods; there's a floor or two of tools and if you are into valves or the like you can while-away the hours in that area. Some of the heating product is not that relevant to Australia but it is interesting all the same.

08 MAKE A NOTE OF STAND LOCATIONS

One of the difficulties is saying to yourself, "I must come back and look at that." The only trouble is, you'll likely forget where the stand is. The place really is that big. So ensure you note the stand number as it isn't hard to become overwhelmed by the immense number of exhibitors (~2,300) and after a day or two, the aisles can start to look the same. Virtually all stands will have staff who can explain their products to you in English.

09 BROCHURES

Most European exhibitors still have masses of print materials for you to take away, though most of it is replicated on websites these days.

Lugging an armful of brochures can weigh you down, so taking a wheeled-bag is a smart idea. If you are going onto other activities before returning home, you might like to post home your brochure materials – you'll find there is a fully equipped post office within the fairgrounds.

10 HAVE A GOOD TIME

While you're taking 'one for the team' by attending ISH, don't forget to have a bit of fun, though I warn you that your legs can get fairly tired after 2-3 days of wandering the floor.

A healthy solution at the end of the day can be a few glasses of local pilsener which will refresh you and other than the sauerkraut [which I'm not a fan of], the food is pretty good. If you can meet up with a few other Aussies and take in a tasty pork knuckle meal somewhere along the streets of 'lively' Sachsenhausen, it will make your day. Prost!



To book entry tickets or for further information, visit:
<https://ish.messefrankfurt.com>

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LOOK TO THE PAST TO SEE THE FUTURE

On the 45th anniversary of the Association of Hydraulic Service Consultants Australia (AHSCA) New South Wales, **Brihony Tulloch** chats to co-founder Don Ledingham about the current state of plumbing and the road ahead. And from his perspective, the future looks bright.

It was 30 years ago when *Plumbing Connection* last sat down with leading Australian hydraulic consultant Don Ledingham. He and business partner, Cliff Hensby (who was also the first technical editor of *Plumbing Connection*) were enjoying enormous success as founders and heads of hydraulics consultancy firm LHO Group.

One of the duo's first jobs was the Menzies Hotel complex – railway station, shops, hotel and Wynyard House.

"That really was throwing us to the wolves," Don told *Plumbing Connection* in 1989.

"We had to integrate the three areas and Wynyard House. A portion of that had been built some 30 or 40 years before.

"In those days we used a lot of commonsense to overcome obstacles... Sure, commonsense still applies, but you have to spend more time on design issues because of things like litigation."

While LHO Group was responsible for several large projects of national importance, Don is perhaps best known as one

of the founders – and first president – of the Association of Hydraulic Service Consultants Australia [AHSCA].

Founded in 1975, the AHSCA was initiated to serve as a forum to facilitate the exchange of ideas, experiences and solutions for those in the hydraulic and fire protection service – something that had never existed for people in the industry before.

Further, the National Plumbing Code was still four years away from its debut.

As we wrote in 1989, prior to the Association's launch, one of the greatest hurdles facing hydraulics consultants was a lack of identity: "*Gradually, hydraulic consultants have gained acceptance by other professions and trades to the extent that no building would be constructed without some input from someone in the design field.*"

Now 45 years since the AHSCA's inception, and 55 years since he started his career as a hydraulic consultant, we caught up with Don to reflect on his time in the industry and to get some insight on what he thinks is coming next.

"Before starting the AHSCA, hydraulic consultants were represented by the Institute of Plumbing Australia. But as LHO Group grew and other companies started to emerge as plumbing and hydraulic consultants, it became evident they needed to be represented by an association similar to the Association of Consulting Engineers Australia [ACEA]," says Don.

"The creation of the AHSCA allowed practicing hydraulic consultants to be recognised by other professional organisations and to be represented to state and federal government bodies on hydraulic services design and technical issues."

The first official meeting was held 9 April 1974 at the Crows Nest Club with 26 members and two associate members. At that time, the number of major hydraulic consulting firms in Australia numbered just six or seven.

The turn-out proved there was an appetite for change.

In 1999, Don was invited by the AHSCA's then-leadership to speak at the association's 25th anniversary celebration. Showing that he was still as forward-thinking as he was when he founded the group, Don used his speech to make a few predictions about where the plumbing industry was heading.

He believed:

- Off-site prefabrication would permeate the construction sector;
- Buildings would be recycled every 25 years to match the requirements of new technology;
- Flat screen image technology would promote teleconferencing;
- Mobile phones would become voice responsive and the size of a wristwatch;
- Information on all products would be available on the internet, eliminating the need for catalogues;
- Utilities would be privatised and consumers would work on a 'user pays' basis. This would accelerate the use of recycled water;
- The rise of the paperless office; and,
- Improved electronic communication that would allow design staff to work remotely.

With today's popularity of Apple Watches, Skype and cloud technology, Don's predictions have a certain [almost spooky] accuracy. But in the 19 years following his speech, there have still been some changes and innovations in the plumbing and hydraulics industry that have surprised him, namely in the area of materials, design processes and a focus on water conservation.

"There has been an amazing transition in the type of materials, installation procedures, standards and regulations employed within the plumbing industry," says Don.

For example:

- Caulked lead spitted and socketed joints for cast iron piping has been replaced with rubber ring joints;
- Galvanised mild steel piping had screwed joints until Victaulic type joints replaced them.

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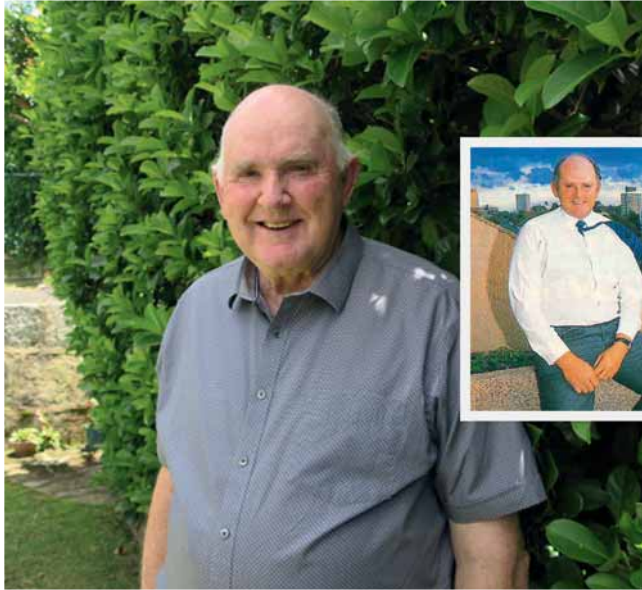
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DIAGNOSTICS PRESSING PIPE & TUBE TOOLS DRAIN MAINTENANCE POWER TOOLS



Top: Don Ledingham. **Inset:** Former business partners Don Ledingham and Cliff Hensby [circa 1988].

- Plastic piping has replaced cast iron and copper for sanitary plumbing stack work;
- Copper tubes for hot and cold water supply were originally jointed with screwed, tinned and sweated joints. But, this was later replaced with either tobin bronze welding, soft solder capillary jointing or silver solder welding; and now we have crimped joints with rubber ring seals;
- Specific plastic materials have made huge inroads into the choice of materials for piping systems whereby today it is considered suitable for a wide variety of applications.

But it's not just materials that have undergone big changes, it's drafting and design processes as well.

Computer-aided design [CAD] software has been the go-to for designers, consultants and engineers since the 1980s. But the convenience and cost-effectiveness of CAD software wasn't available in the early days of LHO Group and the AHSCA.

"When I first started in business we used to draw everything by hand. Our design process involved 20 or so tracers to complete the drafting of design documents by hand," says Don.

"Today it's all computerised. Things have shifted from 2D vector-based drafting and 3D solid and surface model CAD software through to sophisticated Building Information Modelling [BIM] systems."

But Don doesn't see the digital renaissance as a threat to the plumbing or hydraulics industry.

"The switch to this digital style of drafting is a huge advantage because the documentation process can start later; it's much faster, more cost-effective and accurate."

As the threat of global warming looms and the depletion of our natural resources continues, water conservation and green design have become a factor when it comes to plumbing design.

It's a focus on environmentally conscious plumbing design that Don considers the biggest change to the industry.

"Most plumbing designs these days will try and use recycled water," he says.

He notes that the government has developed policies to deal with improved water conservation.

"Now we have developed water conservation procedures like the Water Efficiency Labelling and Standards [WELS] scheme."

WELS reduces demand for high-quality potable water by informing consumers about water efficiency at the point of sale. It estimates that using water efficient products could save Australians more than \$2 billion by 2030.

The 2006 scheme was like nothing Don had seen before.

After six decades in the industry and already bearing witness to drastic changes in policy, design and materials, it's hard to imagine what else could be in store, but Don believes things are only going to improve in the plumbing industry.

Given his already demonstrated ability to predict the future, we thought it would be interesting to see what he believes will happen in the future.

"I believe plumbing and hydraulics will become more sophisticated and there'll be more engineering incorporated in design," he says.

He also stresses the importance of educating young people just entering the industry.

"The next thing we need to do is improve the education of people involved the design of hydraulic services, which is what the AHSCA is doing."

Despite retiring from LHO in 2006, Don is still diligently cranking out design advice and solving hydraulic problems for a wide

range of clients.

"I have continued acting as an expert witness on a number of hydraulic services issues and sit on committees for Standards Australia."

He also looks back on his time with the AHSCA very fondly.

"I've enjoyed my long period with the plumbing industry and I'm very proud of how the AHSCA has developed and the good work that's now being done by the people involved with the Association," says Don. ■

"When I first started in business we used to draw everything by hand. Our design process involved 20 or so tracers to complete the drafting of design documents by hand," says Don.

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ARE YOU ON 'THE PANEL'?

An array of organisations – from insurance companies to community housing providers – maintain their own 'panels' of preferred building industry contractors. But how do trade professionals get onto such panels in the first place? And are all panels alike? **John Power** reports.

For many tradespeople, the idea of gaining extra income from 'insurance work', or jobs sourced from similar private and public entities, is a tantalising prospect... but what are the first steps? How do small building companies, electrical contractors or plumbers, for instance, achieve the status of 'preferred contractor' on an organisation's panel of trade professionals? Are there any special criteria for selection? What are the mutual obligations? Is it all worth the effort?

In this article we address the above issues in detail, and explore the main options and opportunities available to tradespeople on panels in four major industries: insurance, community housing, defense housing, as well as motor accident commissions.

INSURANCE

Let's start with the largest sector: the insurance industry.

All insurance companies involved in building repairs have their own panels of preferred contractors. This makes sense, as contractors appointed by insurers undertake the majority of all building repairs in Australia arising from insurance claims.

A readymade database – or panel – of approved, fully vetted trade contractors is necessary to ensure efficient, timely and quality-assured work. A panel also allows an insurer to create great depth of service, based on detailed predeterminations of contractor availability, expertise and territorial coverage. This high level of organisation is critical in the event of a catastrophe, for instance, such as a flood or cyclone, when large numbers of trade professionals need to be mobilised with the utmost speed and reliability, regardless of holiday schedules, conflicting work obligations or sickness. Indeed, even the smallest



one-off jobs can be addressed faster and more reliably if an established array of trusted trade professionals is on call.

Panels vary in their composition depending on the size of the insurer, and the level of formality of their agreements with trade businesses. Some small insurers' panels, for example, comprise lists of individual contractors or trade-based businesses, with terms and obligations privately negotiated between the insurer and each business; larger insurers, on the other hand, tend to favour the appointment [often by tender] of at least one 'head contractor' to project manage jobs via the head contractor's own network of subcontractors, who will hopefully cover all relevant geographical locations. Panels of medium-sized insurers might feature a

blend of partnerships with both private contractors and geographically distinct head contractors.

An example of a typical insurance claim might proceed as follows: a customer's bathroom leaks and destroys a floor; the customer lodges a claim with their insurer; the insurer sends out an assessor to examine the damage and prepare an estimate of the repair costs and a full scope of remedial works; the insurer delegates the project directly to one or more of its panel contractors [or to its head contractor, who then appoints one or more subcontractors]; the work is completed and an itemised invoice/task description is sent to the insurer [or head contractor] for payment. NB: if a head contractor is involved, then the head contractor, rather than the actual insurer, usually pays invoices.

This begs an obvious question: is it better for a trade business to make a direct arrangement with small insurance companies [i.e. aim to be a big fish in small ponds], or would it be easier to become a subcontractor for one or more larger head contractors [i.e. become a small fish in large ponds]?

It all comes down to 'the right fit'. Certainly, a trade business that deals directly with a small insurance company might be able to negotiate favourable terms and customised flexibilities, which may well suit a small, less 'formal' operator in search of occasional supplementary work. The downside is that small businesses dealing directly with numerous small insurance companies might struggle to handle heavy peaks in demand, different kinds of job management software platforms, or conflicts with existing private projects.

Unsurprisingly, the notion of being a subcontractor on a panel managed by a centralised head contractor is

becoming increasingly popular, as it allows individual trade businesses to establish preferred work volumes and timetables with greater precision.

One of Australia's fastest-growing head contractors is Claim Central Consolidated (CCC), which acts as project manager for building repair work on behalf of approximately five medium-to-large insurance companies, as well as a smaller number of agencies and brokers. CCC maintains its own panel of 1,200 trade professionals and building suppliers throughout Australia, and is rapidly expanding its operations into New Zealand, Africa, Europe, and North America in recent years.

CCC global chief operating officer Clint Kerekes says more and more insurance companies are opting to appoint one or more head contractors instead of becoming bogged down with the logistics of dealing with hundreds or thousands of separate contractors and suppliers. A head contractor, Clint

says, can act as a collective agency and streamline day-to-day operations for all parties, effectively creating a 'digital ecosystem' that allows all participants to view the status of a given job. The insurer, therefore, can focus on core activities while delegating all repair works, project-related customer liaison, as well as full task management to the head contractor. Indeed, many of CCC's insurance company clients have incorporated CCC's proprietary software – ClaimLogik – into their own business management software systems.

Meantime, each subcontracted trade business has the benefit of receiving jobs sourced from numerous separate insurance companies via a single aggregated hub. Another advantage for tradespeople, Clint notes, is that they only have to master one project management and invoicing software platform instead of dozens of different software systems from separate insurance companies. ➤



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Not only do tradespeople appreciate consolidated workflows, he adds, but they also benefit from substantial supplier discounts... though there is no obligation to use specific brands of products. Tradespeople can claim these discounts when working on private jobs as well, Clint points out.

Apart from satisfying obvious conditions like licensing requirements and qualifications, trade businesses need to demonstrate a proven track record of professional service and good communication skills to gain admission to most panels (i.e. tradespeople must always remember they represent an insurance company on each job). Reliability and expertise are important, as is the ability to understand complex interactions among different trades.

How much work can a tradesperson expect to receive through membership of a panel?

"Usually, full-time professionals will also be getting work from other insurers, as well as private work," Clint says.

"But about half of our tradespeople would receive regular work from us on a monthly basis based on our normal distribution of work."

A balanced work portfolio made up of private work and projects from a number of different insurers or agencies, Clint advises, is preferable because it prevents a trade business from becoming dependent on a single source of work.

Clint says CCC is always refining its project management software to make it easier for all parties to use, from customers to tradespeople and insurance companies. As insurance companies delegate more and more project management tasks to their head contractors, it is no surprise that user-friendly, fully integrated software systems are being developed at great pace, as mentioned above. CCC innovation, Clint says, includes improvements to its software platform

to better handle emergencies and large-scale catastrophes.

Next step: Trade professionals should make direct contact with insurance companies operating in their area and inquire about joining their panel of preferred building practitioners. If the company maintains a head contractor, then ask for that organisation's contact details. Be ready to address skills, optimal territories, experience, expertise, qualifications, as well as well-formed expectations of workflows and the ability to cover contingencies like sick staff.

COMMUNITY HOUSING

Another sector with its own panels of preferred trade contractors is community housing, which is serviced by scores of Community Housing Providers (CHPs) across Australia. These CHPs are classified into three tiers according to size.

Tier 1 CHPs – the largest by portfolio size – might manage several thousand properties; Tier 2 CHPs might manage a few hundred up to a couple of thousand properties; while Tier 3 CHPs might manage 100 or so properties or as few as a handful.

One of Australia's most progressive Tier 1 CHPs is Compass Housing Services, which operates in NSW and Queensland. Compass has a portfolio of 4,600 properties, about a third of which [1,500] it owns. The lion's share of the balance of the portfolio is leased from the government, while a small component is leased from private landlords and sublet to social housing tenants.

Compass has a presence on the NSW Central Coast, Newcastle, Upper Hunter, Dubbo, Broken Hill and a smattering of other locations in regional NSW. Some 900 properties are in south-east Brisbane.

Each year Compass oversees approximately 20,000 building repair

and maintenance callouts ('work orders'), which are funded through an annual budget of about \$10 million.

At present a team of four head contractors, each of whom covers a specific region, handles Compass' sizeable workload. [Typical Tier 1 head contractors in this sector tend to manage 800-1,200 properties, depending on demographics.]

Compass executive manager of strategic assets Donald Proctor says building repair and maintenance work for community housing, generally speaking, operates in the same manner as the insurance industry (i.e. trade professionals often make one-on-one service agreements with smaller Tier 3 or even Tier 2 organisations to perform routine repair and maintenance works, whereas larger Tier 1 CHPs tend to appoint one or more head contractors to supply and manage a network of subcontractors. Standard projects might include small-to-medium repairs, landscaping and gardening cleanup, as well plumbing and electrical work in response to wear and tear. Upgrades often occur during brief vacancy periods in preparation for the arrival of a new tenant.)

There are, however, some unique aspects to community housing that are worth noting.

Regardless of whether a tradesperson is dealing directly with a CHP or indirectly via a head contractor, all tradespeople need to be sensitive to the environment in which they are working.

"We do often house people who have complex needs," Donald explains.

"A small minority might greet contractors with challenging behaviours, and sometimes contractors might need to work through carers to get access to a property."

Due to these kinds of circumstances, contractors need to be mature, possess good communication skills and adhere to strict performance criteria.

For example, Compass and most Tier 1 providers have their own codes of conduct, which contractors are required to sign.

A typical code might include a Police Check, a Working with Children credential, and other rigorous

"A small minority might greet contractors with challenging behaviours..."



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induction formalities whenever a new contractor is appointed.

"So, there's 'a bar' that trade professionals have to be able to get over," Donald says.

Another important point is strict adherence to schedules. Due to the critical nature of community housing, most large CHPs themselves have very firm contractual obligations (through the National Registrar for Community Housing and through their contracts with government) to complete different classes of work according to preset agreed schedules. This responsibility flows down the supply chain to contractors. Compass, for example, has a policy that 'make safe' tasks must be completed within four hours; another class of project might have to be accomplished within a time period of 24 hours, another within seven days, etc.

"Time restrictions are very strict and our contractors have to meet them – the turnaround for our vacant properties averages probably six working days," Donald says.

Compass' head contractors, regardless of how many other CHPs they might service, have obligations to perform all building tasks without fail and in accordance with all pre-agreed terms.

While Compass' head contractors are paid according to a fixed schedule of rates aligned to specific job descriptions, other CHPs may issue work based on quotes or hourly rates.

As with the insurance sector, prospective contractors in this sector need to appraise their own strengths and weaknesses when looking for potential CHP partners.

Next step: Donald advises contractors to contact CHPs in their area. For more information visit the website of the National Registrar for Community Housing (www.nrsch.gov.au). State- and territory-based agencies may also be useful. For example, visit the website of the NSW Federation of Community Housing Associations (www.communityhousing.org.au) to learn more about community housing and view a comprehensive list of CHPs by location in that State.



Agencies like Defence Housing Australia (DHA) manage the repair and maintenance of thousands of properties across the country.

DEFENCE HOUSING

Defence Housing Australia (DHA) is one of the country's largest property managers, with a portfolio of approximately 18,500 properties under management worth around \$11 billion.

Approximately 13,150 of these properties are managed on behalf of investors.

The agency, according to a spokesperson, is responsible for all building maintenance, repairs and renovations to properties. Specific DHA state and territory regions allocate work using a repairs and maintenance panel.

"All our work is undertaken by our preferred contractors in liaison with the DHA regional technical specialists from each DHA region," the spokesperson says.

"We use our panel contractors wherever possible, but we also use 'open market' approaches where it is deemed to be appropriate. DHA has a lot of long-term contractors that we work with across the country."

These contractors range from sole traders to larger businesses.

Criteria for selection are mainly experience, financial capacity,

compliance with the WHS Act and basic suitability to project design. AS4300 AS4000 minor works agreements apply for construction work. For minor repairs and maintenance most contractors are on a 'Deed of Agreement'. These agreements are all quite structured and formal arrangements.

Which specific trades are in demand at the moment? DHA has recently approached the market for cleaning, asbestos, grounds maintenance, painting, smoke alarms and a number of other trades to refresh an existing nationwide panel arrangement.

Next step: The following link to the DHA website outlines the process for construction and upgrade panel applications: www.dha.gov.au/partnering/development-and-construction

If you are interested in partnering with DHA, email contractors@DHA.gov.au for more information.

HOME MODIFICATIONS

Motor accident commissions overseen by state and territory authorities provide services, including home

building modifications, to victims of road accidents.

Relevant agencies are: State Insurance Regulatory Authority [NSW]; NT Motor Accidents Compensation Commission [NT]; Motor Accident Insurance Commission [Qld]; Motor Accident Commission [Allianz] [SA]; Motor Accident Insurance Board [Tas]; Transport Accident Commission Victoria [Vic]; and Insurance Commission of Western Australia [WA].

The purpose of home modifications is to enhance the safety, comfort and independence of people – typical projects might include the installation of ramps, door threshold widening to accommodate wheelchairs, light switch repositioning, installation of bathroom and toilet facilities for disabled users, and similar kinds of mobility-related works.

Dealing with this sector, however, can carry its own challenges and frustrations.

For example, when we contacted TAC [Vic] to obtain information about its home modifications program, the agency would not comment on any aspect of any element of its activities, pending an end-of-year tender process. Indeed, the agency refused to provide any details about even the most general functions or aims (past, present or future) of its program. Even worse, when asked about how private contractors might make themselves known to the agency in order to discuss work opportunities, a spokesperson responded that, “we just can’t discuss anything. Sorry.”

This kind of ‘Manhattan Project’-level secrecy is, of course, utterly ludicrous: the mere existence of a forthcoming tender does not require the tendering service to become an indescribable, intangible phantom.

We experienced similar frustrations when contacting the NT Motor Accidents Compensation Commission.

Despite multiple requests (phone and email) for information about the agency’s interactions with private contractors for its home modifications program, we received no response at all.

One could easily be left with the impression that in some cases, this type of work is controlled by a ‘mate’s club’ that has been established and built up over the years – but let’s hope not.

Next step: Serious private-sector professionals seeking to work with these kinds of mid-level bureaucracies might be better off focusing their efforts on insurance, community housing or DHA work. ■

John Power is a freelance journalist based in Cherokee, Victoria, and a former editor of *Building Connection* and *Plumbing Connection*.



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SPRAY THAT AGAIN

Longer, hotter and drier summers are predicted in years to come and for bushfire prone dwellings a well-designed copper sprinkler system is not only cost effective but durable, writes **John Fennell**.

Building in protection from fire damage all year round is now a big issue.

The intensity of bushfires – and warnings of longer, hotter and drier summers to come – has heightened the need for careful planning.

This matter should be on the plumbing industry's agenda, as home sprinkler systems get a lot more attention from the public, government, fire authorities and insurers.

Local councils are usually responsible for building approvals in bushfire-prone areas. However, approval must generally also be sought from the regional bushfire authority and/or a qualified bushfire consultant.

In NSW, for example, the Rural Fire Services document *Planning for Bushfire Protection* is a guide for council planners and owners when building in such locations.

This document deals with the type and size of water supply services, gas services, pumps, taps and hoses, as well as sprinkler systems, so plumbers need to understand the issues and be skilled in handling them.

PUTTING OUT FIRES

Australian Standard AS 5412-2012 *Bush Fire Spray Systems* specifies the guidelines for sprinkler systems, including flow rates and capacities.

Once again, plumbers should consult this document when developing or installing a sprinkler system.

There are many custom-designed sprinkler systems suitable for protecting homes against all bushfire risks. They are designed to completely cover the walls and roof with water sprays. Vulnerable areas such as decks, windows, gas bottles, etc, can also be given water coverage.

The amount of water and the correct sizing of pipeworks and pumps are subject to calculations to ensure the hydraulic performance of the system.



A roof mounted sprinkler system constructed of copper pipe is an ideal solution for homes in bushfire prone areas.

Mike Berghuis of Evolved Bushfire Protection recommends that all homes in bushfire-prone areas have an external water spray system to increase resilience to bushfires.

Such systems can be automated while also providing a haven for family members and fire services personnel in case of a rapidly approaching bushfire.

A sprinkler system constructed of copper pipe and mounted to the roof of a home is a great solution. Only metal pipes can be used in exposed areas, as plastic pipes do not maintain integrity when exposed to high temperatures.

It has been estimated that the basic design and installation of a fire sprinkler system for a small house is 7-8% of the building's total cost.

Designs include a water storage tank to provide at least 30 minutes of supply, an appropriately sized diesel pump, a 40-50mm copper water service and several critically sited and calculated sprinkler heads.

An independent dedicated water

supply is recommended so that manual operation of the system is not required.

The use of copper plumbing for fire applications is common sense, as it is the same material as used in the domestic water supply. The pipe size of the copper tube offers a superior flow rate while providing an excellent fire and pressure rating compared with other materials.

Ideally this is a job for skilled plumbers, but they should always seek advice from industry professionals such as a qualified bushfire consultant.

To find out more about the benefits of copper, visit copper.com.au ■

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PIECING THE POD PUZZLE TOGETHER

Bathroom modules can be an attractive proposition to the construction of multi-storey dwellings; however, as **Terry Nguyen** explains, hard work needs to be done upfront at the approvals stage and must include the involvement and co-operation of all parties who form part of the process.

PHOTO: INTERPOD OFFSITE



The construction industry has been one of Australia's largest and best performing industries for many years now. And with construction still booming the competition between contractors is ever increasing. One of the latest trends across high density construction projects is the move towards prefabricated modular rooms, and in particular bathrooms.

The humble bathroom is a small space where a lot of skilled labour is required in a concentrated area. The rooms are identical, and all of this makes it feasible to have the rooms prepared and made ready to be inserted into a high rise construction like building blocks on a Lego castle.

In principle, the concept provides the prospect of efficiency gains through reductions in overall construction time and costs, but like all good things

there are pitfalls that can easily be overlooked.

In many ways, prefabricated bathroom modules (or pods) are no different to a bathroom that is created in-situ. They have plumbing and drainage lines roughed-in and fixtures attached to them such as taps, toilets, showers, etc.

Products used are the same brands that come from the same factories, and are installed and set out to predetermined locations on the building specifications in the same manner. The differences lie within the concept of creating a bathroom offsite, and having it inserted into the rest of the development.

Creating a bathroom module offsite, ready to be installed, only becomes economically viable if the entire bathroom is completely finished and where no further work is needed. This

means that wall cavities, where the services reside, are already covered with insulation, cladding, tiles, etc.

While the fixtures are visible, the rest of the regulated work is unavailable for inspection once installed. By the time the bathroom module is fitted into place, all that is on show for a plumbing inspector is a finished bathroom with only fixtures exposed. Internal plumbing cannot be inspected, and this may even include the inter-connections between the bathroom with the rest of the building.

The bathroom module in its application can therefore be viewed as more of a manufactured product that uses plumbing components.

Products used for plumbing in Australia are assessed and approved for use through the WaterMark certification scheme. The WaterMark certification scheme has products assessed prior to manufacture to ensure that they (if made correctly) will be fit for purpose and meet all requirements of our plumbing code.

Modules are required to be certified against the requirements of WMTS-050 and carry their own WaterMark certification before they can be installed. The certification process involves checking that pods are made from suitably certified plumbing products, and that the products are used in a manner that creates watertight joints. The testing for WaterMark certification on the pods themselves is quite a simple process.

A short pressure test and a quick review of the bill of materials, in essence, is all that is needed for a bathroom to be given a WaterMark licence. Bathrooms are then given the green light to be mass produced in large quantities and delivered to building sites of large multi-storey high rise dwellings before an inspector has had the opportunity to see one. ➤

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Unlike any other plumbing product under the WaterMark certification scheme, bathroom modules have an added level of complexity.

Conformity Assessment Bodies (CABs) typically work with accredited laboratories during the product certification stage for WaterMark. However, bathrooms not only need to meet product certification, but also the plumbing installation code. This requires the assistance of a third party, where a regulator needs to also approve the actual design of the bathroom itself. And when considering that regulators have varying opinions between states and territories the process becomes yet more cumbersome again.

Prudent CABs will work with the regulators of the states and territories to ensure the design of the pods do not infringe on any local installation requirements. Having a single design to meet particular requirements in different jurisdictions can be challenging for CABs needing to apply product certification for the entire nation.

A lot of background work is required upfront to validate the design where a WaterMark can be applied without any need for confusing exclusions in certain areas. Varying regulations between States and Territories is difficult, but the risks with the manufacturing of bathroom pods does not end there.

Bathroom modules require a lot of different plumbing products for completion, and it is very easy for a design to be slowly altered over time. Often inadvertently through many different possible scenarios.

What happens when the 'regular' pipe work runs out of stock? What happens when the current bathroom fixtures are no longer in fashion? What happens when a manufacturer changes its product design, goes into administration or refuses supply?

As the pods are manufactured products, it is quite possible that not all works will be performed by licensed practitioners. Unqualified workers may not understand the impacts of inter-changing products.

It is important that the CABs who inspect the manufacturing locations



During the inspection process, PROVE Standards & Engineering make note of each individual component; check whether it has a WaterMark and ensure the Standard is correct for the product. This process limits a manufacturer's ability to chop and change with alternative 'equivalent' products (usually cheaper) after approval has been granted.

have a design freeze to work with to pick up on any modifications that have been made over time to mitigate the risk of non-compliant modules needing re-work once installed.

PROVE Standards & Engineering, during product testing, painstakingly take note of every single plumbing fitting on a bathroom module and note all markings in the final test report. The process is long, slow and not actually a mandatory requirement for testing and reporting. However it provides a level of surety to the CABs that the bathrooms have been constructed as per the design specifications, and the ability to quickly check whether any products in the final design have been changed.

Any products not bearing a WaterMark licence can be identified before mass manufacturing begins, or before modules are installed with problematic components buried behind tiles, steel sheets and columns. Attempting to rectify or replace faulty components may not be possible once the larger building has been finished.

Bathroom modules can be an attractive proposition to the construction of multi-storey dwellings, and there is no reason that they cannot

be a trouble-free alternative to building bathrooms in-situ. However, hard work needs to be done upfront at the approvals stage and must include the involvement and co-operation of all parties who form part of the process.

Granting WaterMark certification on a bathroom module can be a quick, simple procedure under the current WaterMark process. However, correctly applying WaterMark certification to products for ongoing compliance requires an extra level of detail to safeguard our communities and builders alike from disastrous consequences in future years. ■

For more information about how bathroom modules are tested please contact PROVE Standards & Engineering Pty Ltd
PROVeng.com.au

Terry Nguyen from PROVE Engineering is a key signatory for mechanical testing and measurement of plumbing, waterworks and solar hot water.





HOLMAN

Our Plumbing Story

with Wally Edwards

Managing Director, Holman Industries

*"Simon Holman formed **Holman** in Perth in January, 1966. Now in its 52nd year, my wife and I have expanded the business every year since purchasing it in 1991.*

*We now have offices and warehouses in Perth, Melbourne, Sydney and Brisbane with over 200 permanent staff. While **Holman** is primarily known for irrigation and gardening products, we have supplied PVC Pressure fittings for 27 years. Over the last 6 years, we increased our range to include DWV and Stormwater fittings.*

Both Kerry and myself are proud West Australians. We are both graduates of the University of Western Australia, Kerry in Science, and myself in Civil Engineering. We've been married for 43 years and have three children and two grandsons.

In 1981, I was excited to venture out of my secure government construction career to buy a small irrigation business called 'Eden'. This was a period of high interest rates and through hard work Kerry and I learned the lessons of running a small business. These lessons are still called upon whilst running **Holman Industries** today.

Eventually, we joined with Total Irrigation to form 'Total Eden', part of the publicly owned company UWL. The 1987 stock market crash had a significant impact on our financial welfare.

After 3 years of restructuring our finances we purchased a small business, **Holman** in 1991, and proceeded to build from the ground up. It has been great fun and hard work, and we are proud of our achievements to this time.

I am passionate about Australian design, innovation and manufacturing. Throughout my business life we have developed new ideas and products, and invested in Australian manufacturing wherever possible. I will talk more about this in the next edition of **Plumbing Connection**."

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“KIWI’S DO IT BETTER”... OF COURSE THEY’D SAY THAT

A proactive approach, advanced technology and an all new approach to campaign delivery combine to ensure the Kiwi’s are staying ahead of the regulatory curve. **Plumbing Connection** reports.

As a trade regulatory body, you are responsible for the registration and licensing of tradespeople, ensuring that those carrying out regulated work are competent, and tasked with promoting and safeguarding the health and safety of people, their property and the environment.

In this challenging domain, it is no easy task holding the attention of your key stakeholder groups and the public.

“To stand out in New Zealand, our organisational offering – being something quite different for a regulator in this area – has been crucial to our success,” says Plumbers, Gasfitters and Drainlayers Board (PGDB) Chairman Peter Jackson.

“In today’s fast-paced world, innovation has been the key, whether through the implementation of new technology or providing a more robust service.”

When asked what’s new for the PGDB in 2019, “Optimising our core business will be what is critical to our long-term impact”, says Peter.

“While it’s one thing to drive your organisation towards success through innovation, it’s another to properly safeguard it for the road ahead.”

Over the last two years the PGDB has been solving its challenges in the regulatory space through the development of the Report-A-Cowboy app, serving as a reporting and intelligence tool to swiftly deal with unauthorised work. The app with more than 13,000 downloads – by both consumers and tradespeople – is doing its job effectively.

An industry public awareness campaign [Sort the Pros from the Cons] was implemented, greatly elevating the three main consumer protection messages. With messaging expanded to reach and raise awareness with those immigrating to New Zealand, the campaign is now gaining exposure to millions of people.

Chatbot technology is improving the organisations customer service and reducing manual handling of enquiries and increasing efficiency. AI-powered, the bot is serving up answers to multiple consumers and tradespeople at the same time on a 24/7 basis.

A new form of Continuing Professional Development [CPD] is another initiative that New Zealanders are now well acquainted with. Linked to the academic knowledge and



PGDB of New Zealand is raising the bar with its latest campaign delivery.

practical expertise required for each particular trade, this professional development is chosen by the industry and delivered for the industry.

Forty three merchant sponsored roadshow training events are now successfully up and running nationwide, assisting practitioners to solve new challenges, understand new product technology and maintain their competency and compliance knowledge base.

"We've gained a lot of insight through our chatbot technology", says Peter.

"In 2019, you can expect to see increased performance in our service with a new advanced approach to the NZ relicensing system and a remodel and upgrade of the website.

"We will continue to remain responsive to industry challenges and ensure our practitioners are equipped to solve them through our CPD programme of events.

"For example, New Zealand has one of the highest reported rates of Legionnaires' in the world. A strain found in potting mix accounts for two-thirds of outbreaks; however, the risk from waterborne Legionella in hot water systems and aircon cooling towers is still a primary focus. Legionnaires' often goes unreported due to the difficulty in distinguishing the illness from other, more common, forms of pneumonia," says Peter.

Acting on this research and evidence will see PGDB adding this topic to the CPD program.

"We want to make certain our practitioners are installing systems properly and working smarter in mitigating the risk of this bug spreading in our communities," says Peter.

"Another aspect of our core business for 2019 will be maximising our existing efforts in public awareness through our Sort the Pros from the Cons campaign.

"Our efforts to build awareness are helping consumers become familiar with our trades, has built a strong reputation for those who hold the NZ Practising Licence, and informed on the health and safety and insurance aspects of unauthorised work.

"Over the past two years, by repeatedly exposing this campaign to our target audience and delighting them with a new visual experience each time around the three main messages, we have earned a lot of trust and loyalty.

"The campaign has gone a long way and achieved considerable reach. It has a defining purpose that truly delivers through to every touch point," concluded Peter.

The PGDB's next campaign launches during the first week of February 2019. ■

Sort the Pros from the Cons Campaign in 2019

The PGDB has defined clear goals for its campaign in 2019. This includes keeping its audience happy with an all new approach to content delivery. It aims to do so by once again raising engagement and strategically contributing to building reputation and advancement of the trades.

Launching under the Sort the Pros from the Cons campaign in 2019 will be:

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THE TRUTH ABOUT TUNDISHES

Did you know that investing in a tundish can save you time and add a professional polish to bathroom and laundry installations? **Brihony Tulloch** has more.

Bathrooms and laundries have transformed from an afterthought to a statement room in most modern homes. Therefore, the appearance and practicality of these rooms should be held to the highest standards for end users. That's why tundish installation should not be overlooked when trying to achieve the best result.

A tundish is a fitting installed on pipes to provide an air-gap and catch any drips caused by overflow. This in turn helps prevent unsanitary cross connection, water damage or spillage. However, tundishes are often overlooked as an unnecessary expense by plumbers during bathroom or laundry installation.

But the truth is, making the effort to install a tundish can save plumbers time and reduce the risk of water damage or safety hazards for end users.

Founder of MAG Specialised Plumbing Products Mark Griffiths has over 30-years experience in plumbing and tundish installation. He even has a patent on two inwall tundish designs.

Mark has seen the benefits of tundishes first hand.

"While purchasing and installing a tundish is an additional expense for plumbers, it's a huge time saver as they won't have to run such a long drain line to discharge any condensate or washing machine pipes," he says.

"Tundishes aren't commonly used because plumbers will get hold of a project, but cut these products out because they can figure out a more cost-effective option. But they don't realise it's at the expense of the finished look.

"Many modern laundry and bathroom designs no longer have a trough to filter the washing machine hose through, so a tundish makes things easier and more compact."

While developing the design for his own inwall tundish, Mark realised that there's a demand in the industry for the solutions this product can provide.

"We were hearing from engineers and architects about how they were struggling to deal with a washing machine hose in apartment buildings that don't have a trough to conceal it," he says.

"Even though tundishes can be retrofitted, some plumbers would lay some PVC on the floor and run the hose through that and across the wall, then the end-user is stuck with this ugly looking pipe through the floor which can get damaged or break and cause problems.

That's when Mark decided to come up with a design that served both aesthetic and hazard purposes.

"There's a cut out hole in the top of the tundish that allows for the condensate pipe to be fed through the top of the box so any drips can be contained. Then the washing machine hose can be fit through the front of the tundish so there's a discharge point for that as well. It's a product that serves both purposes," he says.



The MAG inwall tundish allows for the condensate pipe to be fed through the top of the box so any drips can be contained.

But there were still issues arising from the tundish sitting too deeply inside the wall.

"The other problem we had was that plumbers were complaining that when the tundish was installed, and it came to plastering, they found the cover plate wasn't engaging into the box as it was sitting too deep into the wall. So we came up with a spacer design that could be cut in different increments to allow it to meet up with the cover plate, so it engages in one piece," says Mark.

"We had some issues when the washing machine hose was fitted into the box, and the condensate pipe was coming through the top of the box, the water from that pipe was dripping, hitting the top of the hose and splashing onto the floor."

The solution was having an internal baffle put in the product, which is the key feature of Mark's patent. Now the water would hit the baffle which caused it to roll to the back of the box and run down into the tundish. The water and washing machine problem was no longer an issue.

But Mark remains perplexed as to why tundishes aren't the go-to product when it comes to laundry and bathroom installation.

"The product doesn't come with instructions, but they're a pretty simple device to install. You have a tab there so it can be screwed to a bit of timber then you've got the outlet there that can go to a PVC pipe," he says.

"I'm not sure if it's a lack of knowledge as such. I think when these first came on to the market plumbers would just buy them and pull them out of the box and fit it without really looking at how it works." ■

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GOTTA KEEP 'EM SEPARATED

Contact between CPVC piping and data cabling can cause big headaches for you and your clients. **Cameron Grimes** investigates the issue and how you can prevent it.

When installing fire sprinkler systems, plumbers have the choice between traditional copper or steel piping, or the flexible and versatile option that is chlorinated polyvinyl chloride (CPVC) piping.

Not to be confused with PVC, CPVC piping undergoes free radical chlorination, which in simple terms, increases the chlorine content of the pipe's material.

The chlorination process allows CPVC piping to withstand a wider range of temperatures than standard PVC piping, and provides greater insulation than copper piping.

PVC piping is cheaper, but cannot be used with hot water and is much less impact resistant than CPVC.

However, the coating of data cabling can break through the strong outer layers of CPVC, as Plastic Failure Labs chief executive Duane Priddy explains.

"Computer network cables are covered with a flexible sheath that contains plasticisers," Duane says.

"Any material that contains plasticisers is not compatible with CPVC. If the cable touches CPVC pipe, the plasticisers will migrate out of the cable into the CPVC causing the pipe to turn brittle and crack at the point of contact."

As plasticisers are designed to provide greater flexibility in the material they are bonded to, this can also cause the CPVC pipes to soften and lose their impact resistance. Not only can this result in broken pipe systems, but corrosion to network cable termination points may also become an issue.

Electrical wires and computer cable must be secured and not allowed to touch CPVC pipes.

The preventative solution to this problem is a simple one; ensure there is no physical contact between data cabling and either pre-existing or future piping.

CPVC piping has a reputation of becoming naturally weaker over time, but contact with Category cabling appears to accelerate the process.

"Electrical wires and computer cable must be secured and not allowed to touch CPVC pipes," Duane says.

"If wires or cables have contacted CPVC pipe, the wires/cables must be immediately removed from the pipe and secured.

The section of the pipe that was in

contact with the cable/wire must be replaced."

Duane adds that the responsibility when such issues occur will vary from case to case, as cabling may have been installed prior to piping, and vice versa.

"That is a legal question and it depends on the circumstances," he says.

In situations where CPVC piping has been installed prior to Category cabling, it is important to be able to identify it to prevent contact.

"CPVC pipes in Australia are mostly used in fire sprinkler systems," Duane says.

"CPVC fire sprinkler pipes are generally orange and will have a print line on the pipe indicating the type, manufacturer and Standard to which the pipe was manufactured to meet. ■



Plastic Failure Labs
www.plasticfailure.com

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STANDARDS IN THE PIPELINE

Some of the most significant standards in the plumbing sector have recently been published, as Standards Australia focuses on delivering more and more guidance for the thousands of plumbers across Australia.

PLUMBING CODE PUBLISHED

AS/NZS 3500 series has recently been published by Standards Australia, and many across the sector will be well aware of the significance of this document. For those unfamiliar, the 3500 series is made up of five separate standards:

- AS/NZS 3500.0-2003, *Plumbing and drainage* - Glossary of terms
- AS/NZS 3500.1:2018, *Plumbing and drainage* Part 1: Water services
- AS/NZS 3500.2:2018, *Plumbing and drainage* Part 2: Sanitary plumbing and drainage
- AS/NZS 3500.3:2018, *Plumbing and drainage* Part 3: Stormwater drainage
- AS/NZS 3500.4:2018, *Plumbing and drainage* Part 4: Heated water services

In publishing these standards, Standards Australia appreciated the fact that these are the type of standards that impact daily interactions of every Australian but go largely unnoticed. That is, the Plumbing Code and referenced documents including the AS/NZS 3500 series guide plumbers and hydraulic engineers from design through to the installation of taps, showers, bathtubs, hot water systems and the drainage systems used by millions of Australians on a daily basis. However, it is likely to be only the profession that are aware of how much work goes into the installation guidelines, not everyday consumers.

Some of the changes include:

- AS/NZS 3500.1:2018, *Part 1: Water services*

The changes to this standard cover backflow prevention in fire services, plastic pipes and fittings installed in direct sunlight, non-drinking water

services, circulatory heated water systems and clarification for jointing methods.

- AS/NZS 3500.2:2018, *Part 2: Sanitary plumbing and drainage*

Following publication the standard covers a range of sanitary drainage topics not limited to structural plastic re-lining of drains, plastics pipes and fittings installed in direct sunlight.

- AS/NZS 3500.3:2018, *Part 3: Stormwater drainage*

This revision was a response to changes in practice and technology which have either already happened or are soon to be incorporated into the professional practice of the sector. Some of the features include a new section for siphonic drainage, updates to rainfall intensities, and changes in stormwater drainage technology.

- AS/NZS 3500.4:2018, *Part 4: Heated water services*

This standard has incorporated changes to circulatory heated water systems, plastics pipes and fittings installed in direct sunlight, clarification for jointing methods, and inclusion of references for thermostatically controlled taps.

There was also an amendment made to this standard with changes to Clause 6.5.2.1 to provide an additional option for the orientation of solar water heaters.

The revisions to the AS/NZS 3500 series was intended to align with the National Construction Code (NCC) amendment cycle for NCC 2019. These standards provide installers with deemed-to-satisfy solutions for both Australia and New Zealand, serving as nationally-applicable 'how to' guides.

DRINKING WATER STANDARD GETS A REFRESH

The products which impact the quality of drinking water across the country are

the focus of a revised standard which has been recently published. Requirements on the products which come into contact with drinking water, such as pipes and fittings, have been outlined in AS/NZS 4020:2018 *Testing of products for use in contact with drinking water*.

This standard provides a way to test the products which assist the plumbing industry in meeting nationally-recommended water quality values. It helps manufacturers, water authorities and regulators to identify the performance that can be expected when purchasing a product to be used in the delivery of drinking water.

In commenting on the release of the standard, chair of the Technical Committee, Chris Pipe-Martin said: "In reviewing the Standard, the committee was focussed on ensuring this Standard results in the use of up to date test methods to provide comprehensive and reliable testing of products."

NCC 2022 – PUT IN YOUR PROPOSALS

As the three-year amendment cycle for the NCC is now in full effect, there is a greater need than ever to plan ahead for what is to be included in the Code.

Standards Australia is encouraging proposals for NCC 2022 to be submitted as soon as possible. For AS/NZS 3500 series to be referenced in NCC 2022 the following key dates apply:

- Mid-2020 – draft revisions to AS/NZS 3500 to be made available for public consultation.
- 1 May 2021 – AS/NZS 3500 publishing deadline.
- 1 May 2022 – States and Territories adopt NCC 2022, including revised AS/NZS 3500 series.

For advice, or to discuss any proposals for the standards in the water and waste sector, contact Senior Stakeholder Engagement Manager Alison Scotland on alison.scotland@standards.org.au. ■



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SHARING INDUSTRY SECRETS

The National Water for Health and the Environment conference was held in Melbourne during October and saw many people come together over the three days to talk about issues in backflow prevention, trade waste and temperature controlled water systems. **Peter McLennan** reports.

The theme for the conference was based around new technologies, innovations, case studies and workshops.

With an audience of over 100 delegates from all areas of the water supply industry from across Australia and the world, the conference was the ideal opportunity to launch new products, create new partnerships, generate leads and connect with both users and regulators.

A table-top style exhibition attracted 18 companies and was a hive of activity during the breaks. On Saturday morning, there was a workshop held at the Plumbing Industry Climate Action Centre in Brunswick which focussed on the more technical aspects of backflow device testing and trade waste auditing.

Highlights of the conference included the two keynote speakers: Manager Utility Excellence from the Water Services Association of Australia (WSAA) Greg Ryan and Commissioner of the Victorian Building Authority Carmel Coate.

Greg spoke of the involvement WSAA has across all aspects of the water supply industry from catchment to distribution. Part of his presentation was a very informative video on the water cycle.

Carmel traced water in Victoria over time and her presentation highlighted the many challenges we encounter as industry and water use changes. The informative presentation covered aspects of recycled water, fire sprinklers, droughts and floods but all centred on water and the environment. A video was shown which showcased how a developer has integrated many parts of water and energy conservation into a new housing development.

The Thursday afternoon saw everyone at the St Kilda Pier restaurant for a networking and social get together.

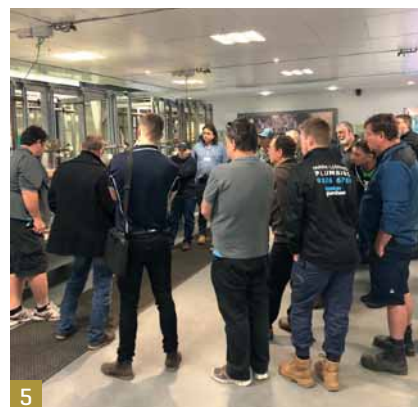
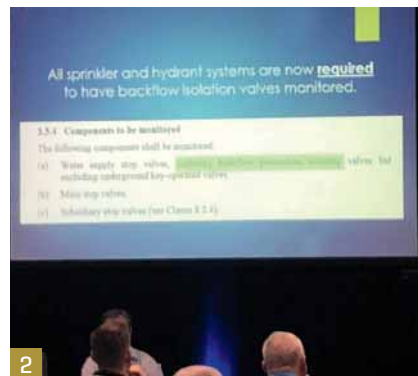


Image 1: Carmel Coate holding the audience engrossed. **Image 2:** New fire regulations relating to backflow. **Image 3:** Glenn Tate from IAPMO explains how the WaterMark process works. **Image 4:** Pic four. Workshop audience on the Saturday morning. **Image 5:** Hands on backflow testing.

We were treated to some fine food and enjoyed the sunset as it descended over Port Philip Bay. The fairy penguin colony just beyond the pier added to the magical feel of the function as people watched their antics.

On Friday, the conference split into two themes: one being backflow prevention and trade waste, while the other covered warm water and legionella topics.

Of the many interesting presentations, highlights included:

- The need for cross connection control expertise within local government by Peter Wenning of Wenning Consultants
- Trends in world plumbing/water protection by Rick Fields from Zurn USA

- A very impassioned presentation by Shayne La Combre on training of the trades and the progress of the World Plumbing Council.

The trade exhibition was well supported and showcased many new and innovative products.

Shae Mete from the Fire Protection Association, Australia had the audience asking lots of questions and opened a lot of eyes on the upcoming changes expected in fire protection.

We received an international update on best practice in legionella prevention and management

by Kelvin Slade, Chair of the Legionella Management Advisory Group.

Plus other notable presentations from Associate Professor, Luis Prado from Epworth Health Care, Alison

Scotland from Standards Australia, Mike Lueck from Mid West Instruments and Dr Richard Bentham from Hindmarsh Plumbing.

The trade exhibition was well supported and showcased many new and innovative products. A big thank you must be extended to Yarra Valley Water, City West Water, The Legionella Management Advisory Group and Zurn Australia, all of whom were the host sponsors.

We met new people, learnt new things, had our thoughts challenged and we went away better for the experience.

Watch out for next year's format. ■

Peter McLennan has been involved with backflow prevention since the late 1980s. He is president of the Backflow Prevention Association of Australia Inc.



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THE FIX IS IN

Building Connection's resident legal expert **Paul Cott** provides an update on recent changes to the law surrounding directions to fix or rectify building works in Victoria.

A 'direction to fix' is a written direction to rectify building work where it is believed by a building surveyor that the building works do not comply with the law and/or building regulations.

The building surveyor must issue a written or oral notice if he or she believes there is such non-compliance. If the oral direction is not complied with within seven days, it must be followed by a written notice. The written direction must give a deadline by which the works are to be done by.

It is important to realise that there is an obligation on an owner to comply with such a notice; however, practically speaking, it is the builder who can rectify the situation and bring the property into compliance.

Directions to fix are often not written with a significant amount of detail in them, but they are usually thorough enough to know why it is being issued and how the alleged non-compliance should be dealt with. In cases of doubt, you should first consult the building surveyor who issued the notice and then, in regards to the practical aspects of the works to be done, a registered builder and/or building consultant.

In the system of fire regulation in Victoria at least, with analogous circumstances in other states, the relevant fire authority has the power to issue orders to owners and/or occupiers concerning fire prevention. The local council [or municipal] surveyor has the power, in appropriate cases, to issue an emergency order when people's health, safety or life are, or may be, in danger.

Such a notice will remain until one of two things happen – the building surveyor revokes it or the matter goes to the Building Appeals Board and the notice is revoked [or stayed, meaning suspended], quashed or set aside there. An appeal can also be made to the Building Appeals Board against the notice even being issued in the first place.

Directions to fix are a serious notice and it is an offence not to comply with them. There can be significant financial penalties for non-compliance.

However, you can often gain, on application, an extension to the period within which compliance is required.

Never just assume though, even once an extension is applied for, that it will be granted. It is a matter of the building surveyor's discretion as to whether an extension will be granted, taking into consideration all of the circumstances.

If a builder does not comply with a written direction, the building surveyor is required to advise the regulatory authority and the owner. In addition, a written direction can escalate to a building notice and then to a building order, which can lead to criminal prosecution.

Usually building notices and orders are a matter of last resort; however, the author has seen a lot of cases where they were issued and it was very difficult to bring the site back into compliance. Generally, a lot of time, energy and money is spent in dealing with the issue.

Written directions to fix can apply to owner-builders too, in pretty much the same fashion.

The issue of external cladding has caused some arguments in regards to directions to fix, with a recent decision by the Supreme Court of Victoria finding the Victorian Building Authority (VBA) is not entitled to issue a direction to fix once an occupancy permit or a certificate of final inspection has issued.

This raises the question of who is responsible for the rectification of issues

regarding defective cladding where the regulatory authority cannot step in. The onus can be on the owners, with perhaps a right to proceed in a legal claim against the builder, but the financial 'hit' to the owner could be significant. Previously, it was widely thought that the power to

issue a direction to fix was a strong tool to be wielded in cases of certain non-compliant building works but the Victorian Supreme Court case seems to limit this power.

The case also has wide ramifications in regards to the increasingly common situation of multi-unit developments. It is in such developments that the Lacrosse fire and the Grenfell tower fire occurred. The importation of cheaper alternative

building products, including external cladding products, has arguably contributed to or caused the cladding issues being experienced around the world, and in particular in Australia. With this problem ongoing, an urgent solution is crucial and further legislative change may be necessary.

This area of the law has some real complexities and the Building Acts in each state and territory should be consulted. If such a task doesn't yield results or confusion still exists, it really is best when one considers what is at stake, to receive professional advice. ■

The local council surveyor has the power, in appropriate cases, to issue an emergency order when people's health, safety or life are, or may be, in danger.

Paul Cott LLB (Hons), Grad Dip Legal Practice, LL.M is a Senior Associate Lawyer with Ascot Solicitors focusing on building and construction litigation.



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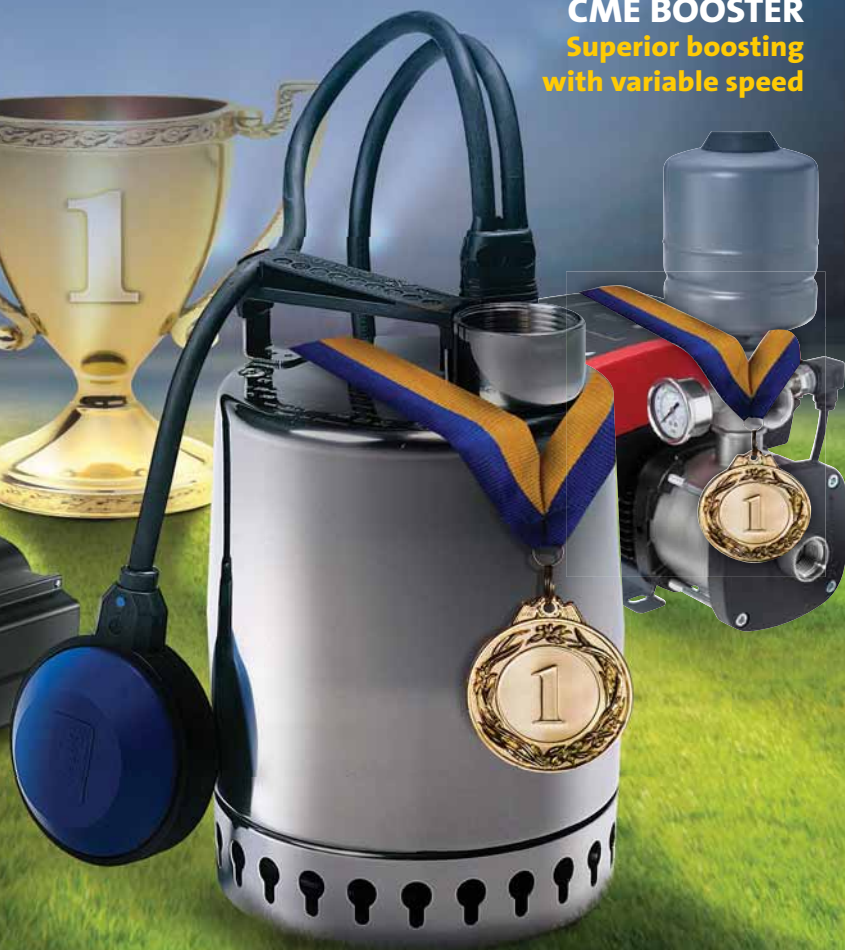


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The DuraHoist 3Pod is a single tripod adjustable to various confined space work situations.

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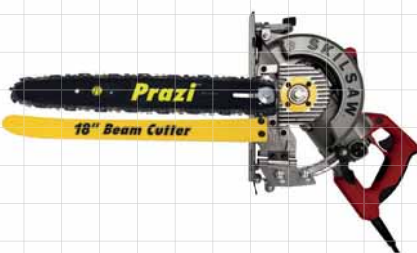
ATTN

AUTUMN 2019

ACROSS THE TRADES

UTE THE FORCE

ELECTRICITY POWERS AUSTRALIA'S FAVOURITE VEHICLE



99 TOOLS



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104 MARKETING

PICK UP WHERE PETROL LEFT OFF

GIVEN THE RISE IN POPULARITY OF ELECTRIC CARS, IT'S ONLY A MATTER OF TIME UNTIL WE HAVE ELECTRIC UTES. **TERRY MARTIN** REPORTS.



It's simply wrong to think of Australia as a large and isolated continent far removed from what's happening in the rest of the world, where electric vehicle sales are taking off and auto companies are committing massive funds to building battery-powered cars, vans, trucks and, yes, even utes.

True, there's a lot of scepticism around these parts, plenty of doubt and, perhaps not surprisingly, hardly any meaningful demand from consumers right now for electric vehicles of any description, let alone the ute which is ingrained in our culture as a big, bold, brawny member of the working class – albeit one that in recent years has moved up into more polite society.

But just as solar panels are fast becoming standard fixtures on the average Aussie home, due in no small part to pain inflicted by higher energy bills, vehicle electrification has a relevance about it and has reached the point where the trends are undeniable and action is well and truly underway.

North America is leading the charge with electric pickup trucks but major programs are occurring in Australia, which gives us reason to investigate who's doing what, and why.

TESLA TWITTER FEED

Tech billionaire Elon Musk has already built the world's biggest lithium-ion battery in South Australia and as head of Tesla Motors in California he is driving the development of an all-electric pickup that could reach production as early as this year.

Hard facts are thin on the ground, with Musk revealing the plan late in

2017 using a comical design sketch that showed an oversized pickup with a more conventional model (such as Ford's F-150) in its load bed.

He has since followed the lead of US president Donald Trump in taking to Twitter to discuss the program and divulge a few details, such as its use of a dual motor layout, "crazy torque" levels, dynamically adjustable suspension (in accordance to the load) and the biggest battery that Tesla has built for its vehicles to date, enabling a driving range of around 500 miles (805km) before recharging is needed – enough to eliminate any sense of 'range anxiety' for most owners.

Expect the still-secret Tesla pickup to therefore offer excellent acceleration – overseas reports point to 0-60mph (0-97km/h) achieved in around five seconds flat – as well as strong pulling power and a high towing capacity, the latter tipped to be 4,500kg and could extend much further than that, if the tweets from Musk are credible.



In-wheel batteries should allow for a deep load bed, while an optional auxiliary battery on top of the load floor is expected to push the range out further. There should be plenty of supply here for tradies to use with their power tools, too, while the cabin is being touted as a six-seater and is guaranteed to come with a high level of advanced technology including, as Musk has indicated, 360° cameras and radars for high-level autonomous safety systems and handy features such as automatic parallel parking.

Whichever way you look at it, Tesla is one of the biggest names in the EV business and its pickup will be a game-changer for the automotive world.

We asked Tesla Australia about the impact the ute was expected to have here, but, perhaps not surprisingly, we were simply directed to Musk's Twitter feed...

BRIDGING THE GAP

All the major motor vehicle manufacturers are moving towards hybrids, combining their traditional internal combustion engines (ICEs) with various forms of electrification.

These include 'mild' hybrid systems that integrate a compact electric motor/generator with the ICE for extra power and efficiency, 'parallel' hybrid which uses a bigger electric motor that can power the vehicle by itself for short periods, and 'plug-in' hybrid electric vehicles (PHEVs) that typically have a longer electric-only range and can be recharged via mains electricity or fast-charging outlets.

With plug-in hybrids, the ICE kicks in only as required, and in the case of 'range extender' versions, the conventional engine is simply used to charge the battery rather than drive the wheels.

Mild hybrid systems are already available in America on pickups such as the Chevrolet Silverado and Fiat Chrysler's Ram 1500, and will eventually become widespread, attached to virtually every ICE from the mass-market brands during next decade.

PHEV pickups are also in the works. Ford, for example, has committed to a plug-in version of its best-selling F-150



Workhorse W-15



Havelaar Bison

that is scheduled to launch in 2020 – the Blue Oval pitching to tradies that it will not only get you to the jobsite but will power the site as well – while Jeep is preparing to launch not only an all-new Wrangler-based ute, known as the Scrambler, in 2020, but a plug-in hybrid powertrain designed for the same platform.

General Motors has also made it clear that its latest platform underpinning the new Silverado and GMC Sierra will be capable of running any powertrain configuration, including PHEV and full-electric, which is important seeing that Holden Special Vehicles (HSV) is now remanufacturing the Chevy pickup in Australia.

ELECTRIC LINE HONOURS

Beating just about everyone to the punch is the Ohio-based Workhorse

Group, which at the time of writing was preparing to launch its series production W-15 mid-size pickup in the US – a 'range extender' plug-in hybrid capable of up to 130km on electric power alone with its 60kWh Panasonic lithium-ion battery, or 500km in total with the three-cylinder petrol engine in action.

Priced from \$US52,500 (\$A73,500), the W-15 uses two 172kW electric motors, one at each end to allow four-wheel drive, with a total system output of 343kW. It can reach 60mph (97km/h) from standstill in 5.5 seconds, has a 1t payload, 2.5t towing capacity and, for running power tools, a 7.2kW power outlet providing up to 30A directly from battery pack. The ute also has high-level safety gear such as automatic braking and lane departure warning.

While the W-15 is not slated for right-hand drive markets, PHEV



powertrains are expected to turn up on global mid-size utes such as the Australian-developed Ford Ranger in the years ahead, in line with development plans announced by their respective parent companies.

Korea's SsangYong and China's LDV are also reportedly developing electrified versions based on their one-tonne utes – the Musso and T60 respectively – but for all the positive noises from various brands with global reach, it's whisper-quiet when it comes to making concrete commitments on full-electric models.

OTHERS STARTING UP

With full-blown battery electric utes, the big players are clearly waiting to see how the market reacts to the Tesla pickup and other new models from smaller manufacturers who are taking a leap of faith – and hoping tradies, as their core audience, come along for the ride.

Among those with positive energy is Havelaar Canada with the Bison, Bollinger Motors with its B2, and other fledgling North American brands such as Via Motors and Rivian Automotive – all of which are working to have full-electric pickups in production by next decade.

There are a lot of similarities in

the basic architecture, typically with truckloads of power and torque, 4x4 drivelines via electric motors stationed at each axle and promises of thorough engineering and heavy-duty components to cope with the demands of travelling off-road.

Preliminary specifications for the Bison point to a driving range of 300km on a single charge, a rugged carbon-fibre reinforced steel space-frame chassis and a body with 1.3m³ of space in the load area as well as 0.51m³ of lockable storage space. Like the W-15, the Bison also has a high-current power socket to run tools.

Bollinger, meanwhile, is taking orders for the B2 pickup ahead of production due to get underway in 2020. This is an all-electric, all-wheel drive, all-aluminium body combination, with dual motors producing a combined 388kW/697Nm that can shift the 2,300kg vehicle from 0-60mph in 6.5s. A 120kWh battery pack can deliver a 320km driving range, with recharging

available via 110/220V ports (taking up to 10 hours on 220) and fast-charge outlets (which need just 75 minutes).

The B2 has a healthy 3,400kg towing capacity and a 2,268kg payload, with a useful load area (measuring 1,752mm long x 1,245mm wide) and – in something you simply cannot get with a normal engine crammed in under the bonnet – a full load-through facility from front to rear that allows long pieces of timber to be carried. This includes 24 lengths of 2x4

through the 'patented passthrough' or 72 sheets of 4'x8.5' plywood with the rear seats removed, according to Bollinger.

The B2 has a healthy 3,400kg towing capacity and a 2,268kg payload, with a useful load area (measuring 1,752mm long x 1,245mm wide)

THE AUSTRALIAN WAY

If this all sounds a bit like 'only in America', let us show you how BHP – aka The Big Australian – is currently trialling all-electric versions of Toyota's tough-as-nails LandCruiser 79 Series ute that have been specially modified by Adelaide firm Voltra.

Voltra has replaced the LandCruiser's stonking 4.8L turbo-diesel V8 with



Bollinger B2

a full-electric powertrain - including 104kW/256Nm electric motor, custom gearbox and 42.24kWh lithium-ion battery pack - and since about mid-2018 BHP has been running two examples of the vehicle (dubbed eCruiser) at its Olympic Dam mine site in a 12-month trial.

It still operates as a fully-fledged 4x4 ute, but the eCruiser is expected to bring a number of important benefits.

These include: zero tailpipe emissions, which is especially important working in an underground environment where diesel particulate matter is a major health hazard; less maintenance due to fewer moving/wearing powertrain parts and less stress on the driveline; lower servicing costs, with no oil changes, air/oil/fuel filter replacement, etc; obvious savings on diesel consumption (and storage); and user-friendly operation, with less heat generation and a quieter, smoother and arguably more comfortable drive.



Bollinger B2

Recharging only takes around 40 minutes when using a 50kW DC fast-charger, and there's also the bigger-picture benefit of lowering the company's carbon footprint and reducing its impact on the environment.

BHP is currently collecting data on the vehicles' performance, power supply, maintenance requirements, charging times and corrosion resistance. Depending on the results, a decision on wider deployment will be made - and ➤



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Voltra eCruiser



Ace Yewt

could really build momentum for the conversion market in Australia while the vehicle importers take a 'let's wait and see' approach.

Voltra's eCruiser project manager Andrew Draffin told us that the company was primarily targeting the mining sector with the electric ute – which has been built to full Australian Design Rule compliance – and that it was really not viable at this stage for light-commercial applications.

But he agreed that "anything is really possible" in terms of potential longer-term opportunities with other sectors such as building and construction, or even exploring partnerships with factory-backed converters such as HSV and its Silverado program.

"The feedback that we've already got has been astounding with the amount of people who want to do a trial and take

this to underground mines," he said.

"If there's a market there for it, most definitely, but at the moment we're not targeting any other market than mining so there's really untapped potential there."

MORE LOCAL PROJECTS

There are other operations getting in on the act in Australia, such as Melbourne-based SEA Electric which has developed fully electric light trucks/cab chassis and vans. The company has backing from the Victorian Government, a pilot fleet contract in place with Kings Transport and a local development project underway with Isuzu Australia Limited.

The Isuzu program at this stage only goes as low as the 8,000-9,000kg GVM class with the NQR series – in this case using a 130kW/1,500Nm electric

motor and a 132kWh lithium-ion battery enabling a driving range of up to 250km – but there is obviously lots of potential for broader applications suitable for trade operators, including those driving with a regular car licence.

The beauty of this is the conversions are relatively simple and chassis rails enable battery packs to be packaged securely between them, which is good in terms of design, safety and dynamics.

Queensland-based ACE Electric Vehicles has also committed to assembling electric vehicles for sale in Australia, including a light-duty 'Yewt' small pickup and a 'Cargo' compact van with payloads of around 500kg, fully independent suspension and a 45kW/174Nm electric motor and 23.2kWh battery. Driving range is 150-200km with a partial load.

A POSITIVE CHARGE

Utes are big business in Australia, with more than 200,000 new ones sold every year, and the two top-selling vehicles in the nation are from the tray-backed class – Toyota's HiLux and the Ford Ranger.

As a result, we've seen rapid changes in recent years in areas such as infotainment and safety technology – driven by customer demand rather than government regulation – and we think powertrain technology, with electrification at its heart, will be the next frontier to be crossed.

The Aussie Voltra eCruiser is a great example. It's not a mass-market production model by any stretch, but a sign of times that was built out of real need, with clear benefits and, let's face it, plenty of question marks in terms of reliability, longevity and so on – all of which are being thoroughly tested and will provide important answers, not just for BHP but for us all.

This is clearly what is also happening in the engineering centres of the major auto-makers. Few want to show their hand just yet – and all of them are waiting, or working, on new battery breakthroughs that will ensure electric utes can cope with Australia's long distances and tough terrain.

But all understand that positive charge is in the air, and is bound to hit the road before too long. ▲



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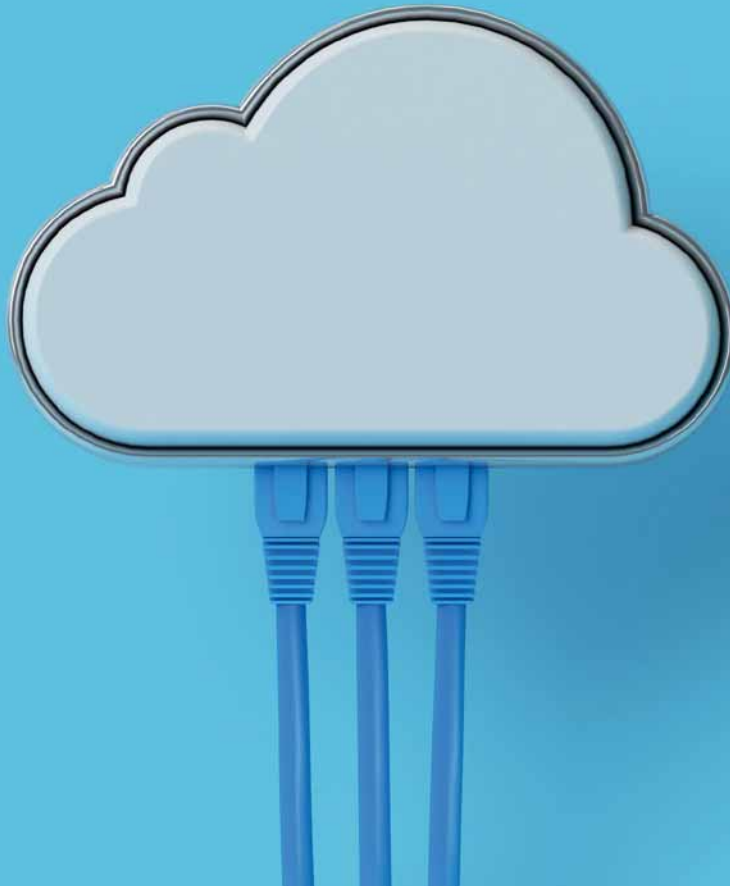
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*Recommended drive away price for TRAFIC single turbo with solid paint valid for vehicles ordered before 31/03/19. ABN buyers only. Renault reserves the right to vary, extend or withdraw this offer. Van shown with customised features available at additional cost.





REACH FOR THE CLOUDS

A NEW REPORT SUGGESTS A STRONG CORRELATION BETWEEN THE NBN, CLOUD-BASED APPS AND SMALL-BUSINESS SUCCESS. **PAUL SKELTON** REPORTS.

Tired of contracting, Clint Ruby decided a few years ago that it was time to become a sole trader, installing solar panels for a couple of major suppliers.

But, as is the case for many entrepreneurs, he didn't have an easy go of things from the outset. When the market dried up suddenly in 2014, Clint had to make a quick transition into general electrical work in construction to stay afloat.

"It was a long, hard road," Clint says.

The switch to construction changed the business model of Ruby Electrical in Currumbin, Queensland, to one with a high volume of jobs and clients. For one thing, it meant employing three or four staff.

This increase in staff, clients and jobs became unmanageable as Clint tried to co-ordinate everything with a diary and a whiteboard. He was working until 10.30pm most nights to catch up on quoting and invoicing.

Apart from two weeks at Christmas, Clint and his family didn't take a holiday in six years, because the paper-based business had to be shut down if he was absent.

Thinking there must be a better way, Clint began searching online for a digital solution and came across ServiceM8. The app was life changing, although making the switch wasn't simple, as he admits to having been computer illiterate.

But he pushed ahead and taught

himself to use ServiceM8, supported by the supplier's online training videos and chat rooms. Now, the app is a core part of his business operations.

Clint estimates that he and his staff save four hours a day by not doing the paperwork required by their compliance-heavy roles. This has freed up staff to do more jobs, as well as reducing the cost of duplicate record books.

Also, the professionalism of his business has increased, which has been the key to serving more than 1,500 clients. In particular, this has been crucial in serving insurance companies, which demand a high standard of care and compliance.

Many small business operators could relate to Clint's story. Going out on your

own isn't easy, but people could be making life harder than it needs to be. Are there readily available solutions that would be easy to integrate into your business?

Trent Innes is managing director of Xero, a cloud-based accounting software platform for small and medium-size businesses.

Recently, through its Small Business Insights division, Xero examined how changes in digital connectivity affect small operations - in particular the role of cloud-based applications and high-speed internet.

"For example, there's a belief in the market that digitisation, or digitalisation, has had a negative effect on employment, but that didn't feel right to me," Trent says.

To test his view, the teams at Xero and data analyst AlphaBeta looked at rollout data for the NBN as a basis for digital connectivity. They compared the figures to Xero customers' data to see what was happening to employment and revenue growth.

The resultant report - *From little things big things grow: How digital connectivity is helping Australia small businesses thrive* - found that the rise of cloud-based applications has enabled small businesses to improve their performance.

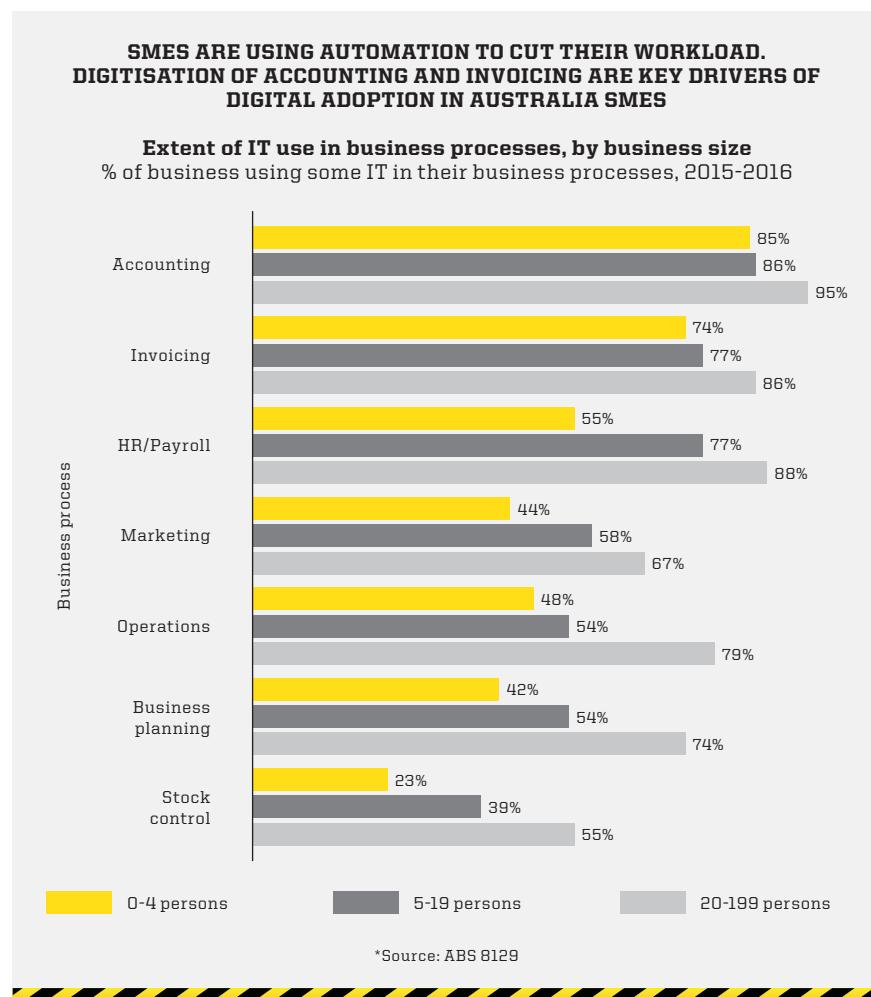
Cloud-based apps store software and customer data on secure, enterprise-grade remote servers instead of on the premises. This allows business operators to access information, updated in real time, regardless of whether they log on from home, at work or via their phones.

"There is a real revolution occurring in the way small businesses access new business process applications, and I believe it is very important," AlphaBeta director Andrew Charlton says.

"Digital connectivity and cloud-based applications are enabling small business to access the tools and efficiencies that were once the exclusive province of big business.

"Small business operators can now do all their accounting in a much simpler way, with a lot less paperwork and in a lot less time.

"They can also do HR functions, marketing and some recruiting. The



list goes on, but these businesses are saving real time and real money thanks to the way they conduct their activities."

Australia is home to 2.23 million small businesses, which make up 99.8% of all businesses in the country. They employ 10.9 million people, so their success is paramount to a healthy economy.

However, many small businesses are not fully participating in the digital revolution. Although the NBN covers half the country, two-thirds of small businesses were not connected to high-speed internet according to the Australian Bureau of Statistics in 2015-16.

"This speaks of opportunity," Andrew says.

"There is a lot to be gained by small business if the power of these technologies is properly harnessed."

He says the biggest challenges for the adoption of digital technologies are

awareness and transition costs. These are exacerbated by a lack of time to investigate options, and fear of change (according to the Australian Taxation Office, 30% of businesses still complete business activity statements on paper).

"Most small business operators are busy - they have limited resources and lots to do.

"Further, if there is a substantial transition cost involved in adopting a new technology, it won't be well received. The message of this report is that the payback period for small business is very short because of the amount of time it will save them."

The rollout of the NBN began in 2009. This sparked a major shift in the type of digital connectivity Australian small businesses can access. In 2009-10, only 8.7% of small businesses and 10.6% of medium-size businesses had a high-speed broadband connection. ➤

Apps connected to Xero are helping industries address longstanding inefficiencies or pain points

Trade & Construction

Business pain points / business needs

- Mobile workforce that needs a remote coordination and supervision
- High volume of client jobs to schedule, perform and invoice
- Essential to assure quality, safety and compliance of work

What do they use apps to do

1. Clerical work
2. Job scheduling, quoting, invoicing and compliance
3. Business performance analysis (eg, cash flow monitoring)
4. Processing orders

Example apps



quotations, appointment setting and reminders.

- Increased revenue by reducing unpaid bills through digital invoicing, which results in a higher proportion of prompt payment online.
- Increased revenue by reducing invoicing errors, or even failing to invoice.

"When you look at the number and type of small businesses in Australia, they're so fragmented and they do so many different diverse things," Trent says.

"From a technology perspective, they were largely ignored until the cloud came along. Now they have better access to the technology that big business enjoys, and at a fraction of the cost."

Removing barriers for digital connectivity now is important, because the digital transformation of small businesses is likely to be a slower process than some other digital transitions, such as social media.

In the past decade, Australian businesses have increased their expenditure on information and communications technology hardware and software by 67%, and have shifted much of their spending from hardware to the cloud.

And it appears to be paying off.

"At a macro level, small businesses that are digitally connected are increasing their employment one-third faster than those not on the NBN," Trent says.

"Their revenue is growing almost two-thirds faster.

"To get an idea of what is happening on a micro level, we decided to look at the number of apps our customers were using, integrated into their Xero system."

The Xero system comprises more than 800 third-party apps that small businesses can use for a range of purposes, including rostering, time sheets or expense management.

With more than 50,000 registered third-party programmers on its database, the Xero app system is quickly becoming a powerful resource for tradies.

In the 2017-18 financial year, businesses on Xero using apps increased their revenue by 5.5% overall. That compares with 3.6% for those on Xero with no connected apps.

"Most of the apps our customers use are very much 'clerical' - accounting, invoicing and payroll, for example," Trent says.

"But we're also seeing a rise in the area of marketing, and for other purposes.

"If you look at construction specifically, the adoption rate is 40% for clerical apps and 20% for business intelligence. Further, 39% of tradespeople use apps for job scheduling and invoicing."

Apps such as ServiceM8 and Tradify allow tradespeople to automate a range of micro-processes, including scheduling jobs with staff and customers, communicating with staff and clients about jobs, recording compliance information, preparing quotes and invoicing customers.

This benefits trades businesses in four main ways:

- Time saved on invoicing and reporting by field staff and managers.
- Increased revenue from better customer service and optimisation of employee time, for example, using time saved on compliance work to allow an extra job to be completed. Customer conversion and retention can be improved by automating

In the 2017-18 financial year, businesses on Xero using apps increased their revenue by 5.5% overall. That compares with 3.6% for those on Xero with no connected apps.

Further, small businesses are often time-poor and can absorb only a certain degree of change at any one time. Adopting digital innovations is likely to be staged.

"Small business is such an important sector, employing 66.8% of the workforce, so digitisation is going to have a huge effect on the efficiency

and competitiveness of the economy," Andrew says.

He believes that growth in adoption of cloud-based apps will largely be organic, but it could be accelerated by more awareness and understanding among small-business operators.

"Gone are the days of people collecting receipts in shoeboxes for a few months then laboriously sorting them, manually entering and submitting them.

"The clerical activities that have consumed so much time in the past are now being automated in ways that are going to save many, many hours a week." ▲



TOOLS



Leatherman Tread LT

Style meets functionality with the Tread LT from Leatherman.

Launching in 2018, the Tread LT is a slimmer and lighter version of the original Tread multi-tool. Consisting of 26 tools, it's travel-friendly, comfortable and will help you solve any problem you encounter. It's also adjustable to accommodate any wrist size and fully customisable with the links you need most.

Each stainless steel bracelet link is a usable tool, like Allen wrenches, screwdrivers and box wrenches. It's quite handy if you don't have your toolbox with you.

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Oliver WB 34 workboots

Oliver Footwear has released its WB 34 series, merging comfort, performance and durability across every style.

Specially formulated technologies make up the WB 34 collection including COMFORTcushion to absorb impact, Odorban Control Technology to minimise odour for optimum freshness and hygiene, NATUREform toe caps with a wide profile and cushion liner to ensure toes are comfortable and a GRIPthane dual density polyurethane sole for superior durability.

As well as offering a six-month manufacturer's warranty on all footwear, Oliver's WB 34 range also come with HYDROstop protection, offering a 3-year guarantee against the effects of hydrolysis and microbial attack on the sole.

Oliver Footwear

www.oliver.com.au



Macaron smart tape measure

With the combination of a flexible ribbon and a small pop-out extension piece, the Macaron smart measuring tape allows you to measure with increased accuracy and fluency. Curved or straight.

Further, it was designed to assist people suffering visual impairment. The Macaron was designed and created by four QUT students, one of whom is blind.

The Macaron is able to take measurements without needing to read the markings, and also connects via Bluetooth to a mobile device. The app can be used to pre-set the object and distances to be measured. Voice input is also available for the setup and all can be saved to the phone app with the press of a button.

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TAKING CARE OF BUSINESS

MANAGING FINANCES IS NEVER FUN; BUT, IT CAN BE EASY. FROLLO FOUNDER **GARETH GUMBLEY** HIGHLIGHTS A SERIES OF THIRD-PARTY APPS FOR YOUR PHONE THAT MAKE CONTROLLING YOUR SPENDING SIMPLE.

These days, it seems like money sprints out of a savings accounts faster than a toupee in a hurricane. It doesn't help that transactions happen so easily now with tap and pay.

Before you know it, you're down to double digits in your bank account and wondering how you're going to limp along to the end of your pay period. Two-minute noodles and instant coffee, anyone?

The apps provided by major Australian banks and lenders work well for checking your current balance, transferring money and paying bills, but they don't actually encourage you to save or budget your money.

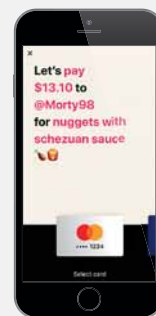
Thankfully, there are a handful of apps out there that fill the gaps and enable you to make the most of your hard-won earnings.



Finch www.finch.me

If you're somewhat of a social butterfly, Finch is a must-have for ensuring your hard-earned money doesn't end up paying for other people's expenses. Whether

it's splitting the bill for a group dinner, divvying up the cost of a shared holiday house or simply asking your mate to put in for a six-pack, Finch makes it as painless as possible with its intuitive interface. You can proactively pay someone money, request that someone else pay you, and also create groups to track shared expenses across multiple people. No more awkward conversations necessary.



Beem It www.beemit.com.au

The beauty of Beem It is that it doesn't overcomplicate payments. So long as the person you want to transact with is an existing Beem

It user, the actual payments process has been designed to look more like a Twitter feed than a stodgy bank transfer. The app is jointly owned by CommBank, NAB and Westpac, and given payments happen instantaneously, it's actually better than transferring money to someone's bank account via online banking – a process that typically takes 1-2 days. New users also get a \$5 credited to their linked debit account.



easyshare www.geteasyshare.com

easyshare is another payments app that focuses specifically on splitting payments and bills in a shared household.

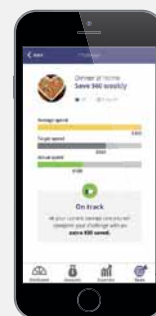
This could be for rent, groceries, electricity, internet and any other shared expenses that need to be divvied up among roommates. Taking the awkwardness out of chasing household members for money – and negating the need for any passive aggressive post-it notes on the fridge – easyshare is clever enough to collect the cash from relevant parties and then pool it all together to pay rent or bills on your behalf on a one-off or recurring basis.



Stocard www.stocardapp.com/en/au

Rewards programs are a great way to save money with vendors that you frequent on a regular basis, but who wants to lug

all of those loyalty cards around? Stocard is an app designed to liberate you from loyalty card fatigue, with support for all of the major vendors and programs, including Woolworths, Flybuys, Myer, Priceline, Qantas and Coles. The app stores digital versions of each card on your phone, and also shows your current rewards points balance, nearby store locations, as well as any relevant offers, coupons and catalogues.



Frollo www.frollo.us

Designed to help improve your financial fitness, Frollo is a free app that gives you all the tools you need to manage your money effectively. It connects all of

your bank accounts, credit cards, loans and superannuation together into a single dashboard to give you a complete picture of your finances, and based off your transactions, it provides you with personalised insights that help you save money. Budgeting and keeping track of bills is all done automatically, and the inclusion of personal goals and community-based challenges help you stay motivated to continue your positive savings habits.



TOOLS



Comtruk Sports Utility Bed

Designed and manufactured in Australia, the Comtruk Sports Utility Bed (SUB) aims to re-imagine the classic ute tray with more performance features and improved safety features.

The SUB's integrated strapping system aims to make loading, load securing and unloading easier, regardless of cargo size or shape. It features multiple channels of attachment for securing of loads and installing equipment carrier accessories.

When not securing a load, the SUB's channels hold rubber friction strips to help reduce sliding and create grip to the bed floor.

Comtruk

www.comtruk.com

Prazi beam cutters

With more and thicker glue-laminated timber (GLT) being used in general construction, there comes a time when a standard circular saw is not up to the task.

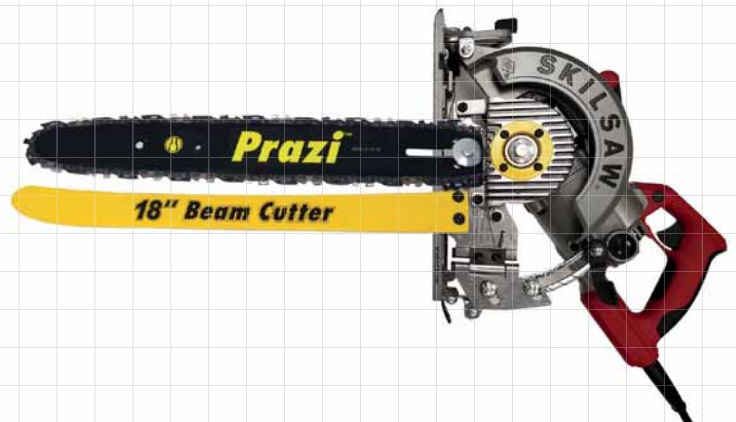
Beam cutter attachments have been available in the US for more than 20-years but have had limited compatibility with some of the circular saw brands on the Australian market. Such attachments virtually turn a circular saw into a refined chain saw.

Recently, market-leader Prazi has released an 18" beam cutter that fits virtually all standard circular saws where the blade is on the right hand side. The product has also been tested and works well with a growing number of 36V cordless saws.

You can buy the tool direct from the manufacturer.

Prazi

www.praziusa.com



Bosch GOP12V-28 12V Multi-tool

The Bosch GOP12V-28 12V Max Starlock oscillating multi-tool features the next-generation Starlock 3-D interface; the accessory connection is cupped and shaped like a bottle cap to provide more contact surface area for rock-solid blade grip and maximum torque transfer.

The tool's EC brushless motor delivers more power versus the previous tool's 12V motor. This tool produces a top speed of up to 20,000 oscillations per minute and it has a 2.8° oscillating arc. The variable-speed dial allows users to match the oscillating speed to the material and task with a range of 5,000 to 20,000 opm (oscillations per minute). Bosch's Constant Response circuitry allows the tool to maintain the desired speed even as load increases.

Bosch Power Tools

www.bosch-pt.com.au



WHAT'S IN A NAME?

MUCH LIKE YOUR OWN NAME, YOUR BRAND NAME MEANS EVERYTHING, WRITES **BLAIR BEVEN**. ARE YOU PROTECTING IT?

They say that a person's own name is the sweetest sound in any language. We strongly identify with our names. It's often the first thing you learn about someone; your first chance to form judgements about who they are.

The same goes for brand names. We see over 4,000 ads every single day. Companies spend a lot of time competing for our attention and this is often through the promotion of brand.

As a seasoned tradie, you probably know all about the art of attracting new business and the value of having a good brand. Whether you've opted for a media-friendly brand (e.g. Dr Sparky for electricians) or you're simply trading under your own personal name, that name is an integral part of who you are and how customers perceive you. So, what rights do you have in law to protect that brand?

This area falls under the broad umbrella of intellectual property (IP) law and it's frequently undervalued or overlooked by business.

It's also complicated: there are several situations where a company might seek to register a name and each requires a different method.

If you're operating as a company, you will have registered the name of your firm with ASIC. Companies must have Pty or Ltd in their name. If you're not operating as a company, you still need to register your business name. Companies can also register a business name, if they wish to operate under a different name from the name they are incorporated under.

But does registering a company or business name protect you from

imposters who want to steal your name and your goodwill? The answer is no. The only way to do this is to register the name as a trademark with the Intellectual Property Office of Australia and secure your ownership over the name. Once granted, the registration lasts 10 years, and if you continue to use it, can be renewed for another 10 years or in perpetuity.



Another misconception is that internet domain names afford you the legal right to that name. Like company names, domain names are merely for administrative use and do not give the company any monopoly in the name. A domain name is only associated with the company's website and points consumers to your business. It does not protect the name itself. It is possible, as most people know, to merely change the company name or domain name by the smallest margin to secure similar names.

For a trademark to be registrable, it must be distinct. The inherent distinctiveness associated with a trademark appears on a sliding scale. The most inherently registrable terms are those names

that are invented (Kodak, Google). Some are illusory (Facebook) and then more common/known names can be trademarked if they do not relate to the goods or services (Tesla, Nike). You would not be able to secure a trademark registration for a word that directly describes the goods or service; for example 'plumber' or 'electrician'. This defeats the purpose of the trademark

registration system where the government allows you to 'own' and have a monopoly in the name for a period of time. Trademark rights are national rights. Owning a trademark registration in Australia for example would not afford you any protection in the United States of America.

There are numerous benefits to obtaining a registered trademark including gaining a complete monopoly over the name, which acts as

a deterrent for a third party

using or registering the same name. The investment business usually makes in the creation and promotion of their brands means that the name should be legally protected as a trademark. Most businesses have taken a considerable effort to create the brand and this investment can be consolidated through your IP protection.

Process

The drafting of a trademark application should be conducted by a qualified trademark attorney or specialised IP lawyer. When a trademark is being considered, the goods and services for which the



Blair Beven is a partner at national law firm Mills Oakley.

trademark will be used are classified with IP Australia according to a global classification system (called a specification of goods and services). There are 45 potential classes covering all possible goods or services in the world. IP Australia and most trademark professionals charge per class. The drafting of the specification requires some skill and expertise. There is no point in spending money to trademark a valuable name if it does not secure what you do or intend to do.

In Australia, once the application is lodged it can take anywhere up to four months for the application to be examined by IP Australia. However the filing date of the application acts as your priority date to the name. This priority date is highly important in IP and starts a six month clock to secure protection overseas and still claim the Australian filing date.

IP Australia will either issue an examination report raising any issues

with the application or issue a notice of acceptance. The application, if accepted, is then advertised in an official trademarks journal, which opens a two month window of opposition – if some other person or company was aggrieved by your trademark application. If no-one opposes the application it is then registered.

If IP Australia raises issues with the application then IP Australia allows 15 months to secure acceptance. A trademark lawyer should be engaged if you have issues with the application as it could identify an infringement risk or other inherent defect in the application. ▲

Blair Beven is a partner at national law firm Mills Oakley and specialises in trademark law and practice. He protects a significant number of trademarks in Australia and globally. He can be contacted at bbeven@millsoakley.com.au or +61 2 82895809.

Benefits of trademark registration

- You are deemed the absolute owner of the name/brand in Australia;
- The registration acts as a deterrence to others to file a similar or identical trademark application;
- The trademark registration lasts for 10 years;
- You can license others to use the trademark for a fee or royalty;
- You can use the Australian applications as a base to protect the trademark in other countries using the same filing date as Australia. This gives you some priority in the trademark.
- A registration can be used to stop others using the trademark or a similar trademark for your goods or services.
- You can sell the trademark to a third party;
- A trademark acts as an asset of the business which can be valued and included in your statement of assets for the company.

PERFORMANCE BRAZING AND SOLDERING

Every day, thousands of trade professionals rely on Tradeflame equipment to deliver superior precision, ease of operation and reliability. Designed to the highest industry specification and featuring an ergonomic handle with piezo ignition safety trigger, Super Cyclone Burner and disposable TF/ULTRA GAS™ Performance Gas cartridge, the Tradeflame Turbo Blow Torch Kit will take care of all variety of brazing and soldering applications.

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PITCH PERFECT

WINNING JOBS CAN BE HIT AND MISS, BUT WHEN YOU DO LOSE A JOB IT'S IMPORTANT TO ANALYSE THE SITUATION TO FIGURE OUT WHY. **CECELIA HADDAD** LOOKS AT MASTERING THE PITCH.

Win some, lose some. That's the way life goes. But wouldn't it be nice to win more often?

Winning new business doesn't have to be daunting or time consuming but it does require an investment of a little bit of time to ensure you will reap the rewards.

There are definitely some jobs that will be small and straight forward that can be won by a quote over the phone. However, winning the bigger and more valuable projects require thought and preparation and some tailoring to meet the individual needs of your next customer.

So, what makes someone 'buy' from you? Is it the lowest quote, the fastest turnaround or the promise of quality? It is probably all of those things, but there is one thing that if you have it, you will always win and that's trust.

It doesn't matter if you have the cheapest price, the fastest turnaround or promise the best quality products money can buy, a customer will never give a job to someone they don't trust.

Trust isn't a word you can just slip into a sentence to make it happen. It starts building from the first impression the customer gets - this could be your website, vehicle signage or your first conversation. There are ways to build and gain the trust of your customer. A bit like a puzzle, you need this and all the other elements to complete the picture, and your pitch! Here are the three stages of pitching to win.

Stage 1 - Prepare

You must do your homework before you work on any quote or new business proposal. What is the customer's situation? What do they want? What do

they need? What is their budget? If you don't know or address this, your pitch will be way off and you won't get the job.

In the words of Stephen Covey: "Begin with the end in mind". Think about what you want your customer to think, feel and do. Sign here? Provide feedback? Make sure you have a clear take out, don't assume the customer will initiate closing the deal.

You should always go beyond expectations. Once you know what the customer needs, don't just supply one idea or one quote especially if you have additional or even better idea. It shows you have thought about their needs and gone above and beyond their expectations.

Time is money; how much time does the customer have? If they say half an hour then you should not be talking or presenting for more than 20 minutes



to allow them time for questions. You want to make sure they have all the information they need to decide there and then.

A picture tells a thousand words and photos of what you have done in the past or ideas for their project will be much more visually exciting than just a verbal presentation. It also allows you to demonstrate your experience. Before and after photos are very impactful and examples backed by facts or testimonials will go further than empty words.

Do you know what your unique selling proposition/point of difference is? Be ready to answer the question "why should we choose you for our project?". They may not ask it, but you need to make sure you cover it because the customer will be thinking it anyway.

Always be ready to address the competition. Do you know your competitors and what they might offer? You can address your competitors without mentioning them. Point out your positive differences (not their weaknesses). This will be far better received than criticising the competition.

Stage 2 - Present Your Pitch

It's all about the customer of course, so start by talking about them and what you understand their needs to be. If you find your pre-prepared presentation isn't going to meet their needs, then at least you will have an opportunity to address that and correct it during your pitch.

It is you they are buying not what's in your presentation. This is directly related to the trust factor. Find common ground - teenagers, pets, proximity - anything that connects them to you will help establish rapport and build a relationship from common ground. At the end of the day, they will hire you if they like you, but not if they don't, even if you have the best presentation in the world.

There is a fine balance between giving away too much information or not enough. You need to avoid underwhelming and overwhelming your client by ensuring you have enough information for a decision to be made but not so much that you have caused confusion and information overload.



A customer will never give a job to someone they don't trust.

Look at their body language, not just their words to understand what they really think about your presentation. Looking at their watch, physically turning away, losing eye contact, checking their phone - these are all indications that they are not on board with what you are presenting. Stop and ask questions before you just continue to ramble down the same path.

Stage 3 - Closing the deal

To close a deal, you will be advised to always talk to the decision maker; however, sometimes the influencer is just a crucial. Make sure one or both are present when you give your pitch.

Overcome any fears or objections. If you don't know what they are then ask if there is anything your potential client is unsure of or doesn't like. Can you clarify anything further?

Don't pressure the customer to close the sale, but you can create a sense of urgency by offering an incentive for them to decide sooner than later. This could mean their project could be completed sooner due to a window of

opportunity or there is an add on you can offer them if they advise by a certain time.

Ask questions to ensure they have enough information to decide. If they are undecided and you really want the job then be bold and ask: "What do you need me to do to win your business?" You might be pleasantly surprised by the answer and something you are willing to do to get the job.

Once the customer has decided, the pitch process doesn't stop there. Evaluating their response will be a great investment of your time for future pitches. Understand why they selected you for the job - or why they didn't - and use that information for your next pitch. Good luck! ▲

Cecelia Haddad

Cecelia Haddad is the director of Marketing Elements, a PR company that specialises in the building and environmental sectors.

MERCEDES-BENZ VISION URBANETIC CONCEPT

Mercedes-Benz has developed a thought-provoking new high-tech light-commercial van concept that combines trade and family transport in the one package.

Dubbed the Vision Urbanetic, the concept is designed to answer “the questions of future urban mobility”.

We might have expected it to be fully autonomous, freeing up the owner from driving duties, and that it would have an all-electric powertrain, reducing air and noise pollution.

But what we did not anticipate was just how deeply the German auto giant’s designers, engineers and product planners were prepared to delve into the idea of a highly flexible trade van that can be easily transformed into an eminently suitable out-of-hours multi-purpose vehicle.

While utes and pickups are increasingly used for both work and recreational purposes, the trade-specific fit-outs in commercial vans are not in the same ballpark. With this concept, however, the vehicle comes equipped with different interchangeable bodies, depending on

the purpose of use.

In presenting the concept, Mercedes has configured a classic delivery van and a 12-seater people mover, but the bodies are really only limited by our imagination - there could be one set up for any particular trade, for example, and another that serves as a luxury lounge-style limo or a mobile man cave...

With the trade body, there is a variable load floor that can be split into two levels and offers 10m³ of cargo volume. The load space measures 3.7m long, within a total vehicle length of 5.14m.

Switching between bodies can be done either automatically or manually, Mercedes says, with the automated process taking just a few minutes.

All driving functions and running gear are built into the autonomous vehicle platform, onto which the bodies are simply fixed. So the chassis will operate independently - even moving from one location to the next if required, without the body attached.

The absence of a driver’s cab - with no need for a steering wheel, pedals,

dashboard, etc - also frees up space for new ideas on interior design, bringing obvious benefits with the ability to carry more tools, materials, occupants, and so on.

The concept also incorporates an IT infrastructure that can perform high-level functions in real time such as monitoring stock levels of materials used and planning optimum routes between jobs to avoid traffic jams and so on.

A lot of advanced safety technology is likewise fitted to the van. With the people mover body, the vehicle uses multiple cameras and sensor systems to communicate not just with the occupants but with those on the outside.

For example, there’s a large-format display on the front of the vehicle to inform pedestrians crossing the street in front of it that the vehicle has noticed them. There is also ‘digital shadowing’ around the side door where several hundred light units display the contours of people approaching along the flanks of the vehicle, signalling to them that they have been noticed. ▲





RENAULT ALASKAN AND OROCH

Renault Australia is continuing to work on the business case to bring the Alaskan one-tonne pickup and the smaller Oroch ute to this market.

Built on the same platform as alliance partner Nissan's Navara, the Alaskan is all but locked in for launch here but minor changes required for local homologation have pushed out its timing to late 2019 or early 2020.

There are also some sticking points in relation to the costs involved in sourcing the Alaskan from Nissan's plant in Barcelona, Spain; however, Renault Australia managing director Andrew Moore has told us that significant progress has been made and that the Alaskan will be sold here as a dual cab only with a limited model range.

He also pointed to the premium-looking design of the Alaskan compared to other pick-ups in the segment, adding that Renault was not out to compete in volume terms with the Thai-built heavy hitters in the segment.

This means the Alaskan will be pitched against the likes of Ranger Wildtrak, HiLux Rugged X, Volkswagen's Amarok and Mercedes-Benz's X-Class - the latter built as part of the same program that has delivered Renault its first mid-size one-tonner.

The Alaskan will be offered with the 2.3L four-cylinder turbo-diesel engine used in Navara, and its underpinnings will include the sophisticated five-link coil spring rear suspension seen on high-end versions of the Nissan ute.

The X-Class relies on many of the same components - including the basic architecture, four-cylinder diesel engine and rear suspension hardware - but has incorporated its own engineering modifications, and various other changes, including a V6 diesel engine option.

Renault Australia is also working closely with the factory in Spain to develop a range of high-spec body

parts and accessories for the Alaskan such as sports bars, wheel arch fenders and bullbars.

The Oroch, meanwhile, looks to be a slightly longer-term proposition for Australia but Andrew is pushing the case for it to be built in right-hand drive as it would hand the company a highly specified small/medium dual cab ute at a much lower entry point - around \$30,000.

Launched overseas in 2015, the Oroch is based on the same platform that underpins a variety of Renault and Nissan compact SUVs and passenger cars and borrows much from the budget-oriented Dacia Duster small SUV.

It was primarily developed for the South and Latin American markets and is designed to sit between the half-tonne pickups that are popular overseas and the one-tonners that are big business in Australia.

As such, Oroch's payload tops out at around 650kg and it is not designed for heavy duty workloads, relying at the moment on 1.6 and 2.0L four-cylinder petrol and dual fuel (petrol/ethanol) engines and using only a 4x2 (front-wheel drive) driveline.

It has a car-like monocoque chassis, fully independent suspension, circa 1,300kg kerb weight and measures around 4,700mm long, 1,820mm wide and 1,695mm high, resting on a 2,829mm wheelbase. This makes it bigger than, say, a Subaru Brumby but a fair bit smaller than Alaskan and Co. The cargo bed can hold up to 683L.

A significant update is due around 2020, so an Australian release would likely be based on this 'Phase II' overhaul, taking on more budget-oriented 4x2 dual cab utes from the Asian brands and hoping to pick up buyers who would otherwise have bought an Australian-made Falcon- or Commodore-based ute before Ford and Holden closed their local manufacturing operations. ▲

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THE METAL PECKER® is specifically designed to cut penetrations in profiled metal roofing for in-situ vent pipe and skylight installation ...as well as air-conditioning duct, furring channel and other straight or formed metal sheet. The tool's precisely engineered slot-shear cutting action eats up folded sheets, seams and joints, like no other hand or power tool, you've ever used. The more you use the tool, the more uses you will find for it onsite.

HOW IT WORKS

The Metal Pecker's bolt-cutter sized handles provide far greater cutting leverage than other metal cutting hand tools.

Its precision cutter blade shears the metal between the anvils and pushes out a 1.7" (43mm) x 0.24" (6mm) slug with each cutting stroke. There is no blade face to blunt.

To cut, you simply punch a pilot opening in the metal sheet, poke the beak of the Metal Pecker's cutting jaw into the opening and commence cutting.

A MULTITUDE OF USES

The Metal Pecker compliments other tools that do their best work on single thickness profile cutting at ground level, or on flat sheet.

However, when the going gets tough with in-situ penetrations and other tools pass up under-folds or have difficulty cutting through a profile, reach for the Metal Pecker.

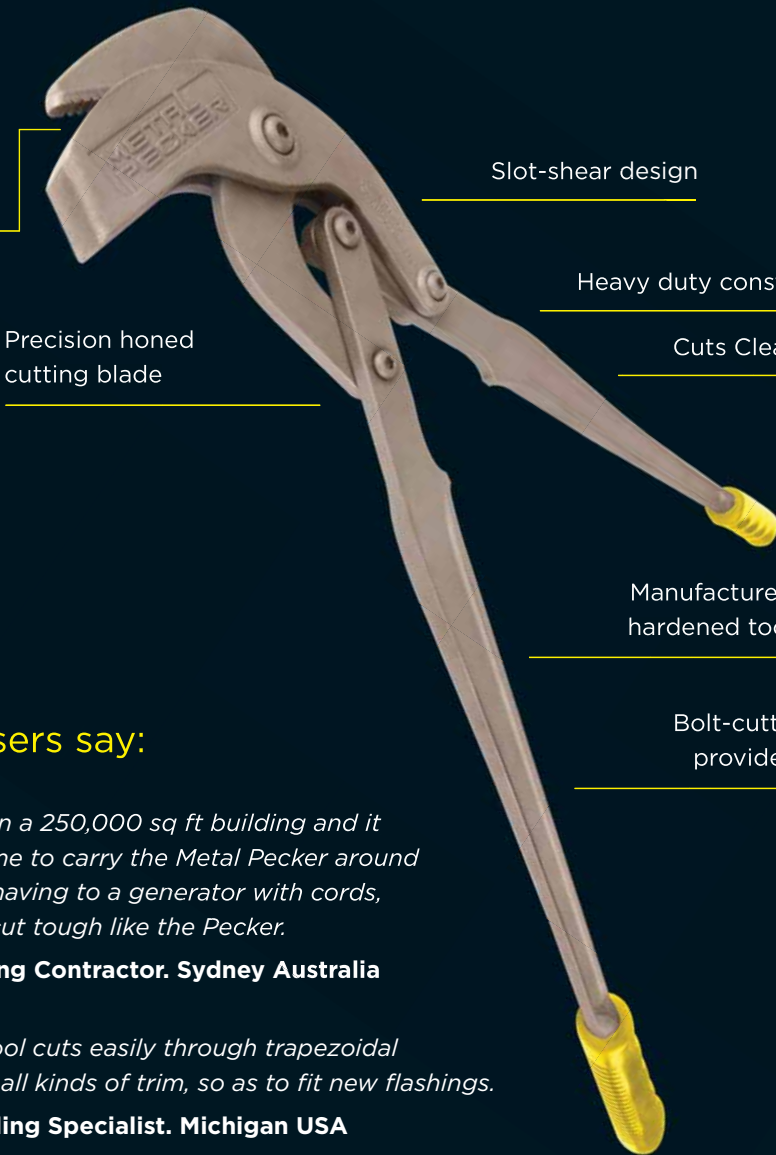
Its extended handles keep you away from the sheet's sharp edges and provide greater reach and leverage in hard to access places - reducing your work time.

Cutter blade shears the metal between the anvils





Every tool kit needs a Metal Pecker The tool with 1001 deconstruction uses



Non-slip serrated
cutting jaw

Slot-shear design

Precision honed
cutting blade

Heavy duty construction

Cuts Clean - no swarf

Comfort-grip PVC
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Manufactured from
hardened tool steel

Bolt-cutter length handles
provide greater leverage

Read what the users say:

I've just finished work on a 250,000 sq ft building and it was more efficient for me to carry the Metal Pecker around than any other tool, or having to a generator with cords, as cordless tools can't cut tough like the Pecker.

Barney Smethers **Roofing Contractor. Sydney Australia**

I like the fact that the tool cuts easily through trapezoidal standing seam ribs and all kinds of trim, so as to fit new flashings.

James Gunnerson **Building Specialist. Michigan USA**

ORDER TODAY AT
www.metalpecker.com



VOLKSWAGEN AMAROK V6 TDI580 ULTIMATE

Volkswagen has set a new benchmark among the one-tonne mid-size ute brigade, launching a more powerful version of its Amarok V6 diesel engine that sees the German brand maintain bragging rights over newcomers such as the Mercedes-Benz X-Class X350d.

Available only in top-spec Ultimate guise for the time being, the new TDI580 4x4 twin cab has emerged with a revised version of VW's 3.0L 24-valve turbo-diesel engine that produces 190kW of power from 3,250-4,500rpm and 580Nm of torque from 1,400-3,000rpm - up 25kW/30Nm over the continuing TDI550.

What's more, Volkswagen says maximum power of 200kW is available from 3,500-4,000rpm via the temporary overboost function, which is a 10kW improvement over the TDI550 and kicks in for up to 10 seconds between 50km/h and 120km/h.

For this to occur, the standard-fit ZF-sourced eight-speed automatic transmission must be in either third or fourth gear, and the driver needs to have depressed the accelerator by at least 70%.

From a standing start, the TDI580 Ultimate can sprint from 0-100km/h in a claimed 7.3 seconds - 0.6s quicker than the 550 and enough to keep its

nose in front of the Mercedes X350d, its chief rival which can complete the task in 7.5s with its own 190kW/550Nm 3.0L V6 diesel.

This is a fair effort for the big VW ute, which drives all four wheels on a permanent basis, tips the scales at 2,244kg and maintains a good fuel economy figure on the official combined test cycle (city/country), returning 8.9L per 100km from its 80L fuel tank. The engine is rated to the Euro 6 emissions standard while the TDI550 is compliant with Euro 5 and returns 9.0L/100km.

The Ultimate brings with it 20" 'Talca' alloy wheels, a unique front bumper design, durable cargo area lining, stainless-steel side steps (with LED lighting) and a 'long-design' sports bar, while other exterior features of note include bi-Xenon headlights, LED daytime running lights, front fog lights with a cornering function and, assisting the driver, a rear-view camera, front/rear parking sensors and tyre pressure monitoring system.

As with all Amarok V6 variants, four-wheel disc brakes are fitted, along with ABS brakes (with off-road programming, electronic brake-force distribution and brake assist), a mechanical rear differential lock, electronic stability and traction control, hill holder system, hill descent

control, an active rollover prevention system, trailer sway stability control (when the towbar wiring kit is installed) and front and side airbag protection for the driver and front passenger.

Interior highlights on the Ultimate include Nappa leather seat upholstery, 'ergoComfort' heated front seats (with 14-way electric adjustment for the driver), a premium multi-function colour display in the instrument binnacle, high-grade 6.5" touch screen infotainment system with satellite navigation and Apple CarPlay and Android Auto compatibility, leather-clad multi-function steering wheel, transmission paddle shifters, alloy sports pedals, black headlining and pillar trim, tailored carpet mats and dual-zone climate-control air conditioning.

Maximum braked towing capacity remains at 3,500kg, while payload is not quite at the 1t mark - 836kg. Gross combination mass is 6,000kg and GVM 3,080kg.

The Amarok sits on a ladder-frame chassis and uses double wishbones with anti-roll bar at the front suspension and a 'multi-layered' solid axle with heavy duty springs at the rear.

The tray measures 1,555mm long, 1,620mm wide (1,222mm between the wheel arches) and 508mm from tub floor to sill. ▲

NISSAN NAVARA BLACK EDITION, SILVERLINE

Nissan has placed fresh emphasis on its Navara one-tonne ute range with two new special edition dual cabs: the ST-based 'Black Edition' and SL-based 'Silverline'.

Nissan has had a strong response to its value-laden mid-spec editions in the past - such as the 2017 ST-X N-Sport - and has now added a host of accessories and other detail items to create the 'black and silver' duo.

Black really is the central element in the ST-based special edition, with the colour appearing on the 18" alloy wheels (with General Grabber all-terrain tyres), front grille, nudge bar, fog lamp surrounds, smoked bonnet protector, wing mirror caps, wheel arch flares and sports bar.

The Black Edition also features an LED light bar, soft tonneau cover and protective tub liner.

The Silverline, meanwhile, has 16" alloy wheels in place of the standard steel rims, a polished alloy sports bar, unique tailgate badging and a mobile phone holder in the cabin.

There are no mechanical changes to the Navara, which at this level runs with the twin-turbo version of the 2.3L four-cylinder diesel engine producing 140kW of power and 450Nm of torque. It combines with a six-speed manual or seven-speed automatic gearbox, driving through a part-time 4WD system with low range.

The new editions join the Series III range in the current D23/NP300 generation, upgraded early in 2018 with a raft of mechanical and detail specification changes to make Navara better suited to Australian conditions and customer preferences.

For the SL, ST and ST-X dual cabs, which have a five-link coil spring rear suspension, the overhaul was headlined by a fresh round of modifications - including a dual-rate rear spring system and faster steering gear ratio - aimed at further improving ride and handling characteristics, especially with a load on board or with a trailer behind. ▲



ISUZU N SERIES

Isuzu Australia has launched its updated N Series light truck, bringing a broader availability of its automated manual transmission (AMT) as well as a host of detail mechanical, cabin technology and specification changes across the huge range that is now available in almost 70 different configurations.

Among the headline acts is the introduction of the NPS 75/45-155 4x4 AMT model, which is billed as the first-ever two-pedal 4x4 light truck on the Australian market - a direct response, Isuzu says, to customer demand for a reliable, rugged and easy-to-operate vehicle that can access difficult job sites and is available in both 7.5t and de-rated 4.5t (car licence) GVM ratings.

The NPS 4x4 AMT comes in single and crew cab body styles and combines the five-speed AMT with a part-time 4WD system and Isuzu's familiar 5.2L 16-valve '4HK1-TCN' four-cylinder diesel, which produces 114kW of power at 2,600rpm and 419Nm of torque from 1,600-2,600rpm.

When low range is selected, the AMT reverts to clutchless manual control mode, which keeps the selected gear engaged. Local engineering work has also seen the transmission specifically calibrated for Australian off-road conditions and usage patterns. A five-speed manual gearbox remains available, too.

Cruise control is now standard across the N Series range, along with a new dash-mounted infotainment system featuring a 6.2" touch screen, updated Android Auto operating system, USB 3.0 connectivity, Bluetooth V4 and DAB+ digital radio.

Local engineering work has also seen Isuzu revise tyre specifications on some model lines, such as the NPS 4x4 swapping to Bridgestone L330 225/80 R17.5 rubber (from Michelin XZT 8.5R17.5s) - a change that the company says improves its off-road performance and gives the truck a higher load capacity, maximising the use of the steer axle's 3,100kg limit (+200kg). NPR and NNR models also now have a new Michelin tyre that is said to bring improvements in braking, mileage and durability. ▲



VOLKSWAGEN AMAROK V6 TDI550 CORE

Volkswagen is pitching its most affordable V6-powered Amarok dual cab ute ever straight at the trades, lowering the entry price for the TDI550 engine to \$50,990 drive-away with the introduction of the new Core 4x4 model grade.

VW Australia has been slowly adding lower-priced variants to the Amarok V6 range, which initially arrived with highly specified Ultimate and Highline variants before a Sportline version was added to bring the baseline price down to around \$55K.

Now, the German prestige brand has stripped it back further with the Core 4x4, which misses out on a few creature comforts but has the main attractions front and centre: VW's highly regarded 165kW/550Nm 3.0L V6 turbo-diesel engine, combined with the eight-speed automatic transmission.

The price point could even fall below \$50K before too long, with Volkswagen Group Australia planning to introduce a long-awaited (six-speed) manual version now that the Core 4x4 is here.

With V6 versions accounting for around 70% of total Amarok sales in Australia - and rising - VW is hungry for more new buyers.

There's a useful amount of safety gear on board including four airbags for front occupants and four-wheel disc brakes with a supporting cast of electronic systems assisting the driver including ABS, EBD, brake assist, traction and stability control, a diff lock, hill holder and, when travelling off-road, hill descent control.

Items left off the Core's standard equipment list include front parking sensors, dusk-sensing headlights, rain-sensing windscreen wipers, a lockable tailgate (with 'comfort' closing), tinted windows, four 12V power sockets (leaving one in the cabin), under-seat storage, rear cup holders and chrome cabin trim highlights.

In terms of outright acceleration, the ute can reach 100km/h from standstill in a claimed 7.9 seconds. ▲

FORD TRANSIT PHEV, MILD HYBRID

Ford has unveiled new fuel-saving electrified versions of its Transit van - a plug-in hybrid electric vehicle (PHEV) version of the mid-size Transit Custom and a 'mild hybrid' version of both the Custom and the full-size Transit with a 48V starter/generator system.

The first series production PHEV in its class, the plug-in Transit Custom will enter production in the second half of 2019.

It uses Ford's 1.0L three-cylinder EcoBoost petrol engine but, rather than doing the main job of powering the vehicle, it serves as a 'range extender' which generates electricity that is then fed into a 14kWh lithium-ion battery pack located under the load floor.

Full technical details were not provided at the vehicle's unveiling in Germany, but the electric drive motor on board takes full responsibility for driving the front wheels and enables a 50km driving range on battery power alone - covering many inner-city trips - while the total driving range, with a full tank of petrol, is claimed to be more than 500km.

Meanwhile, Ford also has first-in-class bragging rights with the so-called mHEV (mild hybrid electric vehicle) powertrain developed for Transit, which uses a belt-driven starter/generator instead of a conventional alternator in combination with the latest 2.0L EcoBlue diesel engine across all power ratings.

The system is designed to capture energy when the vehicle brakes or decelerates, storing this as charge in the 48V air-cooled lithium-ion battery pack and using it to power the van's electrical ancillaries and provide improved torque under acceleration and during normal driving.

This reduces load on the diesel engine and, in combination with an updated automatic engine idle-stop feature, delivers fuel savings of up to 3% on average - or as much as 8% in start/stop urban conditions, based on the latest WLTP test procedure. ▲



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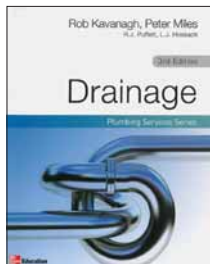
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collection, treatment and disposal of waste. Common treatment methods and alternative disposal methods are explored in depth and with astute attention to principles, practices and regulations.

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The update includes wide ranging revisions to meet the requirements of the CPC08 Construction, Plumbing and Services Training Package. New features include sustainable plumbing practices, case studies, new and revised illustrations, technical drawings and resources, a competency grid aligned to the training package, and Australian Standards grid and worksheets for each chapter.

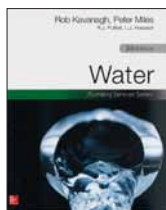
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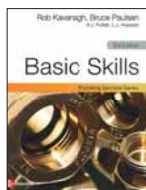
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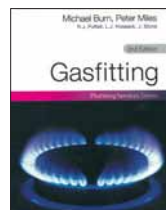
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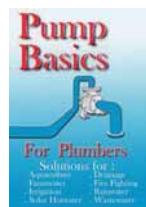
This text assists the licenced gasfitter to understand and correctly interpret the Standards laid down in the current code for the installation of gas burning appliances. This new second edition incorporates thorough and wide ranging revisions to bring it up to date with the requirements of the Plumbing and Services Training Package.



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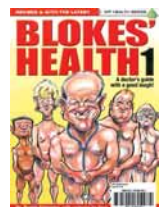
This is a very small book with a lot of big information and will help you with many applications. Plan your own solar hot water system. It gives you an understanding of solar water heaters and the most common models and their features. It also covers retrofits, size and site locations, including mains pressure versus low pressure, collectors, tanks, boosting and freeze protection, warranties, rebates and Standards. A very helpful booklet.



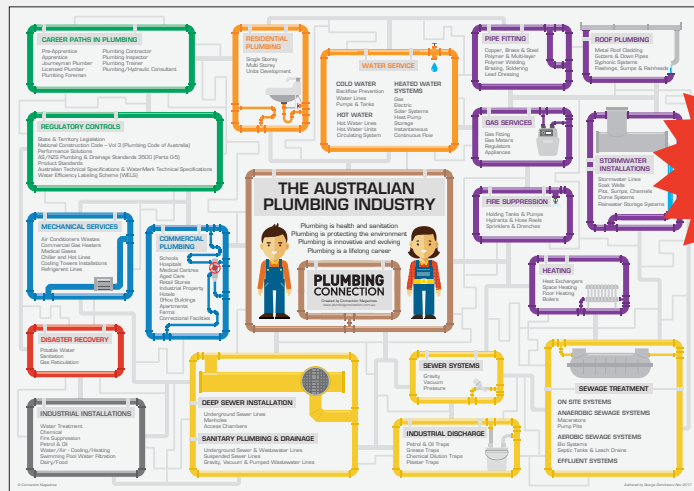
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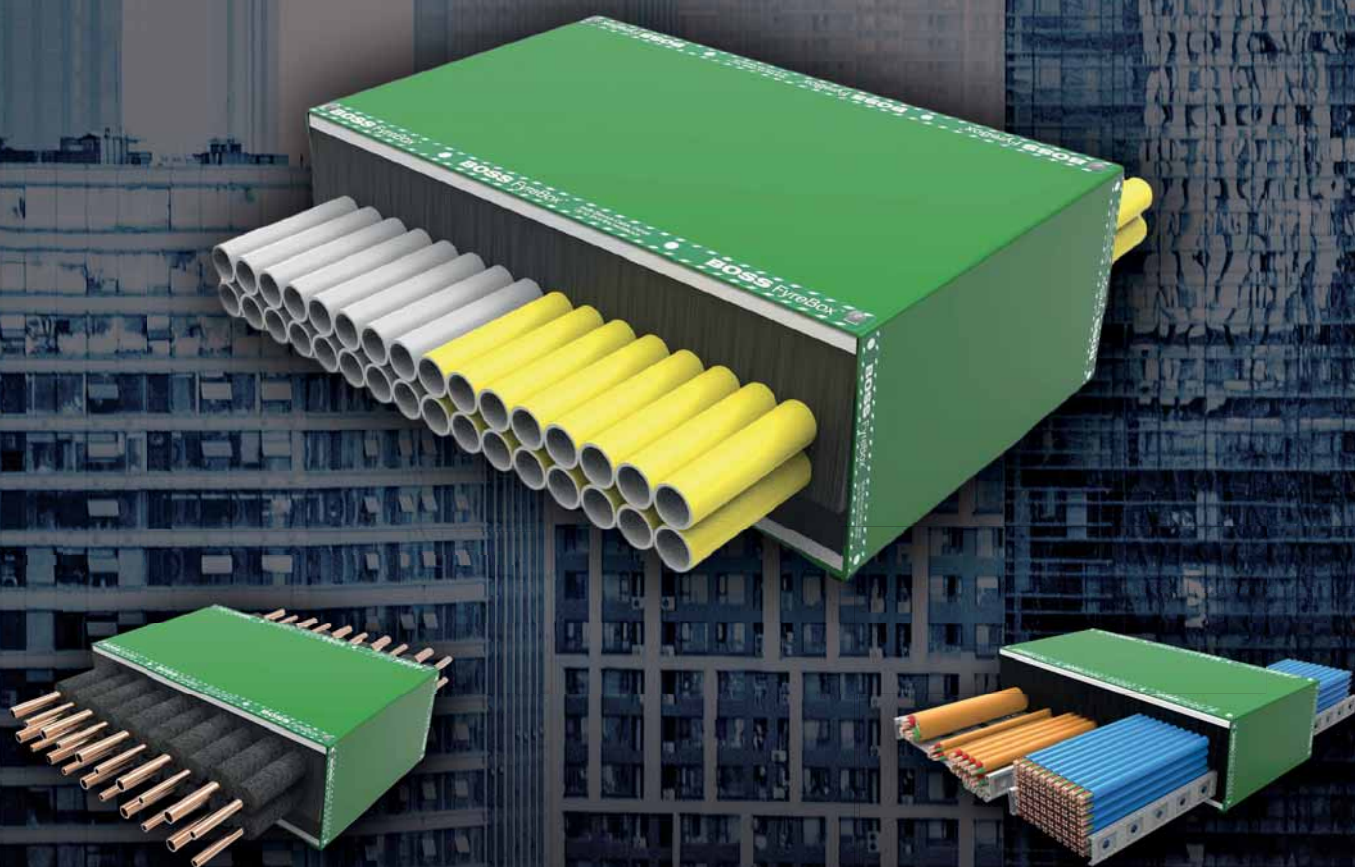
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