FIRE AUSTRALIA2025

Innovation and Newtons Third Law of Motion in the Fire Protection Industry.

With apologies to Issaac Newton

John Clampett & Shae Mete

John Clampett Consulting

jcc@ihug.com.au

Newtons Third Law of Motion

According to Newton, whenever objects A and B interact with each other, they exert forces upon each other. Object A exerts a change force, and Object B exerts a resistant force. These two forces are called action and reaction forces and are the subject of Newton's third law of motion. Formally stated, Newton's third law is:

- ***For every action, there is an equal and opposite reaction!!!!***

Newton and the Fire Industry

- Object A in this case is an innovation or change idea related to fire protection.
- Object B in this case the fire protection industry.
- As a result of its interaction with another object, forces result from these interactions!

- As with the laws of physics – this law of Newtons is predicable, but not always taken into account and reactions are often from surprising sources.

Introduction of Innovative Technology

- Innovative Technology in building construction industry presents new fire protection challenges.
- It poses the question of those of us in building fire protection industry are doing enough to develop innovative solutions to these challenges.
- But there are hurdles to overcome when adopting innovation.
- The building and fire industry, in general, can be great adopters of innovation and new technology.
- It could be argued that the same may not be said for the building fire protection industry.

Examples of thinking outside the square

Medium rise dry hydrants in San Francisco

Exit signs in the floor in art gallery in Japan.

Examples of thinking outside the square – Cont.

My all-time favourite!!!

Hose reel in the bathroom in a hotel room in St Petersburg - Russia

New Threats

We are facing a significant influx of new building elements, products, and materials technology that existing fire protection systems may have difficulty in addressing.

The building industry develops approximately 10,000 new building products, materials, and systems each year!

Such an example is electric vehicles, electric vehicle battery banks in car ports and garages attached to domestic dwellings.

Some cities are, to reduce maintenance and lowering water pressure and flows in street mains.

Performance Based Building codes

One of the main reasons that Performance Based Building codes were developed was to solve this problem of overwhelming introduction of new products, and with the joint objective of permitting the use of innovative designs and systems.

Many approval authorities do not embrace performance based building codes willingly

The deemed to satisfy building codes provide more comfort.

Barriers

- Often no standard tests for new products - water mist systems for engines
- The approval body will not accept the test reports from the countries that the system was already tested and approved.
- One wonders if Fire and Water (great album by the way!!) behave differently in other countries!
- The industry scandals re Grenfell did not help! Neither was the loss in confidence in CodeMark.
- One will find it very difficult to get insurance if the product or system has not passed a recognised standard test.

Hurdles to innovation adoption:

Remember – Newtons' Law Relevancy to Fire Protection?

We will discuss some these forces and how the result from:

- contact interactions (normal, frictional, tensional, and applied forces are examples of contact forces) and
- other forces that are the result of action-at-a-distance interactions.

Hurdles to innovation adoption: Human Behaviour!!!

Not all authorities suffer from the below. I have managed in AHJ's, building code drafting, innovation projects and testing and accreditation schemes.

- **Commercial blocking**: Competitors denigrating the product within that industry and regulatory bodies.
- **Agenda blocking**: Not on the agenda as to the direction of the AHJ. A view of some AHJ's that the current provisions are adequate.
- **"Nose out of joint"** blocking: Someone of influence was not consulted on this, so will teach a lesson.
- **Fear of responsibility**: If a person or authority approves it, then they wear the responsibility. This is not an unfair concern. One can guarantee if a product does not perform as intended, the first thing the manufacturer will do is point to the Approver and say –"but they approved it!".

Hurdles to innovation adoption: Human Behaviour!! Cont.

- **Because I can**: Those that will block something just to show that they have the influence and power to do so – regardless of the merit of the product or idea. Even if their feedback had been positive! Democratic country test and certification.
- **“Not my idea”:** different from the above, you may have consulted and done everything else one can, but it was not their idea, and they will not support it. Reason to exist – they are the expert.
- **“Oh dear, I may have been wrong”** – Having spent a lot of energy all that time blocking it, especially those who do it publicly, even if they then come to see the benefit, find it very difficult to walk back from their position. “When I learn the facts, I change my mind – why, what do you?”

My favorite examples:

- Some jurisdictions have a requirement for a test report from an accredited registered testing laboratory AND also require an accreditation certificate for the tested product confirming that it did pass the test. AND then must obtain the approval certificate from AHJ before implementation! You pay for the certifier to be at the test, you pay for the certification, then you pay for the certifier to go to the AHJ to get their piece of paper!
- It's rubbish! - Did you review or read it? - No – why not? - I know it will be rubbish!
- Can I get some to use at home? But will not approve it.
- Territorial: NSW Vs Victoria, wise men from the east and mainland.
- Fires and water in NZ different to Australia.

Solutions?

To be clear – I am not advocating lesser standards of safety, rigour and review.

- Accepting of “performance testing and certification”. Does as it claims. Not a standard test. Meets standard test objective – repeatability!
- Acceptance of international testing and certification – credible!!
- Read the proposal – read the evidence.

[illegible]

If this statement is true, we have a big problem…

(And it applies to much more than just sprinklers)

“Innovation” used here means - the step improvement of;

- Fire protection products
- Fire protection systems
- Fire industry processes or services

where step improvement is ‘revolutionary change’ not minor ‘evolutionary change’

Real world example of trying to innovate a fire protection product.

Say we have on offer an innovative solution that solves a real problem with commonly used valves.
This is your road ahead;

- $7,000 for a provisional patent (or nobody has exclusivity which is a necessary driver)
- Take it to a big valve manufacturer. They put you on the shelf (…until you figure it out)
- Find a smaller manufacturer. But he wont pay Approvals because you cant prove there is a market
- You agree to pay Approvals
- $50,000 for manufacturer tooling fees for the samples for Approvals
- $100,000 for Approval but they can't start because there is no test spec (cos it hasn't been invented yet…)
- $30,000 for Patent and you need to select countries forever.
- Standards still don't allow it quite yet, so you spend 30K on marketing and engineers reports while you wait for Standards to recognise the innovation. (Hard because committees haven't seen it installed)
- Your valve competitors are undermining you in the market because it "isn't compliant"
- Standards finally permit your new tech
- Installers hate your new valve because it means they can't upsell typical equipment cos you made it all redundant.
- Maintainers hate it cos nothing breaks down anymore
- Patent examination and renewal fees 25K per year

PROBLEM = No open pathway exists for step-innovative products to enter market

Innovating Fire Protection Systems – (huge potential economic & safety benefits)

Typical stakeholder views on a proposed new innovative system;

- **Fire Brigades** – “I don’t care. It’s DtS or show me actual test results beating it”
- **AU Standards Committees** – “We don’t have time to start that project for about 3 years”
- **ABCB** – It has to out perform current NCC, and cost no more, and have no unintended consequences
- **Local Water Authorities** – “it better not reduce water quality or hit revenue or cause us lots of work” “I don’t care about the other authorities, our document says….”
- **RTO’s** – “we support the system that requires the most training. By the way, we write the National Accredited Training Package”
- **Regulators** – “all aspects need to work with our Regs from 2018 and only licenced people can do the work, Qualifications must be in line with our ratified quals published in 2018

- Finished? Now do the same all over again in the NEXT state

PROBLEM – Innovating ‘systems’ impacts everyone and no one wants to budge on their requirements

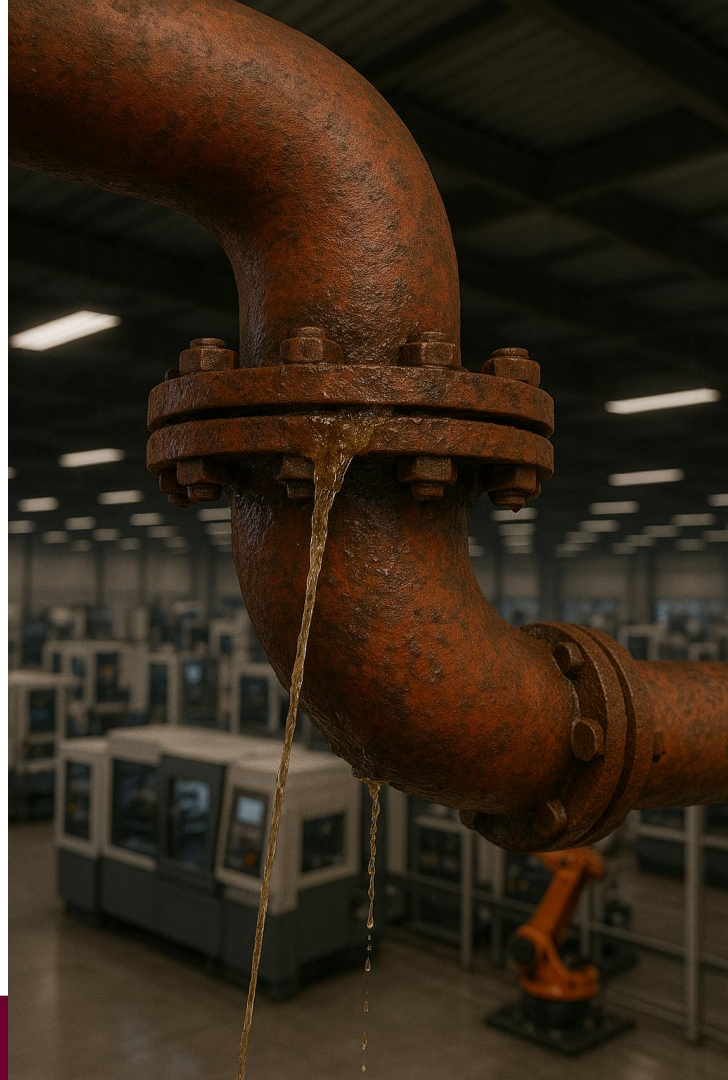
Processes innovation example - Hydrostatic testing of hydrant systems (long standing problem)

Relevant Stakeholder feedback;

- **Testers doing the work** – Not confident your systems can hold 1700 kPa The standards provide NO guidance. I have to do it.
- **Building owners** – a burst at 1200 L/Min+ will destroy my business
- **Fire Brigades** – we pump to 1700 kPa. It better hold at 1700 kPa no point testing to less than that
- **Insurers** – "Mr Insured, you'd better make sure you follow Standards and best practice 100%"
- **FPAA** – we know the solution and can provide the 'best practice procedure' that will balance risk. But, we can't take any liability.

We already have a good solution for years but only AS1851 can solve it. AS1851 revision is already 13 years overdue and uncertainty as to when it will be ready

PROBLEM = No short-term pathway for to be the solution for process innovations



So, is innovation in fire protection good after all?

Occupant – yes, I save money
Maintenance contractor – no I lose install and rectification work
Property manager – that depends if I get a cut in rectification work
Investors of innovation – only if profits roll in one day
Insurers – yes as it will reduce claims
Fire Authorities – sure, as long as it is perceived to not erode performance
Product manufacturer – who cares, I just wanna sell products. Old or new. Give me orders or go away
Approvals bodies – sure, keeps us very busy
AU community – yes

Summary - Innovation in fire protection is good for some, but also BAD some. Typically, it is bad for those making money from the problems around the current limitations the innovations seek to eliminate.
Fixing the problem can mean reducing revenues for some

Ok, ok, so what? Innovation and change is problematic, get over it!

Fire protection innovations or changes that were unnecessarily delayed cost future lives or delay benefits;

Seat belts not mandatory until 1984 – “studies suggest thousands of lives could have been saved in 28 years”

The '56 Ford Thunderbird—latest version of the fabulous car that inspired the styling of Ford's full line for '56.

The new Ford Fairlane Victoria—one of Ford's 18 exciting new models for '56. You can see the Thunderbird kinship in its long, low lines and graceful silhouette.

The NEW '56 FORD...with new and exclusive new LIFEGUARD DESIGN

New Thunderbird styling is your first clue that something new and wonderful has happened to Ford in '56. All 18 of Ford's new models have the long, low lines—the exciting silhouette—made famous by the fabulous Ford Thunderbird.

But, this is only the beginning of Ford's news for '56. Beneath that low, flat hood you may have the same basic engine that made the Thunderbird the performance star of the American road—the new 202-h.p. Thunderbird Y-8. You'll pass with added confidence—you'll go places as you've never gone before.

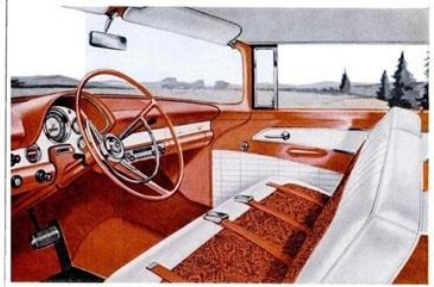
Exclusive new Lifeguard Design, however, is Ford's most important news for you and your family. It is the first major contribution to driver and passenger safety in accidents . . . the end result of more than two years of Ford testing and research so that a safer car could be built.

With the co-operation of leading universities, medical associations and safety experts, it was found that most serious injuries in accidents were caused by the driver being thrown against the top of the steering post . . . occupants being thrown forward against hard surfaces within the car . . . or occupants being thrown outside of the car.

To give you added protection against these three major areas of danger, Ford developed its new Lifeguard features. These include a new Lifeguard steering wheel with a deep-center structure to act as a cushion in the event of accident . . . Lifeguard double-grip door locks to give added protection from doors springing open under shock . . . optional Lifeguard cushioning for instrument panel and sun visors, to help lessen injuries from impact . . . and there are optional nylon seat belts that help keep occupants securely in their seats for added safety.

But there's more! When you visit your Ford Dealer, you'll discover luxurious new interiors . . . fine exterior finishes . . . quality construction throughout . . . *everything* that makes Ford the *fine* car at half the fine car price.

202-h.p. Thunderbird Y-8 engine



Y-8

Ford 8's are more than V-8's . . . they are Y-8's . . . engines designed to run smoother, last longer.

The confidence and enjoyment you get from the split-second "Go" of all the new Ford engines is only part of the story. They have a rigid, extra-deep block to make them run smoother, quieter, last longer. This deep, Y-like design works its smooth magic in Ford's new 202-h.p. Thunderbird Y-8 (available in Fordomatic Fairlane and Station Wagon models) and the new 176-h.p. Y-8 (available in Fordomatic Custom-line and Mainline models)! Ford's new 137-h.p. Six also has deep-block build. Any of these brilliant new Ford engines for '56 will freshen your ideas on the *joy* that responsive power can bring you.

FIRE AUSTRALIA2025


Your finger is the key
0.5s Unlock · 20 groups of fingerprints
No password
No key
NEWISDOMAKE


9:41
Living Room
My Bulb
Basic
Scene
Favorites
nanoleaf

We can be pretty good about considering future generations;

- Water conservation, low flow shower heads
- Recycling
- Reusable bags
- Planting trees
- Digital over paper mail
- Environmentally safe detergents

And we are also good at donating to save people we will never meet in another land

Why is there no **responsibility** to save 64 preventable fatalities in the future. When we can??

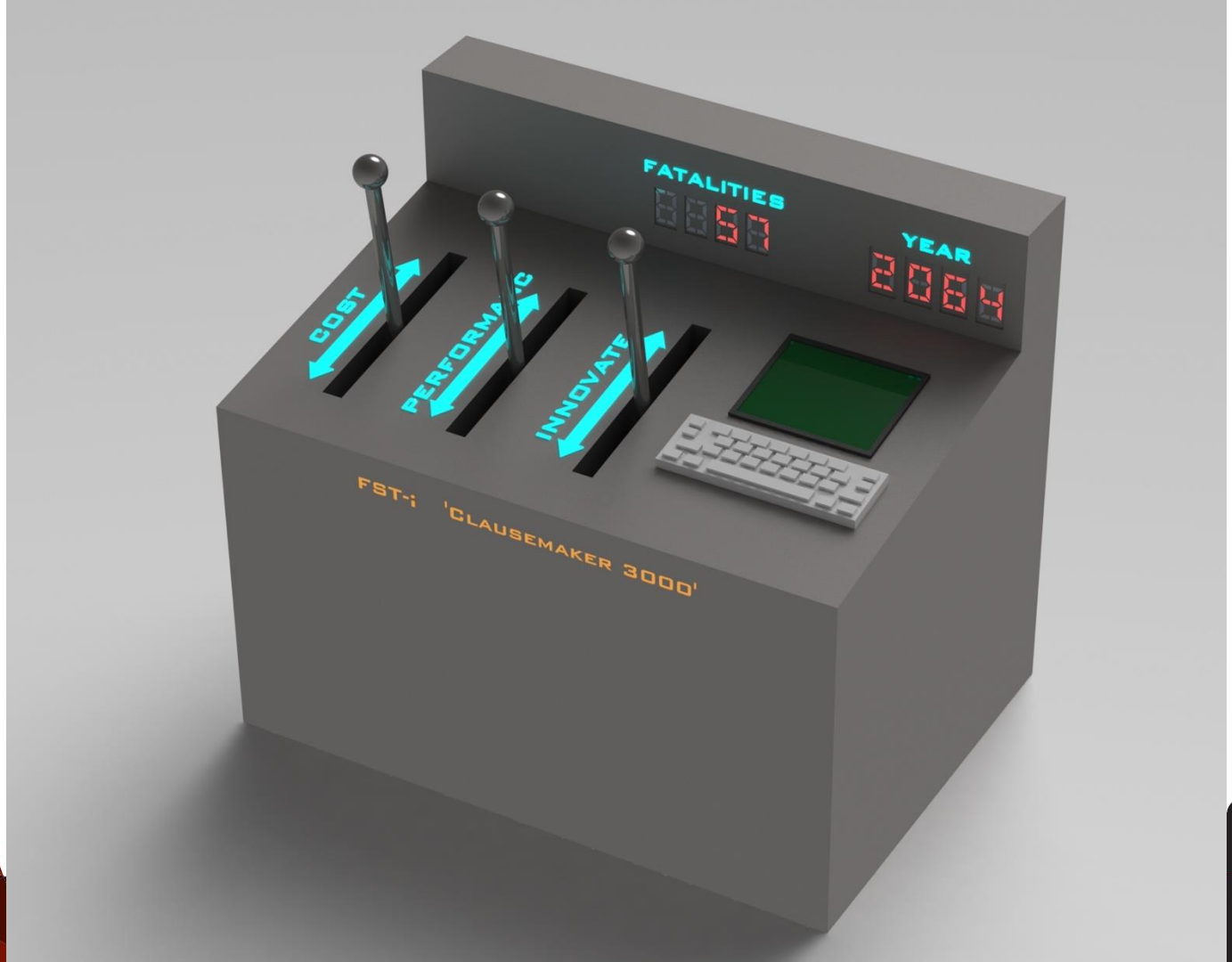
FST-i “Clausemaker 1000”

Instructions for use;

1. Type in your problem needing a clause
2. Select your target future year
3. Lever your degree of innovation for the clause
4. Switch Flux Capacitor to ON
5. Read how many people your clause kills or saves in that year.
6. Adjust degree of innovation and repeat

No Flux Capacitor means we must guess where to position the lever.

Is the safe guess killing more than the risky guess?


FATALITIES
0 0 5 7
YEAR
2 0 6 4
COST
PERFORMANCE
INNOVATE
FST-i 'CLAUSEMAKER 3000'

FIXES

Innovate the framework FIRST

We've seen that introducing innovative products/processes is near impossible. Imagine innovating the framework to make innovation easier??

Honest opinion - We are not ready for this…

….but let's look anyway

Increase pressure for Standards committees to consider innovation

Rely on Approval Listings heavily. Perhaps without exception?

“all products Listed by the following agencies, are deemed compliant with this Standard’

After 3 years of work, AS2118.6 is delayed because of dispute over a product that is Listed. (This Standard is in dire need of publication, 13 years old)
The outcome here could set the precedent

1.3.15 Listed

Refers to a product listed for fire protection application by an internationally recognized testing laboratory or approval body.

NOTES:

1 A register of accredited products is issued by the CSIRO ActivFire Scheme.

2 The following are examples of internationally recognized testing laboratories or approval bodies:

(a) Factory Mutual Insurance Company (FM Global).

(b) Underwriters Laboratories (UL).

(c) Loss Prevention Council (LPC).

(d) Verband der Schadenverhutung (VdS).

Innovation doesn't just improve the fire sector, it can improve Australian economy, environment, community etc.

There should be an independent government process checking that there are unnecessary blocking of step innovation

Rep doesn't need to attend meetings instead just be available for advice and intervene where required

A govt funded rep would save millions of AU$ in JUST ONE CLAUSE !

(b) Where discharge of some water is unavoidable, it should be captured and returned to the sprinkler installation or redirected to another use. This may be accomplished through the use of temporary on-site recirculating storage tank, greywater recycling plant where it exists on site, or discharge directly to a tanker for off-site use in council gardens and the like.

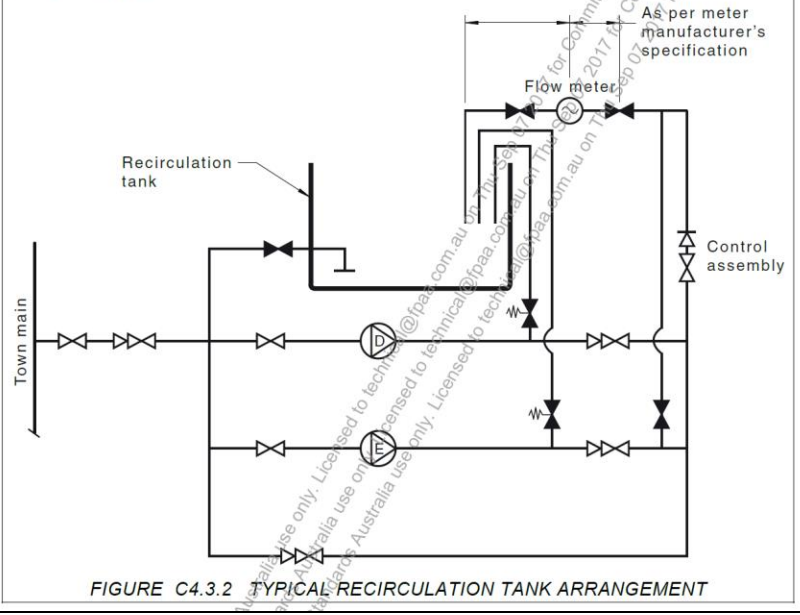


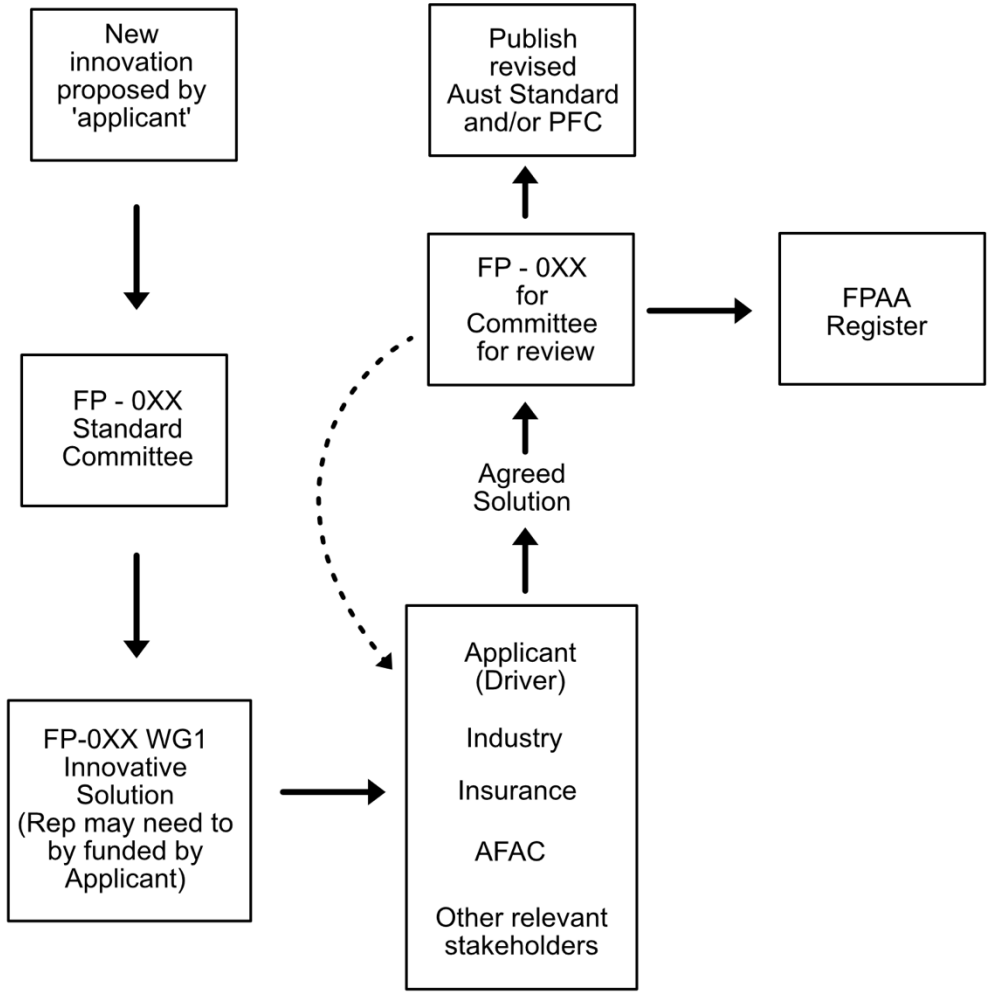
FIGURE C4.3.2 TYPICAL RECIRCULATION TANK ARRANGEMENT

‘Out of session’ application process for innovation

This process can be available anytime, not just during Standards revisions.

If required, the process may be funded by the applicant (who has a commercial interest) This is a GOOD thing, not a bad thing

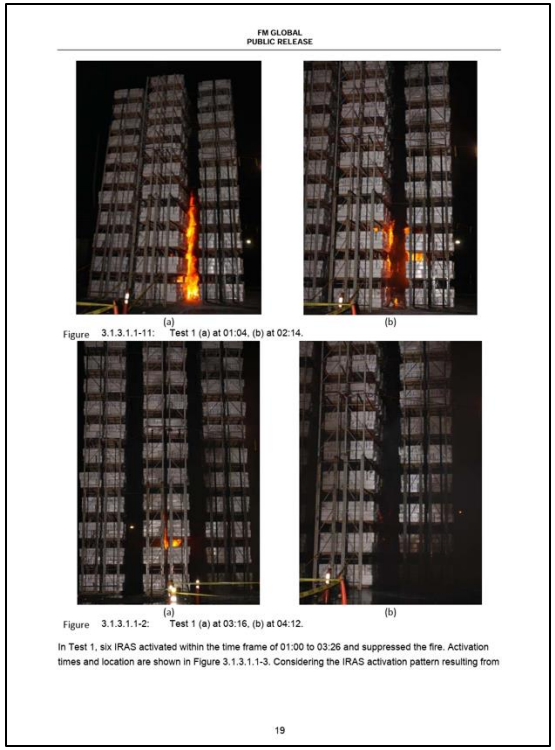
Similar has worked for AS2419.4 already



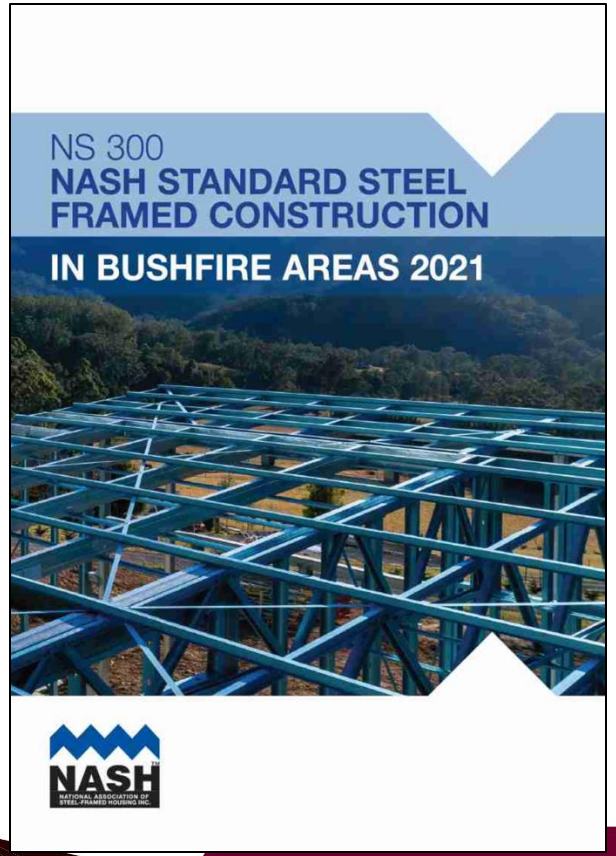
FP-0XX should be able to draw in any innovation from “agreed accepted global standards (FM, NFPA ,BSI etc)”

This could be extended to an innovative Clause

- Just a quick review for sign off
- We could list those agreed standard in the relevant parent Australian Standard



Permit and actively support non-Australian Standards bodies to conduct Innovative projects



1 NORMATIVE INTERIM STANDARD

This Interim Standard is Normative. This means that unless clauses are stated explicitly as informative, or provided as Notes, all clause in the Interim Standard must be complied with.

NOTE 1: Users of this Interim Standard are advised to always ensure compliance with local State/Territory plumbing and building regulation and licencing.

NOTE 2: For definitions of terminology, please refer to the National Dictionary of Building & Plumbing Terms.

2 SYSTEM CONFIGURATION

The piping configuration that forms the basis of this Interim Standard is derived from Clause 3.3.6 of the FPAA101D sub-metered configuration. The provisions of this Interim Standard adapt the sub-metered configuration for the specific application of a stand-alone home, rather than a multi-unit building.

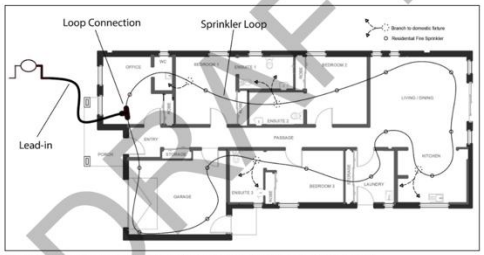


Figure 2a – A typical design for a typical single level 3-bedroom home

However, almost by definition, seeking to reduce disruption limits the magnitude of the benefits of the innovation

That said, **significant** innovations need to be phased in over time so as NOT to disrupt too much.

Examples of introduction of significant innovation;

- Phase out of analog TV and mobile phones
- Phased out leaded fuel.
- Phase out incandescent bulbs
- Increasingly stringent car emission standards
- CFC's phased out substances harmful to ozone layer

Bold innovation success requires one step at a time.

The Product Approvals Dilemma

Product Approvals are perhaps the single largest impediment to innovation in fire protection today.
Typical policy seems to be – test everything, always, regardless. This is extremely time and cost prohibitive.

What some other critical industries do;

- Physically crashing a vehicle for each design variation, trim level, or component change is extremely costly. Finite element **crash simulations are permitted** to validate changes without full physical testing each time.
- Orthopedic implants must be shown to withstand millions of loading cycles. Regulatory bodies like the U.S. FDA and European Notified Bodies allow manufacturers to use **validated computational models** as part of the submission process.
- Seatbelt buckles - FMVSS 209 in the U.S. and ECE R16 in Europe specify performance requirements for seatbelt systems. These regulations allow the use of **desktop simulations**—such as FEA and explicit dynamic modeling—to demonstrate compliance, provided they're validated with representative physical testing.

Many fire products have been tested for 100 years plus, and barely without change. Can some of this be simulated/calculated/modelled? If not, how do the other critical industries do it safely?

Is it time to investigate this problem further given this is the single largest impediment to innovation?

The Product Approvals Dilemma

Some Approvals bodies invest in innovation or provide grants apparently in response to questions about restricting innovation.

This is like clicking on the cabon offset option when you book your holiday flights. It eases guilt while you're sitting on the beach, but is it as effective as not taking the flight?

Is investing in Innovation the most effective way of reducing restrictions to innovation?

Given the potential gains lost, should fire Approvals bodies be asked if they can explore more effective approaches of removing barriers to innovation?

Other Approval body options

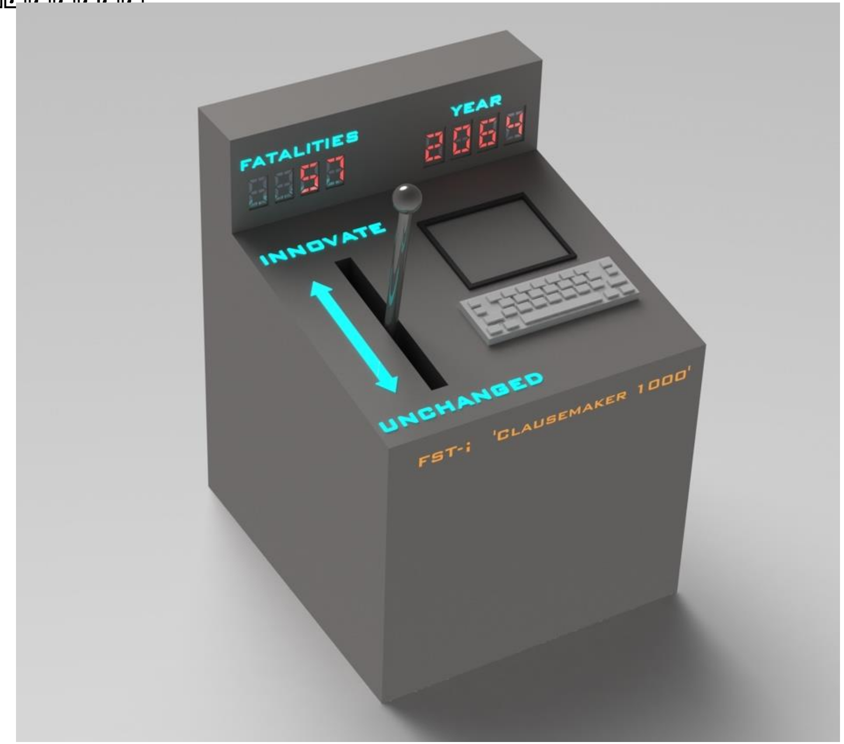
Australian standards permit home sprinkler piping to be ‘in accordance with plumbing Standards’. These are life safety fire systems and arguably some of the most important systems.

So can we use plumbing Approval bodies also for some fire equipment like valves, fittings, pipe etc?

Ditto for electrical Approval bodies for detection.

Plumbing bodies might have more capacity and reduce the bottle neck of getting fire products approved.
They are already well accepted by our plumbing cousins in the NCC and referenced Standards.

Should we have a discussion about how to engage local plumbing (or electrical) Approval bodies to provide local fire Listings today?



It’s time to pull the lever

THANK YOU AND STAY SAFE!!

John Clampett - John Clampett Consulting

jcc@ihug.com.au

Shae Mete - FST Innovation

shae.mete@fst-i.com