

fire NZ

2016

CONFERENCE & EXHIBITION

HOW SAFE IS SAFE?

Evolving Fire Safety.



9TH – 11TH NOVEMBER 2016
ASB SHOWGROUNDS
GREENLANE, AUCKLAND





ORIGIN
FIRE CONSULTANTS
CREATIVE COLLABORATORS

Assessing Passive Fire Defects in Existing Buildings Pt 3 – Risk Based Case Study

Michael James – Origin Fire Consultants



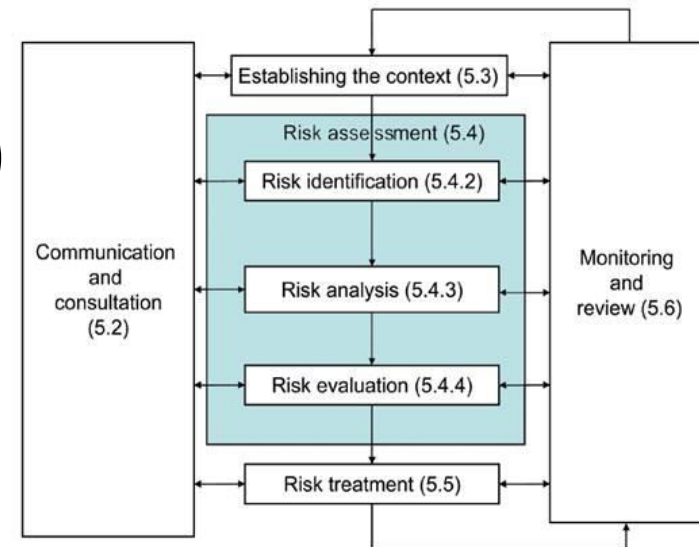
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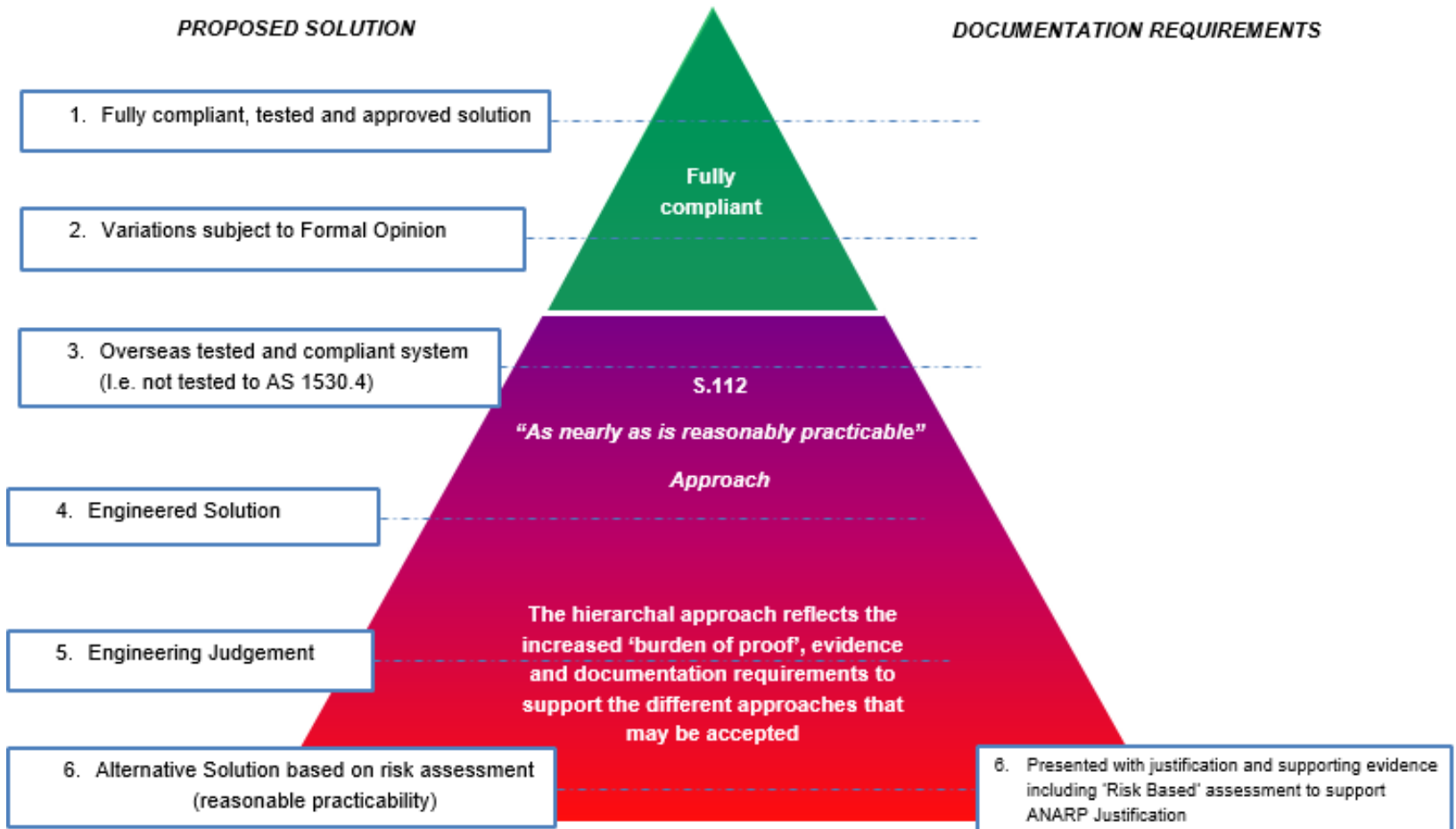
- Introduction
- Communication and consultation
- What are the defects? (Identification)
- How bad are they? (Analysis)
- Should it be fixed? (Evaluation)
 - Options, Cost, time
- Presentation of findings (Eval)
- Conclusion



AS/NZS 31000 Fig 3



Introduction



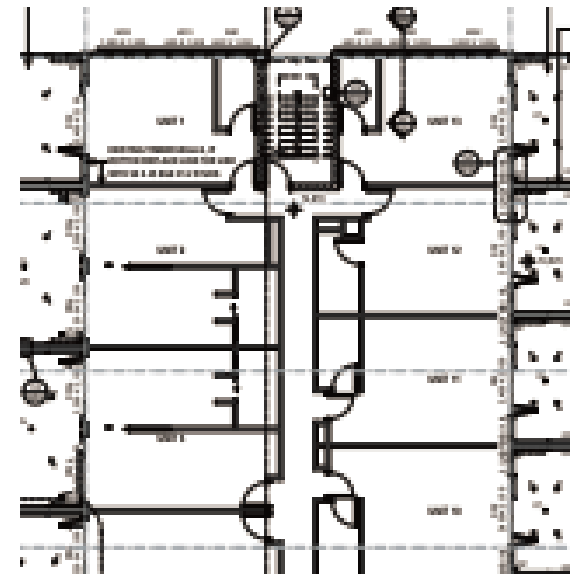
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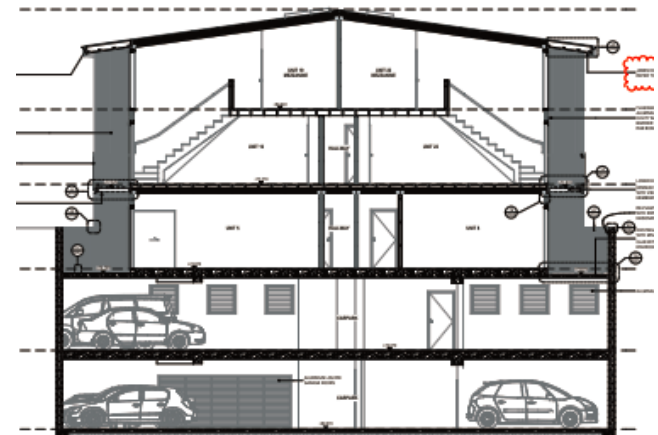


The Building

- Concrete floors, steel frame construction
- Internal linings steel stud and plasterboard
- Type 4 fire alarm in safe path corridors
- Single escape stair
- Located in South Auckland
- Proposed work is to reclad
- Built in 2002 so no litigation



Part L3 Plan



Cross section



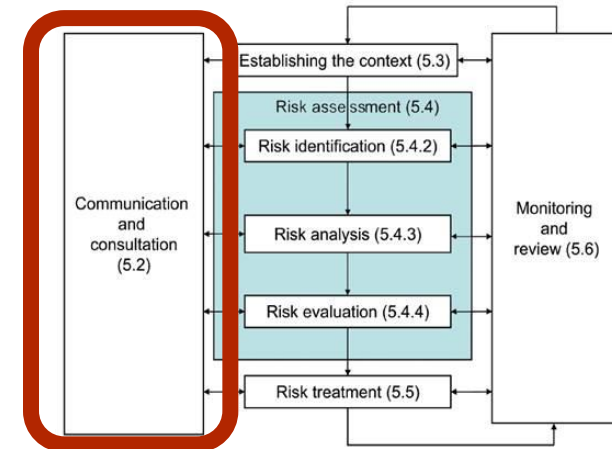
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Communication and Consultation

- Take advantage of the Fire Engineering Brief (FEB) Process
- Draft FEB
- Stakeholders meeting
- Reach agreement
- Revise FEB
- Pre-application meeting
- Prepare construction documentation



Fire Engineering Brief Contents

**Description of the project
(Context)**

**Which section of the Building Act
Applies**

**What are the GAPS or defects
(Identification)**

**Qualitative risk assessment of the
defects (Analysis)**

LOW, MEDIUM, HIGH

**What would it take to achieve full or
partial compliance (Evaluation)**

**What is the sacrifice to achieve this
(Evaluation)**

Time and cost

**Tabulate the results and provide
recommendations (Evaluation)**

Keep it simple so stakeholders can understand it.

Classify the defects into:

- Must do
- Not sure. More analysis, discussion required
- Not important to do
- Cost to fix each classification



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What are the defects?

11. Service riser hatches not fire rated.

3. Penetrations from apartment to corridor not fire rated

7. Cable penetrations through wall not fire rated.

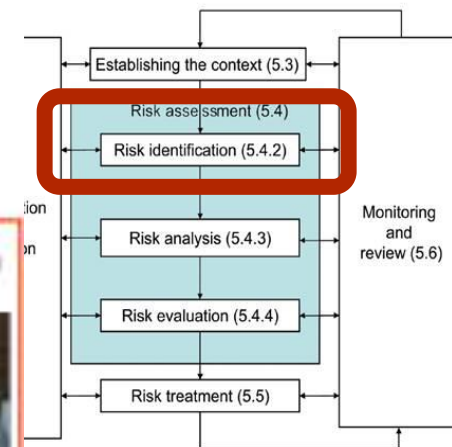
5. Fire rating of penetrations through the floor in bathroom and kitchen are not done well.

8. Apartment doors don't have closers

6. Penetrations into the service riser not fire rated.

12. Internal 10mm plasterboard walls built up to IT walls. Fire rated lining not taken through the junction.

10. Shower mixer not fire rated



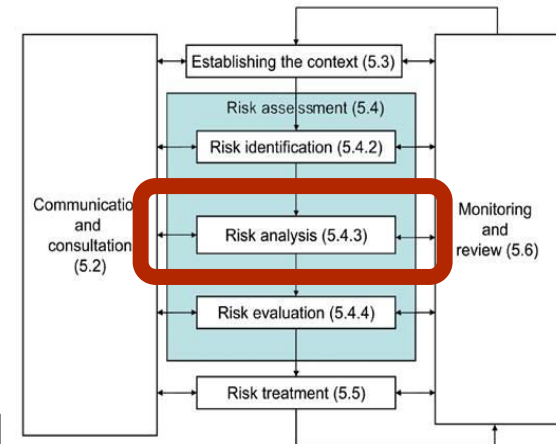
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How bad are the defects?

- Imaginary design fires
- Where will the smoke spread
- How many people will it affect
- Is there other property involved
- Rank consequences
 - High
 - Medium
 - Low



No	Defect	How bad are they
1	Type 5 fire alarm required in the apartments	Smoke has the reach the corridor before a building wide evacuation is initiated. Door could be left open when people leave.
2	Sprinklers required in the carpark	Low population. People familiar with surroundings. Short escape route lengths.
3	Emergency lighting requires upgrade	No natural light in the stairs or corridor so can impact people even if there is a power failure and no fire.
4	Required apartment fire rating 60min but building designed for 30 min	Preliminary burnout calculations give a 30 to 40 minute rating. Walls are 60 min for acoustic reasons. Concrete floor will achieve 60 minutes
5	Fire rating of penetrations through the floor not carried out well	Can affect on apartment above. Due to the penetrations being visible on the level above, they will be at least smoke sealed.
6	Penetrations into service riser generally not fire rated properly	Can affect people in the apartments above and the corridors.
7	Penetrations through IT walls generally not fire rated. 1 or 2 per apartment	Smoke can affect people in another apartment. Property protection issues.
8	Penetrations from apartment to corridor not fire rated	Smoke can affect all apartments needing to use the corridor.
9	Apartment doors do not have closers	Generally they are closed but if it was left open when someone was leaving and there was a fire it would affect the whole
10	Shower mixers not fire rated properly and located on corridor wall.	Fire can get into the apartment corridor.
11	Service riser hatches not fire rated.	Smoke and fire getting into a riser can affect corridors on all levels.
12	Internal 10mm plasterboard walls butt up to IT walls. Fire rated lining not taken through the junction	Fire can get in the adjacent apartment.



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No	Defect	How bad are they
1	Type 5 fire alarm required in the...	Smoke has the reach the corridor before a...
2	Sprinklers required in the carpark	Low population. People familiar with surroundings. Short escape route lengths.
	upgrade	can impact people even if there is a power failure and no fire.
4	Required apartment fire rating 60min but building designed for 30 min	Preliminary burnout calculations give a 30 to 40 minute rating. Walls are 60 min for acoustic reasons. Concrete floor will achieve 60 minutes
5	Fire rating of penetrations through the floor not carried out well	Can affect on apartment above. Due to the penetrations being visible on the level above, they will be at least smoke sealed.
6	Penetrations into service riser generally not fire rated properly	Can affect people in the apartments above and the corridors.
8	Penetrations from apartment to corridor not fire rated	Smoke can affect all apartments needing to use the corridor.
	doors	open when someone was leaving and there was a fire it would affect the whole...
10	Shower mixer not fire rated	Fire can get into the apartment corridor...
11	Service riser hatches not fire rated.	Smoke and fire getting into a riser can affect corridors on all levels.
	lining not taken through the junction	



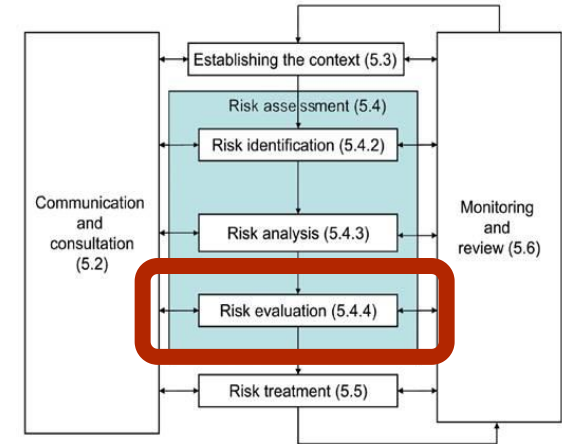
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What can be done about it?

- Options
 - Do nothing
 - Smoke rating
 - Fire rating
 - Fire alarm
 - Fire sprinkler



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No	Defect	How bad are they	Repair options
1	Type 5 fire alarm required in the apartments	Smoke has the reach the corridor before a building wide evacuation is initiated. Door could be left open when people leave.	Add type 3 plus type 1 to apartments. Upgrade system to a type 5
2	Sprinklers required in the carpark	Low population. People familiar with surroundings. Short escape route lengths.	Add sprinklers or smoke extract
3	Emergency lighting requires upgrade	No natural light in the stairs or corridor so can impact people even if there is a power failure and no fire.	Add emergency lighting
4	Required apartment fire rating 60min but building designed for 30 min	Preliminary burnout calculations give a 30 to 40 minute rating. Walls are 60 min for acoustic reasons. Concrete floor will achieve 60 minutes	Replace apartment doors so they are 60 minute doors
5	Fire rating of penetrations through the floor not carried out well	Can affect on apartment above. Due to the penetrations being visible on the level above, they will be at least smoke sealed.	Remove ceiling and redo fire rating
6	Penetrations into service riser generally not fire rated properly	Can affect people in the apartments above and the corridors.	Remove ceiling and redo fire rating
7	Penetrations through IT walls generally not fire rated. 1 or 2 per apartment	Smoke can affect people in another apartment. Property protection issues.	Remove section of ceiling to fire rate. Remove kitchen to fire rate.
8	Penetrations from apartment to corridor not fire rated	Smoke can affect all apartments needing to use the corridor.	Remove ceiling and fire rate
9	Apartment doors do not have closers	Generally they are closed but if it was left open when someone was leaving and there was a fire it would affect the whole	Fit closers
10	Shower mixers not fire rated properly and located on corridor wall.	Fire can get into the apartment corridor.	Redo bathroom and fire rate
11	Service riser hatches not fire rated.	Smoke and fire getting into a riser can affect corridors on all levels.	Replace with fire rated hatches
12	Internal 10mm plasterboard walls butt up to IT walls. Fire rated lining not taken through the junction	Fire can get in the adjacent apartment.	Remove wall. Redo fire rating. Redo bathroom



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No	Defect	How bad are they	Repair options
1	Type 5 fire alarm required in the apartments	Smoke has the reach the corridor before a building wide evacuation is initiated. Door	Add type 3 plus type 1 to apartments. Upgrade

2 Sprinklers required in the carpark	Low population. People familiar with surroundings. Short escape route lengths.	Add sprinklers or smoke extract
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		failure and no fire.	
4	Required apartment fire rating 60min but building designed for 30 min	Preliminary burnout calculations give a 30 to 40 minute rating. Walls are 60 min for acoustic reasons. Concrete floor will achieve 60 minutes	Replace apartment doors so they are 60 minute doors
5	Fire rating of penetrations through the floor not carried out well	Can affect on apartment above. Due to the penetrations being visible on the level above, they will be at least smoke sealed.	Remove ceiling and redo fire rating
6	Penetrations into service riser	Can affect people in the apartments above	Remove ceiling and redo fire rating

8 Penetrations from apartment to corridor not fire rated	Smoke can affect all apartments needing to use the corridor.	Remove ceiling and fire rate
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	closers	open when someone was leaving and there was a fire it would affect the whole	
10	Shower mixers not fire rated	Fire can get into the apartment corridor.	Redo bathroom and fire

11 Service riser hatches not fire rated.	Smoke and fire getting into a riser can affect corridors on all levels.	Replace with fire rated hatches
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	junction		
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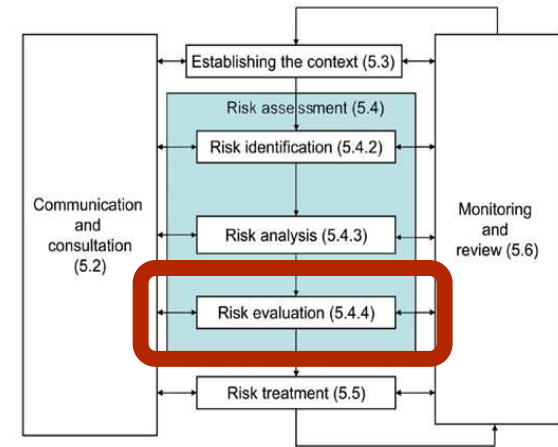
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What will it cost to fix?

- Quantify the work.
 - Penetrations
 - Fire safety systems
 - Builders work
- Rough order of costs
 - Scheduled rates for passive fire
 - “QV Cost Builder” for builders work
 - “QV Cost Builder” for fire protection systems



No	Defect	How bad are they	Repair options	Cost to fix
1	Type 5 fire alarm required in the apartments	Smoke has the reach the corridor before a building wide evacuation is initiated. Door could be left open when people leave.	Add type 3 plus type 1 to apartments. Upgrade system to a type 5	Type 3 plus Type 1 \$30k. Builders work \$20k. Type 5 \$50k. Builders work \$50k
2	Sprinklers required in the carpark	Low population. People familiar with surroundings. Short escape route lengths.	Add sprinklers or smoke extract	Sprinklers \$50/m ² = \$25k + Valve set \$10k + valve enclosure \$5k + water supply \$20k
3	Emergency lighting requires upgrade	No natural light in the stairs or corridor so can impact people even if there is a power failure and no fire.	Add emergency lighting	\$15k. Builders work \$7k.
4	Required apartment fire rating 60min but building designed for 30 min	Preliminary burnout calculations give a 30 to 40 minute rating. Walls are 60 min for acoustic reasons. Concrete floor will achieve 60 minutes	Replace apartment doors so they are 60 minute doors	28 Apts x \$2k per door = \$54k
5	Fire rating of penetrations through the floor not carried out well	Can affect on apartment above. Due to the penetrations being visible on the level above, they will be at least smoke sealed.	Remove ceiling and redo fire rating	5 penetrations per apt @ \$100/penetration. = \$500 x 28 apts = \$14k. 10m ² of ceiling for 14 apts @ \$100k/m ² = \$14k
6	Penetrations into service riser generally not fire rated properly	Can affect people in the apartments above and the corridors.	Remove ceiling and redo fire rating	Similar cost to 5
7	Penetrations through IT walls generally not fire rated. 1 or 2 per apartment	Smoke can affect people in another apartment. Property protection issues.	Remove section of ceiling to fire rate. Remove kitchen to fire rate.	Penetrations 28 apts x 2 penetrations x \$100/penetration = \$5.6k. Remove kitchens to get access 28 x \$2k each = \$56k
8	Penetrations from apartment to corridor not fire rated	Smoke can affect all apartments needing to use the corridor.	Remove ceiling and fire rate	Similar cost to 5
9	Apartment doors do not have closers	Generally they are closed but if it was left open when someone was leaving and there was a fire it would affect the whole	Fit closers	28 apts x \$300/apt = \$8.4k
10	Shower mixers not fire rated properly and located on corridor wall.	Fire can get into the apartment corridor.	Redo bathroom and fire rate	Penetration \$500 x 28 apts \$14k. Rebuild bathroom 28 x \$20k = \$560k
11	Service riser hatches not fire rated.	Smoke and fire getting into a riser can affect corridors on all levels.	Replace with fire rated hatches	14 hatches @ \$1,000 each = \$14k
12	Internal 10mm plasterboard walls butt up to IT walls. Fire rated lining not taken through the junction	Fire can get in the adjacent apartment.	Remove wall. Redo fire rating. Redo bathroom	28 walls x \$2k = \$56k. Bathrooms \$560k as above



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No	Defect	How bad are they	Repair options	Cost to fix
1	Type 5 fire alarm required in the	Smoke has the reach the corridor before a	Add type 3 plus type 1 to	Type 3 plus Type 1 \$30k.

<p>2 Sprinklers required in the carpark</p>	<p>Low population. People familiar with surroundings. Short escape route lengths.</p>	<p>Add sprinklers or smoke extract</p>	<p>Sprinklers \$50/m2 = \$25k + Valve set \$10k + valve enclosure \$5k + water supply \$20k</p>
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60min but building designed for 30 min	to 40 minute rating. walls are 60min for acoustic reasons. Concrete floor will achieve 60 minutes	so they are 60 minute doors
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<p>8 Penetrations from apartment to corridor not fire rated</p>	<p>Smoke can affect all apartments needing to use the corridor.</p>	<p>Remove ceiling and fire rate</p>	<p>5 penetrations per apt @ \$100/penetration. = \$500 x 28 apts = \$14k. 10m2 of ceiling for 14 apts @ \$100k/m2 = \$14k</p>
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closets	open when someone was leaving and there was a fire it would affect the whole
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<p>11 Service riser hatches not fire rated.</p>	<p>Smoke and fire getting into a riser can affect corridors on all levels.</p>	<p>Replace with fire rated hatches</p>	<p>14 hatches @ \$1,000 each = \$14k</p>
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lining not taken through the junction



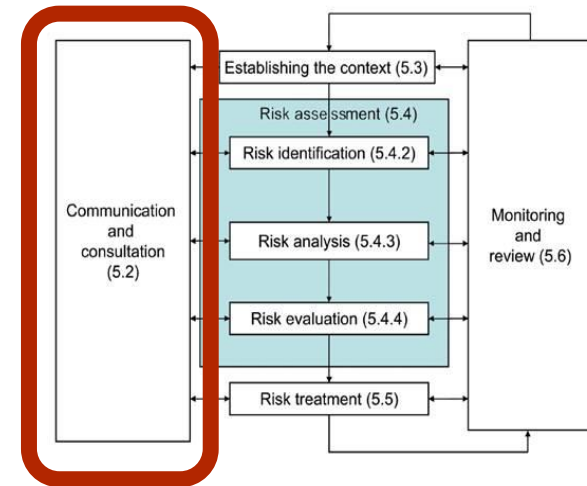
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Presentation of findings

- Tables
- Drawings
- Photographs
- Words
- FEB meeting



No	Defect	How bad are they	Repair options	Cost to fix	Recommendation
1	Type 5 fire alarm required in the apartments	Smoke has the reach the corridor before a building wide evacuation is initiated. Door	Add type 3 plus type 1 to apartments. Upgrade	Type 3 plus Type 1 \$30k. Builders work \$20k. Type 5	Discuss

2 Sprinklers required in the carpark

Low population. People familiar with surroundings. Short escape route lengths.

Add sprinklers or smoke extract

Sprinklers \$50/m2 = \$25k + Valve set \$10k + valve enclosure \$5k + water supply \$20k

Don't fix

30 min	acoustic reasons. Concrete floor will achieve 60 minutes	doors			
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8 Penetrations from apartment to corridor not fire rated

Smoke can affect all apartments needing to use the corridor.

Remove ceiling and fire rate

5 penetrations per apt @ \$100/penetration. = \$500 x 28 apts = \$14k. 10m2 of ceiling for 14 apts @ \$100k/m2 = \$14k

Discuss

10 Shower mixers not fire rated	was afire it would affect the whole Fire can get into the apartment corridor.	Redo bathroom and fire	Pepertration \$500 x 28 apts	Don't fix
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11 Service riser hatches not fire rated.

Smoke and fire getting into a riser can affect corridors on all levels.

Replace with fire rated hatches

14hatches @ \$1,000 each = \$14k

Fix

lining not taken through the junction				
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Project Summary

- Fix \$45k
- Discuss \$196k
- Don't fix \$674k



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Recommendations

In existing buildings –

- Expect there to be issues
- The more you can do upfront to investigate the state of the existing construction the better the outcome and easier the process
- Engage a passive fire specialist
- Do not wait for construction to find the issues
- Have a plan for what you will do when you find issues
- Don't solve in isolation
- Be proactive!



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Conclusion

Be proactive



Do your homework



Communicate



Best Possible outcome



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Thank you!

Questions



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