

Presentation: Developing a New Tool for Inspecting and Remediation Efforts of Buildings at Risk

An **intersec** co-founded initiative

Safety Design in Buildings

With the Participation of The Public Authority for Civil Defense and Ambulance:



Muscat

September 5, 2018, Crowne Plaza Muscat

Dr. Susan Lamont, Fire Engineering Leader, ARUP

Dr Susan Lamont has worked in the fire protection industry for 15+ years in the UK, US and Middle East. She is a chartered engineer and professional member of the Society of Fire Protection Engineers (SFPE). Her Doctorate research looked at the response of steel frame structures in real fires. Since joining Arup she has worked on a diverse range of projects from large assembly buildings, hospitals, schools, shopping malls and offices to masterplans and transport hubs. Her role on many projects is to guide the developer/owner through fire safety design, testing and commissioning to occupation and fire safety management of the completed building. She is currently the technical skills leader of the fire engineering team for Arup in the Middle East. She works closely with her clients and the local authorities in the Gulf to maintain a high level of fire safety in new and existing buildings. In addition to leading the development of the fire risk assessment tool for existing buildings with combustible facades, the topic of her presentation, Susan is currently working on delivery of Abu Dhabi International Airport Midfield Terminal Building and Dubai Creek Harbour Retail District.

Learning Objectives

- 1. Understand the problem of combustible facades in high rise buildings internationally*
- 2. Understand the purpose and development of EFFECT™*
- 3. Understand the applicability and limitations of EFFECT™*
- 4. Learn where and how to access/use EFFECT™*



High Rise Buildings with Combustible Exterior Façade Systems:

**EFFECT™ - External
Façade Fire Evaluation and
Comparison Tool**

Dr Susan Lamont

Susan.Lamont@arup.com



Introduction

Many fires globally on high rise buildings with combustible facades.

Combustible façade system can cause rapid fire spread.

NFPA identified need for Façade Fire Risk Assessment tool.

Goal of project:

- Develop Risk Assessment methodology
- Provide tool for global authorities



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Project Team

Project sponsor



*Project management
and technical panel*



RESEARCH FOUNDATION
RESEARCH FOR THE NFPA MISSION

Project Consultant

ARUP

Peer Reviewers



JENSEN HUGHES

*Technical advisor to
Project on fire testing*



Summary

- Why we need the Fire Risk Assessment (FRA) Tool
- Challenges
- Literature Review
- Methodology
 - *Applicability*
 - *Tiers*
 - *Scoring likelihood and consequences to arrive at risk*
 - *Hypothetical case study*
 - *Limitations*
- **EFFECT (External Façade Fire Evaluation and Comparison Tool) and Questions**



Atlantic City
2007



Busan
2010



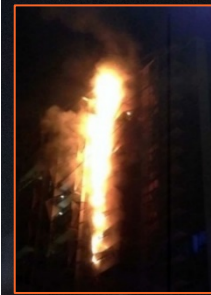
Roubaix
2012



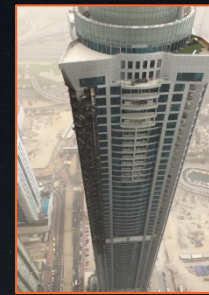
Sharjah
2012



Dubai
2012



Melbourne
2014



Marina Torch
2015, 2017



Ajman One
2016

Why we need the FRA tool

- High rise building fires with combustible façade systems are becoming more frequent
- NFPA wanted to provide AHJs with a standardized method of assessment for existing buildings



Grenfell
2017



Address
2015

Options?



1. Do nothing

More fires, potential fatalities, much larger incident, insurance premiums, investor confidence, image, reputation.



2. Prepare for the next incident

Disaster-recovery, emergency response, enforce testing & maintenance/fire drills.



3. Upgrade knowingly

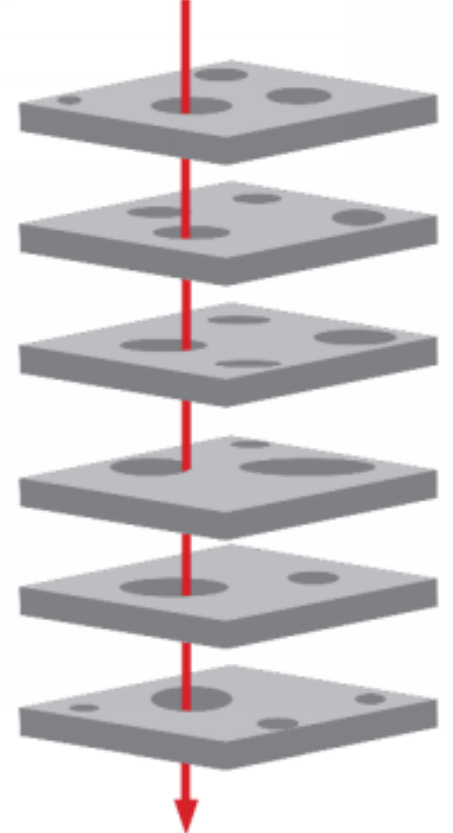
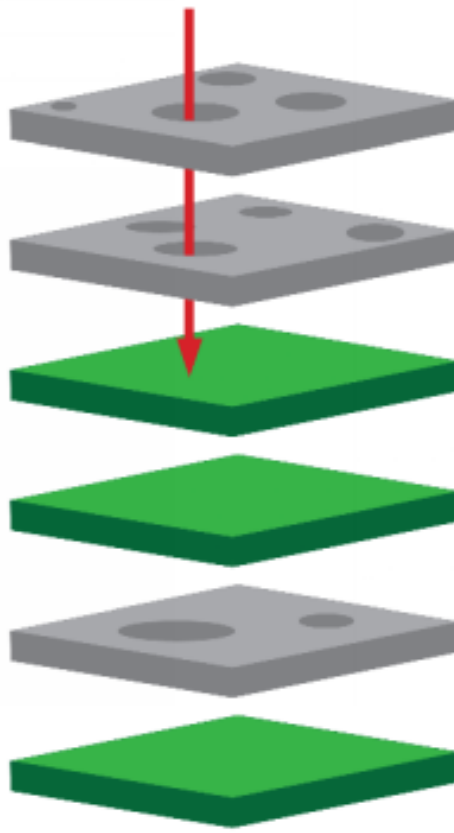
Address safety, economic, political, societal risks in a planned and balanced way.



4. Full upgrade of all buildings

How? when? where to start?

Why we need the FRA Tool – Layers of Safety



Scope of the Project



Challenges?

- Which primary factors contribute to building risk?
- How do we prioritise which buildings to look at first?
- Range of façade systems and components.
- Which variables to address?
- Availability of as-built information for audits.



Literature Review



Risk Assessment of Existing Buildings?

Other industries?

ASCE 31 Seismic Industry – Tiered approach:

- Tier 1 – Screening Phase
- Tier 2 – Evaluation Phase
- Tier 3 – Detailed Phase



Risk ranking method

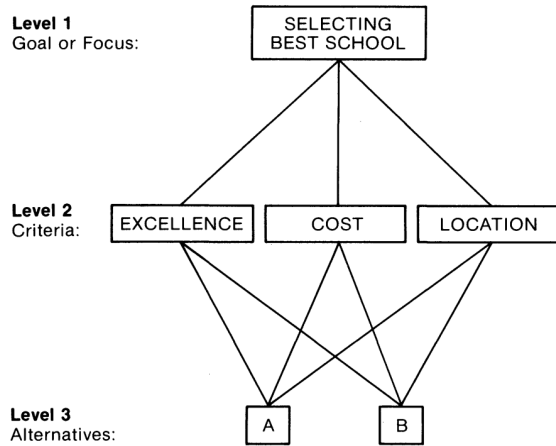
- Quantitative approaches
- Semi-quantitative (e.g. FSES in NFPA 101A)
- Qualitative (e.g. PAS 79)

The risk assessment tool is qualitative

	Likelihood of fire hazard		
Potential consequences of fire hazard	Low	Medium	High
Slight harm	Trivial risk	Tolerable risk	Moderate risk
Moderate harm	Tolerable risk	Moderate risk	Substantial risk
Extreme harm	Moderate risk	Substantial risk	Intolerable risk

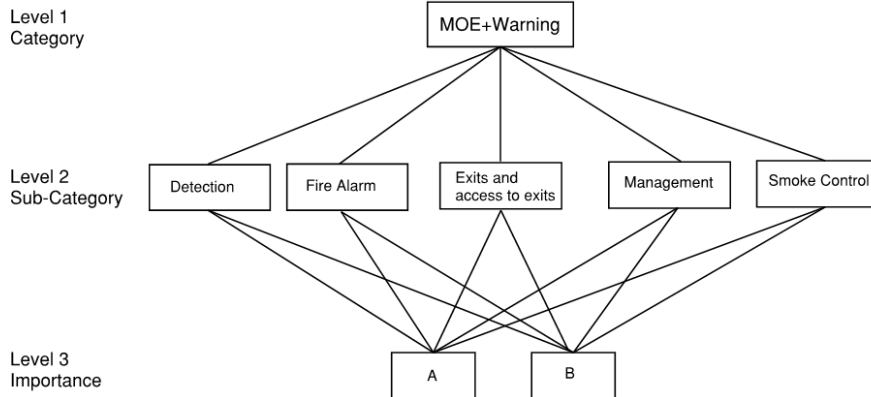
Relative importance of variables?

Analytical hierarchy process



Comparison of Categories							
	ARUP	#	JH	#	NFPA	#	Overall
Façade Hazard	36%	20	31%	10	41%	4	35%
Means of Escape and Warning	38%	20	37%	10	32%	4	37%
Containment and Extinguishment	27%	20	33%	10	27%	4	29%

Category: Means of Escape and Warning							
	ARUP	#	JH	#	NFPA	#	Overall
Detection	19%	20	18%	10	17%	4	18%
Fire Alarm	26%	20	22%	10	22%	4	24%
Exit and access to exits	29%	20	30%	10	29%	4	29%
Management	15%	20	15%	10	17%	4	15%
Smoke Control	12%	20	16%	10	15%	4	13%



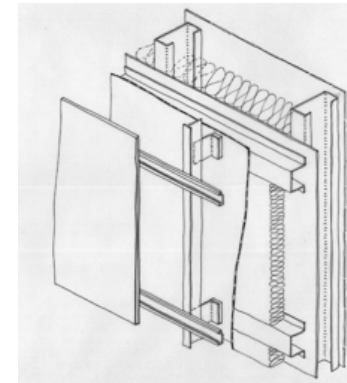
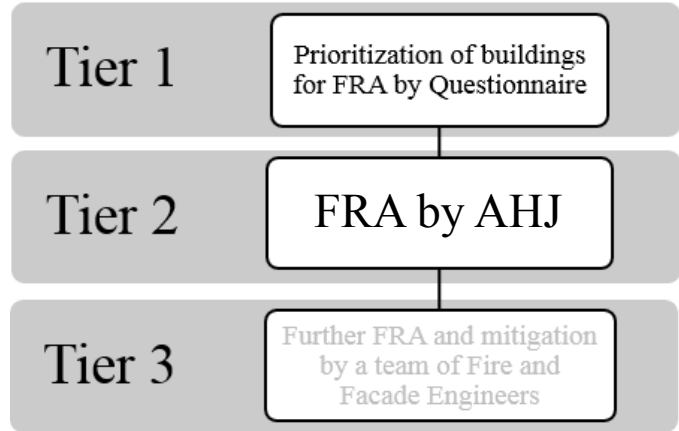
Category: Containment and Extinguishment							
	ARUP	#	JH	#	NFPA	#	Overall
Sprinklers	40%	20	36%	10	31%	4	38%
Fire Service Facilities	21%	20	31%	10	37%	4	26%
Compartmentation	40%	20	33%	10	31%	4	37%

Category: Façade Hazard							
	ARUP	#	JH	#	NFPA	#	Overall
Façade ignition sources	20%	20	17%	10	22%	4	20%
Component materials	30%	20	25%	10	30%	4	29%
Combustible connections	20%	20	22%	10	19%	4	21%
Perimeter fire stop	14%	20	19%	10	14%	4	16%
Cavity barriers	15%	20	17%	10	16%	4	16%

Methodology



Scope of Methodology



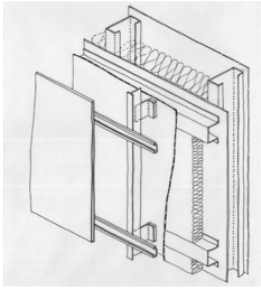
Process A



Process B

Scope of Methodology

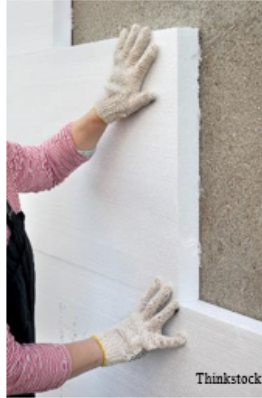
Variables assessed in Tier 1 and 2 in Process A are:



Process A



Process B



Insulation (fuel)



Façade Ignition Sources



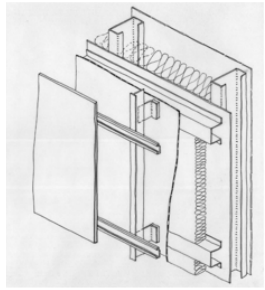
Cladding (fuel)



Vertical Connectivity

Scope of Methodology

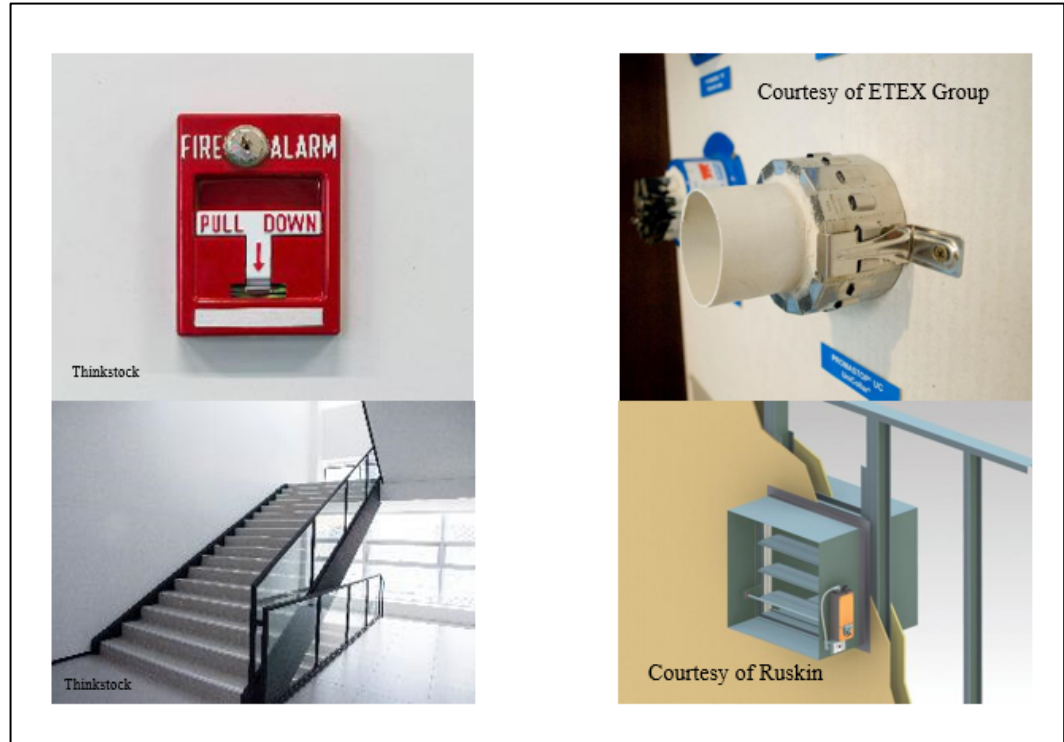
Variables assessed in Tier 1 and 2 in Process B are:



Process A



Process B



Tier 1

For a town, city or large portfolio of buildings.

A few relatively simple questions are issued by AHJ to facilities managers.



Building	Tier 1 Prioritization		Action
	Process A	Process B	
1	E	C	Tier 2 assessment required as process A prioritization > Tolerable
2	E	B	
3	D	C	
4	D	B	
5	C	D	
7	C	A	
8	C	A	
9	B	B	No action
10	B	D	Fire safety provisions to be assessed using alternate tool
11	A	D	
12	A	C	No action
13	A	B	
.			
etc.			

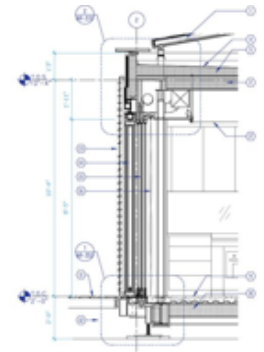
Potential consequences of fire hazard	Likelihood of fire hazard		
	Low	Medium	High
Slight harm	Trivial risk	Tolerable risk	Moderate risk
Moderate harm	Tolerable risk	Moderate risk	Substantial risk
Extreme harm	Moderate risk	Substantial risk	Intolerable risk

Tier 2

- AHJ then visits each building in order of priority.
- More detailed questions are asked about the façade system, ignition sources and the fire safety systems.
- Each elevation of the building is given a risk ranking to help identify problem areas.

Step 1

Review as built drawings (if available)



Step 2

Review as built material submittals (If available)



Step 3

Visual inspection of façade at the building.



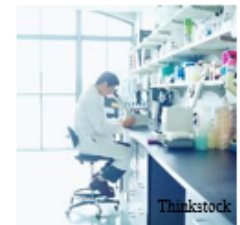
Step 4

Visual inspection with removal of façade elements.



Step 5

Destructive sampling and laboratory testing of component façade materials (insulation and cladding) if necessary



Risk Matrices

RISK MATRIX FOR OFFICE - TIER 1A and 2A						
		Likelihood of a fire on multiple stories				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Slight harm	A	A	B	C	C
18-30m	Slight-moderate harm	A	B	B	C	D
30-50m	Moderate harm	A	B	C	D	E
>50m	Moderate-Extreme harm	A	C	D	D	E

RISK MATRIX FOR RESIDENTIAL "ALL-OUT" - TIER 1A and 2A						
		Likelihood of a fire on multiple stories				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Slight-moderate harm	A	B	B	C	D
18-30m	Moderate harm	A	B	C	D	E
30-50m	Moderate-Extreme harm	A	C	D	D	E
>50m	Extreme harm	A	C	D	E	E

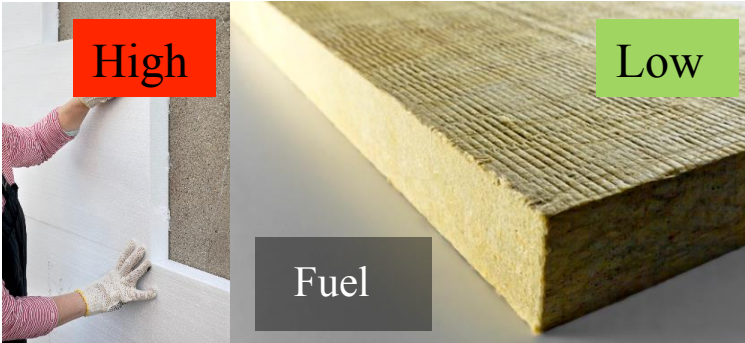
RISK MATRIX FOR RESIDENTIAL "STAY-PUT" - TIER 1A and 2A						
		Likelihood of a fire on multiple stories				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Moderate harm	A	B	C	D	D
18-30m	Moderate-Extreme harm	A	C	D	D	E
30-50m	Extreme harm	B	D	D	E	E
>50m	Extreme harm	B	D	E	E	E

RISK MATRIX FOR OFFICE - TIER 1B and 2B						
		Likelihood of means of egress and warning being compromised				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Slight harm	A	A	B	C	E
18-30m	Slight-moderate harm	A	B	C	C	E
30-50m	Moderate harm	A	B	C	D	E
>50m	Moderate-Extreme harm	A	C	D	E	E

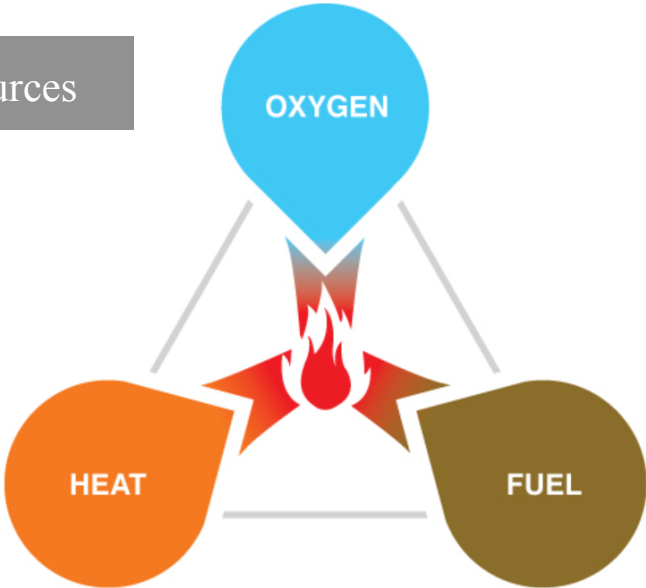
RISK MATRIX FOR RESIDENTIAL "ALL-OUT" - TIER 1B and 2B						
		Likelihood of means of egress and warning being compromised				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Slight-moderate harm	A	A	B	C	E
18-30m	Moderate harm	A	B	C	D	E
30-50m	Moderate-Extreme harm	A	C	C	D	E
>50m	Extreme harm	A	C	D	E	E

RISK MATRIX FOR RESIDENTIAL "STAY-PUT" - TIER 1B and 2B						
		Likelihood of means of egress and warning being compromised				
Building Height (m)	Consequence due to Height	Very Low	Low	Medium	High	Very High
<18m	Moderate harm			C	D	E
18-30m	Moderate-Extreme harm			D	E	E
30-50m	Extreme harm			D	E	E
>50m	Extreme harm			E	E	E

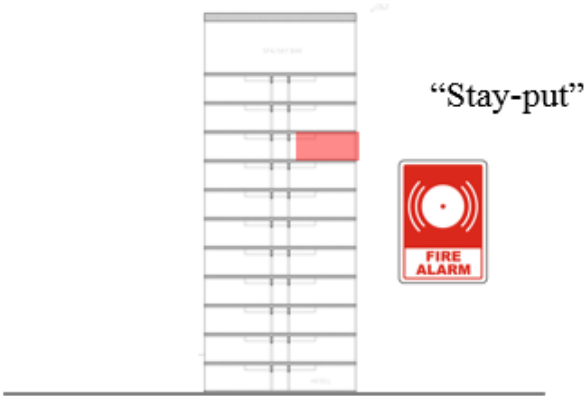
Likelihood of a Fire Over Multiple Stories



Ignition sources



Consequence of Fire Over Multiple Stories – Height, Occupancy

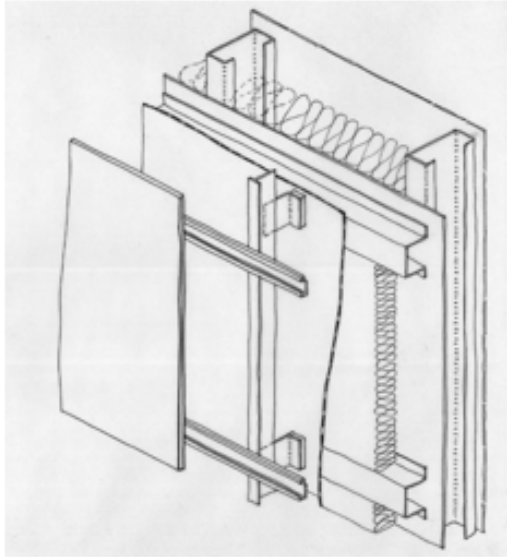


Likelihood + Consequence = Risk

RISK MATRIX FOR OFFICE - TIER 1A and 2A						
Building Height (m)	Consequence due to Height	Likelihood of a fire on multiple stories				
		Very Low	Low	Medium	High	Very High
<18m	Slight harm	A	A	B	C	C
18-30m	Slight-moderate harm	A	B	B	C	D
30-50m	Moderate harm	A	B	C	D	E
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RISK MATRIX FOR RESIDENTIAL "ALL-OUT" - TIER 1A and 2A						
Building Height (m)	Consequence due to Height	Likelihood of a fire on multiple stories				
		Very Low	Low	Medium	High	Very High
<18m	Slight-moderate harm	A	B	B	C	D
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30-50m	Moderate-Extreme harm	A	C	D	D	E
>50m	Extreme harm	A	C	D	E	E

RISK MATRIX FOR RESIDENTIAL "STAY-PUT" - TIER 1A and 2A						
Building Height (m)	Consequence due to Height	Likelihood of a fire on multiple stories				
		Very Low	Low	Medium	High	Very High
<18m	Moderate harm	A	B	C	D	D
18-30m	Moderate-Extreme harm	A	C	D	D	E
30-50m	Extreme harm	B	D	D	E	E
>50m	Extreme harm	B	D	E	E	E

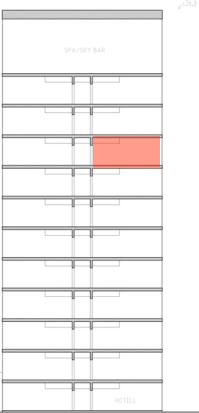


Process A

Likelihood of Means of Egress and Warning Compromised

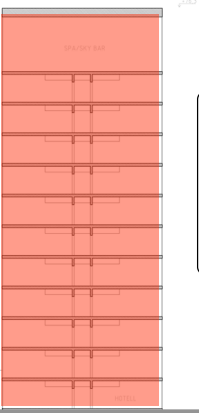
“Stay-put”

High



“All-out”

Low



Likelihood of Means of Egress and Warning Compromised

Means of Escape	Detection and Fire Alarm	Likelihood of means of egress and warning being compromised
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low
High Medium Low	High Medium Low	V. High High Medium Low V. Low



Likelihood of means of egress and warning being compromised if compartmentation also poor
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low
V. High High Medium Low V. Low

Likelihood + Consequence = Risk

RISK MATRIX FOR OFFICE - TIER 1B and 2B

Building Height (m)	Consequence due to Height	Likelihood of means of egress and warning being compromised				
		Very Low	Low	Medium	High	Very High
<18m	Slight harm	A	A	B	C	E
18-30m	Slight-moderate harm	A	B	C	C	E
30-50m	Moderate harm	A	B	C	D	E
>50m	Moderate-Extreme harm	A	C	D	E	E

RISK MATRIX FOR RESIDENTIAL "ALL-OUT" - TIER 1B and 2B

Building Height (m)	Consequence due to Height	Likelihood of means of egress and warning being compromised				
		Very Low	Low	Medium	High	Very High
<18m	Slight-moderate harm	A	A	B	C	E
18-30m	Moderate harm	A	B	C	D	E
30-50m	Moderate-Extreme harm	A	C	C	D	E
>50m	Extreme harm	A	C	D	E	E

RISK MATRIX FOR RESIDENTIAL "STAY-PUT" - TIER 1B and 2B

Building Height (m)	Consequence due to Height	Likelihood of means of egress and warning being compromised				
		Very Low	Low	Medium	High	Very High
<18m	Moderate harm			C	D	E
18-30m	Moderate-Extreme harm			D	E	E
30-50m	Extreme harm			D	E	E
>50m	Extreme harm			E	E	E



Process B

Mitigation

Effectiveness



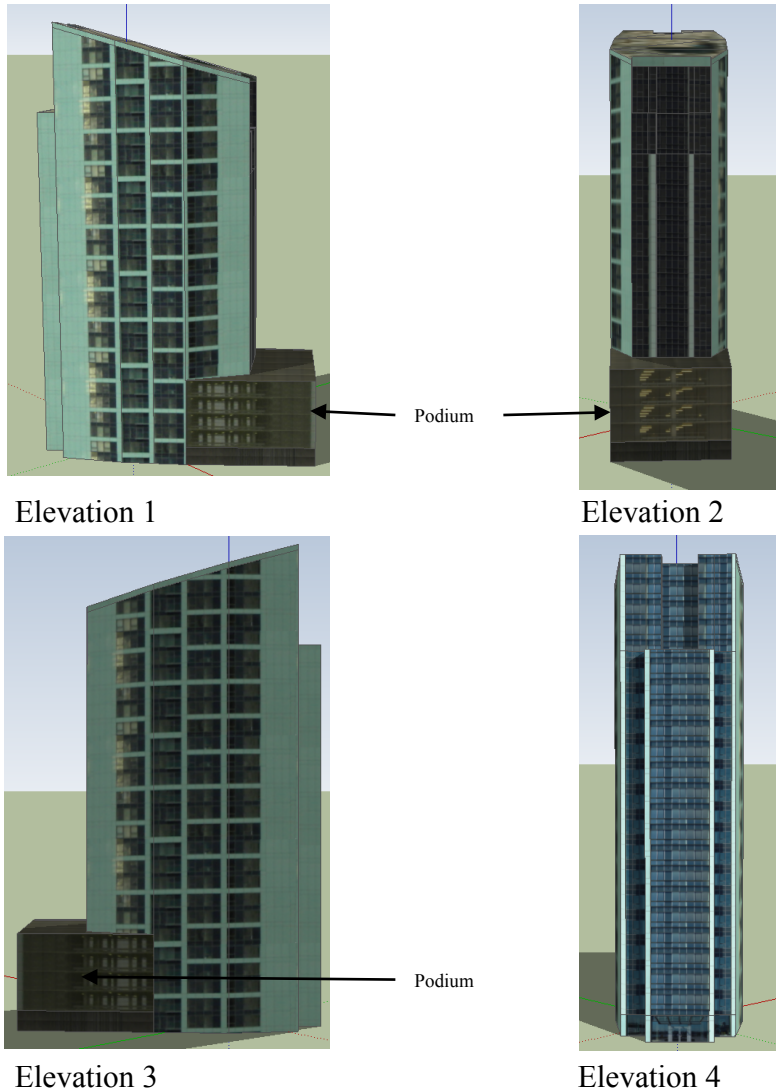
- Management solutions;**
- Repair and regular testing/maintenance of existing fire safety provisions;**
- Installation of additional fire safety provisions;**
- Façade system remediation.**



	Likelihood of fire hazard		
Potential consequences of fire hazard	Low	Medium	High
Slight harm	Trivial risk	Tolerable risk	Moderate risk
Moderate harm	Tolerable risk	Moderate risk	Substantial risk
Extreme harm	Moderate risk	Substantial risk	Intolerable risk

Hypothetical Case Study





Case Study

The building shown on this page is highlighted as a case study.

This case study is hypothetical and any resemblance in details to any constructed buildings is unintentional.

It is over 50 m high, residential occupancy utilising a “Stay put” evacuation strategy with 4 distinct elevations as shown and a podium.

The façade system type used on the building elevations is:

- Elevation 1 & 3 - Unitised curtain wall with mineral wool insulation and ACP cladding materials used in opaque areas. Based on sample testing the ACP core has about 30% combustible content.
- Elevation 2 – Glazing
- Elevation 4 – Glazing
- Podium: Concrete frame, open side or open deck car park.



Elevation 1



Elevation 2



Elevation 3



Elevation 4

Case Study – Fuel

The pattern of fuel (Insulation or cladding) present on elevations 1-4 are shown on this page. These are as follows:

- Elevation 1 – ACP cladding panels (Orange).
- Elevation 3 – ACP cladding panels (Orange). Located on spandrel panels only.
- Elevations 2 & 4 – No fuel sources
- Podium: No fuel sources.



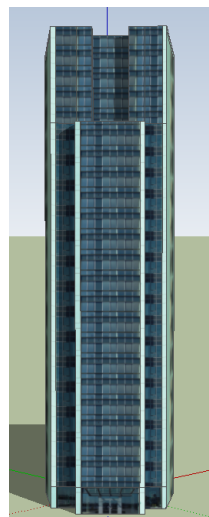
Elevation 1



Elevation 2



Elevation 3

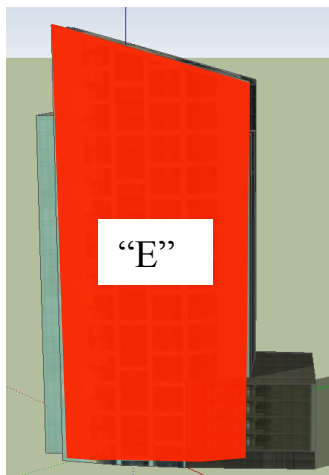


Elevation 4

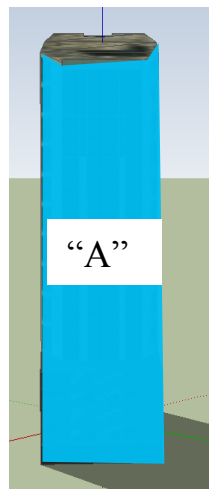
Case Study – Ignition Sources

The ignition sources present on elevations 1-4 are shown on this page and summarised below:

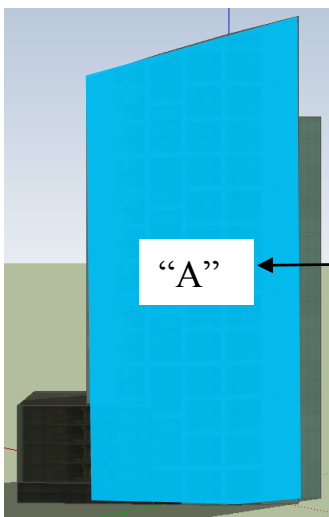
- The building is sprinklered throughout except balconies.
- Elevation 1 - Balconies
- Elevation 2 – Car parking inside the open deck podium and on top of the podium
- Elevation 3 – Basement smoke exhaust grille
- Elevation 4 – No specific ignition sources.
- Podium: Concrete frame, open deck car park.



Elevation 1

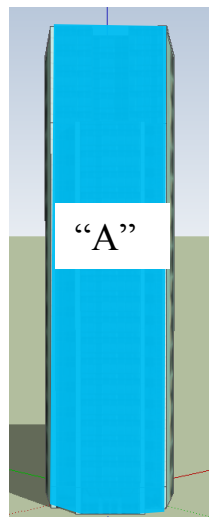


Elevation 2



Elevation 3

Ranking due to lack of fuel.



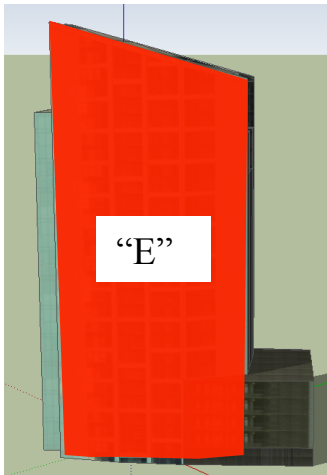
Elevation 4

Case Study – Outcome

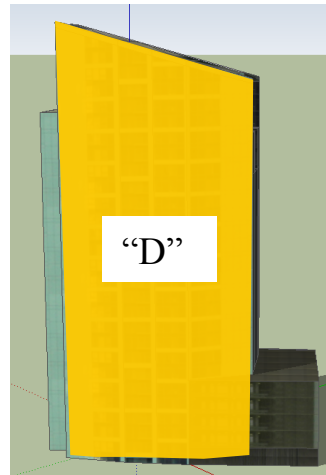
A risk score of more than “B” as established in Tier 2, Process A indicates that mitigation measures are recommended.

For this building, the tool would recommend mitigation measures for elevation 1.

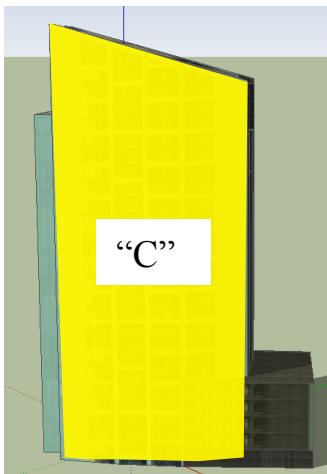
For the purposes of the case study, Tier 2 Process B is ranked as Trivial.



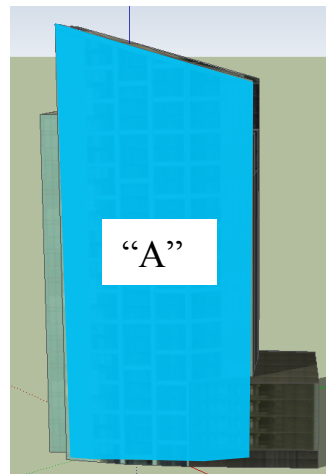
Elevation 1 – Initial risk ranking



Elevation 1 – Sprinklers on balconies



Elevation 1 – Sprinklers on balconies + “all-out evacuation”



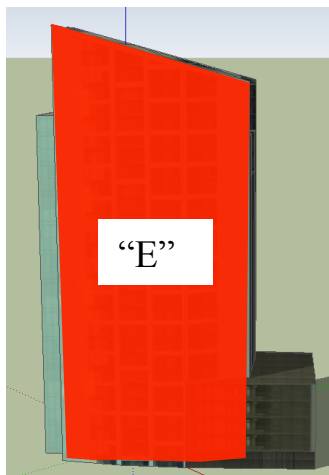
Elevation 1 – Removal of vertical connections only

Example Assessment of Mitigation Measures

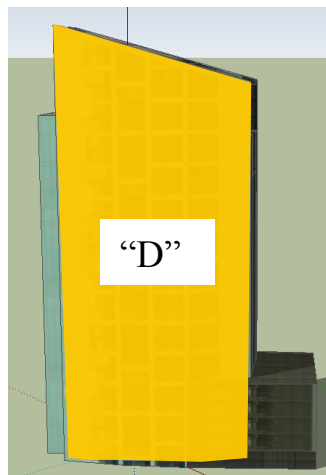
Mitigation measures impact upon risk rankings.

On this page the effects of progressively introducing mitigation measures are shown:

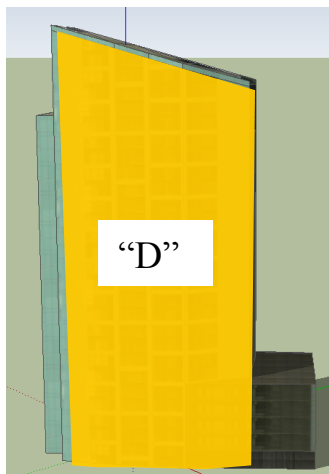
- Introducing sprinklers on balconies
- Upgrading the fire alarm to support an “all-out” evacuation strategy.
- Removing vertical connections in combustibles.



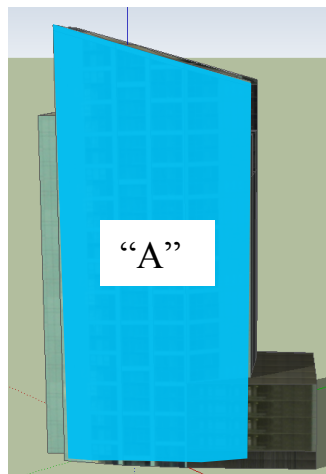
Elevation 1 – Initial risk ranking



Elevation 1 – Sprinklers on balconies



Elevation 1 – Sprinklers on balconies + "all-out evacuation"



Elevation 1 – Removal of vertical connections only

Example Assessment of Mitigation Measure

Assessment of mitigation measures if ACP is 100% Polyethylene

Limitations

EFFECT is for office or residential (apartment/hotel) buildings over 18m high and with a combustible façade problem.

It is only suitable for buildings with a steel or concrete frame (not timber).

EFFECT is not suitable for assessing buildings without combustible facades. Do not use to assess internal fire safety provisions only.

It is for assessment of existing buildings – it is not a design tool.

Some buildings will need Tier 3 assessment (not addressed by EFFECT).

The output is only as reliable as the input by the user.

EFFECT™

External Façade Fire Evaluation and Comparison Tool

NFPA's online tool based on methodology developed by Arup.



IT'S A BIG WORLD.
LET'S PROTECT IT TOGETHER.™



bcollins@nfpa.org

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NFPA's EFFECT™

NFPA's Exterior Façade Fire Evaluation and Comparison Tool—EFFECT™—is intended for use by Authorities Having Jurisdiction (AHJ) to assess a portfolio of high rise buildings where there is a concern that the exterior facade systems include combustible materials. The tool aids AHJs in prioritizing buildings in their jurisdiction, conducting initial fire risk assessments of each building, and identifying those building that have a highest priority for inspection. EFFECT™ is based on a Fire Risk Assessment methodology developed by Arup with peer review and technical input from Jensen Hughes as a delivery to the NFPA Research Foundation Project *High Rise Buildings with Combustible Exterior Façade Systems: Fire Risk Assessment Tool*. The tool is applicable in any geography but is currently limited to residential (hotel, apartments) or business (office) type occupancies that are over 18m high where height is measured as the vertical distance from fire department access level to the top most occupied floor of the building. Please visit NFPA.org for [additional information](#) on fire risks from exterior walls.

To get started with EFFECT™, please login above using your NFPA.org login credentials or [create a free NFPA.org profile](#).



Occupancy Types

- Business
- Residential (All out)
- Residential (Stay put)

Check/Uncheck All

Building Heights

- Intermediate: 18-30 meters
- High: 30-50 meters
- Very High: > 50 meters

Check/Uncheck All

Apply Filters

Legend



- About EFFECT™
- User Guide
- Assumptions & Limitations
- Technical Definitions
- Additional Resources
- Contact

constitute harm, further assessment might be required to establish more precisely the likelihood of harm as a basis for determining the priority for improved control measures.

D Substantial: Considerable resources might have to be allocated to reduce the risk. If the premises are unoccupied, it should not be occupied until the risk has been reduced. If the premises are occupied, urgent action should be taken.

E Intolerable: Premises (or relevant area) should not be occupied until the risk is reduced.

Export

Print



Add Property

* Required

Is the structural frame of the building non-combustible (e.g. concrete and/or steel)?

Back

Save & Continue



Add Property

* Required

Webinar building

Is the structural frame of the building non-combustible (e.g. concrete and/or steel)?

No ▾

Note: This tool is not suitable for a building with a combustible frame.

Back

Save & Continue

Webinar building

Is the structural frame of the building non-combustible (e.g. concrete and/or steel)?

Yes

Occupancy Type:

+ Additional Information

Business

Building Height:

+ Additional Information

Very High: > 50 meters

Is there an assembly use (bar, restaurant, pool deck, nightclub) in the building?

+ Additional Information

No

Back

Save & Continue

Webinar building Tier 1A - Façade Fire Hazard

Question 1

* Required

Webinar build

Methodology

Building Characteristics

Tier 1-A

Tier 1-B

Tier 2-A

Tier 2-B

Mitigation

Business

Tier 1A, Q1

Question 1:

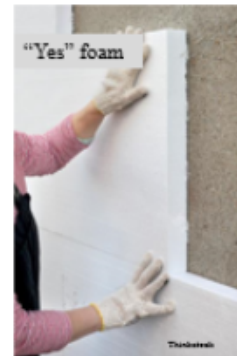
- Is the insulation provided within the building façade system made of a combustible material, e.g. foam insulation etc. ?

Commentary:

- Mineral wool and glass wools are made up of fibers that are scratchy and sharp to the touch. Foam is cellular and smooth.
- Mineral insulation does not pose a fire hazard but any type of foam will burn.
- Answer "yes" if the insulation is a foam.
- Answer "no" if the insulation is mineral or glass wool.
- Answer "no" if there is no insulation.



Courtesy of [Knauf Insulation](#)



Tier 1, Process A - Insulation

Users Guide

Insulation

1. Is the insu

+ Additional I

Cladding

2. Are the o
(ACP) etc...?

+ Additional I

te Panel

External Ignition Sources

3.1. Does the building have balconies within 6 m of the combustible façade system?

+ Additional Information

3.2. Does the building have PV panels or external lights fixed to the combustible facade system (or similar)?

+ Additional Information

3.3. Are there ignition sources (e.g. vehicles or trash cans or similar at the base of the building) within 6 m of the combustible façade system?

+ Additional Information

Internal Ignition Sources

4. Is a sprinkler system provided throughout the building?

+ Additional Information

4.1. Is the sprinkler system fully operational and reliable, and being tested and maintained regularly?

+ Additional Information

Façade Vertical Connectivity

5. In terms of the façade system pattern over the building, is there continuity in the combustible insulation and/or the combustible cladding vertically across more than one story?

+ Additional Information

Back

Save & Continue



Webinar building Tier 1B - Egress, Warning, Containment and Extinguishment

* Required

Webinar building

Business ▾

Very High: > 50 meters ▾

Fire Alarm

6. Is a fire detection and fire alarm system provided within the building?

+ Additional Information

Yes ▾

6.1. Is the fire alarm system fully operational and reliable, and tested and maintained regularly?

+ Additional Information

Yes ▾

Tier 1A Façade Fire Hazard

Risk Score:



Intolerable: Premises (or relevant area) should not be occupied until the risk is reduced.

Risk Factors:

Insulation: **High**

Cladding: **High**

Ignition: **Medium**

Connectivity: **High**

Tier 1B Egress, Warning, Containment and Extinguishment

Risk Score:



Trivial: No action required and no details need to be kept.

Risk Factors:

Fire Alarm: **Low**

Exits and Access to Exits: **Low**

Compartmentation: **Low**

Show 25 entries

Search:

Action	Property	Occupancy Type	Building Height	Tier 1A Façade Fire Hazard	Tier 1B Egress, Warning, Containment
<input type="checkbox"/>	Building 2 Scenario 3	Business	Very High: > 50 meters	E	A
<input type="checkbox"/>	Webinar building	Business	Very High: > 50 meters	E	A
<input type="checkbox"/>	Building 2	Business	Very High: > 50 meters	D	A
<input type="checkbox"/>	Building 2 Scenario 2	Business	Very High: > 50 meters	D	A
<input type="checkbox"/>	Building 2 Scenario 4	Business	Very High: > 50 meters	D	A
<input type="checkbox"/>	Building 3 Scenario 1	Residential (All out)	High: 30-50 meters	D	A
<input type="checkbox"/>	Building 3 Scenario 4	Residential (All out)	High: 30-50 meters	D	A
<input type="checkbox"/>	Building 1 Scenario 1	Business	Very High: > 50 meters	D	A
<input type="checkbox"/>	Building 2 Scenario 5	Business	Very High: > 50 meters	D	A
<input type="checkbox"/>	Building 3 Scenario 3	Residential (All out)	High: 30-50 meters	D	A



Webinar building Tier 2A - Façade Systems on the Building

* Required

Webinar building

Business ▾

Very High: > 50 meters ▾

1.1 Façade Systems on the Building

1.1.1 How many elevations are on the building?

[+ Additional Information](#)

Select* ▾

Action	Property	Occupancy Type	Building Height	Tier 1A Façade Fire Hazard	Tier 1B Egress, Warning, Containment	Tier 2A Façade Fire Hazard	Tier 2B Egress, Warning, Containment	Flags
<input type="checkbox"/>	Building 2 Scenario 3	Business	Very High: > 50 meters	E	A	E	A	N/A
<input type="checkbox"/>	Building 3 Scenario 2	Residential (Stay put)	High: 30-50 meters	E	E	E	D	N/A
<input type="checkbox"/>	Webinar building	Business	Very High: > 50 meters	E	A	E	A	N/A
<input type="checkbox"/>	123	Residential (All out)	Very High: > 50 meters	E	E	E	E	N/A
<input type="checkbox"/>	ETICS test	Residential (All out)	Intermediate: 18-30 meters	E	A	A	A	N/A
<input type="checkbox"/>	Stay Put test	Residential (Stay put)	Very High: > 50 meters	E	E	B	E	Flags
<input type="checkbox"/>	Building 1 Scenario 1	Business	Very High: > 50 meters	D	A	A	A	N/A
<input type="checkbox"/>	Building 2	Business	Very High: > 50 meters	D	A	D	A	N/A
<input type="checkbox"/>	Building 2 Scenario 2	Business	Very High: > 50 meters	D	A	D	E	N/A
<input type="checkbox"/>	Building 2 Scenario 4	Business	Very High: > 50 meters	D	A	D	A	N/A
<input type="checkbox"/>	Building 2 Scenario 5	Business	Very High: > 50 meters	D	A	A	E	Flags
<input type="checkbox"/>	Building 3 Scenario 1	Residential (All out)	High: 30-50 meters	D	A	D	A	N/A
<input type="checkbox"/>	Building 3 Scenario 3	Residential (All out)	High: 30-50 meters	D	A	A	A	N/A



<http://www.nfpa.org/exteriorwalls>

Questions?

