SCDF
The Life Saving Force
. . . for a safer Singapore

Fire Safety Engineer (FSE) Workshop (formerly known as FSE Dialogue)

23rd Apr 2021 from 2:30 pm to 4:30 pm
(Video Conference via Zoom)

Agenda:

1. Registration
2. PB Regulatory System (Update)
    - FSE Registration
    - Number of PB cases
3. CPE Program (update)
4. Admin Requirements (update)
5. Fire Engineering Technical Requirements (update)
    - Mark-up drawings
6. AOB
7. QnA

Performance-Based Regulatory System

FSE Registration

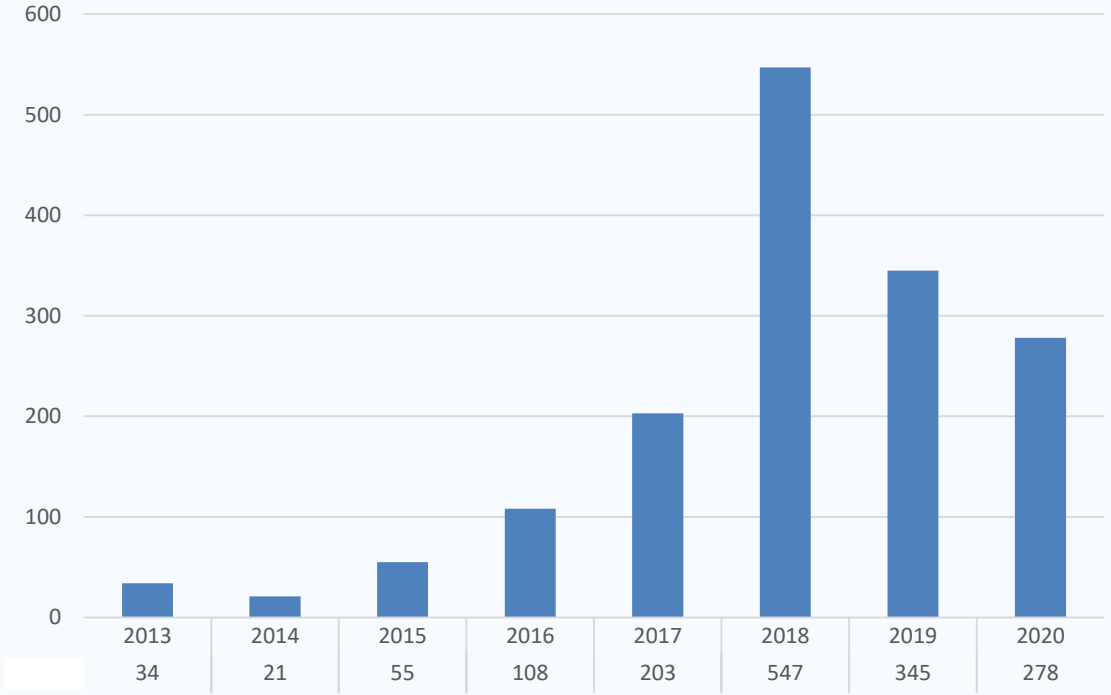
Year	Number of FSEs registered	Year	Number of FSEs registered	Year	Number of FSEs registered
2004	40	2011	0	2018	2
2005	11	2012	5	2019	0
2006	5	2013	2	2020	0
2007	7	2014	1		
2008	8	2015	3		
2009	7	2016	0		
2010	3	2017	0		

- Current FSEs ("Practising" & "Restriction of Practice") – 78
  - Deregistered – 16 (No longer practicing)

Number of PB Cases

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number	1	15	7	53	63	33	29	41	41	54	44	46	42	62	84	103	71

Number of PB WVR Issues



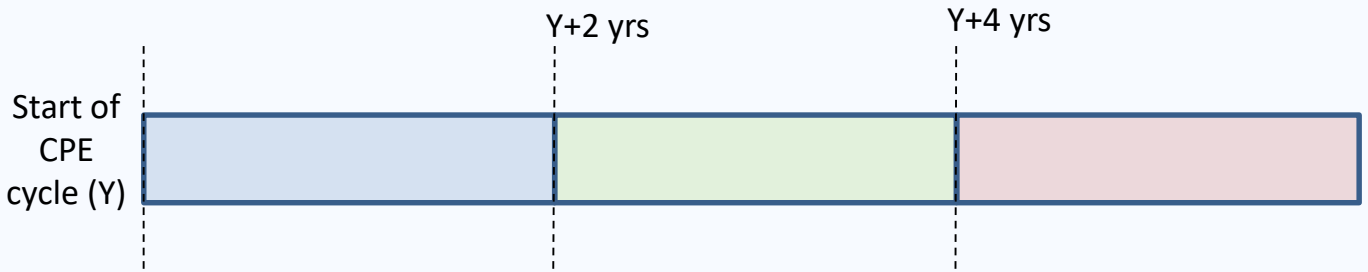
Continuing Professional Education Program

- www.scdf.gov.sg
  >> Fire Safety
  >> Plans and Consultations
  >> Performance-Based Approach to Fire Safety Design
- Emails from LTC Tong

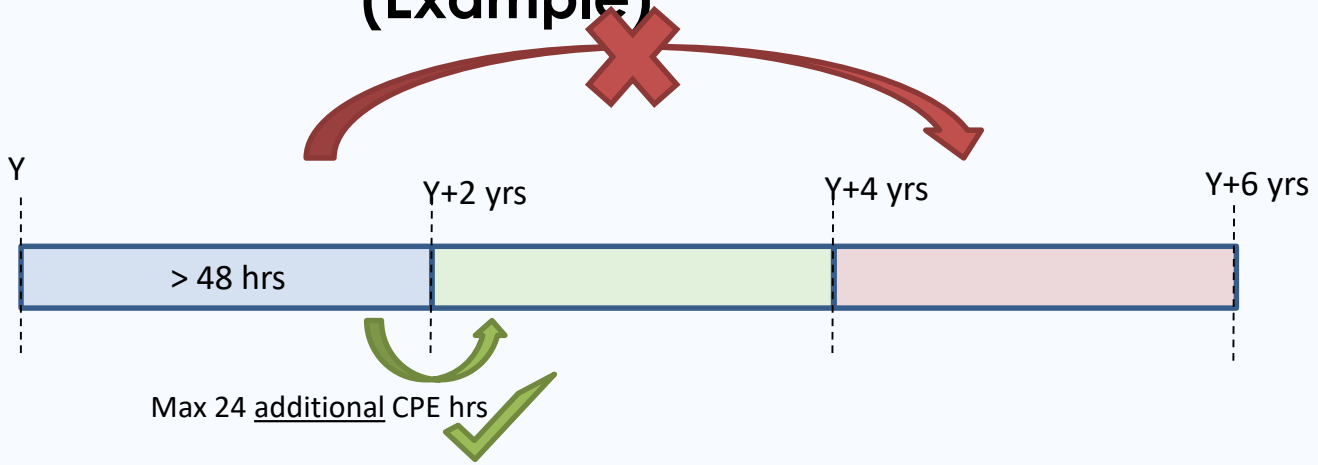
84	Advanced Fire Dynamics and Application to Performance-Based Design (online)	09 Jan 2021 to 17 Jan 2021	16
85	Advanced Fire Dynamic Simulator and Smokeview [Live Online Seminar]	15 Feb 2021 to 12 Mar 2021	22
86	Fire and Life Safety Design of Very Tall Buildings Challenges and Strategies (Online)	15 Mar 2021 to 19 Mar 2021	7
87	Fire Engineering in Rail and Road Infrastructure - Course for LTA participants only (online)	23 Mar 2021	7
88	SFPE 2021 Virtual Europe Conference (Online)	24 Mar 2021 to 25 Mar 2021	10
89	Beyond Cause and Origin: Engineering Analysis of Building Fire (Online)	5 Apr 2021 to 9 Apr 2021	15

CPE Program (Recap)

- Attain minimum 48 CPE hours for every 2 year-cycle. Cycle starts on:
  - 1 Sep 2013 (for FSEs registered before 1 Sep 2013)
  - FSE registration date (for FSEs registered after 1 Sep 2013)
- Different FSEs may have different CPE training cycle start/end dates
- FSE's responsibility to track and monitor own CPE training records
  - ✓ Development of CPE portal still on-going



Carry over of CPE hours (Example)



- Allow extra CPE hours (up to 24 additional CPE hrs in the immediate previous cycle) to be carried forward to the NEXT training cycle only

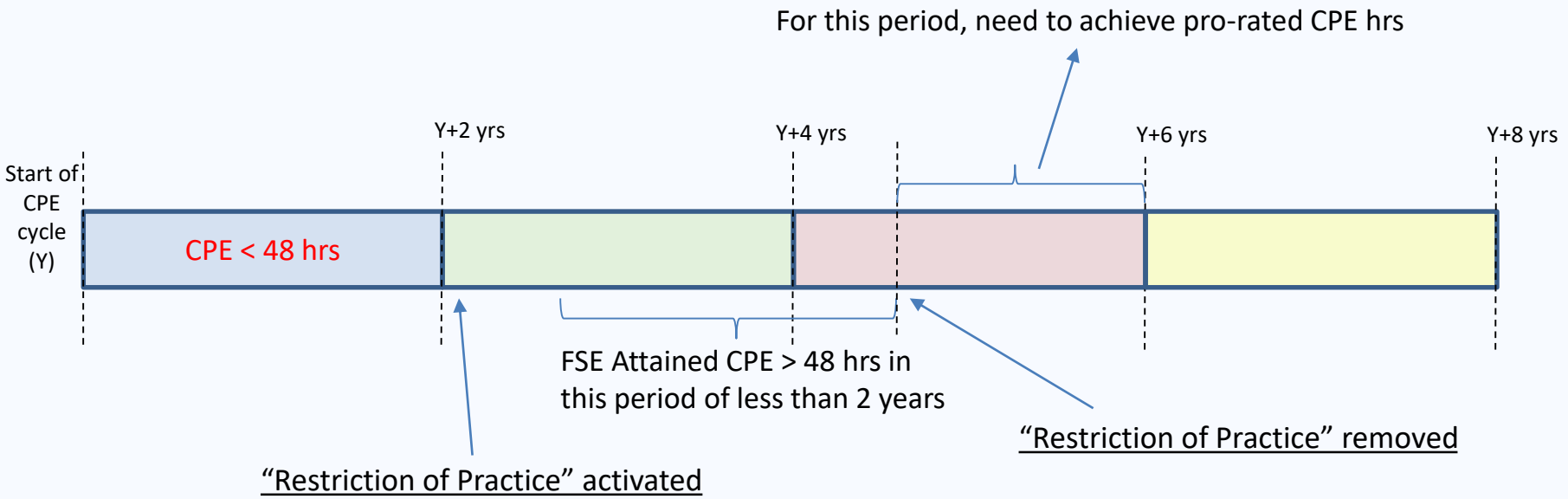
Failure to meet CPE requirements

Registration Number	Registration Date	Full Name	Correspondence Address / E-mail Address	Contact Number (Office / Home / HP)	Status*
025	1st July 2004				Practising
026	-	-	-	-	Not practising
027	1st July 2004				Practising
028	-	-	-	-	Not practising
029	1st July 2004				Restriction of Practice (From 1 Sep 2017 onwards)
030	-	-	-	-	Not practising
031	1st July 2004				Practising
032	1st July 2004				Restriction of Practice (From 1 Sep 2017 onwards)

Practising status listed as "Restriction of Practice" instead of "Practice" in FSE register

- Unable to submit PB plans & reports
- Existing submissions will not be processed further
- Allow reinstatement once they fulfill 48 CPE hours within a 2 year period (see example in next slide)
  - From the point of reinstatement to the end of the FSE's cycle, need to attain pro-rated CPE hours to maintain status.
  - FSE to submit reinstatement declaration

Example


For this period, need to achieve pro-rated CPE hrs
Y+2 yrs
Y+4 yrs
Y+6 yrs
Y+8 yrs
Start of CPE cycle (Y)
CPE < 48 hrs
FSE Attained CPE > 48 hrs in this period of less than 2 years
"Restriction of Practice" removed
"Restriction of Practice" activated

Reinstatement of practising status

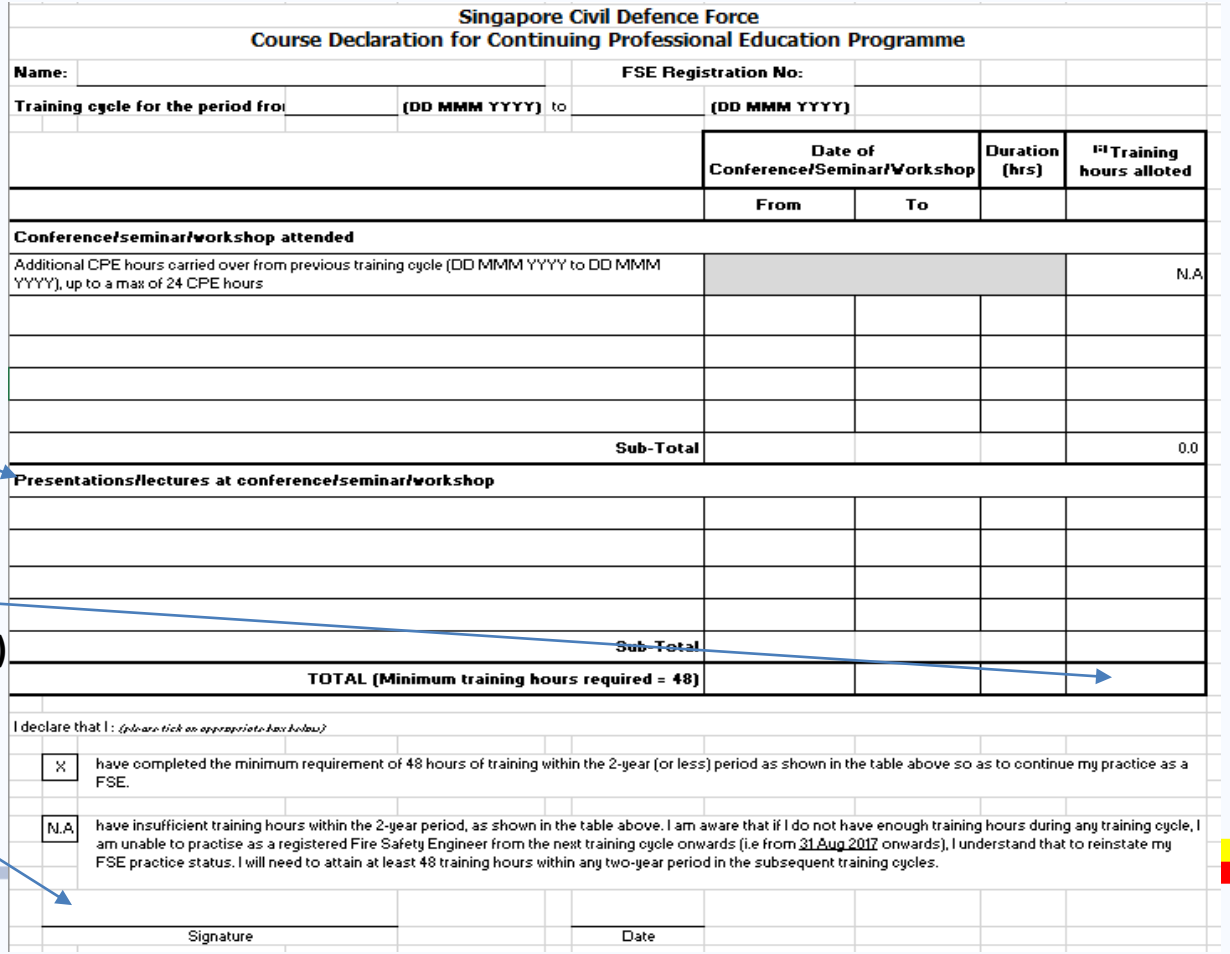
2-year period

No carry forward

Ensure approval from SCDF (for the presentations/lectures to be awarded CPE hours) is obtained prior to the event

Ensure 48 hours or more (extra hours NOT carried forward)

Sign and submit in PDF format



Singapore Civil Defence Force
Course Declaration for Continuing Professional Education Programme

Name: _____ **FSE Registration No:** _____

Training cycle for the period fro _____ **(DD MMM YYYY)** to _____ **(DD MMM YYYY)**

	Date of Conference/Seminar/Workshop		Duration (hrs)	[#] Training hours alloted
	From	**To**		
Conference/seminar/workshop attended				
Additional CPE hours carried over from previous training cycle (DD MMM YYYY to DD MMM YYYY), up to a max of 24 CPE hours				N.A
Sub-Total				0.0
Presentations/lectures at conference/seminar/workshop				
Sub-Total				
TOTAL (Minimum training hours required = 48)				

I declare that I : *(please tick as appropriate box below)*

X — have completed the minimum requirement of 48 hours of training within the 2-year (or less) period as shown in the table above so as to continue my practice as a FSE.

N.A — have insufficient training hours within the 2-year period, as shown in the table above. I am aware that if I do not have enough training hours during any training cycle, I am unable to practise as a registered Fire Safety Engineer from the next training cycle onwards (i.e from 31 Aug 2017 onwards). I understand that to reinstate my FSE practice status, I will need to attain at least 48 training hours within any two-year period in the subsequent training cycles.

Signature _____ Date _____

CPE declaration at end of training cycle

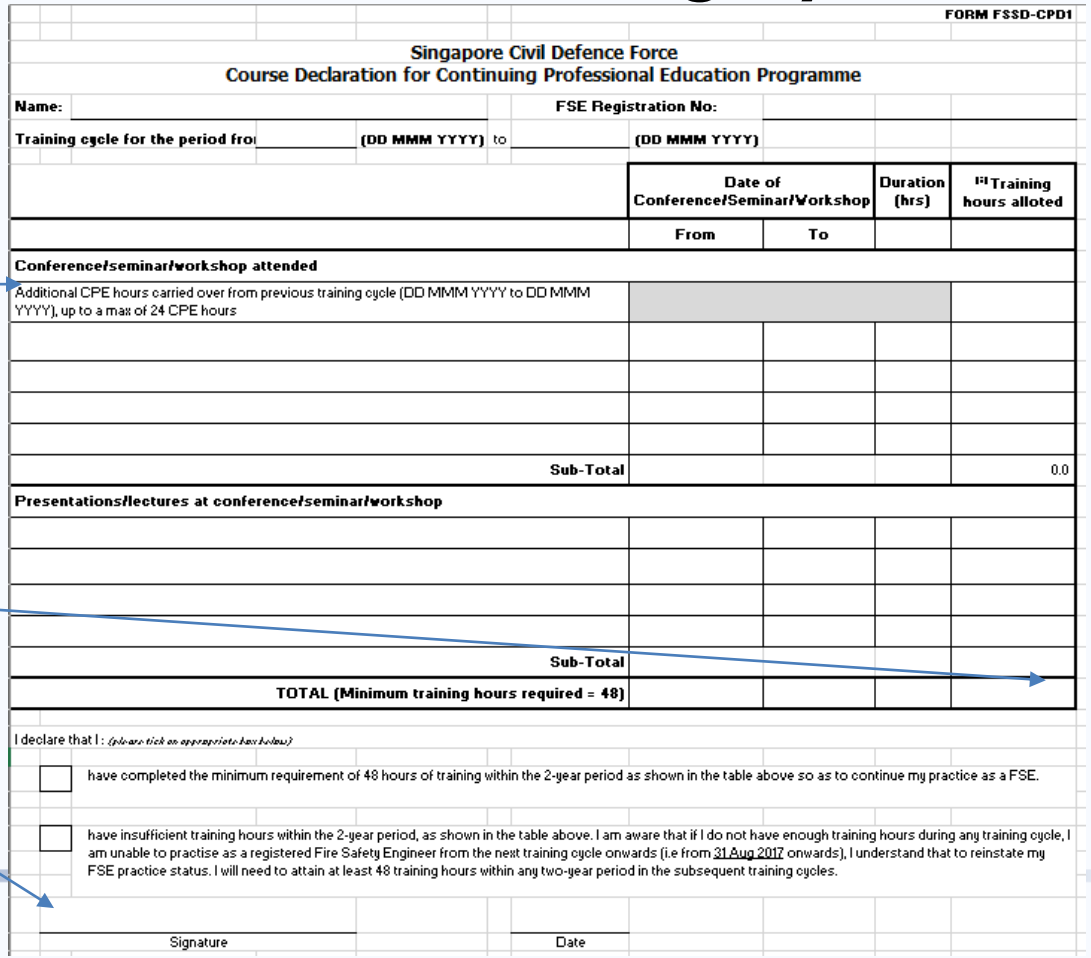
Ensure the time period aligns with your training cycle (or the prorated duration if recently reinstated)

May include carry forward from immediate previous training cycle

Ensure approval from SCDF (for the presentations/lectures to be awarded CPE hours) is obtained prior to the event

Ensure:
- 48 CPE hours or more, or
- exceed the pro-rated CPE hours for recently reinstated FSEs)

Sign and submit in PDF format



FORM FSSD-CPD1

Singapore Civil Defence Force
Course Declaration for Continuing Professional Education Programme

Name: _____ **FSE Registration No:** _____

Training cycle for the period fro _____ **(DD MMM YYYY)** to _____ **(DD MMM YYYY)**

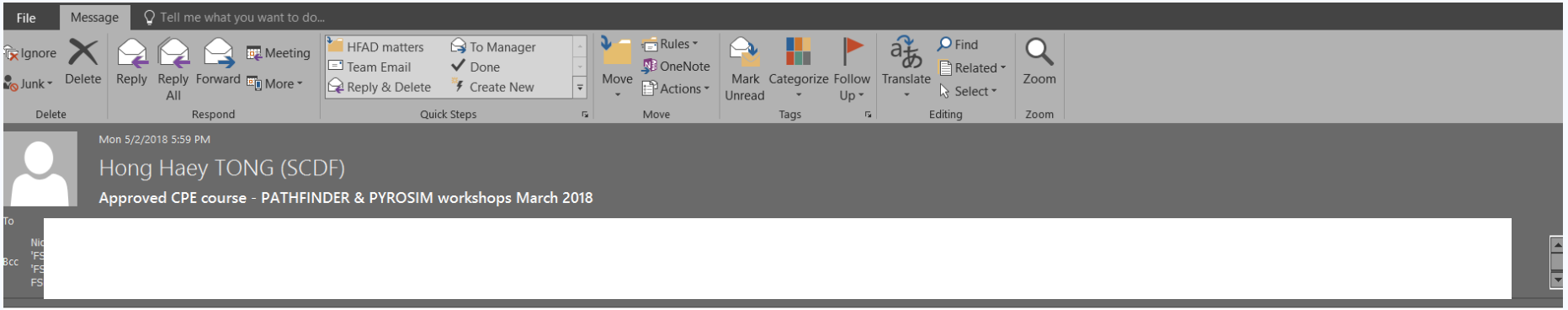
	Date of Conference/Seminar/Workshop		Duration (hrs)	[#] Training hours alloted
	From	**To**		
Conference/seminar/workshop attended				
Additional CPE hours carried over from previous training cycle (DD MMM YYYY to DD MMM YYYY), up to a max of 24 CPE hours				
Sub-Total				0.0
Presentations/lectures at conference/seminar/workshop				
Sub-Total				
TOTAL (Minimum training hours required = 48)				

I declare that I : *(please tick as appropriate box below)*

☐ have completed the minimum requirement of 48 hours of training within the 2-year period as shown in the table above so as to continue my practice as a FSE.

☐ have insufficient training hours within the 2-year period, as shown in the table above. I am aware that if I do not have enough training hours during any training cycle, I am unable to practise as a registered Fire Safety Engineer from the next training cycle onwards (i.e from 31 Aug 2017 onwards), I understand that to reinstate my FSE practice status. I will need to attain at least 48 training hours within any two-year period in the subsequent training cycles.

_____ Signature _____ Date



Dear Fire Safety Engineers (FSEs, in bcc)

This is to inform you that the events below will be considered as part of the approved courses for FSE Continuing Professional Education (CPE) programme. You may refer to the attachments for more information and registration details.

S/N	Event	Date	Venue	Event details	CPE hours
1	PATHFINDER workshop	19 to 20 Mar 2018	460 Alexandra Road	20180319-23 Py..	14
2	PYROSIM workshop	22 to 23 Mar 2018			14

2 For FSEs who are attending the event, you are required to show documentary proof of participation from the event organiser and forward it to me within 1 month from the end of the event.

3 Just a gentle reminder to FSEs that you will need to submit a declaration at the end of your CPE training cycle to indicate all the approved CPE courses you have attended for your CPE training cycle. A template of the declaration form is attached. If you are unsure of the period of your CPE training cycle, you may contact me for more information.

CPE declaration template - dat...

4 For Fire Safety Engineers whose practising status is currently under "Restriction of Practice", if you have attained the reinstatement criteria (i.e achieve 48 CPE hours within a continuous 2-year period during the restriction), you may apply to reinstate your status to "Practising" by submitting the below CPE declaration form to me. You may refer to your practising status in the FSE Register (Go to www.scdf.gov.sg, Under Fire Safety/Fire Safety Approval, Click on Performance-Based Approach to Fire Safety Design).

CPE declaration template (for ...

5 Thank you.

LTC Tong Hong Haey
Senior Consultant (Performance-Based Plans)
Fire Safety & Shelter Department
Singapore Civil Defence Force
DID: (65) 6848 1448

www.scdf.gov.sg
>> Fire Safety
>> Plans and Consultations
>> Performance-Based Approach to Fire Safety Design

Performance-Based Approach to Fire Safety Design

- Registration for Fire Safety Engineers
- List of Projects involving Performance-Based Fire Safety Design
- List of approved CPE course
- Fire Safety Engineers (FSE) Dialogue Session
- Register of Fire Safety Engineers
- Performance-Based Plan Approval Process
- Performance-Based Provisions
- Performance-Based Provisions Code Structure
- Frequently Asked Questions
- Circulars on Performance-Based Fire Safety Issues
- Singapore Fire Safety Engineering Guidelines

Revised PB submission declaration forms (For full PB submission)

- NRIC no longer a field in the forms
- Download from www.scdf.gov.sg
  - Downloads >> Forms >> Plan Approval

Upcoming Review of PB regulatory framework

- Eligibility as a Peer Reviewer (PR)
  - Only FSE with more than 10 years experience (as an FSE) as an FSE are eligible to practise as PR
  - Alignment to RI framework
- Comments from FSEs?

Upcoming Review of PB regulatory framework

- Mandatory attendance at FSE Workshop
  - Must attend at least one FSE Workshop during each two-year training cycle
  - Alignment to RI framework
- Comments from FSEs?

CORENET 2.0 & NetTrust token

- CORENET 2.0 is scheduled to roll out before June 2021 (previous target of end 2020 was postponed)
- Allows all FSEs to submit FEDBs and sign off FSER/PR reports via CORENET, regardless of whether the FSE is a QP.
- More details will be shared once the system is ready.

Update of Fire Safety Act

- Effective 14 Sep 2020
- FSEs should review and update themselves on the changes
  - Example - Note that the monetary penalty quantum for FSA-related offences have been increased from $50K to $200K

Admin Requirements Update

Waiver description

For PB-WVRs, the Waiver Description and relevant clause quoted in the Fire Engineering Report (table of deviations) shall match and document clearly:

1. Relevant Fire Code (2013/ 2018/etc)
2. Relevant clause number

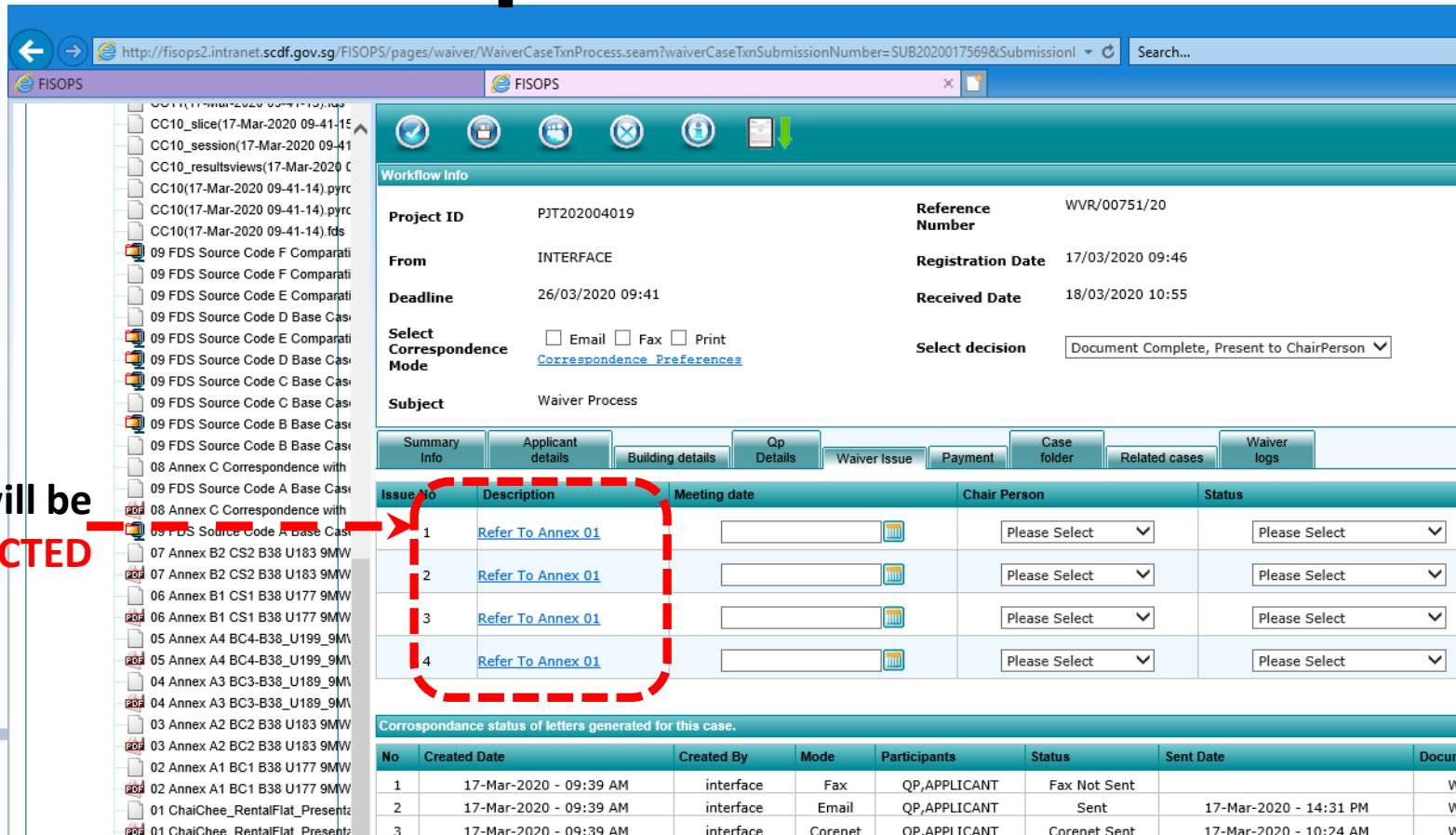
Issue No : 1

Description: To permit the minimum size of the staircase air-well of Tower A to be less than the requirement stated in Table 1.4.2 Clause : Fire Code 2013, Cl. 2.3.3(f)

Status: Conditionally Approved

Extracted from WVR decision letter

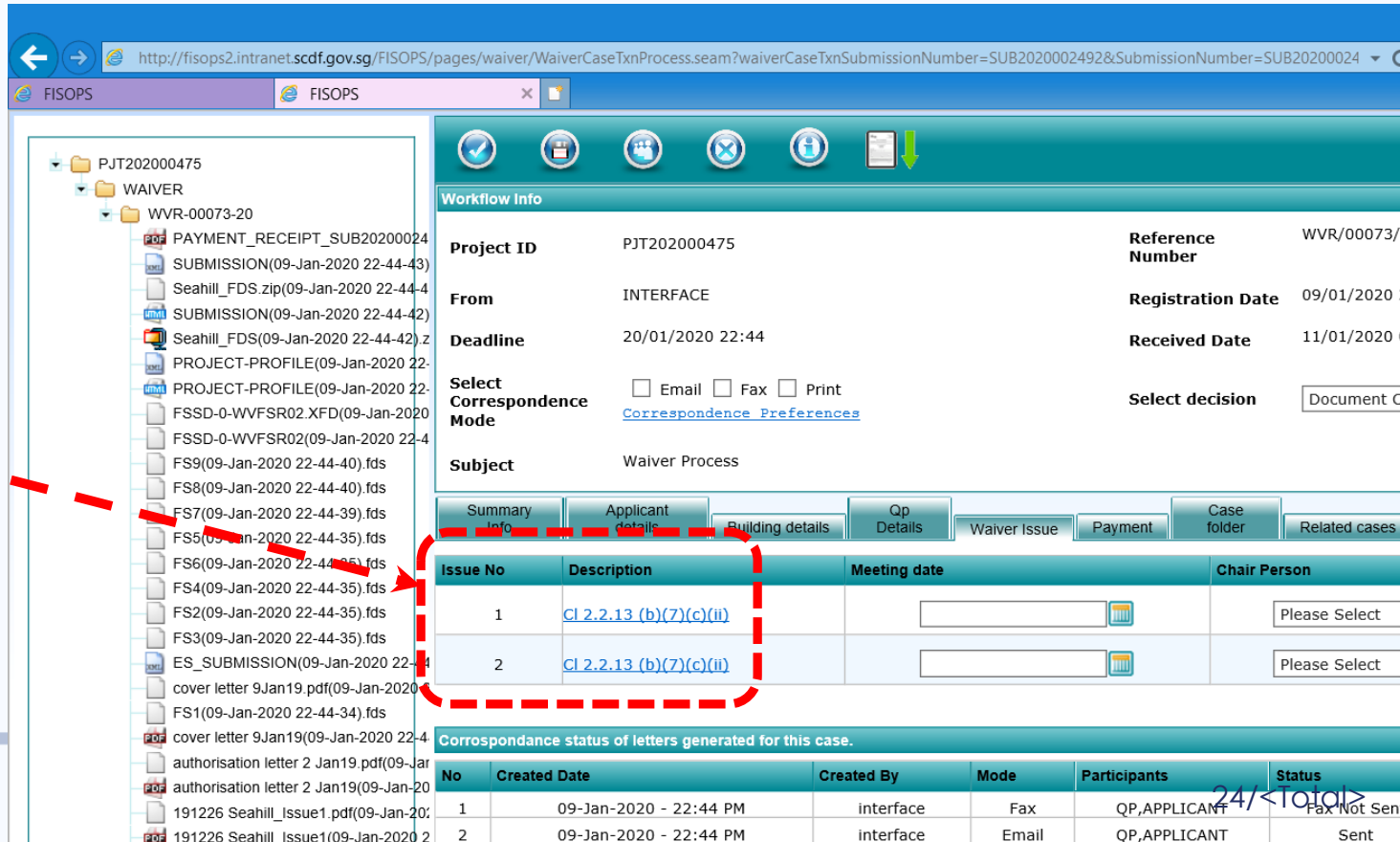
Waiver description



WVR will be
REJECTED

Waiver description

Contains same clause. Confusing



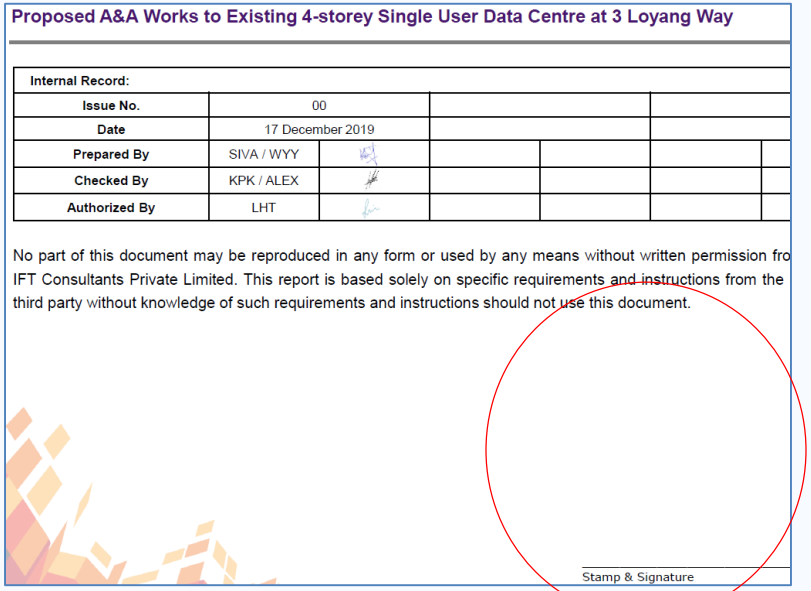
Waiver description

Issue No	Description	Meeting date	Chair Person
1	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.53m		Please Select
2	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.53m		Please Select
3	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.65m		Please Select
4	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.53m		Please Select
5	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.55m		Please Select
6	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.55m		Please Select
7	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.55m		Please Select
8	Clause 2.2.13b.(7)(a) To allow minimum air well width of 2.27m		Please Select
9	Clause 2.2.13b.(7)(a) To allow minimum air well width of 2.27m		Please Select
10	Clause 2.2.13b.(7)(a) To allow minimum air well width of 2.27m		Please Select
11	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.54m		Please Select
12	Clause 2.2.13b.(7)(a) To allow minimum air well width of 1.55m		Please Select
13	Clause 2.2.13b.(7)(a) To allow minimum air well width of 2.02m		Please Select

Insufficient details

Submission of Fire Engineering Reports

- Submission of DRAFT/PRELIMINARY/etc Fire Engineering Reports will be REJECTED.
- Do advise QP not to submit draft/preliminary fire engineering reports to SCDF.
- Do watermark your DRAFT reports so that QP knows not to submit.
- Do endorse on your submitted reports with FSE stamp and signature.
  - (A good practice: Only reserve your stamp for submissions, not draft)



Proposed A&A Works to Existing 4-storey Single User Data Centre at 3 Loyang Way

Internal Record:		
Issue No.	00	
Date	17 December 2019	
Prepared By	SIVA / WYY	
Checked By	KPK / ALEX	
Authorized By	LHT	

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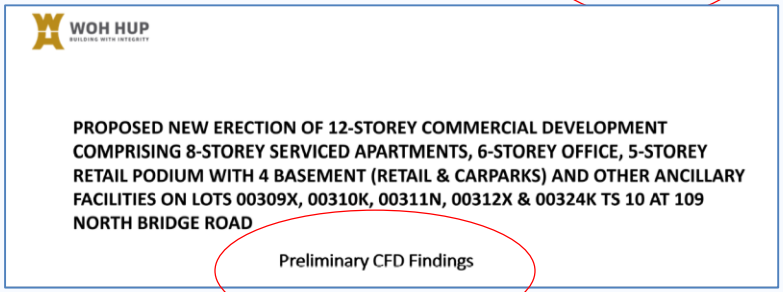
third party without knowledge of such requirements and instructions should not use this document.

Stamp & Signature



WOH HUP

PROPOSED NEW ERECTION OF 12-STOREY COMMERCIAL DEVELOPMENT COMPRISING 8-STOREY SERVICED APARTMENTS, 6-STOREY OFFICE, 5-STOREY RETAIL PODIUM WITH 4 BASEMENT (RETAIL & CARPARKS) AND OTHER ANCILLARY FACILITIES ON LOTS 00309X, 00310K, 00311N, 00312X & 00324K TS 10 AT 109 NORTH BRIDGE ROAD

Preliminary CFD Findings

Point of Contact between SCDF PB team and Project Design Team

- Always through FSE
  - ✓ FSE is deemed competent to handle the related technical queries
  - ✓ FSE will then take ownership of the issues and be familiar with the project
  - ✓ Avoid miscommunication when dealing with multiple parties

- DO NOT falsely tell QP or any stakeholder that SCDF do not wish to meet them
  - ✓ We are always open to meeting anyone (in addition to FSE), but only if they have a valid reason to be at the technical discussion.
  - ✓ We avoid having unnecessary parties in any meeting because past experiences show that these parties may take away precious time and divert the discussion away from the intended technical agenda

Letter Format/Template

- Undertaking letter
- Client's letter for closure of PB audit

Download from www.scdf.gov.sg
- Downloads >> Forms >> Plan Approval

Fire Engineering Technical Requirements Update

Determination of ASET (General Guide)

1. Taken when any modelled location fails tenability criteria (exclude area in the vicinity of fire). Could be at :
   a) Main exit door
   b) Exit staircase door
   c) SSL/FFL door
   d) Along ALL egress routes
2. Mark out these egress provisions clearly in CFD results.
3. Show ASET slice in FER.
4. Show closer time steps slightly before/after ASET timing.

Recap from 29/4/19 FSE Dialogue Session

OK

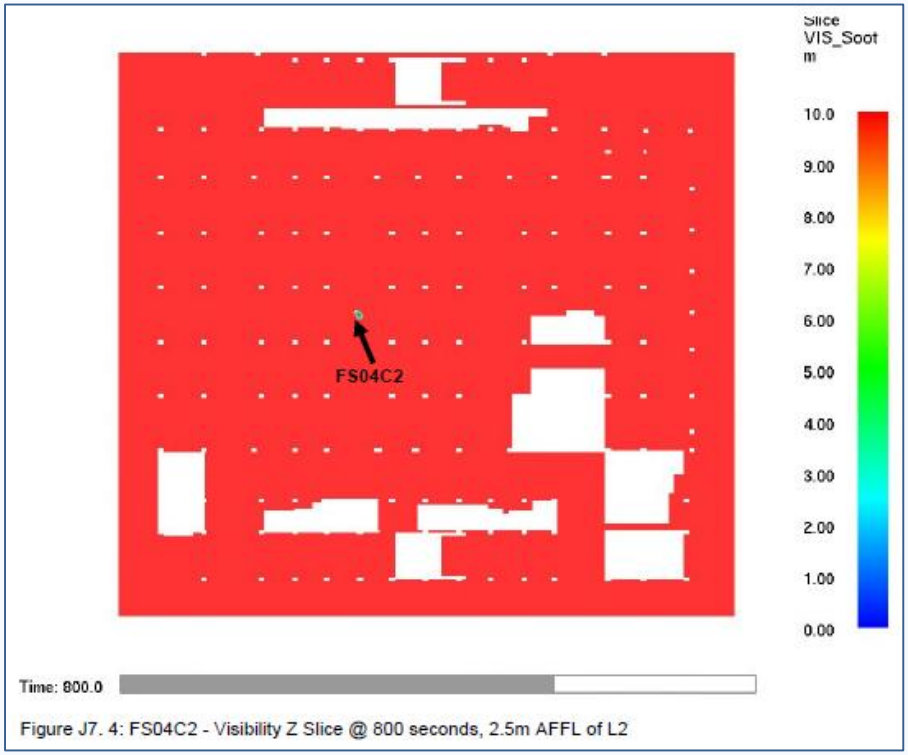


Figure J7. 4: FS04C2 - Visibility Z Slice @ 800 seconds, 2.5m AFFL of L2

NOT OK

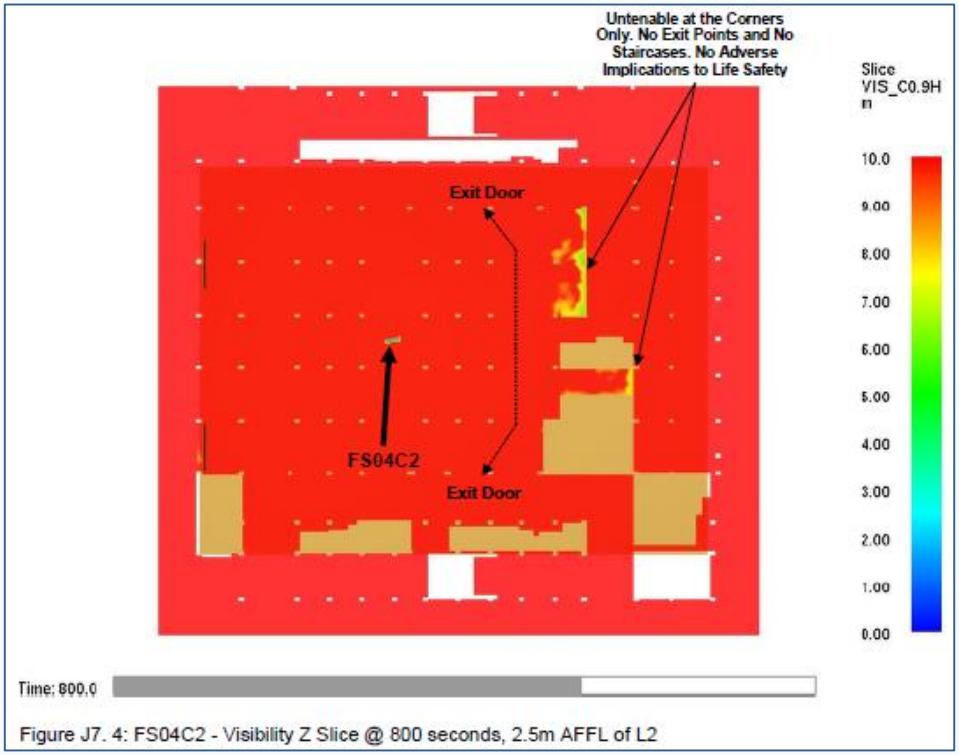


Figure J7. 4: FS04C2 - Visibility Z Slice @ 800 seconds, 2.5m AFFL of L2

Both FSE and Peer Reviewer must check the CFD simulation results

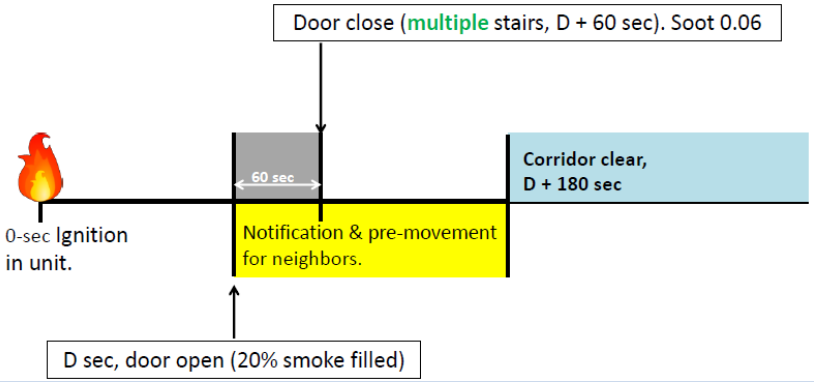
Residential Corridor Scenarios

Parameters in the scenario are only to be used to assess "**residential" + "corridors"**

Acceptance Criteria for residential corridors.

180 seconds after door opens, at the height of Z = 2m:

1. Visibility for the whole corridor must exceed 10m &
2. Temperature for the whole corridor must be less than 60°C.



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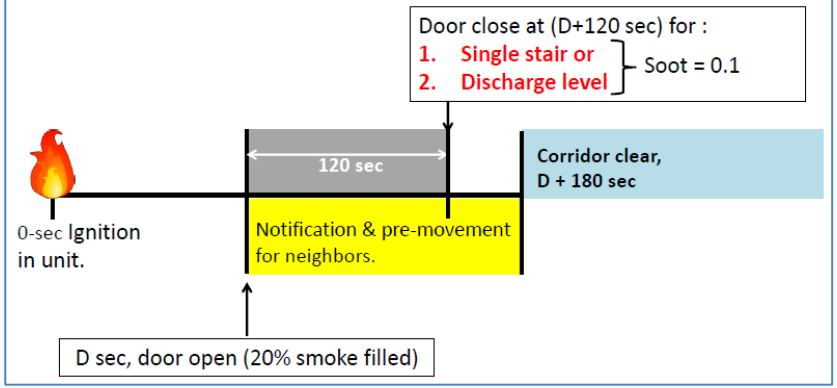


DO NOT use the prescribed scenario or parameters for assessing non-residential (non-PG II) occupancies or non-corridor scenarios e.g. dormitories (PG III) or hotels (PG VII)

Activation of smoke control systems

Clause 7.4.5 k.(1)(a) : The engineered smoke ventilation system shall be activated by **smoke detectors** located in the smoke control zone…….

Must be activated by smoke detectors (not by sprinklers or other means), except in carpark, loading bays/driveways of industrial developments where there is a build-up of exhaust fumes.

Engineered Smoke Control system must activate upon activation of the 1st smoke detector.

- No double-knock proposals.
- No delayed activation.
- No manual activation *in lieu of* automatic activation.

Ventilation assessment (WVR)

For all ventilation-related fire engineering assessment :

1. Airwell size
2. Staircase ventilation
3. Corridor ventilation
4. Etc

FSE also needs to study the impact of **wind**. Wind speed needs to be justified. Direction of wind shall be the most onerous for the fire engineering assessment.

Situations that could be unsuitable for a PB study (General Guidelines to share with FSEs for reference)

Situations involving:

1. Waiver or omission of sprinklers which the fire risks cannot be appropriately evaluated

2. Omission of exit staircases (whether serving mezzanine floors or not) which can be critical

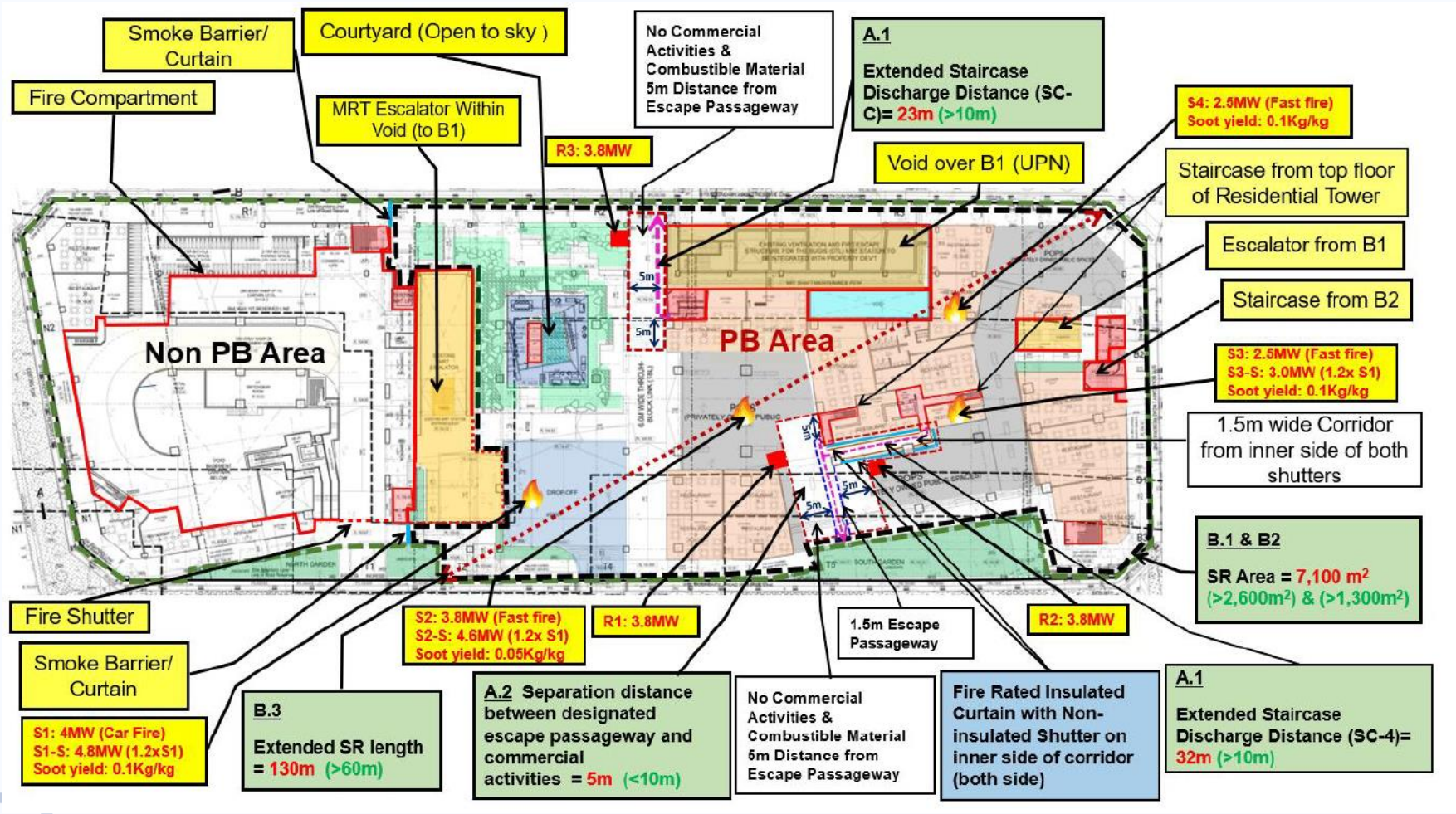
3. Situations when risk is difficult to quantify/measure
   - One-way travel distances
   - Omission of exit staircase protection on multiple sides
   - Any provisions intended for redundancy
   - Number of doors leading to a passageway
   - Fire-fighting provisions (e.g. *no appropriate assessment methodology in local context*)

SFEG Update

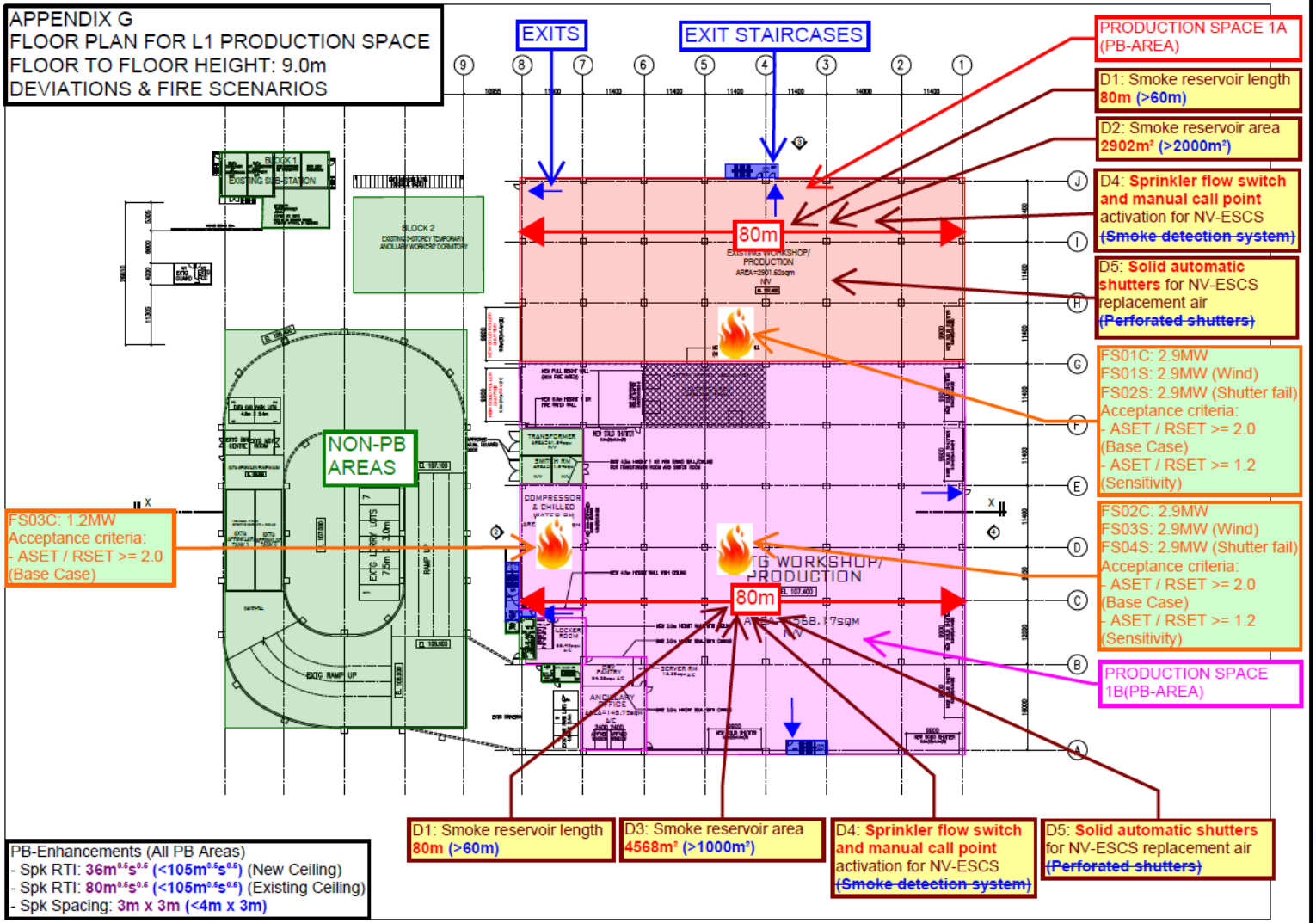
- Final stages of drafting the SFEG.
- Wider FSE/public comments in 3rd Quarter this year.

Mark-Up Drawings

Good examples

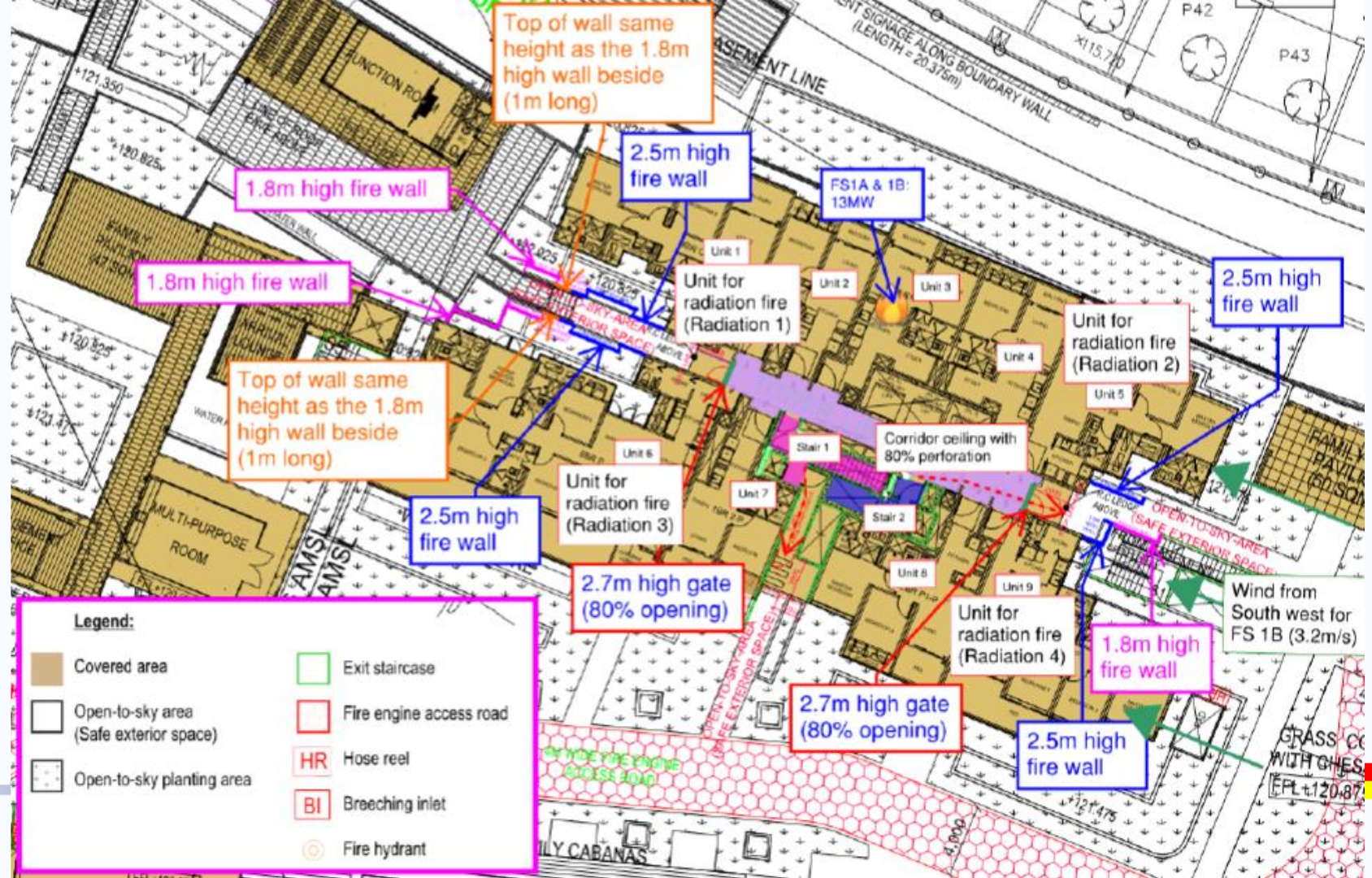

Smoke Barrier/ Curtain
Courtyard (Open to sky)
No Commercial Activities & Combustible Material 5m Distance from Escape Passageway
A.1
Extended Staircase Discharge Distance (SC-C)= 23m (>10m)
Fire Compartment
MRT Escalator Within Void (to B1)
R3: 3.8MW
Void over B1 (UPN)
S4: 2.5MW (Fast fire)
Soot yield: 0.1Kg/kg
Staircase from top floor of Residential Tower
Escalator from B1
Staircase from B2
Non PB Area
PB Area
5m
S3: 2.5MW (Fast fire)
S3-S: 3.0MW (1.2x S1)
Soot yield: 0.1Kg/kg
1.5m wide Corridor from inner side of both shutters
B.1 & B2
SR Area = 7,100 m²
(>2,600m²) & (>1,300m²)
Fire Shutter
S2: 3.8MW (Fast fire)
S2-S: 4.6MW (1.2x S1)
Soot yield: 0.05Kg/kg
R1: 3.8MW
1.5m Escape Passageway
R2: 3.8MW
Smoke Barrier/ Curtain
S1: 4MW (Car Fire)
S1-S: 4.8MW (1.2xS1)
Soot yield: 0.1Kg/kg
B.3
Extended SR length = 130m (>60m)
A.2 Separation distance between designated escape passageway and commercial activities = 5m (<10m)
No Commercial Activities & Combustible Material 5m Distance from Escape Passageway
Fire Rated Insulated Curtain with Non-insulated Shutter on inner side of corridor (both side)
A.1
Extended Staircase Discharge Distance (SC-4)= 32m (>10m)

APPENDIX G
FLOOR PLAN FOR L1 PRODUCTION SPACE
FLOOR TO FLOOR HEIGHT: 9.0m
DEVIATIONS & FIRE SCENARIOS



PB-Enhancements (All PB Areas)
- Spk RTI: $36m^{0.5}s^{0.5}$ ($<105m^{0.5}s^{0.5}$) (New Ceiling)
- Spk RTI: $80m^{0.5}s^{0.5}$ ($<105m^{0.5}s^{0.5}$) (Existing Ceiling)
- Spk Spacing: 3m x 3m (<4m x 3m)

Bad examples


Top of wall same height as the 1.8m high wall beside (1m long)
2.5m high fire wall
1.8m high fire wall
FS1A & 1B: 13MW
1.8m high fire wall
Unit for radiation fire (Radiation 1)
2.5m high fire wall
Unit for radiation fire (Radiation 2)
Top of wall same height as the 1.8m high wall beside (1m long)
Corridor ceiling with 80% perforation
Unit for radiation fire (Radiation 3)
2.5m high fire wall
2.7m high gate (80% opening)
Unit for radiation fire (Radiation 4)
Wind from South west for FS 1B (3.2m/s)
1.8m high fire wall
2.7m high gate (80% opening)
2.5m high fire wall
Legend:
Covered area
Open-to-sky area (Safe exterior space)
Open-to-sky planting area
Exit staircase
Fire engine access road
HR Hose reel
BI Breeching inlet
Fire hydrant

Poor colour contrast

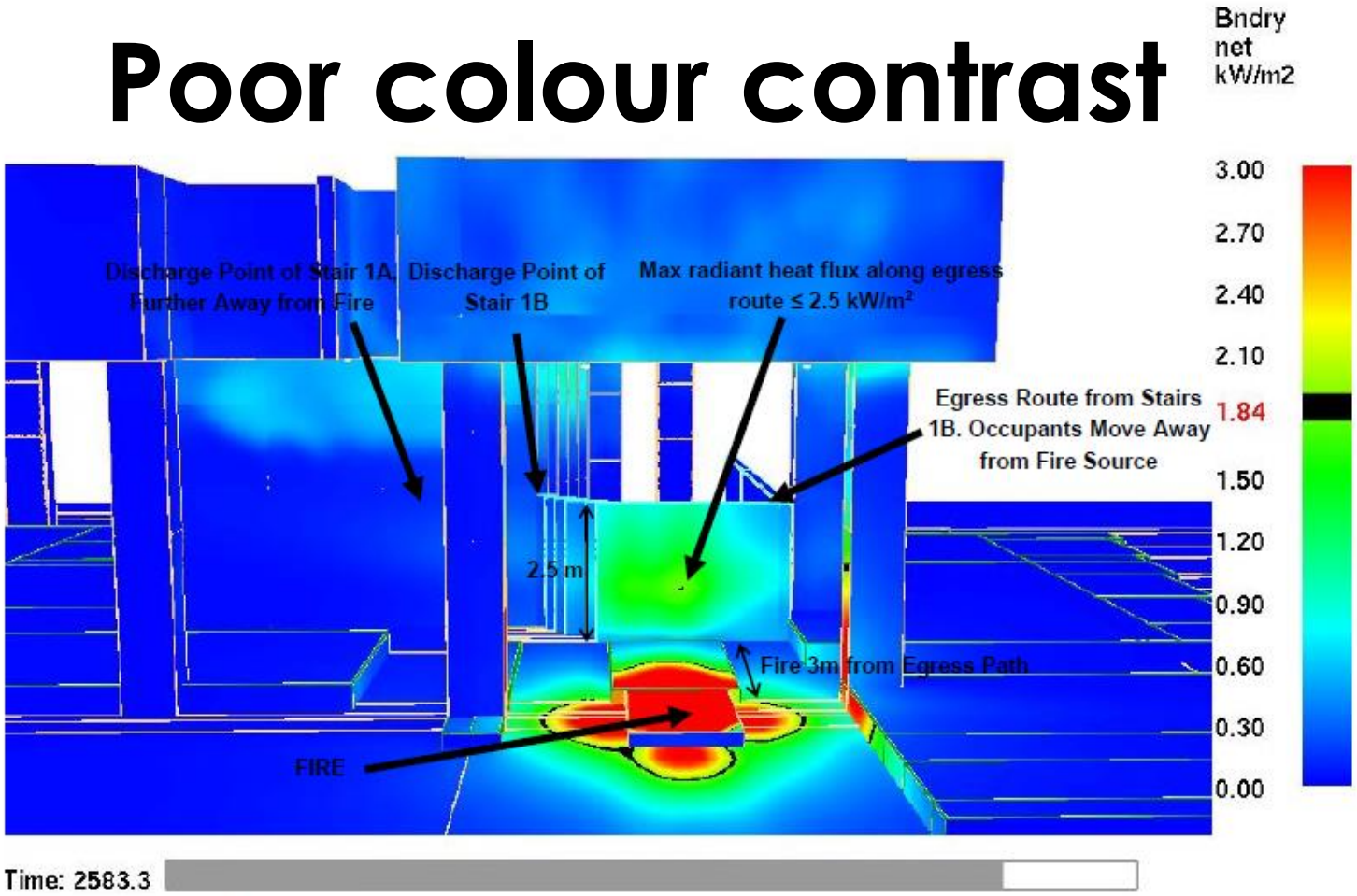


Figure B3. 8: Scenario FS02S – Maximum net radiant heat flux along egress route for Stair 1B @ t=2584s

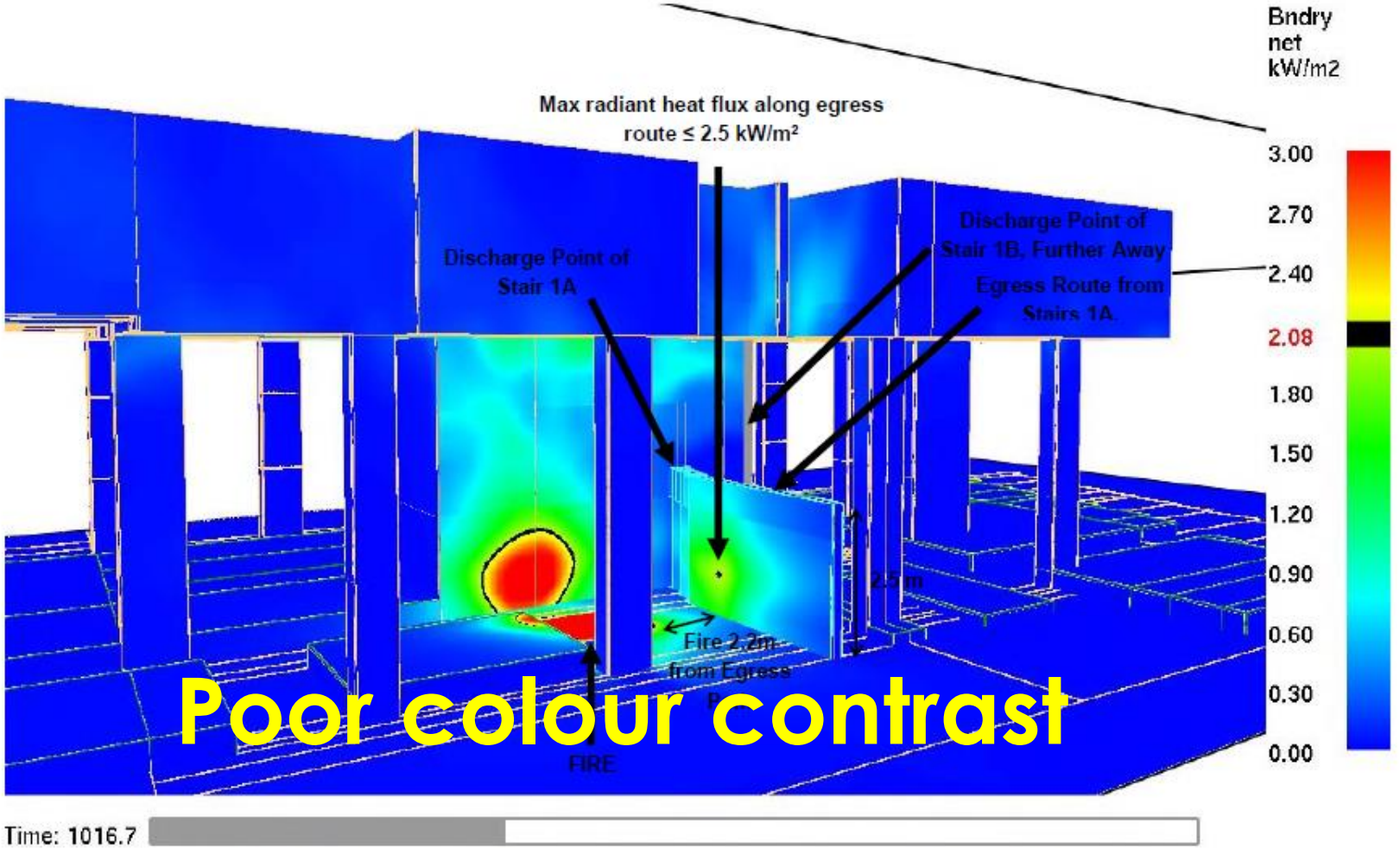


Figure B4. 8: Scenario FS02C – Maximum net radiant heat flux along egress route for Stair 1A @ t=1017s

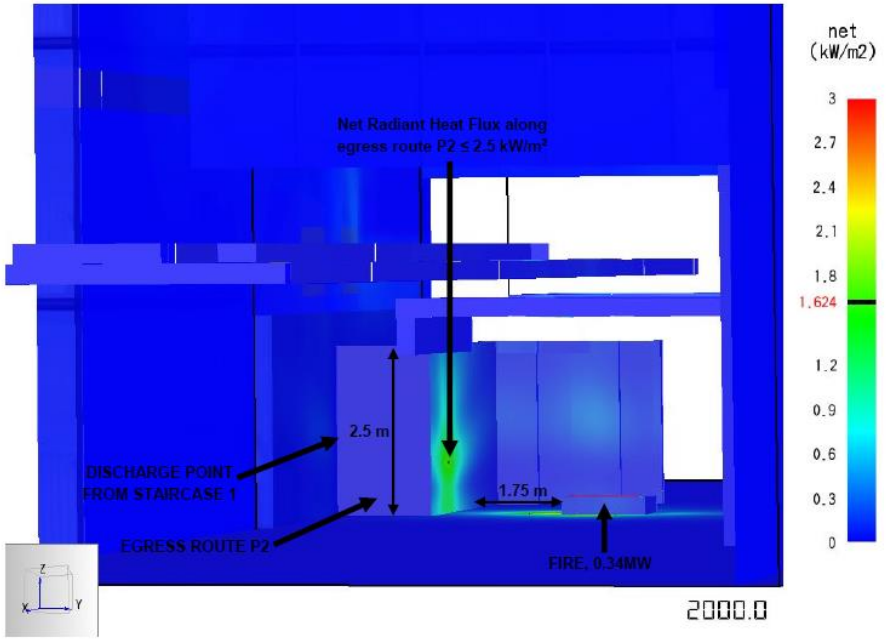


Figure B2. 7: Scenario FS01S – View A, Net radiant heat flux along egress route P2 for staircase 1 at t=2000s

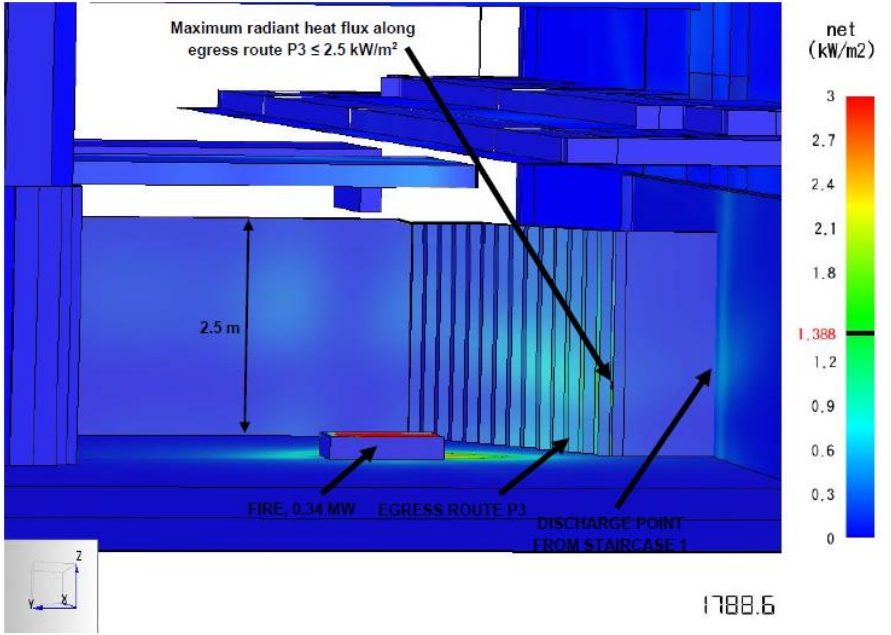


Figure B2. 8: Scenario FS01S – View B, Maximum net radiant heat flux along egress route P3 for staircase 1 @ t=1789s

Project Priority Card

Retain your FSE Workshop event registration invoice

- It is a proof of your Priority Card.
- Drop us an email together with your priority card (i.e FSE Workshop event registration invoice) if you wish to expedite the processing of a submission. SCDF reference number needs to be quoted for documentation.
- Priority card valid until next FSE workshop.
- Priority Card can only be used once during its validity period, and only applies to one FEDB submission, FSER submission, or fire engineering waiver submission.
- Non-transferable
- Can be used to borrow VGA cable for consultation

Q&A

- FSE:
  - I recently attended the SFPE European virtual conference as part of my CPD. I have misplaced your email detailing how many hours. Would you please resend?

FSE-CPE = 12 hours for 2021 FSE Workshop attendees

https://go.gov.sg/1cuxo2

Only if you complete the quiz by Fri 23 Apr 2021 with all the correct answers.