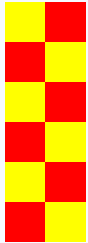




# SCDF

The Life Saving Force

*... for a safer Singapore*



# Fire Safety Engineer (FSE) Workshop

5<sup>th</sup> July 2023 from 10 am to 12 pm

- HQ SCDF City Campus Classroom, Level 3



# Agenda

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



# Performance-Based Regulatory System



# FSE Registration

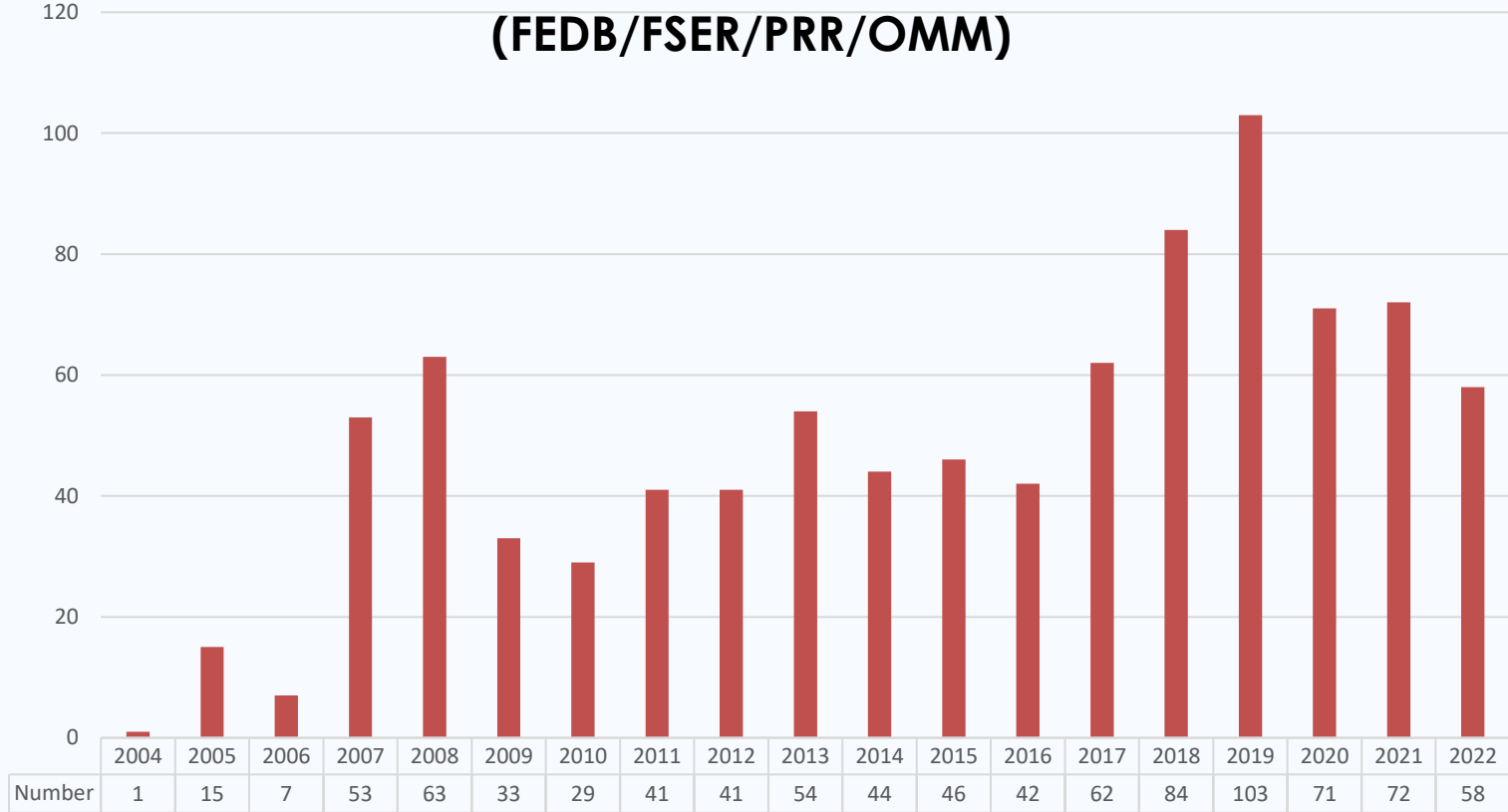
Year	Number of FSEs registered	Year	Number of FSEs registered	Year	Number of FSEs registered
2004	40	2011	0	2018	2
2005	11	2012	5	2019	0
2006	5	2013	2	2020	0
2007	7	2014	1	2021	0
2008	8	2015	3	2022	1
2009	7	2016	0	2023	1 (Register in Sept 2023)
2010	3	2017	0		

- Current FSEs (“Practising” & “Restriction of Practice”) – 78
  - Deregistered – 17 (No longer practicing)

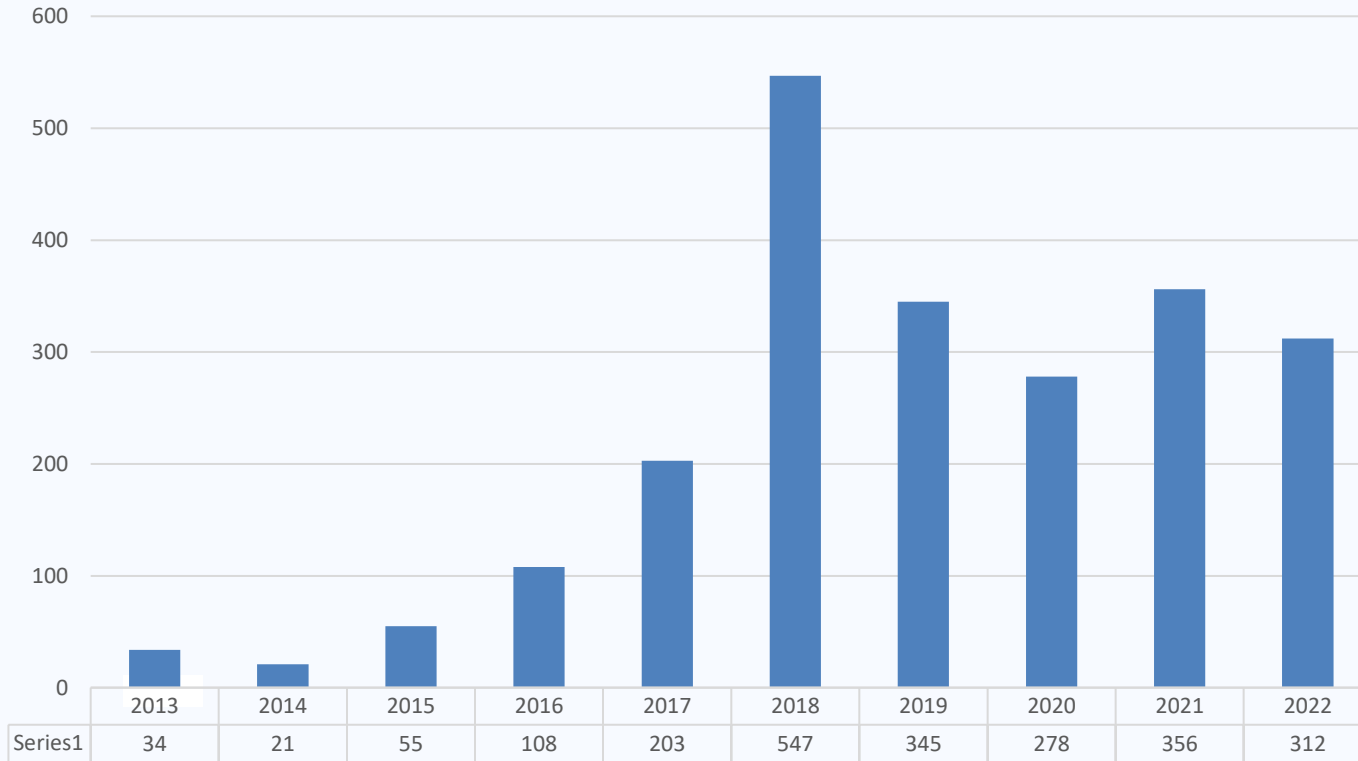


# Number of PB Cases

(FEDB/FSER/PRR/OMM)



# Number of PB WVR Issues



# Continuing Professional Education Program

- [www.scdf.gov.sg](http://www.scdf.gov.sg)
  - >> Fire Safety
  - >> Plans and Consultations
  - >> Performance-Based Approach to Fire Safety Design
  - >> List of approved CPE courses
- Emails from the PB team (Nicholas/Khai/Eunice)

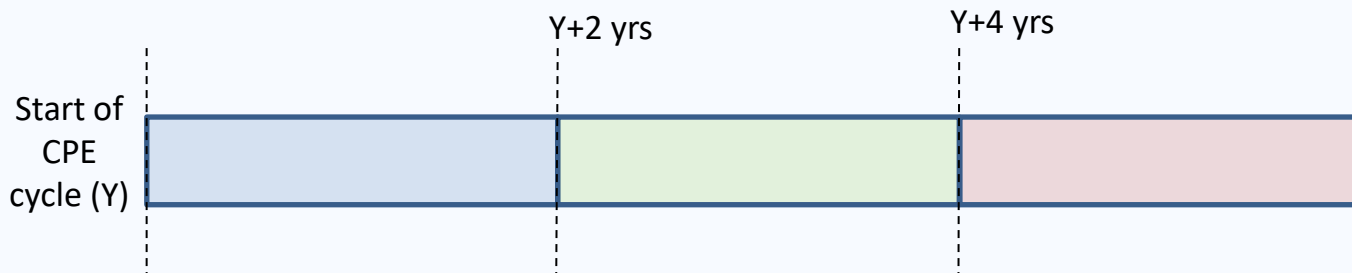
S/No	Approved Course	Date	CPE Hours
118	FISAC 2022 Conference (Online option available)	16 Nov 2022 to 17 Nov 2022	18
119	FISAC 2022 Workshop	18-Nov-22	5
120	SIF 2022 12th International Conference on Structures in Fire (hybrid)	30 Nov 2022 to 2 Dec 2022	18
121	Code of Practice for Fire Precaution in Rapid Transit System	12 Apr 2022	1
122	SFS and SFPE Joint International Conference on Holistic Fire Safety Design	26 Jul 2023 to 28 Jul 2023	4
123	SFPE Engineering Solutions Symposium for Mass Timber	24 Aug 2023 to 25 Aug 2023	2

Last updated: 23 Jun 2023



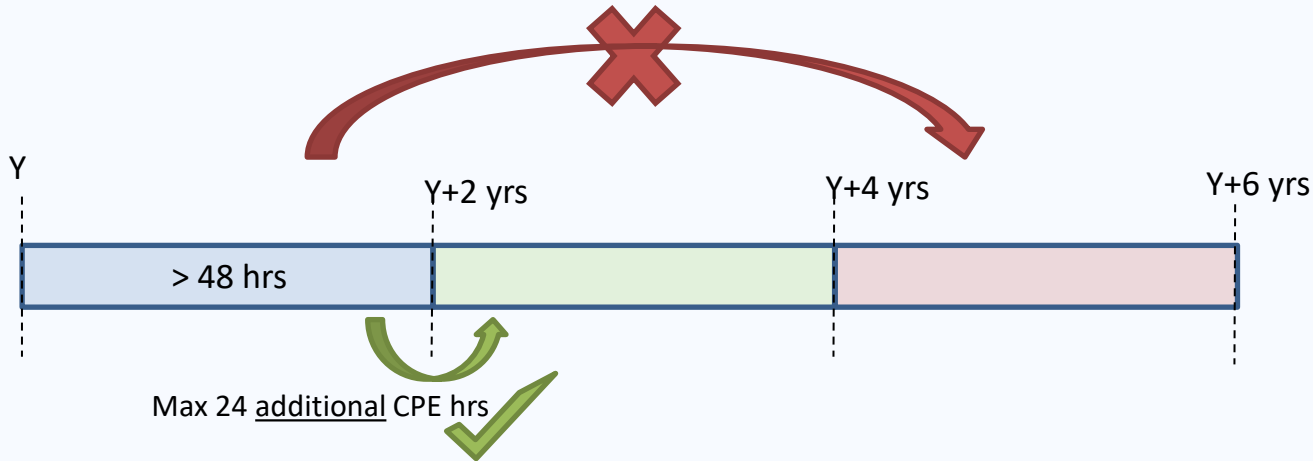
# CPE Program (Recap)

- 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

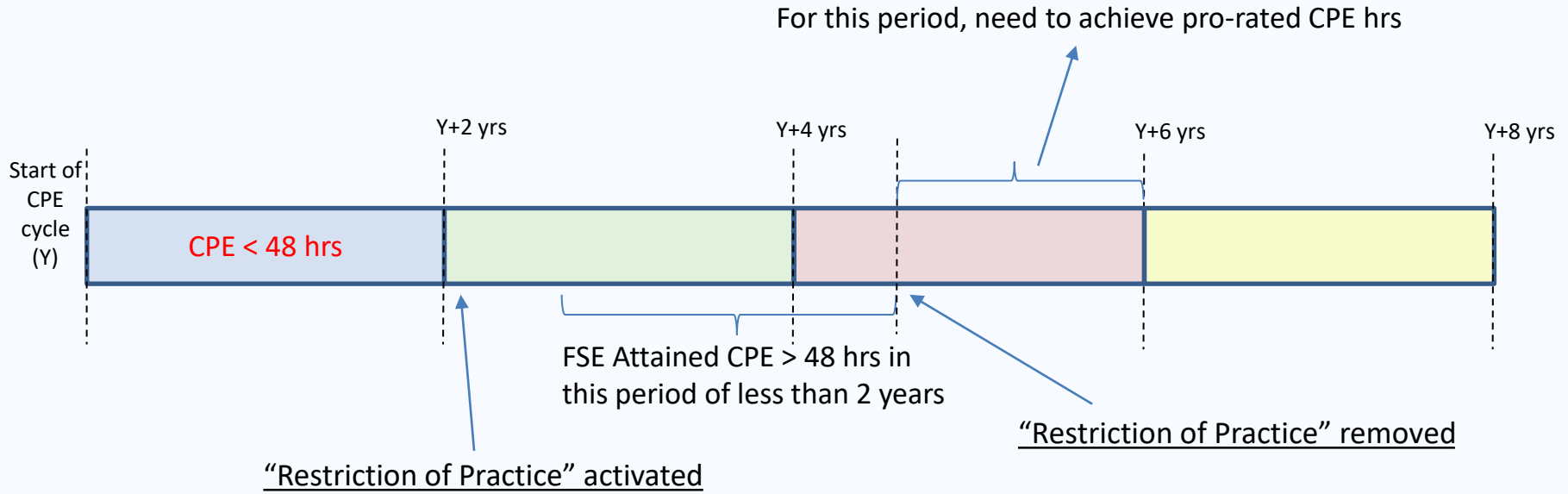
Registration Number	Registration Date	Full Name	Correspondence Address / E-mail Address	Contact Number (e / HP)	Status*
025	1 <sup>st</sup> July 2004	Li	Email: <a href="mailto:lbsec@singnet.com.sg">lbsec@singnet.com.sg</a>		Practising
026	-	-	-	-	Not practising
027	1 <sup>st</sup> July 2004	H. Vincent	Email: <a href="mailto:vhanks@singnet.com.sg">vhanks@singnet.com.sg</a>	6743 1496 (O)	Practising
028	-	-	-	-	Not practising
029	1 <sup>st</sup> July 2004	Er	<a href="mailto:heokeng@hotmail.com">heokeng@hotmail.com</a>		Restriction of Practice (From 1 Sep 2017 onwards)
030	-	-	-	-	Not practising
031	1 <sup>st</sup> July 2004	Yc Le			Practising
032	1 <sup>st</sup> July 2004	Ni	<a href="mailto:e2000@e2000.com.sg">e2000@e2000.com.sg</a>		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



# 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 from \_\_\_\_\_ (DD MMM YYYY) to \_\_\_\_\_ (DD MMM YYYY)

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

I declare that I: *(please tick an 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 \_\_\_\_\_



# Update : CPE Hours for online courses

## Email by LTC Tong on 9<sup>th</sup> April 2017

3 Just a gentle reminder for FSEs whose training cycle is ending in 2017. You will need to attain at least 48 FSE-CPE training hours before your current 2-year cycle ends (e.g 1 Sep 2015 to 31 Aug 2017), and submit a declaration at the end of your training cycle to indicate all the approved courses you have attended for the current cycle.

4 In addition to the above events, there are FSEs who enquire whether online training courses are eligible for FSE-CPE hours. I would like to inform you that we are willing to consider suitable online courses to be part of the list of approved courses for FSE-CPE program. If you come across online courses that fulfil the criteria listed below, you may wish to surface them to SCDF for consideration.

### Criteria for online courses to be considered as approved CPE course

- Online training courses must be relevant to the field of fire safety engineering.
- The estimated training duration must be specified in the course materials.
- The maximum number of CPE hours that SCDF can award for online training within each training cycle is 5 CPE hours (1 CPE hour awarded for every 2 hours of online training).

Maximum number of CPE hours that SCDF can award for online training within each training cycle is **5 CPE hours**.

**1 CPE hour** awarded **for every 2 hours** of online training.

Applicable from Sep 2023 onwards (start of new training cycle for most)

# Admin Requirements Update



# Fire Safety Engineering Register

- Please check your particulars on the Fire Safety Engineering register.
- For those with multiple emails, ensure that both emails are in use.
- Email Eunice to update

- [www.scdf.gov.sg](http://www.scdf.gov.sg)
  - >> Fire Safety
  - >> Downloads
  - >> Directory of Fire Safety Engineer Register



# Update: CORENET 2.0 & NetTrust token

- CORENET 2.0 has rolled out.
- Allows all FSEs to submit FEDBs and sign off FSER/PR reports via CORENET, regardless of whether the FSE is a QP.
- No longer accept submissions :
  - ✓ Via email
  - ✓ At SCDF front counter





# Update: Eligibility as a Peer Reviewer

- Original proposal circulated to FSEs in March 2022
- Discussed at FSE Workshop 2022 – min. 10 years as a FSE
- Fire Safety Regulations will be updated
- SCDF will update FSEs once the Fire Safety Regulations are updated



# Submission of PB documents

**Helpful to drop a note to PB Team when** (quote SCDF Ref number):

1. Design team has submitted a waiver with fire engineering assessment.
2. Design team has responded to SCDF's query via corenet correspondence
3. FSE has submitted the full PB package for PB audit with BP/MV Plan

**Prevent cases from being dropped.**



# Fire Engineering Technical Requirements Update



# CFD Visibility Factor

Default visibility factor used for all CFD models **shall be 3**. This is to ensure occupants' wayfinding ability is not compromised during evacuation.



# Soot Yield for Industrial Building and Warehouse

Default soot yield value for industrial buildings and warehouses **shall be 0.1.**

FSE may propose a different value only if the type of fuel load in the building is of specifically known usage during operation and doesn't change (e.g., aggregates storage, traditional vegetable farm) over its occupancy period.



# Tunnel Ventilation System Design

- FSE to be aware of the suitable type of TVS for different types of road/service tunnels:
  - Unidirectional: Longitudinal, semi-transverse, full transverse, single point extraction
  - Bidirectional: semi-transverse, full transverse, single point extraction
- SCDF does not accept TVS design which does not follow this design principle.



# Tunnel Ventilation System Design

Example schematic drawing extracted from NFPA 502

Figure I.2.1(a) Longitudinal Ventilation System with Central Fans and Saccardo Nozzle at Entry Portal.

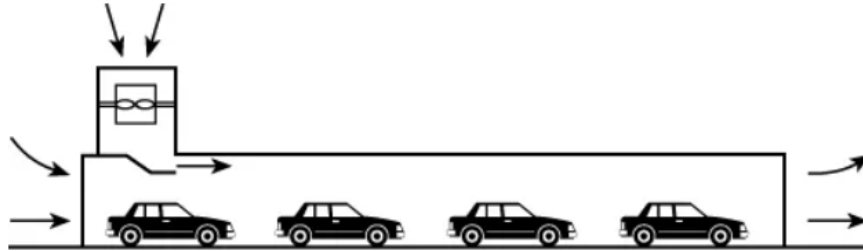
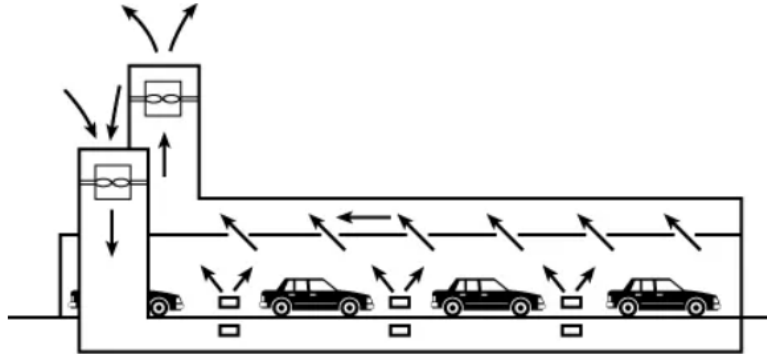


Figure I.3.1(a) Full Transverse Ventilation System.



# Tunnel Ventilation System Design

Example schematic drawing extracted from NFPA 502

Figure I.3.1(c) Semitransverse Exhaust Ventilation System.

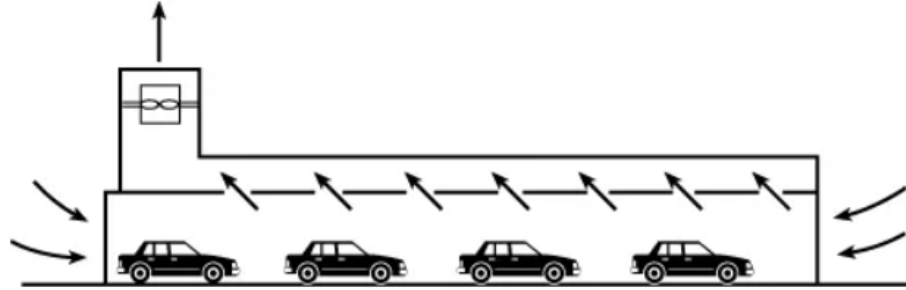
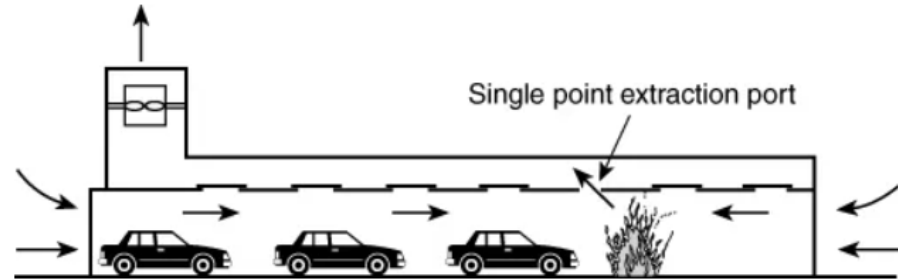


Figure I.4.1 Single Point Extraction with Semitransverse Exhaust Ventilation System.





# Review of Setback Distance

## Method :

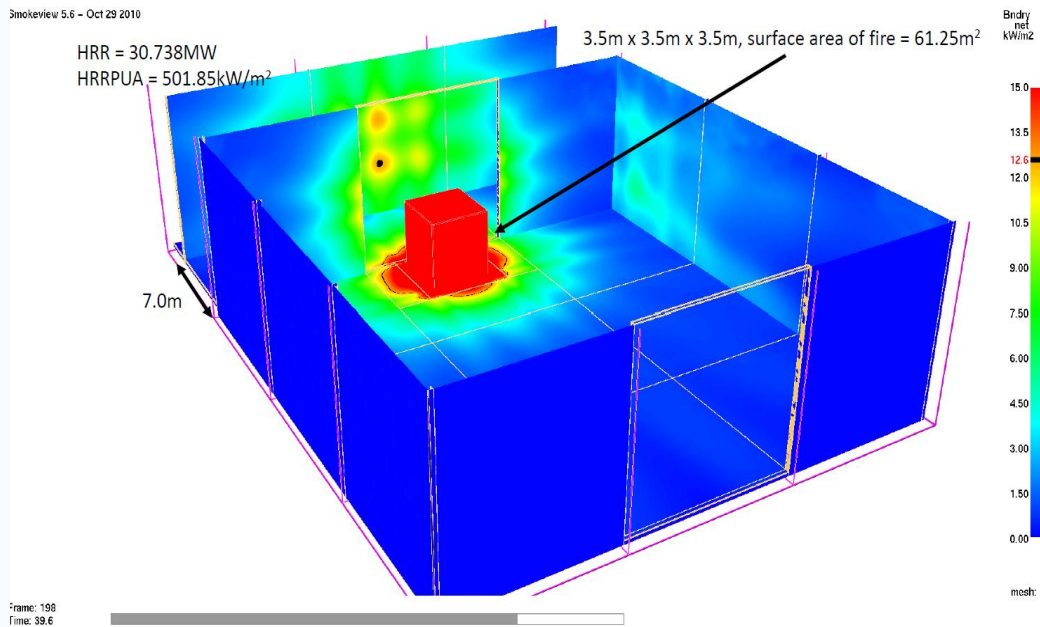
1. Determine HRR based on various compartment heights
2. Model in FDS
3. Determine distance to 12.6 kW/sqm



# Review of Setback Distance

## Input parameters

- Sprinkler installed 3m by 3m
- Ultrafast  $t^2$  growth
- RTI  $150 \text{ m}^{0.5}\text{s}^{0.5}$
- Temp rating 93-degree
- Height of room
- 2<sup>nd</sup> ring sprinkler



# Review of Setback Distance

Floor height (m)	Fire size (MW)	Setback required (m)
3	6.2	3.6
6	10.6	4.2
9	15.1	5.0
12	19.9	5.8
15	25.1	6.4
18	30.7	7.0

Applies only to **sprinkler protected** premises.

Fire code may be updated.

**Any technical concerns ?**



# Report Standardisation: Sensitivity Case Table

For better understanding on how certain sensitivity study tests are chosen/not chosen, FSE to tabulate table according to SFEG 2015 section 2.2 to provide explanation for each fire location.



# Report Standardisation: Sensitivity Study Table

Example for a sprinkler-protected single storey warehouse fire provided with mechanical ESCS:

Fire scenario	Description
Base case (BC1)	4.5MW fast t2 sprk-ctrl fire in the middle of warehouse
Sensitivity test 1: Buoyancy	Scenario not applicable as it is intended for naturally ventilated spaces
Sensitivity test 2: Wind effect	Scenario not applicable as it is intended for naturally ventilated spaces
Sensitivity test 3: Fan efficiency	Scenario not applicable as SS1-4 results in more than 20% increase in fire size
Sensitivity test 4: Increase in fire growth rate (SS1-4)	5.5MW ultrafast t2 sprk-ctrl fire
Sensitivity test 5: Fire rendering an exit unusable (SS1-5)	Largest exit door (ED-XX) shall be blocked
Sensitivity test 6: Delay in detection time (SS1-6)	Automatic smoke detection system assumed to fail. Method of detecting fire/smoke is via sprinkler system instead.
Sensitivity test 7: Smouldering fire	Scenario not applicable as it is intended for sleeping occupancy



# Report Standardization:

## Summary of Fire Scenario Table

FSE to include the following key info in the summary of fire scenario table (more info can be included if necessary):

- a. Floor
- b. Location
- c. Deviation
- d. Fire scenario name (BC1, SS1-4, etc.)
- e. Fire size
- f. Fire growth rate
- g. Method of determining fire size (e.g. sprinkler-controlled, SFEG, fuel load controlled, etc.)
- h. Soot yield
- i. Method of smoke/fire detection (e.g. point type smoke detector, beam detector, flame detector, sprinkler etc.)
- j. Method of smoke ventilation (e.g. mechanical ESCS at ceiling, natural ESCS via louvre etc.)
- k. Method of assessing ASET (e.g. FDS, CFAST etc.)
- l. Method of assessing RSET (e.g. Pathfinder, hand calculation etc.)
- m. Acceptance criteria (e.g.  $ASET > RSET \times 2$  at 2.5m above L2, etc.)



# Report Standardization: Natural Ventilation Opening Sizing

- FSE to document clearly the dimension of the openings used for means of natural ventilation and make up air in FER, O&M and Fire Engineering Assessment, for example:
  - Soffit, sill, length, width and aerodynamic coefficient of louvre/ screen/ ventilator/ door
  - Soffit and sill of perimeter openings
- Remind QP to indicate on BP drawings that such openings are used for PB natural ventilation.
- This is for proper peer reviewing, regularizing the design and audit checking.
- The openings shall not be altered in future unless submit Letter of No Objection or new PB submission.
- Treat it like how you would document details for mechanical ESCS.



# Update: Water monitor requirements

## **To be updated in CP 52**

1. Proprietary Auto Fire Scanning and Fire Extinguishing Water Monitoring Device.
2. Pressure and flow requirements
3. Water Supply
4. Protection area
5. General Specification

**Applicable to all PB projects with water monitor protection**





# Reminder: For deviations of requirements for exit staircase

## **FSEs to do the following assessments :**

1. Smoke spread from unit to corridor to exit staircase
2. Smoke spread from unit to airwell to exit staircase
3. Smoke spread from other potential fire locations to exit stairs (e.g., aircon ledge and planter)

## **Acceptance criteria :**

At all staircase landings at Z=1.7m

1. Temperature < 60°C
2. Visibility > 10m

Throughout whole exit stair

1. FED < 0.3

## **Report :**

1. Tabulate fire scenarios clearly
2. Apply wind impact as sensitivity
3. Indicate clearly all the relevant door opening times



# Reminder: Issues that cannot be addressed using Fire Safety Engineering

Date : 1 Dec 2022

Our Ref: CD/04/05/01/01

Registrar, Board of Architects  
Registrar, Professional Engineers Board  
President, Singapore Institute of Architects  
President, Institution of Engineers, Singapore  
President, Association of Consulting Engineers, Singapore

Dear Sir/Mdm

**ISSUES THAT CANNOT BE ADDRESSED USING PERFORMANCE-BASED (PB) APPROACH**

# Reminder : Response to SCDF's queries

**For responses to SCDF's queries. FSE to submit :**

1. Reply document to show that all issues are responded to AND
2. Revised FER/FEDB (Changes highlighted clearly)

All responses shall be via corenet correspondence as primary means. FSE may also email the above documents as a back-up.



# Bad Examples



## Workflow Info

<b>Project ID</b>	PJT202208874	<b>Reference Number</b>	WVR/00373/23
<b>From</b>	ESERVICE	<b>Registration Date</b>	22/02/2023 02:39
<b>Deadline</b>	03/03/2023 16:53	<b>Received Date</b>	27/02/2023 09:35
<b>Select Correspondence Mode</b>	<input type="checkbox"/> Email <input type="checkbox"/> Fax <input type="checkbox"/> Print <a href="#">Correspondence Preferences</a>	<b>Select decision</b>	Document Complete, Present to ChairPerson ▾
<b>Subject</b>	Waiver Process		

- Summary Info
- Applicant details
- Building details
- Qp Details
- Waiver Issue
- Payment
- Case folder
- Related cases
- Waiver logs

Issue #	Description	Meeting date	Chair Person	Status
1	<a href="#">Refer attachment</a>	<input type="text"/>	Please Select ▾	Registered

### Correspondance status of letters generated for this case.

No	Created Date	Created By	Mode	Participants	Status	Sent Date	Do
1	21-Feb-2023 - 18:29 PM	interface	Fax	QP,APPLICANT	Fax Not Sent		
2	21-Feb-2023 - 18:29 PM	interface	Email	QP,APPLICANT	Sent	21-Feb-2023 - 19:27 PM	
3	21-Feb-2023 - 18:29 PM	interface	Corenet	QP,APPLICANT	Corenet Sent	21-Feb-2023 - 18:55 PM	

Waiver description will appear in the waiver decision letter.  
 Design team reminded to articulate the waiver issues clearly in the waiver description.

- PJT202213602
  - WAIVER
    - WVR-00238-23
      - PAYMENT\_RECEIPT\_SUB20230080
      - L3P1(06-Feb-2023 12-44-43).pth
      - 1599\_FSSD-WA\_ITEM 1(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).pth
      - 1599\_FSSD-WA\_ITEM 1.doc(06-Feb-2023 12-44-43).pth
      - Fire Engineerina Report Issue 2.pdf(06-Feb-2023 12-44-43).pdf
      - 1599\_FSSD WAIVER PLAN.pdf(06-Feb-2023 12-44-43).pdf
      - ES20230206-73336(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - 1599\_FSSD WAIVER PLAN(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - 1599\_FSSD-WA\_ITEM 2.doc(06-Feb-2023 12-44-43).doc
      - 1599\_FSSD-WA\_ITEM 2(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - FDS Source Codes(06-Feb-2023 12-44-43).fds
      - F1Sv5(06-Feb-2023 12-44-43).fds
      - 1599\_IDA Cover letter\_FSSD.pdf(06-Feb-2023 12-44-43).pdf
      - FDS Source Codes.zip(06-Feb-2023 12-44-43).zip
      - 1599\_IDA Cover letter\_FSSD(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - SUBMISSION(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - SCDF-0-WVFSR02.XFDX(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - PROJECT-PROFILE(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc
      - SCDF-0-WVFSR02(06-Feb-2023 12-44-43).doc(06-Feb-2023 12-44-43).doc

Workflow Info

Project ID: PJT202213602      Reference Number: WVR/00238/23

From: ESERVICE      Registration Date: 06/02/2023 20:34

Deadline: 15/02/2023 18:12      Received Date: 13/02/2023 07:48

Waiver description will appear in the waiver decision letter.  
 Design team reminded to articulate the waiver issues clearly in the waiver description.

Issue No	Description	Meeting Date	Chair Person	Status
1	Clause: xxxx		Please Select	Registered
2	Clause: xxxx		Please Select	Registered

Correspondance status of letters generated for this case.

No	Created Date	Created By	Mode	Participants	Status	Sent Date
1	06-Feb-2023 - 12:24 PM	interface	Fax	QP,APPLICANT	Fax Not Sent	
2	06-Feb-2023 - 12:24 PM	interface	Email	QP,APPLICANT	Sent	06-Feb-2023 - 14:27 PM
3	06-Feb-2023 - 12:24 PM	interface	Corenet	QP,APPLICANT	Corenet Sent	06-Feb-2023 - 12:51 PM

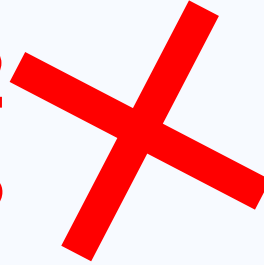
# Reminder : Building with multiple fire safety non-compliances

WVR/00001/22

FER

Will be REJECTED

- PB 1 • Prescriptive 1
- PB 2 • Prescriptive 2
- PB 3 • Prescriptive 3
- PB 4 • Prescriptive 4
- Prescriptive 5



# Reminder : Building with multiple fire safety non-compliances

WVR/00001/18

FER

- PB 1
- PB 2
- PB 3
- PB 4



WVR/00002/18

- Prescriptive 1
- Prescriptive 2
- Prescriptive 3
- Prescriptive 4
- Prescriptive 5





# Update : Fire Research Centre

- Located in Civil Defence Academy (CDA) at Jalan Bahar
- Equipment: 10MW calorimeter



# Q&A



**FSE-CPE = 2 hours  
for FSE Workshop 2023 attendees**

**FSE needs to register by given  
deadline.**



**Thank you!**

