



**SCDF**  
The Life Saving Force

# Building Fire Protection System

**FIRE SAFETY MANAGER BRIEFING 2017**



# Scope

- **Buildings Requiring Fire Certificate (FC)**
- **Roles of Fire Safety Managers During FC Inspections**
- **Common Findings During FC Audit Inspections**



# Buildings Requiring FC

## Section 20 of Fire Safety Act

- **Industrial buildings**

(a) Has an occupant load of at least **1,000 persons**;

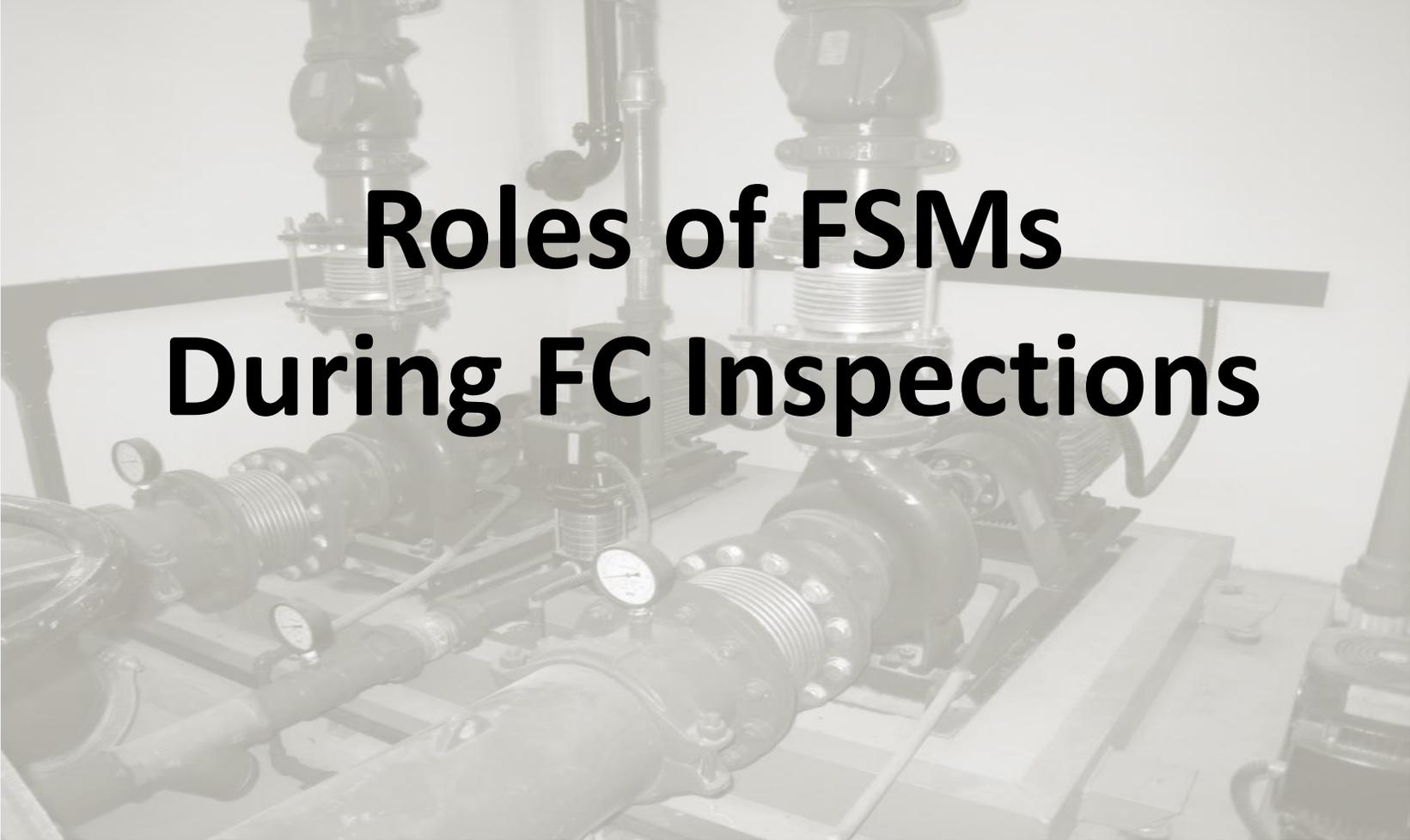
(b) Has a floor area or site area of at least **5,000 m<sup>2</sup>**;

(c) Exceeded **24 metres** in habitable height; and

- **Public buildings**

Any public building which has an occupant load of more than **200 persons**





# Roles of FSMs During FC Inspections



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# Roles of FSMs - FC Inspections

- Supervise the maintenance of all fire safety works in the premises



- Work closely with the Professional Engineers during the FC inspections to ensure that all fire protection systems are in order



# Roles of FSM - FC Inspection

- Fire Certificate Forms FC-01, FC-02 and FC-03
- Owner or MCST endorses on Form 1
- Professional Engineer (PE) endorses on Form 2 with Annexes
- All three parties i.e. Owner, PE and FSM endorse on Form 3



# Roles of FSMs - FC Inspections

- In Form FC-03, Fire Safety Manager's endorsement :

I, \_\_\_\_\_ (Name of FSM/Building Owner) hereby certify that the fire protection systems have been maintained and tested by the Qualified Person in accordance with the Code of Practice for Fire Precautions in Building, Fire Safety Act & Regulation and the relevant Code of Practice and are found to be in good working condition.



# Roles of FSMs - FC Inspections

- What is the purpose of the 2 new Annexes attached to Form FC-02?
- What are the details in these Annexes that I need to know?



# Roles of FSMs - FC Inspections

Commissioner  
Singapore Civil Defence Force  
HQ Singapore Civil Defence  
Force  
91 Ubi Avenue 4  
Singapore 408827

CERTIFICATE OF MAINTENANCE [REGULATION 24 (1) (b) OF THE  
FIRE SAFETY (BUILDING FIRE SAFETY) REGULATIONS 1994]  
Form FC - 02

Instructions:  
1. All forms are to be duly completed upon submission, failing which the submission shall be rejected.  
2. Delete where applicable.

CED Reference No.:

To be completed by Qualified Person

Name of Building: No of storey:  
Address:

\* Particulars of Fire Protection Systems to which this certificate relates:

(01) Dry Rising System	<input type="checkbox"/>	(12) Standby Generator Set	<input type="checkbox"/>
(02) Wet Rising System	<input type="checkbox"/>	(13) Lift / Fire Lift Systems	<input type="checkbox"/>
(03) Automatic Sprinkler System	<input type="checkbox"/>	(14) Voice Communication System	<input type="checkbox"/>
(04) Automatic Fire Alarm System	<input type="checkbox"/>	(15) Hose reel System (with pump)	<input type="checkbox"/>
(05) Atrium Smoke Control System	<input type="checkbox"/>	(16) Private Hydrant (with pump)	<input type="checkbox"/>
(06) Engineered Smoke Control System	<input type="checkbox"/>	(17) Private Hydrant (Dry)	<input type="checkbox"/>
(07) Pressurisation System	<input type="checkbox"/>	(18) Water Mist System	<input type="checkbox"/>
(08) Ductless Jet Fans System	<input type="checkbox"/>	(19) Persons with Disabilities (PWD) Communication Device	<input type="checkbox"/>
(09) Passive Fire Protection (Structural Steel/Dry Wall/Fire Retardant Paint)	<input type="checkbox"/>	(20) Exit doors linked to Fire Alarm System. E.g. Electro-mechanical locking device	<input type="checkbox"/>
(10) Car Park Smoke Extract System	<input type="checkbox"/>	(21) Compartmentation doors. E.g. Fire-rated roller shutter linked to Fire Alarm System	<input type="checkbox"/>
(11) Air-conditioning System	<input type="checkbox"/>	(22) Others. E.g. Gas Suppression System, etc. Please specify:	<input type="checkbox"/>

\*\* Please indicate tick if applicable and cross(X) if not applicable, in boxes above.

In accordance with Regulation 24 (1) (b) of the Fire Safety (Building Fire Safety) Regulations 1994,

\_\_\_\_\_ hereby certify that the above system(s)\* has/have been maintained and tested in accordance with the Code of Practice for Fire Precautions in Building, Fire Safety Act 1993, Regulation and the relevant PSB's code of Practice and \* is/are found to be in good working condition.

Professional Engineer Stamp and Signature \_\_\_\_\_ Date \_\_\_\_\_

Name of Professional Engineer: \_\_\_\_\_ Email Address: \_\_\_\_\_  
Name of Professional Firm: \_\_\_\_\_ Mobile No.: \_\_\_\_\_  
Address: \_\_\_\_\_  
Name of Owner / Representative who are present during testing: \_\_\_\_\_  
Date and Time of testing: \_\_\_\_\_

## FC-02 for PE endorsement :

- Dry Rising System
- Wet Rising System
- Automatic Sprinkler System
- Automatic Fire Alarm System



# Roles of FSMs - FC Inspections

- FC Form Annexes A-1 & A-2
- To provide additional test results/readings during inspections such as:
  - Wet Rising Main Flowrate and Pressure Test
  - Sprinkler System Water Proving Test
  - Dry Riser Hydrostatic Pressure Test
  - Private Hydrant Pressure and Flow Test
  - Staircase Pressurization Test



# Roles of FSMs - FC Inspections

ANNEX A-1 to FORM FC-02

**QUALIFIED PERSON TESTING REPORT**

FC REFERENCE NUMBER: \_\_\_\_\_

**DRY RISING SYSTEM (IF APPLICABLE)**

DRY RISER STACK NO. (List all stack readings)	HYDROSTATIC PRESSURE READING (INITIAL) (Pressure constant at 200 psi / 13.8 bar for 2 hrs)	HYDROSTATIC PRESSURE READING (AFTER 2 HOURS)

**WET RISING SYSTEM (IF APPLICABLE)**

WET RISER STACK NO. (List all stack readings)	STOREY TESTED	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

**PRIVATE HYDRANT (WITH PUMP) (IF APPLICABLE)**

PRIVATE HYDRANT NO. (List all hydrant readings)	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

## DRY RISING SYSTEM (IF APPLICABLE)

DRY RISER STACK NO. (List all stack readings)	HYDROSTATIC PRESSURE READING (INITIAL) (Pressure constant at 200 psi / 13.8 bar for 2 hrs)	HYDROSTATIC PRESSURE READING (AFTER 2 HOURS)
DR 1-3	200	200
DR 2-3	200	200
DR 3-3	200	180

- Hydrostatic pressure reading of the dry riser shall remain constant at 200 psi (SS 575, Clause 10.4 : Tests in Dry Rising Main)

# Roles of FSMs - FC Inspections

ANNEX A-1 to FORM FC-02

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FC REFERENCE NUMBER: \_\_\_\_\_

**DRY RISING SYSTEM (IF APPLICABLE)**

DRY RISER STACK NO. (List all stack readings)	HYDROSTATIC PRESSURE READING (INITIAL) (Pressure constant at 200 psi / 13.8 bar for 2 hrs)	HYDROSTATIC PRESSURE READING (AFTER 2 HOURS)

**WET RISING SYSTEM (IF APPLICABLE)**

WET RISER STACK NO. (List all stack readings)	STOREY TESTED	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

**PRIVATE HYDRANT (WITH PUMP) (IF APPLICABLE)**

PRIVATE HYDRANT NO. (List all hydrant readings)	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

## WET RISING SYSTEM (IF APPLICABLE)

WET RISER STACK NO. (List all stack readings)	STOREY TESTED	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)
1-1	Roof	6	3.5	38
1-2	Roof	6	3.5	38

- Water flow rate for non-residential building is 38 l/s for one stack and additional of 19 l/s for subsequent stack (SS575, table 3.2).
- Minimum running pressure of 3.5-5.5 bar
- Static pressure shall not exceed 7 bar



# Roles of FSMs - FC Inspections

ANNEX A-1 to FORM FC-02

**QUALIFIED PERSON TESTING REPORT**

FC REFERENCE NUMBER: \_\_\_\_\_

**DRY RISING SYSTEM (IF APPLICABLE)**

DRY RISER STACK NO. (List all stack readings)	HYDROSTATIC PRESSURE READING (INITIAL) (Pressure constant at 200 psi / 13.8 bar for 2 hrs)	HYDROSTATIC PRESSURE READING (AFTER 2 HOURS)

**WET RISING SYSTEM (IF APPLICABLE)**

WET RISER STACK NO. (List all stack readings)	STOREY TESTED	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

**PRIVATE HYDRANT (WITH PUMP) (IF APPLICABLE)**

PRIVATE HYDRANT NO. (List all hydrant readings)	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)

## PRIVATE HYDRANT (WITH PUMP) (IF APPLICABLE)

PRIVATE HYDRANT NO. (List all hydrant readings)	STATIC PRESSURE (BAR)	RUNNING PRESSURE (BAR)	FLOW RATE (LITRE/SEC)
FH-01	3.5	2	38

- In general minimum water flow rate for non-residential buildings must be 38 l/s
- Minimum running pressure of 2 bar (SS575, Clause 3.1.2)



# Roles of FSMs - FC Inspections

ANNEX A-2 to FORM FC-02

**PRESSURIZED STAIRCASES (IF APPLICABLE)**

STAIRCASE NO.	PRESSURE DIFFERENTIAL (MINIMUM 50 PA)	AVERAGE AIR VELOCITY (MINIMUM 1 M/S)	FORCE REQUIRED TO OPEN ANY DOOR (MAXIMUM 110 N)

**SPRINKLER SYSTEM WATER-PROVING TEST (IF APPLICABLE)**

CONTROL VALVE NO.	LOCATION OF CONTROL VALVE	AREA SERVED	Hazard Group	DESIGNED FLOW RATE (L/MIN)	DESIGNED PRESSURE (KPA)	ACTUAL FLOW RATE (L/MIN)	ACTUAL RUNNING PRESSURE (KPA)

**DEVIATION ITEMS (ITEMS BASED ON FORM FC-02)**

*DEVIATION ITEMS (ITEMS BASED ON FORM FC-02)	RECTIFICATION SCHEDULE
e.g. Faulty Basement Carpark Fan no. 1 (Justification by PE : To provide standby extraction fan during the replacement period.)	01/03/2016 – 01/04/2016

\*Fire Protection Systems shall not be compromised. Any deviation, PE shall provide justifications and be subjected to SCDF prior approval for the issuance of Fire Certificate.

DATE & TIME OF TESTING BY PE: \_\_\_\_\_

NAME & SIGNATURE OF PE: \_\_\_\_\_

## PRESSURIZED STAIRCASES (IF APPLICABLE)

STAIRCASE NO.	PRESSURE DIFFERENTIAL (MINIMUM 50 PA)	AVERAGE AIR VELOCITY (MINIMUM 1 M/S)	FORCE REQUIRED TO OPEN ANY DOOR (MAXIMUM 110 N)
01	55	1.34	100

- Pressure differential min. of 50 Pa
- Minimum 1 m/s average air velocity
- Force required to open the door max. 110N  
(Chapter 7 of Fire Code, Clause 7.2.2 )



# Roles of FSMs - FC Inspections

ANNEX A-2 to FORM FC-02

**PRESSURIZED STAIRCASES (IF APPLICABLE)**

STAIRCASE NO.	PRESSURE DIFFERENTIAL (MINIMUM 50 PA)	AVERAGE AIR VELOCITY (MINIMUM 1 M/S)	FORCE REQUIRED TO OPEN ANY DOOR (MAXIMUM 110 N)

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\*Fire Protection Systems shall not be compromised. Any deviation, PE shall provide justifications and be subjected to SCDF prior approval for the issuance of Fire Certificate.

DATE & TIME OF TESTING BY PE: \_\_\_\_\_

NAME & SIGNATURE OF PE: \_\_\_\_\_

## SPRINKLER PUMP WATER-PROVING TEST (IF APPLICABLE)

CONTROL VALVE NO.	LOCATION OF CONTROL VALVE	AREA SERVED	Hazard Group	DESIGNED FLOW RATE (L/MIN)	DESIGNED PRESSURE (KPA)	ACTUAL FLOW RATE (L/MIN)	ACTUAL RUNNING PRESSURE (KPA)
CV-01	1 <sup>st</sup> STY	1 <sup>st</sup> , 2 <sup>nd</sup> & 3 <sup>rd</sup> STY	OH 3	1100	200	1100	860
				1350	170	1350	860
CV-02	4 <sup>th</sup> STY	4 <sup>th</sup> , 5 <sup>th</sup> & 6 <sup>th</sup> STY	OH 3	1100	270	1100	250
				1350	240	1350	210



# Common Findings During FC Audit Inspections

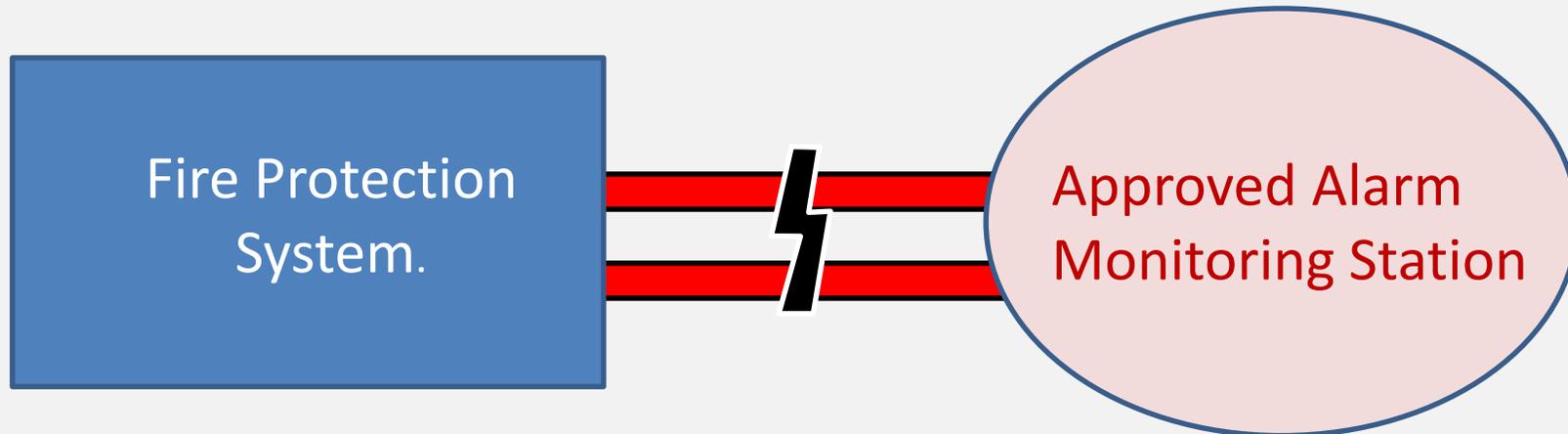


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# Signal Transmission/DECAM System

Fire Protection System fails to send signal to the approved alarm monitoring station (Clause 6.3.7).



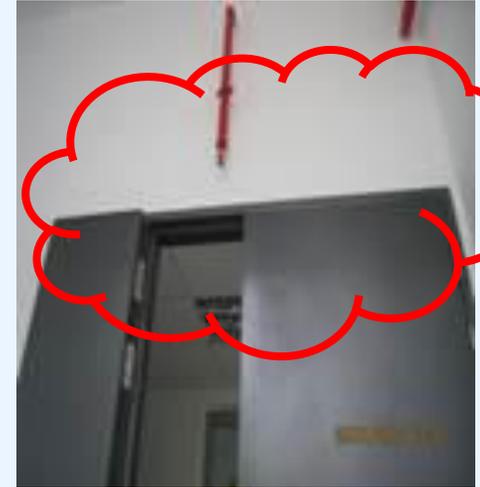
# Fire Alarm System

- Fire alarm zone at alarm panel does not tally with the zone chart whenever there is A&A or upgrading works being carry out



# Fire Door and Exit Door

- Fire door is left opened without door closer
- Dislodged door closer
- Fire door wedge opened
- Exit or Exit direction sign faulty when tested under secondary power supply



# Emergency Lighting/ Pressurisation Staircase Door

Faulty emergency light  
along exit route



The force required to open  
pressurization staircase door  
force shall not exceed 110N



# Emergency Voice Communications System

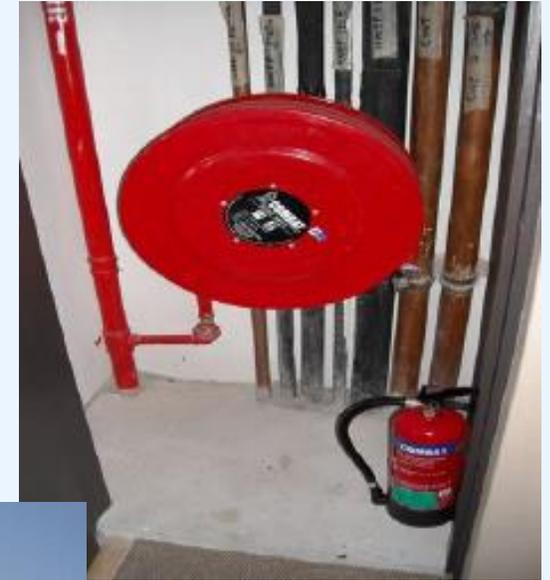


- Faulty system
- Volume too loud (echoing) or too soft (cannot hear clearly)
- Isolation of voice communications system



# Portable Fire Extinguisher

- Expired date of service
- Being obstructed
- No product listing label
- Not hung in bracket



# Private Hydrant



- Hydrant pit was sealed up
- Hydrant pit was filled with water and mud, unable to access valve



# EM-Lock not link to alarm system



- Under alarm activation mode, the electro-magnetic locks are not activated to unlock the exit door





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**END**

