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 m²;
  
  (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
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

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

**DRY RISING SYSTEM (IF APPLICABLE)**

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

- 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

- 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

### WET RISING SYSTEM (IF APPLICABLE)

<table>
<thead>
<tr>
<th>WET RISER STACK NO. (List all stack readings)</th>
<th>STOREY TESTED</th>
<th>STATIC PRESSURE (BAR)</th>
<th>RUNNING PRESSURE (BAR)</th>
<th>FLOW RATE (LITRE/SEC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1</td>
<td>Roof</td>
<td>6</td>
<td>3.5</td>
<td>38</td>
</tr>
<tr>
<td>1-2</td>
<td>Roof</td>
<td>6</td>
<td>3.5</td>
<td>38</td>
</tr>
</tbody>
</table>
Roles of FSMs - FC Inspections

• 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

**PRESSURIZED STAIRCASES (IF APPLICABLE)**

<table>
<thead>
<tr>
<th>STAIRCASE NO.</th>
<th>PRESSURE DIFFERENTIAL (MINIMUM 50 PA)</th>
<th>AVERAGE AIR VELOCITY (MINIMUM 1 M/S)</th>
<th>FORCE REQUIRED TO OPEN ANY DOOR (MAXIMUM 110 N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>55</td>
<td>1.34</td>
<td>100</td>
</tr>
</tbody>
</table>

- 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

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

<table>
<thead>
<tr>
<th>CONTROL VALVE NO.</th>
<th>LOCATION OF CONTROL VALVE</th>
<th>AREA SERVED</th>
<th>Hazard Group</th>
<th>DESIGNED FLOW RATE (L/MIN)</th>
<th>DESIGNED PRESSURE (KPA)</th>
<th>ACTUAL FLOW RATE (L/MIN)</th>
<th>ACTUAL RUNNING PRESSURE (KPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV-01</td>
<td>1st STY 1st, 2nd &amp; 3rd STY</td>
<td>OH 3</td>
<td></td>
<td>1100</td>
<td>200</td>
<td>1100</td>
<td>860</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1350</td>
<td>170</td>
<td>1350</td>
<td>860</td>
</tr>
<tr>
<td>CV-02</td>
<td>4th STY 4th, 5th &amp; 6th STY</td>
<td>OH 3</td>
<td></td>
<td>1100</td>
<td>270</td>
<td>1100</td>
<td>250</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>1350</td>
<td>240</td>
<td>1350</td>
<td>210</td>
</tr>
</tbody>
</table>
Common Findings During FC Audit Inspections
Signal Transmission/DECAM System

Fire Protection System fails to send signal to the approved alarm monitoring station (Clause 6.3.7).
• Fire alarm zone at alarm panel does not tally with the zone chart whenever there is A&A or upgrading works being carried 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
• 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
END