Problem Statement

The tall atrium space of the retail establishment is often a venue for exhibition events. However, for atriums taller than 12m, the automatic sprinklers installed at the ceiling may not be effective. From 1st September 2009, Singapore Civil Defence Force (SCDF) imposed that the owner must improve atrium protection with long throw sidewall open-sprinklers (controlled by solenoid valves after fire detection), before they can be allowed to hold exhibitions in the tall atrium space.

Challenge

The 3 main challenges are as follows:
1. Atrium protection system must tap on existing sprinkler tank and pump to keep project costs low and mitigate space concerns.
2. Atrium space is too large to be protected by long throws sidewall sprinklers alone.
3. A sensor activated automatic deluge sprinkler system may give rise to false activation, resulting in immense property damage and losses.

Solution

The atrium space at the 1st Storey is divided into 13 periphery zones and 2 central zones. The 13 periphery zones are protected with 43 long throw side mounted open sprinklers installed at 1st storey high level and the 2 central zones are protected with 14 pendant type open sprinklers installed at the atrium ceiling level. The zoning was sized to ensure that the existing sprinkler pumps and water tank storage capacity will be able to handle the most demanding scenario. To address false activation, the proposed activation is by manual means with each zone controlled by a separate solenoid valve. The control panel for the system will be at 2 locations; at the 1st storey with a full view of the atrium space and at the Fire Command Centre.

Results

The above proposed atrium’s deluge sprinkler system will be adequate to address local fire authority concerns on a potential fire outbreak arising from the exhibition events in these atrium spaces as well as addresses the shopping complexes’ building managers’ concerns on accidental water discharge due to false alarms’ activation of the deluge system.