December 2005

A Design Approach to Fire Protection in Data Facilities

A study by the National Archives & Records Administration in the US showed that 93% of companies that lost their data processing for more than 10 days filed for bankruptcy within one year of the incident.

This Advisory Note provides a brief guide to a design approach for providing fire protection systems in data processing facilities.

It must be noted that the minimum level of fire protection for the facility must meet Building Code requirements. These can be advised by the relevant Building Surveyor.

When looking at protecting a data facility from a disruption of service, the first step is to decide how critical the facility is to the continuity of your business. This will help determine the risk consequences and the level of fire protection required.

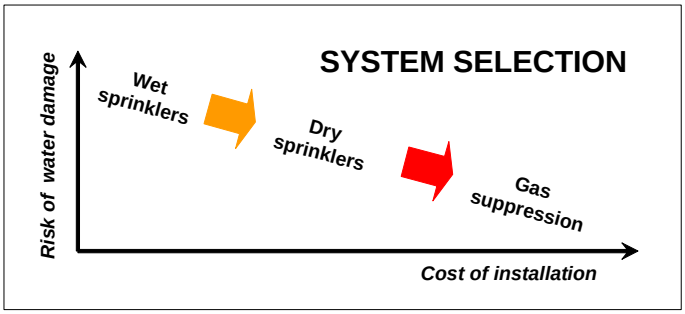
Sprinklers are one of the most reliable forms of fire protection. However, a wet system introduces the risk of water damage to equipment either by accidental discharge or collateral damage in a fire. Concealed (or flush) type heads or guards can be considered to reduce the chance of accidental discharge due to mechanical damage to the sprinkler.

If the risk of water in the area is deemed too high, a dry pipe (or pre-action) system can be considered. This type of system has the sprinkler pipes in the critical area filled with compressed air. This type of system only releases water when there is a smoke detection signal and an activated sprinkler head (via a drop in the air pressure in the pipework), that is the detection of both heat & smoke.

The introduction of a pre-action system (and most detection systems) requires a Fire Indicator Panel (FIP) to control the system. Either the main FIP or a local Sub-FIP may be used depending on the building. A Sub-FIP provides the benefit of local indication and control.

Smoke detection systems are typically either point type smoke detectors or aspirating type detection systems (e.g. VESDA). Point type detectors can be either photo-optical or ionization or a combination of the two. Point type detectors provide a relatively low cost detection system but are limited in providing an escalating response. Aspirating systems can be configured with multiple outputs (up to 4) to provide a staged response to the fire. The lowest alarm level can be set to provide a very sensitive response for early occupant intervention.

If the risk of collateral water damage from a sprinkler system is deemed too high, a gas suppression system may be used either in conjunction with a sprinkler system as a first response system, or in lieu of a sprinkler system (subject to Building Surveyor approval). There are two main types of gas systems used; Inert gases or chemical agents. Both rely on a sealed enclosure to maintain design concentrations and a detection system to activate them. There are advantages and disadvantages with each of the different types of gases. Chemical agents tend to require a smaller storage footprint but some agents are detrimental to the environment. Inert gases require larger concentrations so pressure relief must be closely considered but can be used more readily to provide protection to multiple enclosures with variances in the protected volume.



The final step is to determine the control response to a fire and the interfaces to other systems. These interfaces may include local warning, paging, soft or hard power shutdown, mechanical shutdowns, and brigade call. This will usually depend on the level of proposed automation of the response. Some of these interfaces may be required to meet building codes. Care should be taken in determining the extent of the automation of the response as spurious alarms may result in accidental disruptions to the facility.

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