

Which circuit should I choose? -- Part 2

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I have studied Table 3-5 from NFPA 72-1996, *National Fire Alarm Code*. How do I decide which Class or Style of circuit I should specify for new a fire alarm system in my building?

In the last issue of this magazine, I explained the Styles stated in Table 3-5 of the *National Fire Alarm Code*. This issue I will offer some suggestions to help you choose which fire alarm initiating device circuit would best serve your particular needs.

Section 3-4.5.1, the *Code* indicates: "The class or style of signaling paths (circuits) shall be determined from an evaluation based on the path performance detailed in this code and on engineering judgment." As we discovered in the last issue, "engineering judgment" can prove illusive. However, if you proceed to make decisions based on an orderly process, giving careful attention to each detail, you will find that you have actually applied "engineering judgment."

As with all fire protection problems, start with the development of clear, concise goals. State what performance you want from the fire alarm standpoint in three key areas: life safety, property protection, and mission continuity.

What tolerance do you have for the safety of individuals at your facility? Said crassly, How many people will you allow to die or suffer injuries? Most of us will respond with an emphatic “None!” Yet, the vast majority of the protection standards recognize that a person intimate with a fire will most likely succumb. That fact alone drives us to design systems to minimize the threat to our fellow human beings.

How much damage to the buildings and facilities at your site can you tolerate? Even with some financial band-aid provided by insurance, can you really tolerate a significant amount of damage?

And what about the mission at your facility. Can you tolerate an interruption in production or in the provision of a service? If so, how much interruption can you experience before it begins to adversely affect the bottom line of your profit and loss statement.

Once you establish these goals, you can flesh out an “action plan” for each one. Such a plan will include terminal objectives that describe the precise performance you expect the overall fire protection system to provide. And, you will detail the role the fire alarm system will play in that overall fire protection scheme.

Be certain you recognize that the most effective fire protection solution comes from a series of interlocking, interdependent fire protection systems. You will use both active and passive fire protection systems. These will work together to prevent and control fires.

Having developed an “action plan” to reach your defined goals, you can create a step-by-step process to choose which initiating device circuit will best serve your needs. Last issue we took a lesson from NFPA 72-1996, *National Fire Alarm Code*, Section:

3-4.5.2: Where determining the integrity and reliability of the interconnecting signaling paths (circuits) installed within the protected premises, the following influences shall be considered:

- (a) The transmission media utilized;
- (b) The length of the circuit conductors;
- (c) The total building area covered by and the quantity of initiating devices and notification appliances connected to a single circuit;
- (d) The nature of the hazard present within the protected premises;
- (e) the functional requirements of the system necessary to provide the level of protection required from the system;
- (f) The size and nature of the population of the protected premises.”

Example No. 1. You have a nine story apartment building with five apartments on each floor. Each floor has a machinery room for the heating, ventilating, and air conditioning equipment, and an electrical room for distributing power, telephone, and television cable to the apartments. Each floor also has an elevator lobby and a set of exit stairs on each end of the floor. Clearly the fire alarm system needs to cover the common areas: corridors, stairwells, elevator lobby, machinery room and electrical room. Nothing particularly challenges the design of a fire alarm system to provide this coverage. So, you can quite comfortably choose a Style A or B initiating device circuit.

Example No. 2. You have a telecommunications relay station located high in the mountains. Even in the best of weather it takes four hours to reach the site. When snow falls, state police routinely

close several of the roads leading to the top of the mountain. Your fire alarm system will need to perform on a virtually “maintenance-free” basis. If an initiating device circuit develops an open fault, the weather may prevent you from reaching the site for days or even weeks. Thus, the Style D initiating device circuit will allow the fire alarm system to continue to operate, even with a single open fault.

Example No. 3. You have a large computer room. The room contains high value main frame computers that control the telephone switching system for a five state area. The room itself stretches over 25,000 square feet. And yet, only five operators remain on duty. Here your fire alarm system truly manages the fire protection for this critical equipment. The operator who staffs the main operating console must know precisely which detector has operated into an alarm condition. You can achieve such point annunciation using several technologies. But, a signaling line circuit from Table 3-6 using multiplex--interrogation and response--technology will serve you the best.

In each Example, the protection goals and objectives you develop serves to guide you to the most appropriate fire alarm initiating device circuit. While technology exists to provide virtually any degree of detection sensitivity and transmission speed you might desire, the cost may prove prohibitive. So, you must always explore the use of technology that meets your defined needs as much as possible, and also allows you to stay within your budget.

Someone has said that the universal answer to all fire protection questions is the word, “depends.” When someone asks: “What type of fire protection system should I provide at this facility?” The answer: “Well, it depends.”

When someone asks: “Should I provide automatic fire sprinkler protection for this facility” You can answer with confidence: “It depends.”

So it is with the question: “What Style of initiating device circuit should I choose for my fire alarm system?” The honest answer: “It depends.”

Wending your way through the maze of design decisions serves as the only way to ever hope to find a detailed answer.

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