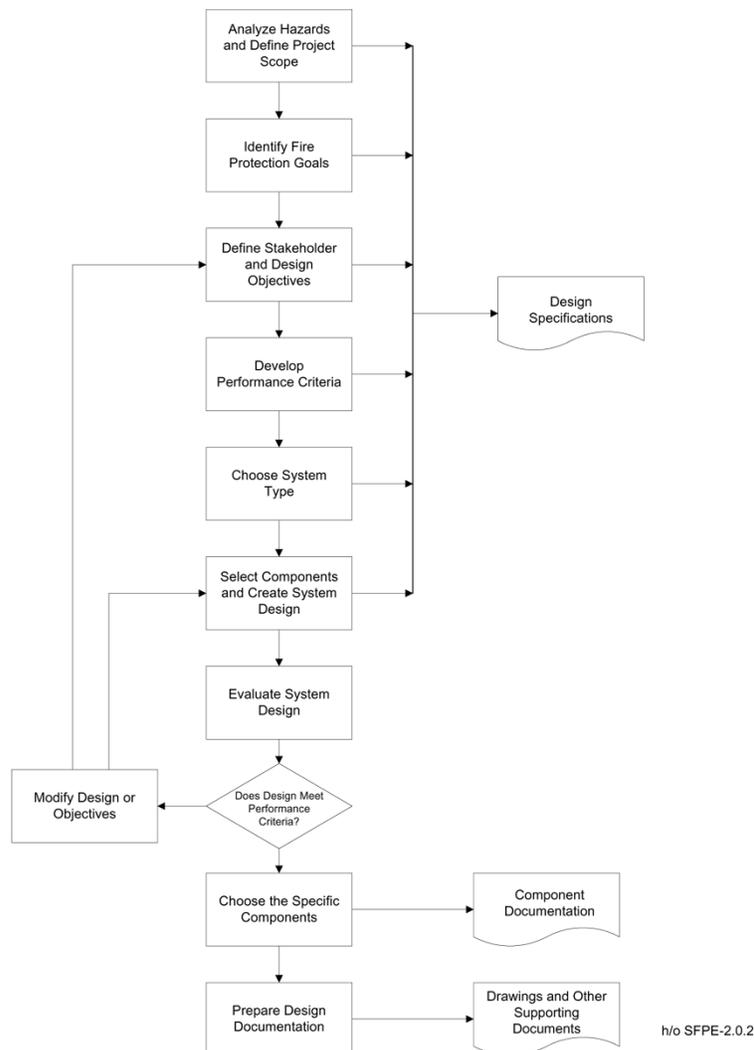


Applying Performance-based Fire Alarm System Design – Part 5

by Dean K. Wilson, P.E.

Over the course of the last five issues I have continued to discuss a very hot topic in the arena of fire protection today, namely, performance-based building design. The graphic attached to this article offers a graphical representation of how this performance-based design process or procedure would apply to the design of a fire alarm system.



By now I am fairly certain that you have gotten the main message of this series, namely that the key to understanding the whole performance-based building design arena rests with realizing that a process makes it work. This means that when a designer applies the concept of performance-based design to a fire alarm system, he or she will use a very methodical procedure. This procedure will help ensure that the fire alarm system design will meet the specific needs of the project. And, it will also provide a comprehensive solution to whatever fire protection problems the procedure has, itself, identified.

The designer begins by analyzing the hazards and defining the project scope. Next, the designer identifies the project-specific fire protection goals, gathers information from the stakeholders in the project, and defines the stakeholder objectives. If necessary, and it often become necessary, the designer uses skillful negotiating techniques to resolve any conflicts between various stakeholder objectives. With these conflicts resolved, the designer then combines the results into design objectives for the project.

In the next step, the designer defines the performance criteria to quantify the design objectives. The designer then moves on to choose the fire alarm system type that will best meet the design objectives.

The final step the designer must take in the first part of this very methodical process involves selecting specific fire alarm system components and creating an actual fire alarm system design. This requires to translate all of the information he or she has gathered up to this point into a system design that will meet the overall fire protection goals for the project. The design must also satisfy the design objectives created as an amalgam of the stakeholder objectives. Further, this design must satisfy the performance criteria. And, it must provide all of this within the framework of the chosen system type.

During this step in the process, the designer will carefully choose which particular fire alarm system components and circuits will provide the most comprehensive and cost effective design. The designer will choose alarm initiating devices, supervisory initiating devices, initiating device circuits, signaling line circuit interfaces, signaling line circuits, fire alarm system control units, notification appliance circuits and notification appliances.

Wisely, the designer will emphasize long-term reliability, and specifically consider the serviceability of the system. He or she will consider the initial capital investment and will also consider life cycle costs. This becomes all the more important once a designer realizes that the ultimate success of any fire alarm system depends on building initial quality into the system, and on maintaining that initial quality through testing and maintenance.

To assist the designer in this process, many manufacturers make detailed information available on their products. Today, a great deal of this material comes on CD-ROMs and the designer can use a search engine built into the CD-ROM to locate specific product information.

A competent designer will become familiar with a wide variety of fire alarm system components from a diverse number of manufacturers. This will assist the designer in matching various product features to the precise needs of the particular performance-based design project.

The designer will also include and document procedures that will help make certain that the integrity of his or her design will persist throughout the installation of the fire alarm system. This may include a variety of items such as a prescribed method of marking all wiring at each point of termination. The designer may even built requirements into the design that helps installs proceed in a workmanlike manner. Such details may include mounting heights for various terminal boxes, or the nature and character of installed wiring.

As the designer makes component and circuit choices, he or she will document each choice as part of the design specifications. By this point in the process, the design specifications will contain a very thorough record of every important decision throughout the course of the process. This will aid anyone reviewing the performance-based design. It will also serve as a record that anyone who wishes to make changes in the building or occupancy can review. This will materially aid the management of change process that becomes especially critical throughout the life of a building.

Once the designer has selected the fire alarm system components and created a fire alarm system design, he or she must next evaluate that system design against the performance criteria. We will focus on this important step in the next issue.

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