What Happened To The Circuit Loadings? — Part 1

by Dean K. Wilson, P.E.

In browsing through NFPA 72-1996, *National Fire Alarm Code,* I notice that the Tables in Chapter 3, "Protected Premises Fire Alarm Systems," particularly Table 3-5, Table 3-6, and Table 3-7.1 no longer have any circuit loading criteria. What happened to these numbers?

To understand why the NFPA Technical Committee on Protected Premises Fire Alarm Systems removed the circuit loadings from these Tables during the 1996 Annual Meeting revision cycle, it is important to understand a bit of history.

Back in 1974, the Standards Council of the National Fire Protection Association approached Irving Mande of Edwards Company, who chaired the NFPA Technical Committee on Protective Signaling Systems, to discuss the subject of how to make the fire alarm standards less hardware oriented and more oriented toward intended performance. Irv decided to see if NFPA 72D, *Standard for the Installation, Testing, Maintenance, and Use of Proprietary Protective Signaling Systems,* could serve as a model for the other protective signaling standards.

You must remember, that in these days there were six basic fire alarm standards: NFPA 71, *Standard for the Installation, Testing, Maintenance, and Use of Central Station Signaling Systems;* NFPA 72A, *Standard for the Installation, Testing, Maintenance, and Use of Local Protective*

Signaling Systems; NFPA 72B, *Standard for the Installation, Testing, Maintenance, and Use of Auxiliary Protective Signaling Systems;* NFPA 72C, *Standard for the Installation, Testing, Maintenance, and Use of Remote Station Protective Signaling Systems;* NFPA 72D, *Standard for the Installation, Testing, Maintenance, and Use of Proprietary Protective Signaling Systems;* NFPA 72E, *Standard for Automatic Fire Detectors;* and NFPA 74, *Standard for Household Fire Warning Equipment.*

Irv Mande's Technical Committee covered 72A, 72B, 72C, and 72D. Later in the 1970's, his Technical Committee would add NFPA 72F, *Standard on the Installation, Testing, Maintenance, and Use of Emergency Voice/Alarm Communications Systems;* and two Guides: NFPA 72G, *Guide for the Testing and Maintenance of Protective Signaling Systems;* and NFPA 72H, *Guide for Indicating Appliance for Protective Signaling Systems.*

Irv appointed a sub-committee, chaired by Bill Ranganath of Standard Electric Time Company, to develop a draft re-write of NFPA 72D using performance-based language and removing, wherever possible, reference to hardware requirements. This sub-committee included such fire alarm history-makers as Bob McPherson of Autocall, Bill Rogers of UL, Al Anselmo of Factory Mutual, Ed Bembeneck of Standard Electric Time, and a number of others, including me.

Beginning in early 1974, this sub-committee labored for nearly five years producing a draft that would use performance-based language. In attempting to describe the performance of various types of fire alarm circuits, the sub-committee reached an impasse in trying to succinctly describe the kind of performance one could expect from the various types of initiating device circuits. After

hours and hours of deep discussion, one of the sub-committee members stepped to the chalk board and drew a grid. Across the top his wrote the types of circuits under discussion by using an arbitrary designation of “A” through “E.” Down the left side of the grid, he wrote various types of circuit faults and operations. He then brushed the chalk off his hands and sat down.

Al Anselmo rose from his seat. Went to the chalk board. Turned around and asked, “If Style A circuit has an open fault, what performance do we expect?” Several sub-committee members chimed in, and the rest, as they say, is history. In that few moments of time, after a very long period of seeking to find a way to describe circuit performance, the sub-committee created a Table for initiating device circuits.

Next, the sub-committee took this same method and applied it to signaling line circuits. The sub-committee was on a roll now. It was a very small jump, once the two Tables had described circuit performance, to apply some quite arbitrary numbers to limit the number of devices, or portions of a system, that would be impaired by a fault or other circuit failure. Thus the loading numbers were born and placed on the two Tables. The loading numbers were based on the only loading numbers that existed in the current standards: 5 waterflow switches and 20 supervisory switches for each specific type of initiating device circuit; and, a maximum of 250 code wheels and 25 plants for each McCulloh-type signaling line circuit.

The performance-based revision to NFPA 72D was adopted by the Technical Committee with some modifications and released through the NFPA standards-making system as NFPA 72D-1979.

In the early 1980's, the Technical Committee decided to take the essence of these two Tables from NFPA 72D-1979 and place them into NFPA 72A. In so doing, it was argued by some members of the Technical Committee that on a “minimum performance basis” the loading numbers should not apply to a “local protective signaling system.” To say the least, this was a controversial subject. However, eventually the majority ruled and the loading numbers were dropped from the versions of the Tables appearing in NFPA 72A.

The Technical Committee then created a companion Table for indicating appliances -- later called “notification appliances.” This Table did not have any loading numbers because, by then, the Technical Committee had made the decision to drop the loading numbers within the confines of NFPA 72A.

In subsequent revisions, it was felt that the Table on signaling line circuits did not offer enough choices to fully describe circuits that had been created by various fire alarm system manufacturers. This resulted in the addition of three more styles: 0.5, 3.5 and 4.5. Some Technical Committee members argued that this fine line of division was unnecessary. But, once again, the standards-making process functioned as it is intended to function, and the consensus ruled.

Next issue, I will continue this narrative and answer the reader’s question that started this article.

IMSA member Dean K. Wilson is a licensed professional fire protection engineer who lives in Windsor, CT. The opinions expressed in this article are strictly his own.