

Background information for Proposed Legislation SB614/HB769

A research project, *Reliability of Fire Dampers, Smoke Dampers and Smoke Control Systems*, was completed in July 2021 by Dr. Jim Milke, Professor and Chair and Robert Ayoub, an undergraduate research assistant of the Department of Fire Protection Engineering at University of Maryland, College Park. Financial support for the project was provided by the National Energy Management Institute Committee. While reliability data exists for some fire protection equipment and systems, such as sprinkler, detection and firestopping systems, no data exists in the public domain for fire life safety (FLS) dampers or smoke control systems. This project was a first of its kind to examine the reliability of fire dampers, smoke dampers and smoke control systems through the collection of data from surveys of contractors who provide inspection services for those components. The analysis of data sought to distinguish components that are fully operational from those that are either not operational or whose operational status is compromised so that they are not at the required performance levels.

Recommended inspection frequencies for fire dampers, smoke dampers and smoke control systems are noted in the following model codes:

- **NFPA 80:** Fire dampers shall be inspected 1 year after installation, every 4 years thereafter, except hospitals, which have a 6-year inspection frequency.
- **NFPA 92:** Dedicated smoke control systems shall be inspected at least every six months and non-dedicated smoke control systems shall be inspected at least annually.
- **NFPA 105:** Smoke dampers shall be inspected 1 year after installation, every 4 years thereafter, except hospitals, which have a 6-year inspection frequency.

A total of 39 responses were received to the surveys that were distributed to contractors, engineering consultants and government agencies who conduct inspections of FLS dampers or smoke control systems.

The responses covered a total of 281 inspection projects in new buildings along with 1,120 inspection projects in existing buildings. The inspection projects in new buildings included inspections of 18,964 FLS dampers and 151,390 of those components in existing buildings.

A comparison of the condition of dampers in new versus existing buildings for questions 3-7 of the survey is provided in Table 1. For each of the responses, the dampers in existing buildings needing corrective actions are substantially greater than those in new buildings. For every question, a **majority** dampers in existing buildings were in need of service (repair or replacement of dampers, access issues, actuator replacement, reliability and the need to provide immediate attention in order to keep the building open). While the issues are much less prominent in new buildings, the number of issues identified are

still substantial. From a project perspective, the data also indicated that more than 90% of the dampers were reported to need immediate attention in 10 of 53 projects.

Table 1. Responses Indicating Concerns with Dampers or Actuators (%)

Question	New Buildings	Existing Buildings	All Buildings
3a. FLS dampers needing repair	39	91	67
3b. FLS dampers needing replacement	5.6	77	53
3c. FLS dampers needing improved access	28	91	70
4. Actuators needing replacement	17	80	58
5. FLS damper projects with reliability concerns	29	79	38
6. Projects with >15% of components needing repair or replacement	17	71	53
7. FLS dampers needing immediate attention	5.6	63	43

The responses pertaining to inspections of smoke control systems varied by the type of system were less than the number obtained for FLS dampers. The number of reported problems observed with smoke control systems is substantial as indicated in Table 2.

Table 3. Responses on Smoke Control Systems

	Type System					
	Stairwell Pressurization		Zoned Smoke Control		Atrium Smoke Mgmt	
	New	Existing	New	Existing	New	Existing
9. How many inspection projects has your company completed in the past 36 months?	118	149	84	297	27	65
10. Proportion of projects required repairs, adjusting, and/or balancing of the system, including associated dampers?	85	41	86	12	81	22
11. Proportion of projects required that more than 15% of the components needed adjustments, repairs or replacements?	69	19	79	7.4	74	11

In summary, the results of the survey indicate that inspections of FLS dampers and smoke control systems are identifying a substantial number of issues concerning these components or systems. The issues for FLS dampers in existing buildings were pervasive. Even so, FLS dampers in new buildings were not immune from needing attention. The issues for smoke control systems were more prominent in new buildings than existing buildings indicating the need for thorough commissioning tests.

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