

SPACE BETWEEN SWING DOORS AND COLLAPSIBLE GATES STILL A HAZARD

by Lou Bialy, PE

On August 23, 2001, eight-year-old Joseph Tucker Smith became entrapped in the space between the **collapsible gate and the swing door** on a circa 1929 elevator in Maine. The elevator responded to an up-directional hall call, and the ascending elevator fatally crushed the child. This tragedy could have been avoided had an A17.3 Code-compliant space guard been installed on the inside of the swing door. The cost of a space guard is minimal, both in terms of material and labor.

This accident was devastating to the Smith family and to the many others who were affected by this loss. It was also an eye-opening event for the elevator industry as a whole, as this horrific swing door accident has brought into question the process by which elevator safety is ensured. The ASME A17 Elevator Safety Codes are intended to address safety issues of the type that led to this accident. To be effective, it is essential that this and other elevator safety codes be adopted by local jurisdictions in a timely manner, that all code-mandated requirements be implemented by owners without delay, and that the safety codes be enforced vigorously by local authorities. All stakeholders in the industry have a role to play in ensuring that elevators are safe for public use. **The fact that a child can still die as a result of a hazard that has been known within the industry for at least 70 years is cause for the entire elevator industry to address this issue collectively with a heightened sense of urgency.**

Elevators installed before the 1930s were, for the most part, under attendant operation. Thus, with respect to swing-door elevator systems, the attendant ensured that there were no entrapments in the space between swinging hoistway doors and car doors or gates. As the use of automatic push-button operation became more popular, the hazard presented by the space between the swinging door and car gate (or sliding car door) was addressed for the first time. The A17.1-1931 Code required, with respect to automatic elevators, that if the distance from the inside of the swing door to the edge of the landing sill exceeded 1-1/2 inches, the space was to be filled in by "suitable means." However, the Code did not provide guidance as to what would constitute "suitable means."

"Mini-spacers," usually five-to-six inches high with beveled faces, were introduced for installation on the inside bottom surface of elevator swing doors. These were intended to prevent people from being caught in the space between the hoistway door and the car gate (door). **Unfortunately, in spite of this modification, fatal accidents continued to occur. People could stand on the "mini-spacers," (either by holding onto the swing door or by leaning on a car gate or door) thus becoming entrapped in the space between the doors and being killed or crushed when the elevator responded to a call and moved from that floor.**

The A17.1-1937 Code required that the distance between the swinging door and the collapsible gate on new elevators be not more than four inches (5-1/2 inches for a sliding car door). This provision has appeared with minor variations in every subsequent edition of the A17.1 Code, and, if implemented effectively, eliminates the entrapment hazard.

Because adoption of the Code is a jurisdiction-by-jurisdiction process, it cannot be ruled out that there are elevators that were installed after 1937 with excessive space gaps. The A17.1 Code focuses, for the most part, on new rather than existing equipment. It has been left to state legislatures and/or authorities having jurisdiction (hereafter "local authorities") whether or not to adopt portions of the A17.1 Code on a retroactive basis. The Preface to the A17.1-1955 Code provided guidance on the application of rules to existing equipment, noting that accident records compiled on a nationwide basis indicated that 85% to 90% of all elevator accidents on older installations occurred in the entrance openings to the hoistway or to the car. The Preface further recommended that, at a minimum, the rules covering safety requirements for hoistway and car doors are applied to existing installations. Unfortunately, this recommendation was not acted upon in many jurisdictions.

Continuing concern for the safety of older equipment resulted in the A17 Main Committee promulgating a separate Code, the A17.3 Safety Code for Existing Elevators and Escalators, published in 1986. The purpose of the A17.3 Code was to enhance the level of safety with respect to existing elevators and escalators.

A17.3-1986 was based upon the A17.1-1955 Code, with the addition of top-of-car inspection, firefighters service, door restrictors and space guards for swing-door elevators where the space gap exceeds certain dimensions. In developing specific code language, the A17.3 Committee considered the hazards created by excessive space gaps, as well as the devices that had been used at various times to mitigate the hazards. The code language developed and ultimately approved via the A17 consensus process requires a 40-inch-high space guard, beveled at the top, and covering the full width of the door (per Rule 3.4.3 and Figure A3 of the A17.3 Code). **The previously mentioned mini-spacer clearly fails to meet these requirements.**

It was believed at the time of its promulgation that the A17.3 Code would be broadly adopted by local authorities in much the same manner as the A17.1 Code had been. Unfortunately, this did not prove to be the case. Despite intensive lobbying by organizations such as the National Elevator Industry, Inc. (NEII), the A17.3 Code was only adopted by a few jurisdictions.

Thus, subsequent to the publication of the A17.3 Code, **fatal accidents involving children still occurred. Out of concern that the code process was not sufficient in addressing the excessive space gap issue, Otis Elevator Co. embarked on a notification program in 1995 to inform owners of Otis elevators of the hazards associated with swing-door elevator systems with an excessive space gap between hoistway doors and car gates or doors.** A list was compiled of vintage elevators, and ultimately, thousands of letters were sent to owners of swing door elevator systems, including those with excessive space gaps and those that simply might have had doors with the hazard present. The letters warned of the hazard, advised how the A17.3 Code addressed it, and provided information on the code-approved remediation.

Despite the concerted effort to inform owners of elevators with swing doors of the dangers of an excessive gap between the hoistway door and car gate, the tragic accident that killed the Smith child occurred in Maine. The fact that the accident took place in a state that had adopted the A17.3 Code makes the event all the more horrific.

The effectiveness of A17.3, or any other safety code for that matter, is contingent upon its adoption and enforcement by local jurisdictions. If both of these actions are not carried out, the concrete steps contained in the Code to increase the public's safety cannot be achieved. Local authorities are urged to adopt and enforce the A17.3 Code without delay. At a minimum, Section 3.4.3 of A17.3, that contains the requirements for space guards, should be adopted immediately. This can be seen as a first step to full adoption of A17.3, but immediate adoption of Section 3.4.3 is imperative. **Some jurisdictions, such as New Jersey, took unilateral action to require space guards throughout the state several years ago, following a number of tragic deaths of children.** Other jurisdictions must follow their lead.

The excellent safety record of the elevator industry as a whole is a result of stringent safety codes, their adoption by local authorities and enforcement of such by local jurisdictions. This proven process, while generally effective in the long run, can be time-consuming in implementation. **This particular safety issue requires immediate attention.**

Otis has been an unwavering advocate of elevator safety for 150 years. Otis recently launched a new program to again notify owners of swing-door elevator systems manufactured by Otis of the hazards posed by an excessive space gap. Moreover, Otis is offering to provide, at no cost to the owner, space guards ready for installation on every Otis elevator that requires them. Also, Otis recently placed on its website, www.otis.com, further information relating to swing-door elevator safety. The website will include updates on jurisdictional adoption of relevant codes.

This important safety issue affects elevators of many different manufacturers. Clearly, then, the entire industry must move forward to eradicate this problem. To that end, the following actions would be invaluable:

- Contact local authorities and state legislatures to encourage adoption of the A17.3-2002 Code as soon as possible.
- As an interim step, local authorities should immediately adopt Section 3.4.3 containing requirements for the space guards.
- Strict enforcement of A17.3, in particular Section 3.4.3, should be mandated in jurisdictions that have adopted the Code.
- By taking special note of any elevators with excessive space gaps that readers of this article inspect, service, maintain, repair or ride, every swing-door elevator that exhibits this problem should be identified and corrected.

Section 3.4.3 of A17.3-2002 requires that the distance between a swing door and collapsible gate not exceed four inches and the distance between a swinging door and

sliding car door not exceed 5-1/2 inches. Moreover, the distance from the hoistway side of the swing door to the hoistway edge of the landing sill should not exceed three-quarters of an inch. These criteria are illustrated in the accompanying diagrams.

If any of the dimensions are not met, readers are urged to contact the local building department elevator inspectors and jurisdictional authorities to advise them of this hazardous condition.

Joseph Tucker Smith was one of too many children who were entrapped and fatally injured in the space between a swing door and collapsible gate in a vintage elevator. By taking unified, urgent action at all levels, the industry can collectively eradicate this problem and ensure that no more people die in this tragic manner.

Lou Bialy is Director of Worldwide Codes and Standards for Otis Elevator Co.