



What you need to know about automatic doors



Do you have a product liability action or one for negligent maintenance?

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One of the most frequent calls I receive from attorneys is about injuries sustained from an automatic door malfunction. The call usually begins like this: "My client, who is almost 80 years old, was in a hotel lobby, and as she was walking through the doorway to the parking lot, the sliding doors slammed shut on her, causing her to break her hip."

Or this one: "Upon entering a revolving door, the door suddenly sped up, and actually trapped a young child between the door panel and the fixed portion of the doorway, crushing the boy's arm and shoulder."

And the attorney wants to know: "What can you tell me about the functions of the doors and why could this have happened? Do you think my client was careless? Was something wrong with the design of the door? How could this

have been prevented? Was this a maintenance issue? Who do you think is at fault for the defect in the operation of the door?"

In most cases the modern automatic door system, whether it be revolving, swinging or bi-pass type, is designed with safety in mind. Multiple redundant safeguards have been incorporated into the design to assure the safe and secure usage of these products. The manufacturers' designs rely on multiple sources of sensory input to their products to assure safe and dependable operation. These door units are failure tested, for hundreds of thousands of cycles of usage, and are not generally put into public venues until they perform satisfactorily and dependably.

So, how do they work?

Beginning with the most basic system... *swinging doors* (they either open inward or outward on fixed hinges) and

bypass doors (the doors slide past each other, whether in a single or double pair) contain the most failure resistant safeguard, the *electric eye beam*. This sensor is used to ensure that any object in the pathway of the closeable section of the door is protected against the door closing. In other words, picture a flashlight beam shining unbroken across a room onto a reflecting mirror or bicycle reflector. The door motor control would be sent a signal that all is clear and then the door would be activated to close safely, without hitting anything. However, if the beam is suddenly interrupted, a signal is immediately sent to the device to halt its closing action.

In addition, automatic door systems usually incorporate an *infrared curtain sensor* type of device. While optically undetectable, this type of sensor operates much like a shower head, spraying a



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fan of water. The sensor is usually positioned on both sides of a doorway. An infrared curtain beam rains down upon a position in front of the doorway to either trigger opening or initiate the closing operation when the area protected by it is found to be occupied or clear of obstructions, respectively. On older systems, you may also encounter a *pressure sensitive rubber mat* that contains sensors. When these mats are compressed, either by foot traffic or by a cart, such as in the case of a supermarket entrance, these devices send a signal to the motor controlling the door to initiate closing or opening.

The sensors that are built into these door systems all function interactively when working properly. They communicate via a microprocessor in the motor control unit to activate various door commands. In addition, built into these control boards are time-delayed circuits that hold the doors in either an open or closed mode until the sensors are cleared or the doorway has been vacated. The harmonious interaction of these various sensing devices is critical, and if in proper working order may in fact disable a malfunctioning doorway, ensuring the protection of the passage of the pedestrian. When these sensor devices are either deactivated, tampered with, or malfunctioning due to lack of appropriate regular maintenance, the doors they control can become potentially deadly.

The motive systems (control motors and conveyance methods) of the door devices vary from manufacturer to manufacturer, some being more stable and reliable than others. Some products may employ plastic gears and parts that are less durable than others, sometimes made to be sacrificial in design to ensure the safe operation of the automatic door unit or to disable a malfunctioning door device. In the more expensive and durable products, the products are manufactured with chain driven or steel gear design and usually rely upon a more sophisticated electronic control board to manage the doorway.

In addition to the sensor controls, many doorways also have a manual door operating switch. You may have seen these marked with a handicap symbol, or more simply "*push*." These switches work in conjunction with the sensors to open the doorway, activating the motor control when the sensors verify that the area is clear.

The most sophisticated and complex automatic door system is the *revolving* type. These types of doors are commonly found in airports, hotels and any area attempting a noise or thermal lock. The complexity and sophistication of these door systems require that there are an even greater number of safety sensors and motor controls. In addition to the types of devices mentioned previously, these revolving doors feature crush sensors located on door leading edges, or fixed panels, proximity beams to determine the speed of the rotation of the doorway, more beams to deactivate the door (if for some reason an object or person is attempting to enter the doorway at an inappropriate time), and an emergency stop device to halt the rotation of the doorway immediately without delay. There are usually manual door operating switches that can be used to slow the door rotation down, such as in the case of wheelchair use, and monitoring devices to show the condition of the door operation to the maintenance staff. These rotating doors frequently have memory devices that record function faults for future retrieval by service personnel.

Why do injuries occur?

With all of these safety devices in place on these doors, why do injuries occur? Poor design? Poor supervision? Lack of maintenance? Cost? Many of these factors play a part in causing injury. Poor design is usually not the primary reason for the injury. Having been called upon to examine thousands of doors during the past 25 years, and performing both installa-

tion and maintenance on all sorts of door products, I have to say that the vast majority of the time it is the owner of the property not following the recommended maintenance guidelines of the manufacturer that has caused the incident.

When an installation of an automatic door is completed, there should be a formal field demonstration of the product by the installer or manufacturer. Management should ensure that training of their staff is adequate to understand the responsibilities of properly maintaining these door products. Manuals with detailed instructions that identify the responsibilities of the owner/user to guarantee the safe operation of the automatic door system are normally provided by the installation team. These manuals indicate the expected intervals of recommended service to the door system, normal operation and special features. Most manufacturers strongly recommend keeping a service contract with the installer to do normal periodic maintenance and adjustments.

On some doors, something *as simple as wiping and cleaning the electronic eye lenses* is required for safe operation. This may need to be performed on a daily basis, depending on the dirt and debris in the area and weather conditions. Other more complex diagnostics are not possible by the end users, and require regular attention from a service professional.

In most cases, the basic maintenance of these door systems is something that should be addressed on a daily basis. I have been told by several manufacturers of revolving doors that their products should be checked, tested and evaluated on a daily basis. These pieces of machinery are complicated and should be treated with the same level of care as a theme park roller coaster ride. They simply must be looked at every day by trained personnel.

As an attorney, the trail of responsibility of an injury is yours to explore. In



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pursuing the responsible parties, use the path from current owner to original equipment manufacturer. Many times, it has been the fault of the maintenance staff (directly linked to the owner of the property).

Normal course and inclusion of a product manufacturer is where many attorneys choose to place the blame. However, I have found in many cases that the actual blame is on the part of the owner of the property who uses improperly trained maintenance staff or

uneducated personnel. They have chosen to ignore the requirements of the manufacturer as far as service and maintenance, and have opted to keep their costs down by not employing factory-trained service technicians. This has occurred even in government-owned facilities such as airports and court buildings as well as privately-owned supermarkets and restaurants. The decision to ignore the service requirements of the door manufacturer is usually purely economic.



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