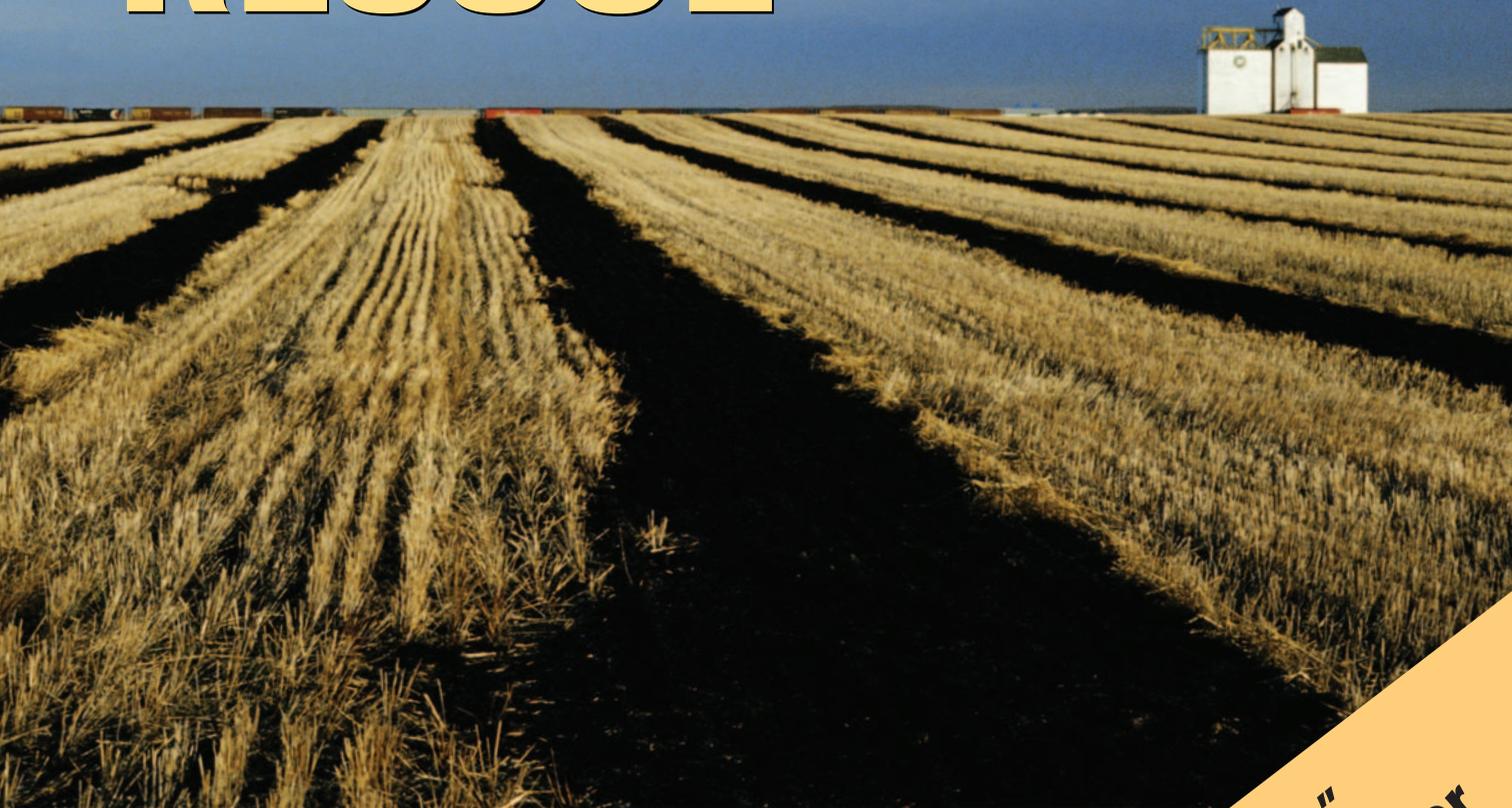


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When looking to put a new face on your apparatus bay, start with the doors for aesthetics and security. Here are key factors to consider when choosing from what's out there.

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The physical location of the fire station will affect how your station should be built or modified. Simple enough, right?

This location relates to the characteristics of the neighborhood. For instance, in historic districts the doors will need to match the historically dominant building design. Security may be more of an issue in a rural or rough neighborhood location where the station may be unstaffed for long periods than in an upscale urban location. There also are environmental issues to be considered, most notably hurricanes, earthquakes, tornados, temperature extremes and snow.

Recent attention to security issues and rising maintenance costs are forcing fire departments to re-examine, among other things, apparatus bay door criteria. When choosing a door, you need to look not only at those issues, but at how each issue relates to overall maintenance and ease of use.

Ins and outs of bay doors

At a presentation on apparatus bay doors at the Fire Industry Equipment

Research Organization's Fire Station Design Symposium last September, a south Florida fire chief said he could document 36 instances of overhead doors being clipped by vehicles in the past year. At the same conference, an assistant fire chief from a different Florida fire department said they had maintenance problems where an overhead door would break and come slamming down.

These serious and costly problems illustrate the need for fire departments to carefully evaluate the door type needed when specifying for new construc-

tion or retrofitting an apparatus bay door opening on an existing building.

When selecting a door type, it's important to consider the average number of responses in a year to determine whether the door is in a high-cycle or low-cycle application. This will help estimate maintenance time and costs.

When choosing a door type, you should consider:

- Where the station is located geographically and how that setting will affect security needs.
- What the station needs to look like to blend in with the neighborhood.



Overhead sectional doors have a lower initial purchase price, so they often are looked at favorably in new construction. However, after installation there are higher maintenance requirements because of their the low-cycle lives and low impact resistance.

- If vision panels are required by department or city code.
- Problems with previous doors, such as clipping the door or high maintenance costs.
- Wear and tear on parts and how often they will need to be replaced.
- What environmental factors are common to the area and the amount of insulation needed.
- What levels of wind and impact resistance will be needed, if the station is located in a hurricane-prone location.
- The amount of drift, which is the movement of the door and frame, allotted before the door is inoperable.
- What operating speed is necessary.
- Whether the station needs a high-cycle or low-cycle door.
- Whether the bay is suited for an upward- or sideward-motion door, and the amount of side space, floor space, head room and back space required for it.

Bay doors are available in three types: overhead sectional, rolling steel and four-fold doors. Each type has advantages and disadvantages, and each has a history in fire station applications.

Heads up

If your bay is tight on floor space because of either size or equipment storage, you might want to look into upward-motion doors, available in two main styles. Overhead sectional doors are made up of four or more horizontally hinged sections. Rolling steel doors feature narrow, interlocking slats that roll up around an overhead pipe barrel.



Study reveals drift problems after earthquakes

A study to determine the performance of apparatus doors on fire stations during and after a number of earthquakes in California was conducted in November 1998. The report was called "Performance of Roll-up Garage Doors – Re-examining the Performance of Roll-up Garage Doors in Fire Stations in Recent California Earthquakes."

One of the issues in the report had to do with drift, or movement of the door and frame during an earthquake. Several potential problems are

cited with the use of roll-up or overhead sectional doors. This is a list of other possible problems with overhead sectional or roll-up doors, as stated in the report:

- Door wheels can bind in their tracks or guides.
- Door wheels bend the tracks or come out of their tracks.
- Door systems generate their own inertia loads.
- Door braces the opening because of a diagonal compression strut between the bottom corner bearing up against the jamb and the

opposite top corner of the door.

- Door panels crimp.
- Door panels buckle.
- Door retraction springs fail.
- Door hoists lose electrical power.
- Apparatus pounds against doors.

The report further stated about sectional overhead and roll-up doors that because "fire stations comprise only a small part of the overall commercial door industry, a major market-driven shift to more reliable doors is unlikely."

Both types travel on rollers that move along tracks on either side of the door.

Available through local distribution and service, these doors have a lower initial purchase price, so they often are looked at favorably in new construction. They have minimal side room requirements, don't take up floor space, and can be insulated easily from hot and cold weather.

The biggest differences between these two doors are the appearance options. While both have a factory finish, the lightweight overhead sectionals have cladding options to match the building design whereas the rolling steel doors have limited cladding options because of the narrow slat construction. The amount of glazing also is limited on the steel doors. Furthermore, departments

The slow operating speed of upward-acting doors causes problems for some departments when the door doesn't move fast enough and gets clipped by the top of vehicles.



are required to install large vision panels in apparatus doors, a process that is easy in overhead sectional doors but not in rolling steel doors.

After installation there are higher maintenance requirements for both types of overhead sectional doors because of their the low-cycle lives and spring and chain replacement costs. These costs also are attributed to levels of impact resistance.

Overhead sectional doors should be used only in low-security applications and minimal wind-load areas. Rolling steel doors are considered a medium-level security door with medium wind-load resistance. Heavy wind loads put excess pressure on the door guides of both types.

The drift requirements of ½-inch or less can result in the jamming problem when there is movement caused by an earthquake, making the door inoperable. In a hurricane, tornado or other high-wind situation, the overhead sectional doors may need to be braced or hurricane shutters may need to be added to ensure protection. And because the doors are lightweight, it takes only a minimum level of impact to pierce the covering.

Natural disasters aren't the only damage concerns. The upward-acting function and the operating speed of 9 inches per second has been a problem at some fire departments when the door doesn't move out of the way fast enough and gets clipped by the top of the vehicle, damaging both the door and the vehicle.

Divide and conquer

Conversely, if your bay has short ceilings or houses tall equipment, you might want to look into side-motion doors. Four-fold doors are identified by the solid panels that work together on hinges and hydraulic-operated arms, requiring minimum headroom. Instead they have side-room requirements and take up floor and back space.

These doors have been in use on fire stations for a long time. A manufacturer brochure from the 1940s states that "four-fold doors [have been] used in fire stations in New York City, Albany, Buffalo, Chicago, Los Angeles, Minneapolis and many others for over 25 years." It also stated

that at the time there were four-fold doors on more than 50 fire stations in Minneapolis.

These doors are customized to meet any aesthetic needs of the fire station, with an unlimited number of cladding options and vision panel selections. However, they do not have a factory finish despite their higher purchase price.

The doors can be manufactured to



Hurricanes leave damage 'blueprint' on garage doors

The effect of hurricanes on garage doors has been studied and placed in an educational program called "Blueprint for Safety," which has been produced by a collaboration of private and public interests working under the direction of the Federal Alliance for Safe Homes, a non-profit organization based in Florida. The Web site for the educational program is <http://blueprintforsafety.org/windretrofit/windretrofit.html>.

The research conducted by this group found that "garage doors are the most vulnerable to hurricane-force winds for two reasons: the relatively long span of opening that they

cover, and the weak materials from which they are usually built. Many garage doors are constructed from lightweight materials to conserve weight and expense. Although their lighter weight makes them easier to raise and lower, it also makes them less resistant to the wind and impact forces of a hurricane."

The Blueprint for Safety educational program is designed to provide information about disaster-safety building techniques and features to help families become better prepared for natural disasters. The information regarding garage doors can be con-

sidered by commercial or public buildings as well, because the garage doors placed on buildings such as fire departments cover an even larger span than garage doors on a family structure.

The potential weak areas of garage door assemblies are deflection under wind loads, track strength and installation, and impact resistance. The study recommends replacing the existing garage door and track with a system designed to withstand wind load and wind-borne debris. Another option is to protect the opening with tested and approved products such as exterior shutters.

stand up to high wind loads and impact from flying debris in hurricanes and tornados. In earthquake zones, the doors will stand up to 2½- to 3-inch drift, so the building can shift and the doors will be operable. In case of power outage the doors can be manually opened. The door panels can be insulated for various levels of insulation for heat and cold weather conditions.

The design also provides the highest level of security. The structural-steel construction makes the doors impact and damage resistant. There is no chance for clipping because side-motion doors are always in view of the driver and move at an operating speed of 2 feet per second. Finally, the doors are made for high-cycle applications, with a life of 1 to 2 million cycles.

Because of the high-cycle application and damage resistance of the doors, four-fold doors are a low-maintenance alternative.

The dependable operation of apparatus bay doors is necessary for fast response. Every location has specialized needs, and doors can't be expected to fit all situations. Fire departments need to identify specific requirements that are needed for their location, environment, ongoing maintenance and security. When making the door decision, initial price should not be the deciding factor.

When in doubt, there's an incredible network of information among fire departments and a willingness to share good and bad experiences with apparatus doors. When checking with other departments, be sure to ask questions about problems with clipping the door as the vehicle leaves and yearly maintenance and repair costs. ■

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