A typical frame-mounted dead stop arm

A Call to Arms

How to select the best arm type and functionality for door closers

by George S. NIMEE

SURFACE-APPLIED DOOR CLOSERS do an admirable job of storing kinetic energy when a pedestrian opens a door, then discharging energy to close the door. In some ways, they're the rechargeable batteries of door control. Store-discharge, store-discharge, store-discharge. But they cannot operate independently. Like a car engine without a transmission, door closers are useless without a physical connection—a "drive shaft"—that conveys energy.

That's where arms come in. Arms permit the transfer of energy from the closer to the frame or the door, resulting in a controlled opening and closing action.

However, the usefulness of arms extends beyond the rudimentary physics described above. As an integral part of a door system, arms can deliver a variety of functions that augment and complement a door closer's operation. And with each manufacturer offering a selection of arms, choosing the proper connection for each door closer, mounting configuration and desired function within a building can be downright challenging.

Standard Arms

Standard arms provide a simple physical linkage between the door closer and door or frame. They are used with regular mount, top jamb or parallel arm configurations when no additional functionality is needed, for

example, on a typical interior or exterior door.

Still, most manufacturers offer a couple standard arm options. Some arms are pinned or riveted at the elbow. Riveted arms deliver a more solid linkage and are generally preferred for security reasons because they do not come apart. Conversely, standard arms are available in an unpinned configuration. The arms can be disassembled for quicker and easier installation. Additionally, standard arms are generally available in a utilitarian rounded form or more eye-pleasing, flat-form style. Also, most companies offer a high-security or extra-duty standard arm that can withstand the use and abuse in facilities like corrections and educational buildings.

Dead Stop Arms

As the name implies, a dead stop arm is designed to assist in stopping the opening movement of the door in conjunction with a strong hydraulic backcheck in the closer to help slow the door prior to engaging the dead stop. They are structured to work in a parallel arm mount or top jamb mount on the push side of the door and regular mount on the pull side to prevent damage caused by a pedestrian pushing the door into a wall.

Dead stop arms in a parallel mount configuration often accommodate aesthetic needs. For instance, an in-swinging museum gallery door should not have a closer and arm on the hallway side. The hardware may look conspicuous on the hallway side of the door. Meanwhile, the owner probably needs to protect the wall—especially if there's a mural or display there. A stop in the middle of the display would simply not be an option. A dead stop arm limits the movement of the door and would be more appropriate in this application.

A frequent option with dead stop arms is a spring shock absorber. They are used in high-traffic applications where dead stop functionality is required, but a floor stop or wall stop is not an option. In normal traffic, as mentioned earlier, a door closer's backcheck feature will slow a door down before it hits a stop. But during high volume traffic, such as students leaving a study hall when the class bell rings, pedestrians pushing on the door can cause it to repeatedly hit the stop. The spring absorber takes the load off the mechanical door stop. The spring acts as a cushion and transfers the force back to the entire door system so it is not as abusive on the individual components such as the hinges, hardware and frame, resulting in a more reliable and longer lasting application.

Hold Open Arms

Again, no surprise here: hold open arms fix the door in an open position, usually between 70 and 120 degrees. They are helpful when the entryway needs to accommodate high traffic over time or when pedestrians are carrying objects and need an unobstructed path. Applications might include store front doors, glass front entrances, interior shopping mall doors and other similar applications.

An important note: hold open arms can only be used on non-fire rated doors. If hold open functionality is desired on a fire-rated door, you have to use an electrical hold-open, such as an electromagnetic stop, that can release the door if the life/safety system is activated. Auditoriums, meeting rooms and sporting venues are three applications where this would apply.

The three primary types of hold open arms differ in how the function is engaged.

Friction hold open arms are available in all three mounts—regular, top jamb and parallel arm. Friction hold open arms allow the door to be automatically placed in the hold open position until the user puts force on the door to disengage the friction hold and cause the door to close. A friction hold open arm can be used with the standard template of the door closer; it's a simple replacement.

Thumb-turn or twist-turn hold open arms are used in parallel arm, top jamb or regular mount applications. You have to know the maximum degree of door swing and the desired hold-open angle—is it 120 degrees? 90 degrees? The hold open angle will impact the templating when the door closer is installed, so a hold-open angle needs to be determined before installation occurs in the field.

Plunger hold open arms are designed with a cam-type mechanism in the arm to allow it to be adjusted to any hold-open position. The plunger arm does not include a positive stop but does include a bypass (breakway) feature, so the arm will not break if pushed beyond the hold open point. The plunger arm design prevents overtravel and damage to the closer arm, door or frame.

Specialty Arms

Of course, special applications require a specially engineered

arm. For example, narrow profile arms are ideal for a low headframe condition, like a drop ceiling that abuts the top of the frame or door. After all, there is some movement of the arm in the vertical plane when the door opens, and without ample space, the arm can hit the ceiling or trim when the door opens or closes. The condition can be resolved with a flat or low-profile arm. A low-profile arm can buy enough room (about ½ an inch) to permit the arm to travel over the top of the door without contacting other surfaces.

Track Arms

Unlike the other arms above, track arms do not have an elbow or shoe. They comprise a single linkage of metal that connects to a track on the door or frame. The arm moves along the track as the door opens and closes. Because they don't have an elbow, track arms are frequently used in moderately abusive situations like the inside door of a school bathroom. (Considering that protruding arms have been known to be used as chin up bars in schools and universities, a track arm removes the enticement to hang from the hardware.) They can also be used in special applications like in a luxury box seating area where a protruding arm is not as desirable.

Track arms can be used for aesthetic considerations, as they offer a clean, minimalist look. In fact, they are much more common in Europe than in the United States. However, their simple nature renders them less efficient across the opening and closing cycle. It usually takes more force to open a track-arm configured door, and less closing force is available. The situation can be remedied by using a cam-roller door closer design. Simply put, the cam-roller design is engineered to match the required opening/closing force with the angle of opening. It's the perfect match for track arms.

A Final Note on Coordination

Finally, one should consider how arms are coordinated throughout a structure. Architects tend to desire uniformity. Arms should not look wildly different despite serving different functions. Coupled with door closers, arms should provide a consistent, harmonized look from opening to opening. Some manufacturers even produce interchangeable arms across their door closer line. Interchangeability gives distributors fewer products to stock, adds flexibility and simplifies field installation. Interchangeability streamlines the ordeal of specifying and ordering products. Given how complicated the process can be, any measure of simplification is welcome.

So just like that car motor without a transmission and drive shaft, a door closer is nothing without an arm. The two pieces of hardware have to work together to transfer energy during the closing and opening cycle. Together, they can perform dozens of functions depending on the exact needs of each entryway.

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