

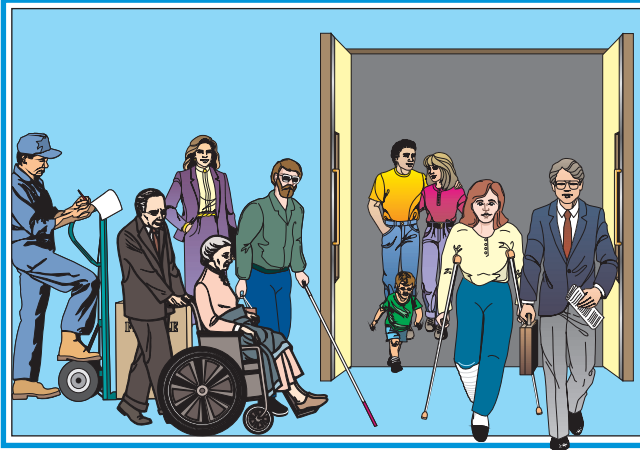
Safety A Matter of Convenience



Architectural & Specialist Door Manufacturers Association



Safety - A Matter of Convenience
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Doortech 2000



Safety - A Matter of Convenience

The primary purpose of a doorset is to provide for a means for 'traffic' to pass from one side of a wall to the other. A doorset is expected to provide this day to day function for the life of a building, and in a manner convenient to the building's users.

In addition to its primary role, a doorset is often expected to provide performance functions such as fire resistance, security, sound attenuation etc. In some cases multiple secondary performances will be required. Most secondary performance functions can only be achieved when the door is in the closed position.

As a functional item, a doorset may be the weak link in a performance barrier, particularly if the building users have difficulty in operating the doors.

While fire extinguishers and sprinkler systems are easily identified as safety measures, doorsets are seldom seen in the same light, yet the humble doorset can be a major safety device in the protection of a building and its users and is every bit as important as the more obvious safety measures.

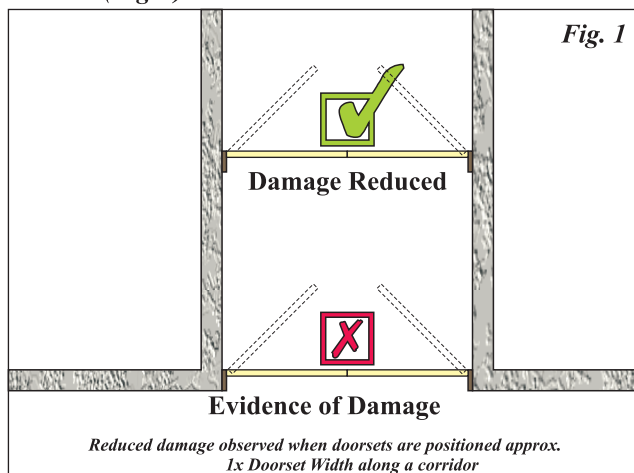
If doorsets are seen to be a barrier to the efficient working of a building, the building users may deliberately or inadvertently undermine the safety measures provided by performance doorsets for their own convenience.

One method for measuring user convenience is to assess the damage caused to doorsets in public buildings. Surveys on public buildings have led to the production of this document, which shows some steps taken by designers and maintenance bodies that have helped to address this problem.

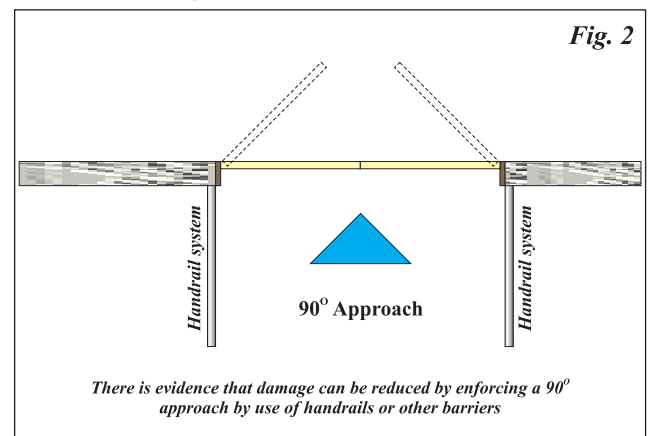
1/ Design - Doorset Location:

A reduced incidence of damage to doorsets was observed where:

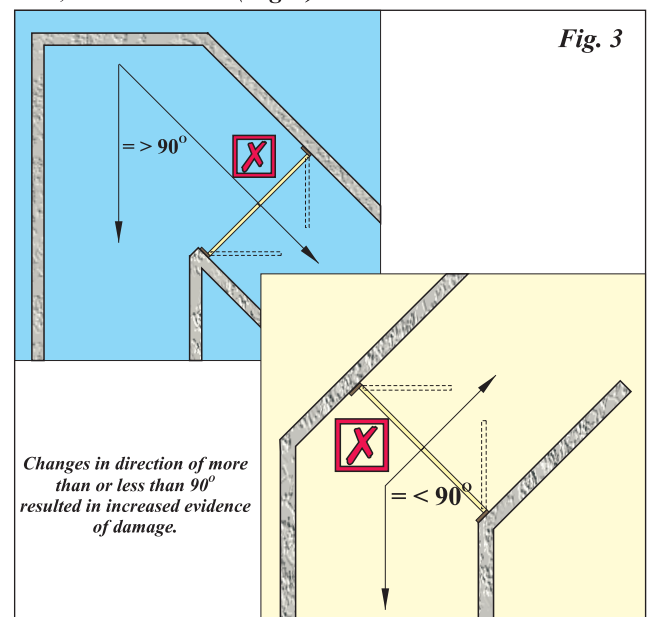
- Doorsets were located a doorset-width from the end of a corridor. (Fig. 1).



- Users had to approach the doorset at 90° (sometimes by use of a hand rail system) rather than where the approach was unrestricted. (Fig. 2).



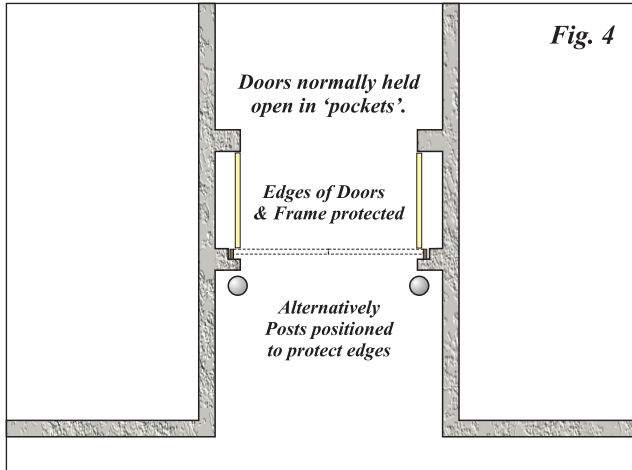
- Doorsets are located in positions that are clear of areas where the direction of 'traffic' movement is varied by more than, or less than 90°. (Fig. 3).



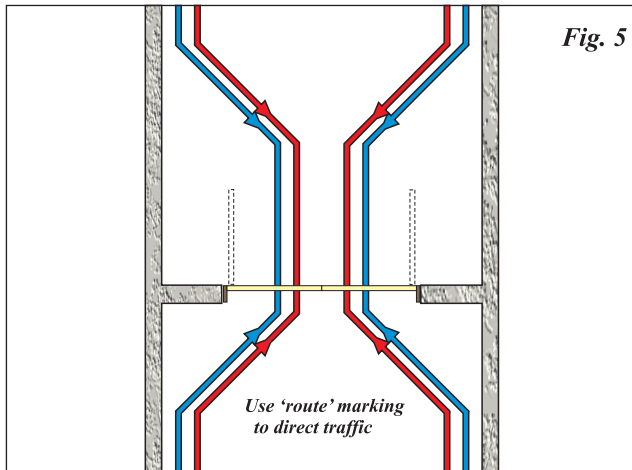
Design - Doorset Location contd.:

- Protection posts or 'pocket door' designs are used.

NOTE: This solution reduces the risk of damage to door edges but not necessarily to exposed door faces. (Fig.4).



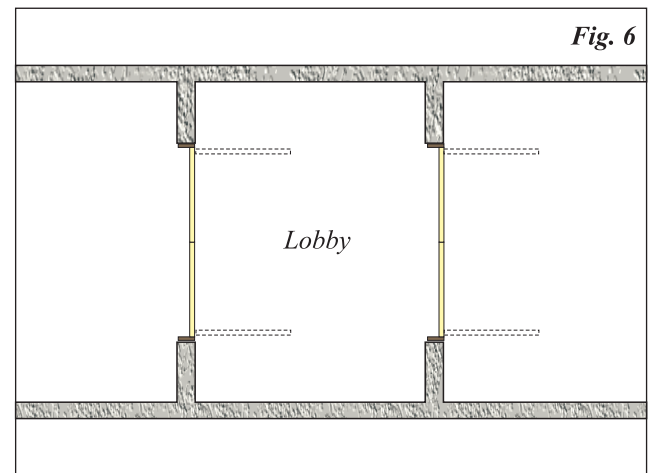
- A 'route marking' system is used in a manner that encourages 'traffic' to pass through doorways at the centre width position. (Fig. 5). (A psychological solutions?)



2/ Design - Doorset Lobbies:

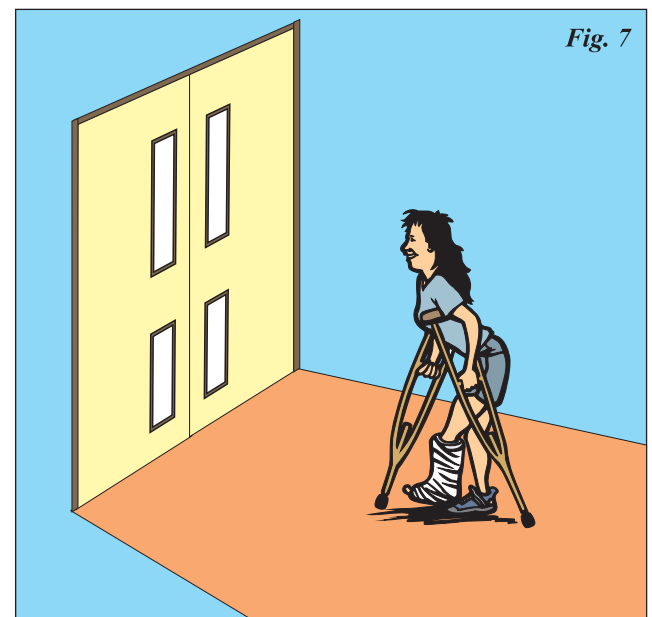
Where doorsets are fitted with sealing systems, (*particularly for high performance sound attenuating applications*), the doors can be difficult to operate during the initial opening phase (*until the doors clear the seals*). The same or superior performances can be achieved for fire resistance, smoke sealing and sound sealing applications by the construction of 'performance lobbies' using two sets of simpler and lower operating force doorsets.

A further advantage resulting from the use of performance lobbies is that some level of performance is maintained when one door is open and the other shut, as opposed to the 'all or nothing' performance provided by a single doorset. (Fig. 6).



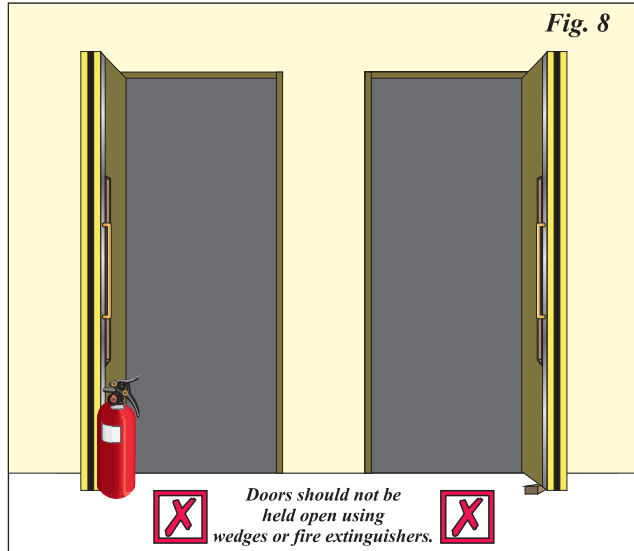
3/ Design - Hardware - Operating Devices:

A doorset can present a barrier to the convenient use of the building, particularly for disabled users and those encumbered with heavy or awkward loads. (Fig. 7).



3/ Design - Hardware - Operating Devices contd.:

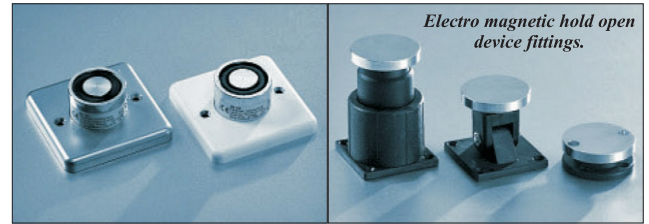
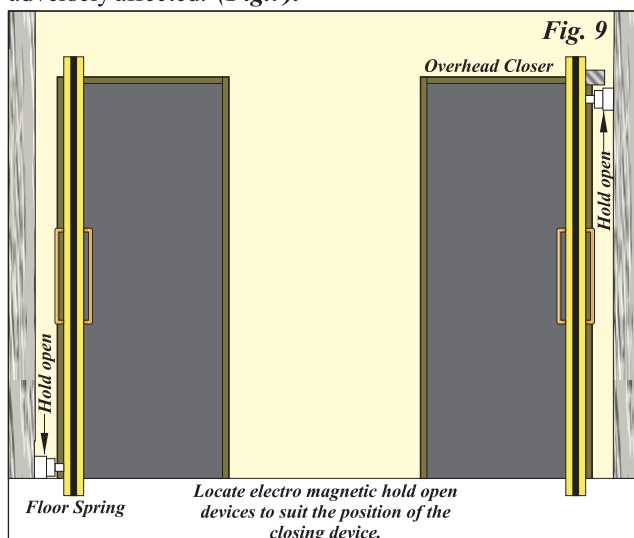
Door closers are the most likely devices to be disabled by building users for their own convenience. It is not uncommon to find doors held open against closing forces by the use of wedges or even fire extinguishers! (Fig. 8).



3a/ Automatic Opening & Closing and Electro Magnetic Hold Open Devices:

These devices improve the ease with which the user can move around a building with a consequential reduction in damage to doorsets. However, the following should be considered:

- When the doors are in a held open position they will not provide for any safety related secondary performances.
- Electro magnetic hold open devices should be positioned to suit the location of the closing device (*near the top of the door where single action overhead closers are used or, near the bottom of the door for use with floor mounted door springs*), otherwise, doors may become distorted to an extent that both door operation and performances may be adversely affected. (Fig.9).



NOTE 1: Automatic opening and closing devices and electro magnetic hold open devices are usually linked to fire alarm systems with all linked devices closing the doors if the fire alarm is activated. In the event of a power failure these devices will fail-safe to close the doors.

NOTE 2: It is recommended that doors that are usually held open using electro magnetic hold open devices should be operated daily during a period of low building occupancy.

3b/ Delayed action Overhead Closers:

There is some evidence to suggest that users will treat doors more carefully where closers with a delay function are used. This function allows for the doors to remain open for a short period of time (*sufficient time for the transit of traffic*) before closing.

3c/ Swing Free Closers:

Reduced damage is also apparent where swing free closers are used. These can be linked to alarm systems or may incorporate built in sensors (*usually smoke sensors*). In normal day to day use they apply no closing force to the door. Doors are allowed to 'swing free' with the doors being opened and closed manually. The closers operate only in the event of activation by the sensor or in the event of a power failure. (Fig.10).



4/ Hardware - Protection Plates:

There is little evidence to show that protection plates on doors reduce damage albeit that they may reduce the visibility of damage.

Protection plates may reduce surface damage to door facings but they do not prevent the transfer of impact forces through to hardware fitting or to the door core. Some high performance fire rated doors use a brittle core material that can be damaged by impact without any visible appearance of damage.

4/ Hardware - Protection Plates contd.:

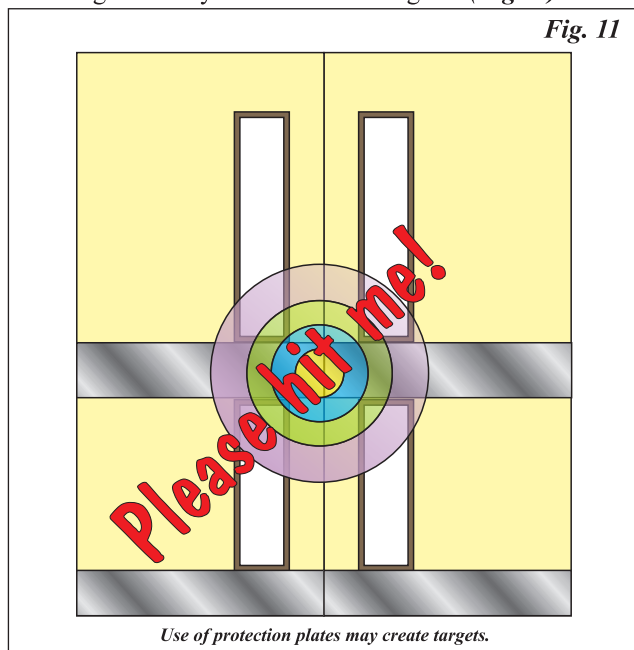
Protection plates are often positioned to suit aesthetic considerations rather than at actual impact areas.

Metal plates (*particularly aluminium plates*) can become sharp-edged as a result of impacts over time with a possible risk of injury to building users.

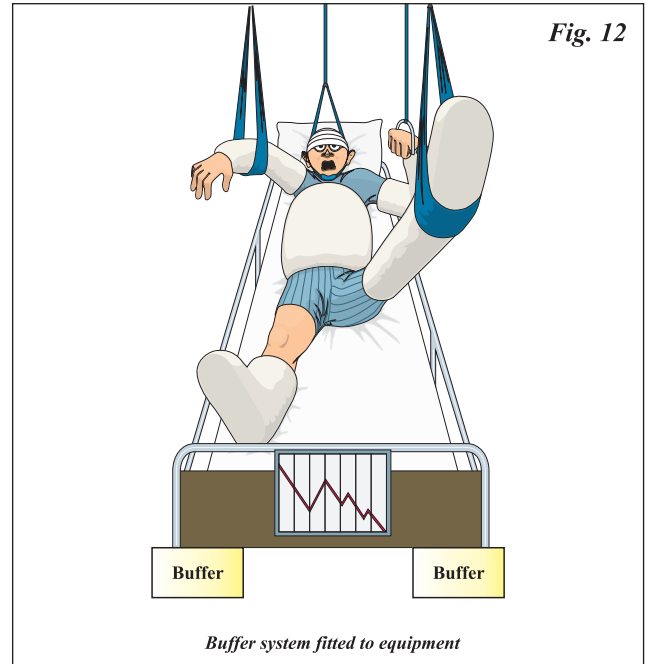
The most serious damage caused to wood doors results from doors being opened by wheeled traffic of varying weight and design using varying levels of force. Trolleys are effectively used as battering rams! The resultant damage is mainly at the door edges where face fixed protection plates have little if any influence.

If metal plates are extended around the door edges they will (*unless recessed in flush with the edge of the door*) occupy the operating gap between the door and the frame creating operational risks and may conflict with smoke or acoustic sealing systems. If extended across the full thickness of the door leaf, they can create a thermal bridge in the event of fire leading to possible premature failure of the door to perform its design function.

There is some evidence to suggest that greater care in use is likely where wood doors are of a 'furniture quality' appearance. Protection plates applied to door faces may encourage abuse by the creation of 'targets'. (*Fig.11*).



If the building use is such that impact attack on doors is likely to occur consideration might be given to the fitting of a buffer system on the wheeled 'traffic'. This may be a more effective method for reducing damage. (*Fig. 12*).



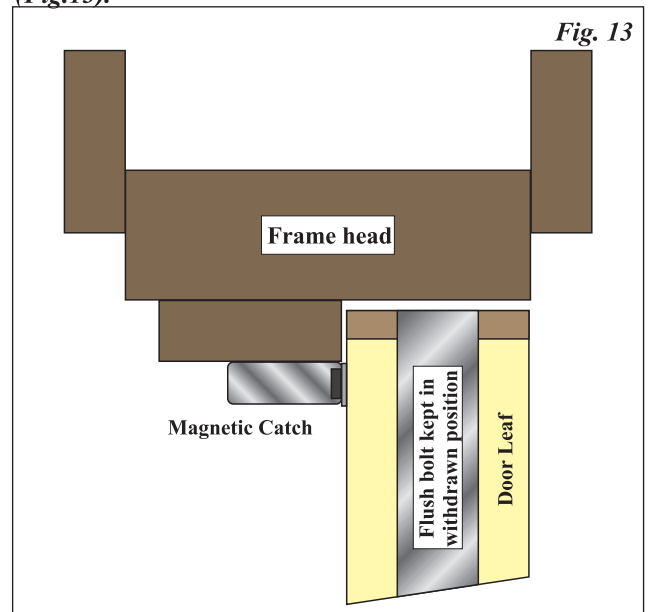
5/ Go with the Flow:

Where there is a high risk of heavy impact, the effect of the impact forces can be reduced if the doors are allowed to burst open. This 'go with the flow' approach has been successfully used in connection with hospital unequal leaf doorsets.

Where the narrow leaf was normally bolted, users found it inconvenient to withdraw them.

The solution for day to day use was to hold the narrow leaf in position using magnetic catches. If the doorset was struck by an impact on the closing face the doors burst open with minimal damage caused to the doorset. The bolts remained withdrawn unless they were needed for security purposes.

(*Fig.13*).



6/ Education:

This document shows some actions that may be taken to reduce damage to doorsets and to provide ease of use of the building for occupiers. It does not offer solutions for all problems likely to be encountered.

➤ Doorsets may be specified for mechanical performance by reference to DD171. *(DD171 sets out a series of mechanical tests including hard body and soft body impact testing).*

NOTE 1: *For 'Q' Mark certification, (administered by Chiltern Dynamics) the original DD171 tests are retained where these are not superceded by later BS EN testing with the new tests substituting the original DD171 tests where applicable.*

NOTE 2: *Whereas motor vehicles are subjected to crash testing, this does not invite drivers to deliberately crash their vehicles. Similar considerations apply to the mechanical testing of doorsets.*

➤ Hold open and automatic devices will certainly provide for improved user convenience for the day to day use of a building but doors will close in the event of a power failure or on activation by an alarm and may hinder escape from a building at the very time that they are required to provide for this function.

NOTE 1: *It should be possible to open doors manually using reasonable force when the power is off, i.e. when the doors are closed.*

NOTE 2: *An assisted escape plan should be prepared to aid the escape of persons in need of assistance for the purpose of evacuating a building.*

NOTE 3: *For locations where doors are held open, care should be taken to ensure that the doorway spaces kept clear and not occupied in a manner that could prevent the doors from closing.*

➤ A 'go with the flow' option may reduce damage to the doorset but with a possible increased risk of injury to persons who are on the opening side of a door that is burst open.

Perhaps the most effective way to provide for ease of use and to reduce damage in public buildings is by way of education. A doorset is used in a building for a purpose. Often that purpose is to provide for a 'performance' in addition to its basic function to provide a means for traffic to pass from one side of a wall to the other. Where fire resistant doors are concerned, the doorset is effectively an essential piece of safety equipment and should perhaps be treated accordingly.

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