Renovation provides a ready market for steel doors and frames

By Perry M. Smith
Ceco Corporation

One of the major pluses diversification has brought to the wall and ceiling industries is its built-in winning combination of giving the contractor the means for improving his bid package and expanding his product line for greater profitability.

More and more often, contractors who have found diversification the catalyst in building their businesses have been looking into the opportunities presented by hollow metal and steel doors and hardware. The record indicates that several do more than just look into the opportunity, they actually move right into the market.

The record also indicates that contractors are discovering that the door, frame and hardware market makes good sense to interior finishing systems, since the products themselves become an integral part of any wall on which they are installed.

As construction costs have steadily risen and energy supplies have begun to dwindle, the door components of a building have vaulted out of consideration solely on their decorative merits or specific functions. One of the major means a building owner or designer has to offset increased front-end costs in building is to use materials that will improve his life-of-ownership maintenance and operating cost picture.

Doors and hardware fit very nicely into that consideration.

However, any contractor who contemplates diversifying into the whole area of hollow metal and steel doors and hardware must convince himself that his investment of time, money and personnel will justify the move. That boils down to considering what his market opportunity is.

Obviously, the market exists in any construction of new buildings. But there is also a secondary market with outstanding potential. That market is renovation and modernization.

The same cost and energy-efficiency considerations that make door selection important to new construction exist in the rapidly-expanding...
Here are the basics on a product many contractors are finding a boon to further diversification and additional profit growth.

renovation market. Following, then, is an explanation of the factors to be considered in tapping this growing opportunity.

In any remodeling or renovation job, doors and door openings are prime candidates for alteration. For modernization of office buildings, apartments, hotels, hospitals, schools and other types of commercial and institutional structures, steel doors are winning increasing acceptance over wood because of their versatility, durability, economy and ease of installation and maintenance. Also accelerating the trend is public demand for greater security, fire safety and energy conservation. It is possible to meet these demands with the construction materials used in steel doors. The core material in a hollow metal door provides superior insulation, and sheet steel is highly resistant to both fire and break-ins.

In choosing the right steel doors, there are many factors to consider. Depending on traffic patterns and anticipated uses, heavier duty doors may be called for. Or, if an area is to be used less intensively, a lighter door may suffice. Efficiency may be improved by switching the handling on a door, or reversing its direction of opening. Doorways may have to be enlarged or moved to another location. Styles and hardware may need re-thinking because of new uses, or simply for appearance’s sake.

In all cases, when selecting replacement doors, it’s best to work backward from the expected use of the door. The basic guidelines for steel replacement doors and frames are essentially the same as for new construction, with respect to performance standards, styles, sizes and finishes. Generally speaking, the frequency of use and the degree of impact the door must withstand govern the gauge of steel used in construction of the door. The core construction used is determined by code requirements for fire resistance in the given location and insulating needs for temperature or noise control. De-

| BUTTED FRAME | Frame that fits against the wall structure rather than around it. Frame depth is normally equal to or less than wall thickness. |
| DOUBLE-SWING FRAME | Frame prepared for a pair of single-acting doors, both of which swing in the same direction. |
| HEADER | Horizontal frame member at top of opening or top member of transom frame; sometimes referred to as head bar. |
| HINGE JAMB | Vertical member of frame prepared for installation of hinges. |
| JAMB DEPTH | Overall width of frame section. |
| KNOCKED DOWN (KD) FRAME | Door frame furnished by manufacturer in three or more basic parts for assembly in the field. |
| LABELED FRAME | Frame that conforms to all applicable requirements and procedures of governing labeling authority and bears their identification label. |
| LOCK JAMB | See Strike Jamb. |
| OPENING SIZE | Size of frame opening; measured between rabbets horizontally and between top rabbet and finished floor vertically. |
| RABBET | The recess or offset formed in the frame to receive the door. |
| ROUGH OPENING | Size of wall opening into which frame is to be installed. |
| SIDELIGHT | Same as borrowed light except that it is attached to door frame. |
| SINGLE-SWING FRAME | Frame prepared for one swing door. |
| STRIKE JAMB | Vertical member of frame prepared for installation of lock strike. |
| TRANSOM FRAME | Door frame having transom bar and glass, panel, or louver above door opening. |
| WELDED FRAMES | Door frame assembled by spot and/or arc welding. |
| WRAP-AROUND FRAME | A frame that fits over the wall. The wall thickness is a nominal 1/8 in. less than the frame throat. |

STEEL DOORS

ACTIVE LEAF—That leaf (or both leaves) of a pair of doors for which the locking or latching mechanism or other operating hardware is intended.

ASTRAGAL—A vertical moulding attached to the meeting edge of one leaf of a pair of doors for protection against weather, to minimize the passage of light between the doors, or to retard the passage of smoke, flame, or gases during a fire.

BEVELED EDGE—The edge of a door not at a 90 degree angle to the face of the door (standard bevel is 1/8 in. in 2 in.). Narrow side of the door is the side in contact with the stop of the frame when door is closed.

DOOR CLEARANCE—The space between door and frame rabbet, between door and finished floor, or between meeting edges of pairs of doors.

END CHANNEL—Horizontal stiffener channel welded into top and bottom of doors for strength and rigidity.

FULL FLUSH DOOR—A type of door formed from two sheets of metal. Top and bottom of the door may be flush or closed with recessed channel end closures. Seams are visible on door edge only. Doors are stiffened by a suitable method in accordance with the manufacturer’s standard practice.

INACTIVE LEAF—The door leaf in a pair of doors that is normally help closed by top and bottom bolts.

Labeled Door—Door that conforms to all applicable requirements and procedures of the governing labeling authority and bears its identification label.

LEAF—An individual door, used singly or in multiples.

SURFACE HARDWARE PREPARATION—Manufacturer-installed reinforcement for field-applied surface hardware. (Does not include drilling and tapping of mounting holes.)
Crow bars and hydraulic jacks we often used in break-ins.

Pending upon relative desirer for privacy, visibility, light, or ventilation, the choice will fall to one of the basic steel door designs—solid flush or panel—half or full glass, narrow or vision light—single, double or full louver. Special situations may call for double doors or a Dutch door.

Standard variations in sizes and architectural treatment are very broad, and a steel door can be customized to achieve virtually any effect that is possible with wood.

The choice in frames and surrounding hollow metal work is also wide. Again, the expected function should be the controlling factor in selection. Compromises are sometimes advisable where renovation is taking place in the midst of continuing activity—for example, in a busy hospital area, while school is in session, or when a tenant has moved into new office space before remodeling is completed. In such situations, it’s desirable to keep disruptions to a minimum.

Some “how-to’s”

Although steel doors in steel frames are preferable, a new steel door can be mounted in an existing wood frame, thus decreasing the amount of construction and lowering expenses. However, if screw holes are stripped out, or the old frame will have to be radically altered for the new hinges and lock, it may be more practical to go to a retrofit steel frame and matching door. The steel frame butt mounts inside the existing wood frame and installation is simple. While the frame requires a minimum of space, the retrofit door will be 1” smaller in width and height than the door it replaces. Ordinarily, this will cause no problems and is scarcely noticeable. Tolerances usually exceed code requirements by at least 2”. But if the dimensions were close for the intended use to begin with, check carefully to make sure the further loss of 1” in the opening won’t render the new door useless. In this case, there is no alternative but to tear out the old wood frame and start over.

Non-handed and reversible steel doors and frames are the big time and money savers. They have many modular characteristics. Building managers can cut their door inventory by stocking non-handed designs, which are adaptable to swing in either or both directions and to handing on either left or right.

The hinge preparation on a non-handed door is mortised through the door’s full thickness and drilled with a double set of screw holes to accommodate a hinge pivoting in or out. A reversible steel plate exposes only one set of holes and covers those not being used.

Preparations for the lock or latch are cut equidistant from the top and bottom of the door, so that the door can be inverted to change the handing. Non-handed doors come in 6’8” and 7’ heights, which are the most popular door heights. But for doors above 7’, the design is not practical, due to the lock height required for a reversible door.

The non-handed frame is another ingenious modular concept. It consists of two jambs, one mortised for hinges and the other for a universal strike—a head that can be fastened to either end of the jambs—and two jamb anchors that can also be attached to one end or the other of each jamb. Clips at each end of the jamb are drilled to secure either the head or the jamb anchor. The five components can thus be assembled in any combination by turning the jambs around to change the hand or inverting them to change the swing. The practical height of the non-handed frame, like that of the door, is limited to 7’ by the necessity for central placement of the lock strike. However, 6’8” and 7’ heights will
serve the majority of door needs. Non-handed frames come in Standard depths from 4¾" to 8¾" and are adaptable for either wraparound or butt installation.

In remodeling, when it’s necessary to replace a frame, a non-handed frame is a wise choice in order to allow the greatest flexibility for possible future changes. Cost differences between handed and non-handed designs are not significant in either doors or frames, especially in light of potential savings later.

In addition to the variety of standard styles, sizes and lock preparations on the market, non-handed doors can be customized to specifications. The lack of a bevel on the strike stile in a non-handed door is not really a drawback, since the gap between frame and door is increased by only 1/32" in comparison with a beveled door, a scarcely noticeable difference.

**Consider the use factor**

As noted earlier, the major decisions in steel door selection begin with fundamental questions of usage—even with such obvious distinctions as those between exterior and interior doors. For economy in installation and maintenance and for efficiency in operation, doors deserve the same careful planning given to computers, office machines and equipment, furnishings and decor. It’s a waste of money to put in a heavy gauge steel door where a lighter gauge would do the job as well. Conversely, it’s poor economy to buy a light door for hard use to save money, since it may cause problems in operation and require early replacement of both door and hardware.

A standard thickness for cold rolled sheet steel that is suitable for many uses is 20 gauge. Light duty doors may be made with 24 gauge, heavy duty with 18, and extra heavy duty with 16 gauge.

Doors are roughly classified with respect to usage as low frequency (no more than 50,000 times annually), moderate frequency (100,000 to 250,000 uses), and high frequency (more than 500,000 uses). Impact ratings fall into similar categories. Doors subject to high impact are usually those that undergo high frequency use. However, some doors may have to withstand high impact even though they get only moderate or low frequency use. Recommendations for light, standard, heavy, or extra heavy duty construction are derived from estimates of both use frequency and impact.

Charts prepared by manufacturers cover almost every conceivable exterior and interior situation, indicating the frequency of use generally experienced and the degree of impact probability. Charts will also contain reminders of special considerations likely to be encountered, such as need for two-way vision or unusual sanitation requirements. A recommendation as to gauge may sometimes be given under the manufacturer’s trade name for a particular door of that type.

Standard door widths range from 2 to 4 feet, the most popular being 2'6", 2'8", 3', 3'6", 3'8", and 4'. In picking your width, think of what’s going to have to pass through it—a serving cart, baby carriages, desks, pianos, or whatever. Consider also whether double doors may be the best answer.

Steel doors are most commonly 1¾" thick. For added strength, fire resistance and insulating and sound deadening properties, hollow interiors are filled with materials such as kraft honeycomb, polyurethane or polystyrene foam, mineral fiberboard, glass fiber with steel stiffeners, or calcium silicate. Weatherstripping may be applied to interior as well as exterior doors to provide further sound insulation.
Local and state codes vary widely, and manufacturers design and produce doors to meet various standards and specifications, including those of the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Steel Door Institute (SDI), and several government agencies.

There is a steel door and frame assembly to meet every fire code and label requirement. The five standard fire ratings, determined by the potential exposure requirements of the door and its location are: A—openings separating buildings require a fire protection rating of three hours and no glass is permitted; B—openings such as stairwells or elevator shafts require a protection rate of 1½ hour and glass areas must not exceed 100 sq. in. per individual door leaf; C—openings in corridors and room partitions require a rating of ¾ hour, the glass area must not exceed 1296 sq. in. per light, and no dimension may exceed 54 in.; D—openings in exterior walls subject to severe fire exposure from the outside of the building require a rating of 1½ hour and no glass is permitted; and E—openings in interior walls subject to moderate fire exposure require a rating of ¾ hour and glass areas must not exceed 1296 sq. in. per light.

In addition to fire safety, security, or protection against forced entry, is an important consideration. Crow bars and hydraulic jacks that spread frames are often used in break-ins. Therefore, a strong frame is needed, as well as a strong door properly reinforced for a good lock. Extra steel or wood studs behind the door jamb can provide extra strength and make it more difficult to spread a frame installed in a gypsum board and stud wall.

For exit doors that must furnish both security and fire protection to meet building codes, special exit devices are required to provide proper latching and unrestricted egress in case of emergency. No lock that might hinder or prevent quick exit is allowed. A device (such as an interlocked bell or alarm) that discourages unauthorized opening of the door from the inside is recommended for security purposes.

Function and design possible

Steel doors offer a wide choice of finishes, colors, decorative treatment and hardware. They are generally delivered with a baked-on coat of prime paint, but about 15 percent are prefinished at the factory. They are usually protected with a plastic sleeve, which is left on until the door is installed.

Textured doors, with a raised pattern impressed or embossed into the sheet steel, add a decorative effect and are resistant to scuffs and abrasion. When designers want an ornamental treatment, a variety of moldings can be securely affixed to the door.

About 60 percent of steel doors are sold for interior use. A growing number of those for exterior use are being made of painted, galvanized sheet steel, especially those for areas where high humidity or corrosive conditions are prevalent.

Cooperation between steel door manufacturers and hardware manufacturers has led to development of standards for the reinforcement and application of hardware. Doors and frames are available that have widely accepted built-in reinforcement to permit field installation of hardware and accessories, such as hinges, locks, bolts, door closers, exit devices, floor checks, pivots and weatherstripping.

In planning a renovation, consolidate all door and frame needs in advance if possible, so that you can place a single order. To avoid delays, steer clear of piecemeal ordering. The great variety of stock sizes and styles available eliminates the need for custom doors to a large extent. A stocking dealer or distributor can be a great help in his ability to render quick service and meet emergencies.

Delivered ready for installation, sized to fit, and pre-mortised for hinges and locks, steel doors and frames help to minimize job site labor. Once installed, the only maintenance needed is occasional painting.