



FIRE AND RESCUE DEPARTMENTS  
OF NORTHERN VIRGINIA  
FIREFIGHTING AND  
EMERGENCY OPERATIONS  
MANUAL

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**Truck Company**  
**Book 2 –**  
**Forcible Entry**  
*First Edition*

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## PREFACE

Forcible entry can be described as the techniques used to access buildings or other areas of confinement when normal means of entry are locked, blocked, or non-existent. An efficient forcible entry operation should be accomplished within a relatively short time. A key concept in forcible entry is that the firefighter must not simply apply force – proper technique is equally as important to be successful. Never forgo proper technique in order to apply more force to the object you are attempting to defeat as finesse often times wins the battle.

### Definitions

The key definitions used in this manual are as follows.

**A-tool:** A beveled, triangular-shaped lock puller that appears similar to a Halligan bar with an adz and pick end. The A-tool, also referred to as an Officers Tool, has a much shorter shaft and is typically used for the removal of a lock face by placing the adz end lock puller behind the lock.

**Arch:** The inside curve on the fork end of the Halligan bar where the two blades of the fork are joined. Also referred to as the crotch of the fork.

**Bevel Side:** The curved outside portion of the fork end of the Halligan bar that provides leverage when applying force.

**Bolt:** A fastening device that is square or round that slides into a notch.

**Chocking the Door:** Process of securing a door in the open position.

**Claw Tool:** A forcible entry tool that is approximately 36 inches long with a hook on one end, like a shepherd's crook, and a curved beveled fork on the other end.

**Concave Side:** The curved inside portion of fork end of the Halligan bar.

**Door Frame:** A structural border into which a door is hung, also known as a doorjamb.

**Fox Lock:** Also known as a police lock, it features two steel bars that spread across the width of the door and beyond, held by two brackets set in the doorframe. When the door is unlocked, the bars pivot inwards and withdraw from the brackets or may retract into the door body.

**Gap the Door:** The process of achieving a space between the door and doorframe to create a purchase point. This is typically achieved by striking the door in three areas (top, middle, bottom) with the selected tool for forcible entry.

**Halligan Bar:** A tool developed in the late 1940's by FDNY Deputy Chief Hugh Halligan. The tool consists of a rectangular steel shaft with one end containing a curved forked end. The other end contains an adz that is slightly curved and flares out towards the end. Additionally, the tool contains a pick that is at a 90° angle to the adz. This multi-function tool is available in lengths from 24 inches to 54 inches with 30 inches being the preferred and most commonly used length for forcible entry. *Can be referred to as Halligan bar, Halligan tool, or simply Halligan.*

**Hockey Puck Lock:** American 2000 series lock (also known as a doughnut lock) is a one-piece solid body design lock with locking bolt concealed within the body of the lock. The lock is circular in design and resembles the size and shape of a hockey puck.

**Hydra Ram Tool:** A one-person operated hydraulic forcible entry tool that weighs approximately 12 lbs. and can exert upwards of 10,000 pounds of force by extending shaft by the pumping motion of the handle. *(Related in functionality to the Rabbit Tool.)*

**Housing and Urban Development (HUD) Window/Door:** A method of securing an opening on vacant structures used by the Department of Housing and Urban Development (HUD). The opening is secured with plywood, 2x4s horizontal to the plywood, and lag bolts connecting the two pieces to keep the plywood in place. Vacant Property Security (VPS) is a manufactured metal version that accomplishes the same goal, but is much more formidable in attempting forcible entry techniques.

**K-tool:** A steel body design that has a metal strap on one side to accept the adz of the Halligan bar. The interior portion of the tool has two beveled steel blades that form the letter K. The tool is applied over the face of a lock; when force is applied to the K-tool, it removes the face of the lock.

**Mortise Lock:** A locking device that is designed to fit into the cavity edge of the door.

**Pivoting Deadbolt:** A fastening device that is square and pivots into a notch.

**Purchase Point:** The opening, or space, achieved by force that is between the door and doorframe that allows for leverage to be used to continue forcing the door.

**Rabbit tool:** A two-person hydraulic forcible entry tool that weighs approximately 25 lbs. and consists of a large jaw that is placed into the door frame and exerts over 8,000 pounds of force. The second part of the tool is the hand pump that when actuated creates the pressure to spread the large jaw. *(Related in functionality to the Hydra Ram Tool.)*

**Shove Knife:** A thin metal tool that is shaped with a rounded hook on one end. The tool can be used to spring the latch on an outward opening door that does not have the deadbolt engaged. Additionally, it can be used on spring latches found on double-hung windows.

**Set the Tool:** Driving a Halligan bar into the gap until the arch, or crotch, of the fork is even with the door.

**Shoulder:** The top side of the forked end of the Halligan where the shaft of the tool attaches. Depending on the make of the Halligan bar the shoulders may be rounded or squared off. It is more functional for the shoulder to be squared off to allow for the striking tool sliding down the shaft that will set the Halligan in the door.



## FORCIBLE ENTRY

Today's society is very security conscious. The trend in homes and businesses is to have strong, complex, and/or multiple locking mechanisms. The locks are designed to keep out intruders, but have the added effect of making the task of forcible entry more difficult for emergency responders. Door and window design and construction have become more secure and subsequently more resistant to forcible entry as well.

The speed in gaining entry by forcible entry measures is dependent on four major factors that follow a good size-up:

- The skill of the crew,
- The selection of the appropriate tools,
- The construction of the barrier/door, and
- The application of the proper techniques.

The techniques for forcible entry are taught in basic and advanced training classes but must be practiced on a regular basis in order for firefighters to remain proficient. Paramount is to remember the first rule of forcible entry: *try before you pry*. For example, personnel should be aware of the presence of rapid-entry key systems (e.g., Knox, Supra boxes) that would negate the need for forcible entry.

Crews performing forcible entry should be proficient with the tools carried on their apparatus. They should have knowledge of building construction, lock design, and forcible entry operations beyond the basic information provided in recruit/basic training. Officers must ensure that their crews remain proficient in forcible entry terminology, techniques, and operations.

Forcible entry is a form of ventilation performed on the structure and, often, it is the first point of ventilation. A key point to remember when forcing entry is the effect this action will have on the fire's flow path. Forcible entry, like ventilation, must be coordinated. After entry is made, the door must be controlled to minimize the creation or alteration of a flow path. Opening the door before the hose team is ready for entry can cause the fire to grow exponentially.

### Forcible Entry Tools

The type of occupancy will typically be a determining factor in what tools are selected for forcible entry.

This section explains the standard tools for forcible entry. The list is not all-inclusive, but rather a basic complement that can be expanded based on the needs of the area served and the preferences and needs of the company. Special situations in a company's first due area may require a deviation from this standard tool complement.

The following tool complement is guide for the following occupancy types and/or forcible entry operations:

<b>Residential structures:</b>	<ul style="list-style-type: none"> <li>▪ Flathead axe (6 or 8 lbs.) and a Halligan bar (30-inch length is preferred) <ul style="list-style-type: none"> <li>– When these tools are paired together they are often referred to as the irons or married pair</li> <li>– The 8-pound axe is preferred when pairing together due to the width of the blade of the axe</li> </ul> </li> <li>▪ Sledge hammer (10-pound minimum)</li> <li>▪ Door chocks to assist in chocking the door after a hoseline is charged and advancing to the fire – always being mindful of coordinated ventilation</li> </ul>
<b>For thru-the-lock operations:</b>	<ul style="list-style-type: none"> <li>▪ K-tool and key tools</li> <li>▪ A-tool</li> <li>▪ Vice grips</li> <li>▪ Shove knife</li> </ul>
<b>Commercial structures and multi-family dwellings (garden apartments, etc.), in addition of the standard complement recommended for residential structures:</b>	<ul style="list-style-type: none"> <li>▪ Hydraulic forcible entry tool (Rabbit Tool or Hydra Ram) for metal interior doors</li> <li>▪ K-tool with key tools</li> <li>▪ A-tool</li> <li>▪ Sledge hammer (10-pound minimum)</li> <li>▪ A rotary disk saw with a metal cutting blade</li> <li>▪ Framing square or L-shaped rebar to reach through the gap between doors with a panic bar <ul style="list-style-type: none"> <li>– The square or L-shaped rebar can travel through the gap and apply force to the panic bar to open the door with limited damage</li> </ul> </li> <li>▪ Duck-billed lock breaker</li> <li>▪ Bolt cutter</li> <li>▪ Vice grips for removal of the face of a commercial style lock</li> </ul>

The tools mentioned above will enable a crew to force entry into most situations encountered. Companies should have knowledge of special forcible entry situations requiring specific tools in their first-due areas.

The art of forcible entry takes forethought and mastery and only constant practice and training can keep truck company members proficient at this vital task. For the purpose of this manual, forcible entry techniques are divided into the following categories:

- Thru-the-Lock Forcible Entry
- Conventional Forcible Entry
- Hydraulic Forcible Entry
- Forcible Entry through Padlocks
- Forcible Entry through Windows
- Forcible Entry through Roll Down/Overhead Doors
- Forcible Entry Special Considerations

Prior to performing any forcible entry technique, truck company personnel must size-up the door or entry point they will force. Additionally, they should consider what airflow/ flow path changes they will create and the effect it will have on fire behavior. **Forcible entry is a form of ventilation!**

## Forcible Entry Size Up

Forcible entry size-up should include:

- Type of occupancy,
- Expected types and number of locking mechanisms,
- Type of door or window(s),
- Hinge location,
- Entry priorities,
- Reasons for entry,
- Resources, personnel, and tools available to perform the entry operation, and
- Location of the fire.

The crew responsible for entry must do a size-up, not only to determine the best route of entry, but also the best way to accomplish entry which may be forcible entry, rapid entry keys, or delayed entry. The type of entry method will be determined from the size-up.

If entry is required for hoseline deployment, the route shall be decided in concert with the engine officer.

The entry location decision is based on time available for entry, occupancy type, construction, location of the fire, location of endangered occupants, and the reason for rapid entry, such as for fire attack or conducting a primary search. Sometimes the presence of a rapid key-entry system, such as a Knox or Supra box, will affect the entry location.

## Identifying Entry Priority

Entry priority can be immediate or delayed.

**Immediate** – This priority is indicative of an emergency condition such as a life hazard or fire condition exists. Speed and efficiency takes precedence over property damage; the only exception to expedient forcible entry is the presence of a vent-limited fire without an engine company present. In the vent-limited fire conditions, companies should gain entry but control the entry and the flow path until an engine company with a flowing handline is present.

To fight a building fire effectively, truck company crews must provide forcible entry for engine companies, search crews, ventilation, and to check for fire extension in both in the fire building and the exposures. It is imperative for truck company personnel to understand that ventilation is a form of ventilation. This action can introduce a large volume of air to the fire causing a rapid increase in fire volume and intensity.

**Delayed** – This priority is indicative of a potential emergency where the crew gains entry to verify the emergency. The objective is to enter with the least amount of damage. Public opinion about the fire department's action at investigative calls is the reason that close attention is paid to minimizing damage. After entry, if damage is present, crews should do everything possible to secure the premises or turn over liability to the proper authority.

## Evaluating the Types of Doors

There are several considerations when evaluating types of doors:

- **Is the door to be attacked weak or is it strong?** An example of a weak door is one that has a thin metal outer shell with light wood supports inside or composite wood covered with light wood supports. A strong door is one that is high-grade metal outer shell with metal supports inside, solid wood, or tubular metal and tempered glass (aluminum stile).
- **What are the number and location of locking devices?** Locking devices are found in various configurations from the most minimal of doorknob locks to the more difficult to force, such as multiple add-on locks (rim) or mortise locks. Even if a door has multiple locks, this does not mean that every lock is actually locked and proper size up and technique will assist in making this determination.
- **Are there windows in the door or window lights on the side panels adjacent to the door and near the locking devices?** Windows found near the locking devices can be easily broken exposing the interior of the lock. This method is only effective if it is a single cylinder lock or the key is in place on a double cylinder lock.
- **Are there weak walls holding up strong doors?** An example of a weak wall would be a studded wall with drywall or siding covering the studs. The wall may be easier to breach than forcing the door. An example of a strong wall would be solid masonry. While a masonry wall can be breached, it may be more practical to go through the door. Assessment of the structural stability of the building must be considered if this tactic is employed.

Typically, doors are preferred for entrance over windows due to the size of the opening and the ability to move freely in and out the point of access.

**Residential Dwellings** – Inward opening doors in these structures are usually the main entrance, bedrooms, and bathroom doors. Residential doors are typically wood or metal/fiberglass for exterior and hollow-core wood for interior openings. Outward opening doors found in residential structures lead to closets, mechanical areas, and the basement stairs.

**Multiple Dwellings (Garden Apartments)** – Public or common area exit doors swing outward and private entrances into individual apartments swing inward. Outward opening doors found in individual apartments lead to closets and mechanical areas. Outward opening doors in the public hallways typically serve maintenance closets, electrical vaults, and mechanical rooms.

**Commercial Occupancies** – Outward opening doors are the main entrance doors that can be located on front and rear of the structure. Firefighters should expect rear doors to have increased security measures in place. Inward opening doors in commercial occupancies lead to closets, mechanical rooms, stairwells (from the corridor), and formal entrances not classified as exits.

To confirm the swing of the door, check the doorframe and hinges. Inward opening doors are recessed in the frame with no exposed hinges. Outward opening doors are flush with the frame

and have the hinges exposed. This could be important in limited or zero visibility to aid in identifying the type of door by touch.

In general, the door most likely to be forced will be the one the occupant locked last or the one that the occupant uses to enter and exit on a normal basis. For example, rear doors in a strip shopping center are usually well secured and the front door only has one lock because the proprietor exits the front when securing it at night.

## THRU-THE-LOCK ENTRY

The thru-the-lock method is a means of gaining entry by attacking the locking device with little or no damage to the door. This method is preferred when immediate access is not required. Proper through-the-lock is an excellent customer service tool and should cause less damage than the fire. An example of when to perform through-the-lock would be when no fire/smoke conditions are evident but further investigation is needed. It may also be useful for a fire situation in a multi-room occupancy, such as a hotel, high-rise, etc. where multiple rooms must be checked for extension.

In order to successfully disable any locking device encountered, preparation is required in three areas:

1. Knowledge of the type and function of the locking device,
2. Competence with through-the-lock entry methods, and
3. Pre-incident planning and familiarization.

A key to success with through-the-lock entry is to access through the door the occupant typically uses on a regular basis as this may be less fortified than rarely used doors of entry.

As with any function on the fireground, a successful size up must occur and should entail:

- Occupancy type,
- Type of door,
- Location of the lock cylinder(s),
- Direction the door moves (inward or outward), and
- Additional locking device evident on the door.

It is incumbent upon the company that when they perform through-the-lock that they are attacking the lock and not the door.

The American National Standards Institute (ANSI) and most lock manufacturers divide locks into five categories:

1. Exit Devices/Panic Hardware
2. Rim
3. Mortise
4. Bored (Cylindrical) - Doorknob
5. Pre-assembled (sometimes called Unit Locks)

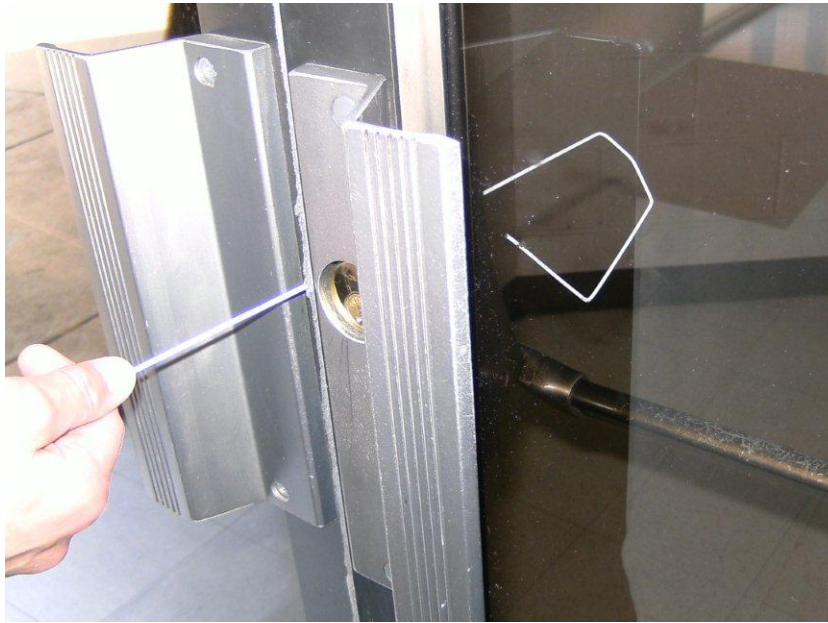
These types of locks can be difficult to force conventionally, especially if they are outward opening, as they are usually set in a metal frame. The door may be strong and designed to resist prying. There are several methods to overcome these doors.

### Exit Devices or Panic Hardware

An exit device, otherwise known as panic hardware, is a locking mechanism on doors usually found in public assemblies. The door requires an occupant to push a plate or bar to release the

door lock. This lock was developed after several multi-fatality fires where occupants died because of their inability to operate a lock. Occupants would panic and converge on the exit in large groups. The cause of these deaths was from suffocation and/or crush injuries rather than from the byproducts of combustion. The design of this mechanism unlocks the door should a panic situation occur at the exit. In a locked condition, the door is secured from the outside while egress is maintained from the inside. Some panic hardware has a time delayed safety feature, preventing immediate opening. This time delay may be necessary in a high security area where the building exits into a higher security area such as an airport terminal exiting onto the runway.

When a panic bar is observed or suspected, personnel can employ forcible entry techniques using a coat hanger, rebar, or tools from a lockout kit for vehicles, Figure 1.



**Figure 1: Something as simple as a coat hanger can defeat panic hardware from the outside.**

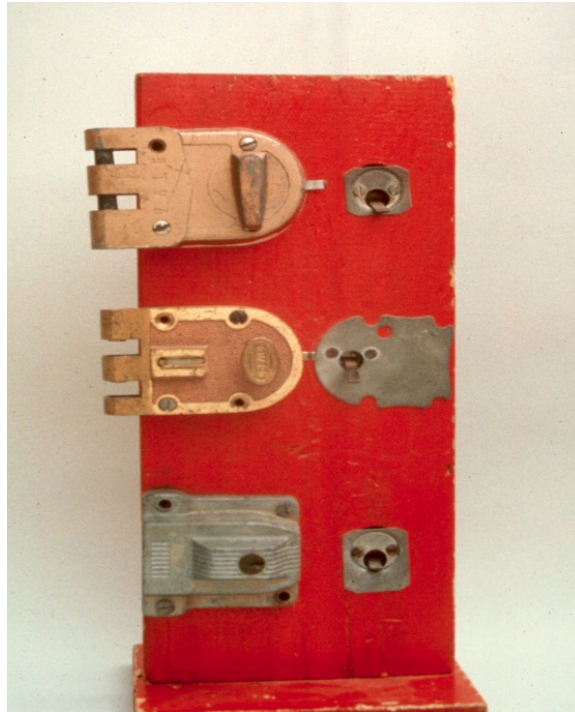
Exit device or panic hardware can be found with a secondary locking device such as a rim, mortise, or vertical rod. The rim lock and mortise lock exit devices consist of an aluminum stile, tubular metal door with static push plate. The push plate does not activate any part on the locking mechanism. A separate rim or mortise lock secures the door. When the door is locked, it is secured from the inside and the outside.

### **Rim Locks**

Every rim lock, regardless of manufacturer, has these general characteristics, Figure 2:

- The lock is secured in place on the door by its rim.
- The rim is larger than the hole in the door.
- Screws hold the cylinder in place.
- A stem protrudes from the cylinder, which turns the locking mechanism.
- The lock is best described as being surface-mounted and for this reason is used as an add-on lock for doors that have other types of locks already in place. It only requires a single hole drilled into the face of the door. A hole in the edge of the door is not needed.

- Modern Rim Locks have a guillotine that springs shut when the lock cylinder is pulled. This shields the locking mechanism and prevents manipulation by a key tool.



**Figure 2: Examples of rim locks.**

The rim lock is usually installed above an existing lock as an auxiliary security device. Apartment dwellers will often add this lock so the management does not have keyed access to their apartment. This lock can be found in all types of occupancies, including houses, apartments, and some commercial buildings. Examples of rim locks are shown in Figure 3.





**Figure 3: Outside (left) and inside (right) view of rim locks.**

Rim locks are found in the following configurations:

- Dead bolt,
- Night latch, or
- Vertical dead bolt - also called interlocking dead bolt.

A rim cylinder appears identical to a mortise cylinder when viewed from the outside of a door. A rim lock is usually mounted higher on the door than a mortise lock. The best way to recognize the difference between the two locks is to look at the lock cylinder after it is pulled.

There may be several rim locks installed in one door. However, not all of the locks may be in the locked position or operational. One way to identify which locks are operational is to look for fresh key marks around the key way, Figure 4. One that is painted is probably not used. Apply slight force against the door to feel which one is locked.

When in doubt, pull all of the lock cylinders.



**Figure 4: The absence of key marks and/or painted over lock face can identify a non-operational lock.**

## Steel Protection Plates

Steel plates are installed to guard and protect the lock cylinder and prevent it from being pulled, Figure 5. Remove these guards by shearing the bolts with the flathead axe or the adz of the Halligan.

Pull lock cylinders with the K-tool or A-tool. The K-tool is specifically designed to address locks once the steel protection plate is removed and therefore is preferred over the A-tool.

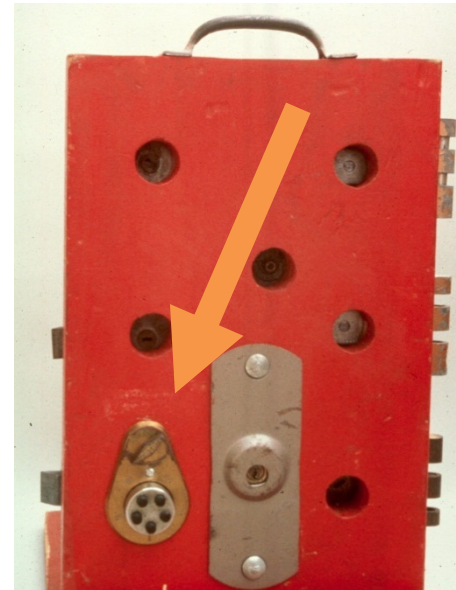
Using the A-tool or K-tool for lock removal:

- Drive the device behind the cylinder ensuring a secure purchase.
- Pry up on the lock puller, pulling the cylinder from the door.
- The back plate will either pull through the opening or the set screws will dislodge from the back plate.
- Insert key tool and rotate to unlock the lock.

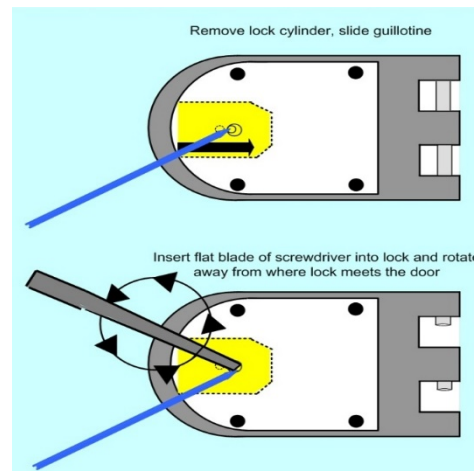
If the lock has a guillotine feature, use a pick, spring-loaded center punch or other sharp object to slide the guillotine back and expose key way, Figure 6.

Rim locks have an added feature called a night latch. The night latch is engaged from the inside and prevents the lock from turning, even with the key. It provides the occupant an extra measure of security. If the night latch is engaged and the cylinder is pulled, the key tool will not turn the lock. This signifies the possibility that a person may be inside the occupancy and had to engage this feature. In this instance, the lock must be removed using the modified punch lock method.

The modified punch lock method is a means of gaining entry by attacking the locking device and opening the door with little or no damage to the doorframe, Figure 7. When a night latch is encountered the modified punch lock method is required. With the lock cylinder already removed, place the pike of the Halligan bar in the cylinder hole against lock and drive the lock off of the inside face of the door.



**Figure 5: The addition of steel plate can increase the difficulty of entry.**



**Figure 6: Guillotine lock feature.**

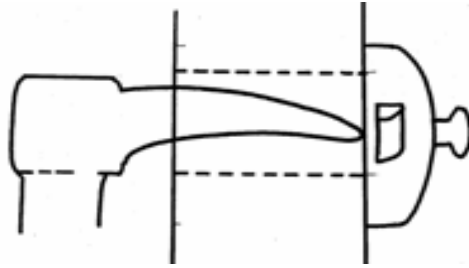


Figure 7: Modified punch lock method.

## Tubular Dead Bolt Locks

Key features of the tubular dead bolt lock are:

- A tubular dead bolt is a combination of a mortise, rim, and key-in-the-knob lock, Figure 8.

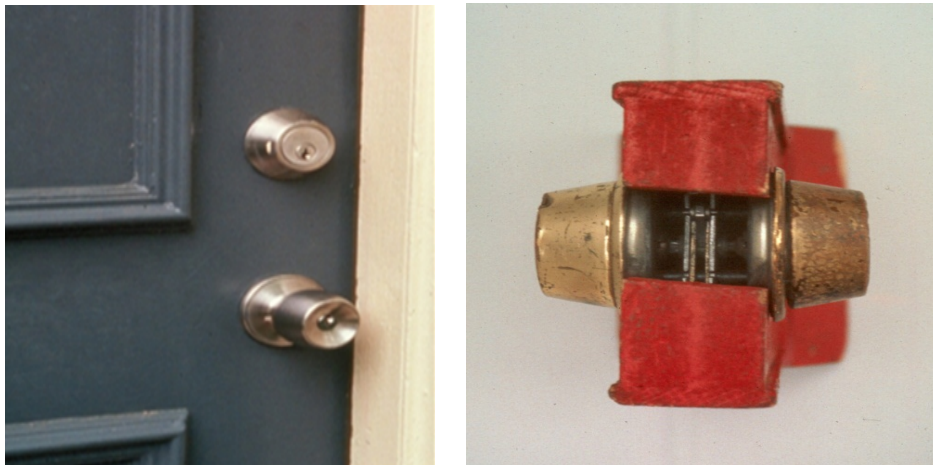


Figure 8: Tubular dead bolt lock on a door (left) and a side view (right).

- It is installed like a doorknob but is held to the face of the door by a large over-sized rim.
- A large hole is drilled through the face of the door and a small hole is drilled in the edge of the door.
- It is identified from the outside by an over-sized rim with the lock cylinder extended out from the door approximately 1 to 2 inches.
- The tubular dead bolt lock consists of a stem protruding from the back of the lock cylinder that passes through a sliding bolt mechanism fastened in the edge of the door.
- The stem turns the sliding bolt mechanism, which causes the bolt to slide 1½ to 2 inches into a strike, mounted in the edge of the doorjamb.
- When mounted in a metal jamb, it is difficult to open with conventional forcible entry (even the hydraulic ram).
- The lock cylinder is connected by two screws to a knob or lever (single cylinder), or another lock cylinder (double cylinder), on the other side of the door. The screws pass through the sliding bolt mechanism similar to a doorknob.
- The cylinder(s) are prevented from passing through the bored hole by the large rim or ring of metal.

This lock is found in ALL types of occupancies, including single-family dwellings, apartments, and some commercial buildings. Newer residential construction uses this type of lock almost exclusively. Homeowners in existing homes will often add this lock for extra security.

These types of locks are the most difficult to perform through-the-lock entry. There is a high failure rate resulting in extensive damage to the door and frame. When mounted in a strong metal jamb, forcing these doors conventionally is extremely difficult.

Another method for through-the-lock entry is to pull the lock cylinder with a small forcible entry tool (Officer's tool, A-tool, Rex tool, etc.). The K-tool will not work on most modern dead bolt locks because the cylinder is larger than the K-tool. The use of this small forcible entry tool works extremely well on commercial doors constructed of heavy metal.

The most efficient procedure for thru-the-lock on a door with a tubular deadbolt is:

- Remove the cylinder by pulling it out with either the (Officer's or A-tool or modified Halligan).
- Insert Key Tool.
- Rotate to open.

Extreme care must be exercised when pulling this lock to eliminate damaging the sliding bolt mechanism on the edge of the door. If the sliding bolt mechanism becomes bent, it will not retract into the door to unlock.

After the lock cylinder is pulled, the stem will protrude from the lock cylinder indicating use of the flat blade key tool or slotted screwdriver.

## **Mortise Locks**

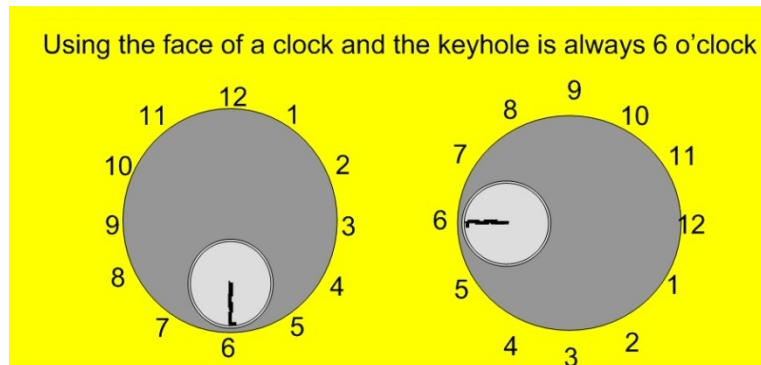
Mortise Locks are among the oldest locks in use today. Earlier mortise locks, found on older balloon-frame residences have a *peeping tom* keyhole for a skeleton key. This is known as a warded lock; very few of these are in use today because they can be easily picked.

Key features of the mortise lock are:

- The lock is chiseled or mortised into the cavity of a door.
- The lock cylinder is threaded into the lock (no screws needed).
- The activation principle is the cam on the rear of the cylinder.
- The locking mechanism is found in four configurations:
  - Sliding latch,
  - Dead bolt and latch,
  - Latch, or
  - Pivoting dead bolt.

A mortise cylinder appears identical to a rim cylinder when viewed from the exterior of the door. A lock cylinder above a doorknob or lever may identify a mortise lock with no keyway. The mortise cylinder is thick and symmetrical with a threaded body. There are no screws in the lock cylinder.

The first thing to do *before* pulling a mortise lock cylinder is to note the position of the key plug as it relates to a clock face. The position of the key plug will become 6 o'clock, Figure 9. This will become important after the lock cylinder is removed.



**Figure 9:** Before pulling a mortise lock cylinder is to note the position of the key plug as it relates to a clock face.

There are two ways to remove the lock cylinder. The lock cylinder can be unscrewed by gripping it with a pair of locking pliers (such as vise grips), Figure 10. To do this, grip the circumference of the cylinder and lock the pliers. Turn the cylinder one-eighth of a turn clockwise to break off the tip of the setscrew. Then turn counter-clockwise to unscrew the cylinder out of the lock casing. The setscrew may jam the cylinder while unscrewing. If this occurs, pull the lock cylinder.



**Figure 10:** Unscrewing the lock cylinder with vise grips.

If needed, pull the lock cylinder with a K-tool or an A-tool if the K-tool is unavailable. Use a striking tool to tap the K-tool over the cylinder, Figure 11. Use care to avoid shearing the face of

the cylinder off the door. Be mindful when setting the K-tool with the Halligan bar as too much force will shear the face of the lock off completely.



**Figure 11: Tapping the K-Tool into place over the lock face.**

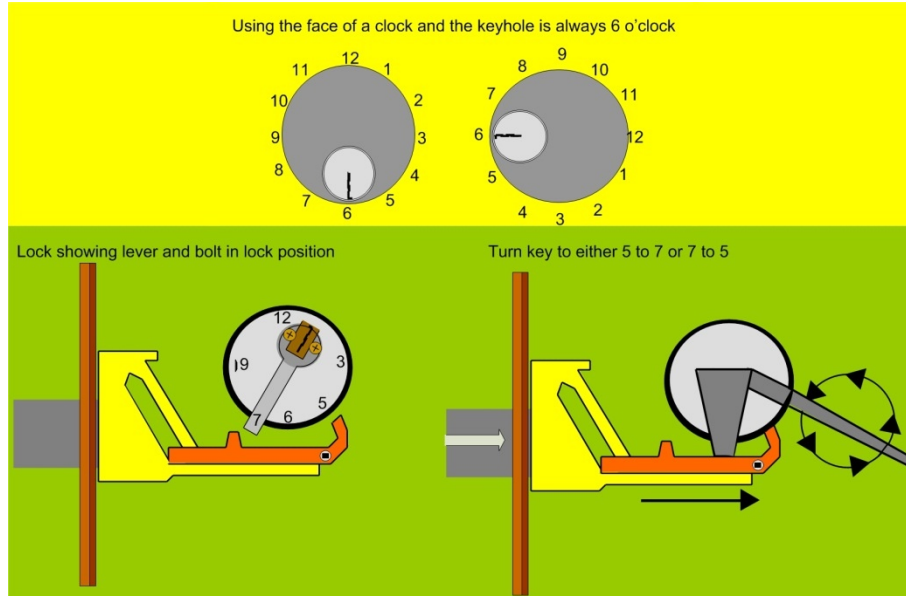
After the K-tool is seated firmly on the lock face, remove the cylinder by **pulling up, not downward**.

With the lock cylinder removed, the 90° end of the key tool is used to unlock the mechanism. The motion of the key tool is dependent on the configuration of the lock.

The sliding latch and the pivoting deadbolt use a 5 o'clock to 7 o'clock (or vice versa) motion to unlock the mechanism. Remember the position of the key plug became 6 o'clock.

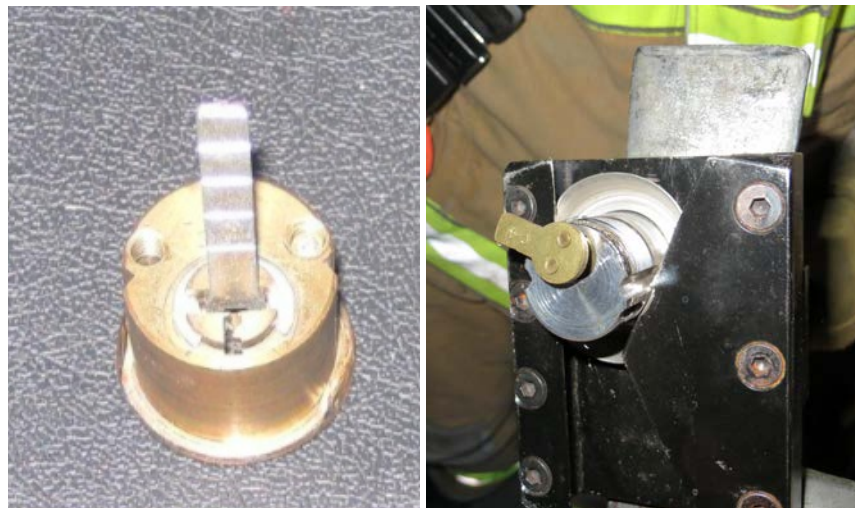
The deadbolt and latch uses a 5 o'clock to 7 o'clock (or vice versa) motion to unlock the deadbolt, Figure 12. After the deadbolt is unlocked, a lever will appear at the 3 o'clock or 9 o'clock position. The key tool must be repositioned to move the lever from 3 o'clock to 6 o'clock or from 9 o'clock to 6 o'clock. The lever must be held in place while the door is opened because it is spring-loaded and will move back to the locked position if released.

The latch (usually found on interior doors) is similar to the deadbolt and latch except the deadbolt is absent. The lever is in place at 3 o'clock or 9 o'clock and should be moved to 6 o'clock. The spring-loaded feature requires the firefighter to hold the lever in the 6 o'clock position to open the door. Sometimes the latch configuration is difficult to identify. If a deadbolt cannot be located at the 5 o'clock or 7 o'clock position, it is a latch configuration.



**Figure 12:** The deadbolt and latch uses a 5 o'clock to 7 o'clock (or vice versa) motion to unlock the deadbolt.

By examining the back of the pulled cylinder firefighters can determine which pick end to use, Figure 13. The straight rod indicates the use of the flat end of the pick. The cam actuator indicates the use of the 90-degree pick.



**Figure 13:** The back of the pulled cylinder can determine which pick end to use – the straight rod (left) indicates use of the flat end of the pick and the cam actuator (right) indicates use of the 90° pick.

### Bored Locks (Doorknobs and Key-in-the-Knob Locks)

Doorknobs are classified in three weights:

1. Light – closet door or bedroom door in a residence.
2. Standard – residential front door.
3. Heavy – exterior door in a commercial occupancy.

There are a number of methods to defeat a doorknob lock. On lightweight doorknobs with no sliding pin or dead-latch, the door can be pried open employing conventional forcible entry methods. Another method would be to jimmy the latch with a shove knife, Figure 14. This method may also be referred to as loiding, a slang phrase coined from using a credit card as a shove knife.



**Figure 14: Shove knife used in door with a night latch (left) and used on a door without the dead latch (right).**

On commercial style doorknobs the door usually has a tighter fit. These doorknob mechanisms will also have a dead-latch, Figure 15. This dead-latch was designed to prevent jimmying or unwanted entry. A dead-latch is a latch that has a sliding pin alongside the latch. The pin must be pushed back prior to jimmying the latch.



**Figure 15: The dead latch contains the sliding pin alongside the latch that prevents entry without retracting the pin.**

Some lock cylinders on doorknobs can be pulled and unlocked successfully. These doorknobs are brand specific and require recognition by the firefighter. Staying abreast of lock types and



changes that may occur in the industry is essential for firefighters to be successful in forcible entry. This can be accomplished by visiting a local hardware store and reviewing the newest lock types and how the mechanisms work or contacting a local locksmith.

The most common technique for forcing entry through doorknobs involves the removal of the knob to expose the lock mechanism. One way is to knock off the doorknob with a striking tool. While this method is successful, it can damage the lock and render it useless. This would require the use of conventional forcible entry to overcome this condition (which defeats the purpose of going through the knob in the first place). The most effective method is to pry the doorknob with the A-tool. The flathead axe is placed flat against the door above the knob. The A-tool is used to pry the knob off using the flathead axe to prevent damage to the door. The axe also acts as a fulcrum to further assist in the prying action, Figure 16.

Once the knob is removed, a key tool is used to unlock and operate the latch. More fortified doorknobs contain a T shape that is visible when the knob is removed. Grasp the T shape with a pair of needle-nosed pliers (or other suitable tool) and turn to unlatch.



**Figure 16: The use of a properly placed axe can provide leverage for prying.**

## CONVENTIONAL FORCIBLE ENTRY

Conventional forcible entry is the oldest and still the most versatile type of entry firefighters will perform, Figure 17. It is defined as the use of hand tools to manually apply the use of leverage, force, and impact to access an opening to a structure.



**Figure 17: Conventional forcible entry.**

Examples of conventional forcible entry for doors include the following:

- Prying open with a Halligan bar or irons (also known as the married pair).
- Breaking open with a sledge hammer or other striking tool.
- Prying open with a hydraulic tool.
- Breaking glass and operating the lock from inside.
- Removing hinge pins and removing the door.

The status of locks installed on the door should be initially confirmed by implementing the basic forcible entry advice of *try before you pry*. After it is confirmed that the door is locked, push or pull on the door to attempt to identify where the door gaps which can indicate where locks are in place.

During routine events, such as food on the stove incidents, truck company personnel must exercise caution while entering the occupancy, locked or unlocked. On more than one occasion, a sleeping or intoxicated occupant has been surprised by firefighters rapidly entering their occupancy. Crews should continually announce themselves by shouting that they are with the fire department. Even then, members may find themselves in a dangerous situation being faced with a dazed occupant who may believe the firefighter is an intruder.

Remain cognizant and report the presence of any unlocked doors, opened doors, or any doors that showed signs of previous forcible entry to the incident commander and fire investigators after the fire. All of the above conditions demonstrate the need for a heightened level of situational awareness throughout the incident.

Truck company crews should expect to force multiple doors while searching for occupants and the fire. Therefore, the truck crew should keep forcible entry tools readily available at all times. Forcible entry tools can become forcible exit tools in an emergency that demands a rapid exit from an untenable area.

### Steps for Entry through Doors (Shock, Gap, Set, Force, and Control)

Personnel should size up a door's construction features, identify the direction the door/gate opens, note the locking mechanisms and select the proper tools for the task. The conventional forcible entry process is divided into a five-step process: *shock, gap, set, force, control*. Prior to implementing this process, *try before you pry!*

**Shock:** Use the head of adz of the Halligan bar to forcefully strike the door, Figure 18. Using the fork end will typically result in the forks penetrating the skin of the door, creating undue damage and adding significant time to the operation. Strike the door high (top  $\frac{1}{3}$ ), middle, and low (bottom  $\frac{1}{3}$ ) on the locking side of the door near any locks. This action will allow the truck company to determine the stability of the door and doorframe. Personnel may note location of the locks by observing if a gap is created by the act of shocking the door. Additionally, shocking the door will loosen the door to facilitate easier placement of the Halligan bar in later steps.

When shocking the door, firefighters should grasp the shaft of the Halligan bar. Firefighters should avoid placing their hands on ends of the Halligan bar while shocking the door. If a firefighter grasps the end of the Halligan bar while shocking the door, the force of the shock will be transmitted back to the firefighter operating the Halligan bar. This has the potential to cause injury and prohibit the truck company from completing their forcible entry task.



Figure 18: Shock procedure for forcible entry.

**Gap:** Use the adz end of the Halligan bar to gap the space between the door and the jamb. Depending upon the force of the shock, a gap may have been created which could make the gap

step unnecessary. Members should insert the adz end of the Halligan bar between the door and jamb, pulling/pushing up or down in the opposite direction of the pick of the Halligan bar to create a gap, Figure 19. The gapping procedure attempts to create space for the fork end of the Halligan bar, which will be used in the set step of conventional forcible entry.

Additionally, gapping the door may force the door open. The gap created should be maintained by placing a chock, the head of the axe, or any object into the newly created gap. This action may also allow firefighters the opportunity to determine the extent of fire and/or conditions on the interior. Forcible entry, resulting in the door to occupancy opening, will introduce air into the fire environment. This can drastically impact the conditions so personnel should drill with this change in conditions expected and perform the skills in the full PPE and SCBA.



**Figure 19:** To gap the door, place the adz in the space between the door and jamb and apply force appropriately.

**Set:** Setting the Halligan bar involves driving the forks of the Halligan bar the appropriate depth through the gap between the door and jamb by striking the head of the adz end with a flat-head axe or sledgehammer. Personnel should be cognizant of the brand and type of Halligan bar used, as the forks can vary greatly in size. A wider or thicker fork will demand a larger gap for the tool to be placed correctly. Set the forks slightly above or below the position of the locking mechanism. If multiple locks are encountered, place the forks in between the engaged locks and drive the forks in between them.

The Halligan bar's forks are beveled by design, adding increased leverage when forcing a door and allows for the tool to curve around the doorjamb, Figure 20. In an effort to maximize leverage, keep the bevel side of the forks toward the door. In some instances, such as if the gap between the door and doorjamb is tight, the member may need to place the bevel of the forks toward the jamb. When driving the Halligan bar, take particular care to ensure the forks are not driven too far thus eliminating mechanical advantage. The crotch of the Halligan fork can be an excellent marker to determine the correct depth of the fork has entered the space to provide leverage.



**Figure 20: Bevel of Halligan bar forks.**

The striking member in this *Set* step must listen to the commands from the member operating the Halligan bar before initiating contact with the axe. The member operating the Halligan bar should be the only person to request hits to the Halligan bar. The member operating the Halligan should keep their hands mid-shaft and may need to push or pull the tool slightly to guide the forks into position and around the backside of the doorjamb. The standardized commands to maintain consistency in striking the tool and lessen striking injuries are as follows:

- **“Hit”** – Strike the Halligan bar once with the blunt portion of the axe head or sledgehammer. This should only be one swing per command and no more. This command is typically utilized until the forks are past the leading edge of the jamb.
- **“Stop”** – The striking firefighter shall stop any movement or swinging immediately.
- **“Drive”** – Strike the Halligan bar continuously with the blunt portion of the axe head until ordered to “stop.” Ensure that the forks are not driven too far as to lose leverage.

\*In order to reduce injury and ensure an expeditious operation, the Halligan firefighter should only be focused on the progress/movement of the forks on the bar. The striking firefighter should only be focused on the adz end of the bar which serves as their target for striking.

**Force:** Once the forks are set behind the jamb, use the angle created with the bevel of the Halligan bar against the door. The pressure created by the forks driving into the space between the door and the doorjamb on the locking mechanisms may quickly break the locking mechanism. Firefighters should position themselves so they are not between the tool and door and use their leg muscles to apply force into the tool. This body position will prevent the firefighter from falling into the fire occupancy if it quickly opens and provide greater range of space to apply force. If the door does not open with the initial force applied, personnel must remember to maintain the increased gap created. This gap can be secured for future use with the placement of a simple door chock or the placement of a tool such as the head of an axe.

Additionally, two firefighters can work together and apply force for additional leverage. This can be achieved by pairing two Halligan bars together by marrying the forks, Figure 21. This action will provide a longer bar for additional leverage. The increased gap may allow the truck company to put the adz end of the Halligan bar into that gap behind the jamb and force up or

down. Firefighters may also place the head of the axe behind the forks to increase their angle for more power.



**Figure 21: Pairing two Halligans together by the forks can provide additional leverage for forcible entry.**

**Control:** Once the door has been forced open, the door must be controlled to prevent the creation or alteration of the flow path. Door control is also important to prevent advanced fire conditions from overtaking the forcible entry crew. The door can be controlled by hooking it with the Halligan bar or other hand tool, applying rope to the knob, applying vice grips with a chain, or applying another securing device to the door to prevent it from opening in an uncontrolled manner, Figure 22.



**Figure 22: Control the door after forcing.**

Personnel should remain vigilant of the time spent on each step in the conventional forcible entry process. If after 30 seconds, the course of action is not creating the forcible entry success anticipated, it may be time to adjust the plan of attack. Personnel should have multiple plans for forcible entry preplanned and ready to execute. This may require one or two personnel to perform conventional forcible entry and any additional members to go evaluate other means of entry.

### **Outward Opening Door**

The outward opening door should be sized up like any door with special attention paid to the potential locking mechanisms. When using the irons to force an outward opening door the steps will remain the same: *try before you pry* followed by *shock, gap, set, force, control*.

However, there are some variations to each step. It may seem that shocking the outward opening door is unnecessary as the door is already in a closed position, however this step should not be ignored. At a minimum, shocking the outward opening door may jar the door from its frame, often times loosening the paint that binds the door at the location where the forcible entry team will gap it. Gapping the door will be completed with the adz end of the Halligan, but the goal is to gap the door in a side to side motion, creating a purchase point for either the forks or adz end to get between the door and frame.

Setting the tool with the forks should be attempted first by placing the bevel towards the jamb. If using the adz end you will set the tool to the door as well and not the jamb. Forcing the door will be done in the same fashion as an inward opening door and finally controlling the door is equally important to control the ventilation.

### **Panic Bar Entry with Conventional Tools**

When the panic bar can be observed, the insertion of the coat hanger or tools from lockout kit can be placed in the gap between the doors or the doorframe. The firefighter can manipulate the tool down and grasp the bar while pulling the tool towards themselves engaging the panic bar.

A panic bar assembly can be evident from the exterior of the door by the presence of bolts typically observed on the rear of strip shopping centers. If this is observed and access is needed to the structure, access can be made with some minor damage to the door. Use the pick of the Halligan and place it above the observed bolt or suspected area of the panic bar. Strike the pick with a sledgehammer or other striking tool to create a small hole in the door. Once the hole is confirmed to be through the entire door, place a piece of rebar bent into the shape of an L into the hole and grasp the panic bar. By pulling the rebar back towards the firefighter the panic bar should engage and release the door, Figure 23.



**Figure 23: Creating hole in a door from the exterior close to the panic hardware is located (left) and placing the bent portion of rebar into the hole to pull on the panic hardware (right).**



## HYDRAULIC FORCIBLE ENTRY

While there are many hydraulic forcible entry tools available on the market, the most commonly used tools in the NOVA region, and the ones we will reference in this manual, are the Hydra Ram, Figure 24, and the Rabbit Tool. These tools are effective when we need to force multiple inward opening doors that are constructed of metal or set in metal frames. They are most often found in residential garden apartments and commercial hotel settings. The tools will also work with solid wood doors set in metal frames, but will be rendered ineffective when used on doors set in wooden frames as the force exerted by the tool damages the frame leaving the tool with nothing stable left to engage the teeth of the tool on.



**Figure 24: Using a hydraulic tool to force a door.**

The Hydra Ram is a one-piece integrated hydraulic forcible entry tool that may be used by one individual making it very successful when faced with multiple doors and limited staffing. To operate the tool, the metal ring that holds the handle in the down position must be removed, but the handle should be held in the closed position. If the handle is accidentally released prior to setting the tool, the pressure dump valve will have to be depressed prior to squeezing the handle back down in order to facilitate getting the jaws set. Once set, the tool will exert 10,000 lbs. of force and travel  $\frac{3}{4}$ " with each pump with a total thrust of 4 inches, which should be sufficient to force most doors. Typically, the travel of the shaft needed for successful forcible entry is accomplished in 5-8 pumps of the tool.

The Rabbit Tool has similar specifications to the force it exerts and its spreading capacity as the Hydra Ram does. However, due to the hydraulic pump and the jaws being separate pieces connected by a hose, this tool requires two individuals to operate it, thus making it less effective when speed and staffing are an issue. When using the Rabbit Tool, the pump should be left in the manufacturer's bag. The bag should be carried over the shoulder, which facilitates going door-to-door rapidly; the pump is operated while it is in the bag.

When operating the Rabbit Tool, open the relief valve (non-pressure mode) and activate the pump for several strokes to remove air in the system. If this is not performed, air bubbles may compress during operation and rob the tool of power. After this has been done, close the relief valve (pressure mode) and the tool is now ready for use.

A hydraulic forcible entry tool low on hydraulic fluid can lose as much as one ton or more of power, **Error! Reference source not found.** When a hydraulic tool has failed to open a door, it is usually due to low fluid or malfunctioning relief valve.

Often, hydraulic forcible entry tools are left at the landing or corridor and not taken into the fire apartment. Leaving the tool outside the apartment (on the floor, up against the wall) also enables crews arriving later to use it to gain entrance to other apartments, if needed. It is imperative that the member responsible for bringing this tool also brings tools suitable for other tasks such as primary search, ventilation, checking for extension, and forcing additional interior doors. Consideration should be given to having one member open all the doors on a landing at one time. This action will provide a safe refuge from the fire apartment and expedite a primary search on that floor.

Lastly, the hydraulic forcible entry tool must be exercised on a regular basis and under pressure. When it is not operated for an extended period of time the internal seals will dry out and the tool will lose hydraulic fluid. A beneficial tip is to place the tool under a heavy stable item at the firehouse, such as a dumpster or vending machine, and extend the tool. This will place the unit under load and provides an opportunity for the user to evaluate the effectiveness of the tool.

### Outward Opening Doors

Outward opening doors will typically only be found on commercial buildings due to code requiring that occupants be able to exit the building without any obstructions or delay in the event of a fire. The doors on the Charlie side of commercial buildings will be the most fortified and require a sound knowledge of forcible entry skills. Outward opening doors may be encountered at the exits of garden apartments or high rise residential structures, but vary rarely on the exterior of a single family residence. Outward opening doors can be forced using the hydraulic forcible entry tool placed between the metal jamb and door. Spreading the hydraulic tool will provide a purchase point for the Halligan bar and then can implement conventional forcible entry techniques.



**Figure 25: Door forced with a hydraulic forcible entry tool that was low on hydraulic fluid – tool failed to open the door because it lacked full power.**

## FORCIBLE ENTRY THROUGH PADLOCKS

Padlocks have been recognized form of securing property and provide for a portable and inexpensive means of security. The basic construction of a padlock is the body, which houses the locking cylinder as well as the two connecting points of the shackle. The shackle is the exposed tubular piece that is used to secure the lock to something. The lock industry also offers a padlock with a hidden shackle that is less common. For basic padlocks, the bolt cutters are often effective, however, some padlocks are case-hardened which allows for the outside shell to be hardened while leaving the metal underneath soft. The process is less complex than tempering, but makes for a stronger lock requiring the use of the irons, duckbilled lock breaker, or power tools, Figure 26.



**Figure 26: A Halligan bar and flat head axe are used together to force open a case hardened padlock.**

The duck-billed lock breaker is used the same as the Halligan bar but is more effective due to its progressive taper, Figure 27.

When using power tools to defeat padlocks it is necessary to secure the lock for cutting with the use of vise grips attached to a chain, Figure 28.



**Figure 27: Duck Bill lock breaker tool.**



Figure 28: Use of vice grips to secure the lock prior to cutting.

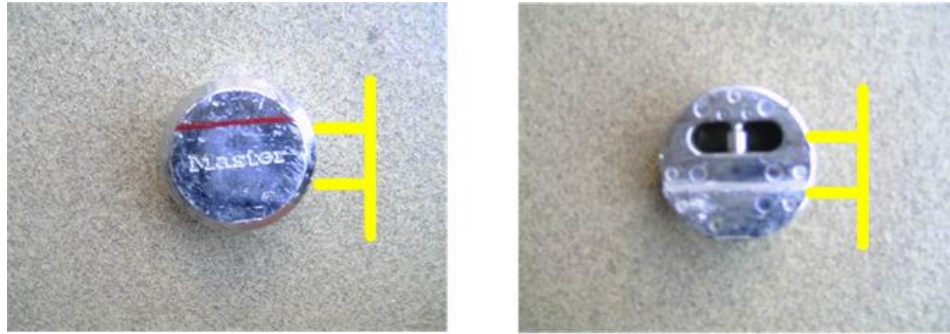
### **Hockey Puck Lock (aka Hidden Shackle Lock)**

A hockey puck lock (hidden shackle lock) is incredibly strong and will require a rotary saw to force. The shackle is contained within the housing of the lock in the upper third portion. In the example in Figure 29, the company used a red marker to denote the location of the locking mechanism prior to cutting, which will allow the saw firefighter to cut in the correct location.

### **Cipher Locks**

A Cipher Lock is a lock where a combination is required to operate the lock. There are several combinations and configurations. They may be mechanical or electrical with a 24-volt direct current (DC). The power may come from a converter or a battery.

One mechanical configuration uses a round face for the keypad (outside) with the locking mechanism mounted on the face of the door (inside), Figure 30.



**Figure 29: Cut hockey puck locks in the upper third portion.**



**Figure 30: Mechanical cipher lock.**

A second mechanical configuration uses a rectangular face for the keypad outside, Figure 31. The lock mechanism is a latch similar to a doorknob latch. This type is best overcome by shearing and prying the rectangular face and knob off the outside of the door, then using a flat blade key tool to manipulate the latch. The configurations of electronic lock configurations are

too numerous and each possess a forcible entry obstacle we will need to overcome. A simple size-up of whether the locking mechanism is in the doorframe or the door will assist greatly in overcoming the lock. Striking the face of the lock so it drives the mechanism off the door on the inside is the best initial means of defeating the lock.

In the case where the electric lock is in the frame, unlocking or removing the doorknob is the most effective.



**Figure 31: Cypher lock/knob combination (left) and electronic lock installed in the wall (right).**

## FORCIBLE ENTRY THROUGH WINDOWS

While recognized as a viable forcible entry option, breaking glass should be considered a last resort method of forcible entry. Once the glass is broken, ventilation has been initiated and the ability to control the opening is, theoretically, lost. There are four basic types of glass: plate, tempered (safety glass), laminated, and thermoplastic (Lexan or Plexiglass). A special consideration is the presence of bulletproof glass. Each has unique characteristics when encountered. It may be possible to determine the type of glass through size-up or pre-incident planning. The type of glass is easy to identify when it has been damaged or broken based upon it reacts.

If the tactical decision is made to break the window to perform entry, ensure all of the glass is removed from the frame to lessen the possibility of injury, Figure 32. In situations where the entire door is made of glass or a large window is needed for entry, strike the glass in the lower corner and stand the side shielding your face from falling glass, Figure 33. If the glass, falls to ground and is in the path of where emergency response personnel will enter, specifically the engine company, personnel should use the hose stream to clear the path of the glass prior to advancing.



**Figure 32: Enter by breaking the glass with a tool and clearing glass to prevent injury.**



**Figure 33: Strike with pick end of the Halligan in a corner and wash glass away entering doorway to prevent hose from picking up small shards of glass in the fabric liner.**

When the glass is removed from an aluminum stile door that is composed of glass in a strip shopping center, the presence of a push bar will still exist. This bar will be the height of a crawling firefighter and can cause an entanglement hazard and must be removed. Do not attempt to remove it by striking down onto the bar to separate the bar from the frame. The screws to install the bar are installed from front to back and the down striking pressure of your tool will cause the screws to lock deeper in the frame. Strike the bar in the same direction the screws used for install are placed which is most likely front to back, Figure 34.



**Figure 34: After removing the glass, remove panic hardware and push bars located along the door to avoid egress hazard.**



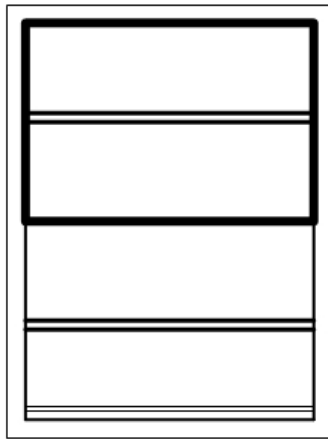
## Types of Windows

Types of windows encountered can include: double-hung, projected or factory, awning or Jalousie, casement, egress, window bars, and HUD/VPS windows/doors.

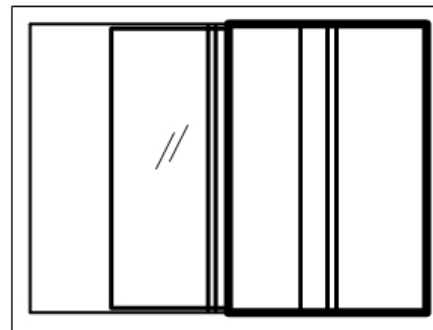
### Double-hung Windows

Double-hung windows consist of a wood or metal frame surrounding the glass. It is secured with a latch between the two sliding portions or a latch between the frame and the sash.

Double hung windows come in two basic configurations, Figure 35: 1) vertical sliding and 2) horizontal sliding (sometimes called Checkrail)



Vertical Sliding Window



Horizontal Sliding Window

Figure 35: Double-hung window types.

### Projected or Factory Windows

Projected or factory windows consist of a large square metal frame (steel in older, aluminum in newer) that is hinged at the top, bottom, or both. The factory type is typically found in basements within a window well. A lever is operated to unlatch the window and then it is pushed out (projected) if it is hinged at the top, or pulled in (factory) if it is hinged at the bottom.

### Awning Windows

Awning windows are hinged on the sides near the top of each section. Awning windows have wide horizontal sections used to protect the window opening during inclement weather.

## Jalousie Windows

Jalousie windows are almost exclusively found in breezeways and enclosed porches in this area of the country. Jalousie windows have very narrow (3-4 inch) sections of glass, Figure 36.

When the owner or occupant is concerned with security, they may install bars outside of these windows to prevent theft. Most types of bar security measures are attached to the window opening by screws or bolts.



Figure 36: A Jalousie window.

## Casement Windows

Casement windows are primarily found in 1940s-1960s-constructed, single-family dwellings and garden apartment buildings. These windows are metal encasing the entire window frame, and are opened by manually operating a hand crank. With casement windows, breaking glass is effective for ventilation. The center pane should be removed after the window is open or broken. On older casement windows, the framing is solid steel with crisscrossing pieces. The windowpanes are smaller (usually six inches square). The framing is solid steel and set securely in masonry.



Figure 37: Casement windows shall be removed if egress is desired from the interior.

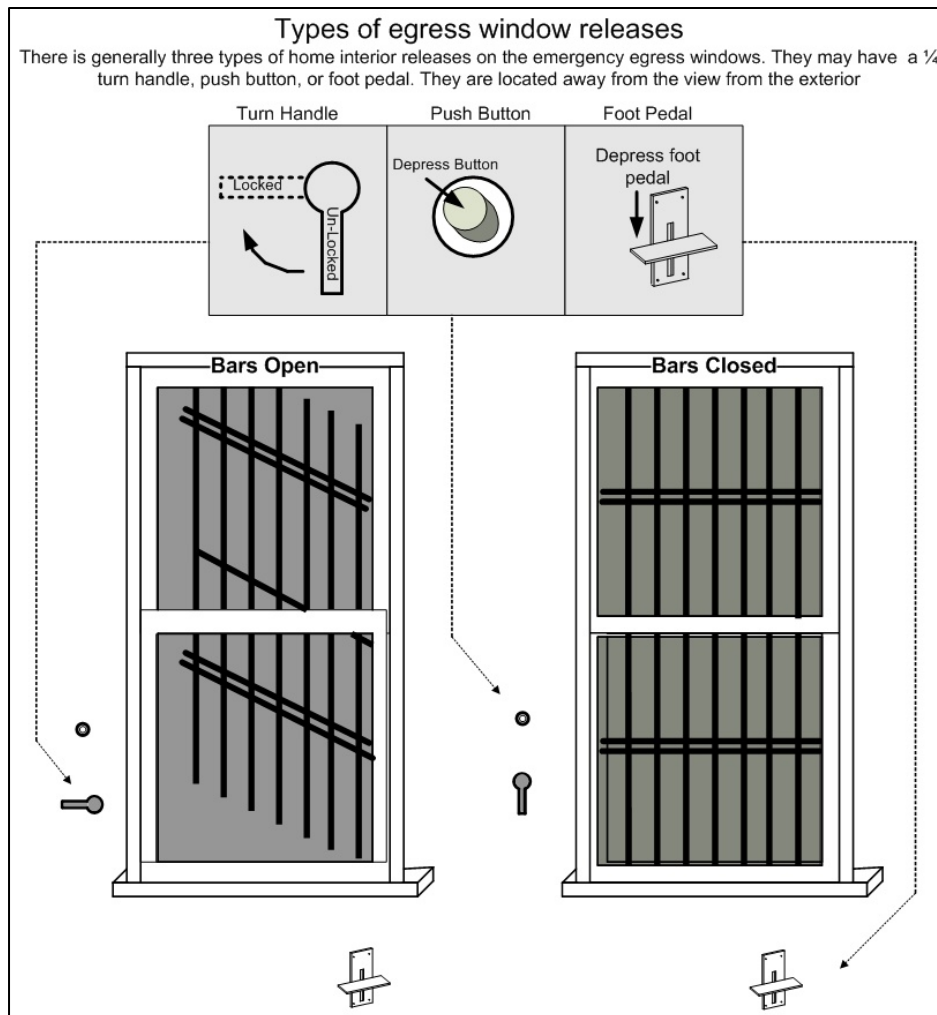
Breaking the glass will provide ventilation with each individual pane broken, however firefighter egress will be almost impossible, Figure 37. **The only way to ensure egress is to completely remove these windows with a power saw.** When this type of window is discovered, it should be voiced over the radio. At a working incident, units must identify every casement window and use a saw to remove the steel center portion(s) coordinated with the fire attack and the incident commander. Under heavy smoke conditions, crews should also consider using a battery operated reciprocating saw to remove the center portion.

## Egress Windows

Due to security concerns, many homeowners are installing rapid egress security bars over bedroom windows. Firefighters must understand how to operate these windows when forced for egress from the structure, Figure 38 and Figure 39.



**Figure 38: Some window bars are able to be opened and closed from within the occupancy.**



**Figure 39: Types of egress windows.**

## Window Bars

Many homeowners install security bars over windows to increase home security, Figure 40. In many cases the bars appear stronger than they are. The actual metal bars are strong but the connection to the building is frequently weaker. Often times due to the age of the installation, simply striking the connections will dislocate the anchors and allow the bars to be pulled from the structure. The bottom connecting bolts may be cut with a saw or broken with a hand tool. Attacking the bottom connection bolts on both sides will afford firefighters the ability to pry the bars upward, breaking the top connection bolts and removing the bars completely, Figure 41.

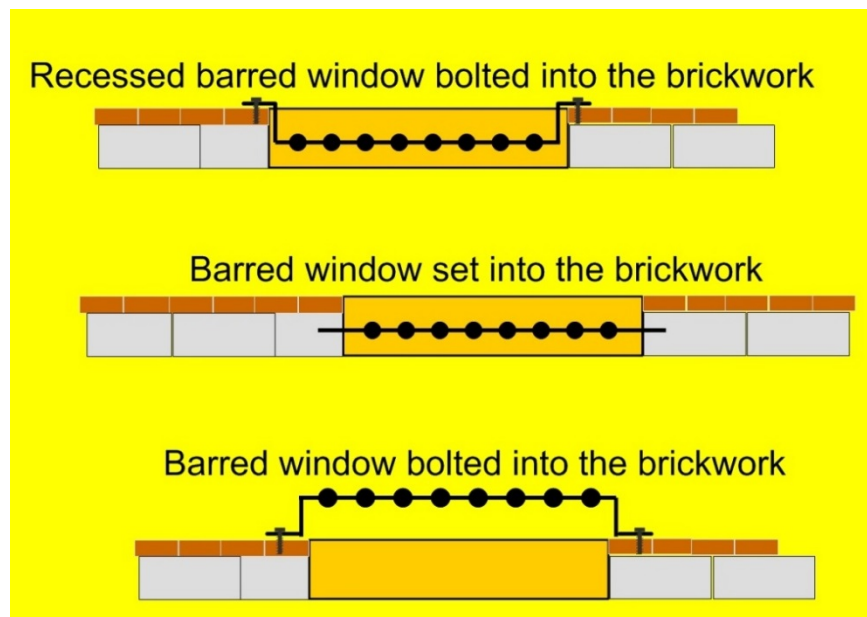


Figure 40: Types of window bars.

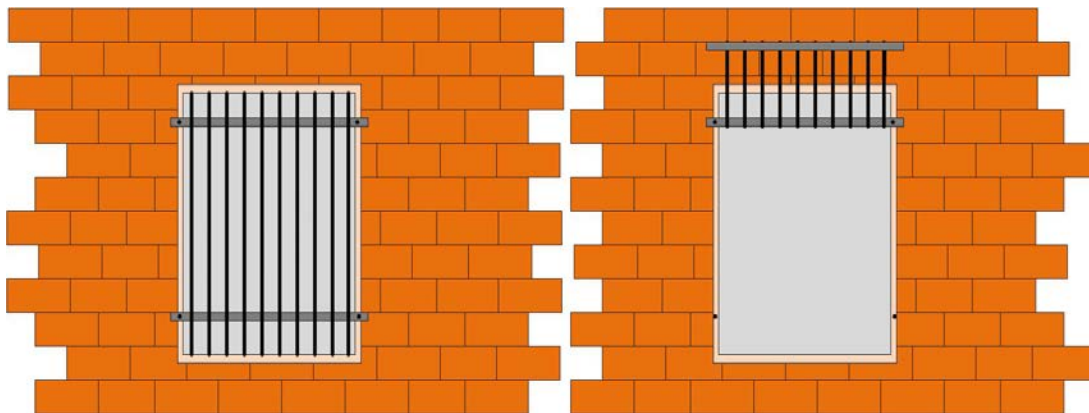


Figure 41: Break the bottom connections bolts and pry the bars upward as shown or side-to-side, breaking the top connection bolts.

## United States Department Of Housing And Urban Development (HUD) Coverings

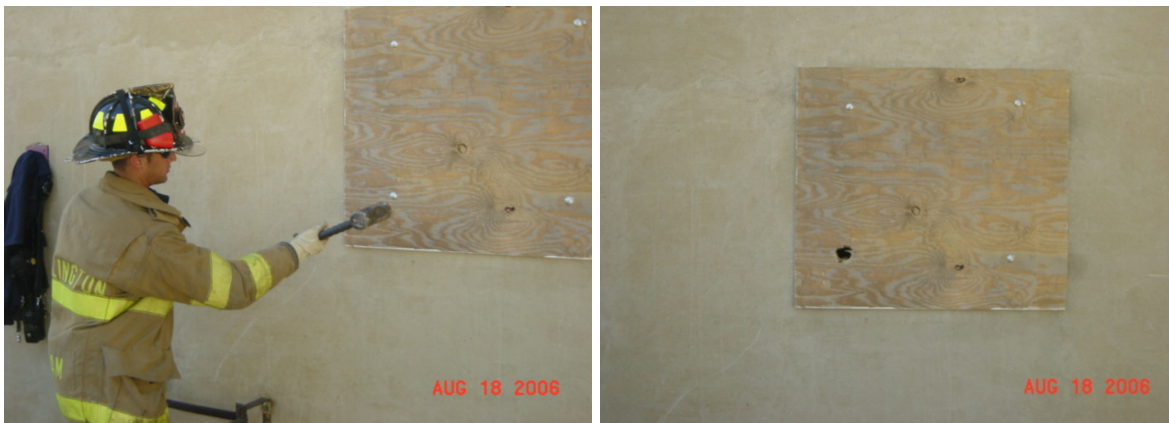
Due to the increasing blight and urban renewal in many areas there has been an increase in the need to secure vacant properties. The U.S. Department of Housing and Urban Development (HUD) created a method for securing vacant properties to prevent squatters and vandals from entering. This boarding up of windows and doors is commonly referred to as HUD coverings. HUD coverings will be difficult to remove, making interior firefighting operations dangerous. There are two styles of HUD windows that we often encounter: homemade or the HUD window and commercially available Vacant Property Security (VPS) systems, Figure 42. Due to the ease of construction, price variation, and availability, we will most often encounter HUD windows constructed by the owner using many different types of materials. The VPS systems are installed and removed by only the VPS contractor using patented tools. This makes removal of the VPS systems an extremely slow and arduous process. Attempts to simply pry off any HUD covering will be labor intensive and will often fail.

There are three proven methods used when breaching HUD windows. The bottom bolts on the window should be attacked first in all three methods. This allows the covering to remain suspended at the top, preventing it from swinging out dangerously. Unfortunately, the VPS windows will require rotary disc saws and potentially pneumatic tools.



Figure 42: VPS manufactured window and makeshift HUD window.

**HUD Window Removal-Method 1.** Strike the head of the carriage bolt with the sledgehammer driving it through the plywood, Figure 43. If only one side of the cover bolts can be reached, after making the hole with the sledge, stick the handle in to attempt to rotate the interior cross boards. This method will not work on reinforced covers, as it is nearly impossible to drive them through.



**Figure 43: Striking a HUD window with a sledgehammer.**

**HUD Window Removal-Method 2.** Use a chainsaw or rotary saw to cut the material away from the bolt heads, Figure 44. This is accomplished by cutting a small triangle around each bolt head. This would be the preferred method for the reinforced covers.



**Figure 44: HUD window removal using a chainsaw.**

Do not allow the saw to plunge too deeply through the sheathing as it may contact the metal window frame of the original window. This may result in the saw kicking back towards the operator.

**HUD Window Removal-Method 3.** A rotary saw with a diamond, carbide, or steel abrasive blade is used to saw the bolts, cutting through both the wood and the bolt, Figure 45. This is the slowest of the three methods, but is still effective.



**Figure 45: HUD window removal using a rotary saw.**

A company faced with multiple boarded windows could use all three methods simultaneously allowing for quick access/egress.

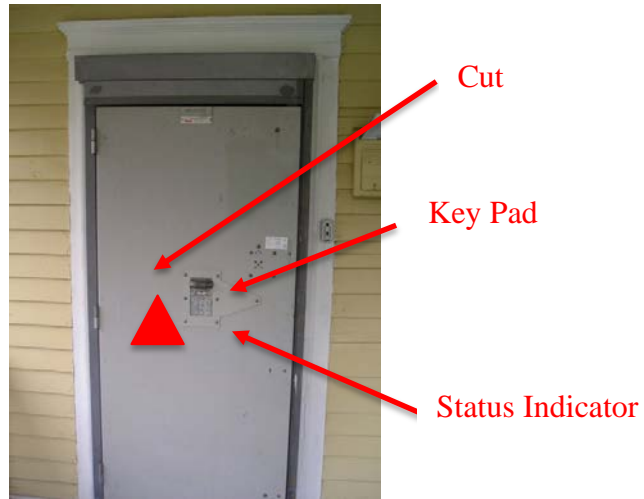
**VPS Window Removal.** The VPS window coverings may be found on both residential and commercial properties, but most likely will be encountered in the commercial setting due to the cost of installation. The VPS coverings don't necessarily indicate a vacant structure, but may be used in the event that a building is for sale or lease, but unoccupied or may be used on lower floors throughout construction. Often times there may be individuals working on the interior with the VPS coverings in place, but a quick check of the entry door to investigate if it is open or unlocked should allow us to determine if this is the case. Attacking these window or door coverings will be labor intensive and time consuming and special calling a tower ladder should be considered in order for members to safely remove these coverings. From the exterior there is only one proven method for removing the window coverings and that is using a rotary disc saw and attacking the assembly that holds the covering from the interior. As shown in Figure 46, the bar securing the window may be seen through the perforations on the covering. Make your bottom cut first which will allow the covering to fall freely once the top cut is made. The result is a severing of the channel used to secure the covering to the interior.



**Figure 46: VPS window removal.**

**VPS Door Removal.** Removing the VPS door will require a different technique as the door has an only an entry pad visible from the outside, but lever mechanism on the inside. The door may

be defeated by simply cutting a triangle to the left of the keypad on the hinge side away from the status indicator and reaching in to manipulate the lever, Figure 47. (Figure 55)



**Figure 47: VPS door removal.**



## FORCIBLE ENTRY SPECIAL CONSIDERATIONS

### Double Doors

When faced with a forcible entry situation where double doors are present, take a circular saw with the metal cutting blade and cut the bolt between the doors, Figure 48. There should be enough room between the doors because of the door swing and the space is usually covered with only weather stripping. This may work with a single door if there is clearance for the saw to get in. You can gap these types of doors by using a Hydra Ram or Halligan bar and placing it between the two doors and creating a gap to reveal the lock shackle to be cut.

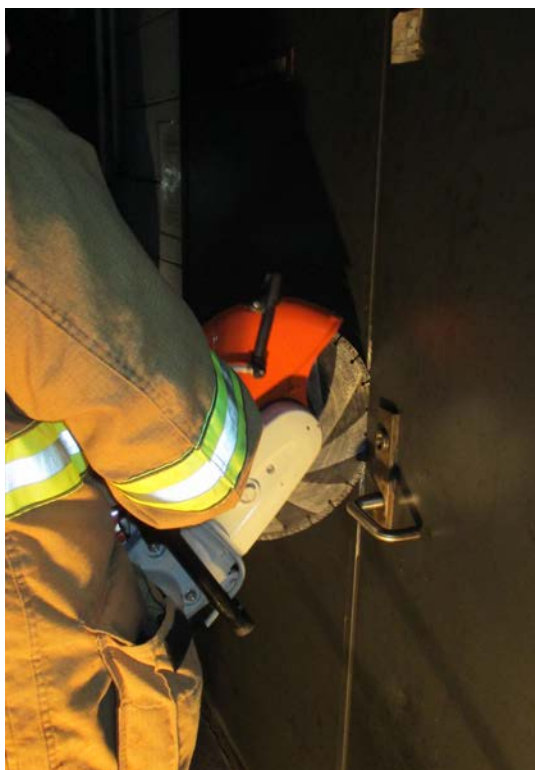


Figure 48: Using a circular saw to cut the lock latch between double doors.

### Entry by Removing Hinge Pins or Removal of the Entire Hinge

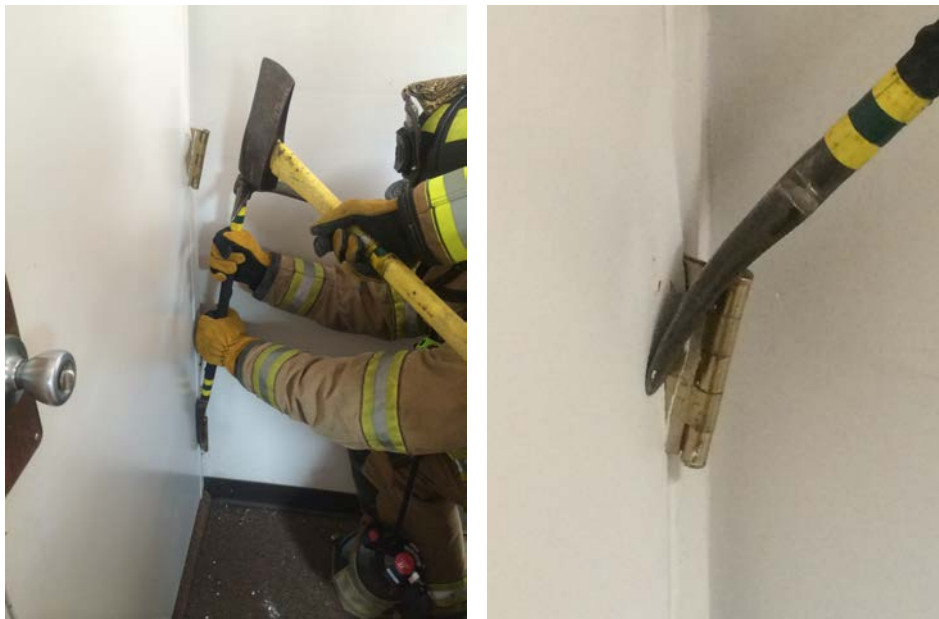
Hinges found on outward opening doors have several different configurations. They can present as sealed self-closing spring loaded hinges or pin type typically seen on commercial occupancies. The self-closing spring loaded hinge can be defeated by removing the top cap with channel locks or the adz of the Halligan bar. Once the top cap is removed, the pin can be removed by sliding it out through the bottom of the hinge.

The commercial pin type can be defeated by cutting the hinge body with a circular saw and separating it from the door. The second option is to attack the anchor point of the hinge which may be weaker than the hinge.

The standard hinge with a pin inserted into the body of the hinge will be the most prevalent type encountered by fire department members. The pin can be tack welded to the hinge or may have a hex head set screw in the bottom to secure it from being removed. In these cases, success is achieved by placing the blade of the flathead axe or the tip of the adz of a Halligan on the bottom of the pin. The bottom of the pin is sheared off by driving the blade of the axe or adz into the pin. A nail can be used to slide into the bottom of the hinge and apply force upward forcing the hinge pin up and out.

To remove the entire hinge that present on the exterior of the door, the Halligan bar forks can also be used to drive down onto the top of the hinge, Figure 49. In an effort to weaken the hinges and associated screws, it may prove beneficial to use an axe or sledgehammer to strike the hinges before placing the forks on the hinges. Additional efforts to weaken the hinges and screws can be made by placing the forks of the Halligan bar over the hinges and rapidly jarring the Halligan bar in a back-and-forth and side-to-side motion.

Once the forks of the Halligan bar are driven down onto the top of the hinges, downward and outward force is applied on the forks. This action may dislodge the screws from the doorframe and doorjamb that hold the hinge in place. Continue pulling the hinge down and out and until completely removed. When this technique fails, the hinge must be cut off with a saw.



**Figure 49: Apply the forks of the Halligan to the top of the hinge and strike the adz to drive the forks onto the hinge (left) then apply downward and outward force to remove the hinge (right).**

Firefighters may attack outward opening metal doors with exposed hinges by cutting the hinges using a rotary saw, Figure 50. Particular care and attention should be made to ensure the hinge is completely cut, as an incomplete cut will greatly hinder attempts to displace the door. Rotary saws with an outboard blade configuration may prove to be extremely beneficial when cutting hinges. After this action is completed, firefighters must pull the door outward and away from the jamb. Either pry the door at the hinge side or drive the pick end of the Halligan bar into the door

and pull. Many commercial doors are tight and can be difficult to open even with the hinges cut off.



**Figure 50: Using a metal composite-type blade to cut the hinges off a door.**

### **Fox Police Locks**

The Fox Police Lock, Figure 51, is a specific brand of security system that is found on rare occasions. This lock is exclusively manufactured for inward opening doors and typically found in residential occupancies. The device consists of a flush mounted plate on the floor and hardware mounted on the door just below the doorknob. To lock the device, the occupant takes a metal rod and inserts one end into the plate in the floor. The other end attaches to the door hardware and locks in place. There are at least two different models of this lock, one that is only secured from the inside (which means, if found, the occupant is likely inside) and one that is secured in such a way that it can be unlocked from the outside. In either case, they are extremely difficult to force conventionally. In situations where extreme resistance is met when forcing on the lock side of a door, the next procedure is to try to force the hinge side of the door.



**Figure 51: Fox police lock.**

## Multi-lock Door

The term multi-lock has been used in the fire service to describe a unique lock that secures a door to a frame at all four sides, to include the top, bottom, and both the hinge and lock sides, Figure 52.



**Figure 52: The multi-lock secures the door at four points in the frame. Notice the bolt from the edge of the door and corresponding keeper in the jamb.**

The device is manufactured and installed as a complete door, frame and lock assembly. Often times, however the frame is hollow and if not set in concrete can be manipulated relatively easily. The lock mechanism can be in the center of the door or near the edge of the door opposite the hinge side, Figure 53. The lock mechanism rotates a series of steel rods into the doorframe at all sides. It is found in commercial and residential applications. It is used where extremely high security is desired. This locking system is rare in the residential setting due to its cost.



**Figure 53: Exterior view of a multi-lock; use multiple hydraulic door opening tools at the top and both sides, then push the entire door inward.**

Forcing entry into a can be taxing and will require the use of a hydraulic forcible entry tool, usually the Hydra Ram. The suggested order of placement and forcing for this type of door is:

1. Force the lock located at the door knob side first.
2. Force the top pin located at the top center of the door second.
3. Force the bottom center pin next. Placing the hydraulic tool at the lower left hand corner to provide the teeth of the tool a substantial purchase point may provide enough force to defeat this pin.
4. If the door has not failed, the fourth point of force will be the hinge-side fourth pin.

### Static Bars (aka Drop Bars)

The most basic static bar on an outward opening door consists of a set of stirrups on the interior of the door. From the exterior the existence and location of the stirrups can be identified by a series of bolts on either side. The bolt pattern is typically just above the door handle in the center (top to bottom) of the door. If a similar bolt pattern is identified at the top or the bottom of the door, this may indicate a sliding bolt (discussed later in this section). If there are no visible bolts on the exterior of the door, the stirrups on the inside of the door may have been welded instead of bolted or may be installed on the doorframe, Figure 54. When the door is secured in the closed position, a long board or a piece of fabricated steel is placed in the stirrups.



**Figure 54: The presence of bolt heads can signify the presence of a drop bar.**

When an attempt is made to open the door from the outside, the walls assist in keeping the door closed. Static bars may be manufactured in many ways with different materials. There is no common brand name or manufacturer.

As with all processes of forcible entry size up, we should try before we pry. After determining that the door is indeed locked we should revert to conventional outward opening forcible entry techniques. This allows us to begin gaining advantage over the door and while we will not be able to move the drop bar, we will gain access to it. At this point we can manipulate the drop bar using a hook or the adz of the Halligan.

Another very successful technique to defeating the static drop bar is to make a hole in the door by driving the pick end of the Halligan bar all the way through the door and using ¼-inch rebar,

bent 90 degrees, Figure 55. Once inserted through the door, the rebar is rotated and may be able to lift the drop bar from the stirrups.



**Figure 55: Rotating the rebar lifts the static drop bar out from its mounting brackets, allowing the door to open.**

If the decision is made to attack the bolts, the irons will be the most efficient means. By driving the pick of the Halligan through the door adjacent to the bolt heads, we create a space by which to shift the bolt into and ultimately pushed through or pulled from the door.

In the case of occupancies like strip shopping centers, it is imperative to get the fortified rear doors opened as early as possible during an incident. These doors will be extremely difficult to open from the inside in poor visibility and could result in firefighter entrapment. With any forcible entry size-up, consideration should be given to breaching a wall, along with other means, when difficulty is encountered in forcing through a door. It is unacceptable to leave the door unforced if members are operating inside, if the door proves to be too difficult command must be notified.

Should personnel come across a static bar on a residential structure the first concern would be why the occupant would require such high security. Extreme caution is warranted in this situation. Regardless of the type, presence of static bars should be noted in *location of interest* information on the CAD, which would be available at the time of dispatch.

The barn door cut is an alternative way of gaining entry into an outward opening metal door set in a metal frame. This method of entry requires a rotary saw and a Halligan bar. Sizing up the door to locate the locking devices on the door. When operating the rotary saw to cut a metal door assign one dedicated saw operator and keep the saw running until the door is opened. Figure 56 shows the process of making a barn door cut, which includes:

1. Using a rotary saw the operator makes a horizontal cut midway up the door, just below all locking devices.
2. The operator then makes a plunge cut in the lower center of the door to weaken the metal.

3. A Halligan bar is driven into the door and pulled to open the lower half of the door outward.



**Figure 56: Making a barn door cut.**

After gaining entry using a barn door cut, be sure to remove the rest of the door and lock from the inside to open the entire doorway for egress.

### **Sliding Bolts**

A sliding bolt is a metal rod that is mounted to a door and slides into a keeper, or hole, in the jamb, Figure 57. It may be fabricated or manufactured and can be found in both residential and commercial applications. If it is found locked in residential applications suspect an occupant is still inside.



**Figure 57: Sliding bolt.**

## Overhead Doors

Overhead doors come in two basic configurations: garage doors, which can be folding or slab, and roll-down doors.

### Garage Doors - Folding and Slab

Overhead slab and folding doors are composed of metal, fiberglass, or wood framed sections that often contain glass panels. These doors are typically found as garage doors and most often associated with residential homes. Wood and fiberglass framed doors can also have wood panels and are usually operated manually or electronically. During size-up, look for bolt heads at the top of the door near the center. This is where the arm from the raising mechanism attaches to the door on the inside. The mechanism is operated by an electric motor that raises the door. To disengage the motor and allow for manual operation, break the panel adjacent to the bolt heads at the top and activate the pull cord. If the garage is the location of the fire, then most likely the cord will have burned away and the arm will have to be disengaged by pulling down with a hook or pike pole.

Always secure an overhead door in the open position. The most secure method is by bending their tracks. If this is not a viable option physically blocking the tracks (vice grips, pike pole, etc.) will suffice, however caution should be exercised as members may mistakenly remove them, Figure 58.

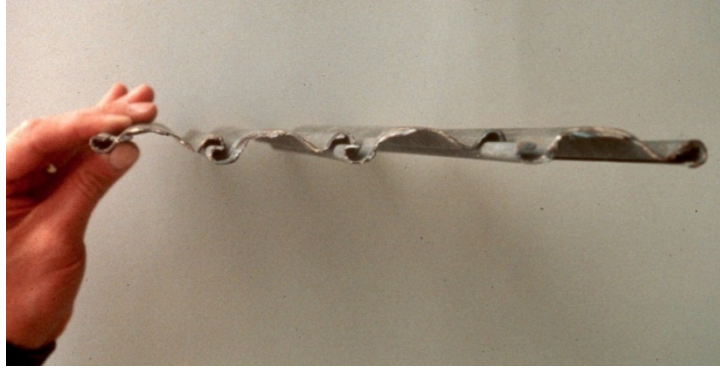


**Figure 58:** The primary method of securing an overhead door is to bend the tracks. If not feasible, placement of channel locks on this track is acceptable.

### Roll-down Doors

A roll-down door is a commercial overhead door that has several pieces of interlocking steel allowing it to roll up like a piece of carpet, Figure 59.

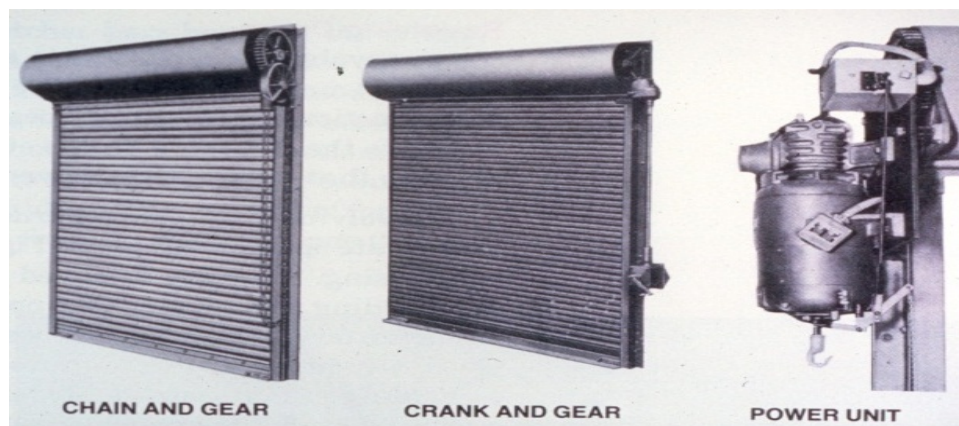




**Figure 59: Cross section of a metal roll-up door.**

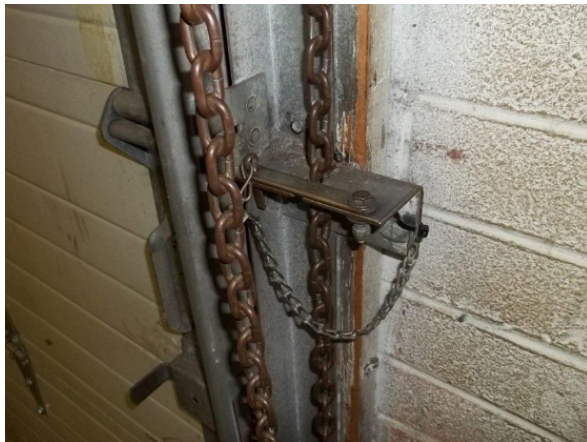
The actual mechanism used to raise the door can operate, Figure 60:

1. Manually,
2. By chain and gear,
3. By crank and gear, or
4. By electric Power and gear.



**Figure 60: Types of manual doors.**

Slide locks and chain keepers can be found at the floor level or at waist height, Figure 61, and must be deactivated from the interior. Once the door is raised pinch the track together with pliers or vise grips. This is imperative as heat exiting from the opening can cause the spring holding the door open to fail. In addition, the chain or crank is secured in a chain keeper as an added measure of security.



**Figure 61: Slide lock and chain keeper securing a manual gear driven chain hoist door.**

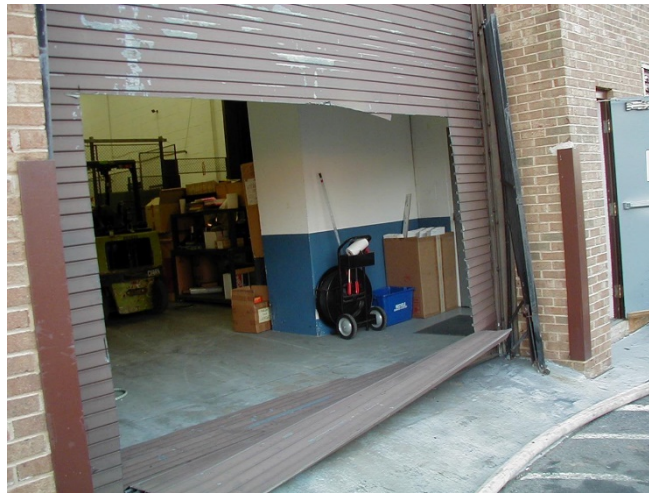
In situations where access cannot be gained to the interior to operate the locking mechanism, attacking the door panels with a power saw can open the door. Several methods of this access are the inverted V cut, the three-cut, and the L cut.

**Inverted V cut.** The inverted V is a cut that is started at the center of a roll-down door, Figure 62. The saw is held at head level in the middle of the door and then moved through the material down to a corner (at a 45-degree angle). The process is repeated again going down to the opposite corner. Another member with a long hook pushes the cut material into the building as the second cut is being made. It is imperative that the material is pushed into the structure and not pulled out, as this will prevent the hose team from getting snagged on the cut material. If the door is extremely wide, it is not necessary to take the cut all the way to the corner. The objective is for the door to be wide as possible so the cuts should be made at the widest angle. This can be accomplished by sliding the door slats out starting from the apex down using vice grips or the pike of a Halligan.



**Figure 62: Inverted V cut; ensure that the cuts overlap at the top of the V.**

**Three-cut method.** The three-cut method is effective on roll-down doors only, Figure 63. The three-cut method is accomplished by making three vertical cuts in the door. The first cut should be made as close to the edge of the door as possible from the maximum height down to the floor. The second cut is made in similar fashion on the other side of the door. The third cut is then made in the center downward about two feet. The resulting slats are short enough to be pulled out before hitting the sidewalls. At times, especially on wide doors, the weight of the hanging sections below can bind the slats that support them, making removal quite difficult. This can be avoided by making additional two-foot cuts every five to six feet. The shorter sections are then easier to pull out. The key point to remember is that every cut must be made through the same slat. Once the first slat has been removed, a member using a flathead axe can assist by tapping slightly on the back of the slat. This method requires more cutting than the inverted V, but it does guarantee clearing a larger area for access, rapid egress, and ventilation.



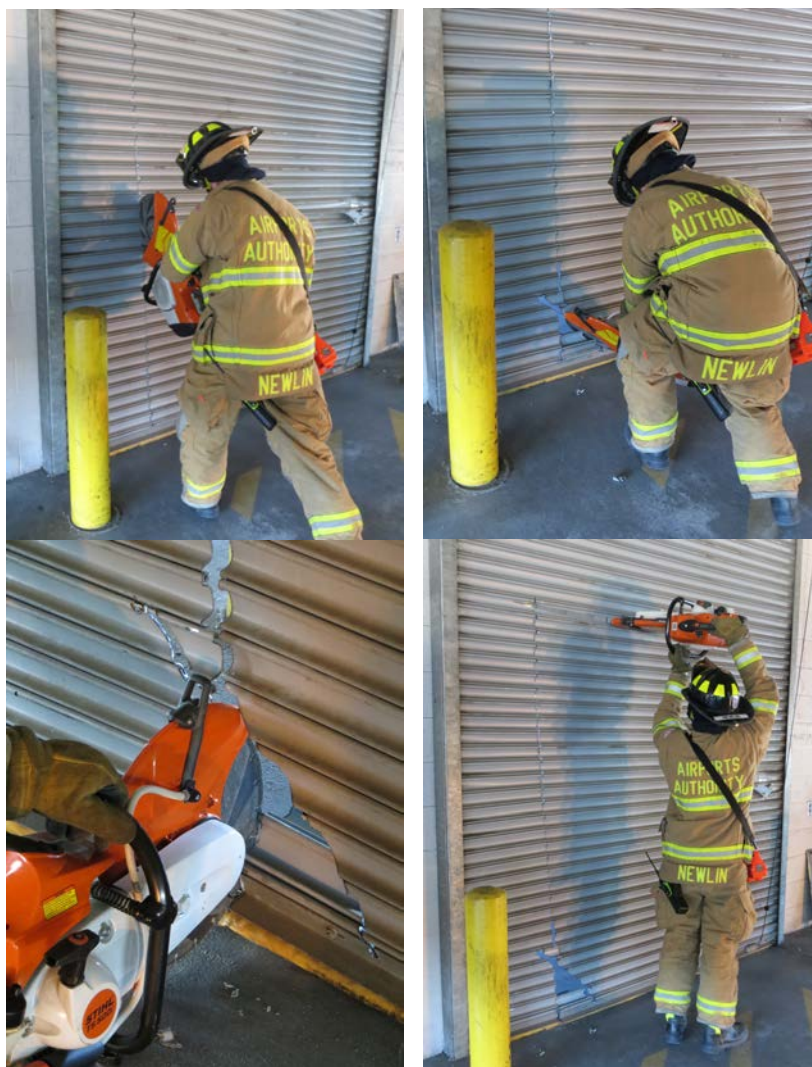
**Figure 63: Three-cut method on a roll-down door.**

**The L cut.** The L cut is a series of four cuts designed to gain the maximum opening yet control the flow path of the fire, Figure 64. The steps for an L cut are shown in Figure 65.



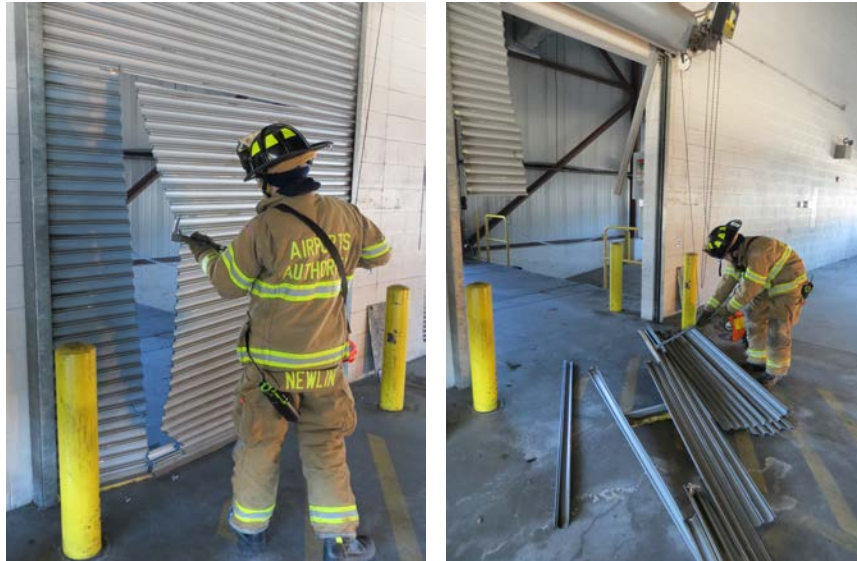
**Figure 64: L cut in a roll-up door.**

- Cut 1: A horizontal cut on either side of the door close to the edge from the top to the bottom.
- Cut 2: An angled cut starting approximately 1-2 feet from the bottom of the door along cut 1. The purpose of this cut is to make room for the saw for cut 3.
- Cut 3: A cut through the bottom angle iron of the door. A long pike pole or similar tool in conjunction with a Halligan as a lever point can be placed under the bottom edge of the door. Slight pressure applied on the pike pole will create a gap of space between the bottom angle iron and the floor that will allow the saw to cut the bottom rail without bottoming the saw out.
- Cut 4: A horizontal cut across the top of the door, overlapping cut 1.



**Figure 65: Cut 1 of the L cut (left top) and cut 2 of the L cut making room for the saw (right top). Cut 3 is the bottom angle iron (bottom left) and cut 4 finishes the task (bottom right).**

Once the four cuts are made, the cut section of the door can be hinged open with a Halligan. This will allow for the door to be re-closed should the flow path need to be controlled. If control of the fire flow is not necessary, the panels can be slid out and the entire cut section removed, Figure 66.



**Figure 66: Hinging the L cut door (left) and sliding out the door panels (right).**

When using any of these methods to attack the panels of a roll-up door, danger exists from the rotating drum holding the door panel. When the weight of the door panels is removed, the remaining panels can violently retract into the drum. After market door assemblies can separate from the building due to vibration and poor installation.

If a hose line will be deployed through the opening in the door, consideration should be given to prevent the hose line from being cut by the sharp metal edges.

The Phelps Lock is a lock unique to shopping malls for roll-down doors. A Phelps Lock is a timed-release lock powered by electricity. The proprietor must unlock each lock (usually three) at the correct time and in the correct sequence. For example, if lock #1 is unlocked; the proprietor must then wait exactly five minutes to unlock #2 and then they may have to wait another three minutes to unlock #3 before the roll-up mesh door can be raised manually. If the timing or the sequence is incorrect, the locks will relock. Pulling the lock cylinders will not unlock each lock unless the firefighter knows the correct sequence and timing, which is unlikely. Recognition of these locks is vital in gaining access to stores with these entry doors. The lock's sliding bolt must be cut with a power saw for access to these types of roll-up doors.

The most common type of gate is the horizontal rod roll up gate. It consists of horizontal rods attached with flat plate aluminum. Attacking the locking mechanism or the gate itself can access this type of gate.

A scissor gate is another security measure used to deter criminals from breaking into the front door and windows of a structure, Figure 67. Although they might appear like a forcible entry challenge, attacking the lock(s) allows for easy access. Cutting into the gate itself will be

complicated and time consuming. One advantage the scissor gate offers is ventilation, as it is not solid like a roll up door.



**Figure 67: Scissor gate.**

### **Screen/Storm Doors**

Screen and/or storm doors must be removed completely anytime the forcible entry task is necessary. Failure to remove a screen door can result in the attack line(s) being caught in the closed door and can affect egress and ventilation. To remove a screen door, place the fork of the Halligan bar between the screen door and doorjamb and pry away from the doorjamb. Next, forcibly slam the door onto the Halligan forks, which can snap the hinges. This can still be accomplished in cases where the screen door has a piano hinge, Figure 68.



**Figure 68: Remove screen doors anytime forcible entry is required.**