

Salvage & Overhaul

23

Section III - Truck Company Operations



Salvage Size-Up & Priorities

Salvage Equipment & Resources

Salvage Operations

Overhaul



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Objectives

- Identify when salvage operations begin and end.
- Identify major salvage tasks.
- Identify the tools available for salvage operations.
- Describe the care, maintenance, and storage procedures of salvage tools.
- Describe salvage tactics utilized based upon occupancy type.
- Describe salvage tactics utilized based upon incident type.
- Demonstrate various methods of use for salvage tools & related equipment.
- Describe and demonstrated methods of water removal.
- Demonstrate the salvage cover evolutions used by the SDFD.
- Describe the benefits of overhaul.
- Identify the various types of overhaul equipment.
- Explain the importance of respiratory protection during overhaul.
- Explain the relationship that salvage and overhaul has with customer service and public relations.



Introduction

Salvage is the protection of buildings and their contents from unnecessary damage due to activated sprinklers, leaky water pipes, fire streams as well as smoke, heat, and other elements. In a structure fire this combination of destructive elements needs to be addressed in order to ensure damage to the structure is minimized. However, the movement of smoke and heat within the structure will depend upon suppression and ventilation techniques employed, these techniques are covered in their respective chapters. Therefore this chapter will focus upon the movement and removal of water from a structure, as well as the protection of the building and its contents from water damage.

It is estimated that seventy-five percent (75%) of total fire loss is created during extinguishing operations and other events occurring after the fire, (Indirect damage). Twenty-five percent (25%) represents the loss actually caused by the fire, (Direct damage). Although we can do little to prevent direct loss caused by fire and its by-products, speedy and efficient salvage operations, performed as early as time and personnel permit, can greatly reduce the total loss and inconvenience to a structure and its occupants.

By nature, some suppression tasks appear more “attractive” to firefighters than others. Nevertheless, the assignment and accomplishment of the tasks deemed less “glamorous”, including salvage operations, are one of the greatest hallmarks of professional firefighting, and an important factor leading to successful fire suppression and property conservation. The goal in fire suppression should focus on suppression in a safe, timely, and effective manner in conjunction with minimizing loss.

Modern fire suppression operations generally requires an aggressive coordinated offensive assault in order to achieve total fire control and ensure civilian life safety. Although this coordinated offensive assault will result in damage to a structure from the accomplishment of forcible entry, ventilation, fire attack, overhaul, and rescue, it is the particular method used, combined with overaggressive, misdirected, or ineffective fire suppression that will create unnecessary damage. That being said, the obligation rests with every crew member, from forcible entry to the final stages of overhaul, to act with due regard in controlling damage in order to keep losses to a minimum.

The care and skill demonstrated by suppression personnel in the salvaging of property and personal possessions will enhance a positive public perception of the fire service. A common indicator of a fire department’s commitment to professionalism is demonstrated in its approach to minimizing loss.

REMEMBER: The fire service does not have a product to sell, but the actions of personnel will affect the voting taxpayer’s perception of the service we provide.



Salvage Size Up

The strategic priorities of any given salvage operation will depend upon a wide range of variables including:

- Training and experience
- Pre-fire planning
- Occupancy size and type
- Construction type
- Location and value of contents including intellectual property
- Incident type (fire vs. flood)
- Incident progression
- Resources available

After taking the above into consideration a company officer will need to implement an action plan as part of the coordinated effort to control the emergency. This plan needs to be communicated to the Incident Commander and firefighters assigned to that particular officer.

In order to develop the action plan evaluate the following:

- Facts - Nature of incident, type of occupancy, type of construction.
- Probabilities - Estimation of progress, possible hazards, weather.
- Resource Status - Type and quantity necessary to perform effectively.
- Decision - What are the objectives?
- Plan of Operation - How to accomplish objectives.

Below is a summary of considerations for firefighters and fire officers to evaluate when developing an action plan for salvage operations:



Training & Experience

As with all other elements of the fire service, success or failure of salvage operations can be directly attributed to the degree to which those involved have familiarized themselves with salvage equipment and techniques. It is a combination of this familiarity mixed with a good dose of imagination and ingenuity that will enable effective and timely salvage at the scene of an emergency.

Pre Fire Planning

Pre fire planning allows crews to develop familiarity with an occupancy and begin planning for a variety of emergency operations including salvage. In commercial or industrial occupancies, this is a particularly good opportunity for members assigned to a truck company to discuss roles and responsibilities during salvage operations. As a member of a truck company conducting a pre fire plan always look beyond the extinguishment of the fire and look towards enabling the speedy re-habitation of the occupancy or resumption of business. In a commercial or industrial occupancy this requires an evaluation for the presence of:

- Fragile stock
- Hazardous products:(Water Reactive, Radioactive, Corrosive, Explosive, Poisonous)
- Baled goods
- Basement drains & sump pumps
- Floor drains & roof scuppers
- Sprinkler system valves (Looped Systems)
- Water tight floors and doors
- Finished products, materials, and raw goods on the floor (Not on Pallets)

During your pre fire inspection take the time to discuss the following with the building / business owners and occupants:

- The value of placing finished products, materials, and raw goods on skids or pallets.
- The value in ensuring well maintained floor drains, sump pumps, and clean scuppers.

This is an opportunity to leave a good lasting impression upon those we serve as having genuine concern for the safety and success of their business, and will help ensure favorable relations with them in the future.



Incident Type

With regard to salvage and water removal there are two main incident types; fires and floods. During a fire the focus of salvage operations is mainly upon the protection of property and building contents from the use of fire streams and leaky couplings. During a flood the focus of salvage operations is upon securing the source of the leak or water flow in order to limit further damage. In some instances a fire will also be the cause of the flooding by activating one or more sprinklers. In any case careful consideration should be given to determining which property is already damaged and unsalvageable and then redirecting our focus on protecting that property which is not already damaged that is of greatest monetary (machinery), intellectual (business records), or sentimental value (family photos).

Building Features

The size and height of the structure will greatly affect all aspects of salvage operations and will be an initial indicator of the potential extent of operations. In a single story structure the flow of water will be limited to horizontal avenues. While in a multi-story structure water will flow both horizontally and vertically.

Occupancy Type

The occupancy type will dictate the areas of greatest value during the salvage operation. In a residential occupancy the structure is generally well compartmentalized with doors and narrow hallways that help to inhibit the flow of water. This helps to limit the extent of the overall salvage operation. Commonly the items of loss are household and personal effects.

A commercial / industrial occupancy usually has large open floor plans that allow the uninhibited horizontal flow of water. This floor plan design coupled with large expensive machinery, finished product and intellectual property may dictate extended salvage operations and the need for additional personnel.

Building Specific Features

Other building features that may be present but may vary from occupancy to occupancy are:

- Floor drains, [Figure 23-1](#).
- Sump pumps
- Sprinkler system shutoff and drain
- Vertical shafts
- Scuppers
- Stairways



Figure 23-1 Commercial Floor Drain

Construction Factors

Construction Style

The construction techniques employed during the development of the structure, as well as construction features will effect the ability of water to flow through floors and walls. Some construction materials and techniques are more permeable to water than others. The two basic construction styles are lightweight and conventional. Generally conventional construction styles offer greater stability when exposed to fire, and can withstand the added weight of water better than lightweight construction.

Construction Features

Construction features affect the degree to which water will be absorbed and retained by the structure.

Floors

Wood floors are easily damaged by water and do not provide an effective barrier for water, unless they are covered by tile, or linoleum, [Figure 23-2](#). Concrete floors are not easily damaged by water, and will provide some degree of protection against the vertical movement of water. However concrete is not water tight so expect some seepage around pipes, drains, shafts, and cracks.



Figure 23-2 Water damage to wooden floors

Walls and Ceilings

Walls and ceilings made of lath and plaster can suppress the flow of water. This allows the water to accumulate in large quantities that can cause a sudden collapse bringing down a large and heavy portion of the ceiling capable of causing severe injury to anyone beneath the collapse. Walls and ceilings made of gypsum are absorbent. The gypsum will continue to absorb water until it becomes too soft to stay secured to the wall or ceiling, and then sag and fall, [Figure 23-3](#). While gypsum ceilings can collapse due to water weight and absorption it poses less risk of injury than lath and plaster.



Figure 23-3 Gypsum becomes heavy when wet and ceilings may collapse without warning

Building Contents

The contents of a building can be divided into three general categories:

- Water Reactive
- Absorbent Materials
- Easily Damaged



Water Reactive

Identification of water reactive materials is essential for the safety of suppression personnel. These materials can be identified by pre-fire planning, building personnel, and building placards such as the NFPA 704, [Figure 23-4](#).

Absorbent Materials

These materials are characterized by their ability to absorb and retain large quantities of water, posing a significant hazard to the structural stability of the occupancy. Some types of absorbent materials are baled paper, cloth, or fiber.

Easily Damaged

Examples of easily damaged materials include; electronic devices, paper goods, files, materials in cardboard boxes, dry goods such as flour, and fragile stock.



Figure 23-4 NFPA 704 Placard will indicate if material is water reactive



Salvage Equipment & Resources



Truck or engine companies may carry many types of equipment specifically designed for salvage operations, or equipment that can be adapted to the need at hand. Below is a partial list of salvage equipment.

Salvage Covers

Salvage covers come in three sizes:

- 12'x 14'
- 12'x 18'
- 14'x 18'



These covers have hemmed and grommeted edges for reinforcement and hanging. Salvage covers are not fire resistant. They are expensive so care should be taken when placing them to avoid areas where they may be subjected to heat and embers. Use the grommet holes to hang salvage covers, do not drive nails through the salvage cover. Additionally salvage covers should not be placed where they will be walked on or used to carry debris. After each use salvage covers should be inspected and cared for using mild detergent and water then hung to dry. Once salvage covers are dry they can be rerolled and placed back on the apparatus. A monthly inspection of the apparatus salvage covers should occur. During this inspection the salvage covers should be removed from the apparatus, inspected for damage, repaired or replaced as needed, refolded and rolled, then placed back in service on the apparatus.

Figure 23-5 Salvage Cover and Hall Runner

Hall Runners

Hall runners are 3'x18' and are great for protecting the flooring in high traffic areas during fire suppression and overhaul.

Visqueen

Is a large roll of thick plastic sheeting, [Figure 23-6](#). Visqueen is a good alternative to salvage covers when:

- The area to be covered is in excess of a standard 12 x 18 foot salvage cover.
- Valuables will require covering for an extended period of time.
- If covers were used initially they can be replaced with plastic prior to leaving the scene.



Figure 23-6 Visqueen



- If covering for water protection on floor(s) below an incident.
- Limited manpower.

Supplemental Salvage Equipment

The following pieces of equipment are commonly used for salvage operations:

Salvage Hooks

Salvage hooks come in an S or 2 configuration. They can be driven into walls or door/ window moulding. Once in place salvage covers, visqueen, light cords and lights can be hung from them

Squeegee / Brooms

These tools are good for pushing water to a desired location.

Mop & Bucket

A mop and bucket are useful for soaking up limited quantities of water.

Scoop & Square Nose Shovel

Scoop and square nose shovels are good tools to remove water from carpets by dragging the nose of the tool on the floor. This will push large quantities of absorbed water out of the carpet.

Submersible Pump

A sump pump is used for dewatering operations where large quantities of water are accumulating.

Water Vacuum

A water vacuum is used to remove moderate to large amounts of water from the carpet or floor.

Redwood Plugs

Redwood plugs are useful to plug broken pipes and fused sprinkler heads.

Wood Wedges

Wood wedges are useful for many purposes including holding doors open or plugging fused sprinklers.

Sprinkler Tongs & Quickstop Sprinkler Tool

Sprinkler tongs and the Quickstop Sprinkler Tool are specifically designed to control the water from a fused sprinkler.

Channel Locks

Channel locks are a multi purpose tool that can be carried in a firefighters pocket and used for crimping tubing, removing small fittings, and turning difficult shutoffs.



Ladders

Ladders used in conjunction with salvage covers and be used to create chutes and basins designed to divert and collect water.

Hose

2 ½” hose can be used to channel water to a desired location similar to a large squeegee, by folding the dry hose in half and with one firefighter at each end dragging the hose along the ground. Hose can also temporarily divert water from a fused sprinkler by placing the female end of the 2 ½” hose over the sprinkler and then placing the male end in an appropriate location to drain.

Pike Poles

Pike poles in conjunction with salvage covers can be used to make chutes and basins to divert or collect water

Box Cutter / Carpet Knife

Oftentimes it is better to remove the water damaged carpet before using the water vacuum or squeegee. Box cutters or a carpet knife are useful for this purpose

½” Drill

When a floor drain does not exist, a ½” drill is useful to help make one. Before drilling consider removing a toilet to create an improvised floor drain, also consider where the water will go and plan accordingly before you drill.

Wood Lath

Wood lath is useful help reinforce the edge of visqueen when securing openings in walls, roofs or ceilings.

Hammer/ Nails /Staple Gun

These tools are useful when securing visqueen and lath to walls, roofs, or ceilings.



Salvage Priorities

Salvage operations should begin at the area of greatest expected loss. This may or may not be the floor of origin. The following factors should be evaluated to determine potential areas of need.

Multistory Buildings

In a multistory building where the flow of water can not be immediately contained, simultaneous consideration must be given to the floors below. A careful evaluation of the value of the contents that have already been damaged versus the value of the contents that may be damaged below will help determine where salvage resources should be deployed. Oftentimes we concern ourselves with protecting that which has already been damaged and will suffer no further loss by exposure to water than focusing upon that which is not yet damaged and can be salvaged from any loss.



Figure 23-7 Personal, non-replaceable items, such as family pictures should also be a salvage priority

Private Residences

In residential or private dwellings, items can be easily divided into five categories:

- Expensive appliances (televisions, sound systems, computers), [Figure 23-8](#).
- Furniture (antique, overstuff)
- Artwork (limited edition, original)
- Sentimental (photo albums, framed photos) These may be the most important since they are irreplaceable, [Figure 23-7](#).
- Clothing. These items may be expensive and difficult to replace



Figure 23-8 Electronics that contain important information, such as computers, laptops, hard drives, should be a priority for salvage



Commercial / Industrial Occupancies

The contents of commercial and industrial buildings are normally prioritized as follows:

Business Records

While the structure can be rebuilt, the business records and intellectual property may be irreplaceable. Without these records the business may never recover from their loss. As a result the tax base and surrounding community will suffer. The most important business records to salvage are accounts receivable as this indicates credit extended. Salvage in the office area is of prime importance including computers, desks, files, and drawers.

Machinery and Finished Products

Expensive and unique machinery, finished products (which are the result of time and money) and products ready to be shipped are the next priority.

Unfinished stock and raw material has the least intrinsic value.

Office Buildings

In office buildings the property of most value are usually computers, filing cabinets, [Figure 23-9](#), and expensive electronic equipment.



Figure 23-9 File cabinets and contents contain valuable information for businesses and should be a salvage priority



Salvage Operations

The two main objectives of any salvage operation are the protection of the structure and its contents from damage, and the removal of water. These objectives are generally accomplished in the following order. While these steps may be accomplished simultaneously with great success, the same is not true if done out of order individually.

Eliminate the Source

While water from fire streams may prove to be difficult to eliminate, some other sources of water flow are much easier to control. Some of those sources include;

- Sinks, and toilets
- Ruptured water heater
- Broken water pipe
- Broken or activated fire sprinkler



Figure 23-10 Localized water shut-of valve

Securing the water at the source is usually accomplished by locating the appropriate shutoff valve, [Figure 23-10](#), or by plugging the leak. In some instances it may prove useful to have multiple personnel working to secure the source by various methods. For instance when attempting to secure a fused sprinkler head, individuals may be assigned to locate a shutoff valve while another is assigned to locate the PIV or OS&Y while others are attempting to plug the sprinkler(s).

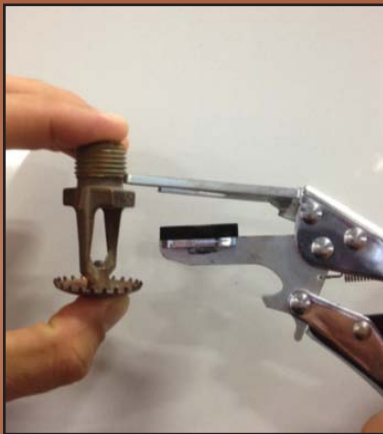
Securing a Fused Sprinkler Head

There are several methods and tools available for firefighters to use to secure a fused or knocked off sprinkler head:

- Two door stops/small shims may be inserted into the sprinkler head cage to form a wedge and slow the flow of water. This method typically does not form a water tight seal and has a varying degree of effectiveness.
- For sprinkler heads that have been broken off and an open end of a pipe is exposed, a redwood plug may be driven into the pipe to slow or stop the flow of water. Depending on water pressure in system, this also has a varying degree of effectiveness.
- Sprinkler Tongs can be used to secure a fused sprinkler head and provide a more water tight seal than the use of shims.
- The Quick Stop Sprinkler tool is probably the most effective tool for securing a fused sprinkler head (see chart on following page for instructions).

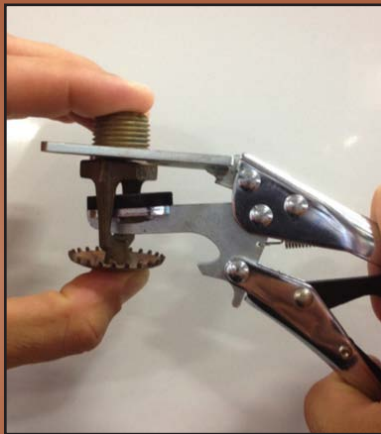


Quick Stop Sprinkler Tool



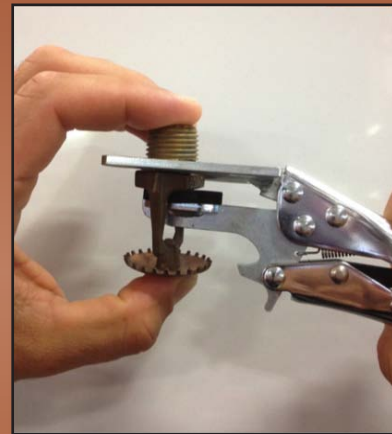
STEP 1

Slide the upper arms of the tool around threaded portion of the fire sprinkler.



STEP 2

Push the tool forward aggressively until it cannot go any further.



STEP 3

Squeeze the handle until the tool locks in place.

Note: Adjust the placement of the lower arm by tightening/loosening the nut and bolt on the end of the handle.

Recessed Sprinkler Heads

You may need to remove the circular disk around sprinkler heads to be able to access the threaded portion of the head



www.QuickStopTool.com

For additional information and training videos



Containment

While firefighters are working to control the source of the water flow it is also advisable to assign firefighters the duties of containment. Containment can be achieved through a variety of methods using both tools and equipment on the fire apparatus as well as items in the structure such as trash cans and waste baskets.

Engine companies can help to direct the flow of water using 2 ½ “ hose from their apparatus. Some of the options include:

- Using webbing to secure hose to the head of a sprinkler that can not be plugged
- Laying charged hose across an opening to divert water

Truck companies can begin the process of containment by creating catchalls, chutes, and basins. Truck companies can also help divert water by stacking or laying rolled salvage covers across an opening to divert water.

Water Chutes

One of the most practical means of removing water from the structure is by creating water chutes, [Figure 23-11](#). Chutes are very useful for collecting water coming through the ceiling from upper floors and draining the water out of the window or door. Chutes can also be used to direct water down stairways, hallways and narrow passages. Chutes may be constructed outside or on the floor below prior to being placed into operation.

Once the chute has been constructed it can be folded into thirds and carried inside. Once inside, place the chute into position on the floor, stairway, or onto a ladder for support. The weight of the water in the trough tends to tighten the rolls of the chute. The chute is now ready to be connected to the catchall.



Figure 23-11 Water Chute

Catchall

A catchall is constructed from a salvage cover which has been placed on the floor to contain small to moderate amounts of water, [Figure 23-12](#). Oftentimes a bucket and sponge is placed under the main drip. The catchall may also be used as a temporary means to control larger amounts of water until a time when chutes or basins can be constructed. Properly constructed catchalls will hold several hundred gallons of water and often save considerable salvage work. The cover should be placed into position as soon as possible, even before the sides of the cover are rolled.



Figure 23-12 Catch-All



Basin

A basin can be made for containing larger amounts of water than a catchall can hold, [Figure 23-13](#). For example, continuously flowing water out of a ceiling can be channeled into the basin for storage prior to removal with a sump pump.



Figure 23-13 Water Basin

- Break the 24' ladder and lash the tops firmly together. Next, strap a pike pole the desired width and distance to the butt section of the bed and then to the fly section.
- Set the opened salvage cover into the triangle formed. Leave sufficient slack over the edges to allow the cover to stay in place as water enters. It may be necessary to roll some of the cover around the pike pole to secure it.
- Furniture from the building, such as chairs and tables, can be placed in a circle and a salvage cover draped over with slack in the middle to form a basin. Lash the components together to prevent spreading.
- A suitable method for draining the basin must also be considered in order to eliminate damage from run-over.
- Consideration must be given to the weight of the accumulated water in the basin, if on any floor above grade.

Joining Covers

When objects are too large for one cover, or when long chutes or catchall need to be made, it is necessary to splice covers with water-tight joints. Also, when water must be routed from a catchall into a chute, the water must be prevented from running back under the catchall. This task may be accomplished by folding one end of the chute back over itself about 12" before it is placed under the catchall. When a long chute is necessary and water must flow over a joint, it may be folded as follows:

- Unroll the downstream edges of the uppermost chute to expose the end and fold this end back upon itself about 20".
- Lap the upstream end of the second or underneath chute over this fold about 10" and fold the remaining 10" of the uppermost chute back over the second chute.
- Fold the entire joint of both chute ends down over the underneath, or second, chute.
- Press the joint smooth so that water will flow over the lap joint. Then roll the edges of the combined chutes in-line with the rest of the chute. Generally, three chutes can be made up and rolled from the downstream side up and carried to the desired area.

Protecting

Protecting the contents of the structure is accomplished by either covering the items with salvage covers, [Figure 23-14](#), or visqueen, or removing them from the affected area. Prior to covering occupancy contents it should be gathered neatly in a common area with the heaviest objects on the bottom and lightest on top in order to ensure minimal damage and maximum effectiveness of each salvage cover.

Consideration should be given to using visqueen rather than salvage covers. Some of the advantages of visqueen are:

- Disposable - It may be left at a scene
- Size - 100 foot roll by 10 feet wide can be cut to size prior to placement
- Cost - Inexpensive compared to the cost of salvage covers
- Lightweight - Less people are necessary to deploy

But use caution when using visqueen to protect contents, as care should be taken to avoid areas near the fire area since visqueen will easily melt. Also consider the amount of water flowing onto the visqueen as it's lightweight nature will tend to sag under the weight of large quantities of water. Lastly never place visqueen on floors as it is extremely slippery when wet.

Methods of spreading salvage covers include just about anything a firefighter can improvise that will handle the situation. On a flat surface it might be easier to unroll the cover then unfold it. On a vertical shelf rack it may be necessary to use grommet hooks or nails using grommet holes and hang the cover as a sheet. The basic techniques used for deploying salvage covers are:

Balloon Throw

The balloon throw uses pocketed air to give the cover a parachute effect which tends to float in place over the article to be covered, [Figure 23-15](#). The steps for performing a balloon throw are:

- Unroll and stretch the cover along one side of the object to be covered. Grasp both ends of the cover near the ends.
- Take several accordion folds in the hand that is to make the throw and place the other hand about midway down the end hem. If using pike poles, accordion fold the cover on one end by laying the poles backward.



Figure 23-14 Salvage cover used to protect the lower cabinets and counter tops prior to overhaul of the ceiling.



Figure 23-15 Balloon Throw



- Pull the cover tightly between the operators and prepare to swing the folded part down, out, and then up in one sweeping movement so as to pocket as much air as possible.
- When the cover is as high as the operators can reach, the accordion folds may either be pitched or carried across the object, an action which causes the cover to float over the merchandise.
- As the cover is floated over the object, guide it into position and straighten for better water run-off.

Single-Edge Snap Throw



Figure 23-16 Single-Edge Snap Throw

The single-edge snap throw is designed to be used in narrow spaces where the balloon throw can not be used. It is especially effective where counters or other objects are near a wall or stacked closely together. The steps are similar to the balloon throw, only in a tight space and without pike poles. When the cover is lifted as high as the firefighters can reach the cover is snapped over the object and guided into position, [Figure 23-16](#).

Enveloping



Figure 23-17 Enveloping (Double Bagging)

Occasionally contents may be so valuable or firefighting tactics so messy that the objects should be enveloped, [Figure 23-17](#). This process starts with the placement of a salvage cover on the floor; the contents are then placed over the cover; and finally another cover or several of them are spread over the contents and tucked under the bottom cover.

Tunnels

Sometimes an area which receives flooding amounts of water will be over a main route and a tunnel would help keep firefighters dry. To construct a tunnel, secure beams of ground or aerial ladders, pike poles, or rope in such a fashion that when the cover is draped it will be high enough and wide enough to provide easy passage.

After any arranged material has been covered, there are likely to be small pockets in the covers where water can collect and cause the cover to sag. The cover should be rearranged whenever possible so that water will drain away. In addition to protecting contents consideration should be given to protecting the floor with hall runners.



Ladder Chute

A ladder chute may be constructed when the easiest method to remove water from a sprinkler head or leaking ceiling is to remove it out a nearby window. A wall ladder is placed inside the window and under the leak. A water chute is then constructed and layed out onto the wall ladder, allowing the water to drain directly out a window, **Figure 23-18**.

Removing Salvage Covers

Regardless of the method used to spread salvage covers, certain precautions should be taken to preserve the covers and permit them to perform their function. During the removal of salvage covers from merchandise the cover should be folded on itself to prevent snagging it on sharp projections. It is never advisable to pull a salvage cover off. To remove covers from “bagged” or “enveloped” merchandise, two fire-fighters should take positions opposite each other then;

- Grasp the corners of the cover,
- Fold each side to the center.
- Then each person grasps an end of the folded salvage cover and,
- Starting at one end, walks the cover down to the other end.
- When the bundle is small enough grasp the edges and raise it clear of the merchandise carry it outside.

It is quite possible that water will have been trapped in the cover during this process. It is much better to have trapped water dumped outside than to dump it next to the merchandise. Also remember that keeping the cover wet until it can be cleared will prevent carbon and ash stains from solidifying.



Figure 23-18 Ladder Chute



Channeling & Removing Water

While firefighters begin to address the source of the water flow as well as containing the water consideration should also be given to channeling the water to a desired location. In some instances it may be desirable to channel the water to a basin for collection then removed from the structure using a sump pump. In other cases it may be desirable to channel the water out of the structure, while yet another option may be to channel the water toward a floor drain.



Figure 23-19 Removing a toilet and the wax ring can create a floor drain to remove large quantities of water

CAUTION: Water will naturally tend to seek the lower levels of a building and this natural condition may be controlled. Care should be given to prevent water from being channeled toward elevator shafts and basements. Firefighters must take action to prevent large quantities of water from accumulating in elevator shafts and basements during fire suppression activities as the accumulation of water in these areas can cause catastrophic failure of the structure and building systems.

The most common method for channeling water is to construct a chute using salvage cover(s), and, or pushing the water with squeegees, brooms, and shovels. As with all other aspects of salvage operations the particular methods employed to channel water are only limited by the available materials, initiative, and individuals' resourcefulness. Some methods to consider are:

- A folded section of hose to pull water toward a desired location
- A rolled salvage cover behind a floor drain to channel water
- A charged hoseline across an opening to divert water
- Removing a toilet to expose the 4" sewer pipe and create an improvised floor drain, [Figure 23-19](#).
- Using the ½ " drill or saw to create an improvised floor drain

Lastly consider removing sections of the water soaked carpet prior to any effort to channel or remove the water. Use of the water vacuum, as well as squeegees and mops, are greatly enhanced by removing the water soaked carpet and exposing the solid sub-floor surface.

Deploying a Salvage Cover



With a partner, place the rolled salvage cover across your knees and grasp opposite ends of the cover. Check over each other's shoulder for obstructions



On command, both firefighters walk backwards and snap open the salvage cover by throwing both arms up and outward, maintaining your grip



Place the cover on the ground



Unfold the first layer flap of the salvage cover



Unfold the second layer flap of the salvage cover



Repeat the previous two steps on the opposite side of the cover

Folding A Salvage Cover



With a partner opposite of you, spread cover out and position yourself at lengthwise ends



Fold one side of halfway to the center of the cover



Anchor your hand at the halfway point of the previous fold



Fold this quartered section one more time toward the center of the cover



Go to the opposite edge and make your first fold to the center of the cover.



Anchor your hand at the halfway point of the previous fold

Folding A Salvage Cover (Continued)



Fold this quartered section one more time toward the center of the cover



Take one end of the cover and walk it down towards the opposite end



Stop short and stagger the ends approximately 12" to 16"



Roll the cover while your partner takes up the slack and keeps cover in line



Fold the exposed 12" to 16" staggered flap from the bottom of the cover over the top half of the cover to lock the ends in place



Finish rolling the cover



Build a Large Catch-All



Spread out cover using two firefighters. Fold each corner inward approximately 3' to 4'



Roll one side of the cover inward approximately 2' to 3'



Repeat the previous step on all sides of the catch-all, rolling the sides inward approximately 2' to 3'



Roll each corner inward again approximately 1' but stopping short to leave the inside flap exposed



Grab the inside flap and fold back over the corner, tucking the corner under the outside of the catch-all



The finished catch-all can be folded in half and transported to the necessary location

Build a Small Catch-All



Begin by folding the salvage cover in half, lengthwise



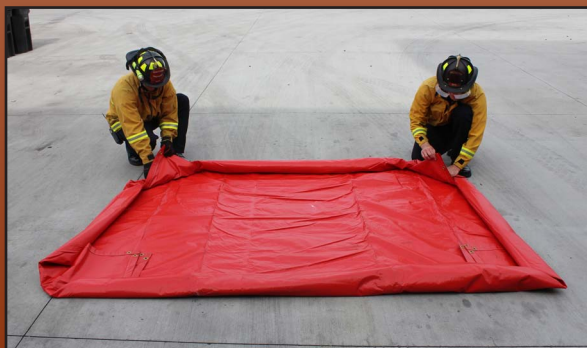
Build the small catch-all in the same manner as the large catch-all previously described



Fold all four corners inward 2' to 3'



Roll all sides inward 1' to 2'



Roll in corners and lock in place with the inside flap



The finished small catch-all can now easily be transported by two firefighters to the necessary location

Build A Chute



Unroll the salvage cover and open up halfway, grasping both folds and keeping them together



Open up the opposite side of the salvage cover, keeping both folds together



Fold 10" of one end of the salvage cover back on itself, this will be the top of the chute



Fold 20" on the other end of the salvage cover back on itself, this will be the bottom of the chute



With a partner, roll one side of the cover to the center



Roll the opposite side of the cover to the center. The chute is now assembled and can be folded in thirds for easy transport

Connect A Chute To A Catch-All



To connect a chute to a catch-all, butt the top of the chute up next to a corner of the catch-all



Unroll te top of the chute



Unfold the top 10" of the chute and tuck under the corner of the catch-all



Unroll the corner of the catch-all



Roll both the catch-all and chute back up towards each other to secure them in place



The catch-all can now be drained using the chute to transport the water



Connect A Chute To A Chute



To connect a chute to another chute, butt the top of one chute to the bottom of the next chute



Unroll both chutes



Unfold the 10" flap and place over the 20" flap



Fold over the first 10" of the 20" flap onto the previous fold



Next, fold over all layers of the flaps in the direction of the water travel to lock the two chutes in place



Roll both edges of the chutes back together to complete

Enveloping (Double-Bagging)



Place the items to be protected on top of a salvage cover



Wrap up as much of the items as possible with the salvage cover



Cover the items with a second salvage cover



Cover the items with a second salvage cover



Tuck the loose edges of the top salvage cover under the items to lock in place



Enveloping Complete

Balloon Throw



Lay out the salvage cover in front of the object to be covered.



Accordion fold the cover



Place two pike poles through the corner grommets and twist around once, be sure to not puncture the cover with the hook



Working together, trap air under the cover by moving forward and backwards once or twice



Once airborne, move cover over the object in one smooth motion



Allow the salvage cover to come to a rest and unhook the pike poles



Overhaul

Overhaul is defined as the search for and extinguishment of hidden fire. Overhaul is an operation that is completed after the main fire has been knocked down. Overhaul is a continuous process that is coordinated with all other operations throughout the incident. Personnel may be assigned to find and investigate fires in concealed areas, remove burning objects or even remove and watch over objects of value. Once extinguishment is complete, companies may be assigned to check for further extension of the fire, secure unsafe areas and may be asked to assist MAST in determining the origin and cause of the fire. A systematic approach should be employed which will maintain firefighter safety, keep damage to the building and its contents to a minimum, and at the same time improve public relations by showing a concern for the occupants' property.

Overhaul Safety Considerations

Although the primary objective of overhaul is the prevention of rekindle, the first consideration of overhaul is safety. Once a fire has been brought under control time usually becomes available to plan and organize overhaul activities. This should be accomplished in such a way as to provide the highest possible degree of safety not only to fire department personnel, but also to others who might be allowed on the scene. Although some overhaul is conducted during the firefighting operation, the bulk of it is not started until the excitement and flames have died down and exhaustion has set in. Consequently, it is important for the firefighters to have relief so the overhauling personnel are alert and can work in a coordinated team effort.

Firefighters will wear proper protective clothing, and SCBA's are required until the I.C. determines the air is safe. The Incident Commander should assign



companies to specific tasks. Firefighters should choose the correct tool for their job assignments. If unsure of either their assignment, or how to do it, firefighters should ask. Company officers should continually check on their crew's progress, enforce safety requirements, and ensure that the correct tools are properly used.

During the overhaul phase, the fire emergency has been abated. There is no reason to hurry; in fact, a hastily done overhaul often results in rekindle. Firefighters should pace themselves, take breathers, and get relief when tired. The building's stability must be examined to ensure the safety of personnel operating inside. Damaged contents can present severe danger to unwary overhaul crews. Firefighters should be alert to content hazards. If the contents are heavy or waterlogged, they may have weakened the floor. Objects that have burned may have sharp protrusions that could injure people.

Pick safe routes to haul material and establish traffic patterns. Set lights as needed until all hazardous areas are well illuminated. Overhaul during the fire should include shutting down utilities exposed by the fire. Any additional hazards, such as gas storage, chemicals, etc., should be checked for safety.

It is not the responsibility of the fire department to actually remove hazardous conditions such as dangerous walls, open pits, and objects that may fall. Such operations often involve the use of cranes, bulldozers, and other heavy equipment. It is, however, the responsibility of the fire department to direct and recommend the removal of dangerous conditions. It is also the responsibility of the fire department to protect people from these unsafe conditions with barriers, warning signs, and lights. The police department is charged with security of the building once fire crews have left.

Some common accidents occurring during overhaul are:

- Being struck by another firefighter's tools
- Being struck by falling objects
- Foreign bodies in the eye
- Strained muscles because poor lifting technique is used
- Cuts from broken glass and sheet metal
- Puncture wounds from nails.

Respiratory Protection During Overhaul

Overhaul is a long, tiring process. Oftentimes firefighters will shed their SCBA's early in the overhaul phase before the atmosphere has been properly monitored. This is an extremely dangerous practice that can and will lead to heart disease, lung disease and cancer. Once the atmosphere has been monitored, ventilated, and deemed safe, personnel should still consider the use of their SCBA, or at a minimum an N95 dust mask, to keep from inhaling airborne particulate.



Benefits of Overhaul

The application of proper overhaul techniques provides a number of far-reaching, valuable results that are important to the fire service and to the public. The fire service benefits by successfully eliminating the threat of fire, determining its cause and by a favorable response from the community for the service provided. The public benefits through a speedier return to production schedule, reduced insurance rates and by conviction of arsonists.

Some of the specific values of overhaul are as follows:

Locate fires in concealed areas

Fires may burn inside walls, attics, Figure 23-20, or even inside smoldering objects (e.g., couches, furniture). Often they can be detected by touch, smell, sight and the use of a thermal imaging camera. Overhaul will systematically look at each area to determine if fire is present.

Prevents rekindle

By examining the incident area thoroughly and finding hidden fires, firefighters can prevent rekindle. Suspect objects may be removed from the structure and soaked down. Areas having a rekindle potential may be kept under surveillance with a charged hose ready to attack any flare-ups.

Aids in determination of cause

Fire cause involves the fuel supply and a heat source. Careful observations should be made while performing any fire operation to determine when these two factors came together with oxygen to start the fire.

Note: If anything is moved during fire operations always note its exact position. Do not move objects that may be evidence in a fire investigation unless it is absolutely necessary.

Prevents unnecessary damage

Systematic overhaul will isolate the fire and identify areas that were damaged as opposed to those that were not. To avoid further damage, contents of value can be moved to safe places. Water should be removed in a manner that will not damage other areas of the structure. Overhaul should proceed from the top floor down, interior rooms outward, and from isolated entrances so that damage is kept to a minimum.

Places the structure in a safe condition

Overhaul should identify those areas that are and are not safe for public use. Areas deemed unsafe should be secured.



Figure 23-20 An attic fire necessitates the removal of all ceiling and insulation material. Blown in insulation is especially problematic in regards to rekindle and must be removed entirely, resulting in a lengthy overhaul process.



Improves public relations

The efforts of overhaul will result in reduced damage, prevention of rekindle and may save life and property. All of these will improve our relationship with the San Diego community.

Overhaul Equipment

Salvage work done throughout a firefighting attack will have a direct bearing upon any overhaul that may come later, and a majority of the tools and equipment carried on the engine and truck companies can be used during both operations (see equipment list under Salvage Equipment in Salvage Section). Some of the more important and additional tools used during overhaul operations are:

- Thermal Imaging Camera (TIC)
- Carbon monoxide (CO) indicator
 - An instrument carried on all fire engines to measure levels of CO present in or around a fire area. This level of CO will determine whether or not the fire area can be entered without SCBA's.
- Multi-gas Detector
 - This tool is carried on all BC rigs and truck companies. It measures CO, Hydrogen Sulfide, Oxygen and LEL/UEL levels.
- Pike poles and roof hooks
 - Used to open ceilings and roofs to check for fire extension.
- Axes, Halligan bars and power saws
 - Used to open walls, floors, and doors.
- Small hose lines used to extinguish small hidden fires.
- Debris carriers, carryalls, catchalls, water basins, buckets
 - Used to carry debris and provide a container for immersing smoldering material.
- Shovels and hay hooks are used to move or separate baled or loose material.



Figure 23-21 Debris carriers and scoop shovels are essential pieces of equipment used during overhaul.

In large-scale fires heavy equipment may be needed such as forklifts, bulldozers, cranes, backhoes, etc., which can greatly aid in removing large quantities of debris, moving undamaged materials, routing water away from the fire scene or constructing dikes to contain water. Utilization of this type of equipment will be made at the Incident Commander level but may substantially reduce demands on personnel.



Overhaul Considerations and Procedures

Overhaul considerations and procedures are essentially the same before, during and after extinguishment. Whether crews should be committed to overhaul is at the discretion of the Incident Commander and depends upon the type of fire.

The first requirement before initiating overhaul is to determine the condition of the building or area in which overhaul will take place. Is the structure safe? The correct answer to this question may save lives and property. Overhaul should be a planned search and extinguishment procedure. One of the first major objectives should be to make a careful check to determine whether the fire has extended to other areas of the building through vertical openings. In particular, through walls, attics, false ceilings, trash chutes, pipe recesses, elevators or other concealed spaces.

General Guidelines for Overhaul

Remember to have watch lines set during overhaul, particularly when opening concealed spaces. Unnecessary water damage can be avoided by placing leaky nozzles in bathtubs or out windows. Leaking hose connections should be tightened. Hose lines should be placed so that any sudden movement such as the reaction to a nozzle being opened will not damage anything. If they are not in use, hall runners and salvage covers should be placed and debris carriers set under areas to be opened. Firefighters should be reminded to clean their boots before entering undamaged areas, if at all possible. Do not allow unauthorized persons in the premises while overhauling, and do not permit the removal of any records or books unless permission is granted by the Incident Commander.

Concealed Spaces

Areas that seem to cause the most trouble include roof and floor seams where they enter party walls. If the floor seams have burned away at the ends, where they enter a party wall, the burned ends should be overhauled, removed, and the voids washed out. The other side of the wall should be checked to see if fire or water has come through or if there are any signs of weakening. Where fire has burned around windows or doors there is a good possibility of fire remaining in the casings (especially in older construction). Incidentally, window and door overhaul tests the mettle of the firefighter. The job can be done with little damage to the framework of the door or window or it can leave them a splintered wreck.

Overhaul of concealed spaces frequently uncovers pockets of gas from the fire or leaking gas pipes which, if ignited, would

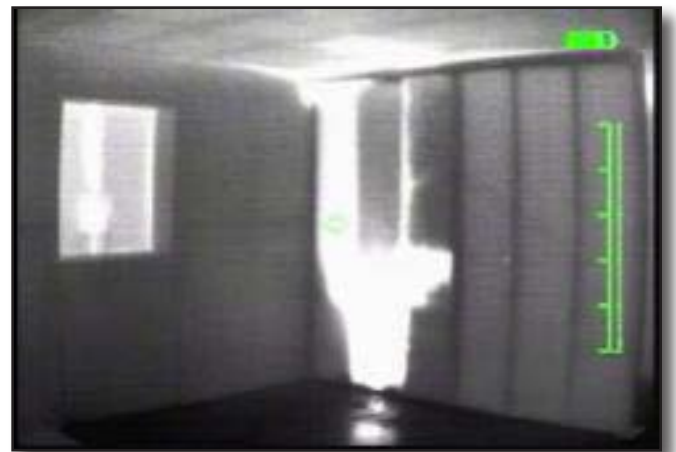


Figure 23-22 The use of a Thermal Imaging Camera (TIC) can help detect fire in concealed spaces.

cause additional damage. Sometimes quantities of water, perhaps scalding hot, may be encountered in out-of-the-way places. Many firefighters have suffered scalds and burns by having hot water or flaming material fall on them while opening areas. To make overhaul safer it is good practice to use teams of at least two firefighters; ensure they have a charged line available; provide ample illumination, and have adequate tools.

Overhaul usually begins at the top and works down. The firefighters should be careful not to scatter or cover any material that retains fire. Care should be taken to ensure that materials not on fire are not damaged by the overhaul operation. If at all possible, the undamaged and less damaged goods should be set aside in a safe area. Do not get into a habit of shoveling everything movable on a floor out a window. Pieces of burned flooring, lath and plaster, burned and unburned furniture and clothing, some of which might conceivably be salvageable, are sent flying out a window mixed with dirty water to make an unsightly pile. It is not uncommon to see this heap of debris rekindle with the result that it too must be overhauled. Firefighters who dump debris out a window onto valuable shrubbery or landscaping also cause additional loss.



Figure 23-23 The debris pile should be placed on the property in a location that will not create any further damage to the structure should it re-ignite. Continuous wetting of the layers of the debris pile is often necessary to prevent a rekindle.

Debris Piles

To facilitate overhaul, material (particularly burned lumber, plaster, bits of tin and steel, glass), must be removed from the floors of a burned building. This can be done with some degree of neatness and without littering the sidewalk and street. Many firefighters agree with the idea that it is poor public relations to dump the damaged contents of a place of business out on the street. Not only does it look bad, but it means additional handling later by clean up crews.

Generally speaking, it is considered good policy to remove only non-salvageable material such as plaster, lath, completely burned items, etc. from the fire building. If this material is such that it can be collected and carried out in containers or on debris carriers, it will facilitate good operations. This debris should then be placed in a pile on the property if possible, [Figure 23-23](#). The debris pile should also be located away from the structure in the event the debris reignites. The debris should be wet down as it is piled to prevent a rekindle. Remember that all scorched or partially burned material, sorted out from the debris, although they may have no salvage value, may prove helpful in preparing an inventory of losses or in determining the origin of the fire.

Naturally, partially burned records and documents should be set aside and saved. If money, jewelry or other small valued items are found while overhauling, they should immediately be brought to the attention of a witness in



the area and the crewmember's officer. They in turn shall notify the Incident Commander.

Losses can be reduced during overhaul by not opening anymore containers, walls, packages, bales or bundles of valuable material than is necessary to check for fire. By removing items to be overhauled to designated area, especially items such as mattresses and couches water damage and the possibility of fire spread can be reduced.

Hazardous Materials

Overhaul may be especially hazardous in electronic manufacturing facilities, drug stores, dry cleaners, chemical warehouses, wholesale drug stores, paint shops and other occupancies where toxic, explosive, or corrosive substances are stored. Extreme care should be taken when extinguishing fire in these types of occupancies. The contents of many of the containers found in these occupancies could cause explosions, spread the fire and subject firefighters to risk of injury.

As soon as a hazardous substance is identified or suspected, contact the Hazardous Incident Response Team. Under no circumstances should suspected containers be moved and the Incident Commander and fire officers should suspend salvage and overhaul operations until the HazMat team arrives and can give informed directions. Where chemical hazards are believed to exist, and the possibility of contamination may have occurred, decontamination procedures must take place immediately under the direction of the HazMat team. Equipment must be thoroughly cleaned and safety clothing must be thoroughly cleaned or destroyed depending on the material (see Hazardous Materials chapter).

Special Buildings

Fires in liquor stores, post offices and banks present different problems during overhaul than regular businesses.

Liquor Stores

In liquor store fires, a representative of the Alcoholic Beverage Control Commission, as well as the owner, should be present before packaged goods are removed from the building or fire area, [Figure 23-24](#). If this is not possible, the Incident Commander should set up accounting procedures and request police department assistance to guard the contents.

Post Offices

In post office fires, quick extinguishment with a minimum use of water is highly desirable for obvious reasons. Ensure that the fire is out and try to preserve any signs of arson. Companies should remain on scene until the arrival of a postal inspector.



Figure 23-24 Liquor store fires present an added challenge during overhaul requiring the involvement of the ABC, PD, and store owner.

Bank Fires

Bank fires are not too great a problem as most of the money will be in a protected vault at night and employees present during the workday. There should be some cooperation between the bank's staff and overhauling firefighters to help accountability of the bank's contents.

Large Vehicles

Overhaul of large vehicles such as trucks, [Figure 23-25](#), buses, railroad cars and small boats follows the same general procedures as building overhaul, with a few important exceptions. Because of the mobility involved, a large vehicle could be almost anywhere in a fire district. Its hazardous contents will generally be indicated on the vehicle. If Department of Transportation (DOT) guidelines are followed, there will be hazardous chemical labels on the truck.



Figure 23-25 Trash truck fires present a significant overhaul challenge and often require heavy equipment to assist.

Determining Cause & Aiding Investigation

A fire's cause is a combination of factors:

- Fuel ignited
- Source of heat of ignition
- Person(s) involved.



Figure 23-26 Every attempt should be made to preserve the room of origin and any significant fire patterns until after the investigators have completed their work.

Firefighters have a very important role in determining the cause of the fire and can aid the fire investigators by collecting data and preserving evidence. During fire scene overhaul the firefighter has a responsibility to not destroy evidence, [Figure 23-26](#). Many times the Incident Commander must stop overhaul operations altogether after fire extinguishment to avoid further damage or the possibility of destroying evidence. This gives the fire investigators time to examine all possible evidence of fire cause. Refer to Fire Investigation chapter for more detailed information regarding fire origin and cause determination and evidence preservation.

Restoring the Occupancy

The prime objective of firefighters before leaving the premises is restoring the structure to as safe a condition as possible. This might include removing debris and water, identifying and securing unsafe areas, restoring fire protection systems and replacing contents that may have been removed during the fire.



Securing Unsafe Areas

Another factor to be considered when rendering a building safe is its structural condition. Such situations as bulging walls, sagging floors, and weakened roofs should be removed, guarded with barricades, or shored up using raker shores, dead shores or vertical or horizontal shores with wood on the scene or wood from Rescue 4. Conveyors, hoists, escalators, and elevators should be checked for safety before they are released to the property owner for public use.

Covering Windows, Doors and Roofs

Covering holes in roofs after a fire is an important overhaul operation. It is essentially poor practice to salvage a stock of merchandise or household furnishings and later have them damaged by bad weather. Roof openings should be covered with salvage covers or plastic Visqueen sheets. The edges must be tied, weighted, or nailed down for security from the wind. Do not use nails or staples to secure a salvage cover. Rolls of polyethylene sheeting can be used with staples to form watertight coverings.

The size of the opening and length of time it will remain covered will determine the material used on a roof. When it is necessary to cover small holes in pitched roofs, the roofing material should be raised around the hole before the hole is covered. This prevents water from running into the hole. The cover should then be fastened in place with lath board and nails or stapled. This same procedure may be used on exterior openings capable of being covered with plastic Visqueen sheeting carried on truck companies. Skylights, roof hatches, and air shafts are probably the easiest of all roof openings to cover and make watertight because of the elevated framework.

Note: Extreme caution should be exercised any time one works on a roof as it may have been weakened by the fire. Firefighters should consider the use of roof ladders while working on the roof.

Making Structure and Contents Safe

As mentioned previously under safety considerations the contents of the building must be made safe - not only for working firefighters but also for the owners or occupants of the building. The fire department must direct the elimination of unsafe conditions as well as ensure there are barriers, warning signs, and lights where required for safety.

Restoring the Fire Protection System

Fire protection systems must be placed back in service. This would include replacing used sprinkler heads, using wooden plugs or special head closing devices (sprinkler tongs), re-engaging the post indicator valve or OS & Y valve and checking for leaks. Standpipe systems should be drained by the fire department if they are dry systems. Wet systems are usually handled by the



Figure 23-27 Ventilation holes should be covered with visqueen prior to turning the structure back over to the homeowner.

Building Department. Alarm panels should be analyzed to see if the system will take a reset to normal status. If the system will not reset the alarm company will be notified and the owner will be instructed to have a fire watch in place until the system is restored.

Restoring Utilities

The San Diego Fire Department is not responsible for restoring utilities or water systems. However, they should supervise such action to ensure that fires are not rekindled or that no further damage results. Notify FCC of any utilities requiring servicing so they can contact the appropriate agency.



Figure 23-28 The Red Guide to Recovery, also referred to as the “Fire Victims Handbook,” contains useful information and resources for the owners after the Fire Department leaves.



Figure 23-29 It is important to remember the human aspect of our job and to be empathetic towards fire victims. Often times the structure fires we respond to contained everything a person owned except for the clothes on their back.

Releasing the Building

After overhaul activities are completed, releasing the premises back to the property owner is usually in order. This is a simple yet formal procedure and should be done in the presence of a witness. This release may only involve the property owner, but in some instances, other persons are involved. For this reason, public relations play an important part in making the proper release. Tactful, but firm recommendations should be made to the responsible persons, and the utmost cooperation should be achieved. Victims should be provided a copy of the Fire Victim’s Handbook, Figure 23-28.

Improving Public Relations

The performance of effective salvage and overhaul will demonstrate to the citizens that there is concern for the protection of their property. During a time of crisis, the seemingly little extras are important to people and it will be returned later in goodwill and support. Small household mementos adequately covered and saved for a youngster or senior citizen will assist in spreading a reputation of quality service by the Fire Department. Commercial or manufacturing locations large and small can profit considerably from good salvage and overhaul operations which control water damage or save particularly valuable stock, records, or working documents. What is of value to others is hard to determine; therefore, following the basic fire service objective of saving property, which implies using all salvage and overhaul techniques, will enhance the fire department’s relationship with the public.



Summary

Salvage

Salvage remains an essential function of the fire service. Victims of fire and other disasters recognize and appreciate the fire department's efforts when irreplaceable personal belongings and other contents of a home or business are saved through efficient salvage work. Salvage does not require a huge workforce. It can be performed by a small number of well trained, well-prepared personnel. Simply put,

EFFECTIVE SALVAGE = GOOD PUBLIC RELATIONS

Overhaul

When the excitement and thrill of the flames die down at a fire the work of overhaul begins. While initial knockdown may only take a few minutes, overhaul is a long and arduous task that must be carried out with due diligence and caution. Use care to ensure injuries are prevented, property is protected and the principle of customer service is upheld at all times.



Media & Link Index



Salvage Covers Video - Balloon Throw 1



Salvage Covers Video - Balloon Throw 2



Salvage Covers Video - Building a Catch-All



Salvage Covers Video - Deploying a Catch-All



Salvage Covers Video - Deploying a Salvage Cover



Salvage Covers Video - Deploying a Water Chute



Salvage Covers Video - Enveloping



Salvage Covers Video - Folding a Salvage Cover



Overhaul Video - Pike Pole Techniques



Salvage Covers Spiel & SOG



Salvage Covers Drill Sheet



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3. SDFD Truck Company Standard Operating Guide - Salvage Covers Drill - September 2009
4. IFSTA Essentials, 5th Edition, Salvage & Overhaul
5. Rio Hondo Truck Academy Power Point Presentation - Salvage & Overhaul

Credits

Writers:

Robert Bunsold

Kevin Pendleton

Layout & Editing:

John Brubaker

Media:

Wayne Whitney

Brian LaVigne

Colin Crowley

John Brubaker

Grammatical Editing:

Kevin Pendleton

NOTE: If you have any additional information or content that you feel would be appropriate to contribute to this Chapter or would like to report any errors or misrepresentations, please contact the SDFD Training Division or email the Drill Manual Revision Staff at

SDFDDrillManualTeam@SanDiego.gov

