Furnace and Duct Cleaning

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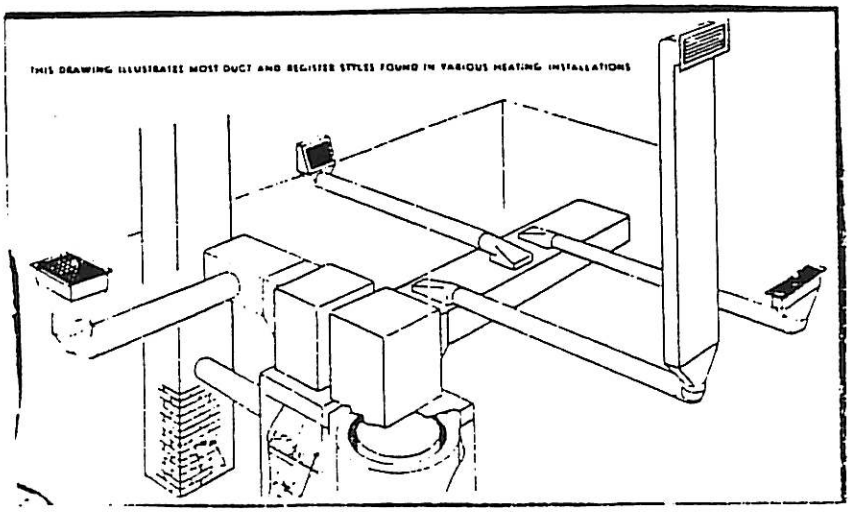
INTRODUCTION

Furnace and duct system cleaning is an important and integral part of many fire restoration jobs. Unfortunately, these services are oftentimes misunderstood by insurance adjusters and property owners. Professional cleaning and restoration companies have the opportunity and obligation to inform and educate insurance adjusters and property owners of the necessity and benefits of having their heating systems maintained and cleaned.

Chapter 1

PUFFBACK

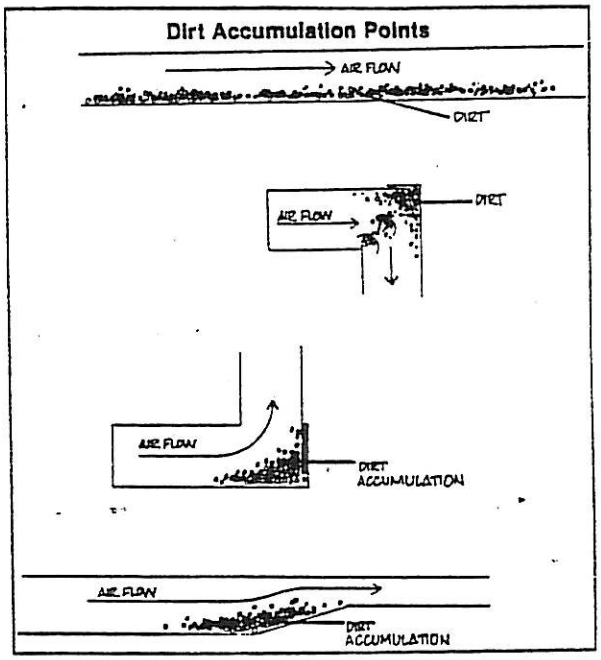
Many fire restoration jobs are the result of a furnace malfunction commonly referred to as a "puffback". A puffback may be described as uncontrolled combustion within the furnace firebox. It most frequently occurs in fuel oil fired, forced air heating systems. A puffback may occur as a single incident in which a significant amount of soot is dispersed throughout the ductwork. This is evidenced by black soot being deposited on the warm air registers and the surrounding walls. A puffback may also occur over a period of time. In this case, small amounts of soot are continually being circulated; and it may take several days or weeks until the problem is realized.



Obviously the first step to correct a puff back situation is to eliminate the source of the problem by having the

furnace repaired or replaced by a qualified heating contractor or technician. The next step is to thoroughly clean the furnace ductwork and firebox to remove soot, dust and other debris caused by the furnace malfunction.

The importance of the furnace duct cleaning cannot be overemphasized. As illustrated, dirt, soot, and other debris tend to accumulate in the bottom of ducts, in corners, and wherever the ductwork configuration changes.



If, for some reason, the ductwork would not be cleaned, the forced air heating system would continue to disturb, circulate and deposit soot over the freshly cleaned and/or painted walls. In addition, removing the dirt, soot and debris from the ductwork will allow the furnace to operate more efficiently. Air flow will be less restricted.

Chapter 2

SMOKE/FIRE LOSS

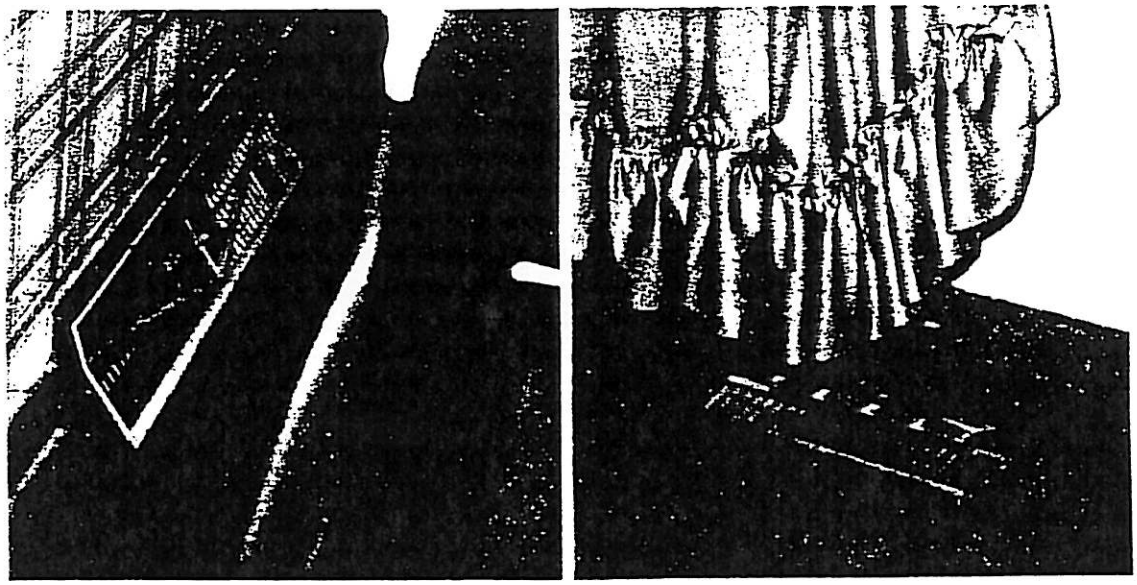
In the case of a smoke or fire loss unrelated to the heating/cooling system, it is still recommended, in most situations, to have the duct system cleaned. The reasoning behind this procedure is that the heating/cooling system continues to operate until it is turned off or until the fire causes the power source to be terminated. Smoke and soot are drawn into the cold air ducts and circulated by the furnace throughout the entire heating/cooling system. Undoubtedly, a certain amount of soot, dust and debris accumulates in the ductwork necessitating a thorough duct cleaning.

In most residential fire restoration situations, power vacuuming the ductwork, followed by sealing the ductwork, will restore a contaminated forced air system to full operation.

Chapter 3

CLEANING PROCEDURES

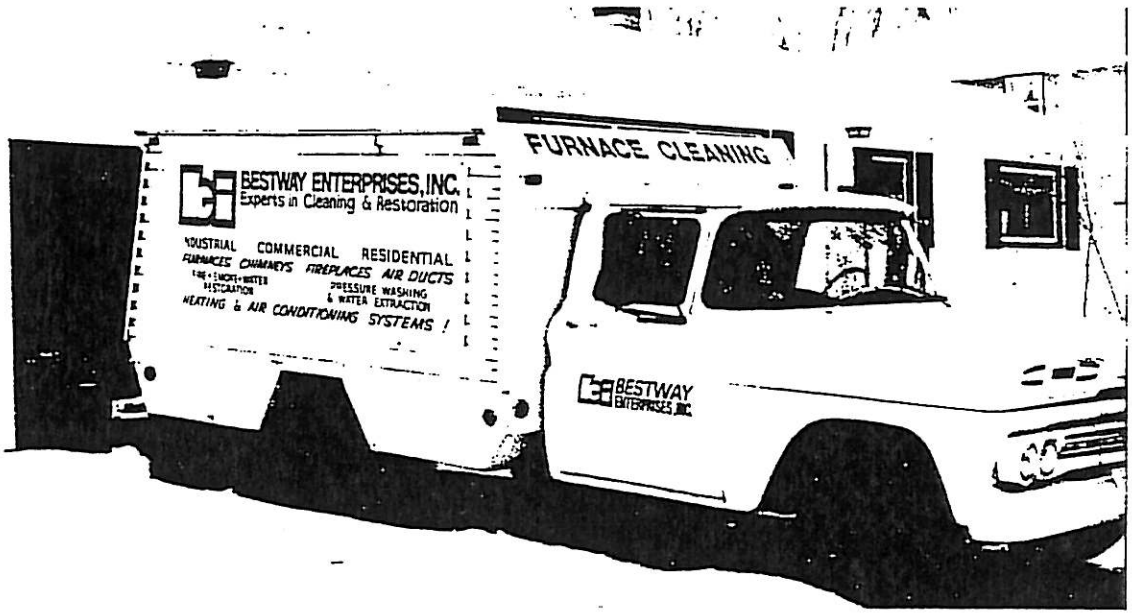
The procedures to be followed to properly clean furnace duct systems are readily learned. As with most procedures, an inspection to become familiar with the particular installation is the correct way to begin. As illustrated, it is not unusual for warm or cold air registers to be obstructed from view by furniture or drapes.



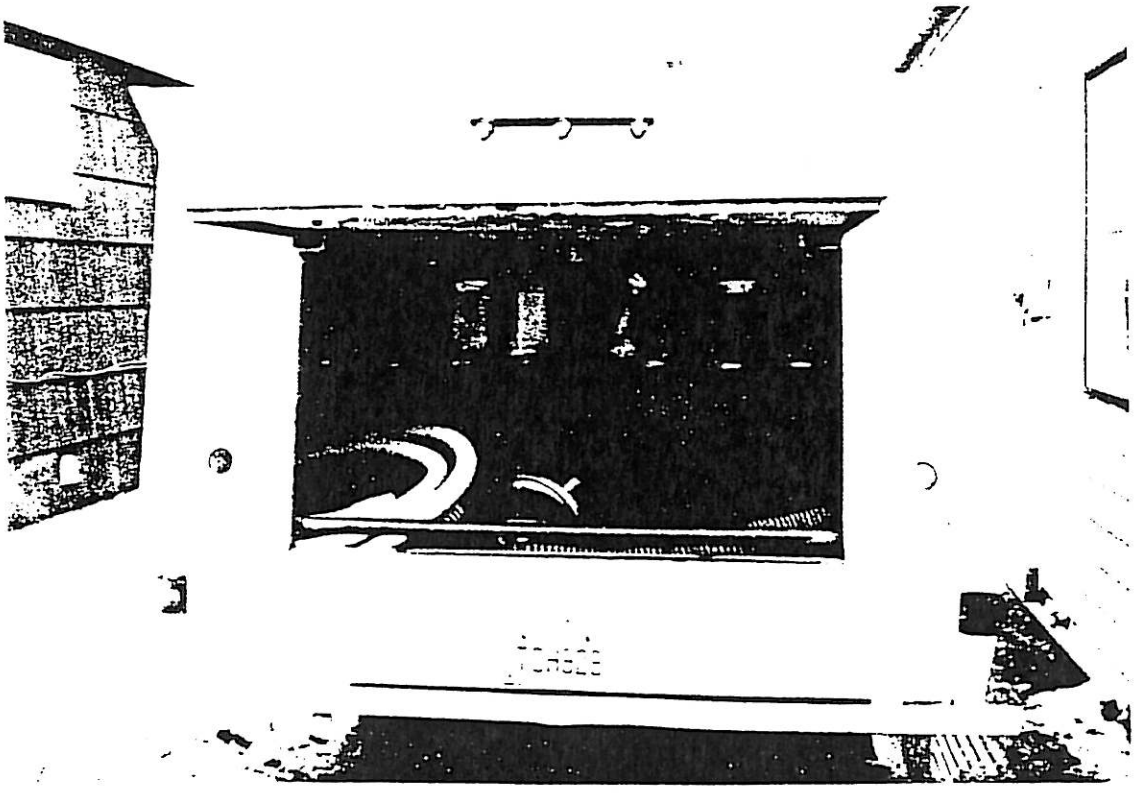
After all registers have been located, either the warm air ducts or the cold air return ducts may be cleaned first.

The vacuum equipment is truck-mounted and is powered by the truck engine. Only the vacuum hose is brought into the house. The vacuum equipment and accompanying

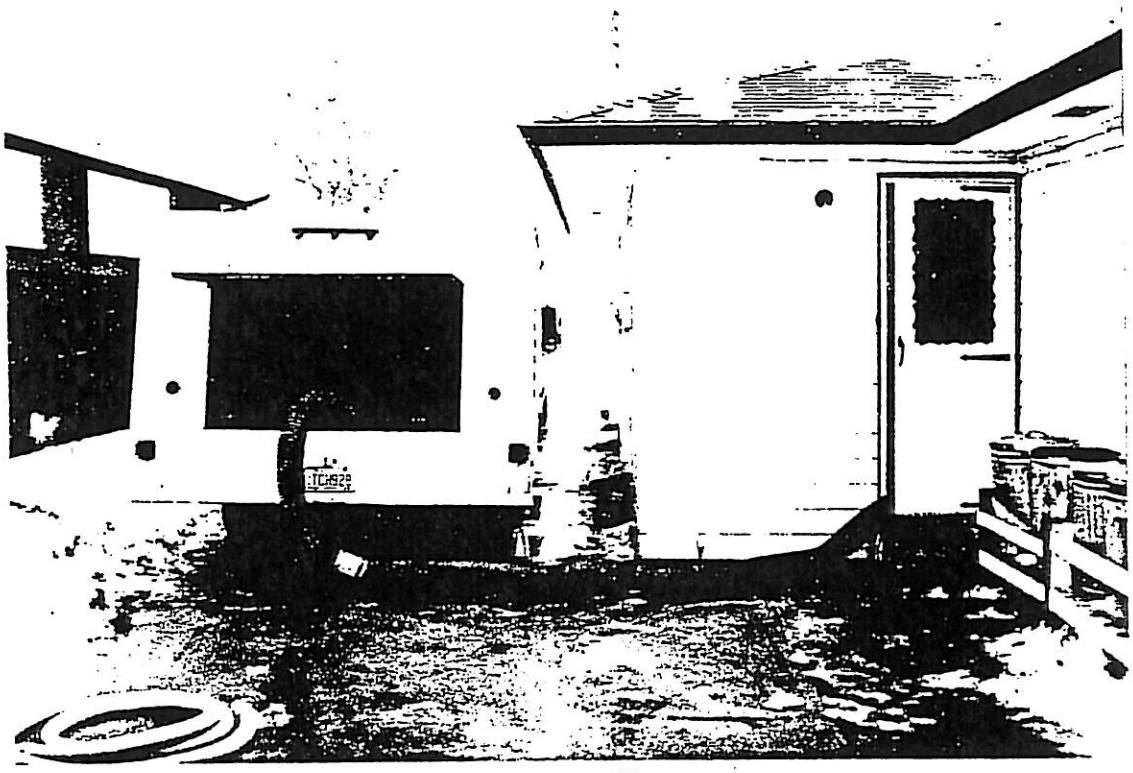
noise remain outside.



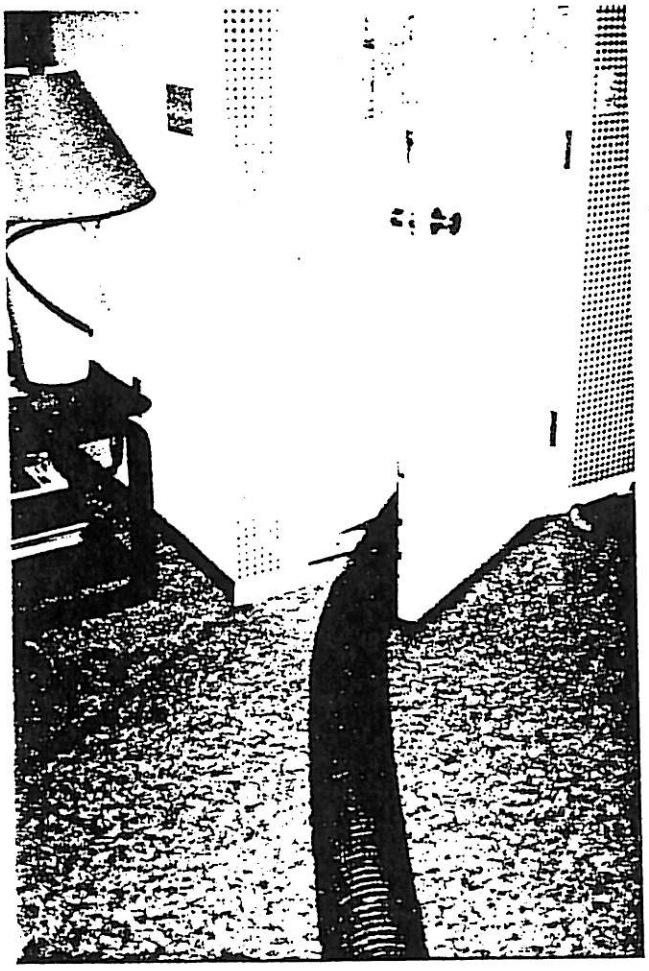
Truck with furnace cleaning equipment



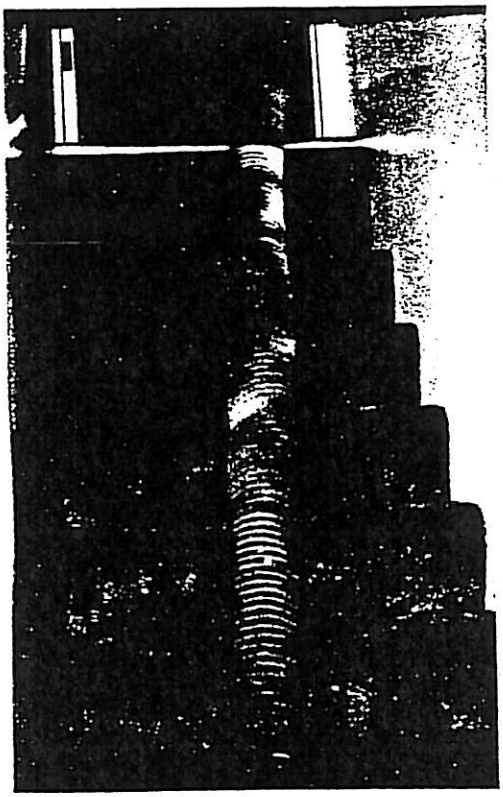
Back of truck showing mounted equipment, hoses



Hose only into house

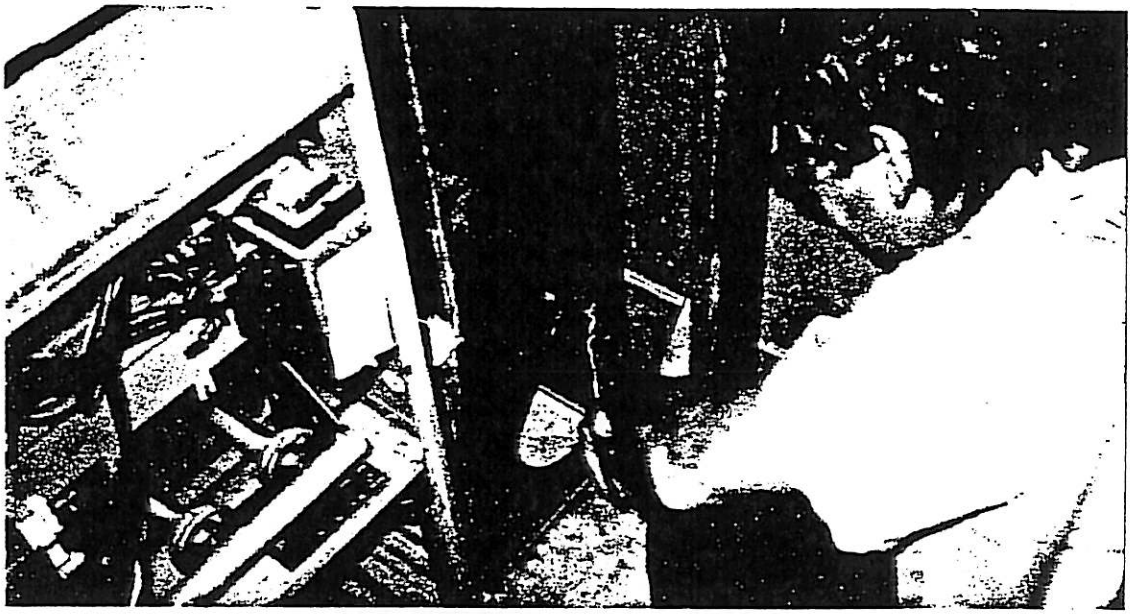


Hose only inside house



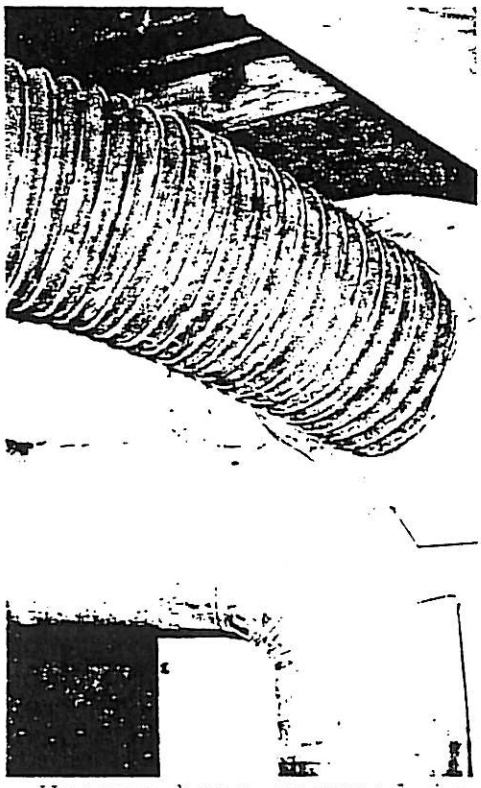
Hose coming down stairway

A round hole is cut into the ductwork with a metal cutting shear. The vacuum hose is then inserted into the hole and secured with duct tape.



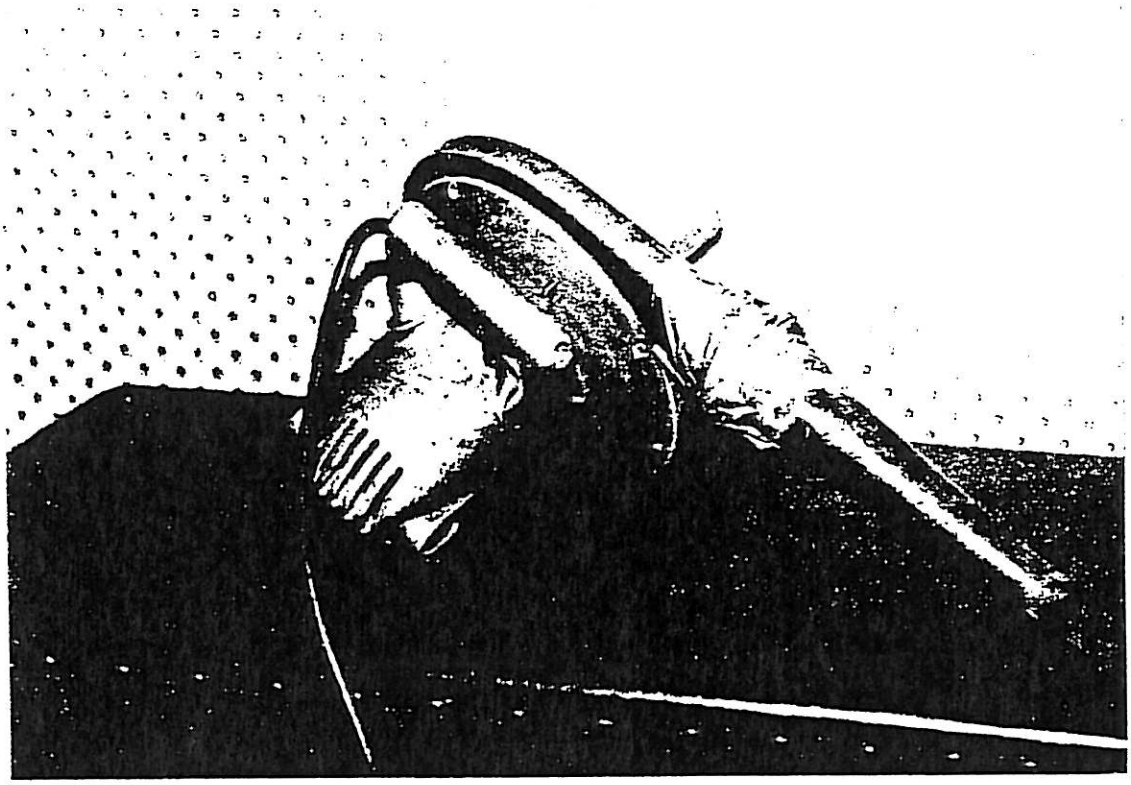
Technician cutting hole into cold air return duct

Technician inserting vacuum hose into hole

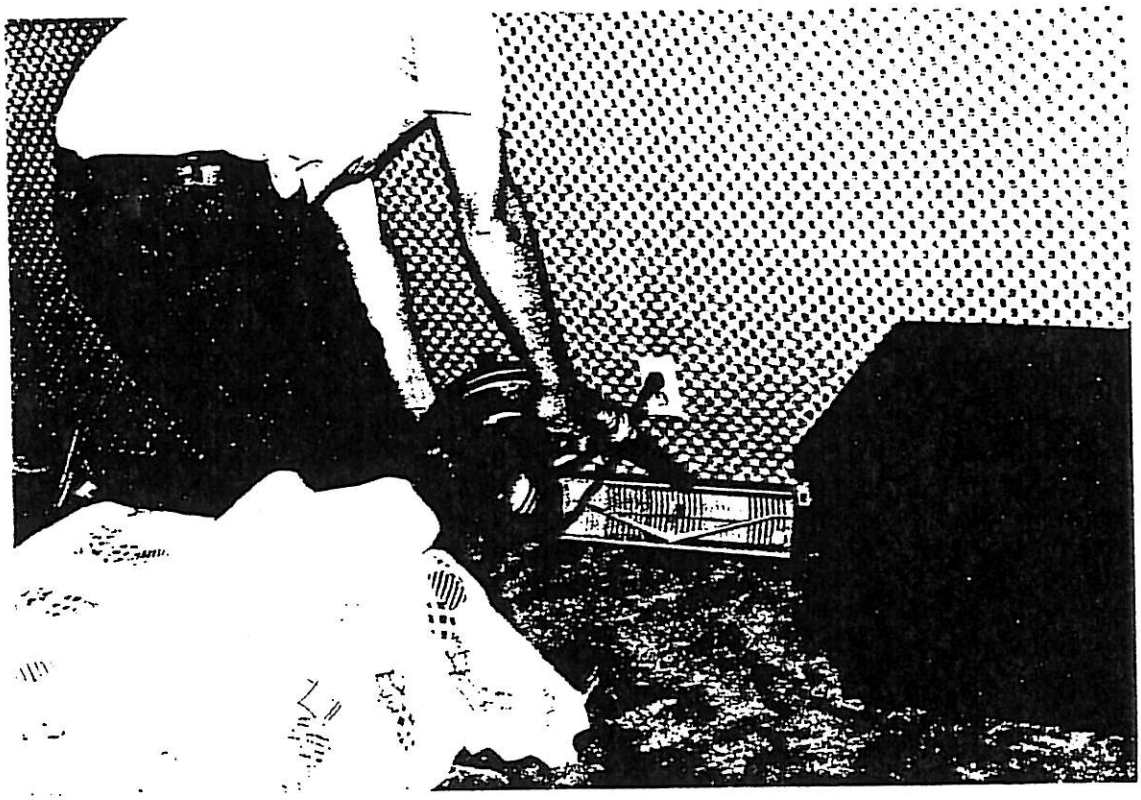


Vacuum hose secured in hole, sealed with tape

Then with the furnace vacuum running, start at the far end of the system and work toward the furnace, one register at a time. A turbo air blower gun is used to blow the dust, soot and loose debris down to where the vacuum hose has been attached to the plenum. The soot, dirt and debris are then drawn into the disposal box of the furnace cleaning truck to be deposited and hauled away upon completion of the duct cleaning.

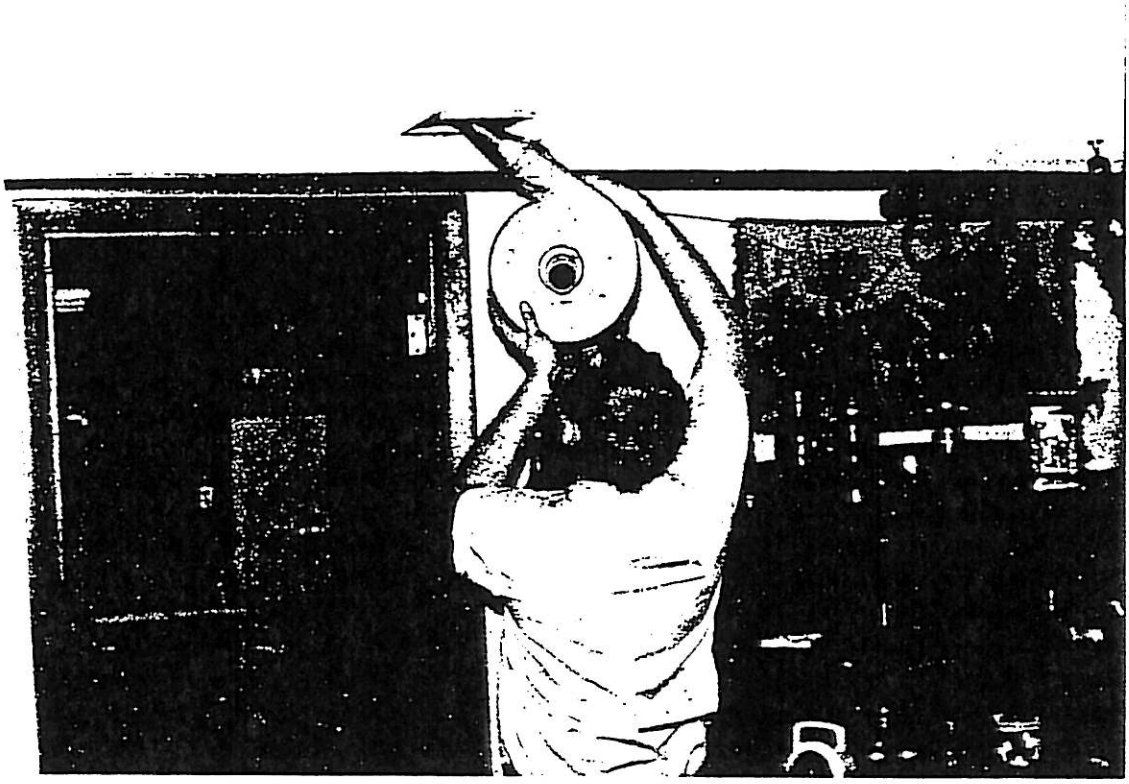


Air turbo gun



Technician "blowing down" baseboard heat register

Technician "blowing down" soffit register



Technician "blowing down" ceiling register

In many instances, it is not necessary to remove the registers when cleaning the furnace ductwork. This is particularly true in a routine (not fire-related) duct cleaning. In the case of a fire restoration situation, it is usually required to remove and hand wash the registers with a detergent and water solution. This procedure eliminates any heavy soot or greasy residue that may have adhered to the registers.

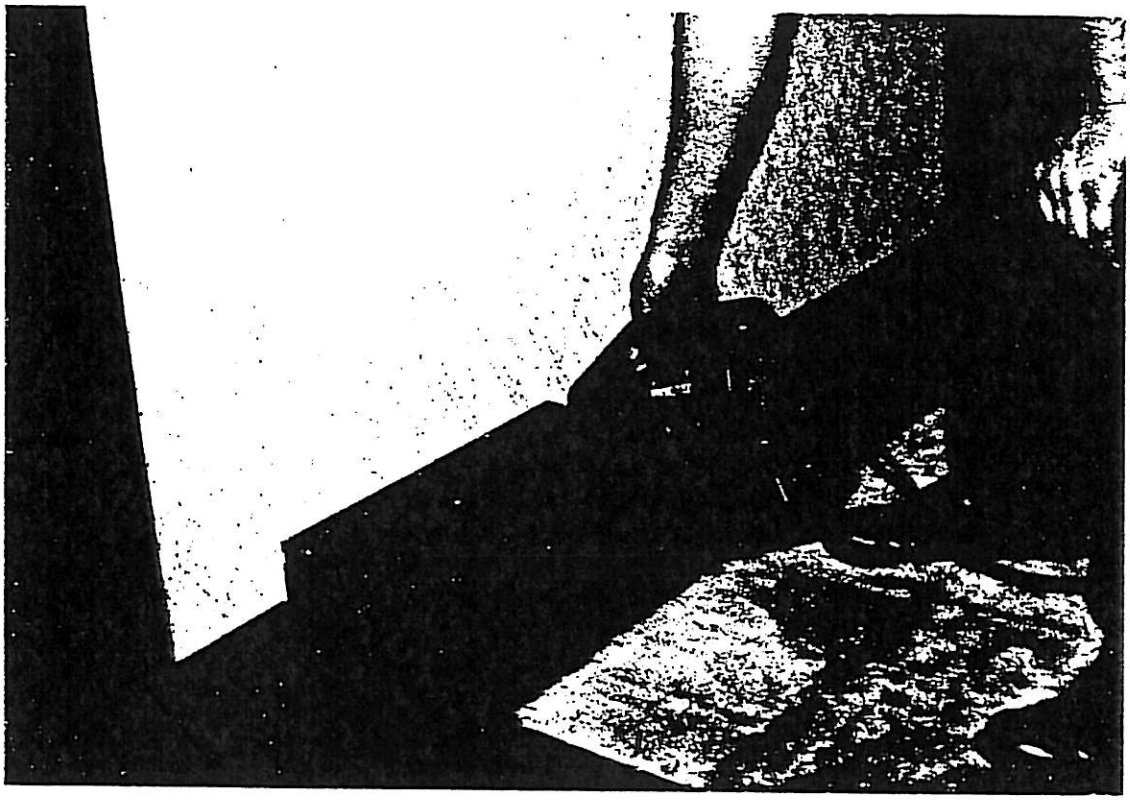
Chapter 4

DUCT SYSTEM SEALING

Another specialized application in a fire restoration situation is to seal the duct system after cleaning. This process involves the introduction of a water soluble resin into the duct system. A deodorizer is frequently mixed with the water soluble resin to assist in deodorizing these areas.

The water soluble resin can be introduced into the duct system by means of an air mist fogger. With the furnace truck vacuum running, the water soluble resin is misted into each individual register. The vacuum suction pulls the mist through the ductwork, saturating the duct interior. The resin adheres to the interior walls of the ductwork, hardening to an inert, fire-resistant coating and bonding any remaining soot and smoke residue to the interior duct walls.

Air mist fogger

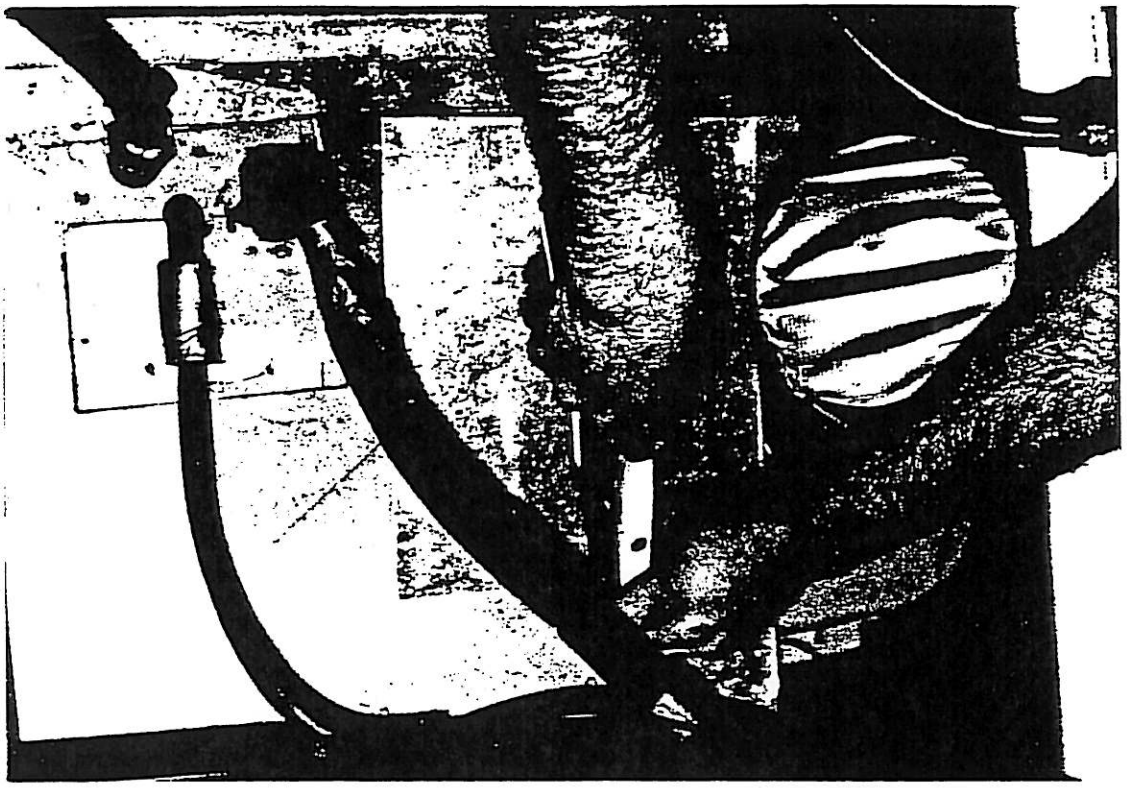


Technician "misting" resin into duct system

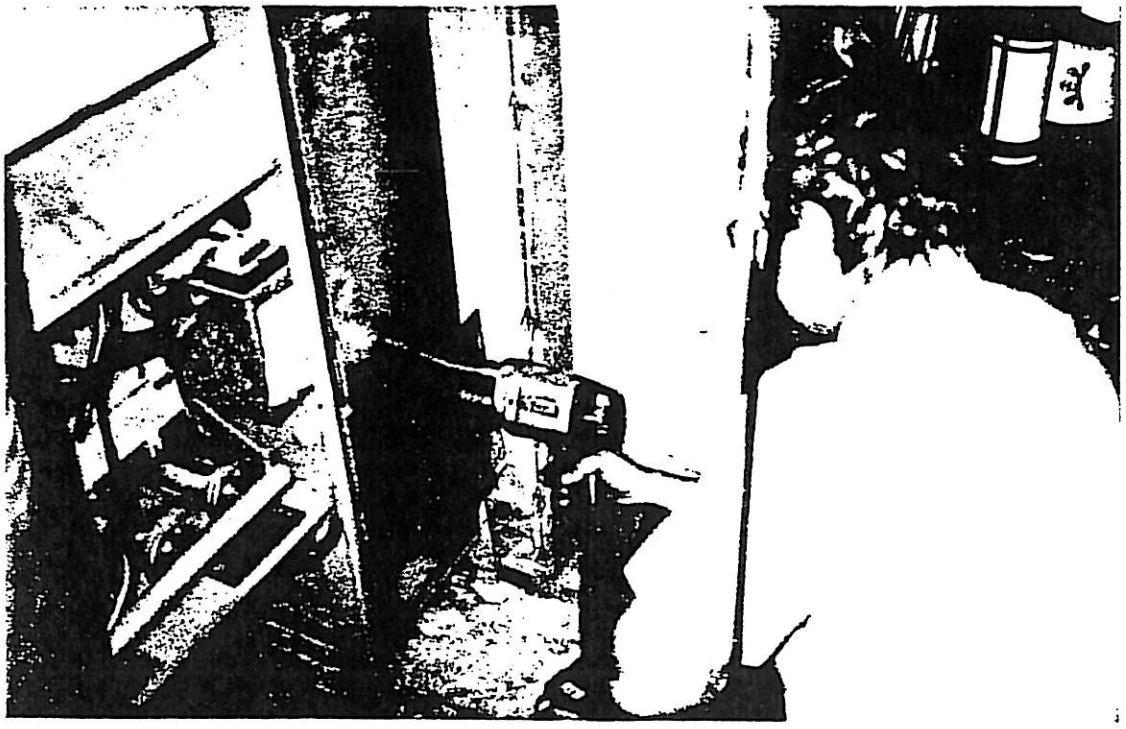
Not only is the "soot set" process effective in sealing smoke residue, it also provides an additional benefit. The water soluble resin also helps to insulate the duct system by sealing small cracks and pinholes, resulting in less air leakage and, therefore, a more efficient heating/cooling system.

After properly power vacuuming the duct system and after "sealing" the duct system, it is necessary to repair or patch the access holes that were cut to accommodate the vacuum hose. This is most easily accomplished by utilizing a piece of sheet metal and a pop rivet tool. Cut the sheet metal patch slightly larger than the hole. With an electric drill, make pilot holes, and secure the "patch" with

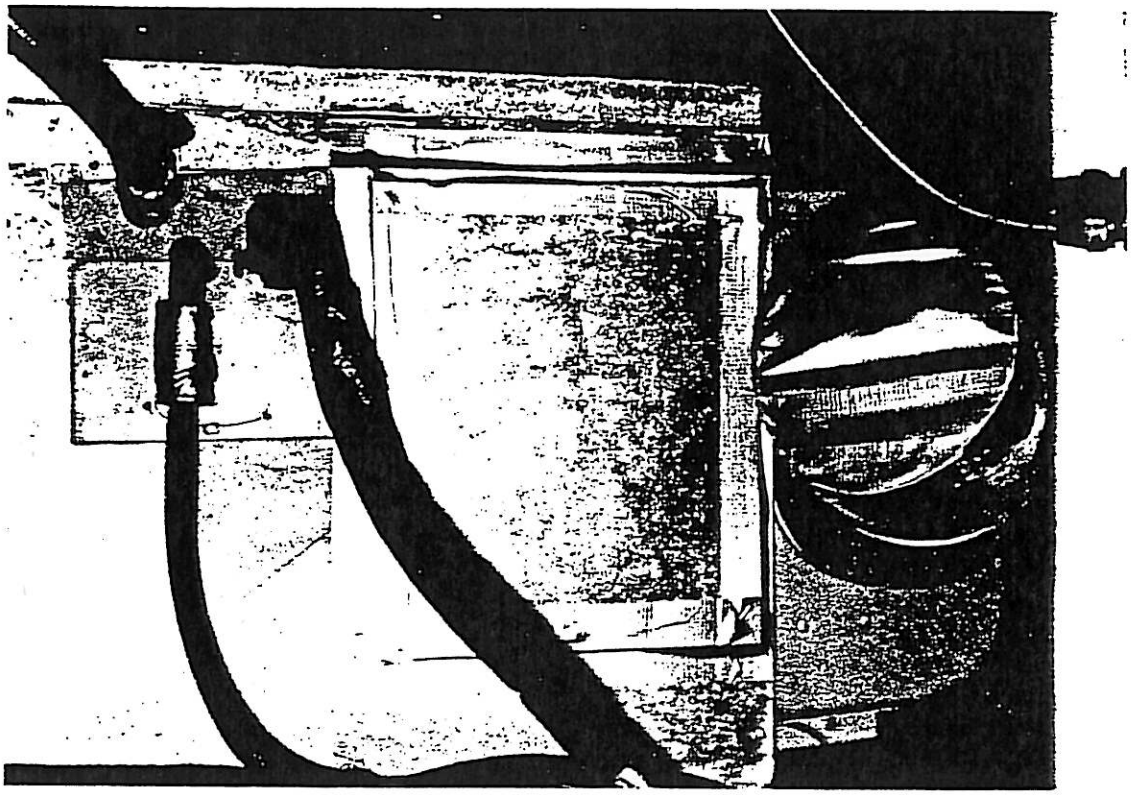
pop rivets. Utilizing duct tape around the perimeter of the "patch" will insure that no sharp edges are left exposed and also seals the "patch" to prevent any air leakage.



Technician drilling pilot holes in sheet metal "patch"



Technician installing patch with pop rivet tool



Perimeter of "patch" sealed with duct tape

A practice that adds a touch of professionalism and impresses the home owner is to vacuum the blower and furnace area to remove any dust and debris that has accumulated over time. Also cleaning the exterior of the furnace and the floor surrounding the furnace gives the home owner additional confidence that the furnace ducts have been properly and thoroughly cleaned.

Spraying the new or cleaned furnace filter with deodorizer will assist in minimizing a dust smell when the furnace is first used.

Chapter 5

INDUSTRIAL/COMMERCIAL APPLICATIONS

Industrial and commercial duct cleaning is approached in much the same manner as the procedure for residential situations. However, there are frequently additional obstacles to contend with when cleaning a commercial or industrial installation. Insulated ductwork, filtering systems reheat coils, and humistats all pose special problems.

In some industrial/commercial installations, the ductwork is large enough that access holes can be cut and a workman can enter the ductwork to hand wash and/or vacuum the interior walls of the ductwork. If there is room to do so, it is preferable to cut the access hole on top of the ductwork. By making the opening here it is much easier for a workman to enter and exit from the ductwork, and the patching of the ductwork and insulation will be easier and less noticeable. It is important always to tape the cut edge of the metal to reduce the chance of injury to the workman crawling through the hole. When all the cleaning through this hole has been completed, repair the access hole in a workmanlike manner using caulking or duct tape to prevent air leakage. To work around dampers, dividers, humidistats, turning vanes, etc., it may require several

access holes.

Smaller uncrawlable ducts may be cleaned in the following manner. Small access openings (approximately 6 inch by 8 inch) should be cut into the ductwork. Once again, it is important to tape the cut edges to prevent injury. Using a vacuum brush and extension pole, the technician cleans as far as possible in each direction. When this has been accomplished, the technician moves down the ductwork to a point where he can reach back and meet where he has just finished cleaning and make another access opening. This process is repeated until the cleaning is completed.

Access openings through fiberglass blanket or roll insulation can be readily made with a sharp knife. If the cut is made on top of the duct, cut all four sides and remove the insulation. If the cut is made on the side of the duct, cut along the bottom and both sides (do not cut top edge of insulation). By using this method, the insulation will be much easier to tape back into position. Make the insulation cut at least two inches larger than the access opening to facilitate repairing the access opening.

Duct cleaning of commercial/industrial installations requires more equipment than a typical residential duct cleaning. In addition to the power vacuum unit (furnace cleaning truck), a power washer is frequently necessary. The power washer can be used to clean fans, coils, filter housings, intake louvers, registers, diffusers, and any

other areas where practical from the standpoint of water runoff. In conjunction with the power washer, a water pick-up unit is oftentimes required to control water run-off.

Chapter 6

FILTERING SYSTEMS

Industrial and commercial heating installations frequently utilize one or more different types of air filtering systems and methods. Most filtering methods will fall into the following general categories:

(1) Throw-away

Paper frame holding filter media; when dirty it is thrown away and a new one inserted.

(2) Permanent (dust or grease)

Metal frame with either a metal mesh filter media, or a take-out-and-wash type insert.

(3) Electronic

These types are many and varied. Some are automatically cleaned and some require manual cleaning. It is important always to refer to the cleaning instructions on the unit before cleaning.

(4) Rotating oil bath

These are multiple fin units (much like a venetian blind going round and round like a fan belt) that rotate in an up and down motion. The lower travel goes through an

oil reservoir to wash off the collected dirt and recoat with oil.

(5) Roll filter media

This type is a wide span of filter material on a roll that automatically moves occasionally, moving clean filter into the air stream. Dirty media is wound on a spool at the other end. When the clean roll runs out, remove and insert new roll.

(6) Water Spray

Filtration is accomplished by air passing through a water mist.

(7) Honey Comb Box Type

These are similar to the paper throw away type, except these are much thicker (approximately 10 inches) and relatively expensive. These do an exceptional job of filtering, but price has kept them from being very common.

(8) Water Wash or Water Fall

These will usually be found on paint booth exhaust systems. Air passes through the water fall, thereby trapping paint mist in the water. These are a permanent fixture and therefore must be cleaned in place.

Chapter 7

ESTIMATES OR PRICE QUOTATIONS

(Commercial Installations)

When preparing an estimate or price quotation for duct cleaning on an industrial or commercial installation, several factors need to be considered in determining a price:

(1) Location.--Can the cleaning equipment be set up in close proximity to the ducts to be cleaned? Are there adequate electrical and water sources available?

(2) Ductwork.--Is the ductwork insulated? If so, what type and how much of a problem is it to make access openings and repair insulation?

(3) Duct accessibility.--Are the ducts located behind finished walls or above ceilings? Is there room to work?

(4) Other obstacles.--Are there humistats, turning vanes, dampers, and other obstructions in the ductwork? If so, how many and where are they located?

(5) What is being cleaned out of the ductwork? Is it dust and dirt accumulations? Or, in the case

of a fire restoration situation, is it soot and smoke residue? This can be vacuumed and then sealed. Is it a greasy, filmy residue requiring power washing or hand washing?

In preparing an estimate or quotation, it is also important to outline exactly what will be cleaned and what will not be cleaned. By detailing this information, misunderstandings are virtually eliminated.

SUMMARY

Furnace and duct cleaning is a specialized area of expertise in many fire restoration situations. The fire restoration job is oftentimes not completed until the contaminated air system is returned to full and clean operation. There is an initial equipment investment required, but frequently the payback period is short; and furnace and duct cleaning can become a very profitable aspect of the business of a professional cleaning and restoration company. Property owners and insurance adjusters need to be continually reminded and educated in the necessity and the benefits of having their heating systems properly maintained and cleaned.