

Chemical Cleaning Sponges

Hal Culbertson, CR

January 1988

PURPOSE OF THIS THESIS

The primary purpose of this thesis is to explain the importance of chemical dry cleaning sponges in fire restoration. What they are, methods of use, the problems involved in the attempt to reuse them and the cost factors.

IMPORTANT FACTS

It is important to know the composition of dry cleaning sponges. Chemical dry cleaning sponges are open cell virgin rubber. The term chemical has been applied in the description of the sponges used in the cleaning trade. Actually, no chemicals at all are added for the cleaning purpose. Chemicals are added to the latex to form it into a usable product.

GENERAL HISTORY OF RUBBER

Rubber is an elastic, springy substance that comes from the milky juice of certain plants. It can also be made synthetically from chemicals in a factory. Rubber is tough, waterproof, and very resistant to electricity. Gases and liquids cannot pass through it. It has thousands of uses such as in automobile tires, rubber bands, balls, cushions, raincoats, boots, hoses, floor coverings, adhesives, balloons, materials to make roofs waterproof and linings for chemical tanks and, of course, chemical dry cleaning sponges.

Pure rubber is a hydrocarbon, which means that it is made up of the chemical elements hydrogen and carbon.

The milky substance that natural rubber comes from is called latex, and it is contained in many plants. More than nine-tenths of the world's supply of latex comes from a tree, usually called the rubber tree, which is grown on large plantations in tropical countries. Most of the rest of the latex is taken from a shrubby tree called guayule, and from the Siberian dandelion.

Latex is poured through strainers into large tanks.

A chemical called formic acid is added, and this makes the latex curdle, or coagulate forming a doughy, white mass. This is rubber.

In 1770, the English chemist, Joseph Priestley found that pieces of this substance would rub out pencil marks, and this gave it the name rubber. The first rubber factory was established in Vienna, Austria in the year 1811. In 1823 a Scotsman, Charles Macintosh, learned to use rubber to waterproof cloth, and certain raincoats still bear his name.

In 1830 Charles Goodyear, an American inventor, accidentally dropped a bit of a mixture of sulfur and rubber on his kitchen stove. The lump charred and became tough and it remained tough and elastic in both heat and cold.

Modern rubber includes more than just adding sulfur to rubber, materials called softeners and plasticizers are added. These materials make the rubber easier to mold. Fillers, materials that give added strength and wearing qualities to the rubber, are added. Also, added are chemicals called antioxidants, which greatly slow

down the rate at which the finished rubber combines with the oxygen gas of the air. This keeps the finished rubber soft and pliable for years, but all rubber eventually combines with enough oxygen to make it brittle.

You will soon see how quickly chemical cleaning sponges will become useless if they are not properly wrapped and stored.

SOOT DAMAGE FROM FURNACE

The sponge can be used with success on flat finished surfaces. Pre-vacuuming may be needed to remove the heavy soot deposits and ionized smoke particles before cleaning with sponge to prevent smearing. The sponge will not work well on gloss finishes.

MEAT BURN

The sponge does not work well on this type of damage as the residue will be very oily or greasy. Complete washing is needed to remove odor laden residues.

PLASTIC OR RUBBER BURN

The sponge will clean well on flat finished surfaces. The length of time the fire burned will effect the performance of the sponge.

SUMMATION

Generally, you will note in the information that has been listed the dry cleaning sponge works best on flat finished surfaces as compared to gloss finished surfaces. In all cases the type of fire, length of burn time and the contents of the fire effect the use of the dry cleaning sponge, just as it would effect any other type of cleaning method.

THE NEED TO RE-USE
PROBLEMS AND COSTS INVOLVED

It's always important to be aware of the impression you make on a customer and starting a cleaning job with soiled looking sponges, even though they will perform well, does not leave a good first impression.

One of the most important features of the chemical cleaning sponge is its ability to be made re-usable.

The sponge wears away with use, much like an eraser, and thus will partially clean itself, but there are other and better methods that can be used to reclaim sponges.

For some time, our firm has tried several different methods of re-claiming the soiled sponges. First, washing was tried by hand and by machine without much success. The sponges never had a really clean appearance after washing. Also the sponges absorb so much water in washing that it is very difficult and time consuming to get them thoroughly dry.

USES OF CHEMICAL CLEANING SPONGES

There are no big secrets in how to use a dry cleaning sponge on walls or ceilings. In just a short time you become proficient in the use of these sponges. A simple wiping motion in one or two directions will bring desired results on most walls and ceilings. You can, in some cases speed up your work by using a sponge in each hand.. It is like using an eraser to remove a pencil mark, and you will find the sponge will wear away as you use it much like the eraser.

Varying degrees of pressure can be applied for the desired results.

The sponges can be used on plaster, sheetrock, wood paneling, cork, firtex, acoustical tile, brick, rock, certain blown on finishes as well as household contents items.

LIST OF FIVE TYPES OF SMOKE DAMAGE
AND HOW THE DRY CLEANING SPONGE REACTS ON EACH

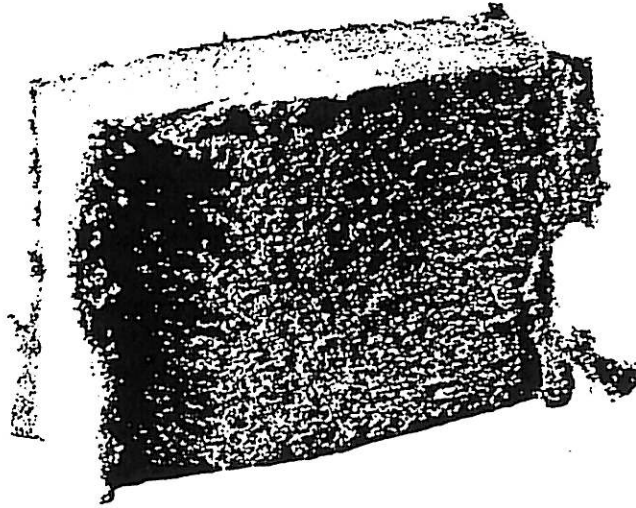
HOT FAST FIRES

In this type fire the sponge cleans very well on all flat finishes. It will also work to some degree on gloss finishes to remove heavier soot deposits to prepare surface for wet washing.

The dry cleaning sponge, you will find, will work best on this type of fire and is more likely to give you a finished job without painting.

COLD SLOW FIRE (smoke streaks down the walls)

On this type of fire damage the sponge does not clean well on most surfaces. You will find the sponge tends to smear the smoke residue from this type fire on flat as well as gloss finishes. The degree of damage caused by the length of time the fire was smoldering, will effect the proficiency of the sponge. In lesser damaged rooms, the sponge cleaning may prepare some surfaces for paint without washing.



WASHED SPONGE

Note: Washing does not improve the worn condition

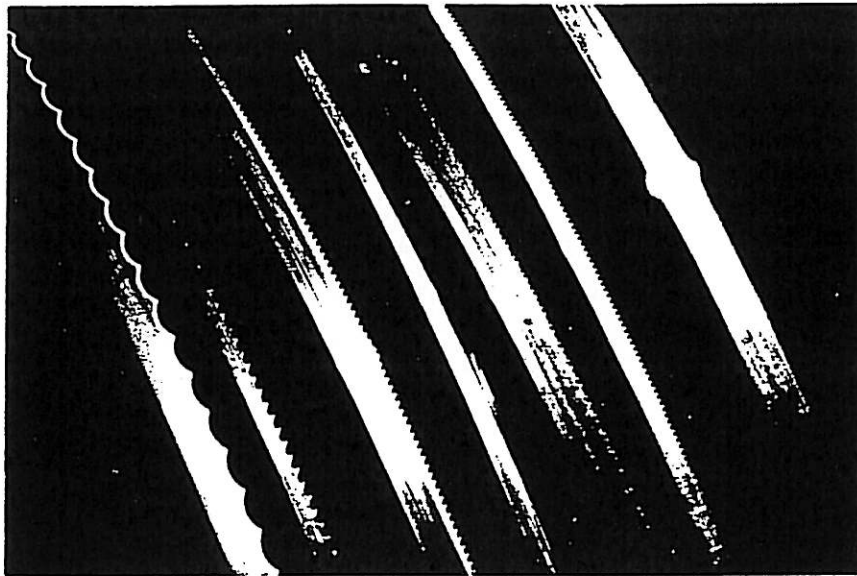
Drying time is important, as heat and light on the unwrapped sponge speeds up oxidation. When the exterior of the virgin rubber sponge deteriorates or oxidizes it becomes crumbly and useless.

We finally decided that cutting away the used surfaces of the large block sponge would be the best way.

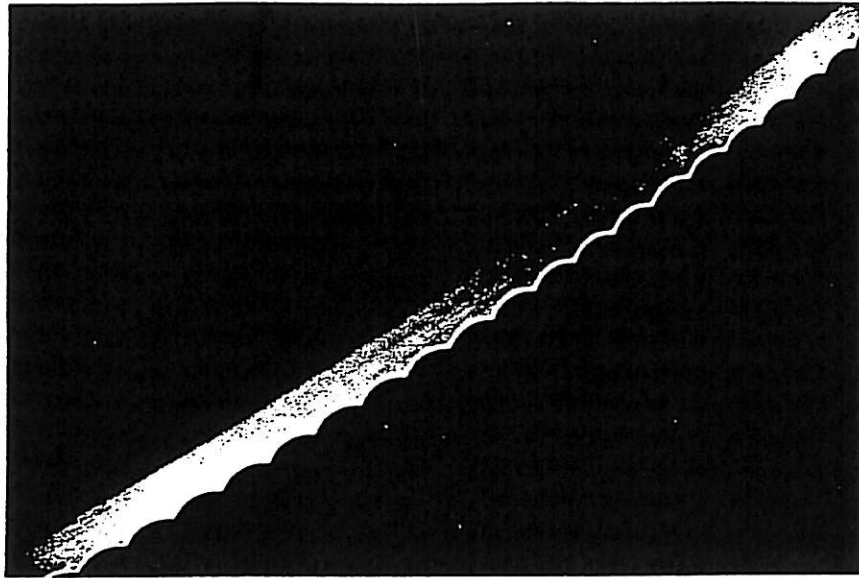
The problems of cutting were numerous. The drag of the virgin rubber on cutting blades, caused by friction resistance to motion, pulled the sponge unevenly through the blades. This resulted in very uneven cuts and it was impossible to make a thin cut.

Many types of saws were tried, meat slicers, radial arm saws, table saws, band saws and others. The band saw, of all those tried, had the best potential, so we then experimented with different blade types. The problem of uneven cutting, because of friction, still plagued us with all the blades tried, but we found some success when we sprayed the blade with silicone. Silicone reduced the blade friction drag and allowed us to make smooth even cuts as long as we

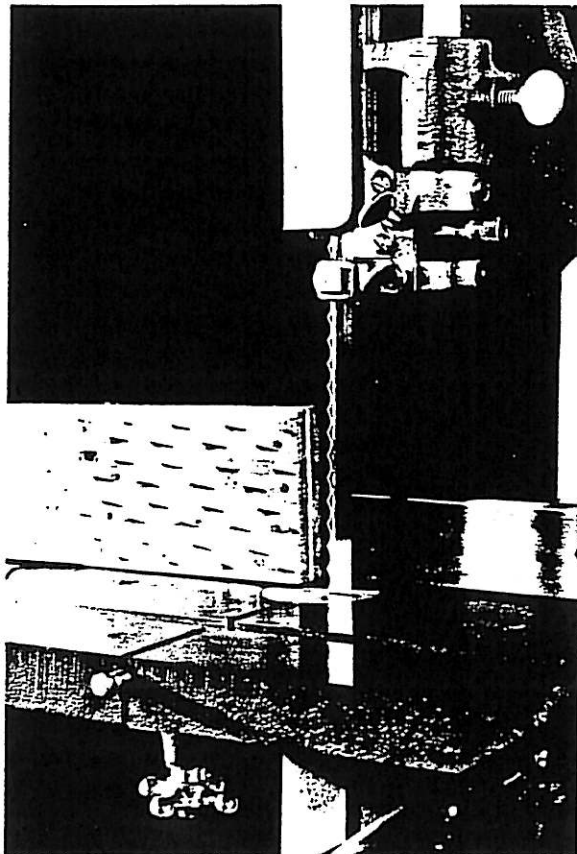
made the cuts fairly thick. However, it was apparent that we could re-use the sponges more times if we were able to make thinner cuts.



TYPES OF BLADES TRIED



NON-DIRECTIONAL BLADE WE FOUND TO BE BEST



HOME MADE
JIG AND
BAND SAW

The jig in the picture is made of 1/2" plywood and faced with carpet tack strip with the nails pointed upward. Press the sponge against the tack strip nails and set the saw guide to remove a cut close to the nails. It is important to cut close to the nails as they hold the rubber stable. With the saw set up in this manner the guides never need re-setting because of sponge size.

With silicone spray applied occasionally to the saw blades, to reduce friction, we were able to shave the used sponge on all sides. This left the sponge with the appearance of a new one.

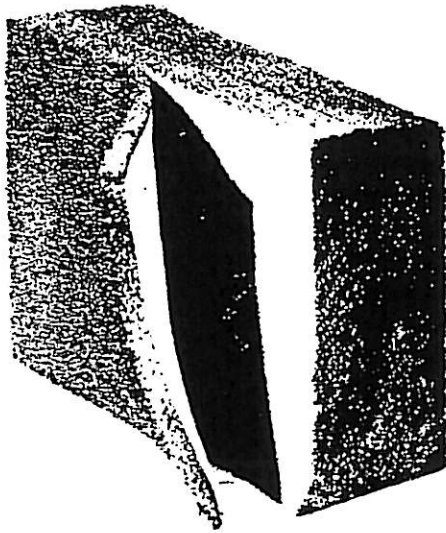
This method proved fairly successful but friction drag between the cutting blades and the sponge forced us to make the cuts thicker than we wanted. We realized if we could make very thin cuts we could re-cut and use the sponges at least two extra times.

Wayne Moore, owner of ABC Cleaning Co., Salem, Oregon had told us about freezing and cutting chemical sponges. He would wet, then freeze a few sponges at a time and

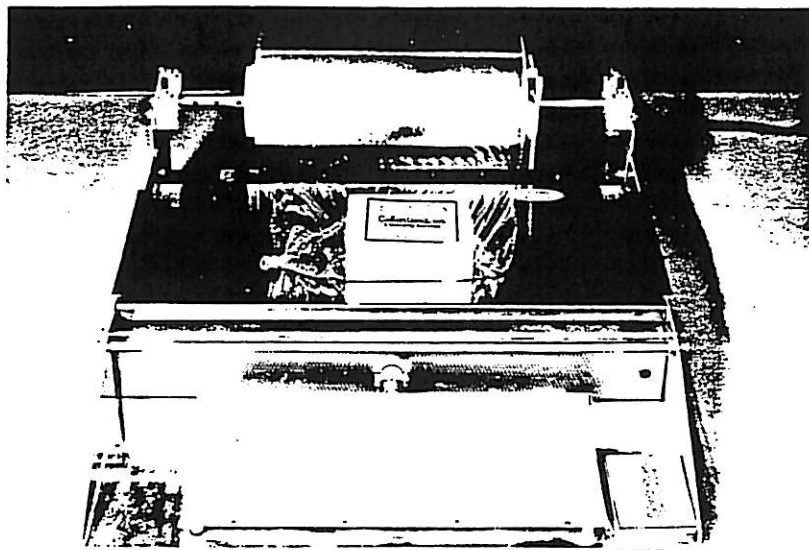
shave the sides with a long knife. This worked satisfactorily, but was much too slow for our needs.

We tried wetting-freezing and then cutting with our band saw and had great success. The sponges were dipped in water, stacked into the original boxes and frozen. Plastic was placed between the sponge layers so they would be easy to separate after being frozen. We were able to make very thin cuts as the stiffness, caused by the frozen moisture, kept the sponge from pulling down into the saw blade. The sponges were only slightly wet before freezing so drying time was short.

We should mention we also tried using liquid nitrogen to freeze the sponges. Liquid nitrogen is used in many industries as a refrigerant and for other uses. The nitrogen instantly froze the cleaning sponges ice hard allowing us to trim them like a piece of wood. After some testing, this method was found not practical for us because of the special container and other equipment needed to handle the liquid nitrogen.



PARTIALLY CUT SPONGE



THE PROBLEM OF WRAPPING WAS SOLVED BY USING A MEAT WRAPPER



FINISHED SPONGE

CULBERTSON'S CLEANING SERVICE, INC.

This wrapper uses a hot cutting bar and special plastic wrap the same as used in meat markets. The wrapping machine is also useful in the plant to wrap many other items. You can wrap 150 or more sponges per hour with this machine.

COSTS INVOLVED IN RECLAIMING

Ten fire damage cleaning jobs were used in establishing an average square footage cost per new dry cleaning sponge.

Square footage costs were easy to figure on the new sponges as the only costs involved were the sponge and the shipping charges. Figuring square footage costs on used sponges was more complex. Time studies were done on the following:

Handling

1. time involved collecting and boxing
for later cutting

Wetting

1. time involved in dipping and boxing
for freezing

Freezing

1. pickup and delivery labor
2. cost of cold storage quick freeze

Drying

1. labor for racking to air dry

Wrapping

1. labor for labeling, wrapping
and boxing
2. wrapping and labeling materials

Labor costs were figured by using our own wage scales.

CONCLUSION

The square footage cost on "re-using" the sponges in the manner described proved to be one-third the cost of using the original sponge.

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Mr. Guy Culbertson
Vice President
Culbertson's, Inc.
Salem, Oregon
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Mr. Wayne Moore
Owner of A B C Cleaning Co.
Salem, Oregon
Information on Freezing

Mr. Learson
Zephyr Manufacturing Co.
Sedalia, Missouri
Information on Composition of Rubber

Mr. Floyd Miles
Engineer
Portland, Oregon
Information on Liquid Nitrogen