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JULY-AUGUST-SEPTEMBER NEWSLETTER - FIRE REKINDLE

"**Rekindle**" is a dirty word in the fire service. A rekindle is a term used by firefighters to describe a blaze that re-ignites after they leave a scene. It describes a situation where after salvage and overhaul have been completed and a blaze is officially declared extinguished, firefighters go back to the firehouse and are later called back to the burning building to again fight the re-ignited fire. Sometimes, the second fire is much larger than the first. And worse yet, sometimes the second fire kills people who assumed the first fire was extinguished.

A rekindled fire is an indicator of a poor firefighting operation. Fire chiefs and fire officers have been subject to legal action, and in some instances forced to resign, when in

command of a blaze that was officially declared extinguished, but after leaving the scene, it re-ignited. A rekindle is a nightmare of chiefs, officers and firefighters.

Firefighters perform overhauling operations to prevent a rekindle after they leave the scene. Frequently, we are criticized unfairly for damaging a person's house or business because we must ensure the fire is not smoldering in concealed spaces or furnishings. Firefighters with pike poles, pry bars, and axes must break open plaster walls, pull apart mattresses and throw out smoldering stuffed chairs. We cut up expensive floors and roofs after a fire has been extinguished to ensure the blaze does not reignite.

Every member is responsible during the salvage and overhauling operations to ensure a rekindle does not occur. This is an important team responsibility of firefighting. I learned this years ago, after extensive salvage and overhaul operations in a restaurant - a kitchen grease duct fire that had a chimney was running up the walls of a high-rise office building. After a survey of the scene, a battalion chief and I agreed a fire in the duct was extinguished. And over the portable radio we ordered the last engine and ladder company inside the building to "take-up." A veteran firefighter came to the command post and heatedly insisted to us the fire was still smoldering in the grease duct. He said he could still detect heat coming out of the grease duct chimney flue up on the roof. He was right. We did more overhauling and prevented a rekindle; that firefighter saved reputations that night-including mine.

After a serious blaze, chiefs, company officers and firefighters are exposed to many physical discomforts. They may be soaking wet, freezing cold, have headaches and be exhausted from the exertion of firefighting. There may be emotional discomforts as well. They may be frustrated or angered by events surrounding the fire, the strategy, the tactics, or because one or more of their comrades have been injured. Discomforts and emotions caused by the after-effects of firefighting can interfere with decision-making judgment during salvage and overhauling. Time becomes more important than looking for smoldering embers. Everyone subconsciously wants to return to the firehouse for dry clothes, a meal and some rest. "Get it done and let's get back to quarters" can often be heard during overhauling.

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What Materials Smolder & Rekindle

Veteran fire officers know what types of materials are difficult to fully extinguish and are susceptible to rekindling. They have passed down to us how to conduct an effective overhaul operation in smoldering material-al and how to prevent a fire from reigniting after we leave the scene.

Burned and smoldering mattresses, bedding material and stuffed chairs are the materials that are the most difficult to extinguish fully. They can smolder inside the box frame and the mattress, then flame up hours later. Also, the inside of a cushioned chair can sometimes be hollow and contain air that can keep a fire smoldering for hours. The exterior surfaces of much-stuffed bedding and many stuffed chairs are coated and designed to prevent the penetration of liquids. A stain-resistant coating intended to repel spilled liquids will also prevent penetration of water from a hose stream used during overhauling from getting to a deep-seated hot spot of a smoldering fire.

The danger of rekindling is so great that firefighters often remove a mattress or stuffed chair from the fire building even after it is quenched with water during overhauling. The mattress or stuffed chair is taken to the street and quenched under a hydrant outlet or a waiting booster line stream.

Foam cushioning is another material that can conceal a smoldering fire. Foam mattresses, pillows, and seat cushions contain small air pockets in which fire may get oxygen for smoldering combustion. In some instances, the foam is a plastic material that contains in its air pocket highly flammable hydrocarbon residue.

Ordinary clothing, when hanging in a closet, can conceal a smoldering fire. Pockets of air between the layers of clothing and the added problem of plastic covering over clothing from a dry cleaner increase the chance of a smoldering fire going unnoticed. Burned clothing must be removed from the closet, pulled apart and wet by a hose stream. When it is being removed from the closet during overhaul, the smoldering clothing may flare up, revealing the rekindle danger.

Clothing in drawers of a piece of burned, charred and smoking furniture must be examined for smoldering fire during overhauling. When flames burn a piece of furniture and char the clothing inside the drawers, any blackened and burned folded clothing must be removed from the drawers, pulled apart and wet with a hose line.

Piles of burned and charred cardboard, newspapers, and rags must be pulled apart by firefighters and the insides wet with a hose stream. All cardboard contains pockets of air. Newspaper and rags, when folded and placed in piles, contain tiny air spaces that let a fire smolder without visible signs on the outside. Charred and partially burned stacks of cardboard, paper, and rags, especially those tied with wire in large bales, must be opened, pulled apart and the inside quenched with water to prevent a rekindle. Overhauling in stacks of cardboard and papers is long operation patience is required to prevent a rekindle.

Rubbish in the cellar storage bins at the bottom of compactor chutes is another rekindle hazard. During overhauling in compactor or incinerator rubbish, the refuse must be pulled from the storage bin onto the cellar floor, separated and wet down with large quantities of water to ensure fire extinguishment.

Concealed spaces in the vicinity of a fire must be carefully examined during over-hauling for smoldering fire. The most common concealed spaces to be opened up and examined for hidden fire during overhauling are the ceiling above a fire and a window frame. After a chair or mattress fire is extinguished, the fast information a fire chief wants to know is whether the fire and heat spread to the ceiling space above the burned furnishing. It is opened with a pike pole. Firefighters must open up the plaster ceiling until they reach a space where there is no sign of char or burning.

When a room-and-contents blaze becomes so large, and hot, that it has melted the glass, and flames flow out of the window, chances are great the fire has spread into the cracks around the window frame and into the concealed space around the top and sides of the window. This concealed space may contain combustible material and smolder.

Inside the concealed space around a window there may be combustible rope attached to window weights for the up-and-down window mechanism. Also found smoldering in this concealed space may be wood shavings, paper, or combustible insulation. This material-al may have caught fire from the flame burning out the window and it could smolder inside this concealed space after the fire is extinguished. When the window frame is charred and this is suspected, the inside framing around the window is removed during overhauling to expose any hidden fire. Using a pike pole from inside the room, a firefighter first removes the top molding over the window. Then, the window frame molding is pulled from the wall. A clear view of the concealed space around the window will be available for water from the hose stream. In some instances where there may be a deep-seated smoldering fire in a rotting windowsill, that too may have to be removed to prevent a rekindle.

Grease inside a duct can continue to burn and rekindle when hose streams are directed from the roof above down through the duct or when the stream directed upward from the kitchen does not reach and fully cool down the burning grease. A rekindle in a grease duct often takes place at the point where a vertical chimney changes direction and becomes a horizontal section. If this is not cleaned properly, large accumulations of grease can build up at the duct's horizontal section. If there is no opening for cleaning the duct at this point, cut open up the duct and examine if fire is suspected.

Cellar oil fires from defective burner units can be easily extinguished with foam or a fog nozzle, but after firefighters leave the scene a more serious fire may occur in the apartments above due to a rekindle. The heat and flame may have spread undetected up into the ceiling space between the cellar and first floor of the structure. Unless the ceiling above the oil burner is opened up with pike poles or if a concrete ceiling is carefully examined above, there could be a rekindle.

One of the most difficult overhauling operations I had after a fire was extinguished was a cellar oil fire that heated the concrete ceiling above and spread fire to the floor above. After the oil burner fire was easily extinguished, we discovered that the fire had heated the concrete floor

and ignited the wood framing of the first floor. We began to cut open a finished oak floor and the sub-floor. Smoke was seeping up through the wood as we cut. The fire had spread to wood 2x2 strips of wood embedded in the concrete above the oil burner. The wood strips were the framing under flooring for the oak floor. We had to extinguish the fire and pulled up the wood strips from the concrete. The more of the oak floor we cut open, the more fire and smoke we discovered. After hours of cutting oak floor and sub-floor, we finally extinguished the fire. After that experience, I never failed to examine the ceiling and the floor above during an oil burner fire.

Material discarded in an airshaft during overhauling in a multi-story row house can be a rekindle fire. One of the first lessons a new fire officer learns during the salvage and overhauling operation is to check the bottom of the airshaft after a fire is extinguished. Sometimes, victims trying to escape fire jump out a window and are found at the bottom of a shaft. You do not want to bury a fire victim with rubbish thrown into the shaft during overhauling. During the initial search, check the bottom of the shaft for victims. Before overhauling begins, check the bottom of the airshaft to ensure there is not any smoldering fire. After a room-and-contents fire in a structure, pieces of wood and rubble may be discarded in the shaft rather than left in the apartment. It is easier for the building management to remove the rubbish from the shaft bottom through the cellar than from an apartment several floors up. However, before this is done, the bottom of the shaft must be examined to ensure there is no fire that will be buried by the material thrown into the shaft. During overhauling, any material thrown into the shaft must be continually wet with a hose stream. And before leaving the scene, the shaft must be thoroughly examined for any sparks or smoldering.

The cellar of a commercial building containing a large amount of stock is another area prone to rekindle after a fire. During overhauling in a cellar, a smoldering fire in tons of paper, boxes or clothing is difficult to extinguish. The confined cellar may not have space to pull apart the smoldering stock for quenching by a hose stream. While overhauling smoldering material in a cellar, you cannot throw the stock out a window or down a shaft. You may not be able to use a large amount of water because it may fill up the cellar if there are no drains. During

overhauling in a cellar fire the tons of stock may have to be carried up to the street and spread out and wet down. During overhaul after a long, serious fire in a cellar that contains a large amount of stock, the tendency of exhausted chiefs, company officers and firefighters will be to take a chance and not remove the stock. This decision will increase the risk of a rekindle. Leave a "watch line company" for 24 hours to protect against rekindling.

Controlled fires in old and historic townhouse fireplaces are another serious rekindle hazard. During the holiday season, fireplaces are used for long periods. Fire sometimes conducts through the hearth floor or back wall of the fireplace to wood floors or wall beams. Fire can spread through cracked bricks or missing mortar in the fireplace structure. The smell of wood burning when firefighters arrive at a call may be mistaken for a residual odor of burning logs. Instead of causing damage to the house by opening plaster walls, baseboards in the apartment below during a holiday, when the house is full of guests, the inexperienced fire officer may decide not to examine the structural wood around the fireplace. This decision could lead to a more serious rekindle fire when the guests are sleeping. The best decision a fire officer can make is to check for hidden fire in a concealed space. Open up the ceiling below the fireplace. Examine the wood beam and framework around the fireplace hearth. It is best for everyone.

Lessons Learned

1. An action that can increase overhaul efficiency and reduce the chances of a rekindle is to send exhausted firefighters who have extinguished the blaze back to the firehouse and call reserve or mutual aid firefighters to the scene. The fresh firefighters will do a more thorough job of salvage and overhaul. There will also be fewer injuries during this hazardous phase of the operation.
2. Fill up a bathroom sink or tub in the burned-out house or apartment with water and soak small amounts of smoldering materials in water.

3. Remove smoldering mattresses and stuffed chairs to the street, then soak them with water outside. When safety conditions allow, discard smoldering mattresses and stuffed chairs out a window instead of carrying them down a stair.

Be careful when removing smoldering mattresses and stuffed chairs. They have ignited in hallways and stairs during the carry out. One superintendent of a high-rise apartment house tried to remove a smoldering couch down to the street in an elevator. As the elevator descended, the couch flared up due to the fresh air moving through the elevator during the descent. The superintendent and the couch were found incinerated in the elevator car on the first floor by firefighters when they arrived.

4. Use a thermal imaging camera to detect a smoldering fire in a concealed space. All company officers should be equipped with this important overhauling tool. It can prevent a rekindle.
5. Set up a "watch line." Leave a company at the scene with a ready hose line to cool smoldering materials and a structure that cannot be overhauled due to the conditions beyond the fire department resources. Large piles of smoldering rubbish in a town dump or a danger of structural collapse preventing safe overhauling operations are possible watch line situations.
6. Increase supervision. Rekindles are more likely to occur when inexperienced chiefs, company officers and firefighters are overhauling. For example, if members were recently transferred or assigned to a new, unfamiliar district, they may not be familiar with the special overhauling techniques for different types of buildings. Concealed spaces, which must be checked to prevent a rekindle, in a modern steel and glass, high-rise building, are in different places from the concealed spaces that must be examined in a wood-frame structure.

Also, different smoldering content or furnishings require different overhauling techniques. For example, cotton, polyester, foam rubber, wood, hay, baled paper and coal all have different smoldering dangers and all require different specific overhauling techniques. Chiefs, officers and

firefighters who are not regularly assigned to fire companies working at the fire may inadvertently overlook signs of a rekindle danger that a regularly assigned officer would easily notice. The least chance of a rekindle happening is at a fire when regular chiefs, company officers and firefighters are communicating among each other and working closely together as a team.

Questions

1. True or False - A rekindle is most likely to happen when the regularly assigned firefighter's company officers and Chiefs are working during salvage and overhauling.

   Answer_____

2. Which one of the following is not a content that usually rekindles after firefighters leave the scene of a fire?

A. Clothes in a closet
B. Baled paper
C. Cushioned chairs and sofas
D. Burning pot on a stove

   Answer_____

3. Which one of the following is an incorrect procedure when overhauling a smoldering window frame with a pike pole?

A. Remove the top piece of window molding

B. Next, remove both side pieces of molding
C. Examine concealed space for smoldering rope paper or wood shaving
D. Never remove the wood window sill

Answer _____

4. Which one of the following is not a method to reduce the chances of a rekindle?

A. Increase supervision during salvage and overhauling
B. Call fresh firefighters to the scene
C. Leave a company with a hose line (watch line)
D. Finish overhauling before the firefighters become tired

Answer_____

5. During overhauling who should be looking for possible rekindle fires?

A. Chief officers only
B. Chiefs and company officers only
C. Chiefs, company officers, and firefighters
D. None of the above

Answer_____

Answers: 1. False; 2. D; 3. D; 4. D; 5. C