WHY DO WE DO THAT?

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When called to a car accident, we often disconnect the battery. Why? At an oil burner emergency, we shut the power to the burner and then we shut down the fuel supply, too. Why do we do that?

These and many other tasks we routinely perform and the precautions we take are done with good reason. Years of firefighting experience gave us rules to follow. They help us get the job done safely and efficiently. We repeat certain actions so frequently that often we do not think about why we do them.

As we instruct our newer firefighters in what to do at fires and emergencies, do we explain why they are taking a specific action, or do we simply tell them what to do and how to do it? If we fail to explain the why of what we do, these young eager smoke eaters will not be equipped to make intelligent independent decisions at future incidents. Soon enough, they will be the senior members of tomorrow and if not told the why, they will not be able to pass this vital information on to the new firefighters.

Let's take a look at the why of some of things we do.

*** When called to a home for a sparking outlet, we feel the wall around a faulty electric outlet or fixture. Why do we do that?**

Sparks generate a lot of heat. The sparking outlet or fixture may have ignited the stud, the insulation, or some other combustible hidden behind the wall and now, hidden behind the wall, a fire smolders or burns unseen. Another reason is that the electric cable may be heating because of a ground fault. If you feel heat leading away from the outlet or fixture, you may be following the route of a hot cable. This cable can heat up along the entire run of cable and ignite combustibles some distance from the original trouble outlet or fixture. You may have to open up several bays to check for fire extension.

Remember, the wires can go in any direction. You may have wires heating up in the next apartment or on the next floor. You can use your thermal imaging camera to reduce the amount of wall or ceiling that must be opened up, but you can't rely entirely on the camera. If the wall is too hot to hold your hand on, you must open it up and see what is going on behind the wall.

*** We use a gas meter to check for a natural gas leak rather than rely only on our sense of smell. Why do we do that?**

The human sense of smell can be desensitized to the odor of gas. After spending some time in a gas-contaminated atmosphere, you may no longer smell the gas. As a result, you will have a hard time finding its source or even detecting its presence.

It is possible for the odorant, mercaptan, to be scrubbed out of the gas. If leaking gas passes up through sandy soil before it enters a structure, it may have no odor at all. The explosion hazard would still exist, but the warning odor would be absent. What happens is that the sand acts as a filter and scrubs out all of the odorant, leaving the natural gas impossible to detect without a combustible gas indicator (CGI).

Some people are able to detect lower levels of mercaptan than others. An occupant may smell gas and call the fire department. When we get there, we may smell nothing but the smoke odor on our own turnout gear. Using a CGI ensures that we do not miss a natural gas leak. The caller may smell trace amounts of gas seeping in from another apartment. We may not smell it, but if it is there, the CGI will detect it. Once we verify that there is in fact a gas leak, we can expend the necessary effort to locate it rather than suspect that the caller is deluded and leave the scene with the hazard still present.

*** At an oil burner emergency, we shut the power to the burner and then we shut down the fuel supply. Why do we do that?**

We shut the power to prevent the burner from cycling on and igniting any oil vapor present in the combustion chamber. If large amounts of oil have vaporized, the result of the burner cycling on could be the ignition of this oil or an explosion. If the vaporized oil has escaped the combustion chamber and filled the basement, and if the burner goes into the ignition cycle, it could trigger a devastating "White Ghost" explosion (see "The White Ghost," Fire Engineering, May 1995).

It is possible for unignited oil to burn in the combustion chamber after the power is cut off. The pooled oil will burn until there is no fuel left. This phenomenon is called "after fire." If fuel is leaking into the burner because of a faulty valve or gasket, there will be a constant supply of fuel. To ensure this is not the case, shut the fuel line at the oil storage tank. You may find a second shutoff at the burner. If so, shut it off as well. If because of defects or damage the fuel still does not stop flowing, it may be possible to crimp the supply line with the back of an ax, but be careful not to rupture the pipe, or you will create a whole new problem.

*** At a carbon monoxide incident, we may raise the thermostat before we make our investigation. Why do we do that?**

A common source of carbon monoxide spillage into the home is the heating system. A blocked or disconnected flue pipe, downdrafts, and a host of other reasons can cause deadly CO to spill into a home rather than exit up the chimney. When we are called to a home for a sounding CO alarm, we try to locate and remove the source of the carbon monoxide, but often when we arrive there may be no obvious source of CO. The heating unit may have been the source; however, it may be in an off cycle and not currently producing CO.

Raising the thermostat will cycle the burner on and may recreate the condition that caused the CO spillage. Raising the thermostat on the water heater also should be considered. Raising the thermostat will cycle the water heater on. It, too, may have been the cause of the CO spillage, or the water heater and oil burner working together may have caused the condition that led to the carbon monoxide problem. If we do not cause them to cycle on, we won't locate the source of the CO.

*** When we clean our forcible entry tools, we oil them, but we do not oil the striking surfaces like the back of the flathead ax or the striking end of the halligan tool. Why do we not do that?**

These metal tools are constantly exposed to the elements, and we know that such exposure when left untreated can lead to corrosion. A light coating of oil on the metal parts can prevent this corrosion, but if the oil is placed on the striking surfaces, a hazardous condition is created. When striking the ax against the halligan, a coating of oil on the striking surface increases the possibility that the head of the ax may slip off the halligan, possibly striking the firefighter holding the tool. A little oil goes a long way, so don't overoil the tools, and don't oil the striking surfaces.

*** When responding to an alarm, we do not continuously sound our siren. Instead, we sound it in a fluctuating manner. Why do we do that?**

Tests have shown that if you operate your siren at a steady, high-pitched wail when approaching an intersection, motorists can't determine from which direction your apparatus is coming. In urban areas, the sound will bounce off the congested buildings, effectively masking the direction from which you are coming. It is better to operate it in a rising and falling pattern. This allows motorists as well as other approaching fire apparatus to identify from where the sound is coming.

*** When the pump operator supplies booster tank water to the attack team at a structure fire, he informs the members that they are on tank water. When he hooks up and is supplied by a hydrant, he informs them that they are on hydrant water. Why?**

As the attack team members prepare to advance on the fire, they need to know if they have a continuous source of water. If they do, they can make an aggressive attack, confident in the fact that they will have ample water to deal with an unforeseen emergency. Although a 500-gallon supply of water would make short work of a mattress fire or small kitchen fire, it leaves little margin for safety. A larger than expected body of fire, more heat than expected, a ceiling being blown down by a smoke explosion accompanied by a ball of fire—all would require lots of water to effectively protect firefighters and safely extinguish the fire. Knowing that there is a limited supply of water should make the attack team more cautious. Members should not advance too quickly or put themselves in danger should they run out of water, and they will run out if the pumper is not quickly connected to a continuous water supply. The pump operator should inform the attack team when he is connected to a continuous source of water. Then the team can advance the line more aggressively.

*** When pulling a tin ceiling, we start pulling with our pike pole at a seam and use short jerking motions to remove the tin. Why do we do that?**

Tin ceilings are nailed to the ceiling joist. If you puncture the tin away from the seam, you will have little success when you start pulling it. All you will do is tear the tin. If you start at the seam, you can peel the tin away from the seam in a single piece. The short jerky motion of your pulls is intended to pull the nails from the joist without the hook's tearing through the tin. With a little practice, you should be able to efficiently peel the tin off the ceiling. Remember to be careful of the sharp and jagged edges of the tin and of protruding nails. To make the work area safer, roll or fold the tin and remove it from the work area.

Sometimes, vacant buildings have their windows covered with tin. You can remove it in the same fashion. Start at the edge of the tin and, with your pike pole or halligan, use short jerky motions to pull the tin off the window. Don't let the tin fall down to the street if you can help it. It can scale through the air landing like a guillotine blade on unsuspecting firefighters or civilians below.

*** In an apartment building, the nozzleman tries to carry one length of hose with him into the building and up to the fire floor, where he flakes it out. Why?**

The nozzleman needs enough hose on the fire floor to reach the farthest area involved in fire. With the hose on the fire floor, the nozzle team members will have to drag the hose behind them as they advance on the fire. If the hose is not on the fire floor but on the stairway below them, they will have to pull the water-filled hose up the stairs and then drag it behind them as they advance. The latter requires much more effort.

Flaking out the hose in the hallway reduces the chance of kinks developing when the line is charged. If there is not enough room in the hallway to properly flake out the hose, consider flaking it out in an apartment adjacent to the fire area. In all cases, a firefighter will have to be stationed wherever the hose goes around a bend. It will tend to bind at the corners, preventing the advance, unless someone is there to push it past the sticking point.

*** The nozzleman and backup man position themselves on the same side of the hoseline when preparing to enter the fire room. Why?**

When they are positioned on the same side of the line, the backup man can lend physical support to the nozzleman. He can lean into him with his shoulder and support him as the backpressure from the flowing water pushes the nozzleman backward.

*** The backup man keeps the hoseline low to the ground as the nozzle team advances. Why?**

By guiding the hoseline from the nozzleman down toward the floor, the backup man is directing the force from the nozzle reaction down into the floor. This makes it easier for the nozzleman to hold the operating line and to advance.

*** When a firefighter vents a window that he plans to enter, he removes all of the glass as well as the window's sash. Why?**

It is easier and safer to enter the window when all of the glass and the sash have been removed. Removing the sash ensures a firefighter's mask will not catch on it as he enters. In effect, he makes the window into a door. This is important as he enters but even more important as he tries to exit. If conditions are deteriorating and he needs to exit in a hurry, any obstruction or remaining jagged glass shards that might slow him down could prove deadly.

*** When we are called to a home to investigate a sounding carbon monoxide alarm and find no CO source in the home, sometimes we close all of the windows and doors and then turn on all fuel-burning appliances as well as all devices that vent air from the home. Why do we do that?**

When we respond to a CO alarm in a home, we are often unable to detect any CO. This does not mean there was no CO present when the alarm sounded. Sometimes the occupants ventilate the home before we arrive, allowing the CO to dissipate through these openings. The CO that was spilling out of the hot water heater can cause the alarm to sound as it should, but when the call for water stops, so does the source of CO as the water heater cycles off. The same is true of the other CO-producing appliances. Turning on the appliances may recreate the conditions that allowed the CO to leak.

For example, in some instances, especially when the oil burner and gas hot water heater share the same flue, a condition known as "downdrafting" can occur. As the oil burner sucks air in for the combustion process, it creates a negative pressure in the home. This negative pressure sucks combustion gases from the hot water heater back down the flue. This reverse draft can also occur in a fireplace as the fire dies down and the combustion gases cool down; as a result, the fireplace's draft lessens. If the oil burner then kicks in and the house is tightly sealed, negative pressure can occur, resulting in downdrafting.

Firefighters may be able to recreate this phenomenon of downdrafting by tightly sealing the house and turning on all the appliances as well as house fans, exhaust fans, kitchen fans, clothes dryers, and any other venting device. The idea is to recreate the downdraft and to identify the offending appliance.

*** When forcing a door in a smoky hallway, the firefighter holding the halligan tool tells the ax-wielding firefighter when to strike his tool. Why?**

The irons man often moves his tool between strikes as he guides it into the space between the door and the jamb. If the ax man struck the tool whenever he felt like it, he might strike as the tool was being moved and inadvertently hit the firefighter instead of the tool. As an additional safeguard, the ax man can tap the ax on the halligan each time before actually hitting it so as to verify its location before striking it.

*** The firefighter assigned to the pedestal position of the aerial apparatus must not be given an assignment that would prevent his operating his ladder or bucket. Why?**

The pedestal man is key to firefighter safety. If a firefighter operating above grade level needs to exit quickly because of deteriorating conditions, it is the pedestal man who will first notice him at a window and be in a position to rapidly supply an escape route for the distressed firefighter. If the pedestal man is operating in an interior position, then this important safety factor is absent and a trapped firefighter would have to hope that someone else is in a position to notice him and can safely operate the aerial device.

The pedestal man in position on the truck's pedestal can rapidly raise his ladder or bucket to trapped firefighters and occupants who suddenly appear at a window and can climb the ladder to assist in their escape. Any delay in observing firefighters or civilians in need of rescue could have deadly results.

*** When firefighters are called to a water leak in a home and find a water-soaked ceiling, they poke a hole in the ceiling with the back end of their pike pole. Why?**

The ceiling, whether lath and plaster, ceiling tile, or gypsum board, will absorb water. This now heavy ceiling will continue to absorb water until it becomes too heavy and too soggy to remain in place. It can fall in large pieces, injuring anyone standing below it. In addition, water can collect above the ceiling, adding to the weight it must support. Poking a hole in the ceiling relieves the accumulating water.

The back of the pike pole is used because it can enter the ceiling and be pulled out without pulling down a large section of soggy ceiling. The hook end is likely to pull more of the ceiling down, creating an injury potential. Use the reach of the tool when poking the hole and try to stand in a protected area such as a doorway or closet. By doing so, you will be protected should you inadvertently cause a large section of ceiling to fall.

*** When clearing a clogged roof drain, firefighters do not use their hands but instead clear the drain with a tool. Why?**

When a roof drain is cleared and the pooled water starts to flow down the drain, a firefighter's hand can be pulled down into the drain by the force of the flowing water and can be held there by suction. If his arm is pulled deep enough into the drain, the firefighter could find himself with his face in the water. This would be life-threatening as well as embarrassing.

*** When entering the window or climbing onto the roof of a burning building, firefighters bang on the floor or roof with their tool before stepping off a ladder or fire escape. Why?**

Entering a smoky room from a window or stepping onto a smoke-obscured roof can be dangerous. If you can't see the floor or roof deck, you can't be sure it is there. It may have been burned away or weakened by fire burning below it. A good solid thumping with your tool can ensure that you are not stepping into a hole. Always thump before you step.

*** When climbing a portable ladder with a hook and extinguisher or other tool, firefighters reach up with their hook and set it on a rung as high above them as they can reach. Why?**

Rather than having a tool in both hands, setting the hook on a rung gives the firefighter one free hand, allowing for a safer climb. When the firefighter reaches the level of the hook, he picks it up, reaches up, and resets it again as high as he can reach.

*** At a car fire or accident, we often disconnect the battery. Why do we do that?**

The fire or accident may have damaged the vehicle's wiring and ignition. If the car has a standard shift, a short in the ignition system can cause the car to lurch forward or backward as it unexpectedly starts. In addition, if there is a gasoline leak and a spark is generated from damaged wires or from firefighters overhauling, the gasoline can ignite. It is better to be safe than sorry. Disconnect or cut the negative battery wire and make certain that it does not contact the positive wire.

*** Before venting a skylight, firefighters will break one pane of glass and wait a moment before venting the entire skylight. Why?**

Many older skylights are multipaned and are located over the stairway in multiple dwellings. We break one pane to warn firefighters operating below the skylight that they may be injured by falling glass. This is a nonverbal "Look out below." When the skylight is broken, firefighters will be showered with jagged shards of glass. Breaking one pane of glass serves as a warning to the firefighters below that more glass will be falling and that they had better get away from beneath the skylight. Firefighters hearing the breaking glass should hug the walls of the stairway if they are unable to get off the stairway.

*** When searching the smoke-filled hallway of a multiple dwelling, firefighters should be cautious when encountering an outward-opening door. Why?**

In residential buildings, apartment doors open inward. An outward-opening door will usually lead to a utility closet or an elevator. It is possible for a firefighter to fall down the elevator shaft if the elevator door is opened without the elevator's being at that floor.

This condition could exist if the elevator malfunctions or if it is under construction or being repaired.

Never assume that everyone in your fire station knows what you do—especially the newer members. They may seem to be knowledgeable or to act as if they know what they're doing, but if you haven't taken the time to explain the "whys" to them, they may be missing key information that could keep them or someone else at the fire or emergency scene alive. Training for a firefighter should be a lifelong pursuit. New firefighters should do all they can to learn all they can about firefighting. As they develop into seasoned veterans, they should continue to seek knowledge and also freely share their accumulated wisdom with the next generation. Our primary goal is to save lives; training saves lives, so it is a primary goal.

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