

# Building Mechanical Equipment Fires

By

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During the heating season, many fire losses will occur with origins in building mechanical equipment. A thorough investigation requires information on the probable cause of the fire. The discovery of defective mechanical equipment design or installation will certainly enhance the chances of monetary recovery. The following are examples of fire causation often found in mechanical equipment in buildings.

## Boilers

Figure 1 shows a badly overheated boiler that was the cause of a fire in a small apartment building. The building was nearly destroyed. The cause of the fire was the overheated boiler that ignited floor joists in the vicinity of the flue



Figure 1

pipe. A clogged low water cut-off control did not sense the drop in water level in the boiler, resulting in the overheating. The maintenance service hired by the insured did not follow appropriate blow-down procedures that would have prevented the malfunctioning.

Boiler control malfunctions can cause fires. The controls should be carefully removed and tested. Boiler installation should be inspected for proper clearances to combustible materials. Since boiler flue temperatures often reach 500 to 600 degrees Fahrenheit, a properly operating boiler can cause a fire if the flue pipe is near combustible materials such as wood structural components. Finally, operational procedures should be reviewed to ascertain the effect of the behavior of boiler operating personnel on the probable cause of the loss.

## Furnaces

A significant number of furnace malfunctions occur in the flue pipe system. Flue blockage, insufficient flue distance from combustibles and improper flue assembly usage are typical causes. Control malfunctions may result from either gas valves or limit switches. In some instances, the limit switch failed causing overheating of the furnaces. Electrical faulting in wiring connected to furnace controls has been known to occur, thereby initiating a fire.

## Water Heaters

Figure 2 shows a burned water heater that was the origin of a fire. Food grease from an overflowing trash container near



Figure 2

the water heater had spilled onto the heater and drained down the side into the burner area, resulting in the fire. Careless placement of combustible debris in the vicinity of water heaters is a common cause of fires. Other causes include malfunctioning gas valves and flue blockage.



Figure 3

## Kerosene Heaters

Figure 3 shows a burned kerosene heater at the origin of a fire. Typical causes of kerosene heater fires are usage of gasoline as a fuel, spillage of fuel from the heater while ignited, placing the heater near combustible materials, and improper adjustment of the heater. Improper adjustment of the heater can result in a sooty flue product from the heater causing significant smoke damage without a fire. In such an instance, a defective wick adjustment mechanism was discovered which did not allow the insured to properly adjust the heater.

## Fireplaces

Fireplace fires are known to be caused by defective flue liners, improperly installed flue liners, creosote build-up in the chimney, blocked flue pipes (bird nests), insufficient screening of the fireplace, gas igniter malfunction, and insufficient hearth area in front of the fireplace. Check local building codes for installation deficiencies that could have caused the fire. Check to see if chimney sweeps had cleaned the fireplace flue. In one instance, a chimney sweep reassembled a flue liner improperly resulting in a gap that allowed hot debris to enter the attic.

Several causes of fires due to mechanical equipment have been reviewed. Many more can occur, depending on the complexity of the mechanical equipment.

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