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Analysis of Clothes Dryer Fires

By

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Fire development in clothes dryers causes a range of losses from severe smoke damage to the building interior to disruption of the entire building. The typical clothes dryer is composed of a large rotating drum which provides an environment of warm air and moisture removal. The drum is supported on bearings and usually powered by an electric motor. The heat source is usually an electric heating coil or a gas fired burner. Temperature limit switches are placed at strategic locations throughout the dryer to provide input to temperature control devices. There are a variety of causes of dryer fires with the following being typical examples.

Figure 1 is a view of an electric dryer that

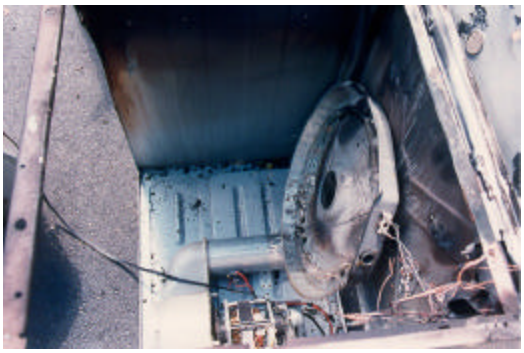

Figure 1

Figure 2

sustained a fire in the drum. The origin of the fire appeared to be near electric heating coils as shown in Figure 2. Combustible debris such as floor dust appeared to be contacting the heating coil. A look under and around the dryer revealed a large accumulation of dust and lint. Ingestion of combustible debris into the dryer which contacts heating coils is a common cause of fires.

Figure 3

Figure 3 is a view of a gas dryer with a relatively low burn pattern in the vicinity of the

Figure 4

burner. Figure 4 is a view of one of the temperature limit switches that had parted from its mount. The small plunger that was a part of the limit switch had fallen out (Figure 5),

Figure 5

rendering the high temperature limit function ineffective. This resulted in overheating, causing the fire. This appears to be a manufacturing related deficiency. Figure 6 is a view of a gas dryer that caught fire shortly

Figure 6

after the owner heard a scraping sound. Figure 7 is a view of a failed support bearing which caused the drum to wobble and scrape the back of the dryer. This opened a gap between the drum and dryer housing, resulting

Figure 7

in clothes falling out of the drum onto the bottom of the dryer.

Figure 8

Figure 8 shows clothing tangled in the other support roller as shown by the right arrow and clothing contacting the burner shroud as shown by the left arrow. The bearing failure appears to be an end of useful life failure, as the dryer is old.

Figure 9

Figure 9 is a view of a large industrial dryer that sustained a fire in the vicinity of the air circulating impeller, which was constructed of a magnesium alloy (Figure 10). The magnesium alloy had ignited and had to be

Figure 10

extinguished with a chemical agent. The impeller was partially consumed, yet one interesting piece remained. In Figure 11 we see a lump of magnesium with a bent paper clip lodged inside. Scrape marks on the paper clip suggest that it became engaged in the gap between the rotating impeller and shroud, causing frictional heating that ignited the magnesium.

Figure 11

Some explosive events occur in dryers, usually as a result of volatile cleaning chemicals entering the dryer or, in some instances, the ignition of butane cigarette lighters in the dryer drum.

Some items to consider when attempting to determine the cause of a dryer fire are statements from witnesses, the physical handling of the dryer after the fire, storage of the dryer and the fire origin. In some instances, the burned dryer may be a "victim" of the fire and not a cause. The typical burn pattern analysis and witness information will aid in this determination. Burned dryer components are often delicate and rough handling, as a result of moving, can cause a loss of evidence. Finally, analyze the dryer as soon as possible since environmental influences such as corrosion and animal infestation can cause evidence deterioration.

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