

Midnight Blaze Strikes Prison. Chino Ca (January 8,1989)

The laundry at the California Institute for Men sustained heavy damage during an early morning fire. Investigators contribute the fire to spontaneous combustion of items which had been removed from hot dryers and placed in polyethylene plastic transport carts. The loss was estimated at \$1.5 million.

Hospital Laundry Fire Destroys. Victoria, BC (March 18,1989)

Spontaneous combustion was blamed for the fire which gutted the Glendale laundry. Despite the laundry's automatic alarm system, which was activated at 10:12pm, the fire caused an estimated \$2.3 million damage. Fire officials found evidence that the fire had started in three or four of a group of 25 plastic laundry carts that were filled with linen waiting to be ironed.

Hotel Fire Causes \$1.5 Million Loss. Orlando, FL (March 23,1989)

According to officials, the fire at the Marriott Orlando Hotel, which originated in the hotel laundry, was the result of linens, self-combusting in a laundry cart. The fire, which was reported about midnight, competetly destroyed the building which housed the hotel's laundry and maintenance facility.

After Hours Blaze Guts Nursing Home Laundry. Litchfield IL (June 16,1992)

The County Care Center Laundry, which served five area nursing homes, was totally destroyed in a \$1.5 million fire which started several hours after the plant closed. The fire originated in the linens which had been piled in a cart. The source of ignition was spontaneous combustion caused by residual chemicals in the laundered fabric reacting to the heat of the dryer.

Early Morning Fire Destroys Laundry. Findlay OH (July 2,1994)

Fire officials blame spontaneous combustion of processed linens piled in a laundry cart for the 3:30am blaze that caused an estimated \$5 million damage to City Laundry. Test results indicate the clean, warm garments piled in a cart, waiting to be folded during the next shift, contained traces of linseed oil.

The Record

One in six laundries, commercial, industrial, or institutional, reports a fire each year, more than 3000 fires annually. Many small fires likely go unreported. National Fire Protection Institute statistics blame dryers up to 70% of laundry fires, only 5% are thought to be spontaneous ignition. All other causes, electrical and machinery failures, faulty heating equipment, smoker's carelessness, arson, etc., total 25%.

The evidence

Analysis of the facts leads to the conclusion that it is not dryer heat alone but spontaneous ignition that causes the vast majority of laundry fires. Properly functioning dryers do not produce temperatures high enough to cause ignition. Commercial dryers must meet American National Standards Institute requirements for safe operation to obtain design certification from the American Gas Association. Utilities will not supply gas to uncertified appliances. The ANSI standard limits dryer temperature settings to a maximum of 225' F. A temperature limiting mechanism must be incorporated into the drying chamber discharge temperature to less than 250' F, even when the blower has failed, and the lint screen and vent is blocked. One of the required tests measures the highest temperature in the drying load in ten locations. The temperatures record can not exceed 240' F in more than five.

The range of minimum auto ignition temperatures for textiles is 490' F to 1060' F. The lowest ignition temperature for any is nearly twice that allowed by the standard. Laundry fires related to the drying process, where no malfunction of the drying system can be demonstrated are almost certainly spontaneous ignition fires.

What is spontaneous ignition/combustion?

Dr. Paula Beever, in the SFPE Handbook of Fire Prevention Engineering defines spontaneous combustion as " the culmination of a runaway temperature rise in a body of combustible material, which arises as a result of heat generated by some process taking place within the body."

There appear to be three variations of spontaneous ignition. They differ mainly in the nature of the ignition. Dr. Beever describes the classic wet hay, barn fire scenario thus: "Spontaneous combustion may occur in piles of moist organic material where heat is generated in the early stages by respiration of bacteria, molds, and fungi. This type of heating can only raise the material to the temperature range of 50 to 75 degrees C (120-160' F), where living organisms die. Beyond this point, some form of chemical reaction must take over if ignition is to occur."

The second variation takes place in materials that are reactive at normal ambient temperatures. Biological heating or an outside source of heat is not required. This form often occurs in piles of soiled laundry, when the soiling agent(s) are reactive and heat the fabric until ignition takes place.

NFPA's Fire Protection Handbook lists seventy common materials which are subject to self-heating. Twenty-five are liquids, each listed with the precaution "avoid contact of leakage from containers with rags, cotton, or other fibrous combustible materials". Any of the twenty-five liquids and many of the solids

could be in the soiled fabric coming into the laundry. Other materials are probably capable of self-heating and any number of combinations of materials may be active enough to self-heat.