

Learning from History - Fire Cause and Prevention

“The most frequent causes of fire are men, women and children” (but not necessarily in that order). This may be correct for fires that are associated with human endeavours, but this knowledge does not help us prevent unintentional or malicious fires.

Over the next few months I have been volunteered to prepare a series of articles on the principal causes of fire, with an emphasis on prevention. These articles will draw heavily on three references: H.W. Marryatt’s book, *Fire - A Century of Automatic Sprinkler Protection in Australia and New Zealand 1886-1986* (for an Australasian flavour), FM Global’s Data Sheets (for some international experience augmented with excellent prevention advice) and The New Zealand Fire Service statistics¹. The data will emphasise that the causes of yesterday’s fires will be the causes of tomorrow’s fires, unless we learn from past experiences.

The scope will encompass both industrial and residential fires, but will not extend to natural events such as lightning. This is not to say that naturally occurring fires are infrequent or do not cause significant damage and loss of life. Rather, it is because there is little that can be reasonably and practically done to prevent the combination of ignition source, oxygen and fuel that leads to such fires.

So let us start with a quiz. Please rank the following causes of fire in order of precedence.

Arson (men, children, and women; in that order – not to be confused with deliberately lit fires for legitimate purposes where the order is more likely to be women, men and children).

Electrical

Smoking

Mechanical Friction

Lightening

Hot work

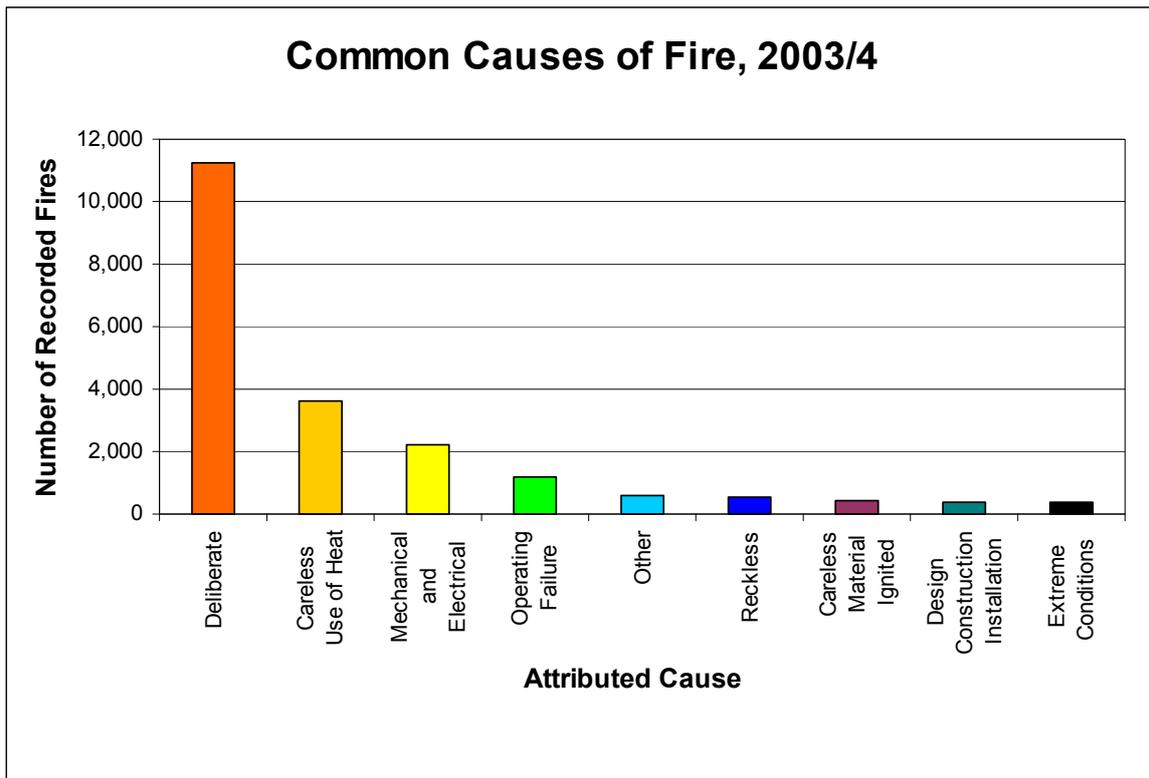
Miscellaneous causes

Domestic (house fires)

When undertaking an ordering task like this there are several approaches that can be used. One method is to alternatively select the most frequent and most infrequent events without replacement. Another is let someone else do the selection for you - I will adopt the latter technique.

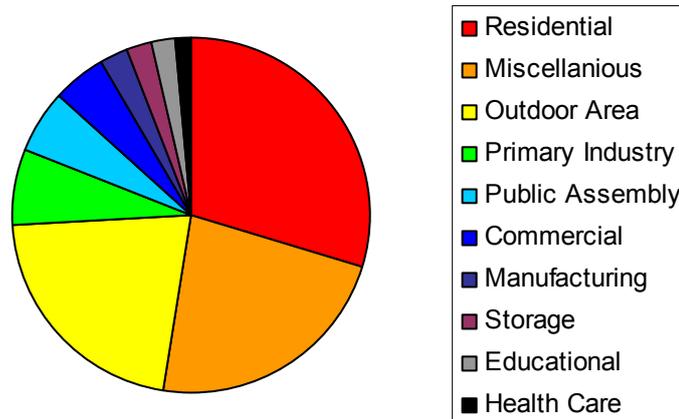
¹ The New Zealand Fire Service Emergency Incident Statistics Book 2003/4 available on line at <http://www.fire.org.nz/>

The New Zealand Fire Service Emergency Incident Statistics are an excellent source of fire statistics in New Zealand. The 2003/4 report identified that, of 20,658 cause-attributed fires recorded, approximately half were deliberately lit and 6,047 of these were unlawful (arson). The number of these fires in any year has been trending upward since the first records in the series in 1999. The number of fires from other determined causes has remained relatively constant over time. In order of frequency the other significant causes were: careless use of heat (which includes cooking, hot work and smoking) 3,645; mechanical and electrical 2,222; and operating failure 1,206.



When looking at building occupancy type, residential fires are certainly the most common fires in New Zealand. 6,378 house fires were recorded in 2003/4. With the exception of outdoor and miscellaneous fire types, the number of residential fires exceeded the total fires in all other occupancy categories including manufacturing, storage, commercial, primary industry and public assembly.

Fires by Occupancy in 2003/4

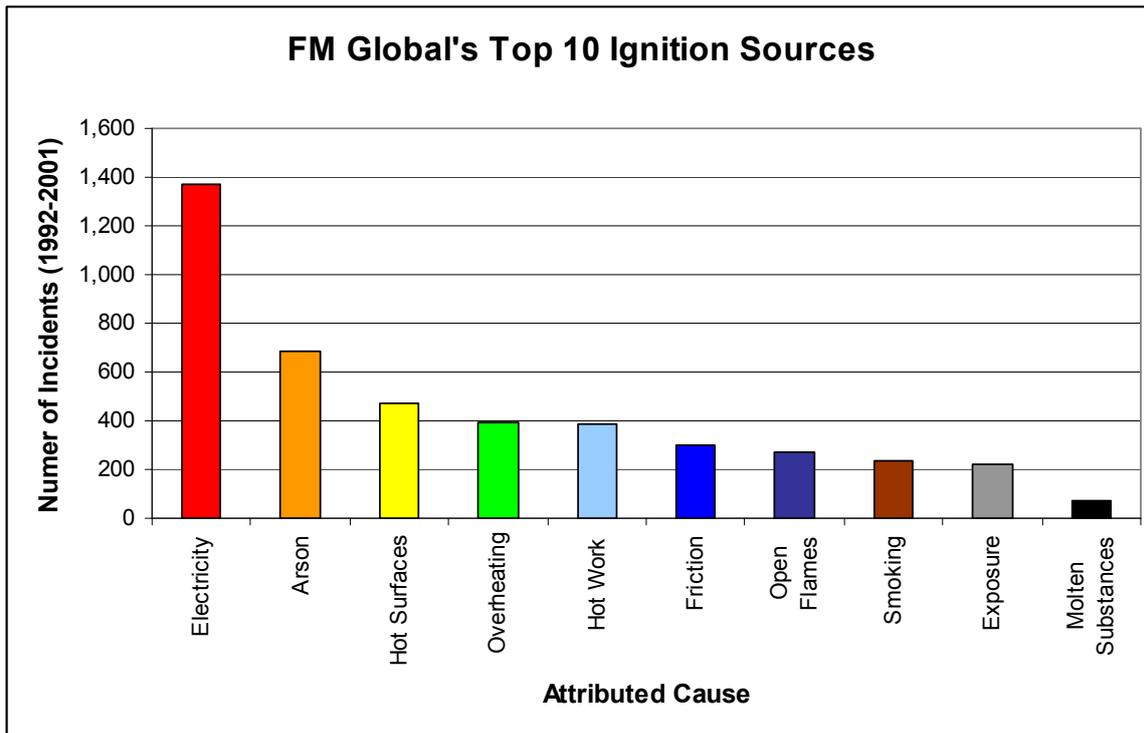


Marryatt reports that in the 100 year period to 1986 the most frequent cause of fire was tobacco smoking (1,046 fires). Smoking was the attributed cause in 30% of fires involving life safety. This was the case in both industrial and commercial premises and residential and institutional occupancies. Since 1986 social and legislative changes are likely to have had an influence on the frequency of fires caused by smoking.

The second most frequent cause of fire recorded by Maryatt was overheating, particularly in industry (914 fires). Overheating is described as ovens and dryers, as opposed to space heaters, that either fail or are misused, resulting in higher than specified temperatures and ignition of the material being processed.

The third most frequent cause of fire was electrical (804 fires). This excluded static electricity, appliances, refrigerators, fluorescent lighting fixtures and vehicles.

FM Global, a North American based Industrial and Commercial property insurer, records the ten most frequent causes of fire and explosions as electrical followed by arson, hot surfaces/radiant heating, over heating, hot work, friction, open flames and smoking. The average cost of these losses was US\$ 1 million.



There are clearly discrepancies between the numbers available. These differences can be rationalised by considering the classifications used, changes in construction and society over time, and the nature of the organisation collecting the data. It has been argued for instance, that insurance company records may only be valid for fires that result in claims. There is a perceived incentive for insured clients not to report small (below deductible) fires as these may influence future premium. But numbers aside, prevalent causes of fire clearly include arson, smoking, electrical, hot work and mechanical processes.

When we look at these it becomes apparent that many of the fires that we experience are caused by men women and children, and that many of them are preventable. By this I do not mean that once the fire has started we can detect, control and extinguish it, I mean preventing the fire from starting in the first place. In the next few articles I want to focus on what can be done to prevent fire from these causes. To be continued...