

# Fire Investigation Myths

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Up until 1992, the fire investigation community relied on the practices, procedures and beliefs of the fire investigators before them. The profession was plagued by misconceptions and myths. The first science based book on fire investigation was authored by Paul Kirk in 1969. The book was written to help fire investigators comprehend the basic principles of fire behavior as they were believed at the time. This book and other similar texts were filled with misconceptions that led to many erroneous determinations of cause.

In 1985 The Standards Council of the National Fire Protection Association formed the Technical Committee on Fire Investigations. Members representing the police, fire, engineering and insurance communities worked for 7 years and in 1992 the first edition of Guide for Fire and Explosion Investigations (NFPA 921) was released. Now in its 7th edition (2011), NFPA 921 remains the standard for determining both the origin and cause of fires.

## MYTH - Depth of Char / Alligatoring

### The myth:

If alligatoring is large, deep, and shiny, the fire spread was extremely rapid. Large alligatoring should be considered an indication of the nearby presence of an ignitable liquid. Slow fires produce relatively flat alligatoring.

### The Reality:

The burning of wood produces char in a pattern of cracks which look like the scales on an alligators back. Depth of char is a very important indicator and can be used to show trends of fire travel over a common surface. Early publications of NFPA 921 addressed this head on:

6.5.5 Interpretation of Char. The appearance of the char and cracks has been given meaning by the fire investigation community beyond what has been substantiated by controlled experimentation.

It has been widely stated that the presence of large shiny blisters (alligator char) is proof that a liquid accelerant was present during the fire. This is a misconception. These types of blisters can be found in many different types of fires. There is no justification that the appearance of large, curved blisters is an exclusive indicator of an accelerated fire.

6.5.5.1 It is sometimes claimed that the surface appearance of the char, such as dullness, shininess, or colors, has some relation to the use of a hydrocarbon accel-

erant or the rate of fire growth. There is no scientific evidence of such a correlation, and the investigator is advised not to claim indications of accelerant or fire growth rate on the basis of the appearance of the char alone.

## MYTH - Flame Temperature

### The myth:

Gasoline burns hotter than wood so the presence of a melted aluminum threshold indicates the use of an ignitable liquid.

### The reality:

While this theory may be appealing, the flame temperature of a gasoline fueled fire and the flame temperature of a wood fueled fire are essentially the same.



## MYTH - Spalling

### The Myth:

The chipping and pitting of concrete is caused by extremely high temperatures associated with the burning of an ignitable liquid. A discolored area around spalling was a sure sign of ignitable liquid use.

### The Reality:

Spalling is caused by different rates of expansion within concrete. The most drastic change in expansion/contraction of concrete occurs when water is applied by firefighting streams and is often the cause of spalling.

A burning pool of ignitable liquid is incapable of reaching a temperature greater than the boiling point of the liquid, therefore as long as there is liquid on a surface, that surface will not reach temperatures in excess of the boiling point of the liquid.

The first editions of NFPA 921 contained a section entitled "Misconceptions about Spalling". The 2004 Edition addressed spalling as follows:

6.6.2.1 In the past, spalling of concrete at a fire scene has been thought to be a positive indicator of a liquid accelerant involved fire.

6.6.2.2 The rapid cooling of a heated mass of concrete, brick, or masonry can also cause spalling. A common source of rapid cooling in a fire is extinguishment by water.