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Hello,

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## Process Safety Dispatch

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### In this Issue

- Explosion Prevention by Eliminating Ignition Sources
  - EXPLAINERS: What is the difference between a Fire and an Explosion?
  - Free On Demand Webinars
-



## Explosion Prevention by **Eliminating Ignition Sources**

*Can you rely on control/ elimination of sources of ignition alone as a secure basis of safe operation? In this article we explore this question with the help of a look back to a rubber dust explosion that led to the death of 5 workers and injuries to 7 others.*

When our Process safety consultants are evaluating fire and explosion hazards for our clients, we are always attempting to establish the basis on which each part of the process is considered to be safe; the '*basis of safety*'. Actually, this seemingly daunting quest for a basis of safety does simplify down when you think about it. A process may be considered safe because:

- Potential flammable atmospheres are eliminated or controlled,
- Potential ignition sources are eliminated or controlled, or
- The plant has properly designed and maintained explosion protection and isolation measures in place.

In practice, a particular operation or process may have more than one of the above bases of safety in play, but it makes sense to identify ONE primary basis of safety upon which to ultimately rely. The question is, how much can we rely on elimination of ignition source as the only '*basis of safety*'?

### **The Explosion**

Back in 2002, a rubber dust explosion occurred at a polymerics rubber recycling plant in Mississippi [Reference 1]. It resulted in the deaths of five workers and injuries to seven others. The rubber recycling process included a wet slurry operation, followed by gas-fired drying of fine rubber paste and had an associated dust handling plant with bag house and screw conveyor beneath.

An employee who was just leaving work in his vehicle noticed a fire in the rubber plant bag house located above the plant's 30 ft roof.

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- Fire and Explosion Hazard Assessment
- Incident Investigation
- Organizational Process Safety Competency Assessment

### Specialist Laboratory Testing

- Combustible Dust Testing
- Electrostatic Testing
- Self-Heating / Thermal Instability Testing
- Flammability Testing of Gases & Vapors



**EXPLAINERS: What is the difference between a Fire and an Explosion?**



### What is the difference between a Fire and an Explosion?

In process safety we often talk about fires and explosions. But what is the difference between these physical/ chemical processes. It's important to understand this since the precautions we take on manufacturing plant are very different for fires and explosions.

#### **Fires**

Fires occur as a result of an exothermic chemical reaction from a combustion process in which oxidation takes place. Simply put, a combustible material (i.e., fuel), and oxidizing agent (e.g., oxygen), and ignition source come together and react to produce heat through a chemical reaction. Generally, a certain minimum energy is required to initiate the combustion reaction, and this is initially provided by the ignition source. After initial ignition, the combustion reaction releases enough energy to sustain the reaction without the ignition source. There are a variety of different types of fires - flash fires, pool fires, jet fires, and fireballs, all of which vary in observed effect, but at the heart of them all is the combustion reaction, initiated by a source of ignition.

#### **Explosions**

An explosion is a phenomenon where a blast (pressure or shock) wave is generated in air by a rapid release of energy. This energy will have been stored in 'a system' in a variety of forms (e.g., nuclear, chemical, electrical, or pressure energy). In process safety, we are usually concerned with the chemical energy stored by substances that are involved in a combustion process, but sometimes it is pressure energy in pressure vessels that concern us.

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## Free On Demand Webinars

**Combustible Dust Hazards: Assessment, Prevention and Protection Including the Requirements of NFPA 652** [\[watch\]](#)

**Electrostatic Hazards in Processing Industry: The Nature of the Problem and Practical Measures for its Control** [\[watch\]](#)

**Fire and Explosion Hazards: How to Identify and Control Them in Your Process** [\[watch\]](#)

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