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Hello,

August 2021

## Process Safety Dispatch

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## COMPARED: A Solvent Vapor Explosion in Germany & a Combustible Dust Explosion in North America

**Which is more hazardous: A solvent vapor explosion or a combustible dust explosion?**

In this edition of Process Safety Dispatch, we take the opportunity to look at two recent industrial explosions and explore the similarities and the differences between **solvent vapor** and **dust cloud explosions**.

**Leverkusen, Germany: 9:40am, July 27<sup>th</sup>, 2021**

In July 2021, an explosion occurred in a tank containing solvents at Chempark's chemical complex in Leverkusen, Germany. At the time of writing, 5 persons are known to have died, one is missing, and 31 persons are reported injured – some seriously. The blast occurred in the storage area of a hazardous waste incinerator, where production residues are collected for disposal. Three solvent storage tanks containing chlorinated solvents caught fire. The Authorities closed roads and warned residents to stay indoors. They also warned of possible release of toxins into the atmosphere, telling residents not to eat fruit and vegetables from their gardens. [Ref 1,2]

**Kinson, NC, USA 29<sup>th</sup> January 2003**

Witnesses reported hearing "a sound like rolling thunder". There was a 'chain reaction' of explosions that rapidly propagated through a drug packaging and delivery products manufacturing factory leaving 6 people dead and 36 people injured. The factory was ripped apart by the blast, the shock wave from which broke windows up to 1,000 feet away, and propelled debris as far as 2 miles, some of which started additional fires. A large fire raged for two days at the site of the plant. The blast could be felt 25 miles away. An automated compounding machine using rubber was at the root of the blast, but it was fugitive dust that had collected in difficult to access places that was disturbed, ignited, and helped propagate the dust explosion incident.

Combustible Dust explosions and gas/ vapor explosions have many features in common – but there are important differences. In this Process Safety Dispatch article, we explore the commonalities and differences, referring to the industrial explosions reported above, as a means of improving our understanding of both dust and vapor explosions.

So, which is more hazardous? A combustible dust explosion or a vapor explosion...

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### Expert Consulting

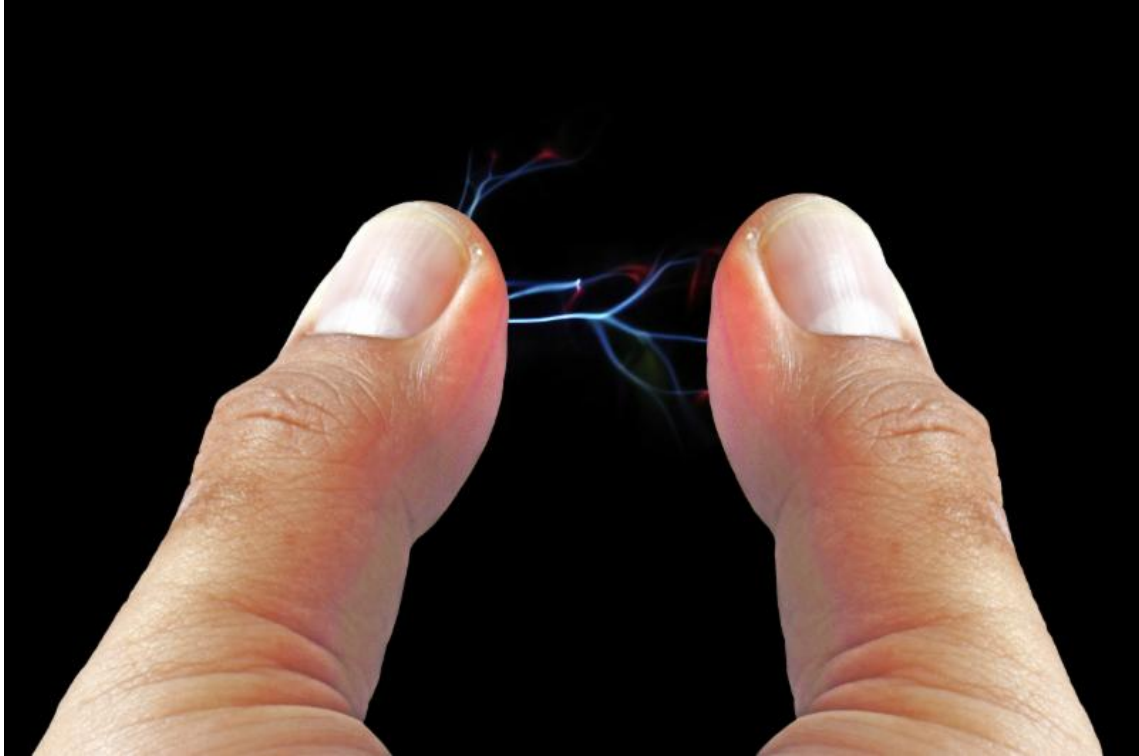
- Dust Explosion Prevention & Mitigation
- Control of Static Electricity
- Hazardous (Electrical) Area Classification
- Process Hazard Analysis
- Process Safety Management
- Fire and Explosion Hazard Assessment
- Incident Investigation
- Organizational Process Safety Competency Assessment

### Specialist Laboratory Testing

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



**EXPLAINERS: What is an Electrostatic Hazard Analysis (EHA)? What are electrostatic tests? Importance of including electrostatic hazard analysis in a Dust Hazards Analysis (DHA), and more...**



### What are electrostatic tests?

In industry, electrostatic testing is performed on materials being handled/processed (typically powders or liquids) as well as on manufacturing and processing plant in order to assess the hazards posed by static electricity. LABORATORY tests may include powder volume resistivity, liquid conductivity, product chargeability, surface resistivity, resistance, and charge relaxation time (charge decay time). Measurements performed ON SITE may include resistance-to-ground of conductive (metal) items of plant, operators' footwear, and flooring, and electrostatic voltage/electric field, and charge measurements.

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### What are electrostatic test results used for?

Electrostatic LABORATORY test results have many critical uses. Electrostatic measurements on powders handled on plant can be used to establish if your materials can give rise to electrostatic hazards by comparing the rate at which static charge is generated with the rate at which it is lost by conduction when in contact with grounded plant. We can also measure powder 'Minimum Ignition Energy' to see if your powder can be ignited by a static 'spark'. Lab measurements on equipment (pipes, liners, big bags....) can be used to explore if such equipment can accumulate static charge – even when it is grounded - and CAUSE electrostatic ignition. Electrostatic measurements ON SITE can be used to check for adequate grounding and bonding of plant and equipment, for testing flooring and footwear in use for electrostatic properties, as well as searching for areas of charge build-up on your plant.

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## What is an Electrostatic Hazard Analysis?

An electrostatic hazard analysis is a FOCUSED process safety hazard analysis covering the usual examination of likely fuel sources, ignition sources, incident likelihood and consequence, as well as hazard control measures. However, the electrostatic hazard analysis focuses on hazards that can be caused by static charge generation, build up, and discharges.

So why have us undertake such a focused electrostatic hazard analysis?

At Stonehouse we have become aware that most process hazard analysis (PHA's) and indeed dust hazards analysis (DHA's) often miss the more subtle electrostatic hazards. Static electricity is a specialist topic that most engineers/ chemical engineers/ process safety professionals have occasionally encountered but have never formally been taught. We bring our experience of performing hundreds of electrostatic hazards analysis, globally and in a wide range of industries, to your facility to enable you to cost effectively identify and control electrostatic hazards.

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If you would like a quote for any of our testing and/or consulting services, please click on the button below. We will get back to you promptly with your proposal.

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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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