2019

# COMBUSTIBLE DUST INCIDENT REPORT





DUST SAFETY SCIENCE

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# MEET THE PROFESSIONALS

## *DUST SAFETY MEMBER COMPANIES, REPORT SPONSORS AND PARTNERS*

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# LETTER FROM THE AUTHOR


***DR. CHRIS CLONEY***

***Managing Director, DustEx Research Ltd.***


## *Awareness, Knowledge, Connection and Change...*

Two years since launching DustSafetyScience.com and I still believe in these four pillars we were founded on more than ever. This is how we, the dust safety community, will achieve our goal of a year with zero fatalities from dust explosions by 2038.

The incident reporting covers awareness of combustible dust hazards. Since starting in 2016 we have recorded 632 fires and 243 explosions. Of these 875 incidents, 116 of them (13.2%) caused injury and 24 of them (2.7%) caused fatalities, resulting in 417 injuries and 45 deaths.

This gives us our measuring stick, the tool we use to track our progress over time.

However, as the famous words say 'What got you here, won't get you there'. And we need to do more to enable, facilitate and drive change in industries handling combustible dust.

As we move into year three of our 20 year mission, we are focussing more and more on the Knowledge, Connection, and Change pillars. This includes our communication platform, the Dust Safety Science Podcast, our education platform, the Dust Safety Academy and our annual event, the Digital Dust Safety Conference.

Early indications are that we are on the right track. With over 12,300 downloads of the podcast, 250+ people inside the Dust Safety Academy and over 200 people from 25 countries attending the first conference, we are making an impact as a global community driving change in these industries.

And this wouldn't have been possible without your help. So I am here to say from myself and from the DustEx Research Team, thank you for reading, thank you for supporting the mission, thank you for sharing, expanding on, and continuously improving our work, and thank you for everything you do in industries handling combustible dust to make them safer every day.

We have a long way to go, but we will get there together.

Stay Safe,

Chris

P.S. Have feedback on the incident reporting? Email me at chris@dustsafetyscience.com.

P.P.S. You can read previous letters from the author here

***"... in analyzing many of the recent events, it seems that there is a sameness [...] and the lessons seem to be learned (or in fact not learned) over and over, again and again."***

*- Dr. Sam Mannan (1954 – 2018)*

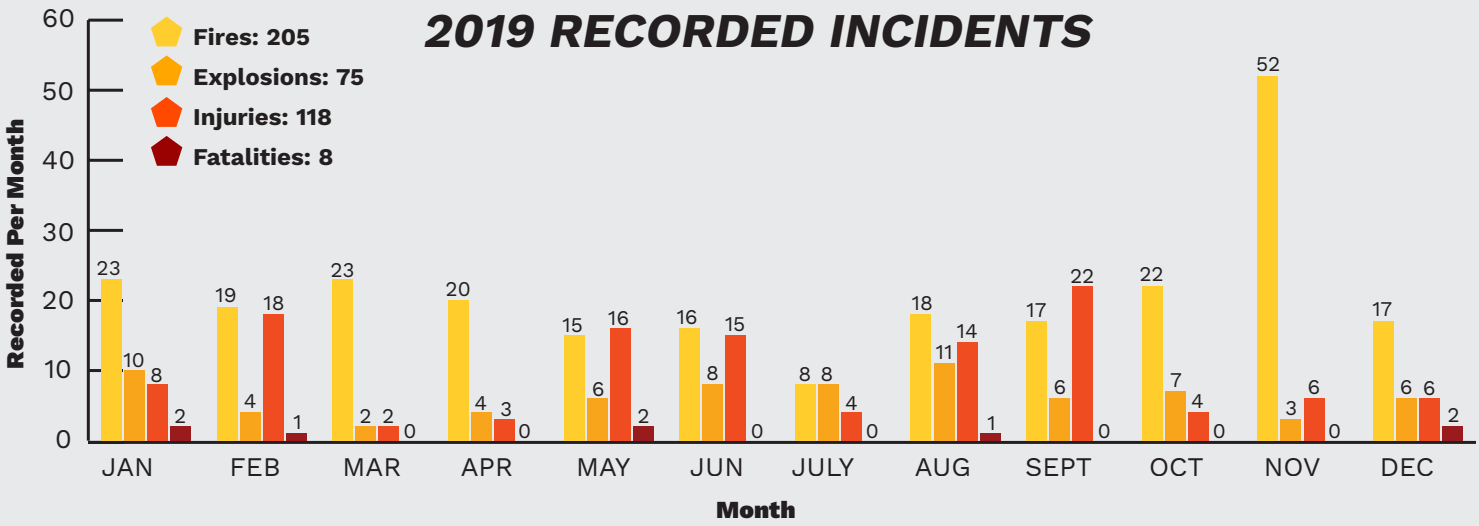
***"Successful knowledge transfer involves neither computers nor documents but rather interactions between people"***

*- Thomas H. Davenport (1802 - 1851)*

## INCIDENT DATA OVERVIEW

| | UNITED STATES | | | | CANADA | | | | INTERNATIONAL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2016 | 2017 | 2018† | 2019 | 2016 | 2017 | 2018 | 2019‡ | 2017 | 2018* | 2019 |
| Fires | -- | 117 | 158 | 175 | -- | 15 | 17 | 22 | 37 | 38 | 53 |
| Explosions | 31 | 28 | 37 | 37 | 2 | 4 | 4 | 1 | 36 | 26 | 37 |
| Injuries | 22 | 52 | 40 | 42 | 0 | 9 | 1 | 4 | 102 | 73 | 72 |
| Fatalities | 3 | 6 | 2 | 1 | 0 | 0 | 0 | 0 | 7 | 19 | 7 |

† A fatal metal dust explosion at an recycling facility in Johnson City, Tennessee on March 14, 2018 was added to the incident data from the last report.
‡ A pellet mill explosion in Entwistle, Alberta was removed from the mid-year report as preliminary investigation suggests it was a gas explosion.
*A fatal metal dust explosion at an educational facility in Beijing, China on December 26, 2018 was added to the incident data from the last report.




## LOSS HISTORY - UNITED STATES

Loss history from dust explosions in the United States over the last four years is given in the following table. This data has been collected in the incident database and reported in the combustible dust incident reports, 2016 to 2019.

| YEAR | EXP./YEAR | INJ./YEAR | FAT./YEAR |
|---|---|---|---|
| 2016 | 31 | 22 | 3 |
| 2017 | 28 | 43 | 6 |
| 2018 | 37 | 30 | 2 |
| 2019 | 37 | 27 | 1 |

This data gives an average of 33 dust explosions per year, 30 injuries and 3 fatalities over the last four years. Note that dust fires are excluded in this analysis.

## 2019 GLOBAL LOSS OVERVIEW

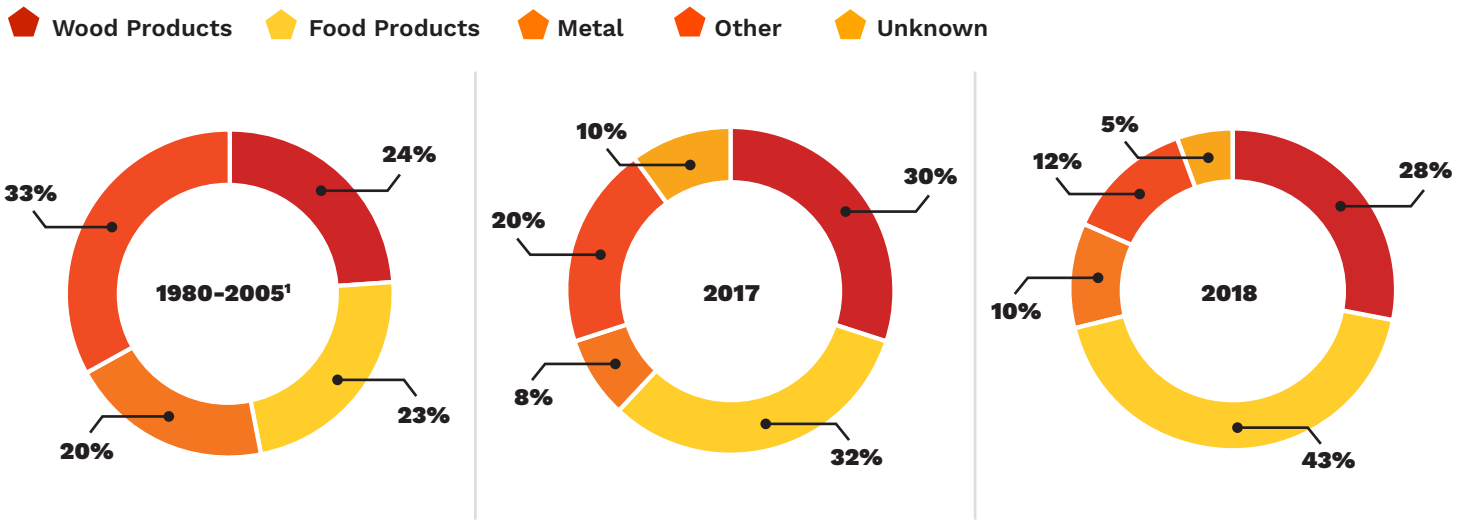
In 2019, 87% of the fatalities recorded occurred due to dust explosions. Of the injuries, 73% occurred due to explosions and 27% occurred due to fires. Some of the more severe incidents include:

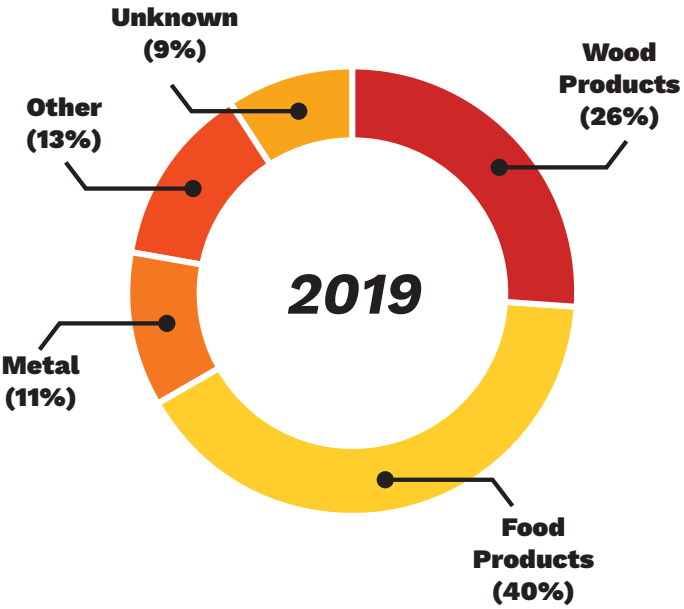
Firefighter Killed In Grain Silo Dust Explosion (Clinton, IA)
Two Killed in Steelmaker Coal Explosion (Divinópolis, Brazil)
One Killed in Wood Dust Explosion (Anzegem, Belgium)
One Killed and Nine Injured in Grain Explosion (Punjab, India)

Limited information is available for damages from dust explosions and fires. From the information that is available the following incidents resulted in more than $1,000,000 in losses:

Equip. Failure Causes Particleboard Plant Fire (Post Falls, ID)
Paper Products Fire Injures Firefighter (Waterville, ME)
Biorefinery Dust Explosion Damages Facility (Cloverdale, IN)
Dust Col. Fire Knocks Out City Power (Eaganville, Ontario)

# MATERIALS INVOLVED




*2019 DETAILED ANALYSIS*

| | |
|---|---|
| Wood | 26.5% |
| Food | 40.3% |
| Metal | 10.8% |
| Coal | 4.9% |
| Paper | 4.6% |
| Plastic | 0.6% |
| Textile | 0.3% |
| Other | 2.8% |
| Unknown | 9.2% |

## *DISCUSSION POINTS*

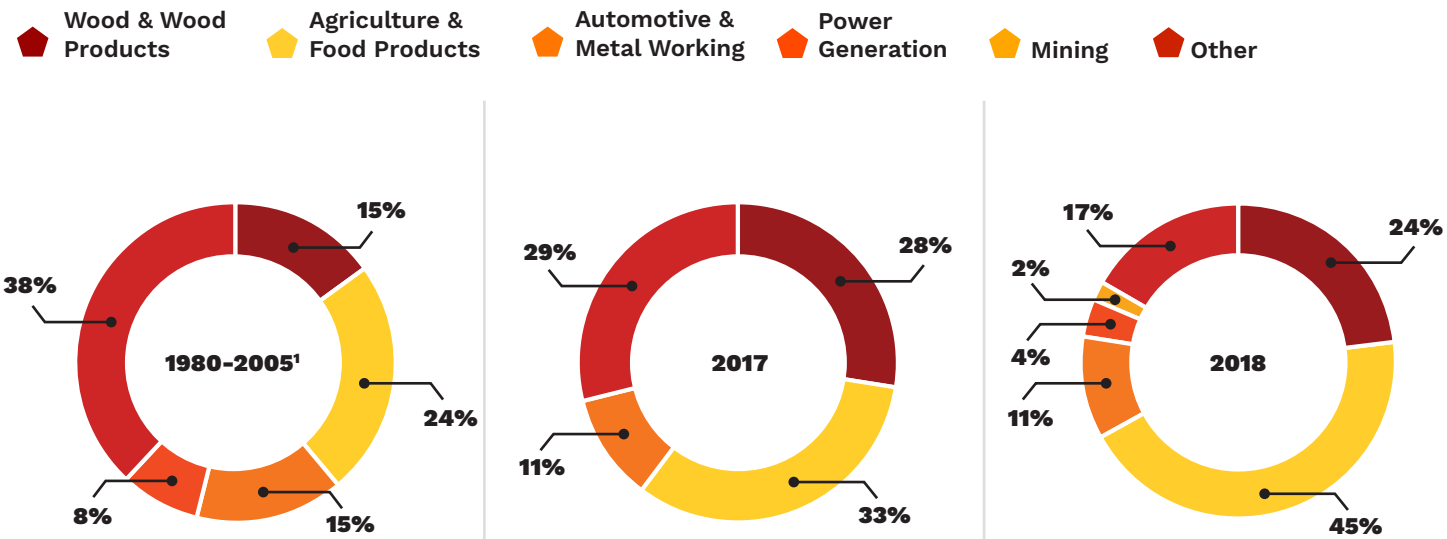
In reviewing the global incident data, food and wood products made up over 65% of the combustible dust fires and explosions recorded. These materials also resulted in 59% of the injuries and 62% of the fatalities. A breakdown of the fires, explosions, injuries and fatalities for each type of material is given as follows:

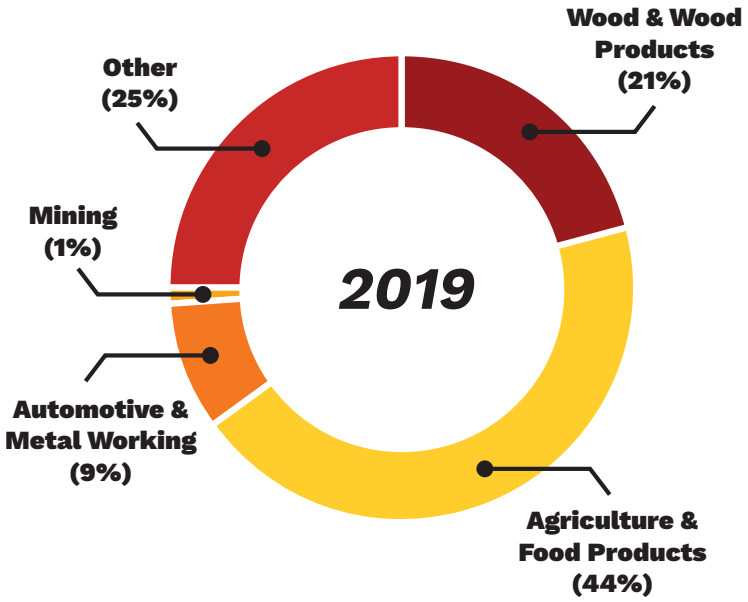
| | FIRES | EXP. | INJ. | FAT. |
|---|---|---|---|---|
| FOOD | 107 | 24 | 30 | 2 |
| WOOD | 62 | 24 | 40 | 3 |
| METAL | 29 | 6 | 12 | 0 |
| COAL | 11 | 5 | 17 | 2 |
| PAPER | 13 | 2 | 1 | 0 |
| PLASTIC | 0 | 2 | 2 | 0 |
| OTHER | 3 | 7 | 6 | 1 |
| UNKNOWN | 25 | 5 | 10 | 0 |
| TOTAL | 250 | 75 | 118 | 8 |

Metal dust explosions causing injury involved titanium and aluminum, while metal dust fires causing injury involved nickle as well as other unspecified metals.

Incidents involving coal dust, plastic, paper and other or unspecified materials resulted in 14%, 2%, 1% and 14% of the injuries, respectively. Additional fatalities resulted from a coal dust explosion in Brazil and what appears to be a fly ash explosion in India.

# INDUSTRIES INVOLVED




*2019 DETAILED ANALYSIS*

| | | | |
|---|---|---|---|
| Wood & Wood Pro. | 21.1% | Power Generation | 0.3% |
| Agriculture | 34.8% | Mining | 1.2% |
| Food Processing | 8.3% | Pulp & Paper | 6.2% |
| Ethanol Pro. | 0.9% | Coal Handling | 2.2% |
| Metal Processing | 7.1% | Schools and Edu. | 2.2% |
| Automotive | 1.8% | Other | 13.8% |

## *DISCUSSION POINTS*

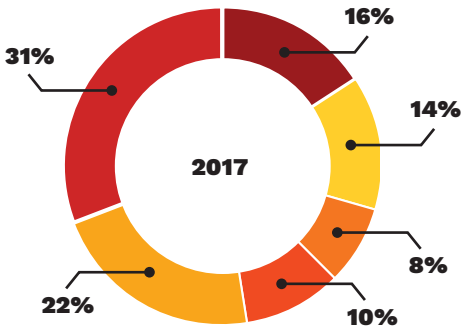
As shown in the historical data, wood processing, wood products, agricultural activity and food production make up a large portion of the overall fire and explosion incidents. Since 2017 wood and wood products have ranged from 21% to 28% of the incidents, while agricultural activity and food production have ranged from 33% to 44%. These ranges are higher than the US Chemical Safety Board data from 1980 to 2005. This is likely because the incident reporting includes both fire and explosion incidents, and global data.

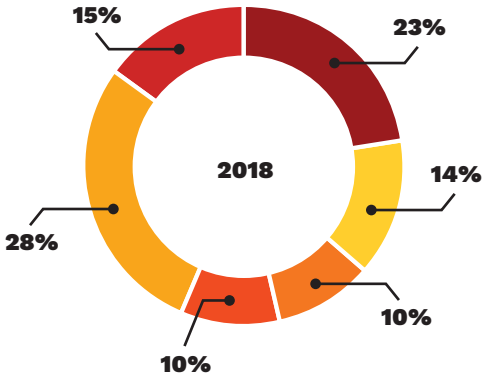
As shown in the detailed incident breakdown, the “other” category in the pie chart includes pulp & paper, coal handling, high schools, and educational facilities. Industries not broken out in the detailed breakdown include incidents in polymer processing, lighting products, tire recycling, concrete production, medical equipment, scrap and recycling, cosmetics, asphalt, marine transportation, printing, metallic pigments, pharmaceutical manufacturing, and mineral processing facilities.

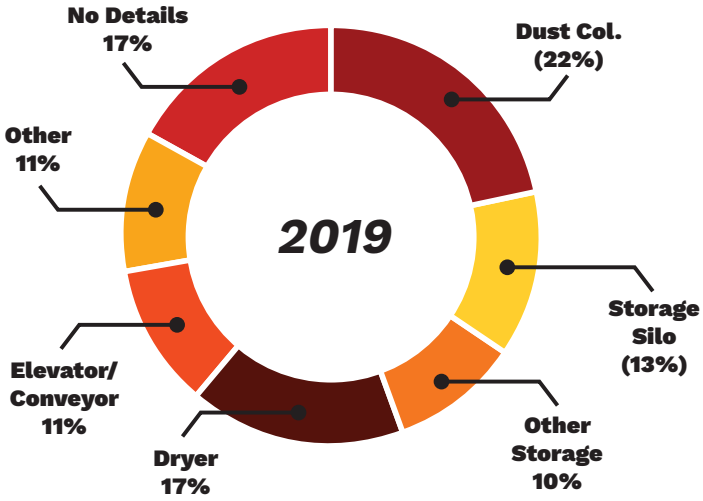
Combined, the overall “other” category of industries makes up 37% of the injuries reported in 2019. Wood and wood products, agriculture and food processing, and automotive and metal working, make up 29%, 25% and 8% of the injuries, respectively.

# EQUIPMENT & CAUSES

Dust Collector | Storage Silo | Other Storage | Dryer | Elevator/Conveyor | Other | No Details




The breakdown between fires, explosions, injuries and fatalities for different pieces of equipment are summarized the following table for 2019:

| | FIRES | EXP. | INJ. | FAT. |
|---|---|---|---|---|
| DUST COLLECTOR | 59 | 12 | 9 | 0 |
| STORAGE SILO | 29 | 13 | 18 | 4 |
| OTHER STORAGE | 27 | 7 | 7 | 1 |
| ELEV./CONV. | 30 | 5 | 0 | 0 |
| DRYER | 52 | 2 | 4 | 0 |
| OTHER | 19 | 16 | 56 | 3 |
| NO DETAILS | 34 | 20 | 24 | 0 |
| TOTAL | 250 | 75 | 118 | 8 |

## *DISCUSSION POINTS*

As discussed in previous incident reports, dust collectors demonstrate the highest percentage of combustible dust incidents with 59 fires and 12 explosions reported in 2019. This is consistent with the range given in previous incident reports between 2016 and 2019 but lower than the historic data from the CSB, which suggests up to 40%.

Although more incidents occur in dust collectors, they appear to be less severe than fires and explosions occurring in storage silos, bins, buckets and hoppers.

Although equipment labeled under “Other” only had 11% of the total incidents, these incidents resulted in 47% of the injuries and 38% of the fatalities. Some of these include a wood dust fire on top of an exhaust manifold, a wood dust explosion in ductwork, a dust explosion in a titanium shredding machine, a mixing drum explosion at a cosmetics manufacturer, an explosion in a grinding machine at a packaging plant, an explosion in a wood pressing machine, an explosion in a spice grinder, and an explosion in a paint mixing machine. In terms of the fatalities, one occurred while raw material was being loaded into a boiler from mechanical belts, one resulted from a boiler explosion that ignited sawdust piles and plywood stacks, and two resulted from a dust explosion when a boiler was blocked with fly ash and cleared by workers.

# 2019 OSHA CITATIONS

| ISSUE DATE | INDUSTRIAL ACTIVITY | STATE | VIOLATIONS | INT. PEN. | CUR. PEN. | INSPECTION | STATUS | CITATION LINK |
|---|---|---|---|---|---|---|---|---|
| 25-Jan | Commercial Screen Printing | IL | 1 | $8,525 | $6,500 | 1342863.015 | Closed | More Info |
| 4-Feb | Wood Office Furniture Man. | WI | 2 | $10,144 | $5,072 | 1353604.015 | Closed | More Info |
| 15-Feb | Sanitary Paper Product Man. | TX | 3 | $61,260 | $24,504 | 1352498.015 | Closed | More Info |
| 27-Feb | Cheese Manufacturing | PA | 3 | $26,521 | $26,521 | 1347834.015 | Under Contest | More Info |
| 29-Mar | Commercial Bakeries | IL | 2 | $6,062 | $3,789 | 1358281.015 | Under Contest | More Info |
| 18-Apr | Fabricated Metal Product Manufacturing | WI | 1 | $7,104 | $7,104 | 1355325.015 | Under Contest | More Info |
| 23-Apr | Kitchen Cabinet and Countertop Manufacturing | TX | 2 | $10,230 | $4,092 | 1377770.015 | Pay. Plan | More Info |
| 29-Apr | Plastics Product Man. | TX | 8 | $25,763 | $12,880 | 1380049.015 | Pay. Plan | More Info |
| 6-May | Hazardous Waste Treat. & Disposal | ID | 3 | $66,300 | $50,000 | 1360878.015 | Pending Abatement | More Info |
| 10-May | Nursery, Garden Center, and Farm Supply Stores | NY | 6 | $56,260 | $33,756 | 1355248.015 | Closed | More Info |
| 14-May | Mobile Home Man. | PA | 10 | $318,234 | $296,640 | 1361440.015 | Pending Abatement | More Info |
| 11-Jun | Wood Product Man. | PA | 6 | $10,230 | $6,000 | 1377258.015 | Pay. Plan | More Info |
| 11-Jun | Machinery Repair & Main. | IL | 2 | $6,820 | $4,775 | 1370209.015 | Closed | More Info |
| 19-Jun | Paper Product Ma. | WV | 11 | $26,711 | $20,000 | 1367708.015 | Pay. Plan | More Info |
| 24-Jun | Millwork | WI | 1 | $6,630 | $5,000 | 1379970.015 | Pay. Plan | More Info |
| 5-Jul | All Other Plastics Product Manufacturing | PA | 1 | $3,221 | $2,000 | 1370741.015 | Closed | More Info |
| 22-Jul | Wood Office Furniture Man. | NJ | 4 | $23,868 | $13,127 | 1374944.015 | Pay. Plan | More Info |
| 25-Jul | Motor Vehicle Brake System Manufacturing | OH | 3 | $37,888 | $13,261 | 1377984.015 | Closed | More Info |
| 30-Jul | Commercial and Institutional Building Construction | KS | 3 | $51,146 | $26,022 | 1378495.015 | Closed | More Info |
| 22-Aug | Medicinal & Botanical Man. | NJ | 6 | $53,806 | $31,965 | 1385559.015 | Closed | More Info |
| 23-Aug | Kitchen Cabinet & Countertop Man. | MA | 9 | $24,757 | $9,000 | 1384019.015 | Pending Abatement | More Info |
| 6-Sep | Sawmills | PA | 3 | $22,542 | $22,542 | 1394706.015 | Under Contest | More Info |
| 13-Sep | Wet Corn Milling | MS | 1 | $13,259 | $5,000 | 1398353.015 | Closed | More Info |
| 25-Sep | Engineered Wood Member (except Truss) Manufacturing | WV | 3 | $39,023 | $27,500 | 1402841.015 | Closed | More Info |
| 3-Oct | Wood Container & Pallet Man. | IL | 1 | $13,260 | $7,956 | 1421681.015 | Closed | More Info |
| 9-Oct | Pump and Pumping Equi. Man. | NY | 1 | $7,577 | $5,304 | 1400773.015 | Closed | More Info |
| 10-Oct | Other Millwork (including Flooring) | NY | 8 | $68,553 | $68,553 | 1405933.015 | Under Contest | More Info |
| 16-Oct | Wood Kitchen Cabinet and Countertop Manufacturing | IL | 3 | $9,851 | $9,851 | 1394524.015 | Pending Abatement | More Info |
| 17-Oct | Recyclable Material Merchant Wholesalers | PA | 4 | $7,730 | $5,400 | 1404720.015 | Pay. Plan | More Info |
| 12-Nov | Paper Bag and Coated and Treated Paper Man. | GA | 2 | $7,577 | $4,546 | 1428309.015 | Closed | More Info |
| 13-Nov | Iron foundries | NY | 20 | $214,059 | $214,059 | 1401131.015 | Under contest | More Info |
| 15-Nov | Fabricated Structural Metal Manufacturing | OH | 8 | $98,503 | $53,703 | 1404889.015 | Pending Abatement | More Info |
| 23-Dec | Wood Kitchen Cabinet and Countertop Manufacturing | NJ | 1 | $9,282 | $5,000 | 1412255.015 | Pending Abatement | More Info |

**Inspections Resulting In Citations:** 33
**Total Citations:** 142
**Total Initial Penalties:** $1,352,696
**Total Current Penalties:** $1,031,422
**Initial Penalty/Citation:** $9,526
**Initial Pentalty/Inspection:** $40,991

***Information was collected from OSHA Data & Statistics by searching for "dust" within inspection details from citations made using the General Dusty Clause.**

# METAL DUST EXPLOSION AT UNIVERSITY IN BEIJING, CHINA

**DECEMBER 26, 2018**
**(MISSING FROM 2018 INCIDENT REPORT)**
**Three Fatalities**

## *BACKGROUND*

The university where the explosion occurred was established in 1896, making it one of the oldest universities in mainland China. It includes 22 research institutes and research centers, and 39 laboratories. As of 2017, there were 25,569 full-time students on the campus.

## *INCIDENT DESCRIPTION*

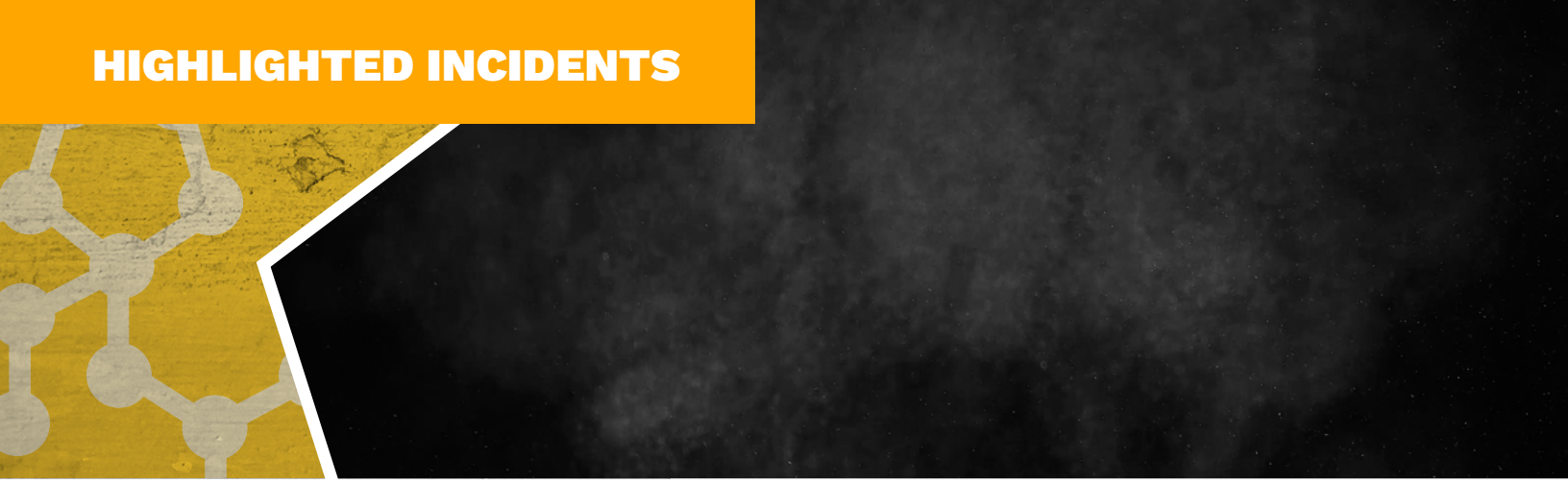
At the time of the explosion, students from the urban planning and environmental engineering department were carrying out sewage treatment experiments. The students were stirring phosphoric acid and magnesium powder in a mixer when metal-on-metal friction produced a spark that ignited hydrogen generated in the hopper and led to a magnesium dust explosion.

## *OUTCOME*

Three students were killed in the explosion. Video footage showed that the building was engulfed in dark smoke while flames were visible. The university issued a statement saying that the fire was brought under control within an hour.

Public security representatives stated that the director of the research project and the laboratory manager would be investigated for criminal negligence. The Ministry of Education and Beijing Jiaotong University also disciplined 12 university officials and comprehensive safety inspections were ordered at every stage of the production, sale, transportation, and storage of dangerous chemicals.

**Incident Database**: Explosion That Killed Three Beijing Students Attributed to Negligence



# GRAIN SILO DUST EXPLOSION IN CLINTON, IOWA

**JANUARY 5, 2019**
**One Fatality, One Injury**

## *BACKGROUND*

The grain processing facility is located in Clinton, Iowa, on the Upper Mississippi River. It is also served by the UP, CP, and BNSF railroads and has facilities for ground and covered storage. No public information is available about its processes.

## *INCIDENT DESCRIPTION*

Fire crews from the Clinton Fire Department went to the facility after receiving reports that a fire had ignited in a silo storage bin. Later reports suggest that a smoldering fire was discovered during efforts to clear a material bridge formation in the silo. There was initially some confusion between the owners, contractors and firefighters on the best way to put it out. The firefighters were in the process of extinguishing it when an explosion occurred, killing one firefighter and injuring another.

## *OUTCOME*

The fireman who died was a 33-year-old lieutenant in the Clinton Fire Department. On January 10, local news resources reported that the other fireman was in critical but stable condition. He recovered and was able to return to work on May 8.

The findings of the Occupational Safety and Health Administration (OSHA) were made public in July. They revealed that six serious citations totalling $55,894 had been filed against the company for violations that included lack of training, lack of communication, and lack of safety gear.

**Incident Database:** One Firefighter Killed and Another Injured By Grain Silo Dust Explosion

# WOODWORKING PLANT DUST EXPLOSION IN ANZEGEM, BELGIUM

**JANUARY 24, 2019**
**One Fatality, Three Injuries**

## BACKGROUND

The woodworking plant, which is located in Anzegem, Belgium, manufactures doors and windows for upscale residences and buildings. It employs 90 people in its 20,000m² facility. On January 24, a small fire had broken out in a silo. The following day, a cleaning company arrived to clear out the contents, which consisted of still-warm wood shavings.

## INCIDENT DESCRIPTION

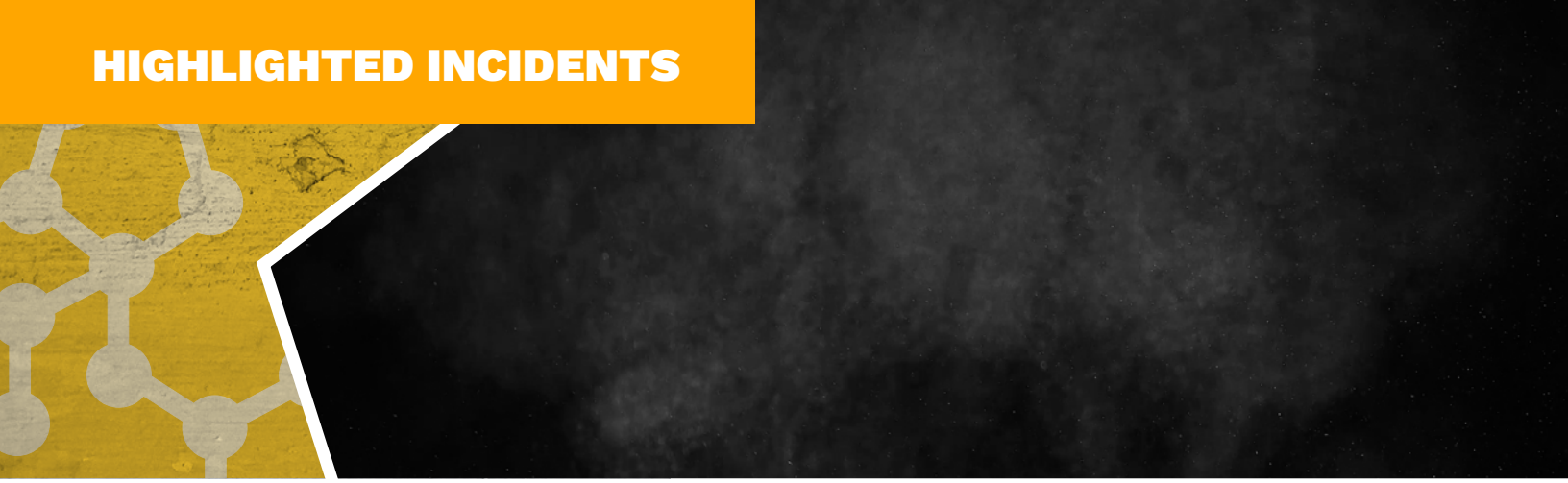
When a hatch was opened around four meters off the ground, oxygen came into contact with the smoldering shavings, causing a dust explosion and meter-high flash fire. Four cleaning company employees suffered severe burn injuries and were sent to the hospital.

One of the employees, a 24-year-old man, subsequently died. He was standing on the platform and fell when the fireball hit him. Of the remaining three, two had to be transferred to a burn center. Due to the seriousness of their injuries, they could not be immediately identified.

## OUTCOME

After the injured workers were removed, the fire department made a hole in the silo to enable a better extinguishing effort. The Ghent labor auditorium commenced a preliminary investigation into the incident, but the results were not made public.

**Incident Database:** One Person Dead and Three Injured in Dust Explosion at Woodworking Plant



# DUST COLLECTOR EXPLOSION AT BIOREFINERY IN CLOVERDALE, INDIANA

**JUNE 21, 2019**
**Two Injuries**

## *BACKGROUND*

The biorefinery is located in Cloverdale, Indiana, and produces 92 million gallons of ethanol per year. It processes approximately 31 million bushels of corn per year, with output including fuel and livestock feed for regional, national and international markets. At the time of the explosion, two truck drivers who were not employed by the facility were unloading corn.

## *INCIDENT DESCRIPTION*

The explosion occurred at around 12:30 p.m. in the grain-loading area of the facility. When the Cloverdale Township Fire Department arrived, firefighters located a smoldering fire in the dust collector and extinguished it. The two truck drivers were injured during the explosion and taken to an area hospital for treatment.

## *OUTCOME*

Both truck drivers were later released from the hospital. Details about their injuries and condition were not disclosed. The refinery general manager told media representatives that the fire following the explosion was quickly extinguished, but the overall facility damage was estimated at $1 million. No status update is available about repairs or impact on company operations.

**Incident Database:** Dust Explosion At Biorefinery Causes Over $1 Million In Damage

# ALUMINUM DUST EXPLOSION AT PIGMENT PLANT IN JÖNKÖPING, SWEDEN

**JUNE 7, 2019**
**Three Injuries**

## *BACKGROUND*

The metallic pigment production company is located in Huskvarna, Sweden. It employs 65 people and manufactures aluminum paste and powder in a modern process industry with 24-hour operation.

## *PROCESS OPERATIONS*

The manufacturing process includes milling the raw material in ball mills for 2-12 hours. To avoid dust explosions the process takes place in wet form with liquid naphtha applied. Drying is used to remove liquid from the powder.

If a completely dry product is needed, the aluminum must be vacuum dried and checked on shaker screens to remove lumps. Due to previous dust explosions, the vacuum drying process is done in a reduced oxygen concentration environment. Although this protects from explosions in the vacuum system, the material can still oxidize during the sieving step.

## *INCIDENT DESCRIPTION*

At the time of the explosion, a worker noticed that the transport container in which the powder aluminum falls after sieving was warm to the touch. When lifting the lid off the container, powder fell into material that was already burning causing an explosion. Three workers were taken to the hospital from the explosion.

**Continued on next page....**

## *OUTCOME*

After the explosion, the company introduced remote control to allow the operator to stand at a safe location when lifting the lid of the transport container. They also apply sectioning and placing of machines to avoid fire and deflagration spread, and regular cleaning to reduce the chance of workers being injured from fires and explosions.

The company was also involved in a industry project entitled “Dust explosion risks in the metalworking industry” with Swedish research groups such as RISE (Research Insitute of Sweden) and PS Group. The company not only shared lessons learned from explosion incidents at their facility, but also helped to constructor the SafeDustExplosion.org platform which is a knowledge center for sharing dust explosion best practices and prevention efforts in Sweden.

**Incident Database:** Dust Explosion at Metallic Pigment Plant Leaves Three Injured

## *FEATURED SPONSOR*

# BOILER EXPLOSION AT PHARMACEUTICAL FACILITY IN ANDHRA PRADESH, INDIA

**AUGUST 11, 2019**
**Two Fatalities, One Injury**

## *BACKGROUND*

The company involved was founded in 1986 and has five research centers that employ over 1560 scientists and analysts. Product areas include antibiotics, antiretrovirals, cardiovascular products, central nervous system products, gastroenterological products, and anti-allergics.

## *INCIDENT DESCRIPTION*

Local authorities reported that the explosion occurred when ash powder had blocked a boiler system. Three workers went to check on the problem when the explosion occurred. Local sources state that the explosion was caused by excess pressure in the boiler; however, it is unclear to what degree combustible fly ash may have contributed to the explosion and resulting injuries.

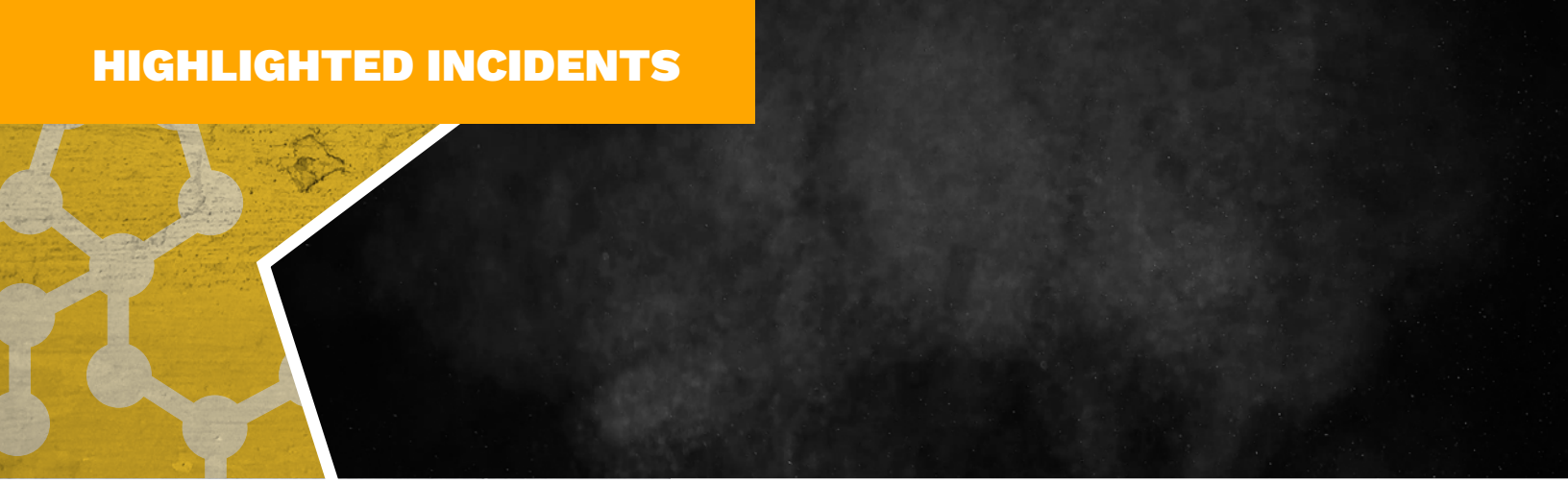
## *OUTCOME*

All three workers were directly impacted by the explosion and deflagration; two were killed instantly, while the third worker jumped out of a window, suffering severe injuries.

## *PREVIOUS INCIDENTS*

The pharmaceutical manufacturing unit in this incident has a long history of severe explosions in their boiler/reactor system: On December 14, 2016 a flash fire was reported at the facility that also killed two workers and injured another; On December 20, 2014 an explosion at the facility injured three workers; In January 2014 a reactor explosion injured three other workers; and on November 27, 2011 a reactor explosion severely burned three workers.

**Incident Database:** Two Workers Killed In Explosion at Pharmaceutical Manufacturing Plant



# GRINDER EXPLOSION AT DUTCH SPICE FACTORY IN OVERIJSSEL, THE NETHERLANDS

**SEPTEMBER 11, 2019**
**Three Injuries**

## *BACKGROUND*

The company involved is a family-run business that processes and sells herbs and spices. Raw materials are unloaded, stored, ground, and mixed on the premises before being packaged and distributed. The company, which is located in Wijhe in the Netherlands, has 12 employees and opened for business in 1974.

## *INCIDENT DESCRIPTION*

The incident started when a fire broke out in a processing machine around 2:30 p.m. It was followed by an explosion that blew away the building facade and a rolling door. Local new agencies stated that the cause of the explosion and resulting fire is believed to be a blockage in the herb grinder.

## *OUTCOME*

Three people were injured and transfered to a nearby hospital. One of the victims is said to have sustained significant burn injuries.

**Incident Database:** Three People Injured in Dust Explosion at Dutch Spice Factory

# BOILER EXPLOSION AT CEMENT PLANT IN CHITTORGARH, INDIA

**SEPTEMBER 29, 2019**
**Fifteen Injuries**

## *BACKGROUND*

The company involved has ten cement manufacturing units across India with a combined capacity of nearly 15.5 million tons per year. It was founded in 1919 and primarily engaged in cement manufacturing and jute goods.

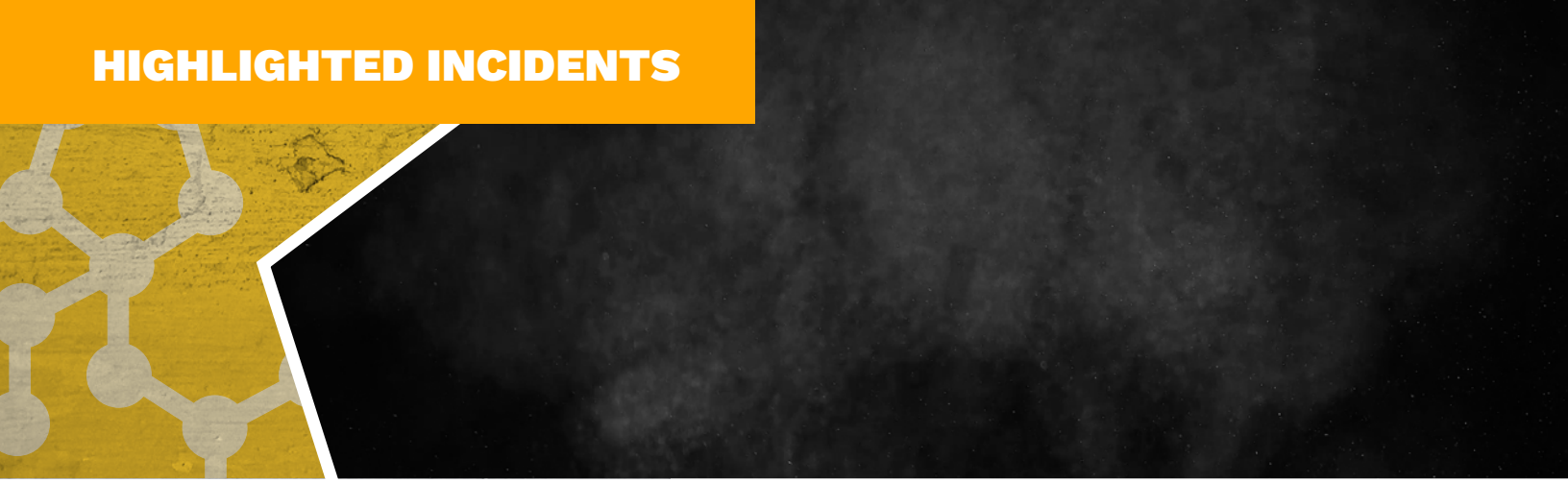
## *INCIDENT DESCRIPTION*

According to local news agencies a boiler explosion was reported at the cement plant on September 29, 2019. Police stated that coal caught fire as the temperature rose in the “coil plant” which led to the explosion. After the explosion burning coal fell on the personnel below causing a large degree of injury to the workers.

## *OUTCOME*

Fifteen workers in total were injured from the explosion and resulting deflagrations or fires. Eleven of them were in critical condition with burns over 70% of their body. Local authorities levied an inquiry into the explosion; however, details could not be found publicly.

**Incident Database:** Boiler Explosion at Cement Plant In India Leaves 15 People Injured



# COAL DUST EXPLOSION AT STEELMAKER IN DIVINÓPOLIS, BRAZIL

**DECEMBER 27, 2019**
**Two Fatalities, Two Injuries**

## *BACKGROUND*

The company involved is listed as a mining and metals facility, and is involved in metalworking operations. It was founded in 1995 and employs between 250 and 500 people.

## *INCIDENT DESCRIPTION*

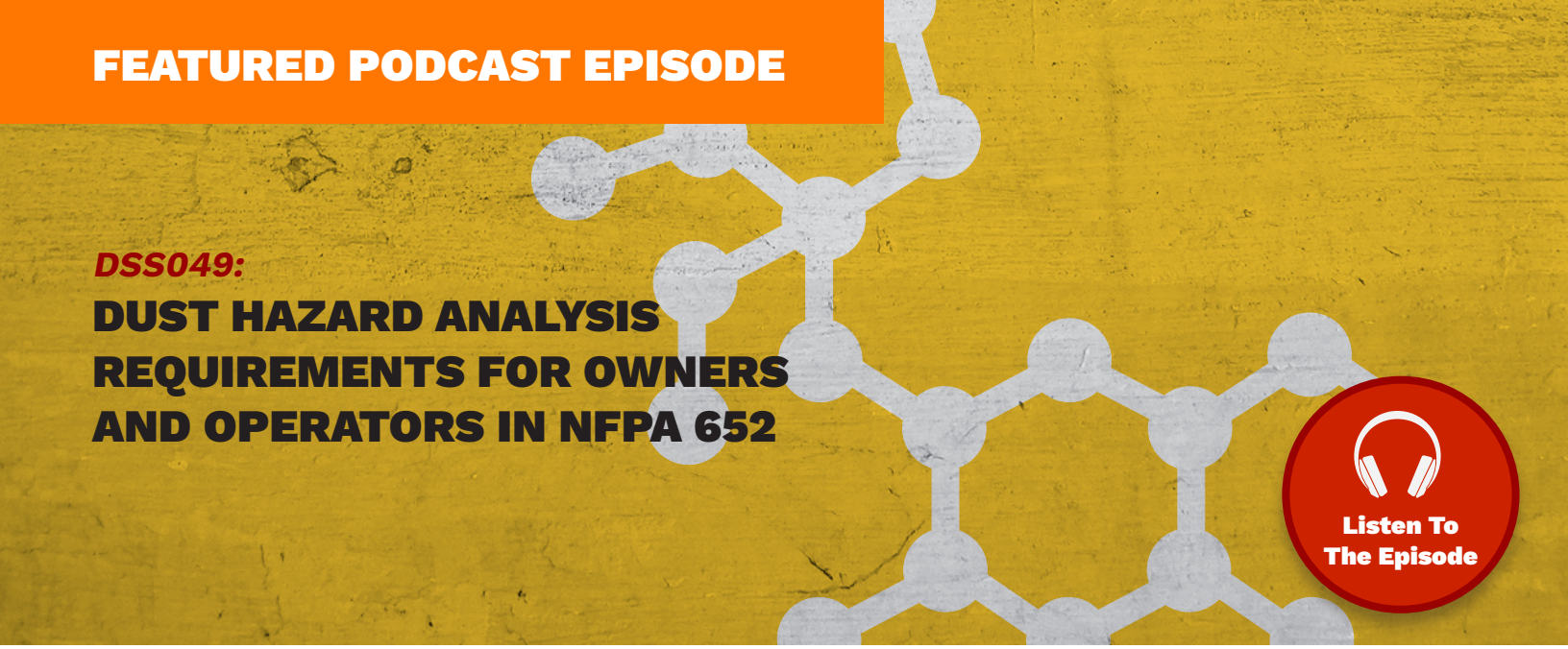
According to the fire department, a storage silo containing coal overheated causing an explosion that quickly spread to other areas of the facility. Representatives stated that company employees had failed to open a mechanism that acts as a relief valve. A team of 17 firefighters worked for four hours to get the fire under control.

## *OUTCOME*

Three workers were injured in the explosion. One had burns to 80% of their body, one had burns to 90% of their body and the other had burns to his eyes. One injured worker passed away at hospital almost immediately while another died a week after the explosion. The police stated that an inquiry has been opened to investigate the cause of the incident.

**Incident Database:** Two People Killed And Two Injured After Explosion At Steelmaker

# FEATURED PODCAST EPISODE




## *DSS049:*
## DUST HAZARD ANALYSIS REQUIREMENTS FOR OWNERS AND OPERATORS IN NFPA 652

**Have you listened to the Dust Safety Science podcast yet?**

Below is a copy of the show notes from a past episode to give you an idea of what is typically covered. We regularly feature interviews with combustible dust experts around the world, how the most recent research is integrated into industry application and the latest developments in best practice, engineering guidance and regulation.

## *INTRODUCTION*

In this episode of the Dust Safety Science Podcast, we're talking about dust hazard analysis requirements for owners and operators as specified in NFPA 652. NFPA 652 is the central document.

NFPA 652 is the central document for the prevention of combustible dust explosions and fires. There are also standards that are specific to certain commodities and industries:

- NFPA 61 for fires and dust explosions in agricultural and food processing facilities
- NFPA 655 for sulphur fires and explosions
- NFPA 484 for combustible metals
- NFPA 664 for wood processing and woodworking facilities
- NFPA 654 for combustible particulate solids

## *WHAT ARE THE REQUIREMENTS FOR OWNERS AND OPERATORS?*

NFPA 652 imposes certain requirements on owners and operators of facilities that handle combustible dust.

***Hazard Identification***
Chapter 4, Section 4.1 and Chapter 5 indicate that those responsible for facility operations must know the combustibility and deflagration properties of materials, either by testing them or looking at historical data.

Chapter Seven of NFPA 652 covers the requirement to identify and assess any fire, flash fire, and explosion hazards. Its opening sections feature important points of consideration for owners and operators.

- 7.1.1 states that a dust hazard analysis (DHA) must be completed for all new processes and facility compartments.
- 7.1.2 specifies that DHAs must be carried out for all existing processes and facility compartments by September 7, 2020.
- 7.1.3 indicates that an absence of previous incidents will not be used as a reason for not performing a DHA.
- 7.1.4 states that DHAs shall be reviewed and updated every five years.

***Dust Hazard Analysis***
By September 7, 2020, a DHA must be carried out on all processes in facilities handling combustible dust. Although the NFPA 652 documentation does not specify how to do a DHA, Annex B provides a good example using a typical powder processing operation.

There are different methods for carrying out a DHA:

- Node-based analysis
- 'What if' analysis
- Checklist-based
- Hazard and operability (haz-op) study

Owners and operators should work with a combustible dust expert or a specialist in the field to come up with the best approach for their facility.

## WHAT IS INCLUDED IN A DUST HAZARD ANALYSIS?

The NFPA 652 guidance states that a DHA is a systematic review to identify and evaluate the potential fire, flash fire or explosion hazards associated with the presence of one or more combustible dust or combustible particulate salts in a processing facility. It will likely include the following:

- Identification and evaluation of locations where hazards exist.
- Identification and evaluation of specific hazards scenarios.
- Identification of existing safeguards.
- Recommendations of additional safeguards where warranted.
- A plan for implementation of additional safeguards.

In the body of the NFPA 652 documentation, it states that each part of the process shall be evaluated. This means all equipment and each line between equipment units (such as conveyors and ducts) and each building or building compartment shall be evaluated.

The annex provides guidance on what could or should constitute a process, building or compartment, such as ducts, conveyors, silos, bunkers and hidden areas above drop ceilings. It also states that the elimination of accumulated fugitive dust is critical and one of the most important criteria for a safe workplace.

## WHO CAN PERFORM A DHA?

NFPA 652 specifies who can perform a DHA. Section 7.2.2 stated that it must be performed or led by a qualified person. According to the definition in the front matter, this is someone "who, by possession of skill, recognized degrees, certificate of professional standing or who, by knowledge, training, and experience, has demonstrated the ability to deal with the problems related to the subject matter, the work or the project."

The annex material expands on this definition, stating that the person should be familiar with conducting a DHA and the hazards of combustible dust. It also says that a team should be involved. For a small process, this could be a two-person team consisting of a combustible dust expert and someone from the processing operation who is familiar with its operation, maintenance, and any history of previous incidents.

The subject of a qualified person has been discussed in previous episodes of the podcast, specifically Episode #12 with Jason Reason and #15 with Michael Marrington, who recommended the implementation of a system that certifies people to do DHAs.

## CONCLUSION

How do we start making facilities safer? If we focus on the incident sequences (in particular, the fugitive dust accumulations), it may be possible to prevent a single fire or explosion from escalating into a disaster. Perhaps the biggest component, however, is doing a dust hazard analysis. With DHAs becoming mandatory on September 7th, 2020, they will be a key driver in outlining facility risks and developing ways to improve safety.

See links to all of the resources mentioned in this episode on the podcast page: **DSS049: Dust Hazard Analysis Requirements for Owners and Operators in NFPA 652**

## CHECK OUT SOME OF OUR MOST POPULAR PODCAST EPISODES LAST YEAR

- **DSS033: Explosion and Fire Safety in 3D Printing Applications with Jason Reason**
- **DSS037: Minimum Layer Thickness Requirements for Combustible Dust With Jeramy Slaunwhite**
- **DSS040: How to Run Effective Dust Explosion Training Sessions With Dr. Chris Bloore**
- **DSS041: The Five Critical Elements of a Great Dust Hazard Analysis Report with David Hakes**


## *DSS076:*
# CASE STUDY – NYLON FLOCK EXPLOSION IN THE TEXTILE INDUSTRY

## *NOT SURE HOW COMBUSTIBLE DUST SAFETY APPLIES TO YOU?*

This year we started a series of podcast episodes focused on detailed case studies from previous dust fire and explosion incidents. Below is a copy of the show notes from an episode focused on a "non-traditional" combustible dust - nylon fibres from an electrostatic flocking process.

See the list of all case study episodes given on Page 25 or visit the podcast homepage to see what other episodes we have recorded (almost 100 to date!).

## *INTRODUCTION*

In this episode of the DustSafetyScience Podcast, we examine a case study for a nylon flock explosion in the textile industry.

The nylon flock explosion happened in the north of Italy in 2001. The investigation was featured in a journal paper titled "Case study of a nylon fibre explosion: An example of explosion risk in a textile plant" by Dr. Luca Marmo, which was published in 2010 in Volume 23 of the *Journal of Loss Prevention In The Process Industries.*

As we review the case, we answer the following questions:

- What is nylon flock?
- What does the flocking process look like?
- What did the facility look like?
- What did the investigation find?
- What caused the explosion?
- Why was there no explosion protection?

## *WHAT IS NYLON FLOCK?*

Nylon flock is created using an assortment of small fibers that range from half a millimeter to one millimeter in length and generally have a 10 to 100-micron thickness. They are applied to a central core to create a fuzzy textile material for applications like noise reduction, insulation, and surface protection.

## *WHAT DOES THE FLOCKING PROCESS LOOK LIKE?*

During the flocking process, plant operators take a ream of these long threads, dye them to the desired color, cut them, and apply them to a nylon core using an electrostatic field.

After a drying process, the flocked material is ready for use.

## *WHAT DID THE FACILITY LOOK LIKE?*

At the facility where the incident happened, there were three parallel drying lines. Drying line one and two processed 163 of these core threads at a time while the third dryer processed 120 of these threads at the same time.

Each of the dryers is quite large: 14 meters long, two meters wide, and six meters high, with multiple sections. They have a lower part where the incoming freshly-created flock flows in with the warm air that goes through the section twice before travelling to the upper section. The flock continues to dry in the hot air, which is heated through a heat exchanger system at 270 degrees Celsius.

There is also ducting at the top of the system that leads

to the dust collector system, which consists of a dust collector with 12 bag filters, each with a 30-centimetre inner diameter. This system receives air from the in-flow line where the freshly-flocked fibres are located.

The last thing is that each of the dryers has eleven inspection doors. We'll see that this played an important role in the actual explosion as well in the injury to the workers.

## WHAT DID THE INVESTIGATION FIND?

In terms of the investigation, the authors of the paper- covered multiple areas, including:

- Witness statements
- The properties of the flock material
- Post-explosion damage to the facility
- The process that led to the explosion

Witness statements indicated that at approximately 4:10 a.m. on the morning of the explosion, one worker noticed some broken threads in dryer number two. They then followed the standard procedure, which was to shut down the dryer to retie core threads. This process turns off the fans or shuts the fans and the valves that control the heating medium, but the heating system is still hot inside the dryer.

At around 5:45 p.m., with everything being done, employee number two started to close the inspection doors to the dryer and employee number one went to turn on the line. When he turned it on, the explosion happened immediately.

A deflagration propagated throughout the dryer system. Flames spread throughout the facility, burning employee number one, who was at the control board. Employee number two was still closing the dryer doors when he was knocked down and suffered severe burns. Another employee was also injured during the explosion and flash fires that followed.

The investigators also looked at the properties of the flocking material. They measured these properties using standard testing apparatus like the 20-litre chamber and determined that the minimum explosible concentration for the flocking material was 70 to 80 grams per meter cubed, which is a similar concentration as many combustible dusts.

They did a thermogravimetric analysis to determine if the flock could release flammable gases at the heats that were found, and concluded that at 270 degrees Celsius, the nylon flock did release some combustible gases.

Examination of post-explosion damage included a look at the dryer assembly, dust collection system, and related areas. Burnt nylon flock was found throughout the entire dryer assembly, which indicates where the deflagration took place and propagated. Thick layers of melted nylon material appeared in the upper part of dryer number two inside the ducts, leading back to the dust collection system.

Other observations included:

- One of the bags was detached in the battery of bags in the dust collector and had been for quite a long time before the incident happened.
- A lot of melted flock was on top of the heat exchanger inside that dryer, giving an idea of where the explosion originated.
- Every inspection door was open in the dryers, even though the employee had closed them. This suggests that the dryers experienced overpressure, which caused the doors to open. They did not have any explosive protection on them, so the incident could have been more severe had those doors not been able to open.
- A large hole was found in the ducting where the deflagration had come out of the side. Drops of plastic were found in an 18 by 18-meter radius, giving a good idea of how large the fireball had been.
- They found the building itself suffered only minor damage. All glass was broken, but there was little structural damage to the roof or to the beams in the columns of the facility because it is much larger than the dryers in which the explosion happened.

## WHAT CAUSED THE EXPLOSION?

The authors proposed two ignition processes that could have occurred when the dryer was turned on after being turned off for the hour and a half.

1. There could have been smouldering combustion in the nylon flock that settled on the heat exchangers. When the dryer was turned back on, fresh oxygen flowing through the system could have ignited either the flock material in the vicinity of the smouldering

combustion or even combustion gases that have been released from the flock material.
2. Electrostatic discharge inside the dryer ignited either the flock material itself or a hybrid mixture of the flock material and the combustible gases released.

By looking at factors like the damage between the ducting and the dust collector, the fact that all the dryers were pressurized and that the inspection doors were open, they came up with the following likely sequence of events.

A primary explosion occurred in the upper part of dryer number two due to one of the ignition processes above. It then ignited a secondary explosion in the flock material, with flames propagating throughout the ductwork above the dryer.

Since the flame front couldn't propagate through the bag filter, it reverted and went in three different directions: two travelled back to the other dryers, pressurizing them and forcing the inspection doors open while the third ejected out the side of the ductwork into the facility, injuring employee number one. Employees number two and three were injured by the explosions and flames that ejected from dryer number two.

## WHY WAS THERE NO EXPLOSION PROTECTION?

There was no venting or supression installed at the facility, nor was there isolation between the equipment. A risk assessment had been done at the facility, but it had never regarded the flocking material as a combustible dust hazard. No one was aware that these fibres could explode and propagate a deflagration when suspended as a cloud.

This lack of awareness is concerning, especially during these critical times. Due to the COVID-19 pandemic, a lot of facilities are either partially shut down or shutting down their operations completely. When they come back online, what steps are being followed to resume operations safely and avoid fires and explosions?

In addition to taking startup precautions, facilities need to obtain expert testing, because materials are quite difficult to assess under the standard testing conditions. A different process needs to be followed to identify things like KSt and minimum explosible concentration, and creating this process requires expertise.

## CONCLUSION

Dealing with nontraditional dusts (a term coined by Dr. Paul Amyotte) can be an uphill battle because their explosive nature is not widely recognized, even despite events like this nylon flock explosion and a 2017 incident at a flocking facility in Leominster, Massachusetts. A willingness to overcome complacency and take a different approach is the best way to move forward.

See links to all of the resources mentioned in this episode on the podcast page: DSS076: Case Study – Nylon Flock Explosion in the Textile Industry

## WANT MORE CASE STUDIES? CHECK OUT OUR FULL LIST OF CASE STUDY EPISODES BELOW.

- **DSS069: Case Study – Dust Explosion in a Fish Meal Factory in Norway in 1975**
- **DSS071: Case Study – Metal Dust Explosion in a 3D Printing Application in 2013**
- **DSS074: Case Study – Insufficient Venting During Sawdust Silo Explosion Leads to Fatality**
- **DSS078: Case Study - Grain dust explosion in a milling facility with Dr. Suzanne Smyth**

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BakerRisk® provides its clients with cost-effective solutions to manage their risk exposures. For over 30 years, clients have benefited from the knowledge and experience of its professionals, its innovative research programs, and its customized engineering analyses. BakerRisk is a leader in the provision of dust hazard analysis (DHAs), incident investigation and strategic management of catastrophic industrial hazards in the particulate solids handling industries.

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**InDust, LLC.**

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### SpaceVac International

*Unit 3 JBJ Business Park,*
*Northampton Road Blisworth,*
*Northants, United Kingdom,*
*NN7 3DW*

*Phone: +0 1604 968 668*
*Email: info@spacevac.us*

SpaceVac is the world's leading high-level cleaning system – enabling operators to remove high-level dust from inaccessible areas from the safety of the ground floor. SpaceVac's innovative cleaning technology can be brought into hazardous and explosive atmospheres using our ATEX certified conductive cleaning system.

### Tiger-Vac, Inc.

*11 S.W. 12th Ave. #112*
*Dania, Florida 33004*

*Phone: 1-800-668-4437*
*Email: sales@tiger-vac.com*

With over forty years of experience, Tiger-Vac has successfully established itself in the International Market as a manufacturer of high-quality Explosion Proof, Industrial and Cleanroom Vacuum Cleaner Systems.

### XP Products

*800 West 5th Ave, Suite 201G*
*Naperville, IL 60563*

*Phone: (630) 464-3800*
*Email: engineering@xpproducts.com*

The XP Products Explosion Proof Drum Kit is an innovative alternative to traditional rotary valves for providing a means of explosion isolation. In addition, XP Products DHA services group specializes in protecting your facility from the effects of combustible dust explosions.

**YOUR COMPANY HERE**

*Want to connect with industries handling combustible dust?*

*Advertise with us at Dust Safety Science and the Dust Safety Academy!*

Email marketing@dustsafetyscience.com to inquire about current availability.

## SPONSOR CASE STUDIES

*IEP Technologies*

***Case Study: Cost Effective and User-Friendly Passive Explosion Protection for the Wood Industry*** *(PDF)*

*Fike Corporation*

***Dust Collector Hazards: Explosion Protection Solutions in Powder-Handling Processes*** *(PDF)*

## UPCOMING EVENTS & TRAINING

*ExNB Certification Insitute*


***ExAM Personal Competency Assessment - Global Training Providers Needed***

View the Community Events & Training calendar here.

## WOOD & WOOD PRODUCTS

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 27 | Ameriwood | Dowagiac, MI | Explosion | Wood Dust | 0 | 0 | Auger System | No Details | |
| Jan 22 | American Wood Fibers Inc. | Circleville, OH | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Feb 14 | Santiam Cabinets | Albany, OR | Explosion | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Mar 12 | Millville Lumber Company | Snow Hill, MD | Fire | Wood Dust | 0 | 0 | Sawdust Shed | No Details | |
| Mar 15 | Fiber Energy Products | Mountain View, AK | Fire | Wood Dust | 2 | 0 | Unknown | No Details | |
| Mar 24 | Plummer Forest Products | Post Falls, ID | Fire | Wood Dust | 0 | 0 | Unknown | $1 million | |
| Mar 27 | Masonite PrimeBoard | Wahpeton, ND | Explosion | Wood Dust | 0 | 0 | Tank | No Details | |
| Apr 9 | Graf Brothers Flooring | South Shore, KY | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Apr 10 | DT Fowler | Lapeer, MI | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Apr 18 | Soapstone Sawmill | Peach Bottom, PA | Fire | Wood Dust | 2 | 0 | Exhaust Manifold | No Details | |
| Apr 22 | Unknown | Buffington Township, PA | Fire | Wood Dust | 0 | 0 | Conveyor Belt | No Details | |
| Apr 26 | The Velvet Mill | Stonington, CT | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| May 2 | Gutchess Hardwood | Unity Township, PA | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| May 12 | New England Wood Pellet | Jaffrey, NH | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| May 29 | Thomson Georgia Pacific | Thomson, Georgia | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| Jun 9 | Unknown | San Leandro, CA | Explosion | Sawdust | 1 | | Hopper | No Details | |
| Jun 16 | Pacific Fibre | Longview, WA | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Jun 20 | Pride Man. Company | Burnham, ME | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| Jun 27 | Timber Products | Grants Pass, OR | Fire | Wood Dust | 0 | 0 | Ductwork | No Details | |
| Jul 2 | McCormick Sawmill | Fountain, MI | Explosion | Wood Dust | 0 | 0 | Sawmill | No Details | |
| Jul 11 | Roseburg Forest Products | Simsboro, LA | Explosion | Wood Dust | 0 | 0 | Dryer System | No Details | |
| Jul 17 | Lignetics of Maine | Strong, ME | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| Jul 15 | Watt Logging Company | Brockway, PA | Fire | Sawdust | 0 | 0 | No Details | No Details | |
| Jul 30 | Fairview Mills | Centerview, MO | Explosion | Grain Dust | 0 | 0 | Processing Equipment | No Details | |
| Aug 2 | Timber Products Company | White City, OR | Explosion | Wood Dust | 0 | 0 | Hopper | No Details | |
| Aug 7 | Vixen Hill | Elverson, PA | Explosion | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Aug 2 | Unknown | Salem, VA | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Aug 27 | Weyerhaeuser | Columbia Falls, MT | Explosion | Wood Dust | 4 | 0 | Unknown | No Details | |
| Sep 2 | West Fraser | Perry, FL | Fire | Wood Dust | 0 | 0 | Dry Kiln | No Details | |
| Sep 4 | Northwoods Lumber Co. | Vilas County, WI | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| Sep 4 | Unknown | Arbor Vitae, WI | Fire | Unknown | 0 | 0 | Silo | No Details | |
| Sep 12 | Unknown | Dundee, OH | Fire | Sawdust | 0 | 0 | Silo | No Details | |
| Sep 27 | Salem Frame Company | Salem, VA | Fire | Wood Dust | 1 | 0 | Dust Col. | No Details | |
| Oct 5 | Southern Finishing Co. | Martinsville, VA | Fire | Sawdust | 0 | 0 | Dustbin | No Details | |
| Oct 9 | Custom Woodworking | Good Thunder, MN | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Oct 15 | Masonite PrimeBoard | Wahpeton, ND | Fire | Wood Dust | 0 | 0 | Dryer | No Details | |

## WOOD & WOOD PRODUCTS CONTINUED

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Oct 19 | Timber Products Company | Medford, OR | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Nov 13 | Curran Renewable Energy | Massena, NY | Fire | Wood Dust | 0 | 0 | Hopper | No Details | |
| Nov 16 | Vicksburg Forest Products | Vicksburg, MS | Fire | Wood Dust | 0 | 0 | Conveyor Belt | No Details | |
| Nov 16 | Southern Softwoods, Inc. | Lakeland, FL | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Nov 26 | Anthony Oak Flooring | Magnolia, AR | Fire | Wood Dust | 0 | 0 | Hopper | No Details | |
| Dec 9 | Georgia-Pacific Building Prod. | Alcolu, SC | Explosion | Wood Dust | 1 | 0 | Ductwork | No Details | |
| Dec 21 | Wood Products Inc. | Grand Forks, ND | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Dec 31 | Northeast Pellets | Ashville, ME | Fire | Wood Dust | 0 | 0 | Conveyor Belt | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 44 | FIRES: 33 | EXPLOSIONS: 11 | INJURIES: 11 | FATALITIES: 0**

## AUTOMOTIVE & METAL WORKING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT. | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 3 | Global Titanium, Inc. | Detroit, MI | Explosion | Titanium Dust | 3 | 0 | Shredding Machine | No Details | |
| Jan 3 | Mercury Marine | Fond du Lac, WI | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Jan 14 | Custom Alloy | High Bridge, NJ | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Jan 22 | Nikkei MC Aluminum America Inc. | Columbus, IN | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 1 | Racine Metal-Fab | Sturtevant, WI | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 4 | Capacity Trucks | Longview, TX | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 15 | IntoMetal Company | Lincoln, NE | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 21 | Royal Green LLC | Reading, PA | Fire | Metal Dust | 0 | 0 | Conveyor Belt System | No Details | |
| Mar 13 | Cooper Standard Automotive | Auburn, IN | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Apr 25 | LJT Tennessee | Chattanooga, TN | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Apr 30 | M&M Sheet Metal | Williamsport, PA | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| May 20 | Kawasaki Motors Man. Corp. | Lincoln, NE | Fire | Metal Dust | 0 | 0 | Vent. Pipe | No Details | |
| Jul 23 | Saginaw Metal Casting Op. | Saginaw, MI | Fire | Metal Dust | 0 | 0 | Casting Machine | No Details | |
| Jul 30 | Birmingham Hot Metal Coatings | Birmingham, AL | Explosion | Metal Dust | 0 | 0 | Unknown | No Details | |
| Aug 15 | Selmet, Inc. | Albany, OR | Explosion | Metal Dust | 2 | 0 | Furnace | No Details | |
| Aug 28 | Unknown | Sherrill, NY | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Sep 20 | Unknown | Mason, MI | Fire | Metal Dust | 0 | 0 | Cable Trays | No Details | |
| Oct 8 | Dicastal North America | Greenville, MI | Fire | Aluminum Dust | 0 | 0 | Dust Col. | No Details | |
| Nov 7 | Industrial Hard Chrome | Geneva, IL | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Nov 11 | Lycoming Engines | Williamsport, PA | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Nov 19 | OMCO Manufacturing | Pierceton,, IN | Fire | Metal Dust | 0 | 0 | Dust Col. | $1,000 to $1,500 | |

**INCIDENT SUMMARY - INCIDENTS: 21 | FIRES: 18 | EXPLOSIONS: 3 | INJURIES: 5 | FATALITIES: 0**

## AGRICULTURE

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 2 | Anderson Hay & Grain Co. | Aurora, OR | Fire | Hay Dust | 0 | 0 | Unknown | No Details | |
| Jan 3 | Riceland Foods, Inc. | Fair Oaks, AR | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Jan 4 | ADM | Decatur, IL | Explosion | Grain Dust | 0 | 0 | Conveyor Belt | No Details | |
| Jan 5 | ADM Grain | Clinton, IA | Explosion | Grain Dust | 1 | 1 | Storage Bin | No Details | |
| Jan 10 | Terry Jones Farm | Trenton, NY | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Jan 13 | Meadowland Farmers Coop. | Walnut Grove, MN | Fire | Grain Dust | 0 | 0 | Conveyor Belt | No Details | |
| Jan 22 | Wolfe-Reece & Lynch Mill | Boonville, SC | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Jan 25 | Heartland Cooperative | Wausau, WI | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Jan 30 | Baden Farm | Bowling Green, OH | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Feb 11 | Interstate Grain Port Ter. | Corpus Christi, TX | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Feb 24 | 2610 Grand Avenue | Roachdale, IN | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Mar 19 | Consolidated Grain & Barge | Clayton, IA | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Apr 1 | Centerra Co-Op | Mansfield, OH | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Mar 27 | Rhea Cattle Company | Arlington, NE | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Apr 1 | Hoffman Farms | Huntingburg, IN | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Apr 27 | Ag Valley Co-op | Edison, NE | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Apr 30 | Crystal Feeds | Oakwood, GA | Explosion | Grain Dust | 0 | 0 | Travel Chute | No Details | |
| May 2 | Gavilon Grain | Kearney, NE | Fire | Grain Dust | 0 | 0 | Grain Dryer | $26,000 | |
| May 2 | M&M Milling | Brookhaven, MS | Explosion | Corn Cob Dust | 0 | 0 | Silo | No Details | |
| May 9 | ADM Grain | Decatur, IL | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| May 16 | Synergy Cooperative | Elk Mound, WI | Explosion | Fertilizer Dust | 0 | 0 | Fertilizer Leg Pipe | No Details | |
| Jun 10 | New Vision Cooperative | Brewster, MN | Explosion | Grain Dust | 1 | 0 | Silo | No Details | |
| Jun 9 | Cargill | Houston, TX | Fire | Grain Dust | 4 | 0 | Silo | No Details | |
| Jun 14 | Ag Partners | Sheldon, IA | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Jun 27 | CHS Pekin | Pekin, IL | Explosion | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Jul 23 | Deluxe Feeds, Inc. | Sheldon, IA | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Sep 1 | Unknown | Berks, PA | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Aug 23 | Central Valley Ag Grinding, | Oakdale, CA | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Aug 26 | Unknown | Westgate, IA | Fire | Unknown | 0 | 0 | Unknown | No Details | |
| Aug 14 | Unknown | Sandwich, IL | Fire | Unknown | 0 | 0 | Silo | No Details | |
| Aug 12 | Natural Blend | Farmville, NC | Fire | Sweet potato | 0 | 0 | Dryer | No Details | |
| Aug 7 | ADM | Fremont, NE | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Sep 4 | Unknown | Maria Stein, OH | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Sep 9 | Jennie-O Turkey | Barron, WI | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Sep 9 | Phoenix Feeds & Nutrition | Brandon, VT | Fire | Grain Dust | 0 | 0 | Unknown | No Details | |

**AGRICULTURE CONTINUED**

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Sep 23 | Vermont Timberworks | Springfield, VT | Fire | Sawdust | 0 | 0 | Dumpster | No Details | |
| Oct 1 | Legacy Farmers Co-Op | Custar, OH | Explosion | Grain Dust | 0 | 0 | Silo | No Details | |
| Oct 15 | Unknown | Palmyra Township, IA | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Oct 22 | Unknown | New Liberty, IA | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Oct 22 | Knott Grain Elevator | Winona, WA | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Oct 22 | Unknown | Blair, NE | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Oct 20 | ADM Grain | Decatur, IL | Fire | Grain Dust | 0 | 0 | Metal Tank | No Details | |
| Oct 23 | Unknown | Loraine, IL | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Oct 28 | Unknown | Manlius, IL | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Oct 25 | Unknown | Albion, WI | Fire | Grain Dust | 0 | 0 | Grain Dryer | $100,000 | |
| Oct 30 | Hansen-Mueller | Sioux City, IA | fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Oct 31 | Braskamp Farms | Fox Lake, WI | fire | Grain Dust | 0 | 0 | Grain Bin | $50,000 | |
| Nov 1 | Beck's Hybrids | Atlanta, IN | Fire | Grain Dust | 0 | 0 | Conveyor Belt | No Details | |
| Nov 1 | Unknown | Liberty Township, OH | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 3 | Unknown | Blanchard, ND | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 3 | Brehm Farms | Arcanum, OH | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Nov 2 | Unknown | Norwalk, OH | Fire | Grain Dust | 0 | 0 | Grain Dryer | $5,000 | |
| Nov 4 | Kingsbury Elevator | La Porte County, IN | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Nov 5 | Sunrise Cooperative Inc. | South Charleston, OH | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 4 | Unknown | Kenesaw, NB | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 5 | Unknown | Fitchburg, WI | Fire | Corn Dust | 0 | 0 | Silo | No Details | |
| Nov 6 | Unknown | Le Mars, IA | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 6 | ADM Farmview | Rensselaer, IN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 7 | Fox Farms | Pendleton, SC | Fire | Fertilizer | 1 | 0 | Hopper | No Details | |
| Nov 8 | Bonucci Farms | Princeton, IL | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 8 | Unknown | Oto, IA | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Nov 7 | Midwest Grain and Barge | Scott City, MO | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Nov 7 | Unknown | Belle Plaine, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | $30,000 | |
| Nov 10 | Unknown | Ansonia, OH | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Nov 11 | Ag First Farmers Co-op | Volga, SD | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 15 | Cargill Turkey Prod. LLC | Temple, TX | Fire | Grain Dust | 0 | 0 | Grain Hopper | No Details | |
| Nov 14 | Unknown | Ashby, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 17 | Witmer's Feed & Grain | Damascus, OH | Fire | Grain Dust | 0 | 0 | Grain Dryer | $55,600 | |
| Nov 19 | Midwest Grain and Barge | Scott City, MO | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Nov 18 | Millville Feed Inc. | Millville, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |

## AGRICULTURE CONTINUED

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Nov 16 | Unknown | Elkton, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 15 | Riverside Farms | Hawarden, IA | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Nov 19 | Unknown | Warren, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 26 | Unknown | Grimes, IA | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 26 | Unknown | Stratford, SD | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 28 | Hamlin Farms | South Haven, MI | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Dec 7 | Unknown | Malinta, OH | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Dec 9 | Unknown | Clay County, MN | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Dec 13 | Unknown | Suffolk, VA | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Dec 15 | Unknown | Chesaning, MI | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Dec 30 | Rosenfeld Farm | Downsville, TX | Fire | Cotton Dust | 0 | 0 | Unknown | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 81 | FIRES: 70 | EXPLOSIONS: 11 | INJURIES: 7 | FATALITIES: 1**

## FOOD PROCESSING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 30 | Riviana Foods | Freeport, TX | Explosion | Rice Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 5 | Post Consumer Brands | Jonesboro, AR | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Mar 17 | FruitSmart | Grandview, WA | Fire | Fruit Seed Powder | 0 | 0 | Dust Col. | $2,000 | |
| Apr 16 | Kellogg's | Battle Creek, MI | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Jun 19 | Kellogg's | Battle Creek, MI | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Jun 24 | Perdue Farms | Lothian, MD | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Jul 15 | ADM | Decatur, IL | Fire | Grain Dust | 0 | 0 | Unknown | $100,000 | |
| Jul 23 | Deluxe Feeds, Inc. | Sheldon, IA | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Feb 1 | ADM | Lincoln, NE | Explosion | Grain Dust | 3 | 0 | Unknown | No Details | |
| Oct 17 | Cargill (Dodge City) | Dodge City, KS | Explosion | Blood Meal | 2 | 0 | Unknown | No Details | |
| Nov 12 | PBM Covington LLC | Covington, OH | Fire | Baby Formula | 0 | 0 | Waste Disposal System | No Details | |
| Nov 15 | Double S Dairy | Alto, WI | Fire | Grain Dust | 0 | 0 | Grain Dryer | $210,000 | |
| Nov 8 | Tyson Foods | Portland, IN | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Dec 5 | Trillium Farms | Grand Township, OH | Fire | Grain Dust | 0 | 0 | Grain Bin | No Details | |
| Dec 9 | ADM | Decatur, IL | Fire | Grain Dust | 0 | 0 | Unknown | No Details | |
| Dec 11 | Nestlé USA | Burlington, WI | Fire | Powdered Chocolate | 0 | 0 | Dust Col. | No Details | |
| Dec 13 | Hostess Brands, Inc. | Emporia, KS | Fire | Flour Dust | 0 | 0 | Vents | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 17 | FIRES: 13 | EXPLOSIONS: 4 | INJURIES: 5 | FATALITIES: 0**

# CDI DATA UNITED STATES

## PULP & PAPER

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 9 | Marcal Paper Mills, LLC | Elmwood Park, NJ | Fire | Paper Dust | 0 | 0 | Dust Col. | No Details | |
| Jan 29 | Huhtamaki Paper Products | Waterville, ME | Fire | Paper Dust | 1 | 0 | Drying Machine | $1,000,000 | |
| Jan 30 | Marcal Paper Mills, LLC | Elmwood Park, NJ | Fire | Paper Dust | 0 | 0 | Unknown | No Details | |
| Feb 21 | Verso Paper Mill | Bucksport, ME | Fire | Sawdust | 0 | 0 | Dust Col. | No Details | |
| Feb 26 | Marcal Paper Mills, LLC | Elmwood Park, NJ | Fire | Unknown | 0 | 0 | Unknown | No Details | |
| Mar 17 | SCA Tissue North America | South Glens Falls, NY | Fire | Paper Dust | 0 | 0 | Conveyor Belt | No Details | |
| Mar 18 | WestRock | Florence, SC | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |
| Apr 17 | Green Bay Packaging | Green Bay, WI | Fire | Paper Dust | 0 | 0 | Dust Col. | No Details | |
| Jun 3 | Resolute Forest Products | Thunder Bay, ON | Fire | Paper Dust | 0 | 0 | Dust Col. | No Details | |
| Jun 6 | Monadnock Paper Mills Inc. | Bennington, NH | Fire | Paper Dust | 0 | 0 | Fan | $20,000 | |
| Jun 6 | IP Paper Recycling | Kent, WA | Fire | Paper Dust | 0 | 0 | Conveyor Belt | No Details | |
| Aug 23 | Mercury Paper | Strasburg, VA | Fire | Paper Dust | 0 | 0 | Unknown | No Details | |
| Sep 26 | Hayter Printing | Morristown, TN | Fire | Cardboard Dust | 0 | 0 | Dust Col. | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 13 | FIRES: 13 | EXPLOSIONS: 0 | INJURIES: 1 | FATALITIES: 0**

## SCHOOLS AND EDUCTIONAL FACILITIES

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 8 | Timpview High School | Provo, UT | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 19 | Kershaw Correctional Ins. | Kershaw, SC | Fire | Wood Dust | 1 | 0 | Dust Col. | No Details | |
| Apr 24 | Lansing Community College | Lansing, MI | Fire | Sawdust | 0 | 0 | Dust Col. | No Details | |
| May 2 | Fossil Ridge High School | Fort Collins, CO | Fire | Wood Dust | 0 | 0 | Dust Col. | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 4 | FIRES: 4 | EXPLOSIONS: 0 | INJURIES: 1 | FATALITIES: 0**

## ETHANOL PRODUCTION

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Feb 20 | Flint Hills Resources | Fairbank, IA | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Jun 21 | POET | Cloverdale, IN | Explosion | Grain Dust | 2 | 0 | Dust Col. | $1,000,000 | |
| Sep 9 | Didion Milling | Cambria, WI | Fire | Unknown | 0 | 0 | Unknown | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 3 | FIRES: 2 | EXPLOSIONS: 1 | INJURIES: 2 | FATALITIES: 0**

## POWER GENERATION & COAL HANDLING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 7 | Kingsford Manufacturing | Summer Shade, KY | Explosion | Charcoal | 0 | 0 | Unknown | No Details | |
| Mar 22 | ABB | Jefferson City, MO | Fire | Coal Dust | 0 | 0 | Exhaust Fan | No Details | |
| Apr 16 | Unknown | Marshall, AK | Fire | Coal Dust | 0 | 0 | Trailer | No Details | |
| Jun 8 | Gulf Power Plant Crist | Pensacola, FL | Fire | Coal Dust | 1 | 0 | Silo | No Details | |
| Nov 23 | Mountain State Carbon | Follansbee, WV | Fire | Coal Dust | 0 | 0 | Conveyor Belt | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 5 | FIRES: 4 | EXPLOSIONS: 1 | INJURIES: 1 | FATALITIES: 0**

## OTHER

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 7 | Appalachian Tank Car Ser. | Lynchburg, VA | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| Feb 5 | Unknown | Minden, NV | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| Jan 29 | Albion Man. Technologies | Ogden, UT | Fire | Unknown | 0 | 0 | Hopper Bin | No Details | |
| Feb 15 | Agri-Fab | Sullivan, IL | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| Feb 15 | Davis-Standard, LLC | Pawcatuck, CT | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Feb 20 | Private Family Home | Manoa, HI | Fire | Wood Dust | 0 | 0 | Unknown | $840,000 | |
| Feb 21 | Kenall Manufacturing | Kenosha, WI | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Mar 18 | Liberty Tire Recycling | Auburndale, WI | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| Apr 2 | J.F. Allen Company | Bridgeport, WV | Explosion | Asphalt | 0 | 0 | Baghouse | No Details | |
| Apr 7 | Stryker Corporation | Mahwah, NJ | Fire | Unknown | 0 | 0 | Dust Col. Bins | No Details | |
| May 3 | Private Family Home | La Jolla, CA | Fire | Sawdust | 0 | 0 | Unknown | No Details | |
| May 7 | Innotec | Zeeland, MI | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| May 8 | Keywell Corporation | Falconer, NY | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| May 21 | Avalign Thortex | Portland, OR | Fire | Titanium Dust | 0 | 0 | Dust Col. | No Details | |
| Jun 11 | Electro-Cycle | Madisonville, KY | Fire | Metal Dust | 0 | 0 | Dust Col. | No Details | |
| Jun 27 | OmniSource | Fort Wayne, IN | Fire | Metal Dust | 0 | 0 | Unknown | No Details | |
| Aug 1 | Stamford Water Pollution Control Facility | Stamford, CT | Explosion | Pellet Dust | 3 | 0 | Polycyclone Drying Machine | No Details | |
| Aug 12 | BNZ Materials | Zelienople, PA | Fire | Sawdust | 0 | 0 | Dust Col. | No Details | |
| Sep 17 | JCS Global Distribution, Inc. | Carlstadt, NJ | Explosion | Cosmetic Powder | 1 | 0 | Mixing Machine | No Details | |
| Oct 4 | Unknown | Manchester, CT | Explosion | Plastic Dust | 0 | 0 | Dust Col. | No Details | |
| Oct 9 | Coastal Logistics Group | Garden City, GA | Explosion | Voxtar-M40 | 2 | 0 | Storage Container | No Details | |
| Nov 13 | International Cushioning Co. | Hickory, NC | Explosion | Unknown | 1 | 0 | Grinding Machine | No Details | |
| Nov 15 | Unknown | Naperville, IL | Fire | Unknown | 0 | 0 | Dust Col. | No Details | |
| Nov 25 | AJ Riley Inc. | Norwalk, OH | Fire | Asphalt | 0 | 0 | Dust Col. | No Details | |
| Dec 28 | Ardagh Group | Roanoke, VA | Fire | Unknown | 2 | 0 | Bake Oven | $4,000,000 | |

**INCIDENT SUMMARY - INCIDENTS: 25 | FIRES: 19 | EXPLOSIONS: 6 | INJURIES: 9 | FATALITIES: 0**

# CDI DATA CANADA

## WOOD & WOOD PRODUCTS

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 2 | Lavern Heideman & Sons | Eganville, ON | Fire | Wood Dust | 0 | 0 | Dust Collector | Millions | |
| May 1 | Pinnacle Pellet | Williams Lake, BC | Fire | Wood Dust | 0 | 0 | Dryer | No Details | |
| May 7 | Aspen Planers | Merritt, BC | Fire | Wood Dust | 0 | 0 | Dust Collector | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 3 | FIRES: 3 | EXPLOSIONS: 0 | INJURIES: 0 | FATALITIES: 0**

## AUTOMOTIVE & METAL WORKING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT. | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jun 5 | Crestline Coach Ltd. | Saskatoon, SK | Fire | Aluminum Dust | 0 | 0 | Dust Collector | $15,000 | |

**INCIDENT SUMMARY - INCIDENTS: 1 | FIRES: 1 | EXPLOSIONS: 0 | INJURIES: 0 | FATALITIES: 0**

## AGRICULTURE

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Feb 21 | Richardson Pioneer | Melfort, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Mar 1 | Trouw Nutrition/Shur-Gain | Olds, AB | Fire | Grain Dust | 0 | 0 | Unknown | No Details | |
| Mar 11 | Parrish & Heimbecker | North Battleford, SK | Fire | Grain Dust | 0 | 0 | Grain Elevator | No Details | |
| Mar 20 | Buffalo Creek Mills | Altona, MB | Fire | Grain Dust | 0 | 0 | Hammer Mill | No Details | |
| Oct 1 | Unknown | Star City, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Oct 23 | Unknown | New Bothwell, MB | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 10 | Unknown | Spruce Home, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 11-18 | Unknown | Kindersley, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 11-18 | Unknown | Wadena, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 11-18 | Unknown | Buckland, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Dec 11 | Unknown | Melfort, SK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 11 | FIRES: 11 | EXPLOSIONS: 0 | INJURIES: 0 | FATALITIES: 0**

## PULP & PAPER

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Mar 11 | Catalyst Paper | Port Alberni, BC | Fire | Paper Dust | 0 | 0 | Paper Machine | No Details | |
| Mar 18 | Resolute Forest Products | Thunder Bay, ON | Fire | Paper Dust | 0 | 0 | Paper Machine | No Details | |
| Jun 20 | Port Hawkesbury Paper | Port Hawkesbury, NS | Fire | Wood Dust | 2 | 0 | Silo | No Details | |
| Aug 13 | Cascades Paper Mill | Trenton, ON | Fire | Paper Dust | 0 | 0 | Dryer | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 4 | FIRES: 4 | EXPLOSIONS: 0 | INJURIES: 2 | FATALITIES: 0**

| SCHOOLS AND EDUCTIONAL FACILITIES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
| Jan 14 | Saunders Secondary School | London, ON | Fire | Wood Dust | 0 | 0 | Dust Collector | No Details | |
| INCIDENT SUMMARY - INCIDENTS: 1 \| FIRES: 1 \| EXPLOSIONS: 0 \| INJURIES: 0 \| FATALITIES: 0 | | | | | | | | | |

| OTHER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
| Aug 7 | Minoan Glory | Vancouver, BC | Explosion | Unknown | 0 | 0 | Unknown | No Details | |
| Dec 16 | Vale Manitoba Operations | Thompson, MB | Fire | Nickel Dust | 2 | 0 | Unknown | No Details | |
| INCIDENT SUMMARY - INCIDENTS: 2 \| FIRES: 1 \| EXPLOSIONS: 1 \| INJURIES: 2 \| FATALITIES: 0 | | | | | | | | | |

There were no reported incidents in the Food Processing, Ethanol Production, or Power Generation & Coal Handling industries.

## WOOD & WOOD PRODUCTS

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 7 | JRS ( J. RETTENMAIER & Söhne Group) | Herbrechtingen, Germany | Explosion | Wood Dust | 0 | 0 | Conveyor Belt | No Details | |
| Jan 16 | Opus Lignum GbR | Kupferberg, Germany | Explosion | Wood Dust | 0 | 0 | Heating System | No Details | |
| Jan 18 | Unknown | Chelmsford, UK | Fire | Wood Dust | 0 | 0 | Dust Collector | No Details | |
| Jan 24 | Groep Pouleyn | Anzegem, Belgium | Explosion | Wood Dust | 3 | 1 | Silo | No Details | |
| Feb 16 | Hyundai (Myanmar) Plywood Factory | Yangon, Myanmar | Fire | Wood Dust | 13 | 1 | Boiler | No Details | |
| Mar 12 | Unknown | Nussdorf, Austria | Fire | Wood Dust | 0 | 0 | Silo | No Details | |
| Mar 18 | Unknown | Scharnstein, Austria | Fire | Wood Dust | 0 | 0 | Dust Collector | No Details | |
| Mar 19 | Kronospan | Chirk, UK | Fire | Wood Dust | 0 | 0 | Conveyor Belt | No Details | |
| Apr 3 | Herman Pacific | Silverdale, New Zealand | Explosion | Wood Dust | 0 | 0 | Silo | No Details | |
| May 26 | Tableros Hispanos | Lugo, Spain | Explosion | Wood Dust | 1 | 1 | Silo | No Details | |
| Jul 7 | Unknown | Rotherwas, UK | Fire | Sawdust | 0 | 0 | Container Bags | No Details | |
| Aug 14 | Unknown | TODTMOOS-AU, Germany | Fire | Wood Chips | 0 | 0 | Dust Collector | No Details | |
| Aug 23 | Sonae Arauco | Nettgau, Germany | Explosion | Wood Dust | 1 | 0 | Unknown | 300,000 euros | |
| Aug 23 | Unknown | Blaustein, Germany | Explosion | Wood Dust | 0 | 0 | Pellet Heating Equipment | No Details | |
| Sep 19 | Unknown | South Shields, UK | Fire | Wood Pellets | 0 | 0 | Silo | No Details | |
| Sep 22 | Heggenstaller | Unterbernbach, Germany | Explosion | Wood Dust | 1 | 0 | Wood-Pressing Machine | No Details | |
| Oct 7 | Bulthaup GmbH & Co KG | Bodenkirchen, Germany | Explosion | Sawdust | 0 | 0 | Silo | No Details | |
| Oct 25 | Unknown | Wardle, UK | Fire | Wood Dust | 0 | 0 | Dust Collector | No Details | |
| Oct 31 | Unknown | Neuenstein-Untereppach, Germany | Fire | Wood Dust | 0 | 0 | Silo | 80,000 euros | |
| Nov 10 | Unknown | Erfurt, Germany | Fire | Wood Dust | 0 | 0 | Silo | 10,000 euros | |
| Nov 23 | Woodland Plywood Processing Company | Kushtia, Bangladesh | Explosion | Wood Dust | 4 | 0 | Dust Collector | No Details | |
| Dec 10 | Unknown | Mattersburg, Austria | Explosion | Wood Dust | 0 | 0 | Silo | No Details | |
| Dec 12 | Strothmann GmbH | Bielefeld, Germany | Explosion | Wood Dust | 0 | 0 | Dust Collector | 30,000 euros | |
| Dec 25 | Port of Geelong | Geelong, Australia | Fire | Wood Dust | 0 | 0 | Unknown | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 24 | FIRES: 12 | EXPLOSIONS: 12 | INJURIES: 23 | FATALITIES: 3**

## AUTOMOTIVE & METAL WORKING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT. | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 29 | Whyalla Steelworks | Whyalla, Australia | Fire | Metal Dust | 0 | 0 | Conveyor Belt | No Details | |
| Jan 30 | Continental Engine Company | Bhiwadi, India | Fire | Metal Dust | 0 | 0 | Dust Collector | $100,000 | |
| Jul 29 | Dudley Industries | Lytham, UK | Fire | Metal Dust | 0 | 0 | Dust Collector | No Details | |
| Aug 10 | AMG Alpoco UK, Ltd. | Holyhead, UK | Explosion | Aluminum Dust | 2 | 0 | Hopper | No Details | |
| Aug 16 | ArcelorMittal | Kraków, Poland | Fire | Coke | 0 | 0 | Conveyor Belt | No Details | |

## AUTOMOTIVE & METAL WORKING CONTINUED

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT. | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Aug 29 | Novelis Inc. | Nachterstedt, Germany | Explosion | Aluminum Dust | 0 | 0 | Dust Collector | No Details | |
| Dec 27 | Siderúrgica União | Divinópolis, Brazil | Explosion | Coal Dust | 1 | 2 | Silo | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 7 | FIRES: 4 | EXPLOSIONS: 3 | INJURIES: 3 | FATALITIES: 2**

## AGRICULTURE

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 8 | ABN | Cullompton, UK | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Feb 19 | CopRice | Tongala , Australia | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Mar 13 | Unknown | Risby, UK | Fire | Wood Dust | 0 | 0 | Grain Hopper | No Details | |
| Apr 19 | Unknown | Stoke Ferry, UK | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| May 30 | Tiwana Oil Mills Pvt. Ltd | Hyundai (Myanmar) Plywood Factory, India | Explosion | Grain Dust | 9 | 1 | Boiler | No Details | |
| Jun 20 | Unknown | Büsum, Germany | Explosion | Grain Dust | 1 | 0 | Silo | No Details | |
| Jul 1 | Agri V Raiffeisen eG | Dingden, Germany | Fire | Grain Dust | 0 | 0 | Grain Dryer | 250,000 euros | |
| Jul 7 | Jäckering Mühlen- und Nährmittelwerke GmbH | Hamm, Germany | Explosion | Grain Dust | 0 | 0 | Filter System | No Details | |
| Jul 25 | Agricultores Federados Argentinos (AFA) | Rojas, Argentina | Explosion | Grain Dust | 4 | 0 | Silo | No Details | |
| Aug 4 | Unknown | Truro, UK | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Aug 6 | Unknown | Seagrave, UK | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Aug 9 | Unknown | Piddlehinton, UK | Fire | Grain Dust | 0 | 0 | Silo | No Details | |
| Aug 23 | Unknown | Блъсково, Bulgaria | Fire | Sunflower Seed | 0 | 0 | Silo | No Details | |
| Sep 9 | Jäckering Mühlen- und Nährmittelwerke GmbH | Hamm, Germany | Explosion | Grain Dust | 0 | 0 | Filter System | No Details | |
| Sep 9 | Unknown | Thirsk, UK | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Sep 12 | Unknown | Gallowater, UK | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Sep 19 | Unknown | Llandrinio, UK | Fire | Grain Dust | 0 | 0 | Dryer | No Details | |
| Oct 28 | Potoki LLC | Dnipro, Ukraine | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Nov 14 | Devenish Nutrition | Belfast, UK | Fire | Grain Dust | 0 | 0 | Storage Unit | No Details | |
| Dec 18 | Unknown | Nhill, Australia | Fire | Grain Dust | 0 | 0 | Truck | $400,000 AUS | |

**INCIDENT SUMMARY - INCIDENTS: 20 | FIRES: 14 | EXPLOSIONS: 6 | INJURIES: 14 | FATALITIES: 1**

## FOOD PROCESSING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Mar 13 | Clover S.A. Ltd. | Estcourt, South Africa | Fire | Milk Powder | 0 | 0 | Unknown | No Details | |
| Apr 10 | Hügli | Radolfzell, Germany | Explosion | Unknown | 1 | 0 | Unknown | No Details | |
| May 12 | Glencore Grain NZ | Mount Maunganui, New Zealand | Fire | Palm Kernel Dust | 0 | 0 | Unknown | No Details | |
| Aug 22 | Nestle | Smithtown, Australia | Fire | Unknown | 0 | 0 | Fan | No Details | |

## FOOD PROCESSING CONTINUED

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Sep 11 | Arva Spices | Wijhe, Netherlands | Explosion | Spices | 3 | 0 | Processing Machine | No Details | |
| Oct 5 | Wilmar Sugar Limited's Pioneer Mill | Burdekin, Australia | Fire | Sugar Dust | 0 | 0 | Conveyor System | No Details | |
| Oct 18 | Glen Wyvis Distillery | Dingwall, UK | Fire | Wood Dust | 0 | 0 | Biomass Storage Room | No Details | |
| Oct 28 | Potoki LLC | Dnipro, Ukraine | Explosion | Grain Dust | 0 | 0 | Unknown | No Details | |
| Nov 8 | Mackay Sugar Limited | Marian, Australia | Fire | Sugar Dust | 0 | 0 | Conveyor Belt | No Details | |
| Nov 25 | Unknown | West Knapton, UK | Fire | Grain Dust | 0 | 0 | Grain Dryer | No Details | |
| Nov 27 | Cutrale | Guarujá, Brazil | Fire | Unknown | 0 | 0 | Conveyor Belt | No Details | |
| Dec 13 | Nordzucker AG | Uelzen, Germany | Explosion | Wood Dust | 0 | 0 | Silo | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 12 | FIRES: 8 | EXPLOSIONS: 4 | INJURIES: 4 | FATALITIES: 0**

## PULP & PAPER

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jun 3 | Unknown | Mönchengladbach, Germany | Explosion | Paper Dust | 0 | 0 | Printing Press | No Details | |
| Jun 16 | Mondi Frantschach | Sankt Gertraud, Austria | Fire | Paper Dust | 0 | 0 | Conveyor Belt | No Details | |
| Nov 30 | K.T. Investments | Budumburam, Ghana | Explosion | Paper Dust | 0 | 0 | Unknown | GH₵3 Million | |

**INCIDENT SUMMARY - INCIDENTS: 3 | FIRES: 1 | EXPLOSIONS: 2 | INJURIES: 0 | FATALITIES: 0**

## POWER GENERATION & COAL HANDLING

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Feb 20 | River Trade Terminal | Hong Kong, China | Explosion | Charcoal Dust | 0 | 0 | Shipping Container | No Details | |
| Mar 5 | City of Taku | Taku, Japan | Fire | Coal Dust | 0 | 0 | Unknown | No Details | |
| Mar 27 | Raichur Thermal Power Station | Raichur, India | Fire | Coal Dust | 0 | 0 | Conveyor Belt System | No Details | |
| May 13 | Unknown | London, UK | Explosion | Coal Dust | 0 | 0 | Unknown | No Details | |
| May 17 | Bhilai Steel Plant | Bhilai, India | Fire | Coal Dust | 0 | 0 | Conveyor Belt System | $7,500 | |
| Jun 6 | Longannet Power Station | Fife, UK | Fire | Coal Dust | 0 | 0 | Bunker | No Details | |
| Aug 18 | Unknown | Kuzbass, Russia | Fire | Coal Dust | 0 | 0 | Conveyor Belt | No Details | |
| Oct 20 | Unknown | Maddingly, Australia | Fire | Coal Dust | 0 | 0 | Conveyor Belt | No Details | |
| Dec 18 | EBB | County Clare, Ireland | Fire | Coal Dust | 0 | 0 | Coal Bunker | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 9 | FIRES: 7 | EXPLOSIONS: 2 | INJURIES: 0 | FATALITIES: 0**

## SCHOOLS AND EDUCTIONAL FACILITIES

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Mar 5 | Orewa College | Orewa, New Zealand | Fire | Sawdust | 0 | 0 | Dust Collector | No Details | |
| Apr 16 | Western Australian College of Agriculture Narrogin | Dumberning, Australia | Fire | Unknown | 0 | 0 | Dust Collector | $80,000 | |

**INCIDENT SUMMARY - INCIDENTS: 2 | FIRES: 2 | EXPLOSIONS: 0 | INJURIES: 0 | FATALITIES: 0**

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## OTHER

| DATE | COMPANY | LOCATION | TYPE | FUEL | INJ. | FAT | EQUIPMENT | DAMAGES | LINK |
|---|---|---|---|---|---|---|---|---|---|
| Jan 29 | Unknown | Clacton-on-Sea, UK | Explosion | Powdered Dye | 0 | 0 | Unknown | No Details | |
| Feb 7 | Unknown | Baumgartenberg, Austria | Explosion | Paint Dust | 1 | 0 | Paint Mixing Machine | No Details | |
| Apr 9 | Unknown | Tilbury, UK | Fire | Wood Dust | 0 | 0 | Conveyor Belt System | No Details | |
| Apr 23 | Unknown | Hanley, UK | Fire | Unknown | 0 | 0 | Dust Extractor | No Details | |
| Apr 27 | Unknown | Tilbury, UK | Fire | Unknown | 0 | 0 | Dust Extractor | No Details | |
| May 18 | Patheon Austria GmbH & CoKG | Linz, Austria | Explosion | Unknown | 6 | 0 | Unknown | No Details | |
| Jun 7 | Carlfors Bruk AB | Jönköping, Sweden | Explosion | Aluminum Dust | 3 | 0 | Unknown | No Details | |
| Jul 26 | Ortho Europe | Girlington, UK | Fire | Unknown | 0 | 0 | unknown | No Details | |
| Aug 11 | Aurobindo Pharma | Andhra Pradesh, India | Explosion | Ash | 2 | 1 | Boiler | No Details | |
| Sep 3 | Trend Store Shop Creation GmbH | Greding, Germany | Explosion | Paint Dust | 1 | 0 | Dust Collector | 55,000 euros | |
| Sep 29 | Birla Cement Works | Chanderia, India | Explosion | Coal Dust | 15 | 0 | Boiler | No Details | |
| Nov 1 | Omya UK Ltd. | Steeple Morden, UK | Fire | Unknown | 0 | 0 | Conveyor Belt | No Details | |
| Dec 17 | ESD-SIC | Farmsum, Netherlands | Explosion | Silicon Carbide | 0 | 0 | Unknown | No Details | |

**INCIDENT SUMMARY - INCIDENTS: 13 | FIRES: 5 | EXPLOSIONS: 8 | INJURIES: 28 | FATALITIES: 1**

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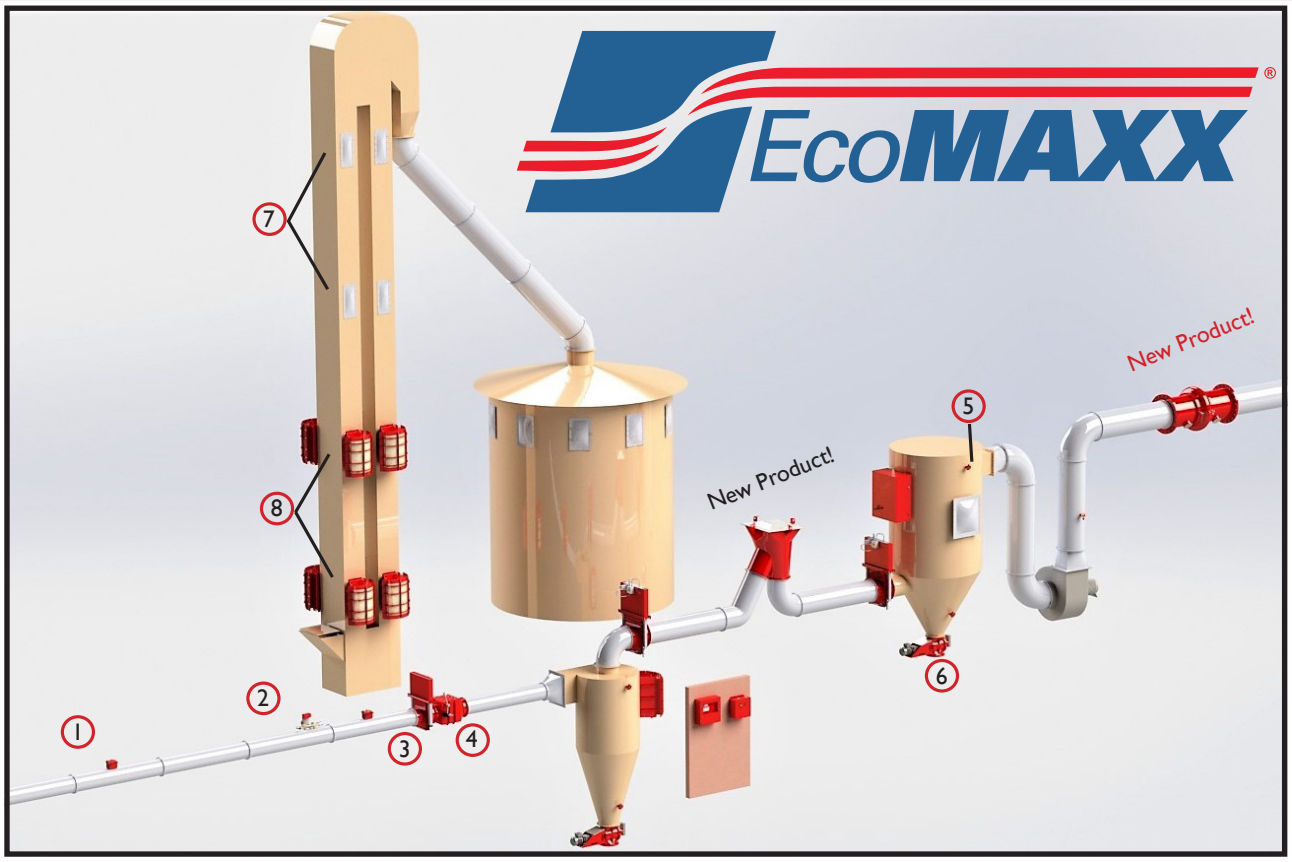


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**Author: Dr. Chris Cloney, DustEx Research Ltd.**
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**Any questions or comments can be sent to chris@dustsafetyscience.com**

Example Reference:
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