

Agricultural Dust Explosions in 2023*

There were 9 grain dust explosions reported in the U.S. in 2023 according to Kingsly Ambrose, Professor, Purdue University. This compares to 10 in 2022 and a ten-year average of 8.4 explosions.

There were no fatalities and 12 injuries.

The explosions were in 1 ethanol plant, 1 wheat mill, 2 grain elevators, 2 soybean processing, 2 corn processing, and 1 corn cob processing plants.

The **probable ignition sources** were identified in 1 case as fire, 1 as equipment malfunction and 6 unknowns.

Fuel sources were identified as 9 from grain dusts.

Dust explosions occurred in 4 different states: 3 each in Illinois and Minnesota, 2 in Iowa, and 1 in Indiana.

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* This report subject to revision as additional information is received.

REPORTED DUST EXPLOSIONS IN U.S. 2023

| <u>No</u> | <u>DATE</u> | <u>COMPANY</u> | <u>ADDRESS</u> | <u>FACILITY</u> | <u>FATALITIES</u> | <u>INJURED</u> |
|-----------|-------------|----------------------------|------------------|---------------------|-------------------|----------------|
| 1 | 3/2/2023 | ADM Corn Processing | Cedar Rapids, IA | Corn Processing | 0 | 0 |
| 2 | 3/24/2023 | The Hoffman Grain Elevator | Hoffman, MN | Grain elevator | 0 | 0 |
| 3 | 4/20/2023 | ADM | Decatur, IL | Soybean processing | 0 | 3 |
| 4 | 9/10/2023 | ADM | Decatur, IL | Soybean processing | 0 | 8 |
| 5 | 9/21/2023 | The Andersons | Delphi, IN | Corn cob processing | 0 | 0 |
| 6 | 9/25/2023 | Primient | Decatur, IL | Corn processing | 0 | 0 |
| 7 | 10/4/2023 | Bay State Milling | Winona, MN | Wheat milling | 0 | 0 |
| 8 | 11/22/2023 | Chandler Feed Co | Chandler, MN | Grain elevator | 0 | 1 |
| 9 | 11/25/2023 | POET | Shell Rock, IA | Ethanol plant | 0 | 0 |

TABLE 1. U.S. AGRICULTURAL DUST EXPLOSION STATISTICS

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | TEN YEAR TOTAL |
|-------------------|------|------|------|------|------|------|------|------|------|------|----------------------|
| Number | 7 | 8 | 5 | 7 | 12 | 11 | 8 | 7 | 10 | 9 | 84 |
| Fatalities | 0 | 0 | 3 | 5 | 1 | 1 | 1 | 1 | 0 | 0 | 13 |
| Injured | 14 | 10 | 8 | 12 | 2 | 8 | 6 | 5 | 18 | 12 | 95 |
| Type of Facility | | | | | | | | | | | |
| Grain Elevator | 5 | 2 | 2 | 5 | 8 | 4 | 4 | 4 | 2 | 2 | 38 |
| Feed Mill | 1 | 4 | 1 | 0 | 2 | 4 | 1 | 1 | 2 | 0 | 16 |
| Flour Mill | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| Other: | | | | | | | | | | | |
| Corn Milling, Dry | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 2 | 6 |
| Corn Milling, Wet | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 3 |
| Rice Mill | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 |
| Other | 1 | 2 | 0 | 1 | 2 | 2 | 1 | 1 | 2 | 3 | 15 |

Source: Dr. Kingsly Ambrose, Purdue University

TABLE 2. AGRICULTURAL DUST EXPLOSIONS BY COMMODITY HANDLED AT TIME OF EXPLOSION 2014-2023

| <u>COMMODITY</u> | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | TEN YEAR TOTAL |
|------------------------------|------|------|------|------|------|------|------|------|------|------|----------------------|
| Corn | 3 | 2 | 1 | 6 | 6 | 5 | 2 | 3 | 2 | 5 | 35 |
| Soybeans | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 4 |
| Wheat | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| Barley (malted) | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Oats | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Beet pulp | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Corn starch | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sugar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mixed feed | 2 | 3 | 1 | 0 | 4 | 3 | 3 | 3 | 1 | 0 | 20 |
| Rice (Bran)(Flour)(Hulls) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 |
| Wheat Flour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wheat (Starch)(Gluten) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Other | 2 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 4 | 1 | 18 |
| TOTAL EXPLOSIONS | 7 | 8 | 5 | 7 | 12 | 11 | 8 | 7 | 10 | 9 | 84 |

Source: Dr. Kingsly Ambrose, Purdue University

TABLE 3. U. S. AGRICULTURAL DUST EXPLOSIONS LEADING STATES - 1958 to Date

| <u>STATE</u> | 1958-2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 10-YEAR TOTAL | 1958-2023 |
|--------------|-----------|------|------|------|------|------|------|------|------|------|------|---------------|-----------|
| Iowa | 87 | 0 | 0 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 2 | 12 | 99 |
| Illinois | 77 | 1 | 1 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 3 | 10 | 87 |
| Nebraska | 77 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 5 | 82 |
| Minnesota | 60 | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 2 | 0 | 3 | 9 | 69 |
| Kansas | 55 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 4 | 59 |
| Texas | 46 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 48 |
| Ohio | 35 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 4 | 39 |
| Missouri | 32 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 37 |
| Indiana | 28 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 7 | 35 |
| Louisiana | 18 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 3 | 21 |
| South Dakota | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| Wisconsin | 8 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 5 | 13 |