Safety Bulletin
CSB Video - "No Detection: Explosion at Watson Grinding"

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Incident Overview

On January 24, 2020, a catastrophic explosion occurred at Watson Grinding and Manufacturing, a precision machining and coatings facility in Houston, Texas. The explosion was triggered by an undetected propylene gas leak, resulting in the deaths of two employees, severe damage to nearby businesses and homes, and multiple injuries. The U.S. Chemical Safety Board (CSB) conducted an in-depth investigation to identify the causes of the explosion and propose safety improvements.

Timeline of Events

• January 23, 2020 (Evening): A leak of propylene gas begins inside Watson Grinding and Manufacturing. The gas, being heavier than air, accumulates at floor level and spreads through the facility.

• January 24, 2020 (4:20 AM): The flammable gas concentration reaches the lower explosive limit (LEL) and finds an ignition source, likely from an electrical or mechanical system.

• Explosion Occurs: A powerful blast devastates the facility, causing extensive structural damage and fires. The explosion is felt miles away, damaging over 400 buildings in the surrounding community.

• Emergency Response: Firefighters and first responders arrive to assess the damage and provide assistance. Authorities conduct evacuations and damage assessments in the affected area.

In This Issue

This Safety Bulletin provides an overview of the Watson Grinding incident including a timeline of events, key findings, and opportunities for improvement for the industry.

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Key Findings

1. Absence of Gas Detection Systems: The facility lacked fixed gas detection sensors that could have provided an early warning of the leak.

2. Failure to Identify and Control Hazards: Propylene gas, which is colorless and difficult to detect without sensors or odorants, accumulated unnoticed in the facility.

3. Lack of Regulatory Requirements: No existing regulation mandated the use of fixed gas detection systems for facilities storing and handling large quantities of flammable gases like propylene.

4. Insufficient Employee Training: Workers were not adequately trained to recognize the hazards associated with propylene leaks or how to respond effectively.

5. Community Impact: The explosion affected a large urban area, leading to offsite damages and injuries, emphasizing the need for stricter oversight of hazardous material storage in populated regions.

Opportunities for Industry Improvement

1. Implement Fixed Gas Detection Systems
   - Facilities using flammable gases should install continuous gas monitoring systems with alarms to detect leaks before reaching explosive concentrations.
   - Early detection can allow for timely interventions, such as automatic shutoff valves or facility evacuation.

2. Enhance Hazard Recognition and Training
   - Workers must be trained to recognize the risks of flammable gas leaks, including how to respond to potential leaks effectively.
   - Facilities should conduct regular emergency drills and implement robust safety protocols for gas-related incidents.

3. Strengthen Regulatory Requirements
   - Safety organizations and regulators should consider mandating fixed gas detection systems for industries that store and handle large amounts of flammable gases.
   - Updating industry codes and standards to include requirements for leak detection and mitigation measures can prevent similar disasters.

4. Improve Facility Design and Maintenance
   - Facilities should design gas storage and piping systems with enhanced leak prevention measures, including automatic shutoff valves and redundancy in safety systems.
   - Routine inspections and preventive maintenance programs should be established to identify and fix potential leak points before they become hazardous.

Conclusion

The Watson Grinding explosion highlights the critical importance of gas detection, hazard awareness, and proactive safety measures in industrial facilities handling flammable gases. By implementing advanced gas monitoring systems, improving worker training, and strengthening safety regulations, the risk of future catastrophic incidents can be significantly reduced. Ensuring a proactive safety culture and compliance with best practices will help protect both workers and surrounding communities from similar tragedies.

Reference: https://www.csb.gov/watson-grinding-fatal-explosion-and-fire-/