

Consideration in Retrofitting a Facility After an incident

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Continental Grain Westwego , LA Dec 22, 1977 35 fatalities

Outcomes:

- Considered in creation of OSHA Grain Handling Standards - Dec 1987
- **Resulted in major redesign of export facilities both in safety and efficiency**
 - One primary change was the replacement of internal house legs with external inclined belts



Consideration in Retrofitting a Facility After an incident



- Incidents vs. hazard vs. risk
- Ramifications of an incident
- Incident investigation
- Incident response

Hazard, risk, incident

What's the difference?

- Hazard - is something that can cause harm
- Risk - is the chance, high or low, that any hazard will actually cause somebody harm
- Incident –
 - **Incidents are the risks that have materialized**
 - An incident is an event that could lead to loss of, or disruption to, an organization's operations, services or functions
 - Types of incidents
 - **Major** - Large-scale incidents may not come up too often, but when they do hit, organizations
 - **Repetitive** or Reoccurring
 - **Complex incidents** - these incidents generally pose extreme, immediate, and/or long-term risk to the environment and public health
 - **Minor** incidents
 - Causes of incidents
 - Human error
 - Design flaw
 - Equipment flaw or failure
 - Intentional/terrorism
 - Act of nature

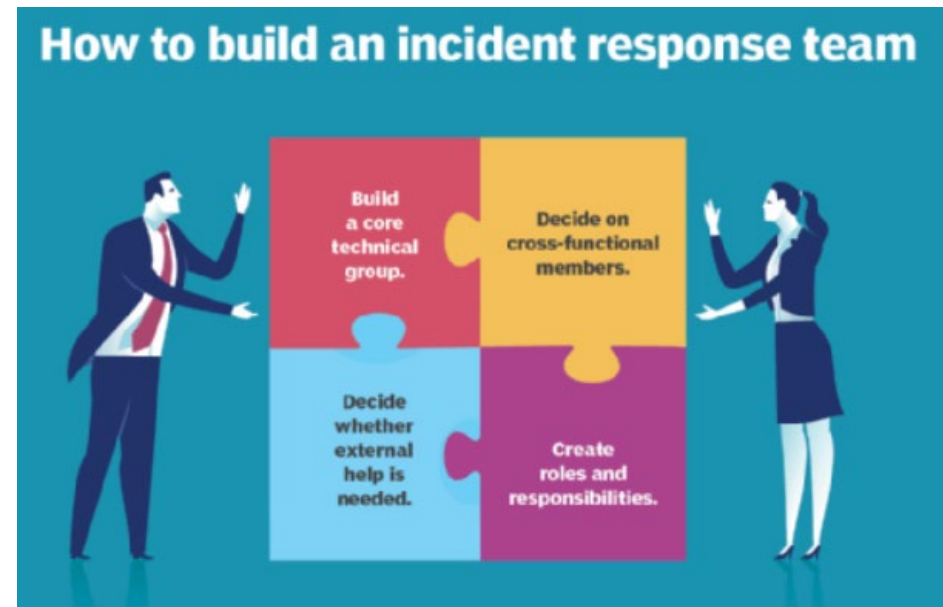
Ramifications of an Incident

- Possible outcomes from an incident
 - Personal injury and/or loss of life
 - Minor or major structural damage
 - Minor or major equipment damage
 - Environmental impact
 - Business interruption
 - Revenue loss
 - Additional expenses
 - Loss of business
 - Litigation - punitive damages
 - Damaged or loss of reputation
 - Morale issues
 - Sustainability



Incident Investigation Methodology

- Incident management are activities to identify, analyze, and correct hazards to prevent future re-occurrence – finding the **root cause**
- Who should conduct the investigation – qualified individual/team
- Incident investigation phases
 - Planning/preparation
 - Identification of the incident
 - Containment of the incident
 - Eradication of the incident
 - Recovery from the incident
 - Lessons learned from the incident



Elements of an incident response plan

1. Gather information on-
 1. Task that were or were not in play
 2. Material that was or was not in use
 3. Environment at time of incident
 4. Personnel involved to not involved
 5. Management level at time of incident
2. Search for and establish facts
3. Establish essential contributing factors
4. Find root cause(s)
5. Determine potential corrective actions
6. Select best alternative
7. Implement corrective actions



Consideration in Retrofitting a Facility After an incident



- Root cause identified
- Determine potential corrective actions
- Select best alternative
- Have new vision
- Set new goals
- Evaluate for improvement, innovate

Have New Vision

- **First** address immediate needs
 - Personnel
 - Regulatory
 - Operational
 - Financial
 - Public Relations
- **Then** consider Possible responses
 - Return to status quo
 - Cease all or partial operations
 - Partial upgrade
 - Total upgrade

Planning During Disruption

Sustaining long-term progress while
addressing immediate needs

Have New Vision

- Expand thinking , explore improvement possibilities
 - Change thinking from reactive to opportunistic
 - Go from what was to what can it be



Set New Goals

- New vision dictates new Goals
 - Short term
 - Long Term
- SMART Goals
 - Specific
 - Measurable
 - Achievable
 - Realistic
 - Timely



Evaluate for Improvement

- **Voice of customer**
 - What is needed vs what you had
 - Current vs future
- Facility Evaluation
 - Overall and by department/systems
 - Identify bottlenecks and or opportunities
- Procedural Evaluation
- Personnel Evaluation
 - Staffing and skills
 - Training
- Target areas of greatest opportunity
 - Address greatest need , must consider ROI



**Voice of the Customer
VOC Research:**

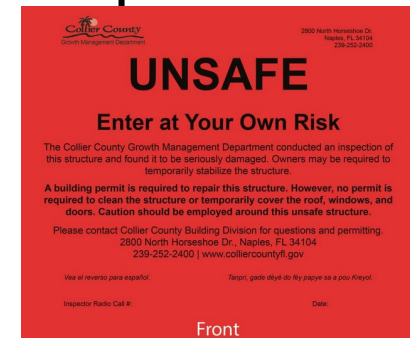
**Tips and Tools to Listen to
Your Customers Better**

Case Studies

- #1 – Dust explosion incident resulting in total loss of concrete silo and auxiliary equipment
- #2 – Structural bin failure incident resulting in loss of bin and nearby dryer
- #3 - Entrapment incident resulting in employee injury and OSHA citation

Don't forget permits

- Investigate for any type of permits that will be required for remediation work
 - Particularly Environmental
 - Surface run off
 - Hazardous material disposal
- Investigate for possible required permits for modifications or upgrades
 - Construction
 - Operating
 - Regulatory – air, water, highway access, etc.



Case Study #1 – Dust Explosion

- Major explosion destroying 4 concrete bins, head house, receiving and shipping equipment, scales, conveyance, dryer, utilities , and office building.
 - Five fatalities , two injured
 - Complete destruction of facility
 - OSHA investigation – no citation
 - Environmental issue – surface run off of contaminated water into nearby river
 - Business interruption
 - Civil suit – out of court awards
 - Hazardous debris removal issues
- Root cause determined – outside ignition source entering thru receiving pit and igniting in bucket elevator leg

Case Study #1 – Dust Explosion

- Analysis
 - Marginal historic volume, limited potential for expanded volume
 - ROI historically not meeting expectations
 - Nearby owned facility to divert business to
 - Location – in urban area, logistics and adjacent property issues
 - High operating cost per unit – utilities and property taxes
 - Location presented high replacement cost
 - Construction market competitiveness
 - Trade Union barriers
- Outcome
 - Decision made not to rebuild
 - Decision to retrofit other operating facilities with explosion suppression devices

Case Study #2 – Bin Failure

- 105' diameter tank has structural failure in wall spilling grain onto adjacent dryer and knocking dryer from foundation
 - Bin Wall and roof major damage
 - Small cracks in bin floor
 - Anchor bolts pulled loose from foundation, foundation damage
 - Fill conveyance and truss major damage
 - Electrical damage
 - Reclaim system undamaged
 - Cracks in reclaim tunnel wall
 - Foundation damage
 - Damage to aeration system and fans
 - Adjacent dryer destroyed
 - Loss of usable storage space
 - Loss of drying capacity
- Root cause determined
 - Improper unloading of bins
 - Lack of sufficient wind rings based on use
 - Uneven foundation settling,, undiscovered soil issues due to water table, foundation design issues

Case Study #2 – Bin Failure

- Analysis

- Location good volume and historically acceptable ROI
- Potential for expanded volume
 - Market share and yields
- Current storage pressed at harvest, ground piles in use
- CFM on aeration at 1/10 , some storage issues on corn
- Drying capacity maxed out in most years, lost opportunity
- Fill conveyor bottleneck, not matched to receiving leg
- Natural gas supply line maxed out
- Bin roof and sheets not viable for repair
- Dryer totaled
- Need additional soil analysis
- Optional- address receiving capacity challenged during harvest

Case Study #2 – Bin Failure

- Outcome
 - Replacement/repair
 - Repairs made to bin foundation, included mud jacking
 - Replaced 105' bin, added additional wind rings
 - Repaired bin floor cracks, replaced anchor bolts
 - Repaired tunnel wall cracks
 - Upgrades
 - Upgraded fill conveyor to match receiving leg, including upgrade to truss
 - Upgraded aeration to 1/7 CFM
 - Modify in floor ducts for aeration upgrade
 - Upgraded electrical with addition of VFDs
 - Upgraded drying capacity, including gas supply line
 - [Optional – added second truck dump](#)
 - Procedures and People
 - Created new written bin unloading procedures
 - Improved training for seasonal employees

Case Study #3 – Entrapment

- Employee made bottom entry into 90' diameter bin to clear sweep auger sump, LOTO not followed, grain being pulled while employee in bin, material hung on walls over employee's head.
 - Grain in bin had pockets of out condition grain, grain hanging on side walls
 - Clumping causing blockage of sump holes
 - Facility busy and employees limited
 - No bin entry permit used, employee not trained in bin entry or LOTO, no observer present
 - Zero-entry sweep in use
 - All sumps open
 - Employee entrapped with physical and emotional injuries, loss time incident
 - OSHA investigation and citation
 - Civil suit
 - Down time on receiving
 - Additional expenses
 - Loss of revenue
 - Loss of two other employees (quit)
 - Damage to company reputation
- Root cause
 - Inadequate procedures
 - Inadequate drying capacity
 - Lack of training
 - Inadequate supervision

Case Study #3 –Entrapment

- Analysis
 - Location good volume and historically acceptable ROI
 - Management focus not on safety
 - Improper handling and processing of inbound grain
 - Failure to follow written procedures
 - Failure to provide proper training
 - Failure to provide adequate supervision
 - Failure to staff facility to meet demands
 - Optional - Evaluation found bin roof load capacity has room for additional weight
 - Optional - Grain drying capacity insufficient for peaks

Case Study #3 –Entrapment

- Outcome
 - Replaced facility manager
 - Retrained facility supervision
 - Reviewed bin entry procedures
 - Reviewed and updated rescue procedures
 - Acquired grain rescue tube and associated equipment
 - Established annual training session with local first responders
 - Retrained employees, upgrade seasonal employee training
 - Reviewed and updated grain handling procedures
 - Drying
 - Coring
 - Aeration
 - Installed new grain spreader
 - Upgraded grain drying capacity
 - Include larger LP tank installation and vaporizer upgrade

Take advantage of Opportunity

- Think of other uses of mobilized services, take advantage of down time for PM and repairs
 - Contractor
 - Crane
- Address other imminent needs
 - Regulatory, efficiency, capacity
- Address future needs
 - Regulatory, efficiency, capacity
 - Growth
 - Market conditions



Summary



- Determine root cause
- Determine potential corrective actions – return to status quo or upgrades
- Evaluate current and future market needs
voice of the customer
- Compare status quo to future needs
- Evaluate for improvement
- Establish new goals/action plans to achieve



Questions

If a man is alone in the woods and speaks, and if there is no woman to hear him, is he still wrong?

Thank You!

JFV Solutions Inc.

Jim Voigt, President

Experience. Expertise. Service.

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Introduction to “TRAIN”

➤ “TRAIN” – What is It?

TRAIN is a client specific service product offering operational and engineering services to grain producers, commercial elevators, processing facilities, and other end users including energy and livestock operations. Services will include data collection, evaluation, risk assessments, and recommendations to meet desired improvements and outcomes derived from client interaction, inputs, and direction.

Management and employee training in targeted areas of the operations will be available upon request.

Customized targeted special projects will be available upon request.

