

A close-up photograph of a person's torso and hand. The person is wearing a dark grey, button-down work shirt with metal grommets on the sleeves. They are holding a bright yellow, glossy hard hat with their right hand. The background is a soft, out-of-focus grey.

# Preventing Catastrophic Industrial Accidents

through the improvement of  
organizational safety culture

***StrategyDriven***

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effective executives, efficient employees





**Chernobyl Nuclear Power Plant**  
Pripyat, Ukraine

# Catastrophic Accidents and Safety Culture...

## How are they related?

Recent industrial accidents within the United States resulted in the irreplaceable loss of human life, destruction of tens of millions of dollars in assets, and forfeiture of untold revenue generation. Each event was preventable, the byproduct of human errors made when safety was subordinated to other priorities.

People act based on their underlying system of beliefs and values. Performance expectations, whether reinforced by executives, managers, and/or peers, drive employee behaviors and what they come to believe and value as being right and wrong. Over time, employees develop and collectively share a common set of reinforced beliefs and values, an organizational culture.

An organization's safety culture plays a key role in actively preventing, mitigating, and controlling catastrophic industrial accidents. Safety culture represents those organizationally shared values underlying personnel decisions and actions prioritizing safety over competing objectives. Safety focused executives, managers, and employees collectively assume responsibility for both their and their co-workers' safety; embody a questioning attitude; encourage issue reporting and priority-based resolution; employ error reduction techniques; embed safety-first features within operational, training, and rewards programs; and embrace ongoing organizational learning. A strong safety culture fosters the elimination of material events and minimization of less impactful errors.

Catastrophic industrial accidents serve as a stark reminder of the operational risks challenging utility and industrial operators every day and the need for preemptive action to prevent such accidents. They represent a call to action for those leading and working within high-risk industries to improve their organization's safety culture thereby reducing the number of human errors leading to these events. The safety culture attributes, method for determining the organization's safety culture strength, and actions individuals at all levels can take to improve their company's safety culture are designed to aid:

- Chief operating officers in high-risk industries responsible for their organization's operational performance
- Plant/Station executives and senior line managers leading facility operations
- Performance improvement, safety, risk management, and internal audit executives overseeing operational performance

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*The unfortunate reality of today's industrial operations is that serious accidents do and will continue to occur; resulting in significant asset damage, personnel injury, and, in the most severe cases, loss of life.*

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## **Applicable High-Risk Industries**

While a strong safety culture benefits any organization, those specifically focused on include:

- Electric generating stations
- Transmission and distribution systems
- Oil refineries
- Oil and gas extractors
- Chemical plants
- Hazardous waste storage facilities
- Mining operations
- Heavy, industrial manufacturing
- Pharmaceutical manufacturing
- Hospitals and medical facilities
- Airlines and railroads
- Large-scale shipping and transportation organizations



# Safety Culture...

## the challenge and the opportunity

The unfortunate reality of today's industrial operations is that serious accidents do and will continue to occur; resulting in significant asset damage, personnel injury, and, in the most severe cases, loss of life. Even if it were possible to build fault-proof administrative and equipment systems, human error, intentional and unintentional, would still create the conditions for material events. Far more potent in preventing, mitigating, and controlling events is the establishment of a strong organizational safety culture that places safety above all other considerations. Such a culture not only minimizes the number and significance of human error, it also serves to mitigate the impact of administrative and equipment failures when they occur.

Several marketplace conditions converge to make catastrophic industrial accidents more likely. Industrial facilities are increasingly reliant on complex technologies. Company leaders and their workforce are continually challenged to produce more, faster, and with fewer resources. Additionally, the in-mass retirement of baby boomers is depleting corporate operating experience. Compounding these physical conditions is the natural decline of performance standards in order to promote heightened efficiency and the human tendency to become complacent when performing repetitive tasks. A healthy safety culture opposes these conditions and helps to prevent events.



# A robust Safety Culture translates to increased operational efficiencies

Decades of operating experience across numerous industries finds that those organization's placing a high value on nuclear, radiological, personnel, industrial, and environmental safety (as applicable) realize significant improvements in their long-term operational outcomes:

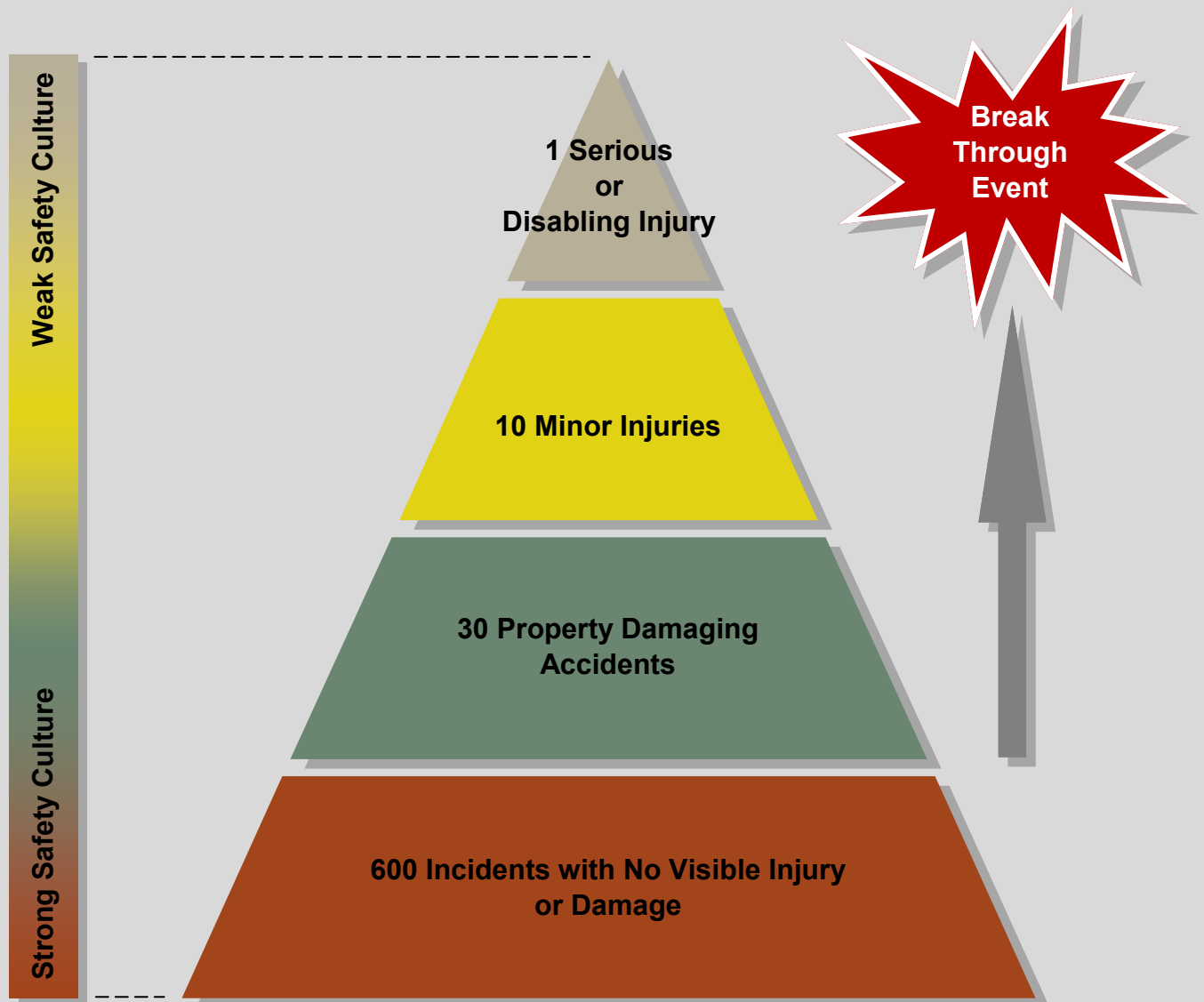
- Ongoing, event-free operations
- Sustained, high levels of plant reliability and performance
- Increased procedural compliance and worker efficiency
- Proactive employee involvement in the collective search and awareness of safety concerns not only in their immediate workplace but across the entire organization
- Empowerment of employees to intercede and stop unsafe operations when they see them occurring
- Greater organizational pride and increased professional respect and teamwork across trade skill organizations as employees become increasingly accountable to one another for safe work practices
- Increased collaborative engagement between bargaining unit organizations and management
- Higher levels of plant worker safety, reduced number of lost work days, and fewer less significant worker injuries
- Lower risk of unplanned, long-duration shutdowns

## *...with associated costs*

Safety culture changes are not easy; particularly when management is less than fully engaged with the process. While the benefits of a robust safety culture are substantial, proactive management involvement can curb the short-term implementation challenges faced:

- Initial O&M expense incurred for implementation costs – rollout and reinforcement meetings, performance measurement system upgrades, procedure rewrites, training, etcetera
- Additional time necessary for managers to set the example, hold safety-share moments, and spend visibly extra time in the workplace observing the operational environment for safety concerns
- Potential near-term productivity decline as the organization adapts to the additional safety measures and guidelines
- Attrition of those who do not want to comply with the new standards
- Need to release those who refuse to comply with the new standards
- Resistance from workers not understanding the need for change based on achievement of desired results today
- Resistance by some managers and supervisors because of perceived long-term productivity loss
- Malicious use of the new, higher performance standards to achieve desired concessions from the company
- Revelation of numerous lower level equipment and personnel issues that were previously unreported

# Accident Pyramid



Organizations with strong safety cultures identify and resolve low level issues that result in no visible injury or damage. They incorporate the lessons learned from these occurrences into their day-to-day operating procedures, training, behaviors, and decisions; preventing the break through events associated with more serious consequences.

Organizations with weaker safety cultures experience consequential events with varying impacts depending on the degree to which they embrace the safety culture attributes.

**Source:** Bird Accident Ratio Study by the Insurance Company of North America  
297 companies reporting 1.7 million accidents during 3 billion hours worked

# Safety Culture...

## What is it really?

Safety culture represents those organizationally shared values underlying personnel decisions and actions that prioritize safety while continuing to optimize competing objectives. Strength of this culture lies somewhere on a continuum depending on the degree to which the safety culture attributes are embraced by executives, managers, and employees. Critical attributes of the safety culture include:

- **Collective Responsibility** – all organization members assume personal responsibility for their and their co-workers' safety
- **Questioning Attitude** – personnel proactively observe operations and continually challenge underlying assumptions and practices; resisting the onset of complacency
- **Problem Identification & Resolution** – employees readily identify and promptly report issues that are subsequently resolved in a timely manner commensurate with their safety significance
- **Empowered Safety Conscious Work Environment** – workers are free to raise concerns without fear of retribution and willingly do so
- **Ongoing Organizational Learning** – continuous learning is embraced through routine, critical self-assessments and the systematic incorporation of internal and external lessons learned
- **Leaders Demonstrate and Reinforce the Safety Culture** – executives, managers, and supervisors establish a vision and goals, establish and reinforce standards, make decisions, and communicate in a manner that supports the safety culture
- **Decision-making Reflects Safety First** – leadership's decisions place safety ahead of production and economic gains
- **Trust and Respect Permeates the Organization** – executives, managers, and supervisors openly communicate with and involve employees in decision-making; welcoming and respecting differing opinions and effectively resolving conflicts
- **Management Systems Embody the Safety Culture** – safety first permeates operational, training, and rewards programs

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*The only way to operate a nuclear plant and indeed a nuclear industry is to establish a system that ingrains in each person a total commitment to safety: a pervasive, enduring devotion to a culture of safety and environmental stewardship.*

F. L. Bowman  
Director, Naval Nuclear Propulsion  
Admiral, United States Navy

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# Identifying the strength of your Safety Culture

High quality assessments of an organization's safety culture require an intimate understanding of how those values manifest themselves in the day-to-day decisions and actions of the organization's members. Artifacts of these values are not only found in the outcomes achieved, but also reside in the organization's goals and performance measures, standards and expectations, policies and procedures, rewards systems, training, and organizational learning and continuous improvement programs. Identification of where an organization's safety culture resides on the values spectrum involves direct behavioral observations, personnel interviews, documents reviews, and individual surveys.

## Phase 1

Safety culture assessments begin with an evaluation of the quality, adequacy, and completeness of the organization's vision, mission, values, and goals as established by senior organizational leaders. This review includes an assessment of business plans, budgets, and performance measurement systems for consistency with and reinforcement of the safety culture.

## Phase 2

Evaluating organizational safety culture continues with an assessment of management's understanding and translation of the organization's mission objectives and values into the day-to-day activities of the workforce via their decisions, performance standards and goals, operational procedures and schedules, training, rewards systems, and organizational learning and continuous improvement programs.

## Phase 3

The evaluation focuses next on worker understanding and behavioral compliance with procedure and policy guidelines, management expectations, and the organization's safety culture. Direct observations of day-to-day operations assesses the degree to which personnel proactively search for unsafe conditions, stop unsafe actions, and accept performance improvement feedback from superiors, peers, and subordinates.

## Phase 4

The organization's systems, environment, and individual behaviors are assessed to determine the degree of visibility to human and equipment problems, particularly deviations from management expectations and the organization's safety culture.



# Improving your Safety Culture



Individuals at all levels of the organization must be engaged in order to foster a robust safety culture. This culture originates from executive defined attributes and goals and is translated to the day-to-day decisions and actions of all employees. Employees must be confident that safety is management's top priority and that they are empowered and obligated to act on any observed unsafe condition before it results in a mishap, injury, or property damage.

## **Phase 5**

Define the degree of maturity desired for each safety culture attribute; noting the specific gaps between the organization's current safety culture maturity and that of the end state. Note that achieving high maturity in each attribute area may not be desired or required to achieve high levels of operational performance.

## **Phase 6**

Identify and design specific people, process, and technology upgrades to close the identified maturity gaps; ensuring employee involvement from all levels of the organization.

## **Phase 7**

Implement the several safety culture performance improvement initiatives including an ongoing performance measurement and rewards system to continuously monitor and reinforce the organization's safety culture values.

## **Phase 8**

Institute a periodic organizational safety culture assessment strategy to lock-in gains, support continuous improvement, and prevent long-term cultural decline.

# The StrategyDriven Difference

StrategyDriven uniquely combines decades of nuclear plant and industrial complex operating experience, deep business acumen, extensive knowledge of regulatory agency protocols, and industry specific methods and tools to provide solutions that enhance operational safety, reliability, and efficiency. We possess unique hands-on operations, maintenance, work management, engineering, and large project management experience; making us credible advisors who can support you in making effective, meaningful change.

- ‘*Stood the watch*’ at commercial and military nuclear plants in operations, maintenance, engineering, work management, craft supervision, and major projects management positions
- Authored or contributed to the development of numerous nuclear industry guidelines and associated evaluation methods involving safety culture
- Led teams of nuclear industry professionals in the qualitative and quantitative assessment of operational performance and safety culture at over a dozen domestic and international nuclear facilities

Our professionals have been awarded top industry licenses, certifications, and qualifications:

- U.S. Nuclear Regulatory Commission Senior Reactor Operator License
- U.S. Navy Chief Nuclear Engineer Officer Qualification
- Institute of Nuclear Power Operations Plant Operations Evaluator Qualification
- National Academy for Nuclear Training Event Investigator Certification
- Project Management Institute Project Management Professional Certification

## Diverse, Global Client Experience

**StrategyDriven advisors serve the global Energy Industry...**

### United States

- 30 nuclear power plants from 18 utilities
- 18 U.S. nuclear powered naval vessels
- 1 coal-fired fossil power plant from 1 utility
- 1 natural gas delivery system from 1 utility

### Canada

- 4 nuclear power plants from 4 utilities

### Japan

- 1 nuclear power plant from 1 utility
- 1 U.S. nuclear powered naval vessel

### United Kingdom

- 2 natural gas-fired power plants from 1 utility

### Central & South America (El Salvador, Peru, and Brazil)

- 1 hydro dam from 1 utility
- 1 diesel generator power station from 1 utility





# Related Thought Leadership

[www.StrategyDriven.com/SafetyCulture](http://www.StrategyDriven.com/SafetyCulture)

StrategyDriven regularly publishes unique points of view on the principles, best practices, and warning flags associated with performance in the safety culture related areas of:



## **Risk Management**

StrategyDriven's Risk Management Forum provides materials focusing on the effective identification, monitoring, mitigation, and response to both identified and unidentified risks.



## **Standards & Expectations**

StrategyDriven's Standards & Expectations Forum discusses the leading practices of companies developing and implementing performance standards that shape employee behaviors so to effectively and efficiently achieve mission goals in a manner consistent with their organizational values.



## **Decision-Making**

StrategyDriven's Decision-Making Forum explores the six phases of each of four decision-making categories associated with long-term strategic and near-term tactical decisions.



## **Human Performance Management**

StrategyDriven's Human Performance Management Forum focuses on those practices that ensure consistent, high-quality execution appropriately balanced with the need for cost-conscious efficiency.

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