



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire



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# Outline

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- Background
- Safety Culture Characteristics
- Organizational Behaviors
- Methods to Measure Organizational Behaviors
- Implications
- Summary



# Safety Culture Evaluation Fundamentals



# Importance of Organizational Behaviors to Safety Performance

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- Industrial catastrophes of modern times have led to increased attention on many human performance components.
- Safety statistics still attribute between 50 and 90 percent of the causes of industrial accidents to human error.
- Human errors associated with industrial accidents are varied in origin BUT are generally part of larger organizational processes.



# Evolution of Safety Culture Attributes and Their Importance to Safety Performance

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- Identification of Organization and Management Behaviors Impacting Safety Performance and Methods for Evaluation
- Characteristics of High Reliability Organizations
- Driver of Other Organizational Behaviors
- Safety Culture Characteristics



# Organization and Management Variables Important to Safety

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- Research indicates variables related to safety performance include:
  - Management commitment to safety
  - Safety training
  - Open communication
  - Environmental control & management
  - Stable workforce
  - Positive safety promotion policy
  - Work pace
  - Status of safety related committees and officers
  - Workplace risk



# Characteristics of High Reliability Organizations (Roberts and Bea, 2001)

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**Definition:** *A unique set of organizations that depend on human performance to avoid incidents involving significant adverse consequences in terms of employee and public health and safety.*

## **HROs are successful at:**

- Getting employees to buy into the big picture through consistent communication and teamwork to arrive at a common path forward
- Being “learning organizations” by aggressively seeking to know what they don’t know
- Using measurement to manage so that reward and incentive systems recognize the costs of failure as well as the benefits of reliability



## High Reliability Organizations (Cont'd)

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- Culture is the umbrella over these characteristics and influences their implementation.
- Successful HROs place heavy emphasis on promoting a positive safety culture.



# IAEA Safety Culture Model

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- INSAG – 4 first definition of safety culture
- Safety culture exists in an organizational context
- Schein model of culture
  - Artifacts
  - Claimed values
  - Basic assumptions
- Stages of safety culture development  
Compliance → Performance → Process



## 3 Stages of Cultural Development

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- **Compliance:** Safety is based on rules and regulations.
- **Performance:** Safety is considered an organizational goal and can be measured.
- **Process:** Safety can be continuously improved.



# Definition of Safety Culture used by the CNSC

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- Safety culture refers to the characteristics of the work environment, such as the values, rules, and common understandings that influence employees' perceptions and attitudes about the importance that the organization places on safety.



# Safety Culture Characteristics

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- Safety is a clearly **Recognized** value
- **Accountability** for safety is clear
- Safety is **Integrated** into all activities
- A safety **Leadership** process exists
- Safety culture is **Learning**-driven

*Specific performance objectives and criteria allowing Evaluation of presence or absence of each characteristic have been identified.*



# Relationships

## Performance Objectives

- Documentation that describes importance and role of safety in operation of organization exists
- Value of safety is clearly transmitted and understood by all personnel through multiple mechanisms
- Decision-making that reflects value and priority of safety in timely and focused manner exists
- Necessary allocation of resources is being made
- Roles and responsibilities clearly defined and understood
- Compliance with regulations and procedures
- An independent and constructive relationship with the regulatory body exists
- Delegation of responsibility with appropriate authority exists
- Management commitment to safety is evident at all levels
- Good housekeeping, material condition and working conditions exist
- Quality of documentation and processes, from planning to implementation and review, is good
- Sets of performance indicators are tracked, trended and evaluated
- Use of self-Evaluation is evident
- Integration of all types of safety is evident in organization
- Knowledge and thorough understanding of work processes exists
- Collaboration and teamwork is encouraged, supported and recognized
- Visibility and involvement of management in safety-related activities
- Involvement and motivation of all staff in organization is evident
- Change management process that promotes orderly transition is evident
- An organizational process for conflict resolutions exists and is effectively used
- The impact informal leaders have on safety culture is recognized
- Open reporting culture without blame exists
- Use of organizational and operating experience, both internal and external to organization, is evident
- Process to identify problems, develop and implement integrated corrective action plan, exists
- Professional and technical continuous development of staff is evident
- A questioning attitude is evident at all organizational levels

## Safety Culture Characteristics

- Safety is a clearly recognized value.
- Accountability for safety in the organization is clear.
- Safety is integrated into all activities in the organization.
- A safety leadership process exists in the organization.
- Safety culture is learning-driven in the organization.

## Organizational Behaviors

- Attention to Safety
- Decision-making
- Goal Setting/Prioritization
- Resource Allocation
- Time Urgency
- Roles and Responsibilities
- Performance Quality
- Management Emphasis on Safety
- Employee Awareness of Risk
- External Communication
- Coordination of Work/Time Urgency
- Formalization
- Training
- Organizational Knowledge
- Cohesion
- Organizational Culture
- Communication
- Commitment
- Job Satisfaction
- Organizational Learning
- Problem Identification & Resolution
- Performance Evaluation
- Personnel Selection



# Performance Objective and Sample Criteria

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- Management Commitment to safety is evident at all levels
  - A significant factor in considering personnel for any management level position is demonstrated evidence of a strong commitment to safety
  - A long-term strategy to ensure the continued commitment to and focus on safety has been developed and effectively communicated to station personnel.



# Organizational Behaviors Impacting Safety Culture

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- Attention to Safety
- Coordination of Work
- Decision-making
- External Communication
- Formalization
- Goal Setting/Prioritization
- Interdepartmental Communication
- Intradepartmental Communication
- Organizational Culture
- Organizational Learning
- Organizational Knowledge
- Performance Evaluation
- Performance Quality
- Personnel Selection
- Problem Identification
- Resource Allocation
- Roles & Responsibilities
- Time Urgency
- Training



# Identification and Evaluation of Organizational Behaviors

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- 17 organizational behaviors identified which impact safety performance
- Data collection tools developed for evaluation of organizational behaviors
- Multiple tools to assess each behavior systematically and objectively
- Tools allow for collection of quantitative and qualitative data
- Collection of convergent data from multiple tools is unique



# Multiple Methods for Behavioral Measurement

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- Functional Analysis
- Structured Interviews and Focus Groups
- Behavioral Anchored Rating Scales (BARS)
- Behavioral Observations and Checklists
- Organizational and Safety Culture Survey



# BEHAVIORAL ANCHORED RATING SCALES

## Attention to Safety

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Attention to Safety refers to the characteristics of the work environment, such as the norms, rules, and common understandings that influence facility personnel's perceptions of the importance that the organization places on safety. It includes the degree to which a critical, questioning attitude exists that is directed toward facility improvement.

- Individuals in the facility believe safety is the number one priority and that perspective is reinforced by senior (high-level) management and clearly disseminated to all individuals in the facility.
- Personnel make an effort to correct problems in a timely and effective manner to ensure that safety levels are not compromised within the facility. Individuals have a clear understanding that safety is a top priority.



# BEHAVIORAL ANCHORED RATING SCALES

## Attention to Safety (Cont'd)

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- Facility management reflects a delicate balance of emphasizing safety, while at the same time, making it clear that there is a need to keep the facility operating.
- At times, the interests of the stakeholders seem to take priority over concerns regarding the safe operation of the facility and the lack of organization wide support for safe facility operations is clearly evident.
- Questions regarding safe operations are not welcome or addressed. Management's attitude is to keep the facility at power regardless of evident safety issues.



## Behavioral Checklist - Communication

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While observing an individual communicate with someone else:

- 1) Did the communications occur with an external entity \_\_\_\_, a member of a different organizational unit \_\_\_\_, or a member of the same organizational unit \_\_\_\_?
- 2) If the communication occurred with an external entity, was the entity another member of the utility (outside the immediate facility) \_\_\_\_, a regulatory agent \_\_\_\_, a labor union representative \_\_\_\_, or a member of the public \_\_\_\_?  
N/A \_\_\_\_
- 3) Was the communication between individuals at the same level within the organization \_\_\_\_ or at different levels \_\_\_\_?  
N/A \_\_\_\_



# Applications of Methodology

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- Fully implemented in 22 different organizations (10 in Canada); partially implemented in 17 additional organizations
- Implemented across different industries including:
  - Nuclear power
  - Fossil fuel
  - Chemical reprocessing
  - Health care
  - Mining
  - Research
  - Transportation
- Methodology used effectively in 5 different countries
- Methodology discriminates between organizations



# Implications

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- Safety culture attributes are definable and assessable
- Tools are available for the diagnosis of the absence or presence of attributes important to safety culture
- Some behaviors have been more successful at differentiating between organizations
- Strategies can be implemented to ensure organizational alignment on the development, implementation, and continuous improvement of a positive safety culture



## Summary

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- A Safety Culture Evaluation Methodology provides an independent evaluation of the current status of the safety culture characteristics;
- The Evaluation will also assist in the enhancement of safety culture by identifying ways in which the organization can continuously build safety;
- The Evaluation will facilitate the progression of the development of safety culture from the compliance to performance-based, to continuous improvement stages.



# Conceptual Model of the Organization

