Asian Nuclear Safety Network (ANSN)

Regulatory Infrastructure Topical Group (RITG)

Regional Workshop on the Development of Integrated Management System based on GSR Part 2

Module 6 – Commitment to Achieving Right Outcomes (cont'd)

"Safety Culture and Assessment"

Hosted by the Office of Atom for Peace
Government Thailand, Chiang Rai, Thailand

Abida KHATOON, IAEA Expert – Pakistan

21 – 23 November 2016

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International Atomic Energy Agency

IAEA Approach to Safety Culture and Assessments

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Contents

- **Safety Culture Requirements GSR Part 2 Requirements 2, 13 & 14**
- **Safety culture and Safety culture self-assessment**

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Safety Culture

The IAEA advisory group INSAG

*"A vital conclusion drawn from this behaviour is the importance of placing complete authority and responsibility for the safety of the plant on a senior member of the operations staff of the plant. Of equal importance, formal procedures must be properly reviewed and approved and must be supplemented by the creation and maintenance of a '**nuclear safety culture**'".*

(INSAG-1, 1986)

The concept of the safety culture was now formally introduced in the area of nuclear safety.

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Definition of safety culture

"Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance".

(INSAG-4, 1991)

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Current definition of safety culture

"Safety Culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, ***protection and*** *safety issues receive the attention warranted by their significance".*

(The 2007 IAEA glossary)

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IAEA Safety Culture Publications *http://www.iaea.org*

Document	Title
Safety Fundamentals No. SF-1	Fundamental Safety Principles
Safety Requirements No. GS-R-1	Government, Legal and Regulatory Framework for Safety
Safety Requirements No. GS-R-3	The Management System for Facilities and Activities
Safety Guide No. GS-G-3.1	Application of the Management System for Facilities and Activities
Safety Guide No. GS-G-3.5	The Management System for Nuclear Installations
Safety Guide No. SSG-16	Establishing the Safety Infrastructure for a Nuclear Power Programme
Safety Series No. 75-INSAG-4	Safety Culture
Safety Series No. 75-INSAG-15	Key Practical Issues in Strengthening Safety Culture
Safety Report Series No. 11	Developing Safety Culture in Nuclear Activities
Safety Report Series No. 42	Safety Culture in the Maintenance of Nuclear Power Plants
Safety Report Series: No 74	Safety Culture during Pre-Operational Phases – Published Sept 2012
Safety Report Series:	How to Perform Safety Culture Self-Assessment - draft
Safety Report Series:	How to Continuously Improve Safety Culture - draft
TECDOC-1321	Self-assessment of safety culture in nuclear installations
TECDOC-1329	Safety culture in nuclear installations

IAEA Safety Standards

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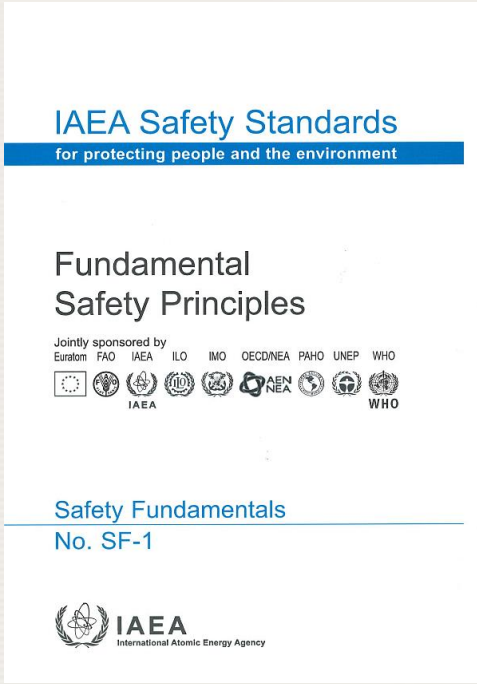
Safety Standards Hierarchy



Global reference for a high level of nuclear safety

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Fundamental Safety Principles SF-1

Integrated management systems

Principle 3: Leadership and management for safety

3.12. *"…Safety has to be achieved and maintained by means of an effective management system. This system has to* ***integrate all elements*** *of management so that requirements for safety are established and applied coherently with other requirements, including those for human performance, quality and security, an that* ***safety is not compromised by other requirement or demands****. The management system also* ***has to ensure the promotion of a strong safety culture****…"*

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IAEA Safety Standards

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General Safety Requirements	Specific Safety Requirements
Part 1 Governmental and Regulatory Framework	1. Site Evaluation for Nuclear Installations
Part 2 Leadership and Management for Safety	2. Safety of Nuclear Power Plants 2.1 Design and Construction 2.2 Commissioning and Operation
Part 3 Radiation Protection and Safety of Radiation Sources	
Part 4 Safety Assessment	3. Safety of Research Reactors
Part 5 Predisposal Management of Radioactive Waste	4. Safety of Nuclear Fuel Cycle Facilities
Part 6 Decommissioning and Termination of Activities	5. Safety of Radioactive Waste Disposal Facilities
Part 7 Emergency Preparedness and Response	6. Safe Transport of Radioactive Material

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General Safety Requirements

Part 1 Governmental and Regulatory Framework

Part 2 Leadership and Management for Safety

Part 3 Radiation Protection and Safety of Radiation Sources

Part 4 Safety Assessment

Part 5 Predisposal Management of Radioactive Waste

Part 6 Decommissioning and Termination of Activities

Part 7 Emergency Preparedness and Response

Specific Safety Requirements

1. Site Evaluation for Nuclear Installations

2. Safety of Nuclear Power Plants

2.1 Design and Construction
2.2 Commissioning and Operation

3. Safety of Research Reactors

4. Safety of Nuclear Fuel Cycle Facilities

5. Safety of Radioactive Waste Disposal Facilities

6. Safe Transport of Radioactive Material

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GSR Part 1: National policy and strategy

- **Requirement 1: National policy and strategy for safety**
  - *2.3 (g): "The promotion of leadership and management for safety, including safety culture."*
- **Requirement 19: The management system of the regulatory body**
  - 4.15. The management system of the regulatory body has three purposes: … (3) *The third purpose is to foster and support a safety culture in the regulatory body through the development and reinforcement of leadership, as well as good attitudes and behaviour in relation to safety on the part of individuals and teams*
- **Requirement 29: Graded approach to inspections of facilities and activities**
  - 4.53. In conducting inspections, the regulatory body shall consider a number of aspects, including:
  - —Management systems
  - —Safety culture

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General Safety Requirements

Part 1 Governmental and Regulatory Framework

Part 2 Leadership and Management for Safety

Part 3 Radiation Protection and Safety of Radiation Sources

Part 4 Safety Assessment

Part 5 Predisposal Management of Radioactive Waste

Part 6 Decommissioning and Termination of Activities

Part 7 Emergency Preparedness and Response

Specific Safety Requirements

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6. Safe Transport of Radioactive Material

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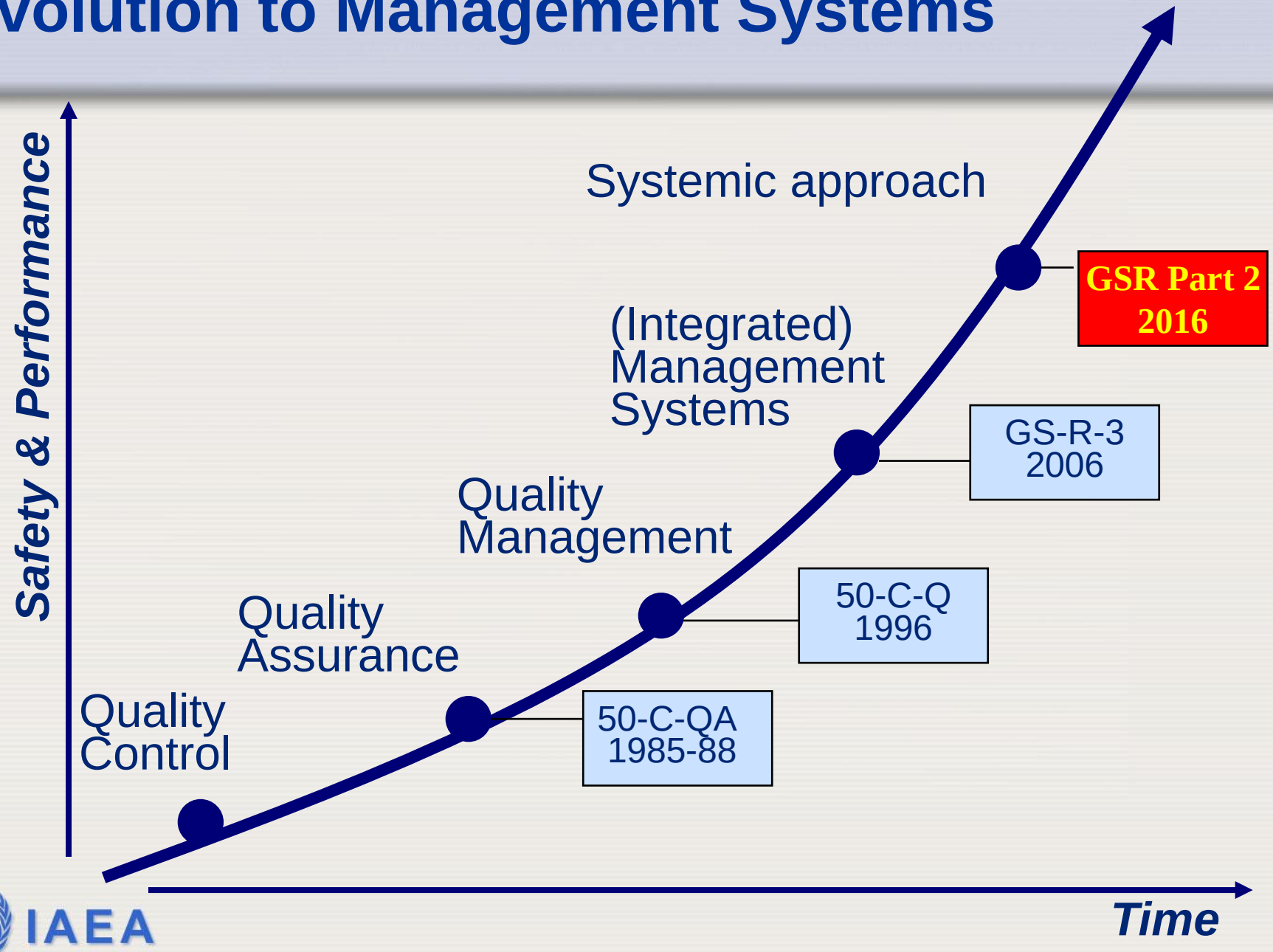
Evolution to Management Systems



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Objective of the GS-R Part 2

Leadership and Management for Safety

- The application of SF-1 to establish requirements for:
  - ✓Effective leadership for safety
  - ✓Effective management for safety
  - ✓Effective safety culture improvement activities
- Safety as a sustainable outcome of excellence in leadership and management
- Integrated management system: make sure that other requirements will not compromise Nuclear Safety
- Systemic approach of ITO

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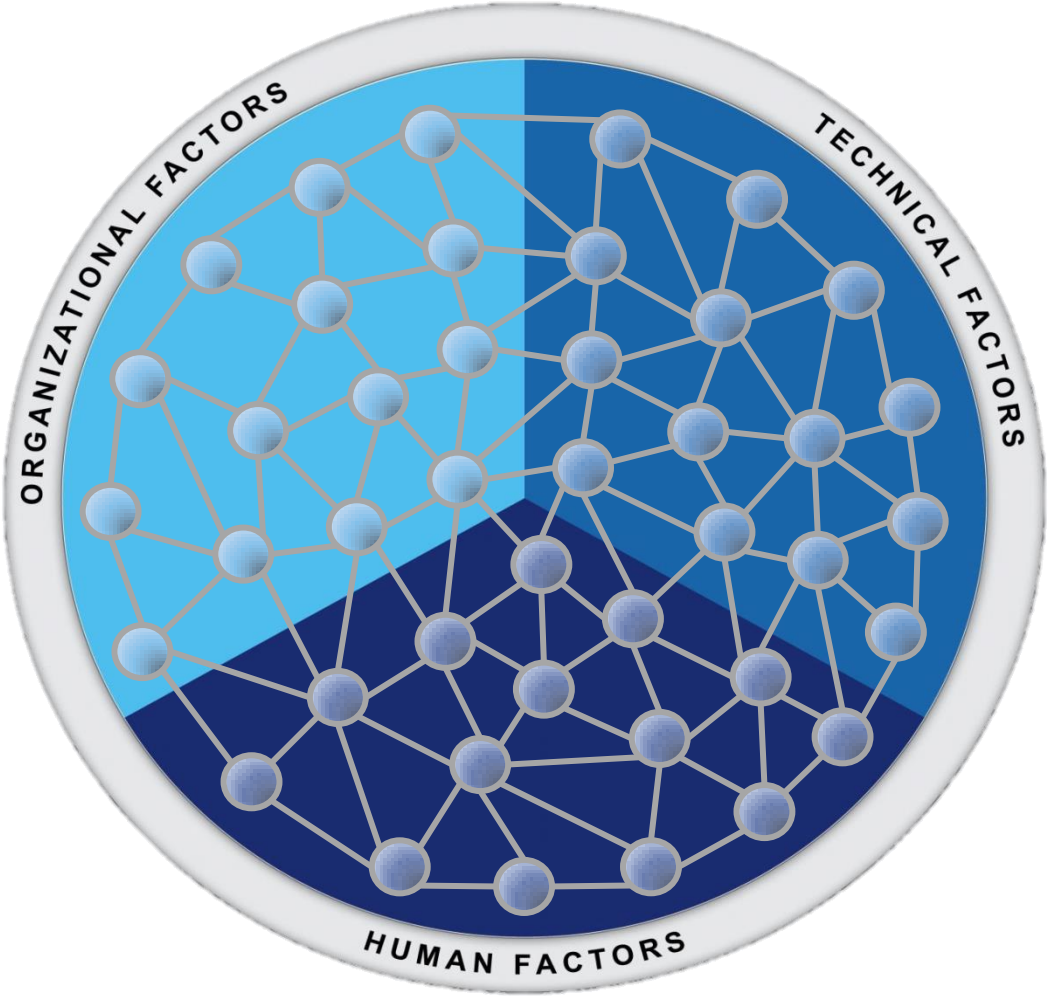
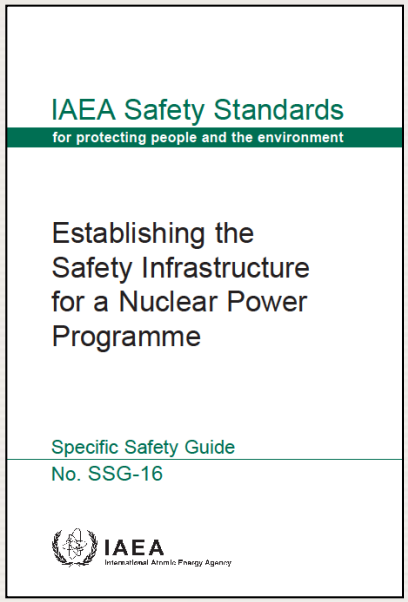
Systemic Approach – The Interaction between Individuals, Technology and Organization



IAEA SAFETY STANDARDS HIERARCHY



Global reference for a high level of nuclear safety

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SSG-16: Infrastructure for new-builds

2.9. The government should also take into account:

…

—The promotion of leadership and management for safety, including safety culture (see also paras 2.142–2.157 on leadership and management for safety)

2.50. The regulatory body's responsibilities also include:

…

—Promoting safety culture

Action 72. The government should take into account the essential role of leadership and management for safety to achieve a high level of safety and to foster safety culture within organizations.

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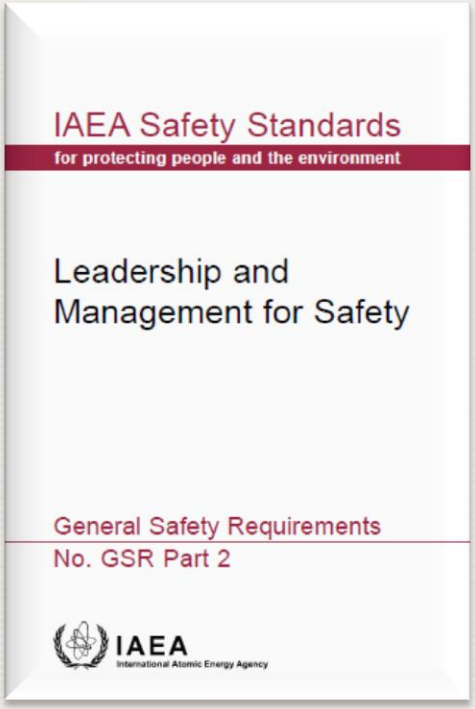
Safety Standards Hierarchy



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Safety (Culture) Requirement GSR Part 2

*"The management system shall be used to **promote and support a strong safety culture** by:*

- *Ensuring a **common understanding** of the key aspects of safety culture within the organization;*
- ***Providing the means** by which the organization supports individuals and teams in carrying out their tasks safely and successfully, taking into account the interaction between **individuals, technology and the organization**;*
- *Reinforcing a **learning and questioning attitude** at all levels of the organization;*
- *Providing the means by which the organization continually seeks to **develop and improve** its safety culture."*

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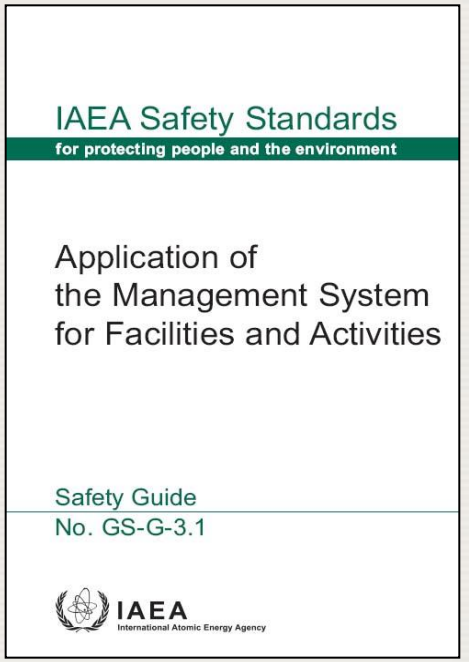
Safety Standards Hierarchy



Global reference for a high level of nuclear safety

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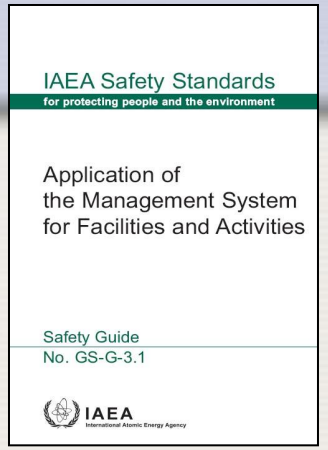
IAEA Safety Standard - Characteristics and Attributes for Strong Safety Culture



Safety is a clearly recognized value

Leadership for safety is clear

Safety Culture Characteristics

Accountability for safety is clear

Safety is integrated into all activities

Safety is learning driven

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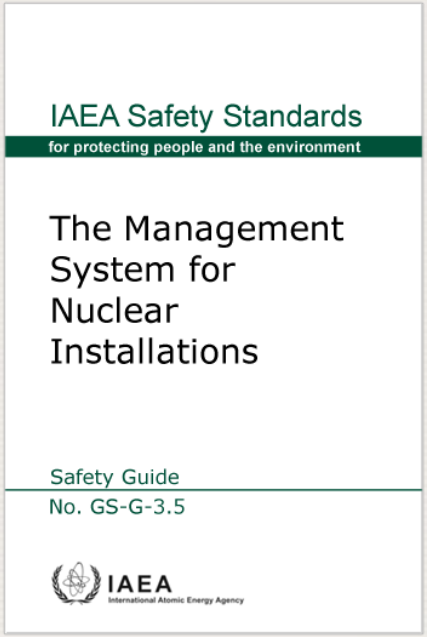
(GS-G-3.1)

Safety Standards Hierarchy



Global reference for a high level of nuclear safety

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Safety (Culture) Guidance GS-G-3.5

Specific guidance for nuclear installations*

- Further explanation of the five safety culture characteristics and the attributes
- Improving safety culture
- Warning signs of a decline in safety culture
- Concept of interaction between individuals, technology and the organisation
- Assessment of safety culture

* Nuclear power plants, other reactors (research and critical assemblies), nuclear fuel cycle facilities

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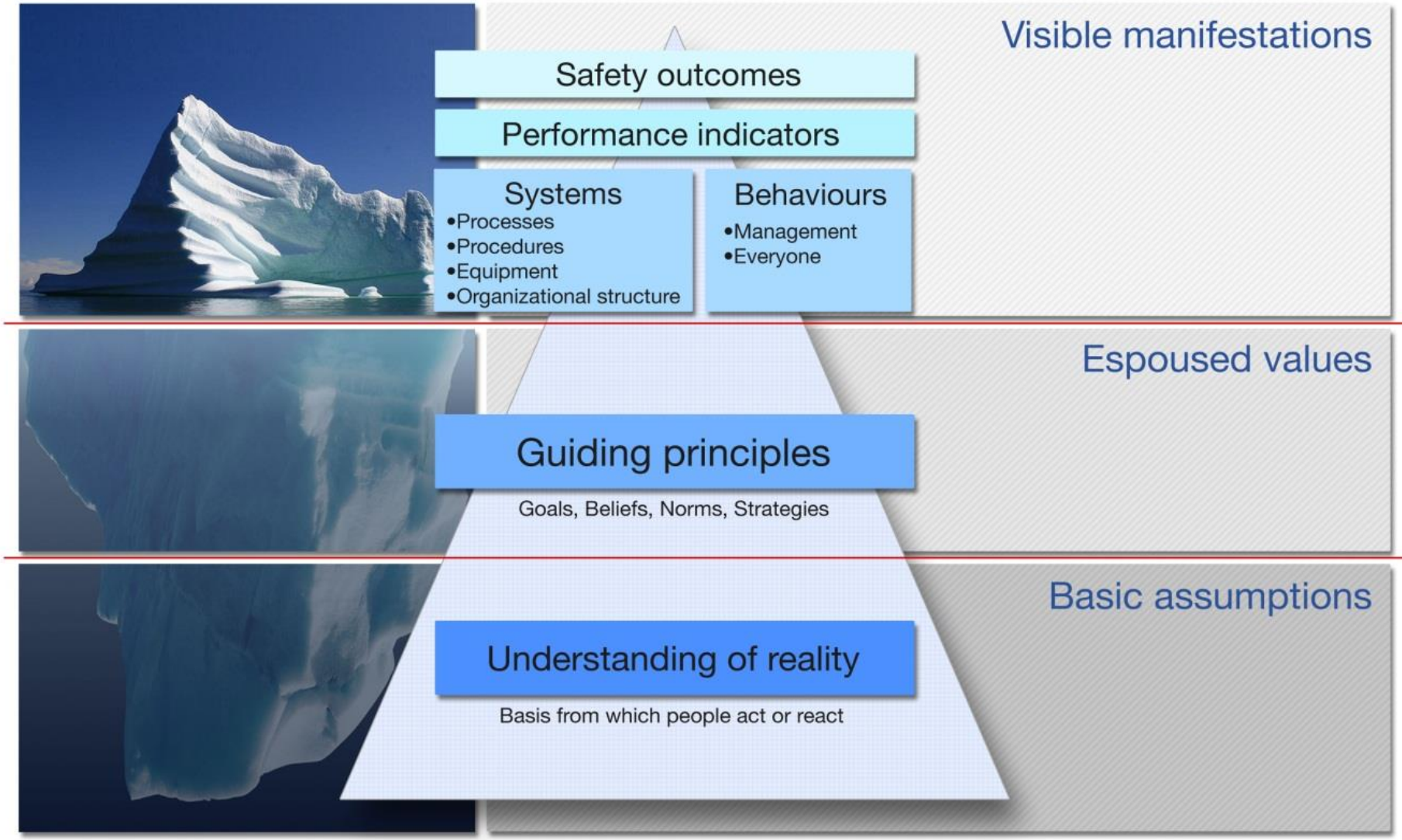
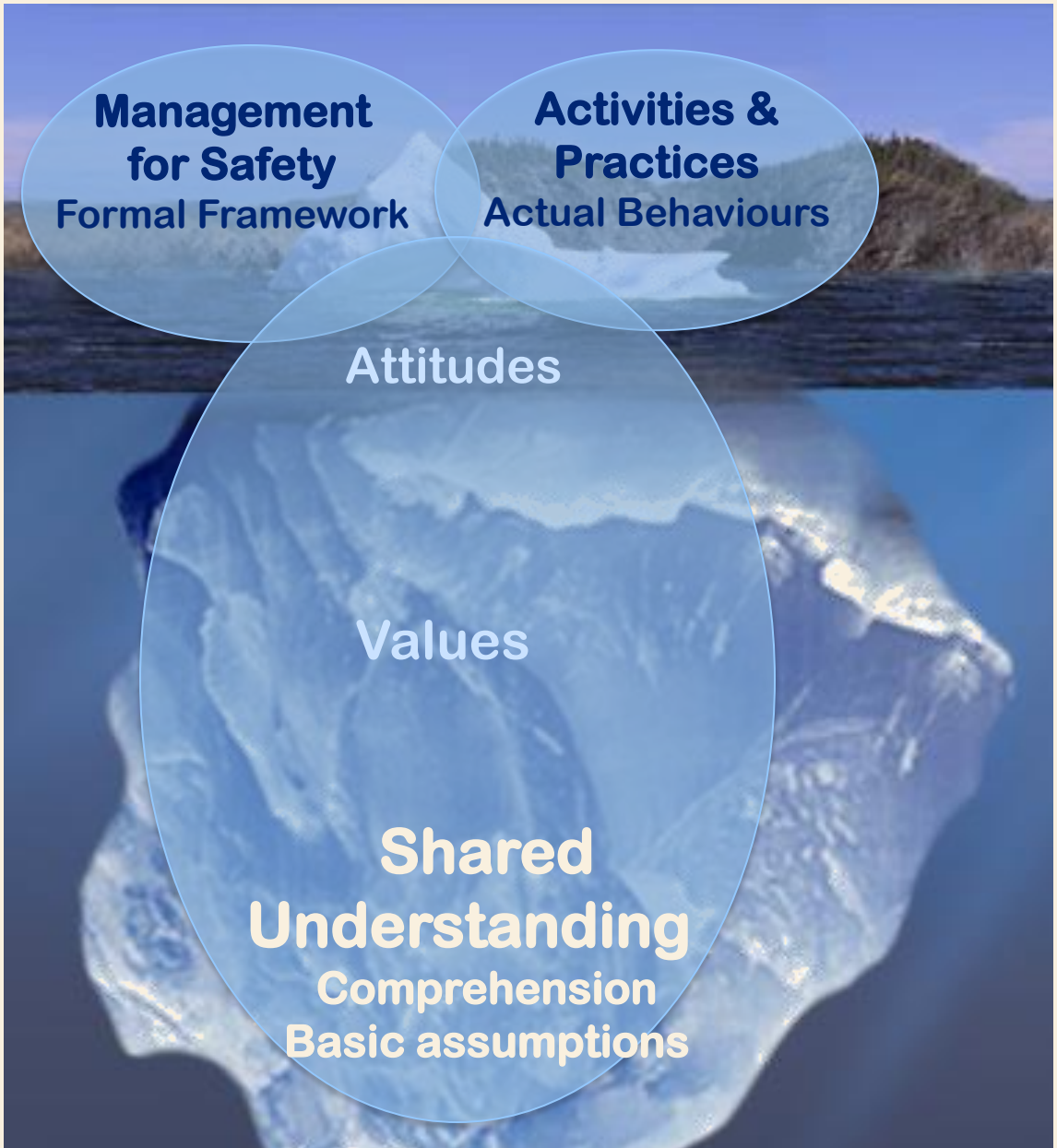
Safety Culture Assessment

Edgar Schein's Levels of culture



Working with the deeper levels of safety culture



Basis of IAEA safety culture assessment methodology

Based on:

- IAEA Safety Standards
- Behavioural science
- Past experiences

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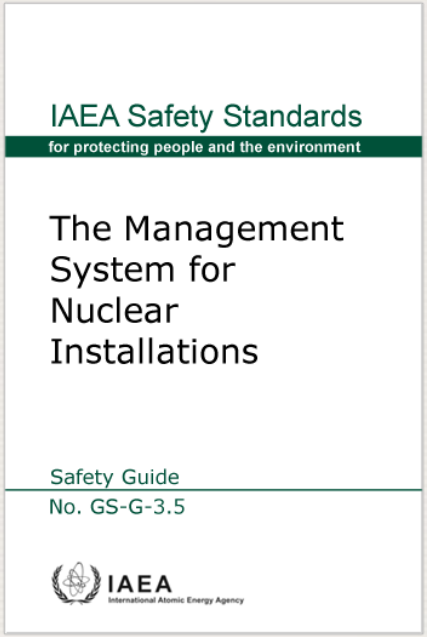
Safety Standards Hierarchy



Global reference for a high level of nuclear safety

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Safety Standard GS-G-3.5: Assessment of safety culture

*Safety culture **self-assessement** should:*

- Include the **entire** organization
- **Several** different self-assessment **tools** should be used (e.g. interviews, focus groups, questionnaires, observations and document reviews)
- A designated **team** representing all organizational levels and functions at the installation should carry out the self-assessment
- A **specialist** in safety culture should be included in the team
- The self-assessment team should receive **training**
- The self-assessment team should summarize the results and identify **areas for improvement** and may suggest **actions** to be taken
- The results should be **reported** to the management at an appropriate level
- A **follow-up assessment** should be performed

The **independent** assessment of safety culture should follow a **similar approach**

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Safety Standard GS-G-3.5: Assessment of safety culture

*Safety culture **independent** assessment should:*

The independent assessment of safety culture should follow a similar approach as self-assessment

- The **independence** and **qualification** of the members of the assessment team should be considered **crucial** for the success of the assessment
- The **team** should be staffed with sufficient **diversity** of experience and should include **specialists in behavioural science**, with knowledge of statistical methods of analysis
- The independent assessment team should aim at **identifying strengths** and **areas for improvement**

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Core of IAEA Assessment Methodology

- Using ***several*** assessment methods
  (questionnaire, interview, document review, observation, focus group)
- Separation of ***descriptive*** and ***normative***

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Descriptive and Normative Analysis

Descriptive

‘is’

Based on data and a theory of culture

Normative

‘should’

Based on data, a theory of culture *and a norm*

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Core of IAEA Assessment Methodology

- Using ***several*** assessment methods
  (questionnaire, interview, document review, observation, focus group)
- Separation of ***descriptive*** and ***normative***
- Performed in ***silos*** – each assessment method treated separate

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Core of IAEA Safety Culture Analysis Process

e. g. Self-assessment or independent assessment

Final Issues;
Normative,
evaluative analysis

Overarching themes: Image(s) of culture

Cultural themes	Cultural themes	Cultural themes	Cultural themes	Cultural themes
Cultural facts	Cultural facts	Cultural facts	Cultural facts	Cultural facts
Interview data	Survey data	Focus group data	Document data	Observation data

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Observations

What is an observation?

- Naturally occurring behaviour in real time
- Visible manifestations of cultures:
  - Interactions between people including, emotional tone and impacts on behaviours
  - Outcomes of interactions, decisions, or task performance
  - Use of tools, procedures and other relevant means of work
  - Context - work conditions, material condition

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Why observations?

- What you see is factual – whether it should have happened or not!
- Make the meaning or importance of relationships, symbols, and other artefacts understandable

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Surveys

Why surveys?

- To capture attitudes and impressions of a large population
- To make sure that everyone in a organization has had an opportunity to make his/her voice heard
- To be able to track changes over time
- The survey itself is a message – ’we care about your view’!
- Data can be processed statistically to identify differences between groups (e.g. functional groups or hierarchical levels)

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Disadvantages of Surveys

- It is resource-intensive to plan, distribute, analyse and communicate survey results
- Surveys identify symptoms rather than causes
- The information collected is about what employees think they think – this is not the same as how they really act!
- Surveys are subject to response bias, e.g. respondents may feel that they should respond in certain ways
- Surveys say more about what the person asking questions thinks is important than what the respondent feels is important!

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IAEAs Questionnaire

Version 10

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Atoms for Peace

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国际原子能机构
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Agence internationale de l'énergie atomique
Международное агентство по атомной энергии
Organismo Internacional de Energía Atómica

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In reply please refer to: Monica Haage
Dial directly to extension: (+431) 2600-22551

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One University. One World. Yours.

Please read the following before you fill out the questionnaire

INSTRUCTIONS

1. Do not put your name on any part of this questionnaire
2. Answer all the questions as completely and honestly as possible. If you are not comfortable answering a question, leave it blank and move onto the next question.
3. Place your survey in the drop box or pass it to the person facilitating your session when you are finished

Please Note:
Your individual answers will be kept confidential to the research team, your participation is voluntary and you can withdraw from the study at any point up until you submit your survey (see information sheet for specific instructions).

If you have any questions please ask the person who is coordinating your session. You can also contact Dr. Fleming at +1 902-420-5273, or at mark.fleming@smu.ca

Thank you for your participation!

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IAEA safety culture survey

- Based on IAEA safety culture framework (characteristics and attributes)
- Collaboration with St. Marys University, Canada
- Database to study global tendencies
  - Anonymous participation

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Document Review

Why document review?

- Documents communicate management values and expectations
- Reveal approaches/beliefs related to ensuring compliance, e.g. how positional power authority is distributed, degree of formality, approaches to corrective actions, etc.
- May reveal actual work practices, e.g. event reports

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Which internal documents?

- Annual reports
- Policies, objectives and short term and long term plans
- Performance indicators
- Key management system processes and procedures
- Inspection reports
- Event investigation reports
- Training records
- Reward and recognition programmes
- Overtime policy and statistics
- Licensing documents
- Results from previous internal audits and assessments
- Minutes of meetings

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Which external documents?

- IAEA missions
- Peer review reports
- External regulatory experience

Remember – sample of documents to gain insights not exhaustive review!

Interviews

Why interviews?

- Interviews provide in-depth knowledge on specific topics and areas of interest
- They make it possible for employees to make their voice heard in a form not constricted by the rigidity of e.g. a questionnaire
- Interviews are a powerful tool, but they require trust, confidence and interviewer skills

Interview technique

An explorative interview tries to capture the respondent's point of view. This means:

- Not too many questions
- Open themes may be better than actual questions
- Questions should be of an open-ended nature
- Listening is one of the most important skills in interviewing!
- Encourage the respondent's story-telling
- Follow the respondent's story, you may discover things you did not know!

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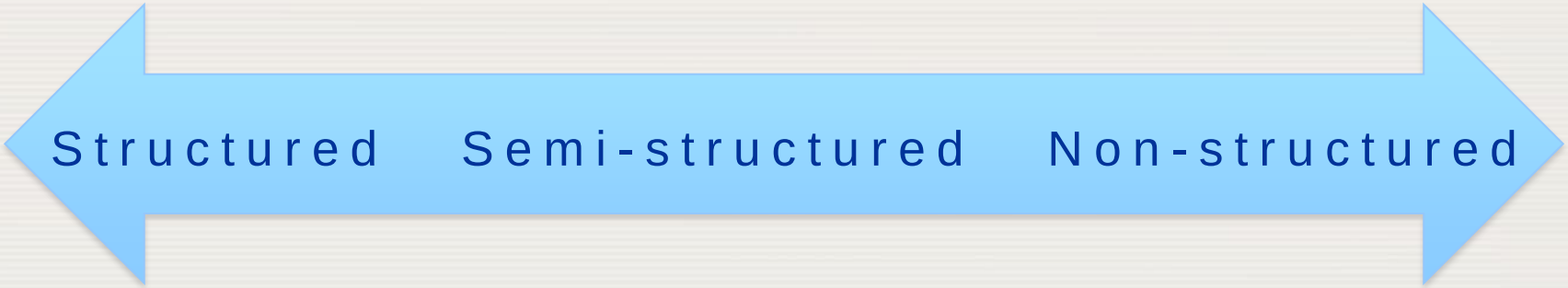
Interview technique (cont'd)

- Consider degree of structuration:



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Interview technique (cont'd)

An interview should not be:

- A *test* where the respondent's knowledge is put to scrutiny
- An *interrogation* where the respondent is held accountable for something
- *Identity work/moral storytelling*, where the respondent feels s/he has to present a certain image to the interviewer
- A *rehearsal*, where ready-made stories and corporate policies are re-told

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Interview technique (cont'd)

Acknowledging the importance of narratives:

- Organizational stories
- The structure of accounts, e.g. how events are interpreted:
  - Cause and effect?
  - Blaming?
  - How are tensions managed in the story?
  - Everyone's story is important – in cultural analysis we are not interested in what happened, but the meaning it has in the organization

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Focus Groups

Why focus groups

- The purpose of focus groups is to develop a broad and deep understanding rather than a quantitative summary
- Focus groups are a highly effective method for listening to others' views
- Draw out attitudes, feelings, beliefs, experiences and reactions in a way that is not feasible using other methods

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Why focus groups (cont'd)

- These attitudes, feelings and beliefs may be partially independent of a group or its social setting, but are more likely to be revealed via interaction in a focus group setting.
- Elicit a multiplicity of views and emotional processes within a group context.

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Advantage of focus groups

- Particularly useful when:
  - there are power differences between the participants and decision-makers or professionals,
  - when the everyday use of language and culture of particular groups is of interest, and
  - when one wants to explore the degree of consensus on a given topic
- Good example of how to create shared space
- Focus groups are also an important tool when facilitating the change process

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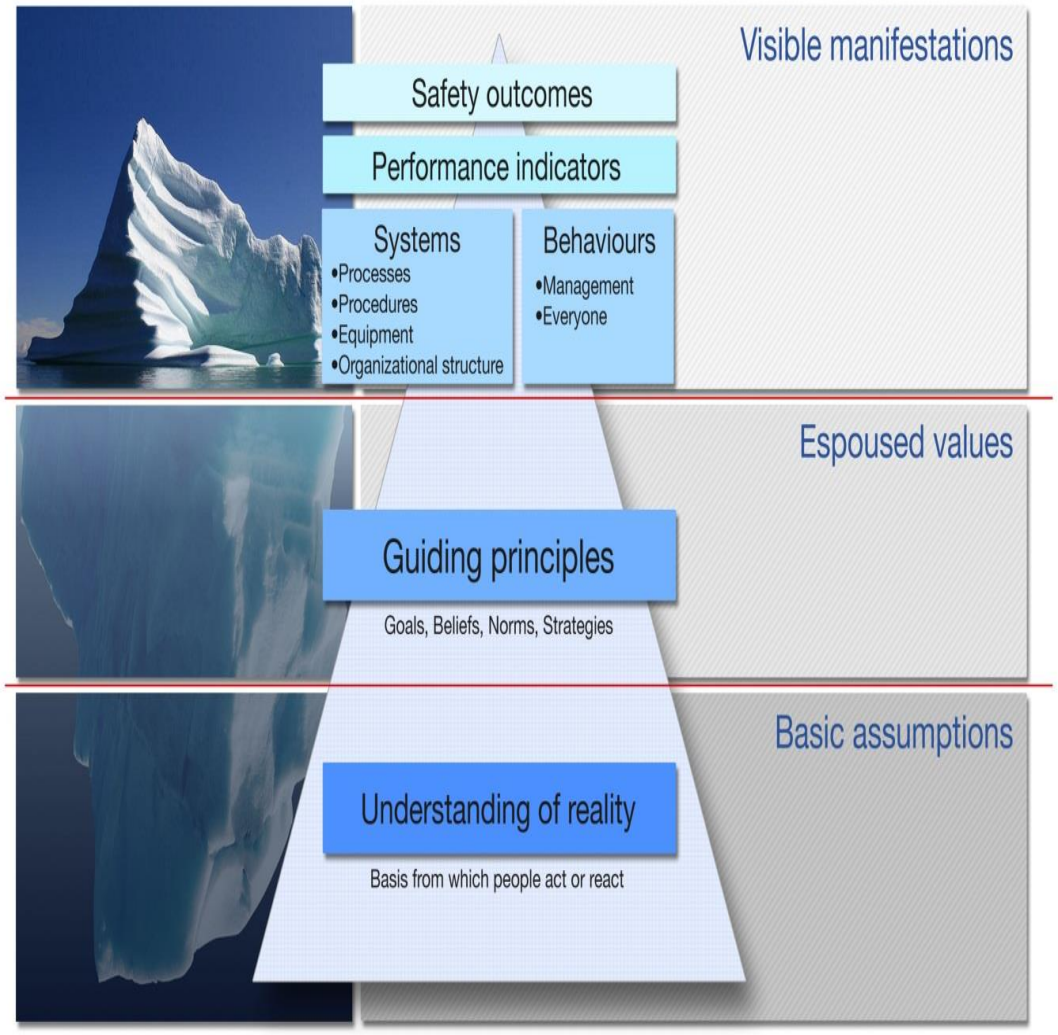
SC SA Method

Overall characteristics of method

- Multiple-methods approach
- Explorative, open approach
- Raw material for interpretation
- Data in itself say little about culture (tip of the iceberg)

Back to ‘culture’



How do we move from observations above the surface

to images of what the culture is like, under the surface?

Core of IAEA Safety Culture Analysis Process

e. g. Self-assessment or independent assessment

Final Issues;
Normative,
evaluative analysis

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Summary

- IAEA's approach to Safety Culture is expressed in Safety Standards, Safety Reports and Technical Documents
- Safety culture is an essential component of the leadership and management for safety
- SCSA is performed in two phases: descriptive and normative
- The descriptive phase is explorative and gathers data in order to form an image of the culture of the organization
- The normative phase applies an evaluative perspective to the culture to determine how well it does something
- SCSA uses five methods of data gathering to capture a wide range of cultural expressions

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Fitting all the pieces together

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