Systematic Assessment of Regulatory Competences (SARCON): Introduction and Methodology

José Gil Martin (Spain)
CONTENT

• The Guidelines
• Quadrant Model of Competences
• The Step by Step Approach
• Experience using SARCoN
Why Competence Management?

- Arrangements for competence management is a key factor to:
  - Support the implementation of article 8 of CNS (Convention on Nuclear Safety – “regulatory body with adequate competence and human resources”)
  - Support the implementation of Modules 3 and 4 of the IRRS and other IAEA Safety Standards (Module 3: “Responsibilities and functions of the regulatory body”, Module 4: “Management system of the regulatory body”)
  - Identify gaps between regulatory required competences and the existing resources
  - Develop and implement tools and programmes to fill the gaps
  - Review periodically the competence needs and training programmes
Regulatory Competence underlined in the IAEA Safety Standards, Safety Documents and INSAG

Competence of the regulatory bodies is mentioned more than 100 times in the relevant IAEA safety standards.

A specific regulatory competence model, guidance for managing regulatory competence and a systematic methodology for regulatory competence needs assessment has been developed by the IAEA in cooperation with Member States.

INSAG 26 recognises and recommends the 4 Q model.
## SARCoN Guidelines

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<thead>
<tr>
<th>No.</th>
<th>Level</th>
<th>Basis</th>
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<tbody>
<tr>
<td>1</td>
<td>Organizational</td>
<td>Quadrant areas</td>
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<td>2</td>
<td>Organizational</td>
<td>KSAs</td>
</tr>
<tr>
<td>3</td>
<td>Individual</td>
<td>Quadrant areas</td>
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<tr>
<td>4</td>
<td>Individual</td>
<td>KSAs</td>
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The quadrant model of competences

<table>
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<th>1. Legal, regulatory and organizational basis</th>
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<td>1.3 Regulatory and regulatory guides</td>
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<td>1.4 Management system</td>
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<table>
<thead>
<tr>
<th>2. Technical disciplines</th>
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<tbody>
<tr>
<td>2.1 Basic science and technology</td>
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<td>2.2 Applied science and technology</td>
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<td>2.3 Specialized science and technology</td>
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<table>
<thead>
<tr>
<th>3. Regulatory body’s practices</th>
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</thead>
<tbody>
<tr>
<td>3.1 Review and assessment</td>
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<tr>
<td>3.2 Authorization</td>
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<td>3.3 Inspection</td>
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<tr>
<td>3.4 Enforcement</td>
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<tr>
<td>3.5 Development of regulations and guides</td>
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<table>
<thead>
<tr>
<th>4. Personal and interpersonal effectiveness</th>
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</thead>
<tbody>
<tr>
<td>4.1 Analytical thinking and problem solving</td>
</tr>
<tr>
<td>4.2 Personal effectiveness and self-management</td>
</tr>
<tr>
<td>4.3 Communication</td>
</tr>
<tr>
<td>4.4 Team work</td>
</tr>
<tr>
<td>4.5 Managerial competences and leadership</td>
</tr>
<tr>
<td>4.6 Safety Culture</td>
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</tbody>
</table>
The 4Q Regulatory Competence Model
Knowledge, Skill and Attitudes (KSA)

Quadrant 1: Competences related to Legal, Regulatory and Organisational basis

1.1.2. Regulatory policies and approaches
This competence area is the knowledge of, and skills needed to comprehend and apply, the regulatory policies and approaches in order to achieve the relevant regulatory objectives.
Examples of KSAs could be:
- Comprehension and appreciation of the mandate, mission and objectives of the regulatory body;
- Comprehension of the values of the regulatory body and the principles of good regulation (e.g. independence, openness, efficiency, clarity, objectivity, stability, proportionality, accountability and consistency);
- Comprehension of regulatory body governance regarding its short and long term strategic objectives and goals;
- Comprehension of regulatory body policies and principles on which the regulatory processes are based;
- Appreciation of measures for implementing actions to achieve the short and long term strategic objectives and goals of the regulatory body.

1.3. Regulations and regulatory guides
This competence area is the knowledge of, and skills needed to comprehend and to apply, the regulations and regulatory guides.
Regulations and regulatory guides typically cover:
- Nuclear safety areas:
  (i) Technical safety requirements for siting, design, construction, commissioning, operation, decommissioning and waste management of nuclear facilities or devices;
  (ii) Requirements on the safety analysis report (SAR);
  (iii) Operational limits and conditions, surveillance and maintenance;
  (iv) Emergency preparedness and response;
  (v) Requirements related to the periodic safety review.

Quadrant 2: Technical disciplines competences

2.1. Basic science and technology
This competence area is the knowledge of, and skills needed to comprehend and apply, science and engineering fundamentals in a particular field. Some typical science and engineering fields that are common to many regulatory bodies include:
- Mathematics;
- Physics;
- Chemical, electrical, civil and mechanical engineering;
- Chemistry, including radiation chemistry;
- Earth sciences, including geology, seismology, meteorology and hydrology;
- Computer science;
- Nuclear engineering, including nuclear reactor concepts, nuclear physics and reactor physics;
- Environmental engineering;
- Materials and metallurgical engineering;
- Radiography, including medical applications;
- Thermodynamics and thermohydraulics;
- Behavioural sciences.

2.2. Applied science and technology
This competence area is the additional knowledge of, and skills needed to comprehend and to apply, engineering and science concepts in specific areas. The main areas may include:
- Nuclear reactor and power plant technology;
- Nuclear fuel cycle technology;
- Nuclear safety technology;
- Technologies regarding the application of radiation in industry, research and agriculture;
- Medical physics;
- Radiation physics, including shielding.

Quadrant 3: Competences related to a regulatory body’s practices

3.1. Review and assessment
This competence area is the ability to examine safety cases and other documents submitted by licensees in support of their justifications regarding installations and the forming of judgements on the adequacy of the documents and the processes used by the licensees in producing them. Examples of KSAs could be:
- Appreciation of measures for implementing actions to achieve the short and long term strategic objectives and goals;
- Comprehension of the regulatory body’s requirements for review and assessment;
- Ability to identify and to synthesize information relevant to the safety of a facility or activity (such as facility’s submission, past performance, and enforcement and inspection history);
- Ability to identify the need for further information in relation to review and assessment;
- Ability to initiate other regulatory processes when needed (such as inspection);
- Ability to take the outcomes of other regulatory processes into consideration in the review and assessment process;
- Ability to examine documentation and relevant information, recognize issues regarding the safety of a facility or activity and possible non-compliance, and make judgements regarding the overall safety and compliance with regulatory requirements.

Quadrant 4: Personal and interpersonal effectiveness

4. Personal and interpersonal effectiveness

4.1 Analytical thinking and problem solving
4.2 Personal effectiveness and self-management
4.3 Communication
4.4 Team work
4.5 Managerial competences and leadership
4.6 Safety Culture
The step based approach

Step 1
Regulatory functions

Step 2
Specific tasks

Step 3
Required KSAs

Step 4
Management Assessment

Step 5
Competence gap analysis

Step 6
Existing personnel KSAs

Step 7
Training & Development, Reorganization, Recruitment or Outsourcing

Periodic Review
The step based approach

**Process 1**
- Developing competence profiles
  - Regulatory functions
  - Specific tasks
  - Competence profiles

**Process 2**
- Competence gap analysis
  - Existing competences
  - Competence profiles
  - Training & Development, Reorganization, Recruitment or Outsourcing

**Process 3**
- Periodic review
Process 1 - Step 1

Determine the regulatory functions of the organizational unit

IAEA Safety Standards

Regulatory functions

Legal Framework / organizational mandate

Organizational structure

Management system

IAEA guidance through Safety Standards:

- GSR Part 1
- GS-R-3
- GS-G-1.1
- GS-G-3.1
Process 1 - Step 1

Functions of a regulatory body

Core Functions:
- Authorization and notification
- Review and assessment of facilities and activities
- Inspection of facilities and activities
- Enforcement of regulatory requirements
- Development of regulations and guides
- Emergency preparedness
- Communication and consultation with interested parties

Supplementary Functions:
- Administrative support
- Legal assistance
- External expert support
- Advisory committees
- Research and development
- Liaison with other organizations
- International cooperation
Determine the specific tasks of the organizational unit

Specific tasks

Legal Framework / organizational mandate

IAEA Safety Standards

Regulatory functions

Organizational structure

Management system

Specific tasks

Organizational unit
Process 1 - Step 2

Determine the specific tasks of the organizational unit

• These tasks should be collected in the management system (GS-R-3)
• Appendix 1 of Safety Reports Series No. 79 provides examples of tasks for the main functions
• These are some examples:
  • “Monitoring national and international researches and developments in nuclear field;”
  • “Assessment of convenience of aims and politics of Authority;”
  • “Provide, co-ordinate and monitor related projects.”
Process 1 - Step 2

Determine the specific tasks of the organizational unit

### TABLE 1. EXAMPLE OF A TEMPLATE FOR A LIST OF TASKS

<table>
<thead>
<tr>
<th>List of task for the organization</th>
<th>Lead organizational unit</th>
<th>Support organizational unit</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA001</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>TA002</td>
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<td>TA003</td>
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<td>...</td>
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</tbody>
</table>
Process 1 - Step 3

Legal Framework / organizational mandate

Step 1
- IAEA Safety Standards
- Regulatory functions
- Organizational structure
- Management system

Step 2
- Specific tasks
- Organizational unit
- Roles / job positions

Step 3a
- Individuals
- Managers and supervisors
- Required Competence
- Competence profiles

Required Competences
Step 3: Developing competence profiles

This step consists of three parts that can be conducted consecutively or separately.

- The first part consists of assessing the required level of competences for each task on the basis of quadrant areas or KSAs;
- The second part consists of assigning tasks to positions or organizational units;
- The third part consists of assigning positions to individuals or to organizational units.
The first part consists of assessing the required level of competences for each task on the basis of quadrant areas or KSAs.

<table>
<thead>
<tr>
<th>KSAs</th>
<th>Task001</th>
<th>Task002</th>
<th>Task003</th>
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<tr>
<td>...</td>
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<td>Level of Competence</td>
<td>Level of Competence</td>
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<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>KSA002</td>
<td>...</td>
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</tbody>
</table>

**TABLE 1. EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE ON THE BASIS OF THE QUADRANT AREAS**

<table>
<thead>
<tr>
<th>Quadrant area</th>
<th>Level of competence for tasks on the basis of quadrant areas</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task001</td>
<td>Task002</td>
<td>Task003</td>
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<tr>
<td>Q1</td>
<td>1.1</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>B</td>
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<tr>
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<td>2.1</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
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<td></td>
<td>4.6</td>
<td>M</td>
</tr>
</tbody>
</table>
Process 1 - Step 3

The second part consists of assigning tasks to positions or organizational units.
The third part consists of assigning positions to individuals or to organizational units.

- Translation and adaptation of 4-Q approach:
  - Definitions of competences,
  - Definition of KSAs
  - New KSAs?
  - Develop a Matrix
Process 1 - Step 3

Assessment of the required knowledge, skills and attitudes

- Carried out by managers
- The outcomes are competence profiles for tasks or generic job positions

![Graph showing tasks for Nuclear Science and Application Division: Overview of the Quadrant Areas]
The step based approach

**Process 1**
Developing competence profiles

- Regualtory functions
- Specific tasks
- Competence profiles

**Process 2**
Competence gap analysis

- Existing competences
- Competence profiles
- Competence gap analysis
- Training & Development, Reorganization, Recruitment or Outsourcing

**Process 3**
Periodic review

Periodic Review
Process 2 - Step 1

Assessment of the existing knowledge, skills and attitudes

- Self-assessment by the staff
- With support and reviewed by the managers
- Other methods: interviews
- Discuss differences
- Can also be done in groups
- The outcomes are competence profiles of the existing staff for the defined tasks
The step based approach

1. Step 3: Managers and supervisors
2. Required Competence
3. Competence profiles
4. Step 4: Staff self-assessment
5. Existing Competence
6. Competence gap analysis
7. Step 5
8. Step 6
9. Education & Training, Reorganization, Recruitment, Outsourcing
Process 2 - Step 2

Comparison of existing and required competences

• The Training Coordinator needs to analyse the assessment of both existing and required competences
• SARCoN comes with a tool that helps to show these gaps
Developing a plan for acquiring competences

Methods of acquiring competence defined in SRS-79:

- Reorganization and Mapping
- Establishing training and development programmes
- Outsourcing (use of external support)
- Participation in knowledge networks
- Recruitment
Process 2 - Step 3

Developing a plan for acquiring competences

- Using the Systematic Approach to Training (SAT)
Developing a plan for acquiring competences

- Training needs and learning points related to specific competences are converted to
  - learning objectives, including evaluation strategies,
  - organized into training plans, taking into account the available options and methods for training.

Choice of Training depends on factors such as:
- the geographical location of the participants,
- availability of leave for training purposes,
- the costs and availability of equipment and materials.
Process 2 - Step 3

Developing a plan for acquiring competences

Possible training methods depend on:
✓ Internal classroom training;
✓ External classroom training;
✓ Distance learning, using manuals, computers and videos, among others;
✓ On-the-job training (OJT);
✓ Structured self-study;
✓ Laboratory training, such as instrument use;
✓ Coaching and mentoring.
Process 3

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- Due to changes within the organization and to monitor the success of the acquired competences, the assessment needs to be repeated periodically.

- It is recommended to repeat the assessment every 3 years.
Process 3

Process 1
Developing competence profiles

- Regulatory functions
- Specific tasks
- Competence profiles

Process 2
Competence gap analysis

- Existing competences
- Competence profiles
- Competence gap analysis
- Training & Development, Reorganization, Recruitment or Outsourcing

Process 3
Periodic review

Step 1
Step 2
Step 3
Assessment criteria

• **Basic** = General competence in the area concerned
• **Medium** = A competence level sufficient in routine cases
• **High** = A competence level needed for more sophisticated cases or at the strategic level within the RB

• More detailed examples of definitions can be found in Appendix II of SARCoN TECDOC 1757
The SARCoN methodology provides a systematic approach for:
- defining competence profiles,
- identifying competence gaps,
- assessing the training needs
- establishing training programmes.

IAEA provides the necessary elements to implement the SARCoN methodology: reference list of competences, quadrant model, software tool.

Commitment of the upper management is an important element to make sure that the SARCoN methodology is properly implemented in a regulatory body. Procedures for its use should be developed with clear definitions of responsibilities within the RB and embedded in the Human Resource process of the Integrated Management System.
The SARCoN methodology has been used successfully by many regulatory bodies all over the world in different levels of detail.

For instance:

- the competence profiles defined by SARCoN are used mainly for HR planning and HR recruitment in embarking countries,
- the competence gaps serve as inputs in countries with NPPs for taking decisions and managing any of the four possible strategies for filling the gaps and acquiring the missing competences: training of the staff, reorganizing, recruiting or outsourcing.

In both cases, the training programmes can be established in a more systematic way thanks to the implementation of the SARCoN methodology.
Modular aspect of SARCoN (1)

MODULAR TOOL

- Experience of different countries with different needs, financial situation, challenges, etc.
- Use common sense, graded approach
- 4 Quadrant model as a common language
- Just developing competence profiles is a step forward for many countries
- Decide the depth within the quadrants you need to go
Modular aspect of SARCoN (2)

**Process 1**
Developing competence profiles

- Regulatory functions
- Specific tasks
- Competence profiles

**Process 2**
Competence gap analysis

- Existing competences
- Competence profiles
- Competence gap analysis
- Training & Development, Reorganization, Recruitment or Outsourcing

**Process 3**
Periodic review

Step 1
Step 2
Step 3
SARCoN for Regional Harmonisation

SARCoN successfully used in Ibero America (CREaN project)

✓ Regional Competence Profiles were identified,
✓ Basis for common regional training needs assessment
✓ Priorities for support at a regional level,
✓ Identifying IAEA and regional resources to fulfil the gaps
Thank you for your attention!

- For more information visit: http://www-ns.iaea.org/training/ni/sarcon.asp
- Or contact us at: NIS-Training.Contact-Point@iaea.org