

Safety Culture Improvement Method: Development of Framework for Capturing Successes

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1. Introduction

As a result of the theoretical and empirical work carried out within last 2 years in KINS, we developed a preliminary framework for safety culture improvement methods by capturing success episodes. The purpose of the framework is to provide the case analysis procedures necessary to derive good practice for safety culture improvement. We provide an overview of the factors that can influence the selection and analysis the cases. This framework is based on learning from the success stories required by the IAEA GSR Part 2. [1]

More specifically, this framework can be carried out at nuclear facilities such as nuclear power plants and companies which use radiological materials studies to derive good practice from successful episodes. This process can be done within the organization itself (eg, self-analysis) and used for independent case analysis (hereinafter, independent analysis).

Based on this framework, we are carrying out a case studies in nuclear power plants, Hanbit and Wolseong, in Korea. It can elaborate the concept of success in nuclear industry and how it can be utilized for learning purposes. We hope that commonly shared "success story" which identified and captured, improve team-spirit and work motivation in future NPP tasks. Similarly, developing these activities is important in order to avoid unwanted side-effect of learning from success and to maintain good

2. Framework for Capturing Successes

I. Establish a case study implementation plan

The process executor shall establish a case analysis plan through the relevant departments in case of self-analysis and, in case of independent analysis, by consultation with the relevant agencies. When establishing the implementation plan, refer to the national and international nuclear safety and safety culture trends and set the activity goals and direction for the year. Also, plan the contents of the activities related to the case analysis, the schedule, the budget needed, and reflect them in the business plan and budget.

Case analysis implementation plan includes: 1) case study activities background, objectives and implementation of the previous year performance, 2) domestic and international nuclear safety and safety culture trends and implications, and 3) the cases analyzed, 4) Analysis Team composition and schedule.

II. Case Collection and Selection

process executives seek cooperation with relevant departments and agencies to collect cases in consideration of the following: 1) Case within one year from the time of collection, 2) When the case is ended, the system status is normal or better than before, 4) Examples related to nuclear and radiation safety, 5) Cases involving human and organizational elements in the case.

process executor can use the following to collect cases of related departments or agencies.

- Examples of excellent employees, excellent departments, and excellent performance
- Examples of near-miss accident cases, safety culture examples, NPP supervision case, etc.

Next, the analytical team will select cases for analysis based on the following criteria for the collected cases:

- Selection according to safety culture component: Examples that can be expected to lead to specific best practices for clarification of safety culture components
- Selection based on ease of data acquisition: A collection of related documents is abundant (considering case records and memorization)
- Selection according to the degree of difficulty of the case: cases where the process and outcome of the cases related to the case are not simple, and cases in which several divisions are involved in order to solve problems
- Involvement of human and organizational factors : Among the collected cases, it is considered that human and organizational factors are highly related to the progress of the case

III. Review of Materials

process Executor shall notify the target department or organization of the selected cases and reasons for selection. And the outline of the cases related to the case, the process, and the person in charge. For case analysis, the process executives can use the following data and check that the document is available and requests it.

- 1) report (ex: operation experience report, event detail report, cause analysis report, performance report, executive reporting documents, etc.)
- 2) Procedures and guidelines (ex: internal regulations and guidelines, amendments, etc.)
- 3) Other documents related to the case (ex: meeting materials, educational materials, etc.)

The analytical team will review the document and select the staff that it deems necessary to interview. As interviewees, the team consider surrounding people such as related persons, superiors, and colleagues for background information related to the case. In addition, when selecting the interviewees, the team should understand the basics such as the position and the work experience, and refer to them when setting up the interview sequence.

process executives shall establish an interview plan by checking the availability and schedule of interviews of the selected interviewees. Interview plans include: 1) a list of interviewees, a list of interviewers and a timeline schedule, 2) the purpose of the interview and a sample of the question, and 3) the request for co-operation with the interviewee. And, the process executor shall send an interview plan to the interviewed departments and agencies.

IV. Field Check and Interview

The analytical team may visit the site related to the case according to the interview plan. In order to increase understanding of the case,) The interviewer visually confirms the working environment such as the location of equipment, facilities, size, etc., and the position and movement line of the employees at the time of the incident to enhance understanding of the case. And, the interviewer shall discuss the data on site after consultation with the target organization if necessary.

The analytical team will use interviews to identify specific details and success factors. The analytical team confirms in detail the details of the observations and the progress of the events through the interviews, and confirms any unrecognized errors or errors during the course of the event. And also, learn about tasks that have anticipated or did not anticipate, and identify activities that involve human cognitive abilities included in the case. Examples of activities involving human cognitive abilities include:

- Planning and checking,
- Resource allocation and collaboration
- Communication and decision making
- Problem solving, situation analysis, etc.

The analytical team shall try to identify lessons learned and sharing process.

Recommendations for smooth interview progress are as follows. (1) Interview will be conducted with at least two people, one facilitator and one record person, (2) Interview time shall be not less than two hours, taking into account the working hours of the subject, (3) The person to be interviewed should be treated with respect, and should be treated with caution, (4) Be familiar with the basic principles of interviewing.

Records shall be recorded in order to check:

- The role, responsibility, career and attitude of the interviewee
- Organizational decision making and communication atmosphere

- Importance of case, urgency, predictability
- The success and failure criteria of the tasks included in the case
- Learning and sharing of learned lessons

V. Case Analysis

The analytical team reconstructs the progress of the case as much as possible, based on the documents, the field confirmations, and the interview data. Reconstructed cases include employee behavior, success / failure, and interview details related to the progress of the incident by time of day.

The analytical team identifies success factors included in the case based on the reconstructed case, and selects key elements among them. In order to evaluate success factors, 1) identify the tasks that can be evaluated as success / failure during the reconstructed work progress, 2) identify the tasks that were identified as the most important All, 3) Evaluate success factors as behavior factors in the worker who made the core work possible and in the organization he belongs to. 4) The success factor can be judged by referring to satisfaction of the expectation level of the safety culture component item.

The analysis team shall classify the types of cases based on the reconstructed case according to the seven detailed types. The analytical team shall describe the manifestation of each success factor based on the success factors. Good practice can be an appropriate form of behavior that can occur at both individual and organizational levels. The following is an example.

- Personality (ex: forward / progressive personality, careful personality, attentive personality, etc.)
- Attitude to work (ex: sense of responsibility, suspicion or questioning, self-efficacy, aggressiveness, etc.)
- Business ability (ex: comprehensive thinking ability, situation judgment ability, creative thinking ability, etc.)
- Organizational atmosphere (ex: free conversation atmosphere, encouraging questions, etc.)
- leadership (ex. Attitude towards the organizers, fast make-up work, etc.).
- Various other factors

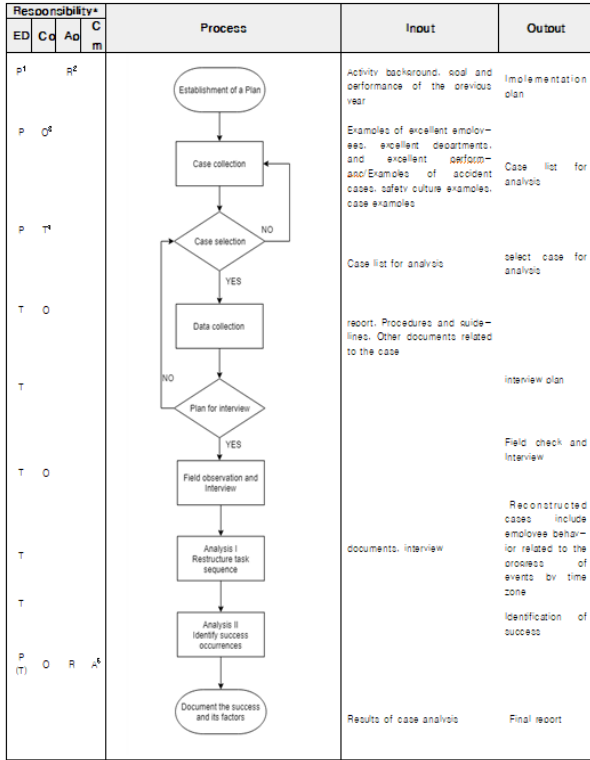
VI. Creating a Report

The analytical team drafts an analytical report on a case-by-case basis. The report contains the case outline, success factors, type of success, best practices analyzed. And, the draft report should be reviewed by the interviewees and the relevant departments for asking opinions. The process executor shall finalize the case analysis report by reflecting the comments of the review. The final report shall be sent to the department or institution to be analyzed and encouraged to share and disseminate best practices .

VII. Record retention

Process executives shall keep records of documents related to implementation of case analysis implementation plan, visit plan, interview data, final report.

- [1] IAEA Safety Standards GSR Part 2, “Leadership and Management for Safety”
- [2] IAEA Safety Standards GS-G-3.1, “Application of the Management System for Facilities and Activities”
- [3] Kaupo Viltanen, etc., “Learning from Success in Nuclear Power Plant Operation – Intermediate Report from the NKS-R LESUN”, 2016
- [4] Jihan Lim, etc., “Enhancing Safety in Nuclear Power Plant by Identifying Successful Performance” 2017.



* ED = Responsibility for decision/implementation, Co = Cooperate, Ad = Approve, Com = Communicate
 P¹ = Project Manager, R² = Senior Manager, O³ = Target organization, T⁴ = Analysis Team, A⁵ = Stakeholder

Fig. 1. Framework for Capturing Successes

3. Conclusion

In this paper we introduce a framework to how successful performance can be captured. We found that success is a complex and multidimensional concept that can take many forms. Based on this framework, we are carrying out a case studies in nuclear power plants in Korea. It can elaborate the concept of success in nuclear industry and how it can be utilized for learning purposes. We hope that commonly shared “success story” which identified and captured, improve nuclear safety culture in future NPP tasks..

This study also aimed at demonstrating the validity of the framework above and enhancing safety of NPP. In order to identifying successful activities in Korea NPP, we collected the date that considered good performance from KHNP since 2017. And then we select the most appropriate cases for each site based on safety culture principle which is developed by KINS. Currently, it is planned to interview relevant staff and manager and to analyze event report.

REFERENCES