

# Preliminary Study on the Development of Quantitative Safety Culture Index

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## 1. Introduction

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. Because it needs to be recognized as the most significant consciousness to achieve the nuclear safety performance, Korean government and nuclear power generation company have tried to develop the practical method to improve the safety culture from the long term point view. In this study, based on the site interviews to define the potential issues on organizational behavior for the safe operation and the survey on the level of safety culture of occupied workers are conducted. Survey results are quantified as a few indicators of nuclear safety by the statistical method and it can be simulated by the dynamic modeling as time goes on. Currently index and dynamic modeling are still being developed, however, results can be used to suggest the long term strategy which safety is clearly integrated into all activities in the nuclear organization.

## 2. Backgrounds and Frame of Study

Principles of nuclear safety are now well known and being put into practice around the world, leading to a degree of international harmonization in safety standards. Although Korean government and utility have made efforts to develop the strategic solutions to

enhance the nuclear safety culture, the development of quantitative index is addressed in this study to find the best way of nuclear safety culture. First, surveys are conducted to the about 400 employees to find the cause and effect relationship and the quantitative single value of safety culture. Second, System Dynamics modeling is adopted to simulate the phenomena according to the variation of occupational behaviors and individual consciousness as time goes on. Finally, long term strategy for the enhancement of safety culture can be suggested. [Figure 1] [Figure 2]

## 3. Statistical Approach

The International Nuclear Safety Advisory Group (INSAG) defines safety culture as “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.” So Questionnaires for the survey are based on the INSAG frame such as policy, manager, and personal level in terms of philosophy, organizational structure, and individual behavior respectively. Additionally concept of 7S (Style, Staff, Skill, Structure, System, Strategy and Shared Value) in the organizational culture is adopted. [Figure 3]

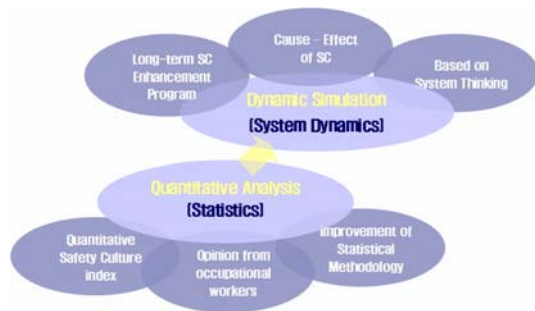
## 4. Dynamic Approach

System Dynamics modeling has been used for the

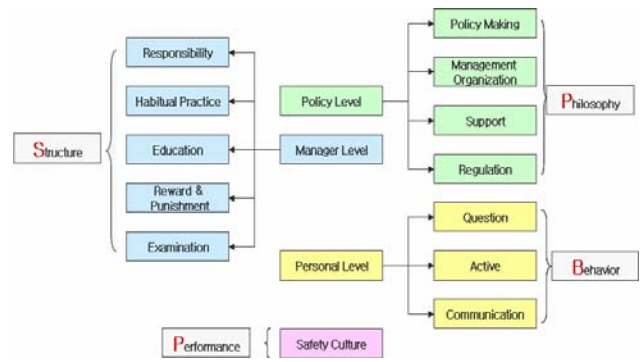
analysis of policy or phenomena according to the variation of cause as time goes on. Relationship between policy, manager, and individual level is defined, and then levels are broken down into detail sub-variables. The issues on not only what is the single value of the safety culture but also what factors are most important to strengthen or weaken the safety culture and how much significant they are can be simulated.

### 5. Results

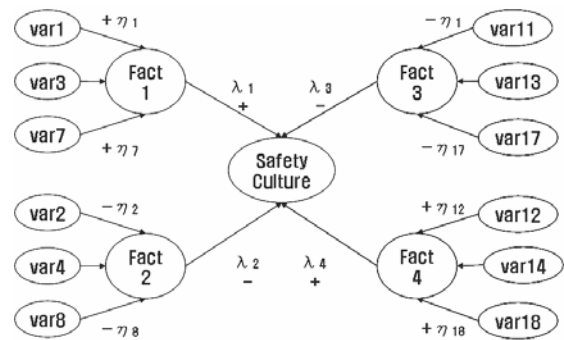
Continued improvement in levels of safety requires the development of a comprehensive “safety culture” at all levels of an organization, with visible and consistent leadership from senior management. External peer reviews and self-assessment can be important elements in strengthening safety culture. Because safety culture is also intangible values of organizational culture, standards, morals, and norms of acceptable behaviors, some kinds of limitation and assumption may have existed to define its value as the single number in this study, however, it needs to be kept in mind that this new approach can be another way to strengthen the safety culture and maintain a self-disciplined approach to the enhancement of safety beyond legislative and regulatory requirements. Safety culture has to be inherent in the thoughts and actions of all the individuals at every level in an organization, which is the key factor of sustainable progress.



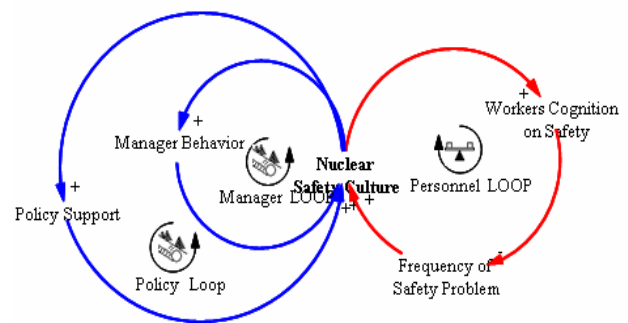
<Figure 1. Goal and Frame of Study>



<Figure 2. Statistical Analysis Concept >



<Figure 3. Statistical Approach Concept>



<Figure 4. Dynamic Modeling Concept >

### References

1. IAEA, SC training workshop, 2003
2. IAEA, Safety Culture –key for sustaining progress, 1998