

## A study on the identification of cognitive complexity factors related to the complexity of procedural steps

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### Abstract

In complex systems, it is well recognized that the provision of understandable procedures that allow operators to clarify “what needs to be done” and “how to do it” is one of the requisites to confirm their safety. In this regard, the step complexity (SC) measure that can quantify the complexity of procedural steps in emergency operating procedures (EOPs) of a nuclear power plant (NPP) was suggested. However, the necessity of additional complexity factors that can consider a cognitive aspect in evaluating the complexity of procedural steps is evinced from the comparisons between SC scores and operators’ performance data.

To this end, the comparisons between operators’ performance data with their behavior in conducting prescribed activities of procedural steps are conducted in this study. As a result, two kinds of complexity factors (the abstraction level of knowledge and the level of engineering decision) that could affect operators’ cognitive burden are identified. Although a well-designed experiment is indispensable in confirming the appropriateness of cognitive complexity factors, it is strongly believed that the change of an operator’s performance can be more authentically explained if they are taken into consideration.