A fuzzy model for safety culture assessment

C. H. S. Grecco[1], P.V.R. Carvalho[1], C.A.N. Cosenza[2], M.C. Vidal[2]
e-mail: grecco@ien.gov.br , paulov@ien.gov.br , cosenza@pep.ufrj.br, mvidal@ergonomia.ufrj.br

[1] *SEESC, IEN*
[2] *COPPE, UFRJ*

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Culture is a complex concept and this paper aims at improving the safety culture in safe-critical organizations. The culture of any organization in the international nuclear industry is centered on safety. This reflects human awareness and the recognition that strict attention to safety is essential if the benefits of this form of power are to be realized. For a nuclear organization safety culture is the dominant aspect of the organizational culture. Assessing the safety culture of an organization is not easy because there is no simple indicator that can measure its state. From the perspective of the nuclear power industry there is no consensus on the essential attributes of safety culture and suitable safety performance indicators.

Furthermore, there are no commercially available safety culture tools that can satisfactorily assess the safety culture of an organization and most methods cannot fully solve the subjectivity of safety culture assessment. In this context, this report presents a fuzzy model for safety culture assessment using safety performance indicators which are able to predict changes in an organization's safety performance. These indicators are based on six elements necessary for developing a safety culture: top-level commitment to safety, organizational learning, organizational flexibility, awareness, just culture and emergency preparedness.

The model uses the concepts and properties of fuzzy set theory to model the indicators (figure 1) and to assess the results of their application. To exemplify its use we performed an exploratory case study on the radiopharmaceuticals package dispatch process of a Brazilian radioactive installation. The results showed that the method is a proactive tool to provide a basis for action, without waiting for the event to occur.

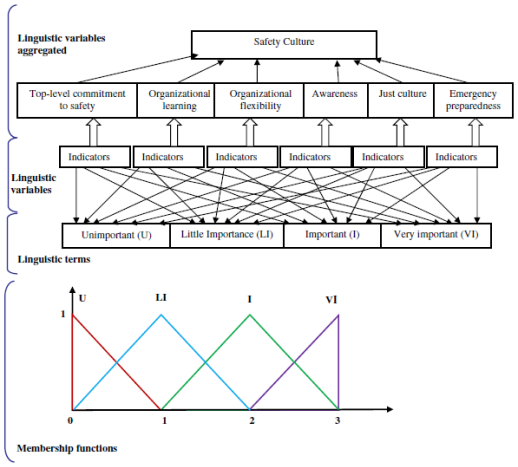

Figure 1. Linguistic variables and memberships functions of the linguistic terms

Figure 2 shows the result of the assessment of the safety culture in radiopharmaceuticals package dispatch by the seven workers.

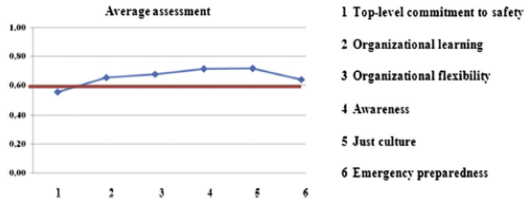

Figure 2. Result of the assessment

We consider a compliance degree above 0.6 as satisfactory, because this value already represents agreement with the safety culture pattern. The result of the assessment showed that the process of radiopharmaceuticals package dispatch was satisfactory for organizational learning, organizational flexibility, awareness, just culture, and emergency preparedness. The process showed problems, however, related to top-level commitment to safety.

References

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