Linguistic Fuzzy Selection of Liquid Levelmeters in Nuclear Facilities

Seong Ho Ghyym
Korea Electric Power Research Institute

Abstract

In this work, a selection methodology of liquid levelmeters, especially, level sensors in non-nuclear category, to be installed in nuclear facilities is developed using a linguistic fuzzy approach. Depending on defuzzification techniques, the linguistic fuzzy methodology leads to either linguistic (exactly, fully-linguistic) or cardinal (i.e., semi-linguistic) evaluation. In the case of the linguistic method, for each alternative, fuzzy preference index is converted to linguistic utility value by means of a similarity measure determining the degree of similarity between fuzzy index and linguistic ratings. For the cardinal method, the index is translated to cardinal overall utility value. According to these values, alternatives of interest are linguistically or numerically evaluated and a suitable alternative can be selected. Under given selection criteria, the suitable selections out of some liquid levelmeters for nuclear facilities are dealt with using the linguistic fuzzy methodology proposed. Then, linguistic fuzzy evaluation results are compared with numerical results available in the literature. It is found that as to a suitable option the linguistic fuzzy selection is in agreement with the crisp numerical selection. In addition, this comparison shows that the fully-linguistic method facilitates linguistic interpretation regarding evaluation results.