

ORGANISING HUMAN AND ORGANISATIONAL RESILIENCE AND RELIABILITY: RESEARCH PROGRAM AND APPLICATION FOR NUCLEAR POWER PLANTS ORGANISATION

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1 ABSTRACT

This paper will describe a research program focused on the organisational resilience and reliability of nuclear power plants' (NPPs) organisation. The characteristics of this program are:

- to gather a multidisciplinary team of specialists involved in different EDF's projects,
- to start from EDF's experience in various domains of nuclear operation,
- to take into account internal issues and developments about resilience such as the MRS model and the international state of the art
- to provide the different EDF's projects with contributions using the concept of organisational resilience and reliability, leading to operational results.

In a paper for the 2015 PSAM conference the author proposed a generalisation of the model called the Model of Resilience in Situation (MRS) which is coherent with the Resilience Engineering Approach and the High Reliability Organizing Approach.

Initially the MRS was built empirically from simulators observations of emergency operation of NPPs. It was theoretically based on the Theory of Social Regulation by J.D. Reynaud. The model supports the Human Reliability Analysis EDF's method MERMOS. In the model, resilience is the ability of the organisation to combine dynamically in situation both robustness and autonomy by alternating them whenever needed. The anticipation process contributes to the organisational abilities of resilience and robustness. The adaptation process contributes to the organisational abilities of resilience and autonomy. The three organisational abilities of resilience, robustness and autonomy allow the Safe Operation and allow the organisation to be reliable. The entire organisation can be described in a global loop of linked processes, if the previously mentioned processes (adaptation, anticipation and operation) are completed by taking into account the Organisational Learning.

The added value of the MRS is for example to show how both rationalities underpinning the anticipation process and the adaptation process must coexist and can coexist in a reliable organisation even if they are often opposite. Moreover, the resulting ambiguity and the resulting conflicts of the coexistence of these rationalities are unavoidable to obtain Safety. A second example is that expertise, which is different from training, is needed to get autonomy in order to be adaptable and consequently resilient.

The research program aims at sketching a general model taking into account the MRS. It will also integrate other relevant models for, and from, organisational assessments and actions in different EDF's internal projects. In the multidisciplinary research team, risk analysis specialists, ergonomists, sociologists and human and organisational reliability analysts will share their former experience and the feedback from their contribution to the projects. The team is called MOREFOR (MODèle de Résilience et Fiabilité ORganisationnelle).

2 RELEVANCE AND SIGNIFICANCE FOR SYMPOSIUM

The MRS model considers resilience as the ability to combine dynamically in situation both robustness and autonomy by alternating them whenever needed. The MOREFOR research program will investigate how resilience is obtained from anticipation and adaptation that are using the Organisational Learning. In this way it proposes a frame of thinking in accordance with the topic of the Symposium "Managing resilience, learning to be adaptable and proactive in an unpredictable world".