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FAULT AND EVENT-TREE TECHNIQUES IN OCCUPATIONAL HEALTH-SAFETY SYSTEMS – PART I: INTEGRATED RISK-EVALUATION SCHEME

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Abstract

Fault-Trees (FT) and Event-Trees (ET) are well recognized techniques worldwide, which have been used by reliability experts in failure analysis of complex technical systems. In risk assessment (RA) of Occupational Health-Safety Systems (OHSS), the situation is absolutely different, since their application is not quite expanded and has not been extensively incorporated in the main risk assessment methodologies of OHSSs, despite their significance. In this article, we review and classify FT/ET methods, and also study and elaborate their characteristics (i), and on the other side, we propose an alternative risk-evaluation scheme (ii), in order to (a) depict the subsistent situation of FT/ET application in various occupational fields, and (b) enhance their handling and usage in RA of OHSS. To reinforce the second aim, we implement a new risk-evaluation framework by the combination of a FT (or ET) process with a stochastic quantified risk-evaluation model. The paper consists of tree sections, including: (1) a literature review of thirteen representative scientific journals, published by Elsevier_B.V. and IEEE_Inc., during the years 2000-2012, and concentrated on the main categories of FT/ET techniques concerning OHSS RA, (2) an overview for the FT/ET techniques in RA and (3) a proposed risk-evaluation concept using FT/ETs.

Key words: event-tree techniques, fault-tree techniques, occupational health and safety systems, risk assessment

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