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#068 Probabilistic approach and fault-tree analysis for increased bucket wheel excavator welded joints reliability

Dušan Arsić¹, Aleksandar Sedmak², Ružica Nikolić³, Aleksandra Arsić², Ljubica Radović⁴

¹ Faculty of Engineering, University of Kragujevac, Sestre Janjić 6, 34000 Kragujevac, Serbia, dusan.arsic@fink.rs

² Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16, Belgrade, Serbia, aleksandarsedmak@gmail.com, aarsic@mas.bg.ac.rs

³ Research Center, University of Žilina, Univerzitná 8215, 010 26 Žilina, Slovakia, ruzicarnikolic@yahoo.com

⁴ Military Technical Institute, Ratka Resanovića 1, 11030 Belgrade, Serbia, Belgrade, ljmradovic@gmail.com

bucket wheel excavator

welded structure

fault-tree analysis

Abstract The main part of this paper is consisted of presentation of a new method for determination of reliability of the structures. Presented method provides more knowledge and confidence when evaluating the construction of vital welded structures and determining the cause of their failure in service. The probabilistic and semi-probabilistic approaches have been defined for expressing the coefficient of validity (v) and the coefficient of the welded joint weakening (η), while reliability (R) has been defined as a measure of quality of installed vital welded structures on bucket wheel excavators in service (Fig. 1).

The applied "fault-tree" analysis enables quantitative and qualitative analysis of the failure causes, diagnostics of behavior and structural degradation, evaluation of integrity and estimate of the service life of the vital welded structures that have a flaw in the welded joint, as well as creating a data base, by which the reliability of the bucket wheel excavators can be increased. The method also makes possible to efficiently test the welded joints, during the manufacturing, acceptance and assembling the new welded structures of the bucket wheel excavators, cranes or bridges.



Figure 1 - The bucket wheel excavator SRs 2000 20/5 in exploitation, Kostolac (Serbia)