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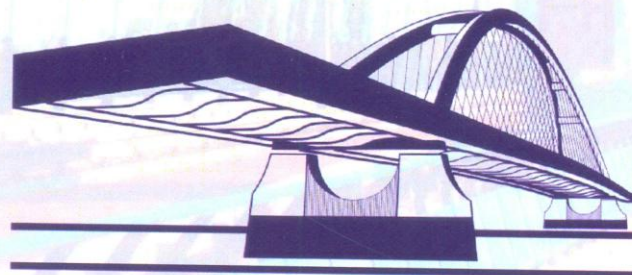
Faculty of Civil Engineering  
Department of Structures and Bridges



# **STEEL STRUCTURES AND BRIDGES 2012**

23<sup>rd</sup> Czech and Slovak International Conference

## **EXTENDED ABSTRACTS**



September 26 – 28, 2012, Hotel Permon, Podbanské, Slovakia

### **ORGANIZED BY**

**Department of Structures and Bridges**  
University of Žilina, Faculty of Civil Engineering

### **IN COOPERATION WITH**

Slovak Association of Steel Construction  
Czech Constructional Steelwork Association



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## Optimization of technical diagnostics procedures for hydroelectric power plants

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In this paper, a mathematical model is proposed for determination of the optimal solution for the maintenance system of a specific steel structure – the hydraulic power plant. The aim is to obtain the maximum efficiency of the plant within existing conditions and limitations. The objective of a mathematical model is to select the diagnostics parameters, which define knowledge of the permissible reliability level and certain analytic expression, which corresponds to precisely described state of hydroelectric power plant components assembly. Model of technical diagnostics procedures optimization represents a specific approach to problems of preventive maintaining according to state. It is related to the concept of state parameters change, which represents a basis for obtaining the optimal solution for procedures of technical diagnostics. It also creates direct relations between the law of the state parameter changes and reliability of the considered power plant components.

Optimization of the technical diagnostics procedures is being defined by the strategy of a process of establishing the power plant components' condition, providing the plan of active loading and its distribution among the components and assemblies. It requires balancing between the long term objectives and short term restrictions imposed by possibilities and imprecision of available data on power plant components operation.

For determination of the optimal safety, the reliability of components operation is considered based on number of recorded failures: number of components failures based on their initial conditions and analysis of components exploitation operation conditions.

By application of the presented model for optimization of the technical diagnostics procedure of the concrete power plant components an increase of 42.5 % of the safe functioning of the plant was achieved. This definitely justifies application of this model, especially in planning the preventive maintenance measures for avoiding the plant's failure.

With the presented model of optimization of the technical diagnostics procedure an analysis is performed of safety of functioning of the power plants components. Based on this analysis, one can precisely determine time period of the safe functioning of the individual assembly or component and can correct the maintenance procedures in order to extend the life span of the power plant as a whole.