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Risk-Based Inspection of Some Components of Power Plant Prunéřov-II

Jan Janošťák[a]*, Jakub Stoniš[b], Zdeněk Ramík[c]

VÍTKOVICE ÚAM a.s., Purkyňova 648/125, 612 00 Brno, Czech Republic

[a]jan.janostak@vitkovice.cz, [b]jakub.stonis@vitkovice.cz, [c]zdenek.ramik@vitkovice.cz

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Abstract: The paper deals with rendering of Risk-Based Inspection method (RBI) for use in maintenance system on "retrofit" power plant Prunéřov-II (EPR-II). Data collected during inspections are stored in database of RIMaSys system. Assessment of inspection data may be used for planning next inspections and to keep the risk of failure of power plant inspected components under control. RIMaSys computer code developed in VÍTKOVICE ÚAM a.s. company was used.

1. Introduction

Risk level analysis is very important not only in business and financial transactions, but in industry too. In heavy industry, chemical industry, aircraft industry and others is risk level analysis used for fitness for service management and inspection planning.

Use of RBI method [1] for assessment of risk of several components of power plant Prunéřov-II (EPR-II) is presented in this paper. For inspection data collection and assessment system RIMaSys developed in VÍTKOVICE ÚAM a.s. company is used.

2. Risk-Based Inspection method (RBI)

Risk-Based Inspection is modern and powerful process based on planning of inspections, visual examinations and nondestructive inspection techniques of equipment. Risk is defined by combination of probability and consequence of equipment failure. Probability and risk can be estimated in one of three ways.

Qualitative RBI is based on experience and expertise of visual testing and nondestructive inspection techniques. Most of components are assessed by qualitative approach, the aim is to obtain wide overview of state of technical preservation of equipment.

Quantitative RBI considers structural degradation and damage in probabilistic manner, so measurement data (wall thickness, size of defect and so on) are necessary for assessment. Only the most important components are assessed by quantitative approach.

Semi-quantitative RBI is between above approaches.

In progress from qualitative to quantitative RBI the results are more accurate, but the cost and the time to achieve them grow up.

3. Software system RIMaSys

The RIMaSys system [2] developed in VÍTKOVICE ÚAM a.s. company is based on RBI method. System consists of two program parts, RIMaSys for PC runs on Windows based computer and RIMaSys for mobile devices, such as smartphones and tablets, runs on operating system Android – almost all types of mobile devices with different screen size are suitable.

During inspection of the power plant components tablet with RIMaSys is used for data collection. RIMaSys running on PC is used for power plant equipment inspection planning, export inspection data sheet to tablet and import collected inspection data from tablet.

Assessment of inspection data, which are stored in MSSQL database type file on hard disk with RIMaSys on PC, may be used for planning next inspection and other analyses. Screen-shots of RIMaSys system for tablet are shown in figures Fig. 1 and Fig. 2.

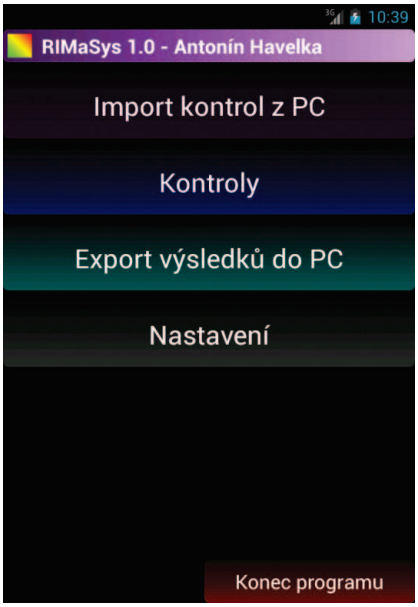

Fig. 1: RIMaSys window for tablet

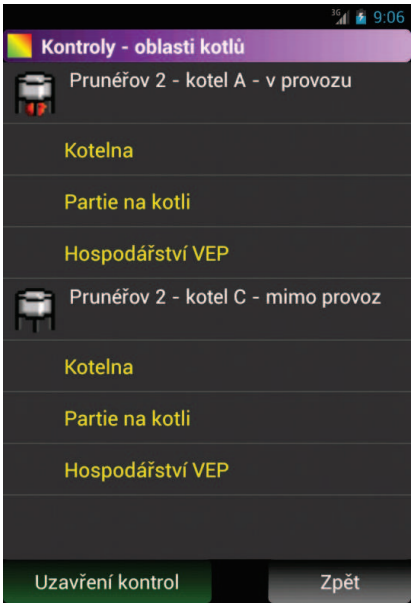

Fig. 2: List of inspection areas

4. Conclusion

Assessment of risk of failure of selected inspected components of power plant Prunéřov-II (EPR-II) is based on RBI method.

The RIMaSys system developed in VÍTKOVICE ÚAM a.s. company is used for inspection, planning, collection data in MSSQL database type file and assessment.

Summary

The paper describes aims stated in paper introduction. Use of RBI method for assessment of selected power plant Prunéřov-II components is presented. RIMaSys computer code developed in VÍTKOVICE ÚAM a.s. company is introduced.

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