



---

## MANAGING OF SUSTAINABILITY MACHINE MAINTENANCE

### RIADENIE UDRŽATEĽNOSTI ÚDRŽBY STROJA

Štefan VALEŇČÍK

---

**Abstract:** At present, the reliability of production equipment as well as the company is necessary to preserve competitiveness on the market. Article examines important aspects of the maintenance organization new production, because good maintenance organization is a key element for reliable production system and maintains market position.

**Keywords:** Maintenance, optimizing, effectiveness, machinery, costs.

---

#### Introduction

Solving optimal access use and care of production equipment is related to maintenance and renewal (MaR) machines. The general problem is to assess the need, define the context and estimate the prospects for maintenance and renewal in removing physical and moral obsolescence means of production. Particularly important are the possibilities and effects of maintenance and renewal of machinery and achieve best life (physical, moral) as a precondition for the determination of a suitable alternative planning necessary technical and economic resources for its security, as well as the immediate needs of the smooth running of production.

#### Defining the problem

Production is worldwide radically affected by complex economic, socio-political and technological dynamics. The management of the production and use of production processes, machines and systems increases the demands on cost and maintainability, as a result, there is support for the identification and quantification of the inputs and outputs of individual subjects production system for the purpose of transparency of economic and financial flows. On the other hand, it is a general requirement to revitalize production (improving employment, increase productivity, ...), which gives the requirements for funds (own, foreign) provided capital and leads to increased demands on an availability of the property (occupancy production infrastructure).

#### Parameters of control

It is very difficult to define the roles for sustainable maintenance due to the fact that each new (modern) management method (lean and agile manufacturing) requires comparison with the traditional approach to maintenance, i.e. what changes is yet to be done. To address these problems, we can talk about the formation of the so-called sustainable maintenance, whose basic principles to guide the transition from traditional mainstay's maintenance methods, in



coordination parameters control the development of production structures and maintenance / recovery machine (Fig. 1).

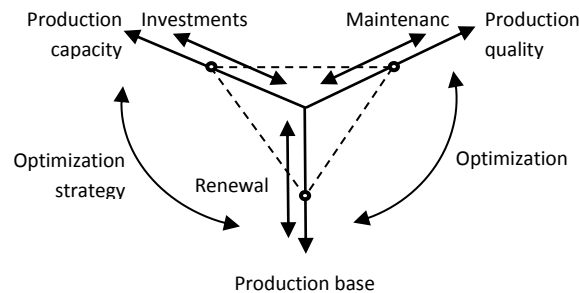
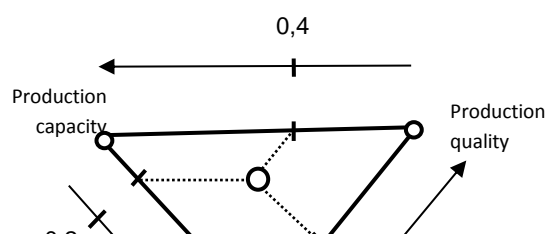


Fig. 1 Control parameters of the production infrastructure

### Integration of control parameters

The most appropriate strategy for managing manufacturing operations and related infrastructure, which shall operate in a competitive environment characterized by development products and technology to solve the dynamics of the global market, is considered the paradigm of coordination of development and recovery. Initial analysis of various industry perspectives on the issue of coordination of development and renewal is presented by the following description an integrated management model parameters (Fig. 1).

We use ternary diagram (Fig. 2) to view three data / entities and their subsequent classification and identification of their level. Ternary diagram is a triangle which each of the three peaks present the level (weight) of the respective entities, ie. the relative importance of the data. In our case, they are designated as production capacity, the production base and the quality of production, on the basis of standard weights (0.4, 0.2, 0.4). For setting of weightings, we either use expert's experience or this value is determined through analysis of the decision matrix based on pair wise comparison. In both cases, weighting vector, which determines coordinates of configuration of the productive structure, is the result of the analysis.





**Fig. 2 Determining the position of integration with the three logical structures**

The integrated model includes the reconfiguration of production and its capacities and product quality throughout the life (reproductive) cycle in the completion form based on the active formation in line with market dynamics (Fig. 3). The manufacturing company will be able to continually work in the state, using the model of integration of basic and derived parameters which ensure the feasibility and profitability of the manufacturing process, despite the dynamic context and the uncertainty of the available forecasts.

To achieve high performance production operation should be analyzed parameters of process control M&R with emphasis on target of parameterization control unit which it is to find the optimal balance between the three fundamental (production capacity, production quality, production base) and three-derived control parameters M&R (maintenance, easy and enhanced renewal).

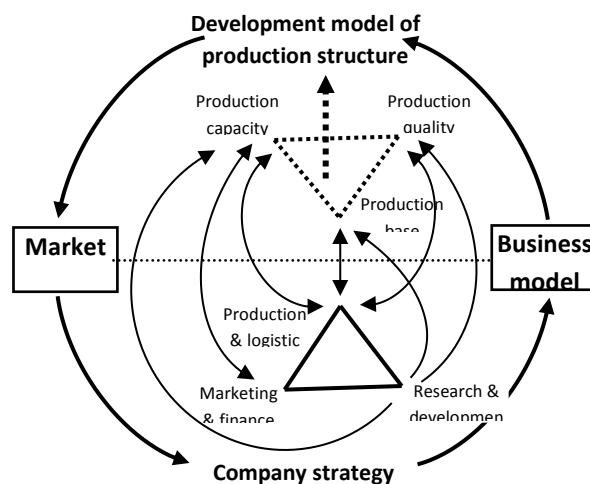




Fig. 3 Profiling sustainability of production company

## Conclusion

The strategic objective of sustainability is to encourage comprehensive economic, socio-political and technological dynamics of mechanical engineering. This is also reflected in the change business behaviour in the market, thereby also changing research priorities (development of new materials, technologies, services, and communications). The result is a new generation of products supporting the modern production of the products termed as adaptive, which are able to address the adaptability of the various stages of the life cycle (the development and / or registration), extending and extending their functionality over time.

*Contribution was elaborated within the project VEGA 1/0879/13 „Agile, market-adaptive enterprise systems with highly flexible corporate structure“.*

## References

- [1] Ben-Daya, M.; Duffuaa, S.O.; Raouf, A.; Knezevic, J.; Ait-Kadi, D.: Handbook of Maintenance Management and Engineering. Springer Dordrecht Heidelberg London New York 2009. 741 p. 330 illus. ISBN 978-1-84882-471-3 e-ISBN 978-1-84882-472-0.
- [2] PUTALLAZ, Y., RIVIER, R.: Modelling Long Term Infrastructure Capacity Evolution and Policy Assessment Regarding Infrastructure Maintenance and Renewal. In: Conference paper STRC 2003, Session Infrastructure and Logistic. Monte Verità / Ascona, March 19-21, 2003.
- [3] SMITH, R., HAWKINS, B.: Lean Maintenance, reduce costs, improve quality, and increase market share. Elsevier Butterworth–Heinemann, 200 Wheeler Road, Burlington, MA 01803, USA, 2004, 287 s., ISBN: 0-7506-7779-1.
- [4] VALENČÍK, Š.: Údržba a obnova strojov. EVaOL Strojnícka fakulta TU Košice, Košice 2010, 417s., ISBN 978-80-533-0514-1.
- [5] VALENČÍK, Š.: Metodika obnovy strojov. Košice. EVaOL Strojnícka fakulta TU Košice, Košice 2011, 330 s., ISBN 978-80-533-0679-7.