



SUSTAINABLE MAINTENANCE OF MODERN MANUFACTURING

PRAVIDELNÁ ÚDRŽBA V MODERNEJ VÝROBE

Štefan VALENČÍK

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.

Key words

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

Maintenance production infrastructure requires in most cases a partial or complete interruption of productive activity due to the realization of as "intervention (maintenance) work" as well as "support (technical and logistical) works". Rescue work is a little extra (maintenance) work at production facilities that are naturally seen as a restriction on the operation and is required to minimize the duration. In contrast, it is but the maintenance requirements, which wants to have as many interventions guaranteeing a significant reduction in operating costs. This has the effect of extending the period of intervention works and the associated availability of production infrastructure, creation of additional operating costs.

Therefore, when designing a model of sustainable MaR needs to be addressed this reality, and its core is then calculate the optimal maintenance interval, minimizing costs of production and the cost of maintenance work. Model during the simulation process MaR takes into consideration value of capacity and related factors (type of intervention, the mechanism for calculating and local conditions), as well as other aspects from the basic definition of sustainability [5].

Principles of sustainability

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. It is based on the



characteristic requirements, in the case of lean production is that in addition to increasing the productivity, quality and cost reduction, in terms of managing the requirement for leaner (reduction of unproductive times, unnecessary operations, surplus stock) production. Agile production is different from lean to the effect that lean production is focused on repetitive manufacturing environment to the properties of high-volume / low-mix and agile manufacturing applies to low-volume / high mix. it shall apply be in an environment where configurable or specialized contract offer competitive advantage. Lean emphasizes technical and operational problems. Agile emphasizes organization and human resources. Slim relates mainly plant (plant). Agility has a broader scope (enterprise and virtual network). Systems can not compete, as lean and agile is its evolutionary stage.

Lean and agile production although revolutionizing appreciation of engineering production, but the impact on support functions, such as maintenance, not yet resolved. You simply can not be covered with a lean / agile manufacturing technology with traditional maintenance. The analysis of lean / agile manufacturing, almost all classified as maintenance of added value. It is therefore necessary to fundamentally review how best to implement the maintenance of lean / agile service not only to current needs but also the growing demands of customers. The maintenance will also need to develop methods to meet the new requirements predictable. 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 mainstays maintenance methods, in coordination parameters control the development of production structures and maintenance / recovery machine (Fig. 1).

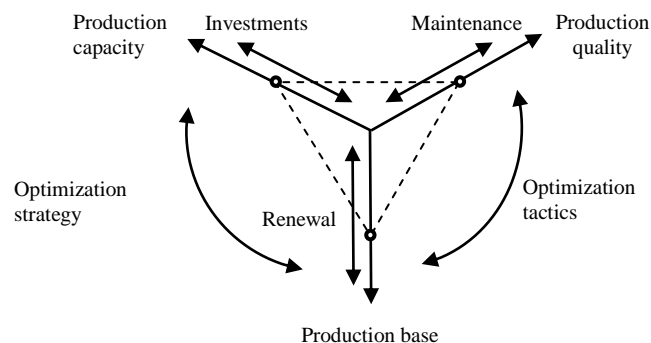


Fig. 1 control parameters of the production infrastructure

The starting point of these principles in the case of lean production is:

- Development of standard procedures to stabilize and increase service life and reducing their own faults (errors) of structural components and modules,
- Improving standards to optimize processes and increase the capacity of the intervention period for all staff,
- Transferring the routine maintenance activity on the production staff (maintaining continuous maintenance quality control),
- Improving the maintenance system (inventory, planning, reporting and analysis), which continued support increases the performance of the operation,
- Operational planning and maintenance management ensuring error-free (stable) operation at all times.

The adoption of these rules has significant implications for the role of tactical planning and management of maintenance and renewal. The first guidelines of these rules shall be used to



increase reliability and to implement control technology. The following guidelines shifting the focus on quality maintenance prevention of disorders of density (intensity) of probability.

Therefore an implementation program of sustainable / lean maintenance with an assessment of the strengths and weaknesses of current maintenance practices by the audit Lean Maintenance [2]. Is assessed when to make improvements alone and that maintenance of the forms will better meet the requirements of the particular terms of thinness e.g. flow, small doses and frequent changes. Moreover, it also helps to identify skills gaps and assign maintenance resources to areas that are most important to achieving the objective.

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.

Conclusion

Contribution points to the possibility and effects of maintenance and renewal of machinery as one of the most important and promising components of the smooth running of production but also the development of operations and growth of property and equipment manufacturing company. The main objective is that the principles presented are appropriate for any production infrastructure (system, subsystem), for which it is necessary to define the functions of maintenance and renewal (the amount of maintenance activities related to the moral and physical abrasion).

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.

Kontakt address

doc. Ing. Štefan Valenčík, CSc.
Technická univerzita Košice, KVTaR SjF
Němcovej 32, 041 87 Košice
tel. 055 602 3238, e-mail: stefan.valencik@tuke.sk

