

2nd International Conference on Ramp-Up Management 2014 (ICRM)

Execution of Ramp-Up Projects in Day-to-Day Operations through a Quantitative Risk Management Approach

Johann Philipp von Cube^{a,*}, Robert Schmitt^{a,b}

^aFraunhofer Institute for Production Technology IPT, Steinbachstraße 17, 52074 Aachen, Germany

^bLaboratory for Machine Tools and Production Engineering WZL, RWTH Aachen, Steinbachstraße 19, 52074 Aachen, Germany

*Corresponding author. Tel.: +49-241-8904-491; fax: +49-241-8904-6491. E-mail address: Philipp.von.Cube@ipt.fraunhofer.de

Abstract

An approach to systematically identify and analyse delay risks in ramp-up projects of automotive manufacturers assuring scheduled ramp-up is discussed considering challenges of time-to-volume, increased quantity of ramp-up projects and increased complexity of products. It follows a multi-stage process based on the common risk management process. Within the first stage comprehensive risk identification in a preliminary process of ramp-up projects is conducted. The second stage includes any activities (risk management) to optimise ramp-up process with regards to delay risks. The approach was validated at an automotive manufacturer site within a ramp-up project of a new product. Results of the forecasting risk simulation and reality of open flaws are to a high degree consistent.

© 2014 Elsevier B.V. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Selection and peer-review under responsibility of the International Editorial Committee of the “2nd International Conference on Ramp-Up Management” in the person of the Conference Chair Prof. Dr. Robert Schmitt

"Keywords: ramp-up management; quantitative risk management; simulation; automotive"

1. Introduction

Increasing customer requirements leading to intense competition in innovation between manufacturers challenge ramp-up management in the automotive industry [1]. Subsequently, they have to cope with shortened product life cycles, decreasing duration of ramp-up projects, larger number of variants necessitating management of parallel ramp-up projects and more comprehensive and complex equipping increasing the number of changes during ramp-up projects [2]. Hence, manufacturers have to master ramp-up projects in less time and with less money while manufacturing more complex products in more complex processes and still assure on-time start of production (SOP). As product life cycle decreases at the same time the amount of sold cars per month is increasingly important for manufacturers thus date of SOP should be complied with at any chance. Assuming a price per car of 25.000€, a production of 25.000 cars per month and return on sales of 7% risks delaying SOP as well as reducing product life cycle by one month imply a loss of turnover of 44€ million. [3] Consequently, high requirements

towards rising maturity level and thereof an effective fault elimination process confront the automotive industry.

In order to prevent such loss threatening manufacturers' existence and meet the requirement dimension time, costs and quality industry applies several management approaches coming from knowledge management, lean management, and risk management. Risk management is the key lever to deal with disruptions and uncertainties in ramp-up projects. However, risk-oriented approaches in ramp-up management base on a top-down risk analysis implying a great effort to model the current risk situation. Bottom-up approaches do exist but are not transferable to and applicable on automotive ramp-up projects so far, as disclosed below.

2. Fields of Action in Ramp-Up Management

Current complexity of ramp-up projects, mentioned above, challenge industries' competence to successfully face ramp-up projects. Thereby, interdependency, dynamic and interdisciplinarity mainly drive complexity of ramp-up projects influencing typical trajectories of open flaws in ramp-

up projects. [4] Such drivers might be laboratory conditions in a ramp-up plant, deficient knowledge and information management, ambiguous defined responsibilities and frictional losses in cause of multifarious disturbances in supply networks as well as in plants and systems engineering. [4] Hence, ramp-up management has to take up these challenges to successfully manage processes. Thus five key fields of action were identified [4]: “development of robust production processes“, “establishment of a demand-actuated change management“, “planning, control and organisation to handle complexity“, “coordination of internal and external fractions“ and “establishment of a corporation-wide knowledge management system, specifically configured for the ramp-up planning and execution“. Since an operative approach is pursued following three action fields are specifically examined:

- Planning, control and organisation to handle complexity (A1)
- Coordination of internal and external fractions (A2)
- Establishment of a corporation-wide knowledge management systems, specifically configured for the ramp-up planning and execution (A3)

Action fields “Development of robust production processes“ and “establishment of a demand-actuated change management“ are not analysed closer due to their strategic nature.

3. Current Approaches of Risk Management in Ramp-Up Projects

3.1. Planning and Organisational Models^{1), 2), 3), 4)}

Focusing on action field ‘A1’ one has to differentiate between a risk-oriented^{1), 2)} and lean ramp-up^{3), 4)} approach.

Risk-Oriented Approaches^{1), 2)}

Nagel¹⁾ combines aspects of risk management with requirements of ramp-up management. In order to track ramp-up projects triggered by risk monitoring several instruments are proposed empowering decision-maker to foresee negative developments at an early stage and to initiate preventive counteractions. Synthesis of project management techniques with requirements of ramp-up and risk management represent key element of this approach. [5] The approach comprehensively addresses risks in ramp-up projects supported by network diagrams enabling better forecast about project development. However, it lacks on usability in day-to-day business due to extensive cause and impact analysis.

Schatteman et al.²⁾ follow an integrated and quantitative risk assessment for ramp-up projects in construction industry. [10] The approach is based on a risk inventory of current projects updated by a team. Based on the risk inventory the duration of single project activities is calculated. [10] Ramp-up projects in the automotive industry deviate from ramp-up projects in the construction industry (parallel conducted activities). However, with adaptations of the approach transfer to projects in the automotive industry is possible.

Lean Ramp-Up Approaches^{3), 4)}

Dombrowski et al.³⁾ apply lean principles to ramp-up projects accompanied by methods and tools to reduce waste. [7] Since ramp-up projects do not comply with steady processes such as series production transfer is challenging. [8] On a strategic level this approach is applicable, but focusing on application at an operative level it covers only a minor part. Furthermore, the approach does not directly address ramp-up risks.

Scholz-Reiter et al.⁴⁾ aim on applying lean principles to accelerate ramp-up projects. In this case ramp-up is not just understood to be an experiment but also to show run-up character enabling companies to quickly produce products suitable for customers. [9] The approach follows fast resumption of value adding activities analogous to tool change of machine tools. In ramp-up projects one differentiates between internal (conducted during the lifetime of the machine) and external (conducted ahead) ramp-up management activities (inherent measures). [9] This approach does not focus on ramp-up risks and only assures usability to some extent. However, Scholz-Reiter et al. ensure better usability and a stronger focus on reducing delays. In comparison, Dombrowski et al. aim on first-mover advantages and neglect quality issues.

3.2. Coordination Models - Integrated Ramp-Up Management⁵⁾

Both, Schuh and Bischoff follow a comprehensive approach linking stakeholders of ramp-up projects in a framework for ramp-up management coordinating internal and external fractions (A2). [11], [12]. Integrated ramp-up management approaches in this case have to be understood as building interdisciplinary teams for ramp-up projects. [12] These approaches enable companies to early meet the demand for experts if needed to assure proper ramp-up. [12] Ramp-up manager take in a key role in such teams coordinating interdisciplinary challenges. [12] This organisational structure facilitates communication between different departments and reduces frictional losses in ramp-up projects. In comparison to Schuh, Bischoff follows a less continuous and more descriptive approach.

3.3. Knowledge Management Models⁶⁾

Applying knowledge management in ramp-up projects database of implicit and explicit knowledge is a core objective of knowledge management approaches (A3). Information and communication technology support storing and spreading data. However, such methods are usually restricted to explicit knowledge. [13] Companies can accomplish steep learning curves when providing data of plans and experiences made in former projects. [13], [14] Best practice workshops or lessons learnt are other instruments not exclusively focusing on explicit knowledge supporting companies to store and spread implicit knowledge. [13]

Download English Version:

<https://daneshyari.com/en/article/1700255>

Download Persian Version:

<https://daneshyari.com/article/1700255>

[Daneshyari.com](https://daneshyari.com)