Production development with the future in sight  
-a green field study at Sandvik

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This article is derived from the master thesis: Production Development with the future in sight- a green field study at Sandvik, which was conducted during the spring of 2011. Sandvik, a company that in current situation is in the engineering phase of a great challenge since they have invested in a new factory that will be built on, literally, a green field. The company now have several decisions take and changes to go through.

Introduction

Sandvik, a global company with several different branches, is one of the great companies within the segment of producing stone crushers for mining industries. In Svedala Sweden, the company is in the middle of a great investment, the so called Green Field investment which will imply a new factory for parts of their stone crush production. The facility is at current situation in the engineering phase with focus on preparations which are running at high speed. The company is for the moment also preparing for an increasing production volume of their crushers and in the near future they are supposed to increase their production volume. This is one of the reasons for their new facility and instead of moving their production to foreign low cost countries they have decided to invest in Green Field.

Problem

Questions that the project has addressed are multiple but this article focuses on organisational and cultural aspects of the production. For example; how can an old industry, filled with traditions and heavy established routines adapt to a totally new situation? How can the competence that is built from years of experience be maintained and developed with ideas of new philosophies of modern production in mind?

Delimitations

The project was conducted at a specific department within the company, Parts, which process the details in different ways on their way to a complete crush.

Since several factors are not yet decided, this research is made upon certain statements and conditions that have been given, such as stated goals for Green Field set by the management of Sandvik. Without delimitating to these conditions the research would be difficult to complete with numberless assumptions and discussions like “on one hand, on the other hand”.

Methodology of the research

Both literature studies and real case studies have been important inputs to the research, although the real case studies have taken a greater part. With the fact that the master thesis contained several projects with different nature, the authors have approached different scientific strategies throughout the whole project.
Since the nature of one of the projects was to find current problems and evaluate improvement proposals with the future factory and organisation in mind, an action research method was applied. A company is often complex and it requires case studies together with interviews and observations fully to understand the company culture and routines. Benchmarking at companies with both similar and different production than the one of Sandvik has been a profound input and has worked as inspiration.

In mission to ensure that the research has high validity and credibility, both primary and secondary data has been used and interviews has been controlled and approved by the persons getting interviewed. The authors have no earlier experience that could be compared to this project since Green Field is a totally new project, as for all stakeholders within the project. This has made the study more interesting but also more complex since several recommendations and conclusions are built and relies on factors and choices that at current situation is not yet decided. Thereby, the conclusions presented for the company are recommendations that might change with time and circumstances.

**Theory**

The Lean philosophy has made remarkable impact on modern production and has enable manufactures all over the world to improve and gain good results in costs and quality [3]. Within the Lean philosophy there are several well known tools, for example 5S, VSM, Kanban and SMED [4]. These tools can be used in production development which is crucial and a condition for a competitive manufacturing company.

Value stream mapping is a way of analysing and clarify the flow of both information and material all the way from customer order to the products are delivered at customer. It is used in mission to decrease the non-value adding activities and eliminate waste activities to create an improved flow where every activity has its purpose.

SMED, Singe Minute Exchange of Die, is a tool focusing on minimising the required time for changing die within the production should not exceed ten minutes. By separating external and internal set up-time, preparations can be made in mission to reduce the time that the machine is not operating.

**Analysis**

By analysing the current production, routines and ways of working were determined and several findings and developments to make for production improvements were found. Through the analysis, interviews were made with stakeholders in workshop, planning department and quality department. Quality department, which handles all the details with inadequate quality, is an important department since Sandvik process casted material, known to suffer of quality problems.

If following issues could be addressed and discussed by the management of Parts, in time before Green Field, better conditions to establish a well functioning and prepared production are created.

At current situation, measurements in the production of Parts are inadequate. In Green Field, high pressure and expectations will be put on the new machines which are supposed to pay back the investment in terms of high efficiency and productivity. Measurements are a tool in finding areas or processes in need of improvements and also are an input data to KPIs’ and production development tools such as SMED. Although, there exist risks when measuring and it is important to fully understand why and what to measure. With too many measurements there is a risk that the most important factors disappear among others and that different goals are in conflict with each other. It is thereby crucial that the management of an organisation transmit the purpose of measuring to all affected stakeholders so that everyone is fully conscious of its importance.

Clear and standardised communication routines that are easy to follow has to be made, which ensure a right information flow between different stakeholders and functional departments. This is to ensure an adequate process but it is also a way of avoiding misinterpretations and unnecessary mistakes due to misunderstandings.

Organisations should have updated manuals and documentations to ensure that information and competence is available to concerned persons as easy as possible. Manuals should be developed, to either work as a guideline for new co-workers or for others in situations where the decision making is unclear. All of this in aim to secure that e.g. planning competence is not based on only personal knowledge. The work and competence should be thoroughly documented to easier adapt to eventual future changes.

One issue that the production is suffering from is, as mentioned before, the quality problems. These problems contributes to delays of delivery to customer and both time and space consuming actions. In the layout for Green Field there is not planned a single square metre area for deviation details with quality problems. In relation to current situation where Parts holds a total area of approximately 600 m² for these details, this puts a high pressure on quality work.
Communication between departments is lacking today and has to be defined and improved. The communication seems to be without routines and everyone has their own view of the “right way”. Knowledge about other departments and their functions is important in a way to understand their needs. This could be accomplished through the Lean tool Value Stream Mapping, VSM, where all the material and information flows are determined in mission to identify unnecessary activities. This would also clarify how the departments link to one and another hence the best and most important communication routines can be defined.

Results and conclusions

The recommendations to the department Parts is that in time for Green Field evaluate and investigate the possibilities of;

I. Value stream map their process as good start on the way to a mutual and overall understanding of the department and its functions. The map gives a good view regarding consequence of an action for concerned stations.

II. Extend the resources among the process experts and education in quality judgment for team leaders, which would enable quicker decisions regarding further actions.

III. Improve relationship with suppliers since one of the problems within Parts is the quality on delivered material. With a better relationship the communication will also be better and this might be a way to manage these problems. It is important for the company and its suppliers to share interests; monitoring of quality problems enables proactive work of creating agreements to secure delivered quality and reduce amount of defects.

In a concluding way; changing an organisation that is filled with old routines and traditions might not always be easy. Soft factors that include human beings are more complex and require more effort to manage and are not possible to solve by implementing a new it system, with successful results as output. We believe that organisations of this kind are in need of putting more effort in communication and routines between different stakeholders. The human resource is the most important one - it is this resource that can change a situation together with new techniques and modern equipment. The other way around will not work sufficiently; new and modern equipment but with lack of human resource, that can handle it adequate and smart, is no winning combination in a developing and leading industry.

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References


