Valmet Mill Maintenance Outsourcing - Best Maintenance Practices in Pulp and Paper Mill to Improve Profitability

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ABSTRACT

Pulp and paper industries have faced difficult times during past decade. Many mills have been closed and the demand for many paper grades like newsprint, magazine papers, etc. has declined. This is due to increasing role of electronic media in dissemination of information. Worldwide the prices of the utilities and other resources have soared to high levels therefore in order to contain the cost of manufacturing, the maintenance outsourcing has become very popular in various countries. Many mills opt for maintenance outsourcing to the main machine supplier when they build new mills. The cases of maintenance outsourcing in a large number of cases, during the past and the present time, have shown that maintenance has become very cost efficient by following the maintenance outsourcing. Maintenance outsourcing in the older brownfield mills has also become very common however, it is more challenging to implement the same in the older mills. In this article the maintenance outsourcing concept from Valmet has been presented and compared with the traditional concept of maintenance followed by the mills.

Introduction

A large number of pulp and paper mills have been closed as the industry faced difficult times during past decade due to decline in demand for many paper grades like newsprint, magazine papers, etc. Dominance of electronic media has been the main reason for the decline in demand of paper. Moreover, the soaring cost of energy and other inputs for production of paper during the last decades has forced the manufacturers to focus on costs and savings . On a positive side, new pulp mills have been built mainly in South East Asia and South America. Also new board and tissue mills have been built around the world.

In order to control the cost of manufacturing, maintenance outsourcing has gained importance in many countries. Maintenance outsourcing has become very popular in green field mills. Many mills want to have maintenance and maintenance establishment from the main machine supplier when they build new mills. The past and present cases have shown that maintenance has become very cost efficient this way. Also, equipment reliability has been good. This way the mills have been able to concentrate on their core businesses like product development, sales and production.

Maintenance outsourcing at the older mills brownfield mills has also become more common but is more challenging to implement. In all these cases proper audits are required in order to find out the status and condition of the mill and set realistic targets.

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Literature Review

Many books and articles have been written on maintenance outsourcing. However, many of them are more related with outsourcing of information technology or related services. However, scanty literature is available on pulp and paper mill maintenance outsourcing and we have presented a brief review of the available literature on maintenance outsourcing.

Henderson.(1) has presented an approach “Five levels of outsourcing operations and maintenance in the pulp and paper industry”. Kenneth Möllersten and Peter Sandberg(2) have written an article ”Collaborative energy partnerships in relation to development of core business focus and competence a study of Swedish pulp and paper companies and energy service companies” in a Swedish journal Business Strategy and the Environment. Ari Jantunen et al. (3) have presented the concept of "Boundary choices in the pulp and paper industry",.In the series of contribution from the authors on maintenance outsourcing, the article from Duening Halvey et al., (4) presents very interesting information with many hints and checklists for companies that are considering maintenance outsourcing planning for the first time.

Practical cases

Valmet started developing maintenance related products and services about fifteen years ago. One of the first success stories was Valmet's streamlined criticality analysis which is a lean application of full scale reliability centered maintenance (RCM). It can be implemented very cost efficiently in a short period of time and the results are good for the pulp and paper industry.

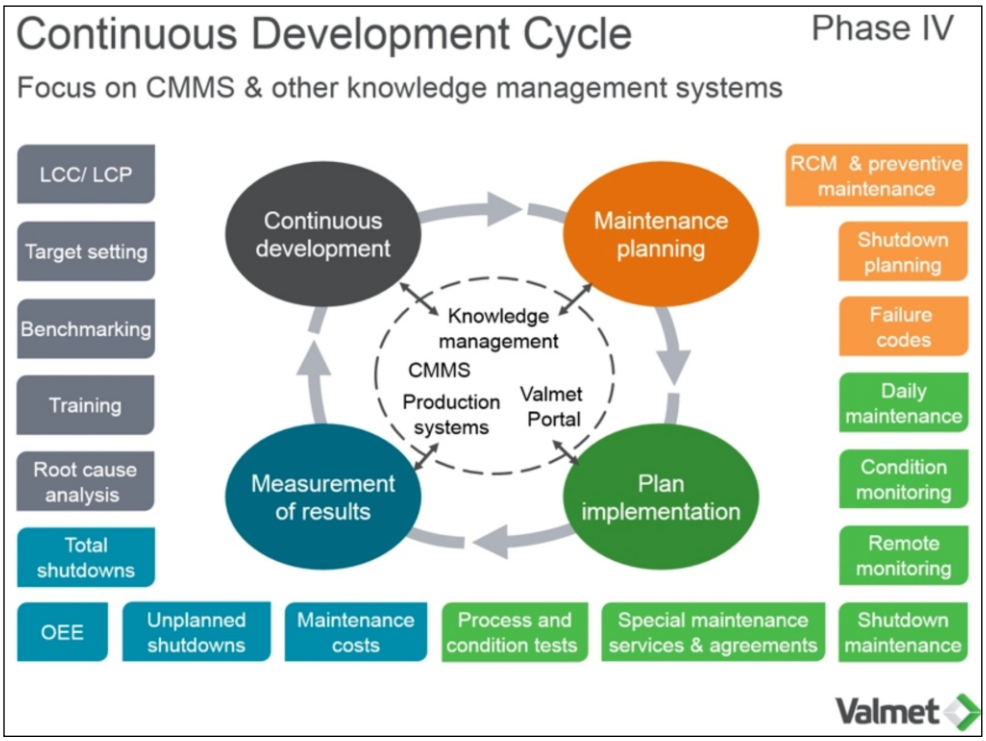

Figure 1. Maintenance development related methods and tools.

Figure 1 shows different methods and tools Valmet has developed over the years to support its maintenance outsourcing and development cases.

The tools presented in Figure 1 are essential also in maintenance outsourcing cases. First of all, it is utmost important to have good preventive maintenance that prevents unplanned shuts due to maintenance. It is supported by operator maintenance and Total Productive Maintenance (TPM). In Valmet's concept operators take care of many of the visual inspections. At the same time when the operators are out on the machines in each shift they will find also other possible failures like leaks etc. This gives maintenance personnel possibilities to concentrate on more demanding maintenance tasks. Preventive maintenance development, however, never gives short term solutions to improve reliability, cut maintenance costs, etc. Normally preventive maintenance development gives tangible results after two three years development work.

However, Valmet has the possibility to use its specialist services to find out possible equipment or system related problems and solve them either at once or through a development program. These services cover mechanical inspections for instance for headbox, press section, winder, process rolls, etc. In a same way also machine automation related issues can be covered. These specialist services can give immediate results and very short payback time after the problems have been solved.

Figure 2 presents Valmet's maintenance outsourcing concept.
In the beginning the most important task is to agree on mutual targets. Both parties have to commit to the target setting. In maintenance outsourcing typical targets are safety related like LTI, availability and maintenance costs. In optimal situation there is also a performance agreement (production related co-operation agreement) that assist the customer in improving their production line efficiency and quality. Typical key performance indicators (KPIs) are total efficiency, time efficiency, broke, etc.

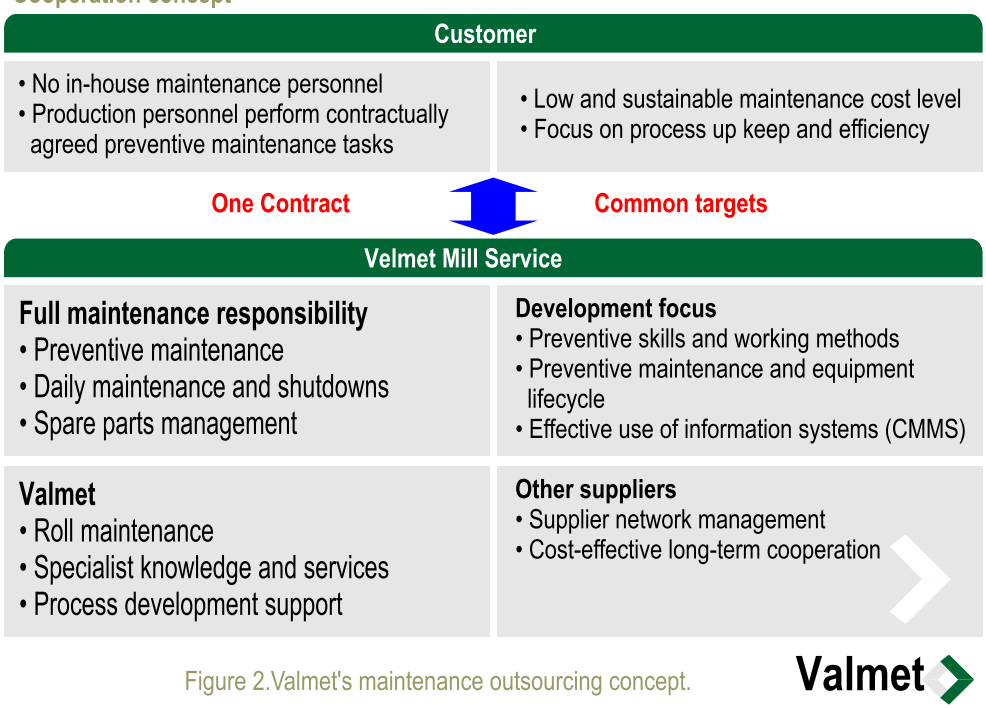

Figure 2.Valmet's maintenance outsourcing concept.

The key elements of successful maintenance are people, systems and tools and equipment. In greenfield projects these elements are easy to take into account and implement. A lot of resources have to be put into recruitment, training and motivation of the people. Another major topic is setting up maintenance management

software into which all maintenance related data has to be entered before the startup of the mill. This data consists, for instance, of mill and equipment hierarchy, preventive maintenance data, spare part data, documents linked to these, equipment technical data, etc. Other systems consist, for instance, of condition monitoring systems and hand held equipment that assist, for instance, in preventive maintenance implementation. Good financial systems are essential in successful implementation of maintenance agreement.

In order to complete all maintenance tasks successfully, availability of good tools and facilities is the most important aspect.

In greenfield mills the manning level of the maintenance organization can be optimized from the very beginning. This helps also in cost optimization.

At brownfield mill there are more challenges than at greenfield mills. In many cases when customers start to discuss about maintenance outsourcing there are problems like high maintenance costs, poor availability etc. Mill culture often is very big hurdle, as there is resistance for any change in the working strategies. Hence, one of the main tasks in outsourcing of a brownfield is change in the management level.

Brownfield maintenance outsourcing starts with mill audit. In the mill audit, maintenance is reviewed with respect to the processes and equipment in the mill. Unfortunately in many older mills most of the equipment exists in relatively poor condition and there is a lot of maintenance liability. Since the concern is to cut maintenance costs, and as these facts are contradictory, therefore thorough target setting discussions are required in order to set realistic, achievable targets and create a good development plan. Figure 3

Figure 4.Kotter's eight steps of change

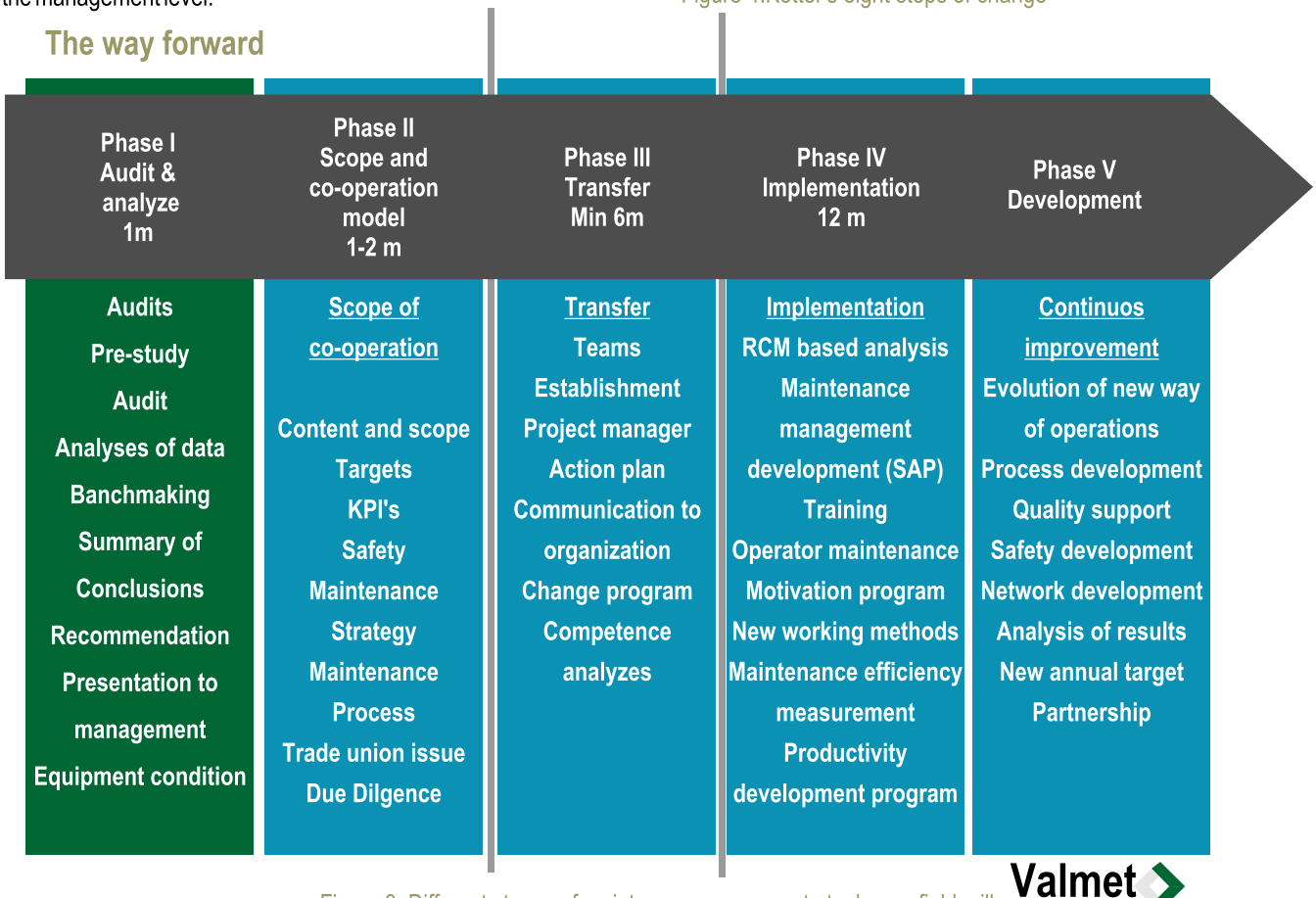

Figure 3. Different stages of maintenance agreement at a brown field mill.

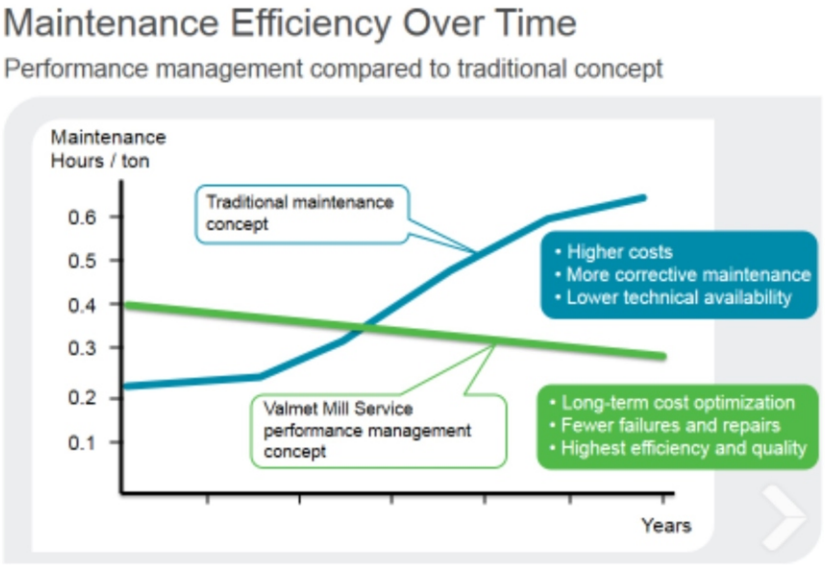

Figure 5. Development of maintenance efficiency

shows different stages of maintenance agreement in a brownfield mill.

In case of the change in management level in a Brownfield mill, a reasonably good approach is to use the Kotter's change management model (5). The illustration of Kotter's change management model is presented in Figure 4. The approach shows that selecting the right management to implement the change in new maintenance is critical for the success.

Results and Discussion

All Valmet's maintenance outsourcing case studies have been success stories, especially in the green field mills. In all the maintenance outsourcing case studies in greenfield mills, Valmet has maintained the promise and all targets have been achieved. .

One important point in these cases has been that preventive maintenance was started from the beginning so that there has been no decrease in the availability figures even after a few years from the commencement. Figure 5 shows performance of the maintenance outsourcing over the conventional concept of maintenance.

In case of the Brownfield mills, the maintenance outsourcing case studies present a different picture. Typically expectations are high, with a vision that everything should change immediately. If there are minor problems in the machines which can be addressed easily, almost instant results are achieved. However, changing the mindset of the people as well as getting results from the preventive maintenance development often takes time. In best cases machine availabilities have gone up drastically already in two three months' time.

When looking at maintenance costs quick savings can be, of course, gained by cutting the number of personnel in case it has been far too big, but this is not a typical case. In many cases there is a lot of maintenance debt and it takes some time to get back to normal level and start cutting maintenance costs. Anyhow, in many cases we have seen maintenance cost reduction of about 30%, new production records, etc. Also the maintenance regime has come to a completely new level. Mills have become cleaner, the content of the CMMS (computerized maintenance management system) has improved a lot, motivation of the personnel has improved, training has been given and OEM specialist services have been used. Also energy costs have come down. (6).

There has been a lot of discussion about pros and cons of maintenance outsourcing. It is not the right "medicine" for all cases. In green field cases it certainly is very useful and ensures that there is a good and cost efficient maintenance available when the mill starts up.

Not all brownfield mills need maintenance outsourcing. If everything is world class then there is no need to change but mills need to endure continuous development and improvement in its working. Unfortunately, this is not the case in all the mills. In these mills, it is better to try maintenance outsourcing to start a change process (7).

Conclusions

Outsourcing is worth considering in all greenfield mill projects and in some brownfield mills in case of certain problems particularly if they have difficulties to find skilled resources.

Original equipment manufacturers (OEMs) have best possibilities for successful maintenance outsourcing. In addition to maintenance, they know thoroughly the equipment, processes, automation and so on. Maintenance development only is not enough in most cases. To support mill development, a good method is to utilize production support agreements.

One issue to be considered is that in today's world, which has changed a lot during the past decade, production and maintenance development may not be enough to save a mill or a company. Instead, new product strategy and company strategy may be required.

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