Towards optimal maintenance scheduling in process plants

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My project in SmartOps

Why is maintenance important:
• Performing maintenance jobs on processing plants traditionally requires shutting down parts of a plant for a period of time
• Maintenance planning has an impact on the availability of a plant and on its overall efficiency
• Start-up and shut-down of a unit for maintenance is usually a waste of energy and raw materials

➢ In processes where availability of the equipment is of key importance maintenance plans are optimized to minimize plant down times

Methodology 1/2

Strategies under investigation
• Combination of preventive maintenance and corrective maintenance on a dynamic basis
• Integration of maintenance planning within production planning
• Dynamic maintenance planning under uncertainties
• Consideration of real time asset monitoring data in a dynamic maintenance planning framework

Conclusions
• Maintenance scheduling is a well established research field in literature
• Several researches (in particular the ones involving condition monitoring information) are looking towards a single asset maintenance
• Optimization and mathematical programming technologies are rarely used in this field

➢ Target of the project is a technology prototype that can help maintenance engineers to take the right decision about maintenance planning in a relatively short time

Problem statement

A range of strategies can be applied to perform maintenances:
• On one hand, they can be executed on a predefined time interval base (Preventive maintenance – PM)
• On the other hand, a system could be maintained only after a failure occurs (Corrective maintenance – CM)

➢ Between these two extremes, different strategies have been proposed to optimize the maintenance process
➢ ABB has high interest and is putting a lot of effort in this research area

Methodology 2/2

System level
• An "optimal" maintenance strategy for a single asset may not give the best result at system level. An holistic approach (i.e. looking at the complete system, a functional area, ...) is needed to increase the performance

Future Work

Use case definition:
• The selection of the best methodology for an optimal maintenance scheduling approach will be defined on the basis of the use case that will be identified and described

Concept demonstrator:
• A simple demonstrator will be developed to ease the explanation of the concept and identify strengths and weaknesses of the approach