The Future of Maintenance
Roadmap Smart Maintenance

Competence-Center Maintenance

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Opportunities and Potential of Smart Maintenance

New digital technologies and the increasing availability of large amounts of data offer manufacturing companies the opportunity to make a needs-based availability of machines and systems even more efficiently available in their maintenance department. In addition, the increasingly available data-supported knowledge can help with maintenance tasks such as:

- Increasing productivity and quality,
- Increasing the life-time of a plant or machine,
- Ensuring the availability of competencies during the entire life-cycle of a plant.

Consequently, maintenance turns into an increasingly important factor for the creation of added value in manufacturing companies.

On the right Track with a Smart Maintenance Roadmap

The challenge on the way to successful Smart Maintenance is, above all, the organizational and cultural transformation of the company’s maintenance organization with the already existing facilities. Only if this is achieved, new technologies, such as data analysis and modular assistance systems, can unfold their full potential. We have made it our task to go this path together with you.

On the basis of in-depth empirical studies, company visits and projects, we have developed a maturity level index solution, along which we create an individual roadmap for companies that describes the transformation route towards Smart Maintenance. This solution includes:

- An assessment of your current smart maintenance organisation
- Benchmarking with Smart Maintenance top-performers and followers,
- Derivation of an individual Smart-Maintenance-Roadmap and
- Support and consultation for the resulting transformation projects.

We are looking forward to accompanying you on your way towards Smart Maintenance.
**Answers to the most important roadmap questions**

We will create the extent and focus of your very own individual roadmap together with you. We want to provide answers to the following questions by providing you our maturity-index-based solutions:

- Where do we stand with our current maintenance organization in comparison to other top performers and followers?
- Which measures include the transformation of our maintenance on an organizational, cultural, resource and IT system level?
- What data do we need to collect and how in order for it to create a solid basis for the further development of our maintenance organisation?
- What requirements do we have to fulfil for the use of new digital technologies (e.g. data analysis, mobile assistance systems)?
- How can we make changes on the way to Smart Maintenance visible and measurable through multidimensional KPI systems?
- How can we increase our ability to change together with our employees to increase acceptance (Change Management)?

**Our procedure for you**

1. **(Re-)Assessment**: During an extensive process analysis and documentation including IT-Systems and Data, we will evaluate and benchmark your maintenance organisation. You set the focus for this.

2. **Roadmapping**: We will develop detailed measures in accordance to your defined goals and your maturity index model, which will provide you with a step-by-step and coordinated development of your maintenance organisation.

3. **Project definition**: Together with you, we will define projects that will serve the purpose of realising your planned measures. To do so, we will support your resource time and process planning.

4. **Project support**: We are happy to support you during the implementation of the projects we defined together by creating the necessary data models and processes with your employees. We are also going to help you make improvements visible in the form of project controlling.
Smart Maintenance Roadmap

**Maintenance goals**

**Deliver productivity**
1. Disposition Digistisation
2. Disposition via an independent IT-System
3. Notifications (e.g., in cases of problems) via tickets
4. Establishing error codes to simplify the evaluation of defects
5. Combination of IT-systems from the production and maintenance (e.g., ME- and IPS-systems)
6. Integrated order planning e.g., maintenance, repair
7. Autonomous maintenance
8. Registration of the order status and feedback in real-time
9. Real-time adjustment of planning time
10. Automatic condition reports from machines/plants in the planning system

**Prolong life cycle**
11. Establishing error codes to simplify the evaluation of defects
12. Combination of IT-systems from the production and maintenance (e.g., ME- and IPS-systems)
13. Integrated order planning e.g., maintenance, repair
14. Autonomous maintenance
15. Registration of the order status and feedback in real-time
16. Real-time adjustment of planning time
17. Automatic condition reports from machines/plants in the planning system

**Ensure competence**
18. Establishing error codes to simplify the evaluation of defects
19. Combination of IT-systems from the production and maintenance (e.g., ME- and IPS-systems)
20. Integrated order planning e.g., maintenance, repair
21. Autonomous maintenance
22. Registration of the order status and feedback in real-time
23. Real-time adjustment of planning time
24. Automatic condition reports from machines/plants in the planning system

**Disposition Measures**

- **Disposition Digistisation**
- **Integration of production- and maintenance planning**
- **Disposition in real time**
Smart Maintenance Roadmap

Industrie 4.0

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<th>Transparency</th>
<th>Predictability</th>
<th>Adaptability</th>
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<tr>
<td><strong>Optimisation and controlling of disposition</strong></td>
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<tr>
<td>• Combination of productions-, quality- and maintenance data via product IDs and or time stamps</td>
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<td>• Optimisation of resource allocation and qualification needs</td>
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<td><strong>Automatisation of disposition preplanning</strong></td>
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<td>• Training of prognosis models via machine learning methods for the prediction of tool and spare part needs</td>
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<td>• Risk-based introduction of predictive maintenance measures</td>
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<td><strong>Introduction of autonomous disposition</strong></td>
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<td>• Automatic generation of solution suggestions for events (such as defects)</td>
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<td>• Autonomous order of spare parts, tools and service suppliers</td>
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<td>• Dynamic, autonomous order planning and management</td>
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With the increasing digital interconnection of humans and machines in the age of industrie 4.0, the potential for value-adding, efficient maintenance for corporate success is increasing. The multitude of new digital technologies (e.g. AR/VR, machine learning) shows promising approaches for increasing the value contribution. However, this can only be realised if the introduction of a technology is accompanied by the adaptation of the organisation and culture of maintenance. Transformation measures must gradually build on each other in order to bring the hoped-for success. In our whitepaper „Smart Maintenance – just do it“ you will find exciting insights into available measures to implement such a smart maintenance roadmap.