



INTERNATIONAL OPERATIONS & MAINTENANCE CONFERENCE  
IN THE ARAB COUNTRIES

UNDER THE THEME  
"MANAGING MAINTENANCE WITHIN INDUSTRY 4.0"  
CONICIDE WITH THE 16<sup>TH</sup> ARAB MAINTENANCE EXHIBITION

# PERFORMANCE OF OVERALL MAINTENANCE AUDIT IN COMPANY

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# 4.0



# CONTENT

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**ESSENCE OF MAINTENANCE AUDIT**

**AREAS OF INTEREST**

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# ESSENCE OF MAINTENANCE AUDIT

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## Maintenance Audit should:

- Determine status of maintenance management
- Make comparison to other businesses (where applicable)
- Lead to provision of a comprehensive picture

## Maintenance Audit is:

- Sequence of systematic activities (data collection, analysis, evaluation, site visit, monitoring, etc.)
- Non-invasive: does not implement measures (these are often implemented by subsequent stages)
- Independent - desirable to be performed by unbiased parties
- Usually subject for large companies possessing own production or large amount of equipment (petrochemical, automotive, energy, geo-mining or metallurgical industries)

# AREAS OF INTEREST

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**MAINTENANCE  
STRATEGY**

**ORGANIZATION  
AND HUMAN  
RESOURCES**

**PREVENTIVE  
MAINTENANCE**

**MAINTENANCE  
PLANNING AND  
SCHEDULING**

**MAINTENANCE  
PROCESSES  
EXECUTION**

**SPARE PARTS AND  
MATERIALS  
MANAGEMENT**

**INFORMATION  
SYSTEM SUPPORT**

**ADMINISTRATION  
DOCUMENTATION  
AND REPORTING**

**MAINTENANCE  
EFFECTIVITY AND  
CONTINUOUS  
IMPROVEMENT**

Where is  
**MAINTENANCE  
4.0?**

# MAINTENANCE AUDIT IS A PROJECT

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## PROJECT PURPOSE, GOALS AND MANAGEMENT



Why?

Sort of „**Higher**“ **Goal** – by purpose we realize the root cause of the decision

Example of project purpose: „We need to increase maintenance efficiency“

What?

**Project Goals** - most important, usually related to audit outputs, giving ability to evaluate result/success of the project

How?

**Project Scope and Time Schedule**

# MAINTENANCE AUDIT IS A PROJECT

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## PROJECT GOALS

### General Goals

- To identify potentials for improvement in maintenance management and execution
- To evaluate potentials for improvement in terms of needed effort and resources for implementation against benefits achieved
- To define action plans for implementation of changes (size of investment, resources, process/structure changes, time schedule, relevant tasks and responsibilities etc.)
- To provide benchmark of maintenance performance

What?



# MAINTENANCE AUDIT IS A PROJECT

## PROJECT GOALS

### Specific (customer related) Goals

- To map spare parts procurement process and assess effects of centralization
- To review spare parts stock levels and provide necessary steps for stock levels optimization
- To verify needed headcount for maintenance execution
- To assess readiness for transition to new maintenance management information system
- To examine effects of outsourcing of maintenance services
- To examine and oppose tender documentation for selection of technologies for new spare parts warehouse

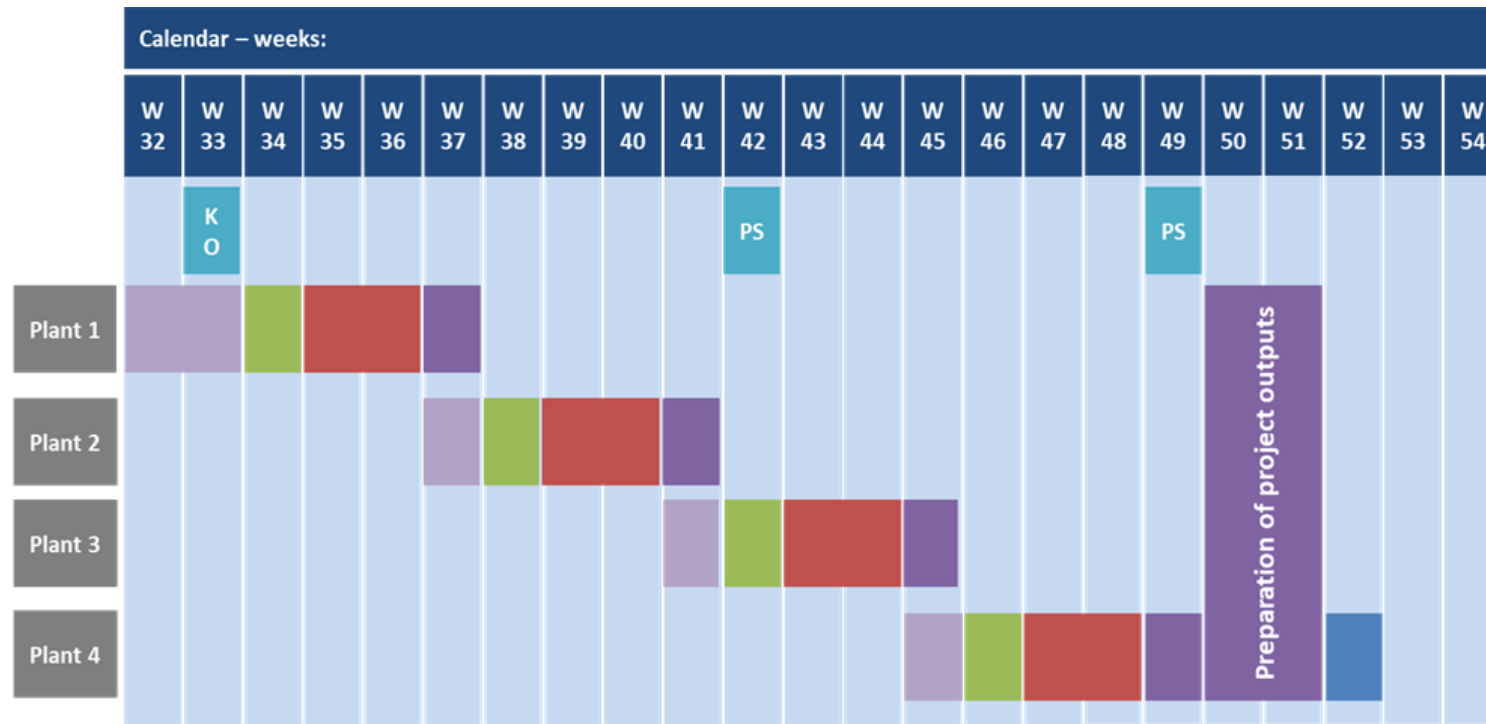
What?



# MAINTENANCE AUDIT IS A PROJECT

## PROJECT TIME SCHEDULE

How?



- Pre-analysis: analysis of obtained data, preparation for visit
- On-site: interviews with key representatives; visit on operations and warehouses
- Analysis and Assessment: processing of data and obtained information
- Follow up: rising additional questions or data requests, re-visit on site when needed, validation of findings
- Kick off meeting: validation of project goals, appointment of project team
- Project status: interim discussion on findings, validation of expectations and project outputs
- End of project: presentation and hand over of project outputs

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# MAINTENANCE AUDIT IS A PROJECT

## PROJECT PHASES

### Phase 0: Pre-Analysis

To avoid delays we define input data requirements in advance, some examples:

- Maintenance budget (x years history)
- Headcount in maintenance and roles (x years history)
- History of production stops (downtimes due to failures)
- OEE for lines or machines/equipment
- Percentage of equipment with preventive maintenance plan defined
- Ratio of preventive/corrective maintenance
- Maintenance cost year by year (x years history)
- Number of spare parts items (x years history)
- Value and quantity of spare parts inventory year by year (x years history)
- List of critical equipment and spare parts and preventive maintenance plans
- Scheme of spare parts procurement process
- Standards, manuals, working guides, and other relevant documentation

How?



# MAINTENANCE AUDIT IS A PROJECT

## PROJECT PHASES

### Phase 1: Audit and Analysis

Site visit and interviews with key representatives. **The cooperation is crucial!**

*Examples: Requested cooperation and detailed steps of phase 1 within 4 days workshop*

Role	Workload
PROJECT COORDINATOR	4 MD
TOP MANAGER	0,5 MD
MAINTENANCE MANAGER	5 MD
MAINTENANCE PLANNER	2 MD
MAINTENANCE TECHNICIAN	3 MD
PROCUREMENT MANAGER	2 MD
MASTER DATA ADMINISTRATOR	1 MD
IT – DATA SPECIALIST	1 MD
BUYER	0,5 MD
WAREHOUSE KEEPER	0,5 MD

#### 1) CURRENT STATUS OF MAINTENANCE MANAGEMENT

- Validation of received data based on preliminary data requests. Going through the data point by point, additional questions and explanations of findings by initial analysis
- Simplified maintenance management audit of areas highly connected to spare parts management (maintenance strategy, preventive maintenance, information system support, spare parts procurement, etc.). Set of questions designed for complex evaluation of the current system
- Identification of perceived issues of maintenance management and spare parts management in particular together with representatives

Required presence of representatives:

Maintenance Manager | Maintenance Planner | Maintenance Engineer | Maintenance Technician | Procurement manager

#### 2) RULES OF EFFECTIVE SPARE PARTS MANAGEMENT

- Introduction of fundamental principles to support optimal spare parts management
- Interactive discussion and application on company environment
- Identification and joint validation of bottle necks and opportunities in company process

Required presence of representatives:

Maintenance Manager | Maintenance Planner | Maintenance Engineer | Maintenance Technician | Procurement manager | Master data administrator | Warehouse manager | Buyer | Warehouse keeper

How?



# MAINTENANCE AUDIT IS A PROJECT

## PROJECT PHASES

### Phase 2: Outputs preparation and presentation

Opportunities identified are subject of description and quantification. Each number represents one potential for improvement, which is evaluated in terms of necessary investment (time, money, resources) against obtained benefits.

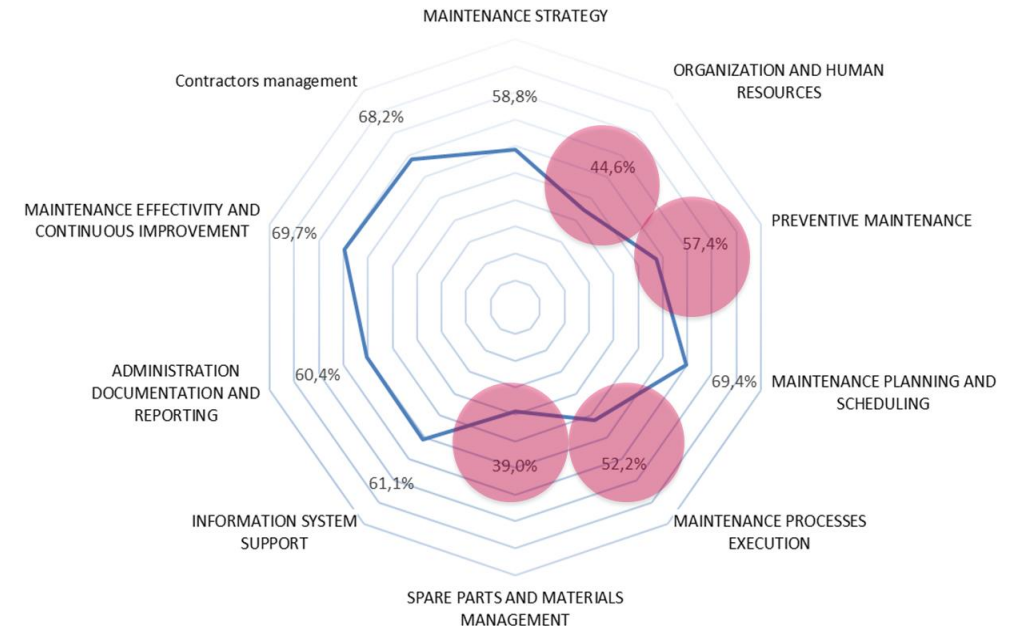
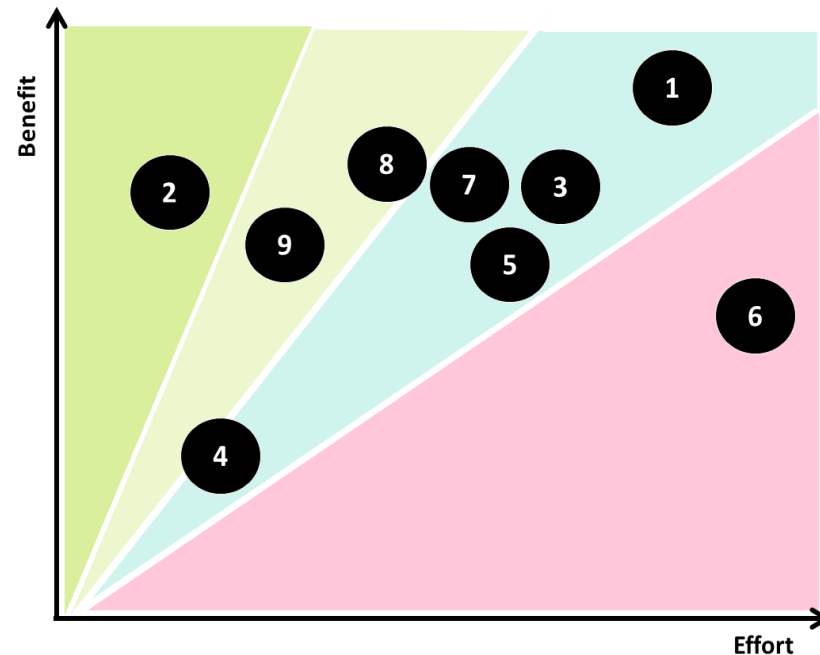


Chart summary interpretation of potentials for improvement



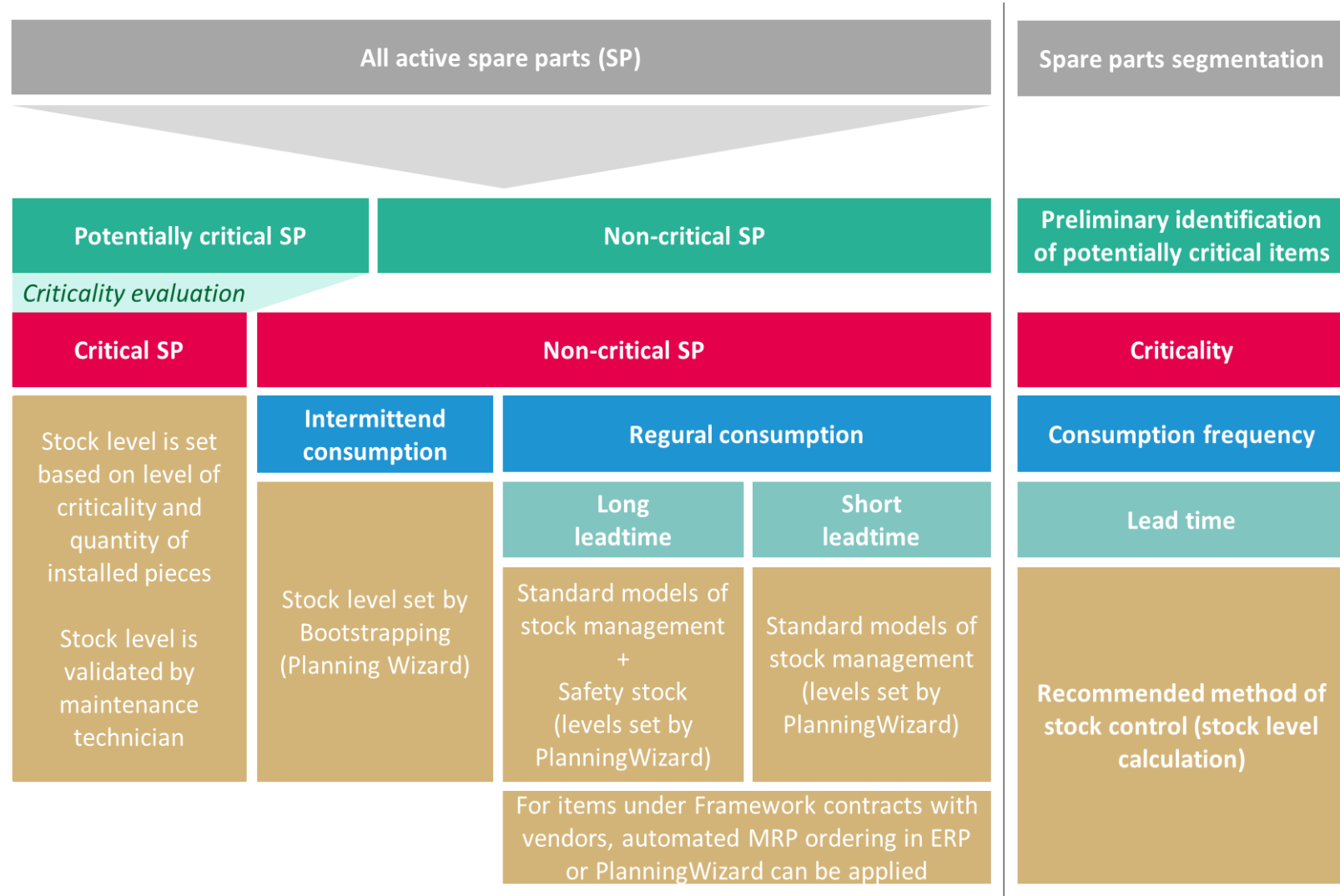
# MAINTENANCE AUDIT IS A PROJECT



Project ID		Project title: <b>Spare parts procurement improvement</b>	
Proposed kick-off date: 1/12/2017		Expected project end: 28/2/2018	
<b>SITUATION:</b> Maintenance in many departments is often delayed due to lack of necessary spare parts. This is caused by problems/obstacles in the procurement process that make internal order and delivery time inappropriately long. These spare parts will be purchased sooner or later anyway, so no saving is achieved by prolonging duration of procurement.			
<b>SPECIFICATION OF CHANGE:</b>			
<ul style="list-style-type: none"> <li>• Improve procurement process so there are no unnecessary delays and obstacles to buy spare parts needed for maintenance.</li> <li>• Utilize possible synergies with XXX (spare parts pooling, joint contracting maintenance)</li> </ul>			
<b>EXPECTED BENEFITS:</b>			
<p>7. <b>Needed maintenance of critical equipment can be done on time</b></p> <p>8. <b>Reduction of downtimes</b> Production uptime improvement due to preventive maintenance: 1 min = 75000 RUB (1 hr = 4 500 000 M RUB)</p>			
<b>OBJECTIVES</b>		Value	
Reduce internal lead time (administration delay) in procurement for critical items		10-50%	
<b>PROJECT PLAN/TIMETABLE:</b>		Deadline	
Procurement process mapping and analysis		19. 12. 2017	
Identification of problems in process		31. 12. 2017	
Identification and analysis of potential synergies with XXX		16. 1. 2018	
Elimination of identified problems – proposal of future state process map		16. 1. 2018	
Implementation of changes		20. 2. 2018	
Evaluation of changes		28. 2. 2018	
<b>PROPOSED TEAM:</b>			
Project expert Logio: T. Hladik			
Project coordinator Logio: T. Kubina			
<b>REQUIRED RESOURCES ESTIMATE:</b>			
CAPEX	None or minor	0	
OPEX	None	0	
Workload (internal)	PM x 1 days/w, Procurement manager 1 d/w, 3 Buyers x 12 days	62 mandays	
Duration (transition period)	3 months (13 weeks)		
<b>DATE: 6/11/2017</b>		<b>PROPOSED BY:</b> Tomáš Hladik, LOGIO	
		<b>PREPARED BY:</b> Tomáš Hladik, LOGIO	

*Project output: Action plan based on maintenance audit findings*

# MAINTENANCE AUDIT IS A PROJECT



*Implementation phase: Design of spare parts inventory management system*

# CONCLUSION

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Maintenance audit is an effective tool to analyze actual situation in company, to identify chokepoints, and to define of next steps for maintenance management improvement.

However,

it crucial to follow predefined and agreed process and methodology, to correctly estimate necessary resources of all parties, and to define clear objectives and outputs.

# PITFALLS AND OPPORTUNITIES

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## 1) **Manage Audit as a project!**

Maintenance is a broad field and you should define and agree scope, goals and outputs of audit before the project starts. You will avoid inconsistencies in supplier's and customer's anticipation.

## 2) **Maintenance is not an isolated discipline**

Maintenance is closely related to operations, purchasing and logistics. It is essential to seek solutions for the whole system.

## 3) **Be prepared to help with implementation**

The best confirmation that the proposed solutions are feasible is an offer for cooperation on implementation.

## 4) **Speak with all levels of employees**

You should obtain view of people running business on a strategic level, but also maintenance workers, warehouse keepers and buyers.

## 5) **Focus on detail where applicable**

It is often impossible to go through everything. Thus, we need to focus on weak areas. They often sound on sessions with management, are mentioned in assignment or uncovered by preliminary analysis and experience.



**Thank you**

