

Q-Proc Maintenance performance audit program

Objectives

The main objective of the audit is to determine the current maintenance performance (both qualitatively and quantitatively) in order to formulate a reference level for developing and monitoring action items for improvement of the effectiveness and efficiency of all the maintenance processes at the paper mill.

By performing a gap analysis between this current state and the desired future state, improvement measures and opportunities can be identified. The desired future state will be determined on the basis of paper industry good maintenance practices and performance.

Approach

A stepwise approach - centered around a framework of '13 core maintenance areas and responsibilities' – based on alignment on objectives, data and metrics acquisition and analysis, comparison with best practices and interviews is used to identify required action items for improvement and to quantify the corresponding improvement potential(s).

A set of generic maintenance performance KPI's¹ will be used to rate the current performance and also as a benchmark to gauge the identified improvements.

In order to measure and quantify progress, a follow-up audit can be organized after 6 to 12 months using the benchmark situation. Action plans will be revised and updated accordingly.

The 13 key maintenance areas are:

1. Organization
2. Costs
3. Technical downtime
4. CMMS² notifications and work orders
5. Planning & scheduling process
6. Breakdowns vs. scheduled activities
7. CMMS and information management
8. Preventive maintenance plans and activities
9. Equipment reliability
10. TPM³ and operator involvement
11. Contractor management
12. Spare parts and storeroom
13. Present maintenance performance management

Stepwise approach

1. Alignment on maintenance effectiveness and efficiency areas to be evaluated
2. Definition of current state by analyzing recent maintenance information system data and by interviewing maintenance and operations staff
3. Agreement on formulated targets based on good maintenance practices and/or company midterm strategy
4. GAP analysis with resulting improvement directions
5. Definition of KPIs to track progress monthly
6. Alignment on action items, responsibilities and planning

¹ Key performance indicators

² Computerized maintenance management system

³ Total productive maintenance

Data/metrics acquisition

- Maintenance costs and cost breakdowns per area and sub-groups
- Organization, staffing & manning (mechanics, foremen, supervisors, planners, schedulers, engineers, clerks, administrative, managers)
- Planned and unplanned downtime (OEE⁴ if available)
- Work orders: scheduled (shutdown and anytime), unscheduled (emergency shift), preventive and other categories
- Overtime and work order backlog
- Planning & scheduling (weekly schedule attainment, work requests, planners input/output)
- Contracted maintenance
- Store room

Meetings and interviews

Proposed daily schedule					
	Monday	Tuesday	Wednesday	Thursday	Friday
Morning	<ul style="list-style-type: none"> • Introduction and nomination of people involved • Mill tour • Collection of CMMS data and metrics 	<ul style="list-style-type: none"> • Kick-off and alignment on audit team, scope and interviews schedule • Interviews • Audit team group discussion and idea generation 	<ul style="list-style-type: none"> • Interviews • Collection of CMMS data and metrics 	<ul style="list-style-type: none"> • Interviews • Analysis of data • Quantification of current state • Definition of generic MT KPIs 	<ul style="list-style-type: none"> • GAP analysis and definition of improvement measures • Definition of KPIs set to track/monitor progress
Afternoon	<ul style="list-style-type: none"> • Collection of CMMS data and metrics 	<ul style="list-style-type: none"> • Interviews • Collection of CMMS data and metrics 	<ul style="list-style-type: none"> • Interviews • Analysis of data • Quantification of current state • Definition of generic MT KPIs 	<ul style="list-style-type: none"> • Group presentation and discussion of current state and desired future state with idea generation • Processing of results of current and future state discussion 	<ul style="list-style-type: none"> • Definition of action items, measures, targets and implementation planning of measures including the wrench time results • Short wrap-up meeting and alignment on action items and further continuation

CMMS: computerized maintenance management system

⁴ Overall equipment effectiveness

Supporting KPI's are used to track and monitor progress

ROUGHASSESSMENT

 Priority area

<u>Performance indicator</u>	<u>Maintenance activity</u>	<u>Good practice</u>
■ Maintenance cost / ERV*	N/A	1.5 - 2.0
■ Preventative / reactive	40/60	70/30
■ Work order back log (weeks)	12 - 16	4 to 6
■ Craft to planning ratio	10 to 1	10 to 1
■ Craft to supervision ratio	8 to 1	15 to 1
■ Tool time (%)	~ 35	60 - 65
■ Overtime (%)	> 10	3
■ Planned maintenance (%)	25	90
■ Scheduled maintenance (%)	~ 50	90
■ Schedule compliance (%)	~ 50	90
■ Rush orders (% of orders)		
- Immediate	70	<5
- Within a week	10	<10

Deliverables

- Current state definition for core maintenance areas providing a good reference for further improvement plans
- Action items for improvement, responsibilities and planning in order to improve from the current to the future state
- Supporting KPI's to measure and track progress during change process

Auditors

1 person (senior level maintenance consultant with more than 20 years experience in the pulp & paper industry)

Audit duration

5 days