

CMMS Input And Output Detail

Each group of the CMMS inputs and outputs shown in the diagram in the main blog is broken out into more detail as follows. These lists are not exhaustive, rather a suggestion of items that should be considered for both periodic and predictive maintenance systems.

Inputs

Equipment ledgers / technical information including:

- Description of machine or asset
- Drawings of equipment, details of parts, piping layouts, flow diagrams and wiring diagrams
- Design specification and changes
- Structural analysis data
- Parts and spares lists / BOMs (Bill Of Materials) (accuracy vital). May also include alternative parts for temporary use
- Expected life of components
- Equipment details
- Process capability
- Improvement history (link to MP data sheets (Maintenance Prevention))
- Equipment health and safety & risk assessments
- Training and development
- Standard operating procedures for start-up, operating, change over and shut down.
- Settings for running, basic conditions required
- Checking standards
- One Point Lessons
- AM sheets e.g. Equipment Function Worksheets, Risk Map, Difficult to clean and Inspect sheets.
- Maintenance procedures / Standard Operating Procedures for strip, part or sub assembly replacement, servicing, Planned Maintenance checks, calibration records
- Fault finding guides / diagnosis criteria
- Manufacturers equipment files / technical reports
- Physically present but not in use equipment (redundant)
- ABC analysis ranking
- Feedback sheets / lessons learned. MP data base link.

Asset management data about equipment and property including:

- Specifications
- Purchase date
- Expected lifetime
- Warranty information
- Service contracts
- Service history
- Spare parts

Inventory data incorporates management of spare parts, tools and materials

- Management of spare parts including:
 - Stocking policy / spares strategy and reason for stocking
 - Consignment stocks
 - Stock levels and shelf life
 - Standby units

- Supplier details
- Parts specifications
- Lead times
- Supplier performance data
- Management of tools and inspection equipment
- Management of materials

Human resource data including:

- Names
- Skills / profile
- Skill requirement
- Rates
- Contractors
- Resource availability (holidays, training etc.)

Safety data includes:

- Management of permits
- Lock Out - Tag out
- Confined space
- Foreign material exclusion
- Electrical safety

Finance and budget data includes:

- Annual budget
- Cost data for labour, materials, parts, tools, third party contractors etc.
- Data on costs for different restoration tasks

Outputs and Functions

Technical information

- Retrieval of any of the documents listed in technical information as an input

Maintenance procedures

- Standard step by step procedures for all planned maintenance
- Maintenance drawings

Other procedures and training information

- One Point Lessons
- Development and training plans
- AM support and training records

Scheduled maintenance activities and plans need to be created and issued

- Maintenance plans; short, medium and long term
- Daily Check sheets, cleaning routines, lubricant replenishment schedules (CIL sheets) – line operator completes Autonomous Maintenance based checks and takes appropriate action.
- Routine inspections on ancillary equipment
- Schedule Time Based Maintenance (TBM), Condition Based Maintenance (CBM) etc. maintenance tasks and inspections. These can be done from maintenance plans and / or meter readings.
- Re-schedule work e.g. if a preventative maintenance task was carried out during a breakdown repair

- Initiate further work

Asset management information

- Retrieval of any of the documents listed in asset management data as an input

Inventory control

- Reservation of parts and materials
- Providing storage locations
- Parts and materials used
- Inventory levels and cost
- Pricing analysis
- Automatic purchase in line with purchase policy
- Tracking goods inwards
- Supplier performance reports

Manpower scheduling

- Skills matrix
- Task allocation

Safety management

- Retrieval of any of the documents listed in safety data as an input
- Records to prove compliance to legislation

Information analysis

- Mean Time Between Failure (MTBF) and Mean time To repair (MTTR) analysis tables – to provide current values for each measure allowing focus on key areas for action and to show progress.
- KPI s including MTTR, MTBF, Mean Time To Arrive (MTTA).
- Charts to allow comparison of predicted downtime losses with maintenance costs and help measure maintenance effectiveness.
- Search options possibilities e.g. by machine type, failure type etc.
- Load capacity analysis.
- Life cycle cost information.
- Estimate and update resources e.g. lists of materials required for routine tasks.
- Tracking relevant information e.g. cause of problem, downtime involved etc. similar to information on Emergency Work Order (EWO). EWO summary reports for daily and periodic meetings.
- Track machine breakdowns; again record all the data on the EWO.
- Provide information to assist diagnose faults.
- Provide information on how much different restoration tasks cost for a range of deteriorated states.
- Calculate the cost of running a breakdown maintenance system versus the cost of using preventative maintenance techniques. This decision feeds into resource allocation decisions.
- Top 10 Focussed Improvement activities.

Summary reports and records aligned to the appropriate interval of control

- Work completed
- Periodic failure summaries

- Maintenance cost reports
- Equipment failure lists
- Maintenance performance to plan and backlog reports
- Maintenance report summary – summary of EWOs, planned overhauls and corrective maintenance work. Maintenance supervisor completes EWO process. Also extracts failure statistics to determine priority equipment and items to be maintained
- Corrective maintenance record – record planned, completed and results of corrective maintenance work. Link to MP database for early management pillar required as well as action for horizontal replication
- Equipment history – record details of principal failures, repairs, periodic servicing and corrective maintenance work with corresponding costs. Provides life cycle cost information and influences future replacement and purchasing decisions
- Maintenance expense record – collates all maintenance related costs; labour, materials and subcontracting for each piece of equipment. Assist to manage the maintenance budget and provide focus for cost reduction activities
- Similar to above but for projected expenses to forecast when funds need to be disbursed.
- Equipment life forecasts
- Budget summaries for different types of maintenance work, comparing budget and actual for different years
- Escalation triggers