

DEVELOPING A BEST PRACTICE MAINTENANCE STRATEGY AND SUPPORTING INFORMATION SYSTEM

[ENGINEERING PROJECT IMPLEMENTATION]

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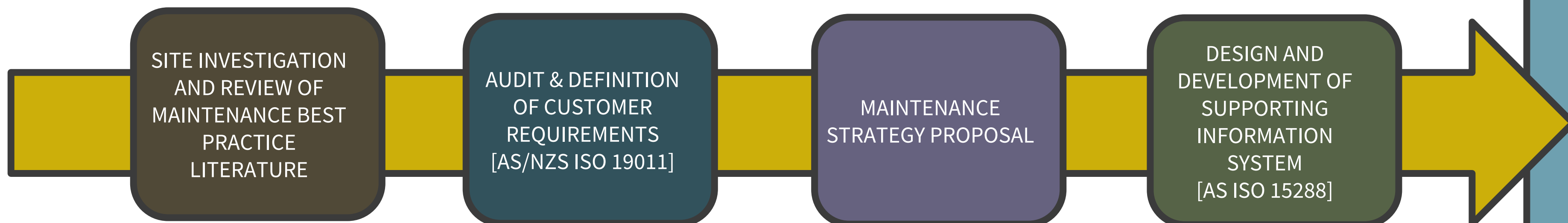


BACKGROUND

Company ABC, has been producing 15 litre bottled spring water at a facility that has been operating for over 5 years. The facility utilises one production line to produce all bottled water requirements of its Southern and Central Queensland customers. Historically, the capacity of the production line was more than sufficient to meet customer demand with less than five hours of operation, five days per week. However in recent years, Company ABC has had difficulty meeting customer demand within planned production hours due to increased customer demand and a reduction in equipment performance. The company has identified a need to improve its production performance in order to meet customer demand within existing planned production hours.

The objective of this project is to improve overall equipment effectiveness and effectiveness of maintenance spending through developing a best practice maintenance strategy and supporting information system.

METHODOLOGY



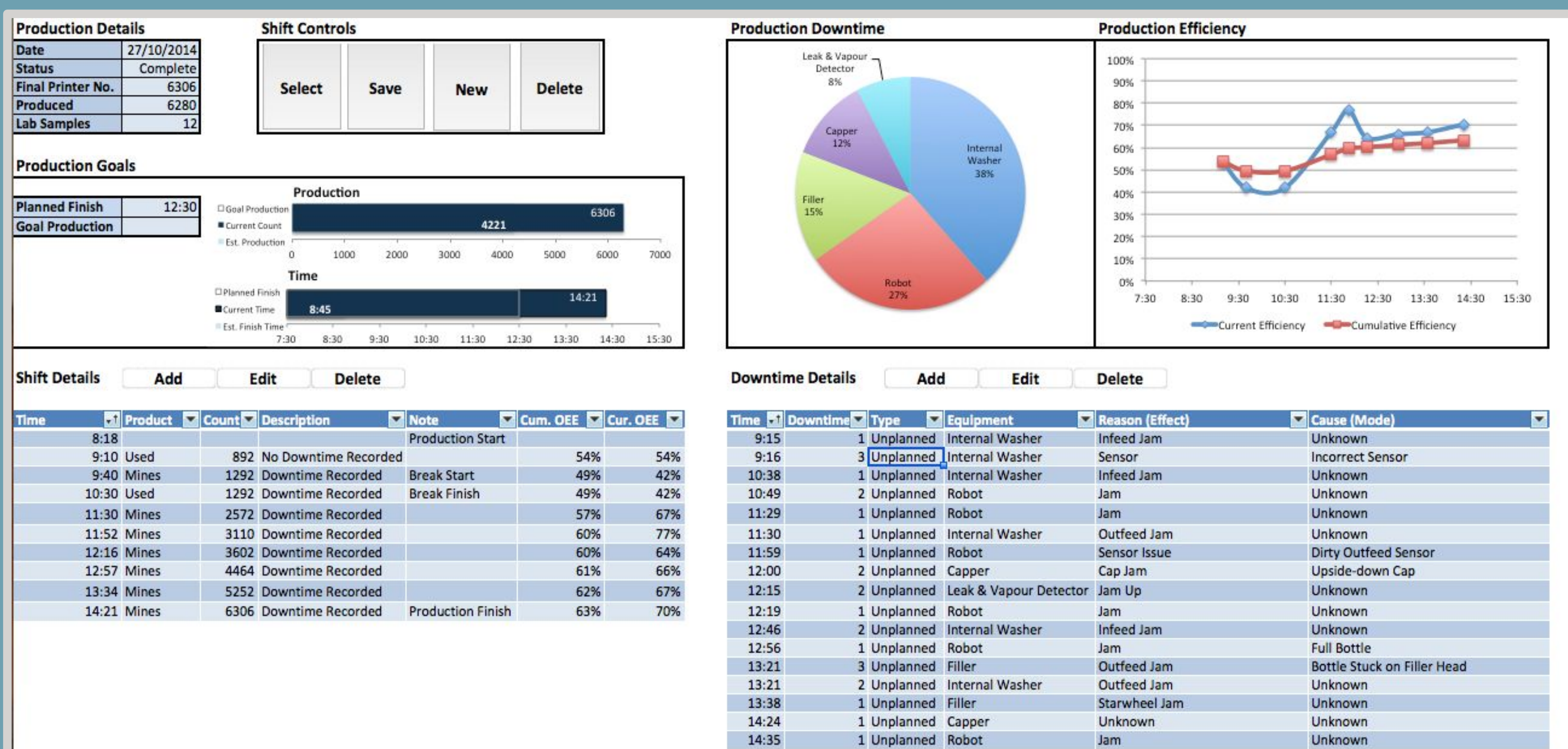
CONCLUSIONS

A customised production and maintenance information system can be utilised to establish where overall equipment effectiveness can be improved. The system identifies production downtime caused by failure modes and is then able to rank these in terms of criticality and financial loss. The most critical system failures should be further investigated using root cause analysis principles, ensuring engagement of employees at all levels to capture valuable information. This enables decision makers to appropriately prioritise maintenance strategies for greatest financial benefit, whilst optimising productivity.

RESULTS

The results present a proposal for a best practice maintenance strategy and supporting information system that utilises current company resources. The proposed system improves processes for; data collection, failure identification, root cause analysis, maintenance selection and financial rationalisation of maintenance solutions. An efficient method for collecting and storing key production and maintenance data is presented. The collected data is used to generate powerful reports that allow the operational team to identify and rank failure modes in terms of criticality and financial loss. The most critical system failures are further investigated using simple and effective root cause analysis techniques, with cross-functional teams to enhance the information captured. The process of maintenance selection employs a proven combination of Total Productive Maintenance (TPM) and Reliability Centred Maintenance (RCM) decision methodologies. This combination along with the information system, allows the decision maker to perform a discounted cash flow analysis, financially rationalising solutions.

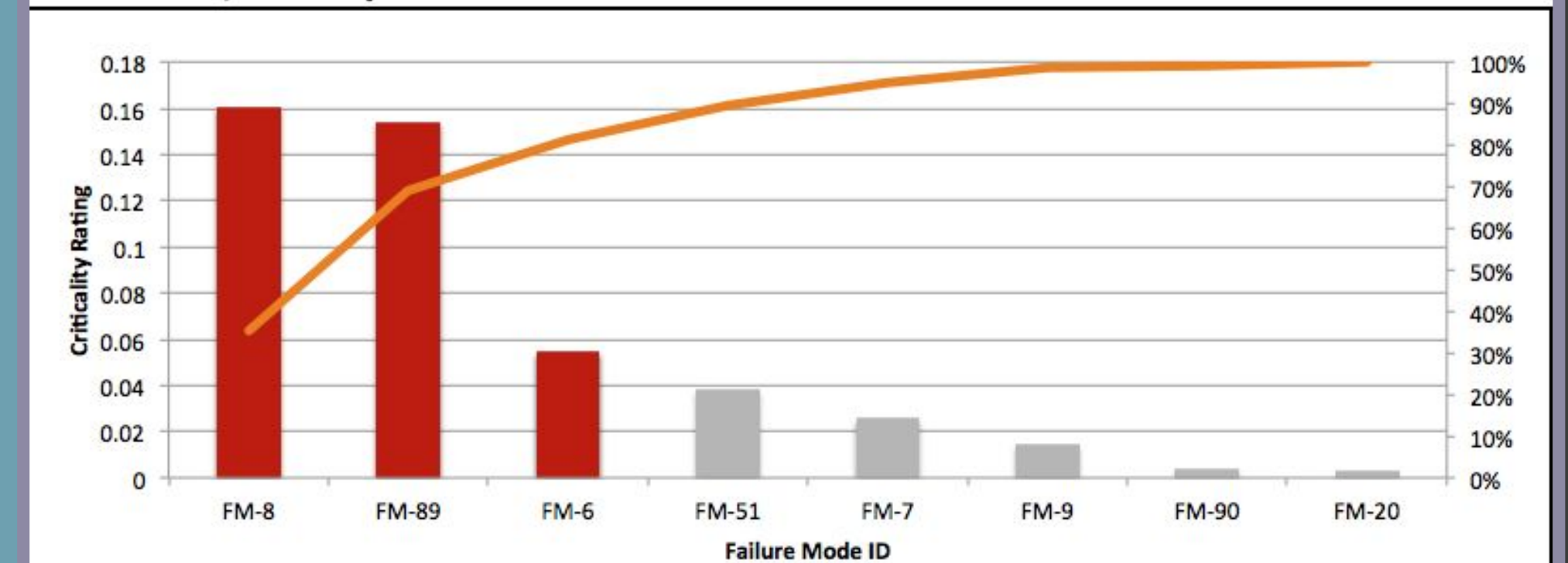
PRODUCTION AND MAINTENANCE INFORMATION SYSTEM (PMIS)



PMIS INTERFACE

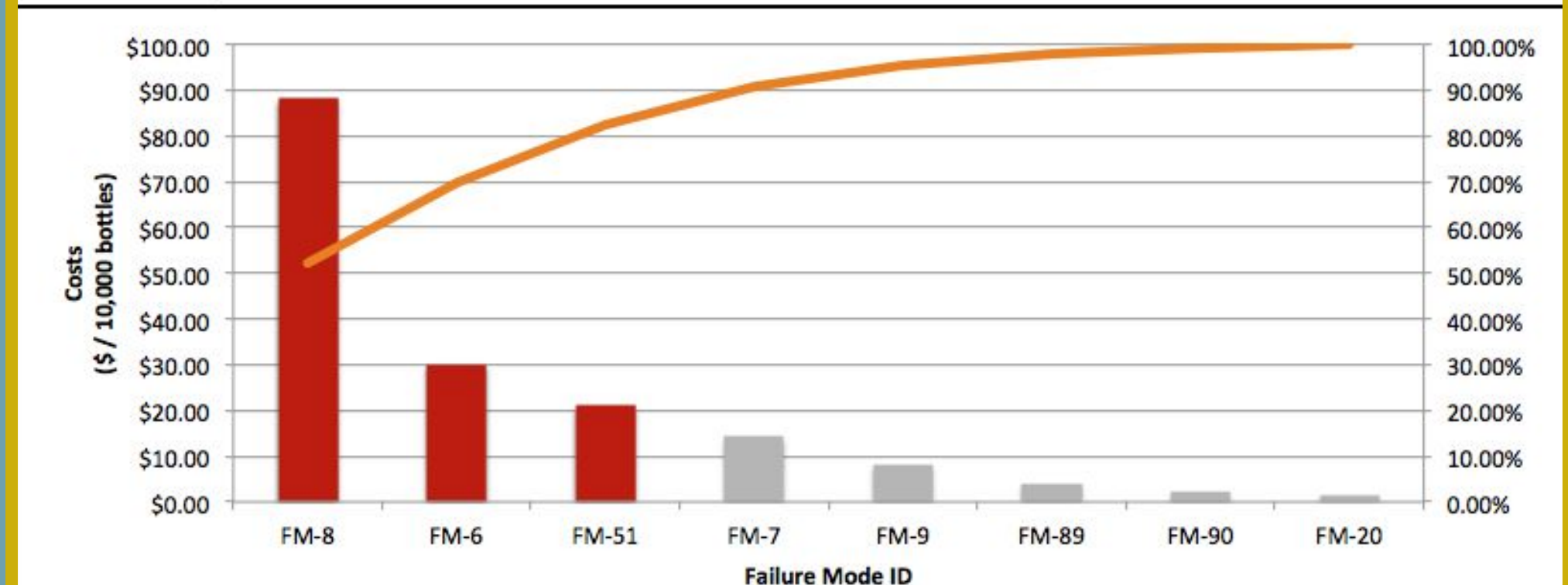
- is simple and intuitive to use
- allows operators to record all production data required for calculating quality, performance and availability components of Overall Equipment Effectiveness(OEE)
- allows recording of reliability data including breakdown durations, causes and effects
- presents one shift at a time
- outlines key performance measures
- estimates production figures which update dynamically throughout the shift
- shows equipment associated with major downtime
- provides a running Overall Equipment Effectiveness estimate for current shift
- allows data to be imported, exported and modified on a master database

Failure Mode, Criticality - Pareto Chart



Criticality is the product of the frequency and severity of a failure. Failure modes highlighted in red represent the highest risk to the company and greatest impact on Overall Equipment Effectiveness. These failures should be considered for root cause analysis.

Failure Mode, Financial Cost - Pareto Chart



The above chart identifies the direct financial costs per 10,000 bottles related to the failure modes causing the greatest amount of downtime. Failures highlighted in red represent 80% of the cumulative cost of all failures shown. These failure modes should be considered for root cause analysis.

NET PRESENT VALUE

Monte Carlo Simulation of Net Present Value (NPV) distribution graph is an effective measure for evaluating the financial feasibility of maintenance solutions. NPV takes into account the timing of cash flows for accurate predictions of maintenance outcomes.

