

The characteristics that define excellence in maintenance and reliability practices are remarkably consistent across industries. Key attributes include:

- A much higher ratio of planned versus reactive maintenance work, often approaching 4:1.
- Higher levels of equipment availability and reliability.
- Much lower spending on maintenance, typically 2% of Replacement Asset Value (RAV) as opposed to 5% RAV or more as incurred by non-optimized practices.
- Better profitability than competitors.
- A higher reliance on condition- and proactive-based strategies for determining when and where to perform maintenance, rather than time-based or run-to-failure practices.

GE, through a strategic business relationship with Management Resources Group (MRG), Inc., brings experience, methodology, qualified resources, and tools to address and improve our customers' maintenance and reliability programs for virtually any industry. Our approach is based upon establishing a strong foundation — addressing the key elements critical to the success of the rest of program — and then building a robust reliability program on this foundation. Our uniqueness also stems from our ability to implement all of our recommended actions. Far more than just consulting. Finally, we are able to deliver these solutions globally in a consistent manner, across multiple divisions and plants,

The result is something we call Business Centered Reliability™ because the focus is never on reliability for reliability's sake — it is always on your business objectives. The following synopses demonstrate this Business Centered Reliability, showing how we have made a difference for customers in a variety of industries.

Industry: Oil Refining



Situation: An oil refinery was experiencing random premature equipment failures, resulting in an average of 14 days of down time, reducing annual capacity of the unit by 280,000 barrels of product.

Solution: We helped the customer institute a condition monitoring program including vibration and infrared measurement and analysis, as well as a PM program of filter inspection, cleaning, and replacement.

Results: Premature failures of the machine train were eliminated, allowing the unit to operate at full capacity through two turnaround cycles. Plant annual capacity was restored, equating to \$5MM of additional revenue and \$1MM of additional profit.

Industry: Power Generation



Situation: A fossil fuel power plant had a critical shell and tube heat exchanger in the water cooling system that was chronically failing, costing the plant over 80 hours per year in downtime and substantial lost revenue.

Solution: We helped implement a comprehensive preventive and predictive maintenance program that measured pressure differential and prescribed cleaning when the condition dictated.

Results: Downtime was reduced by nearly 90% resulting in savings of more than \$350,000 per year.



Industry: Steel



Situation: A large steel mill was on the verge of bankruptcy.

Solution: We implemented an integrated, plant-wide reliability centered maintenance program.

Results: The plant became the most profitable steel producer in

North America and was rated the #1 steel mill in the world by Dow Jones. This plant reduced reactive maintenance from 70% to 20%, increased availability from 78% to 91%, improved First Run Yield from 76% to 91%, and decreased storeroom inventory by \$40 million — all with fewer people.

Industry: Chemical



Situation: An international chemical company was suffering from unreliable assets, poor system design, high maintenance costs, and inability to achieve 50% of its annual production goal.

Solution: We performed a

Reliability Centered Maintenance analysis on several systems and instituted a comprehensive program designed to help the plant improve performance.

Results: Upon implementing the results of the analysis, the facility reduced its annual maintenance spend from 7% of RAV to 4% and increased its production capability to 133% of the rated nameplate capacity.

Industry: Pharmaceutical



Situation: A Fortune 500 pharmaceutical company had a top-of-the-line CMMS, but virtually no implementation method had ever been in place.

Solution: We assessed the situation and custom designed

an implementation program to suit the specific needs of the CMMS and the organization.

Results: After a successful implementation, the company saw an increase in effective system use, leading to improved efficiency and more wrench time.

Industry: General Manufacturing



Situation: A major manufacturing company was losing time and money due to inefficient use of an existing CMMS.

Solution: Following a CMMS audit, we recommended and implemented reporting and

analysis improvements along with intensive user training.

Results: Through increased employee use and their ability to maintain their revamped materials catalog, this company dramatically reduced their parts and labor costs while increasing wrench time.

Industry: Oil Refining



Situation: A US refinery underwent several capital improvement projects over eight years, requiring the accumulation of numerous spare parts to support new equipment.

Solution: We instituted the

requirement of accurate and complete BOMs to manage the incoming parts.

Results: Even though the value of new spare parts increased by 400%, the total inventory increased by only 12% — negligible considering the 30% maintenance spend reduction and reliability improvement savings they enjoyed.

Industry: Food Processing



Situation: A food processing company was losing revenue through their primarily reactive environment.

Solution: We instituted new planning and scheduling training requirements.

Results: The company was able to optimize all of its resources while creating a more proactive environment, identifying potential problems before they disrupted production.

Industry: Import/Export



Situation: A major latex manufacturing importer/exporter was experiencing an excessive amount of breakdowns while production suffered.

Solution: By introducing PdM procedures and utilizing

specialized tools, we helped to create a proactive environment.

Results: The manufacturer reduced the number of equipment breakdowns by 75%, enabling significantly improved production.

Industry: Agricultural Products



Situation: A multi-national agricultural product manufacturer needed strategy and process consulting, knowledge transfer, training, and CMMS implementation services under a corporate-wide initiative to improve asset reliability.

Solution: The customer adopted our proprietary methodologies for their reliability model.

Results: The company transformed into a low-cost provider of high-quality products with sustainable competitive advantages that also included increased availability and capacity.

Industry: Steel



Situation: A major steel company was losing time and money due to poor MRO data quality.

Solution: We standardized the company's MRO catalog through extensive data extraction and subsequent reformatting and

enhancement procedures.

Results: With a completely standardized MRO catalog, operating costs declined and workers performed with greater ease and efficiency.

Industry: Power Generation



Situation: An energy company was reactive and inefficient in its maintenance practices, losing valuable time and money.

Solution: We helped the customer catalog all their equipment and establish appropriate maintenance

strategies for each asset. After entering this data into a new software system, we guided them in making the transition from failure-based (reactive) maintenance to time- and condition-based (proactive) maintenance practices.

Results: The company increased its performance while reducing maintenance costs in both O&M and capital areas. It was also better able to plan its work, accurately anticipate capital spending needs, understand the lifecycle costs of its equipment, and realize greater efficiencies.

Industry: Pharmaceutical



Situation: A major pharmaceutical company had a disorganized and poorly designed storeroom containing obsolete and duplicate parts that were often difficult to locate.

Solution: We helped the company standardize its inventory descriptions, organize the parts more efficiently, label and record each part in the CMMS, design and implement a process for part location and ordering, and update the storage equipment.

Results: The new organization and processes cut overtime costs by 18%, decreased overall parts and labor costs by 11%, and increased production by 15%.



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