Maintenance inefficiencies cost the industry over $184 billion per annum, according to the US Department of Commerce, and this does not include over $500 billion in productivity losses.

In a typical plant, the maintenance department averages about 30% ‘wrench time’. The majority of the time is spent on performing other activities such as data entry and retrieval, work-order reporting, and other paperwork.

There is evidence that this type of maintenance work is unnecessary, ineffective, and even counterproductive. This includes routine equipment checks as well as preventive maintenance on equipment, which may not be necessary. Worse still, certain maintenance activities can reduce equipment reliability. Problems can result from incorrect re-assembly, inadequate tightening, misalignment, or other maintenance induced errors.

While there is a mountain of data available in the Computerised Maintenance Management Systems (CMMS), it is not always available in a format that will highlight improvement opportunities. Furthermore, the process of extracting useful information from the data is slow and tedious.

Our Solution

Cygnus has developed a methodology that uses CMMS historical data of past repairs and maintenance actions to quickly and effectively identify gaps and improvement opportunities in maintenance programs. The method uses a specialized software tool with a Natural Language Understanding Process (NLUP) for analysis of unstructured text, such as text found in fields for opening and closing comments in maintenance work reports.

It identifies improvement opportunities by finding the ideal range for maintenance frequencies and targets low-risk components to extend or delete maintenance tasks potentially. The process focuses on high impact opportunities to reduce costs significantly.

“... the cost of a typical repair is 5 to 15 times greater than the cost of the (proactive maintenance) effort that would have prevented the failure from occurring”

“... Where maintenance systems are predominantly reactive, up to fifty percent of maintenance spending can be eliminated.”
MAINTENANCE EFFICIENCY ANALYSIS USING NLUP

The Cygnus software solution consists of 4 main steps:

1. Staging

Data files (in CSV format) are obtained from the CMMS and the SCADA/DCS system if available. These are reformatted to produce the databases which are required for the automated NLUP, analysis, and reporting processes.

2. NLUP

NLUP is the approach in which computers analyse free text to gain meaning in a useful way. The NLUP technology uses proprietary dictionaries and algorithms that allow it to extract and format the information. Keywords are standardized, ‘Blocks of Information’ are identified and grouped into categories for analysis.

3. Analysis

The analysis process uses the NLUP categorised keywords and expressions, labor costs, material costs, component criticalities, Work Order priorities, and other forms of asset jargon to identify the following:

- Maintenance cost breakdowns
- Operational cost breakdowns
- Maintenance efficiency savings like over maintenance, under maintenance, rework, premature replacements, etc.
- Reliability, availability and failure modes amongst others.

4. Reporting of Results

Results are presented on Microsoft PowerBi dashboards. The dashboards are in the form of interactive charts and tables with the ability to drill down to component level. They provide the ability to view and understand the overall maintenance costs easily, efficiencies, and failures in a single concise overview. They can be tailored to company reporting requirements. The reporting dashboards also have a performance monitoring facility that allows the effectiveness of changes to be tracked.