# LOSS ELIMINATION CASE STUDY

The Corvus Loss Elimination Suite was developed to extend the existing Resource Events framework and help maintenance teams capture and analyse the required information to improve the following key metrics: Availability, First Failure After Service (FFAS), Unscheduled Downtime and Mean time Between Failure (MTBF); to meet the required maintenance targets. As a result, many teams have moved away from using spreadsheets in favour of more accurate event details and reports.

### **THE PROBLEM**

The existing processes used by site maintenance teams to generate maintenance metrics were overtly manual in nature. These manual processes had evolved because the existing data management system did not capture the necessary level of information against key resource events to generate the required metrics. To solve this, the maintenance teams implemented a process that exported data from the existing database system into spreadsheets. They then augmented the spreadsheets with additional detail to be used by Continuous Improvement specialists to generate the required metrics. This process took the data from a controlled environment (a fully auditable, relational database management system) into uncontrolled, manually maintained spreadsheets.

The combined effects of key personnel dependencies (due to the knowledge required to maintain the spreadsheets) and delays in augmenting events with the necessary detail, were also problematic. Creating and maintaining the spreadsheets to identify which events required analysis lacked timeliness and often caused these delays. Often, key personnel conducting maintenance activity were unable to follow up investigations due to having finished their shift or being rostered off for periods of time.

# THE DELIVERABLES

- Data structures and data flows to support a Loss Elimination framework that extended the existing Resource Events framework.
- Extended the definition of existing Resource Event artefacts with assignable flags representing the maintenance condition for analysis.
  - Major Event
  - Chronic Event
  - First Failure After Service (FFAS)
- Real-time notification of events meeting analysis trigger thresholds.
- Ability to mark an existing Resource Event as having the necessary analysis (data collection sheet) completed and capture person who flagged analysis as complete.
  - Data Collection Sheets can be attached to the applicable flagged Resource Event.

- Suite of reports encompassing required Maintenance analytics and defined measures.
  - Site Reliability Summary Weekly report designed for Maintenance Leadership Team encompassing a range of key metrics
    - MTFF : Mean Time to First Failure based on fleet average FFAS
    - FFAS counts
    - 12 week rolling MTBF
    - Availabilities Planned vs Actual
    - Chronic Focus
    - Top 5 Major downtime events
- First Failure after Service Report
  - Weekly/daily report designed for entire Maintenance Group encompassing FFAS analysis.
- Chronic Event Report
  - Weekly report in form of Pareto
  - Daily report in form of last week summary
- Major Failures Report

### THE TECHNICAL STUFF

#### Objects

- Extended database framework with new & updated table designs, new stored procedures, functions and suites of attribute settings along with accompanying scheduled jobs.
- Implemented framework to accommodate the business rules required to trigger the correct analysis states for each event category: Major Event/Chronic Event/ FFAS
- User Interface extensions accommodating the real time event flagging/notification of events along with the required analysis auditing detail in detail forms
- Purpose built reports

## THE SOLUTION

Intov8 extended the existing Resource Events module to encompass the Loss Elimination framework and it has been operating successfully at the partner site since December 2016. The origins of the Resource Events framework extend back to 2009 when it was originally built as part of the Corvus suite. It was commissioned for the partner site in 2014 and formed the basis upon which event data from any disparate source system could be fully described with event reasons, components, notes and attachments. Integrations to both the Mineware and CAT Minestar source systems were included as part of the original implementation.

For this project, the scope of the source system integration was extended to include Ampla data from the Fixed Plant assets. This included the Coal Handling and Preparation Plant (CHPP) and Train Load Out (TLO) because the site saw value in ensuring all related maintenance information was maintained in a single place. Critically, the extended Resource Events framework introduced real-time event notifications, which captured more accurate and timely information against each flagged event. The consolidation of all required base data in a single, controlled system also replaced the manual process of exporting and maintaining uncontrolled spreadsheets.

#### Data Flow

- Continue the triggering of specific resource events (Unscheduled downtime, Scheduled Downtime, Operational Downtime etc) from the base source systems including CAT Minestar, Minware and Ampla
- Weekly generation of Chronic Event focus based on business rules
- Execute business rules across logged resource events and set appropriate flags (Major/Chronic/FFAS) in real time to facilitate live notifications
- Fully described resource event dataset is the primary data source for reporting.

# THE RESULT

Intov8's Prior software to implementation, the site relied on extracting information from source systems into spreadsheets, forming uncontrolled data sources. Where previously the site needed approximately half a day to reconcile the uncontrolled data sources to take required action, they now had the information they needed to act in near real-time. This effectively closed their feedback loop.

The Loss Elimination framework was implemented and matured at the original partner site in late 2016 and was then adopted throughout the same organisation at different sites in subsequent years.

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