

Aptime wards

Best Maintenance Reliability Programs

2011



Teck Coal

Teck Coal is the world's second largest exporter of seaborne steelmaking coal, with five mines in British Columbia and one in Alberta. We have taken steps to increase our production levels to meet the additional demand for quality steelmaking coal. A substantial portion of the increased capacity will be driven by our corporate vision of increasing asset utilization enabled by increased availabilities.

The key focus areas of our vision are:

1. Maintenance and Operations take joint responsibility for equipment
2. Use best practices in the core maintenance functions
3. Apply Reliability tools and techniques
4. Share knowledge and learn from others to drive improvement

To enable the reliability portion of this vision Teck staffed all sites with personnel in the reliability roll. The initial step was to provide training and mentoring for the reliability personnel. All reliability personnel have been tasked with attaining their CMRP within 2 years, 3 have been certified at this point.

The business processes were redefined and all supporting management control and reporting systems (MCRS) Celerant® steps were defined and implemented. This was integrated with an implementation of Dynamix AX as an EAM system. This effort developed a platform to Plan, Schedule and Execute the Right work in an efficient and effective manner.

A structure work plan was initiated including a living RCM process that will be integrated with FRACAS (Failure analysis reporting and corrective action system). We

are conducting RCM on critical assets that can be leveraged through all sites. We have trained and mentored facilitators that have conducted RCM on multiple asset types. 14 key asset types were selected and the workload distributed between the 6 sites. We are utilizing a process of conducting a full RCM on the asset at one site then following up by a short RCM to deal with the differing operational loading and context at each site utilizing the RCM. We have extracted substantial value in this process on our primary fleets.

In order to better manage risk we have implemented asset criticality and are in the process of developing work criticality logic. We have incorporated this in our overall maintenance strategies. In addition to this Teck is utilizing a diagnostic inference engine to build rules that evaluate the risk of failure of major components. It analysis the symptoms and propagates the risk level. This gives us an understanding of which engines to extend the life of and which to replace early and allows us to align our requirements with vendor service levels. At any time we can evaluate all engines at all sites and sequence their replacements based on risk, this process is integrated with risk reduction processes.

In addition to the standard CBM programs, Oil, ultrasound, Vibration and Thermography, we are implementing MEM (Mobile equipment monitoring) on our trucks and shovels with the key focus being failure avoidance. We are calling this FAM (Failure avoidance monitoring) we monitor and correct the behaviors that create the failures in the first place.



Software & Equipment

EAM system:

- Dynamics' AX with MRO work management module, we have also developed an in house tradesman interface.

Reliability engineering Tools:

- Availability Workbench (Arms) we utilize all modules which are RCM Cost, Lifecycle Cost, Availability Simulation and Weibull Analysis
- CMORE for Reliability statistics and spares modeling

Condition Based Monitoring Software:

- MAINTelligence is used for Oil analysis, Vibration

analysis (also have CSI as backup), Thermography, Ultrasound, Hand held inspections- Maintenance, Operations, Safety, and Environmental. We also utilize MAINTelligence for diagnostic Risk evaluations for major components

- TRAKA is used for condition intelligence on our oil analysis information

Real time monitoring is conducted with:

- Mobile Equipment Monitoring (Matrikon-MEM) for Operational Loading, CBM, Haul Road Management, Trouble shooting Aid (MTTR

reductions) and PM time reduction (if we have it in real time we don't need to inspect for FM)

- Wonderware is utilized for our plant data historian

PDM Instruments are:

- UE UP15000 Ultrasound guns
- Fluke Ti 32 Themographic cameras
- CSI 2300 Vibration data collectors
- Comtest VB8-4CH Vibration data collectors
- Intermec CN3 handheld computers
- Rayteck MX 4 infrared thermometers



Teck representatives received the award for "Best Emerging Maintenance Reliability Program" presented to Teck Coal by Uptime Magazine at the International Maintenance Conference in Bonita Springs, Florida on December 5, 2011.

Left to right: Terry Kryczka GHO, Nick Frenks FRO, Terrence O'Hanlon – CEO/Publisher Uptime Magazine, Mark Bernadet SPO, Dave Williams Van, Jeff Smith SPO, Lindsey Wolf FRO, Alan Beran CMO, Barry Deluca CMO, Ryan Ramage GHO, Bill Partipilo-Vice President/Sales and Publishing Uptime Magazine