At Komatsu we understand the challenges mines experience in tough times. Facing little or no capital, you still need to operate on a day to day basis, maintain reliability, and improve productivity, all the time pushing the life of your core assets. This understanding has allowed Komatsu to develop an aftermarket service with cost effective solutions tailored to your individual needs and budget.

**Extended life services**

Extended life testing is a process used to evaluate the life left in powered roof support structures. It is a predictive tool that can determine when individual components are likely to reach the end of their serviceable life.

To perform extended life testing this a representative support is taken out of service and shipped to Komatsu’s facility in the UK where it is stripped and fully evaluated. The results of the evaluation establishes base line condition for the support. A test protocol is then developed using load cases that are tailored to replicate the typical, actual service experienced by the support to date. Following the development of the custom test protocol, the support is tested up to the customer’s required number of life cycles.

Extended life testing allows Komatsu to provide the customer with a report indicating when components will likely reach the end of their serviceable life. A detailed Life Cycle Management plan is also proposed giving the customer the ability to plan future maintenance budgets with a high level of accuracy and confidence in the life of the supports going forward. The report may also suggest options or upgrades, including the latest improvements, features and solutions that can enhance the productivity of the customer’s supports.

Extended life testing can also include other elements to suit a mine’s specific requirements such as legs, valves and hoses. With valve gear for example, health monitoring to suit budgets and circumstances can be provided.

- A full integrity test includes strip, full examination, replacement, rebuild and test
- A targeted health examination of high wear components such as seats and seals, rebuild and test
- Function testing and report
Case study

A powered roof support supplied in 2009 and initially tested up to 30,000 cycles was presented to us, with a requirement to extend the support’s life to 45,000 cycles. The support had seen 13,000 underground cycles in some pretty tough conditions. It was first dismantled and visually inspected, with all cracks and damage being identified and assigned unique crack identification marks.

The components were then shot blasted and visually inspected again with the addition of magnetic particle NDT testing (Figures 1 and 2) to establish the location of any additional weld cracks. Hinge pins and bores were also examined, measured and recorded.

Based on the results of these inspections, a unique test program was agreed upon with the customer that best replicated the load cases the support had seen in actual service. The test program also included the test failure criteria, which for this case study was a condition that would leave the unit unfit for service or economical repair.

The test was suspended after 19,000 cycles (a total of 32,000 cycles including those seen underground) due to the catastrophic failure of the lower links (figure 3). Other structures showed signs of fatigue but still maintained their prime function.

The lower links were replaced, and the test resumed. Deterioration was monitored throughout the process which didn’t impact structural performance, with the support achieving the customer’s target. Using the results of the testing, Komatsu was able to present the customer with a comprehensive plan and advise on when to carry out the proactive replacement of the lower link, as well as any other work required to take the supports to the required 45,000 cycles.

Extended life testing, taking a support past its original life cycles, including comprehensive plans based on test results predicting when components are likely to reach the end of their serviceable life, allows maintenance budgets to be developed to a high level of accuracy and gives customers confidence going forward.

Fig. 1 - Front view of the base prepared for magnetic particle NDT testing

Fig. 2 - Rear view of the base prepared for magnetic particle NDT testing

Fig. 3 - Catastrophic failure of the rear lower link

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