Donaldson HY-PRO™

Hitachi Excavator Hydraulic System

Keeping Clean in a Dirty Environment

The Problem

Hydraulic systems in mobile mining equipment are typically exposed to high particle ingression rates. A mine using the Hitachi EX2500 excavator was experiencing premature component failure due to contamination. In the machine's first 27 months of operation, technicians had to replace four variable-displacement piston pumps (at a cost of $20,000 per exchange or $34,000 for a new one) three swing motors, two drive motors, numerous servo valve repairs or replacements, 42 hydraulic hose related problems and 16 instances requiring cleaning of contamination sensors. Other associated costs included more than 39 hr of unplanned equipment downtime, plus associated maintenance costs.

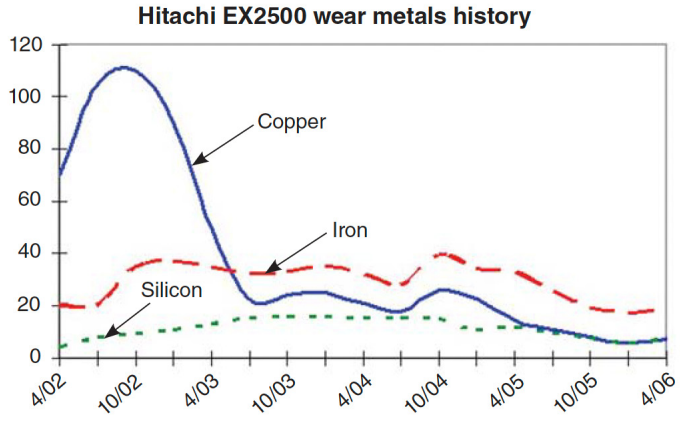
The Solution

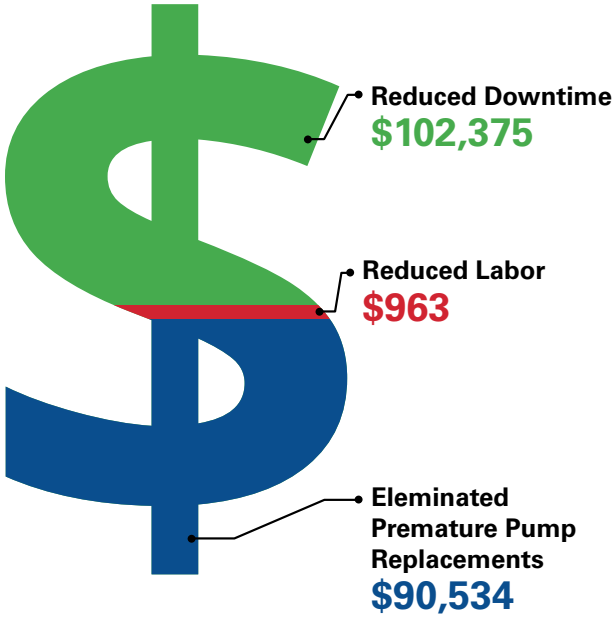
Fluid cleanliness levels per ISO4406:1999 were consistently monitored from 22/20/17 to 21/19/15. Based on the criticality of the hydraulic system components and the cost of unplanned downtime, mine operators set a target fluid cleanliness code of 15/13/10 with a total system cleanliness approach.

Maintenance practices were implemented to minimize the introduction of contaminant into the system from new hoses. The fluid was upgraded to Mobil DTE 25 to improve component wear protection and reduce the potential of varnishing and deposit formation in hydraulic pumps, valves and motors. Existing 10 µm cellulose media was upgraded to Donaldson Hy-Pro 12-µm rated glass media elements to flush and stabilize the system. Lastly, Oil sampling procedures were standardized and personnel were trained on new procedures to ensure more consistent fluid sampling.

The Results

The impact of the fluid change was seen almost immediately. Copper levels, indicative of pump shoe wear, dropped by an average of 70%, and overall component wear metals also dropped. The fluid service life was extended to 17,000 hr, far exceeding the OEM rated fluid service of 4000 hrs. The 12-µm flushing element was replaced after 50 hrs of service, then the 6-µm element was installed. The result is better than the target cleanliness of 15/12/9. The substantial costs associated with component wear have also been drastically reduced over the past four years. This resulted in the elimination of four pump replacements, 39 hr of shovel downtime, and a 400% increase in hydraulic fluid life





Total Savings

$193,872

Want to find out more? Get in touch.

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