



TOUGHMET APPLICATION:

OFF-HIGHWAY

PROFILE: HITACHI CONSTRUCTION MACHINERY, Co., LTD

Hitachi Construction Machinery Co., Ltd. (HCM) and its consolidated subsidiaries (the HCM Group) use extensive experience and advanced technological capabilities to develop and manufacture a wide range of leading-edge construction machinery, including excavators, wheel loaders, off-road dump trucks, and tunnel boring machines.



CHALLENGE:

A traditionally problematic area of dump truck design is the upper and lower kingpin bushings on the front suspension. These bushings experience edge loading and can wear, leading to slackness in the steering which can ultimately damage other components.

Using lubricated steel bushing on a steel kingpin resulted in galling if the lubrication became marginal. A change to aluminum bronze overcame the galling problems, but these bearings suffered from high wear rates. To overcome both the wear and galling issues, engineers at Hitachi looked to Materion Performance Alloys' ToughMet®.

ToughMet® 3 CX105 is used in the upper and lower kingpin bushings.



SOLUTION:

Extensive testing of ToughMet® 3 CX105 exhibited one-third the wear rate of aluminum bronze, which resulted in a five-fold increase in the service interval of the vehicle.

With the strength of steel and the low-friction and lubricity associated with leaded bronzes, ToughMet® was able to be directly substituted for aluminum bronze in the bushings with no additional modifications required. In addition, Hitachi found no overall cost premium for this substitution. In fact, they realized specific competitive advantages, such as improved supply chain management (including shorter lead times) and the ability to maintain lower inventories.