Grader glides with zinc's bearing properties

Zinc alloy's mechanical properties enable designers to integrate bearing surfaces into an assembly wiithout the use of inserts or more expensive materials. The most obvious bearing application for cast zinc alloy is sleeve bearings. Champion Road Machinery, Goderich, Ontario, a manufacturer of road graders, is a good example. The Champion Series IV grader incorporates three different ZA-12 low-speed, high load bearing applications which improved operating performance.

Champion's use of Concast ZA-12 bearings provides improved operating performance and cost-effective bearing properties for low-speed, high-load applications. Pictured here are bearings ranging in size from 3-1/2 in. I.D. x 4-3/4 in. O.D. x 1/8 in. thick (far left) to 3-1/2 in. I.D. x 3-3/4 in. O.D. x 3 in. long (upper right).

Mold Board Slide Bearings - Four mold-board slide bearings provide the grader blade with transverse slide and structural support. The bearing is J-channel shaped with a 1/2 in. cross section and dimensions of 3-1/2 in. high x 1-1/2 in. high x 3 in. wide and 9 in. in length.

Because of its off-road applications, it is difficult to keep the slide bearings properly and routinely lubricated. As a result, they often ran dry or unlubricated under the worst possible conditions. The original cast iron bearings needed replacement every three to four months.

Phosphorous bronze and ZA-12 alloy were tested as replacement materials for the slide bearings. Phosphorous bronze proved to be intolerant of foreign substances, wore prematurely and tended to friction-weld under unlubricated conditions. The ZA-12 test bearings were very tolerant of foreign substances and performed well under dry conditions with very little indication of wear. Bench testing indicated that the ZA-12 bearings would last up to three years without wearing appreciably under dry running conditions.

Front Axle Bearings - This ZA-12 alloy bearing application materialized as a replacement for the grader's front axle needle bearings. The needle bearings performed well when conscientiously lubricated but operating problems quickly appeared when lubrication ceased. Needle bearing failures often caused damage to the pin and frame housings. The needle bearing was redesigned with a ZA-12 cylindrical sleeve bearing. ZA-12's previously proven dry running properties made it well suited as a front axle bearing, eliminating the risk of housing and pin damage.

Blade Lift Assembly Bushings - ZA-12 bushings were also used to replace the steel sleeve bearings that supported the lift cylinders. The bushings were less expensive and easier to install than the steel bearings. In addition, they allowed designers to reduce the housing size. As a result, less housing material was used and, more importantly, operator visibility was improved.

ZA-12 sleeve bearings are furnished to Champion by Team Tube Ltd., Milton, Ontario.