

Roller bearing failure prevention and detection

In view of the increasing demands on the railroad wheelset journal roller bearing and the projection of greater performance demands particularly from heavier axle loads, various scenarios for failure prevention and detection are being investigated. The roller bearing was introduced into freight-car journal use in the U.S. in 1954. Today approximately 90% of the freight-car fleet of U.S. railroads rides upon roller bearings. The change to roller bearings from plain bearings has led to a marked decrease in the number of setouts for overheated axles and of accidents.

The immediate concern about the roller bearing is the final stage of failure, which is the seizure process. Roller bearings generate tremendous amounts of heat in a very short period of time during the final phase of bearing failure. The disintegration phase for the roller bearing is believed to differ from that of the plain journal bearing. The final stage, ultimately leading to a journal burnoff, occurs in a relatively short distance (one to two miles), in comparison to hotbox-detector spacing. (Detector spacing was set in the 25-to-30-mile range for plain journal bearings). With this discrepancy in distance, the unavoidable result is often a burnoff and derailment.

To improve the performance of roller bearings, two parallel and mutually supportive courses of research are being undertaken by the Association of American Railroads. First, quantification of the mechanisms of final bearing failure (leading to seizure) will enable the development of improved wayside detection methods.

Secondly, rationalization of reconditioning standards and improvements in wheel/bearing shop inspection techniques will improve the quality of bearings reentering service.

The first program focuses on improved wayside detector reliability and/or sensitivity and the development of non-heat-based detection systems. The second program is aimed primarily at roller-bearing defects and current reconditioning practices.

In an effort to assess current defect popu-

lations of bearings set out by hotbox detectors, an intensive and detailed bearing teardown program was initiated in July and is planned to last approximately six months. Presently, five railroads are involved, and it is hoped that 400 to 500 bearings will be inspected. The information derived from these inspections should provide an accurate data base to be used determining current failure modes and rates, associated by bearing size, manufacturer, remanufacturing shop, reconditioning shop, mounting shop, age and component.