

## Development of wheel hub bearing test rig to reproduce bearing failures in the field.

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Hub bearing assembly of an automotive vehicle suffers severe loading under bad road conditions. It is subjected to dynamic vehicle weight and cornering forces. It operates in the presence of dust and mud. Extensive field testing is required to validate its design for reliability. This paper describes development of a hub bearing test rig (see Fig. 1) which can simulate operating conditions in realistic manner. Vibration, oil temperature and bearing race temperature were recorded during the accurate control of dynamic load and speed profile. Using these measured parameters, we can identify different modes of failure – cage failure, lubricant starvation, oxidation due to heating, pitting and fracture of housing. Furthermore, these results in comparison with field test will be discussed. Such a test system can complement or replace the expensive and time-consuming field testing.



**Figure 1.** Ducom wheel hub bearing test rig (left) and the wheel hub post submerged test in slurry medium (right). The maximum axial and radial load in this system is 50 kN and 150 kN, respectively. The spindle speed can reach up to 2000 rpm.