

The Structure and Function Investigation and Analysis of the Automatic Spin Regulator (ASR) in the Powertrain System of Construction and Mining Machines with the Focus on Dump Trucks

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Abstract : The powertrain system is one of the most basic and essential components in a machine. The occurrence of motion is practically impossible without the presence of this system. When power is generated by the engine, it is transmitted by the powertrain system to the wheels, which are the last parts of the system. Powertrain system has different components according to the type of use and design. When the force generated by the engine reaches to the wheels, the amount of frictional force between the tire and the ground determines the amount of traction and non-slip or the amount of slip. At various levels, such as icy, muddy, and snow-covered ground, the amount of friction coefficient between the tire and the ground decreases dramatically and considerably, which in turn increases the amount of force loss and the vehicle traction decreases drastically. This condition is caused by the phenomenon of slipping, which, in addition to the waste of energy produced, causes the premature wear of driving tires. It also causes the temperature of the transmission oil to rise too much, as a result, causes a reduction in the quality and become dirty to oil and also reduces the useful life of the clutches disk and plates inside the transmission. this issue is much more important in road construction and mining machinery than passenger vehicles and is always one of the most important and significant issues in the design discussion, in order to overcome. One of these methods is the automatic spin regulator system which is abbreviated as ASR. The importance of this method and its structure and function have solved one of the biggest challenges of the powertrain system in the field of construction and mining machinery. That this research is examined.

Keywords : automatic spin regulator, ASR, methods of reducing slipping, methods of preventing the reduction of the useful life of clutches disk and plate, methods of preventing the premature dirtiness of transmission oil, method of preventing the reduction of the useful life of tires

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