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Surface Shaped Wedge Gears for Improving Performance in External Gear Machines

An external gear machine design utilizing wedge shaping on the gears improves lubrication performance, reduces fluid shear power losses, and extends the unit's operating life.

Different designs of external gear machines (EGMs) are extensively used in many applications, and the wide use of these units is primarily attributed to their features of compactness and relatively low cost, owing to the presence of relatively lesser internal components. Due to significant strain and workload, improperly designing lateral lubricating interfaces can lead to excessive leakage or unwanted wear on both the gears and the lateral bushings, which can compromise the reliability and operating life of the machine.

Researchers at Purdue University have developed an external gear machine with wedge shaping on the gears. This surface shaping design has the ability of improving the lubrication performance of the units, reducing power losses due to fluid shear and achieving good balancing conditions at low operating speeds. The idea of using wedged surface shaping or other micro surface shaping designs on the gears to improve the mechanical efficiency of EGMs has never been manufactured and validated before due to the intricacy in designing and studying its effects on the complex phenomena associated with lateral lubricating gap. However, the prototype designed with the step and wedge surface shaping was manufactured and the reduced torque losses when compared to the corresponding nominal EGM design was experimentally validated with simulation results.

Advantages:

-Improved mechanical efficiency

-Reduces chances of wear during operating life

-Extends operating range

Potential Applications:

Technology ID
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Category
Automotive & Mobility
Tech/Internal Combustion
Engine Optimization

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Intellectual Property:

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