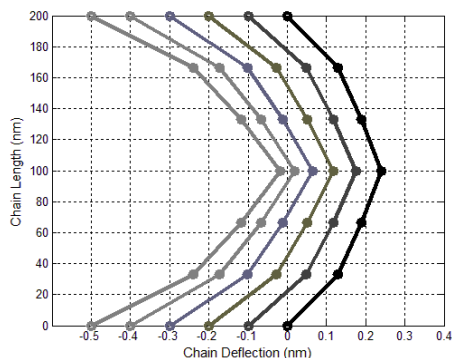
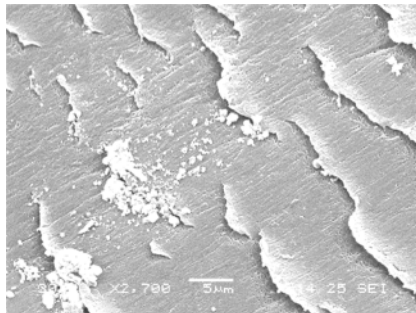
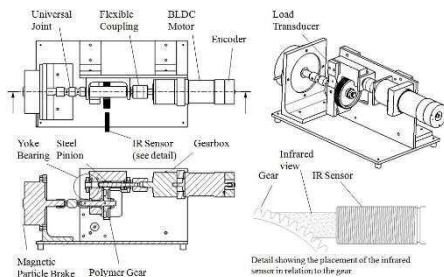
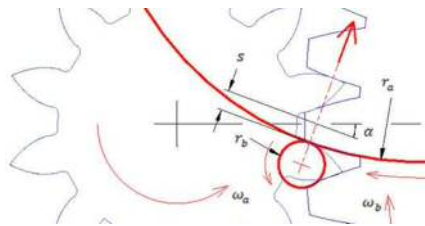


## Research Project

# WEAR & EFFICIENCY MECHANISMS IN POLYOXYMETHYLENE SPUR GEARS



## Motivation

In recent years, the volume of spur gears manufactured from polymeric materials has begun to outnumber metallic gears. This is due to their low cost, low inertia and ease with which they can be designed into mass produced items.

## Objective

The investigation of wear mechanisms in Polyoxymethylene (POM) involute spur gears. This research has resulted in the identification of a previously undocumented and unpublished wear mechanism.

## Current work

Analysis was carried out to determine the dynamic interactions between gear teeth, which resulted in a definition of the slip/roll characteristics of the involute spur gear pair. Experimental hardware was designed and built to run a gear pair under laboratory conditions at a defined load and speed. Scanning Electron Microscope techniques were used to inspect samples from gears run under those laboratory conditions and wear features were identified that result in material removal from the tooth flank during loaded operation. A phenomenological model was built to explain the wear mechanism based on polymer chain bunching and was further developed to predict the wear volume created by a certain number of cycles at a pre-determined speed and load.

## Future work

Research results have been published in the journal Tribology International.  
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