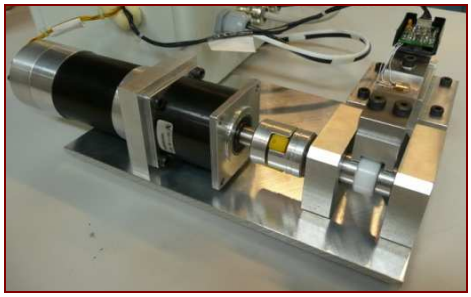
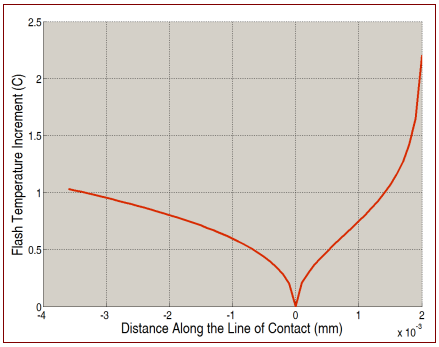
The Centre for Power Transmission and Motion Control

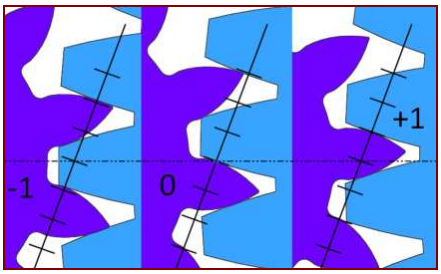
UNIVERSITY OF BATH

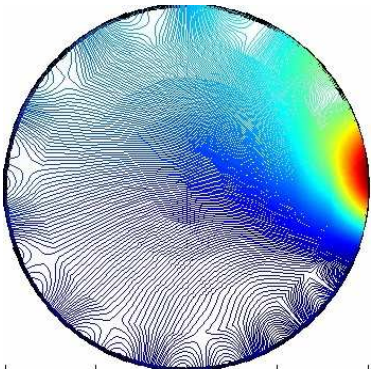
## Research Project

# STANDARDISED DESIGN PARAMETERS FOR POLYMER SPUR GEARS





## Motivation

In recent years, the quantity 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

When used in a life specified power transmission application, a standard set of design tools and methods do not currently exist to accurately determine the correct sizing of polymer spur gears. Life prediction of a given gear pair is essential in order to properly assess the viability of a new product.

The objective of the research is to build a set of design tools to enable engineers to predict the life of a polymer spur gear pair accurately.

## Current work

The research is currently focussed on temperature rise in the gears from the Flash Temperature generated at the gear teeth contact point. This has been identified as a possible accelerator of wear given the relatively low melting temperature of polymers. A mathematical model has been formulated to predict the Flash Temperature and the subsequent bulk material temperature rise. A pin and disc test machine has been designed and built to validate the model.

## Future work

The mathematical model will be expanded to describe a whole gear, building from the pin and disc analogy. The onward research will be in the investigation of abrasive/adhesive wear between the gear teeth.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