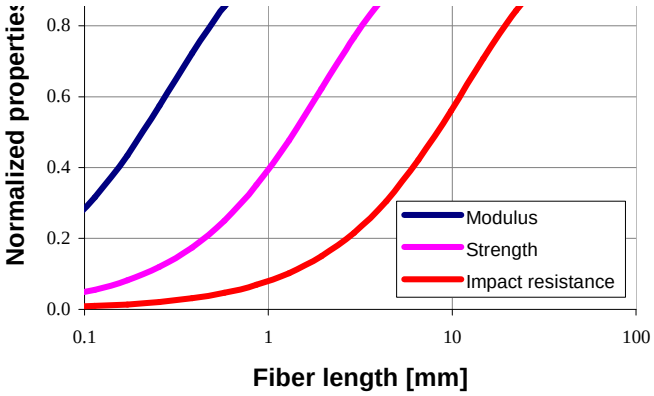
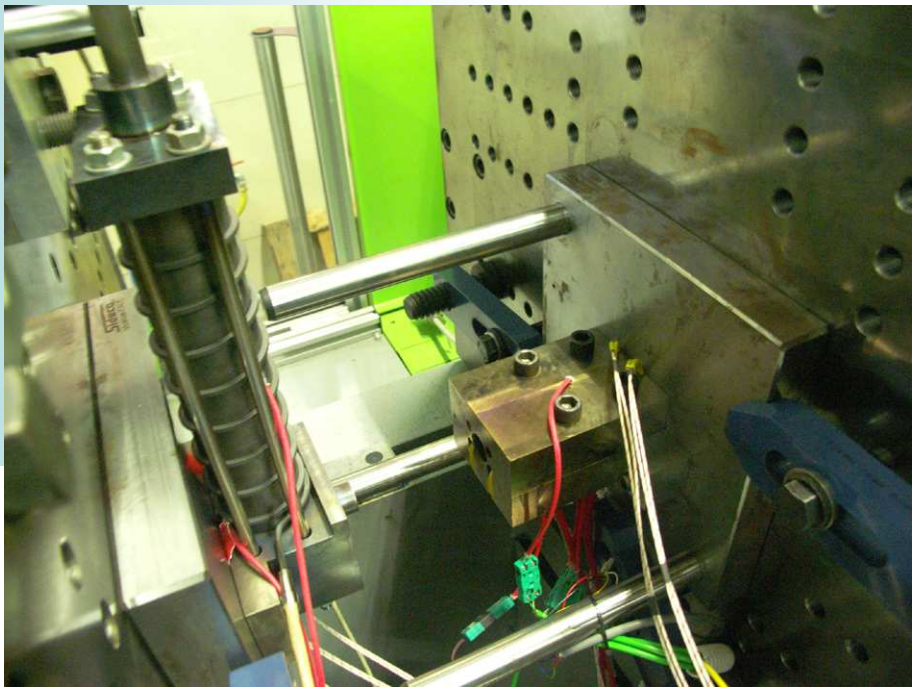
DIMEG - DIPARTIMENTO DI INNOVAZIONE MECCANICA E GESTIONALE
UNIVERSITY OF PADOVA

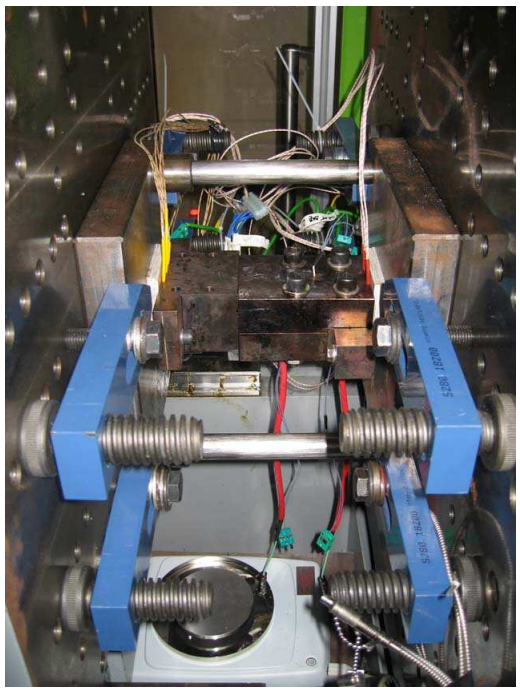
Research activities of Net Shape Forming Lab:

Long Fibres Breakage

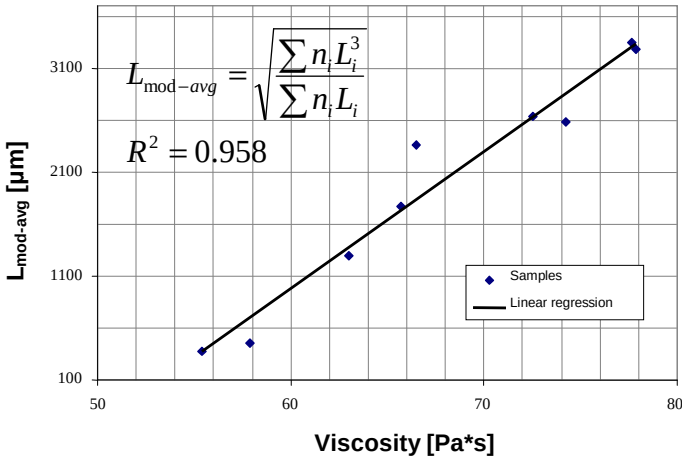


- Long glass fiber-filled polypropylene composites are widely used in industry because of their low cost and high performance. However the length of long glass fibers is significantly degraded during the plastification process.
- Since composite mechanical properties can be dramatically affected by the retained fiber length, increasing rapidly above a critical length, the key factor of this technology is to retain the optimal fiber length throughout the plastification process.





- To investigate the rheological properties of such composites in the molten state an in-line slit-die rheometer was developed and mounted on an injection molding machine.
- The shear viscosity of filled PP determined by the in-line rheometer was found to strongly depend on the fiber length distribution. In particular, a linear correlation was determined between the viscosity at a constant temperature and shear rate and the average fiber length $L_{mod\text{-}avg}$.
- The developed model and the in-line rheometer were then used to assess the effects of the main plastification parameters (i.e. screw rotation speed and backpressure) on fibers damage and to determine the optimal plastification conditions.



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