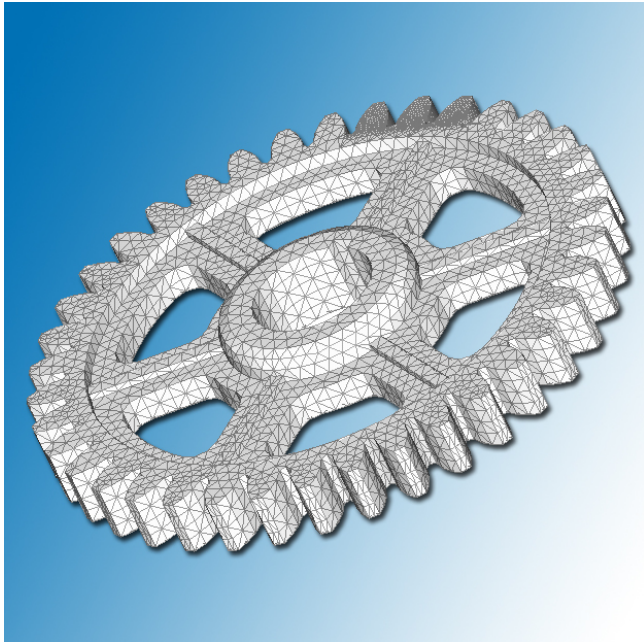


CO-DESIGN ACTIVITIES OF THE LATI TECHNICAL ASSISTANCE: PROJECT CUSTOMER SUPPORT



To carry out this computing activity, the **MPI/STUDIO** system requires:

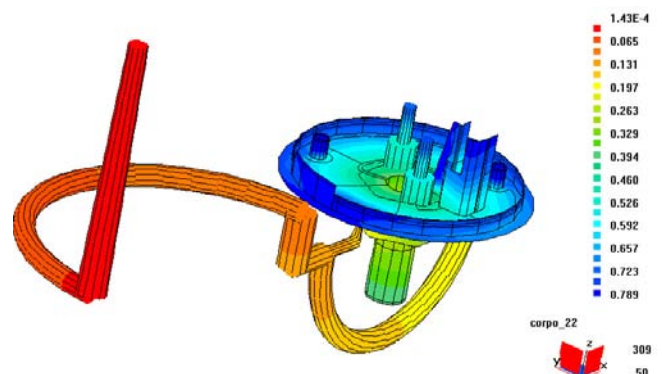
- a three-dimensional model of the part
- a three-dimensional model of the conditioning circuit
- rheological and thermal data, PVT curves and mechanical specifications of the material chosen
- thermal data of any inserts present in the mould
- position and type of injection on part
- part moulding parameters
- position of constraints on the geometry of the cavity for calculating deformation.

In addition to the existing MoldFlow and NASTRAN programs, the LATI Technical Service has acquired new software for FEA activities.

The applicational flexibility of technical thermoplastic materials allows to produce increasingly refined products, which must be finalized correctly during the design phase in order to keep the development and industrialization costs low.

This is the setting for the **MoldFlow MPI/STUDIO** software, which consists of a set of programs dedicated to fluid dynamics analysis of polymers capable of providing a valid help for optimum production of extremely complex products by means of injection moulding, safeguarding as far as possible the properties and main characteristics of the compound concerned.

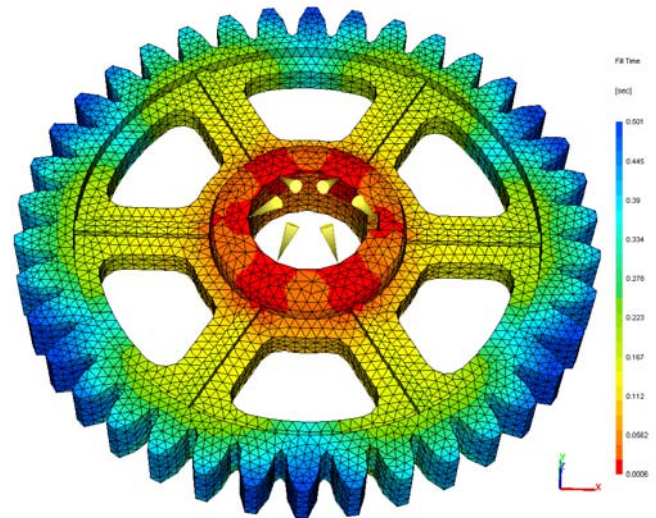
The mathematical model used up to now to represent the structure of the cavity is defined midplane and consists essentially in representing the object by means of surfaces shown visually as "sheets of paper" that is, two-dimensional geometrical entities in which the thickness is an attribute associated with each surface.



Although this type of model is extremely reliable, its precision is reduced when the object is extremely thick or has variations in thickness whose simplification using the midplane model would create major imprecision in the computing phase. In addition, for these geometries, the generation of a "mid plane", that is, a surface set between the opposite surfaces of the actual object may prove to be rather uncertain and inaccurate.

In order to meet these new requirements, the **MPI/STUDIO** software has been enriched with two new programs capable of providing reliable results even with particularly problematic geometries from the modelling point of view:

- **MPI/FUSION** is a variant of the basic package studied to work with models consisting exclusively of the border surfaces obtained by CAD through exportation to **IGES, STL, I-DEAS UNiVersal file, PARASOLID, STEP** format. The thickness is determined by the program, which evaluates the distance between the borders. The FUSION module also comprises tools for simulating fibre-reinforced materials and estimating deformation, making the software complete and suitable for handling all cases.
- **MPI/3D** is a new program which, through exportation to **I-DEAS, Pro/ENGINEER, Unigraphics or CATIA** format, is used to carry out filling and packing analysis on particularly thick products by means of a special computing algorithm in which the thickness of the part non longer exists as a dimension of the object but only as a distance with respect to the outer surface.



The FUSION module provides a set of extremely accurate information in that it takes into account the actual external geometry of the product avoiding an approximation obtained by sticking "sheets of paper" together. The main disadvantage with respect to the midplane system is represented by the time required to compute and prepare the grid of finished elements, which is considerably longer.

Particularly refined management of the fluid dynamics of the molten polymer is the predominant feature of the 3D package, which is capable of generating a set of comprehensive indications on the injection and maintenance phase. The computing times are rather long for this module, too.

With a view to satisfying the increasingly specific market requirements, LATI has chosen to purchase both packages, so that it may provide its customers with increasingly broad, flexible and precise design support.