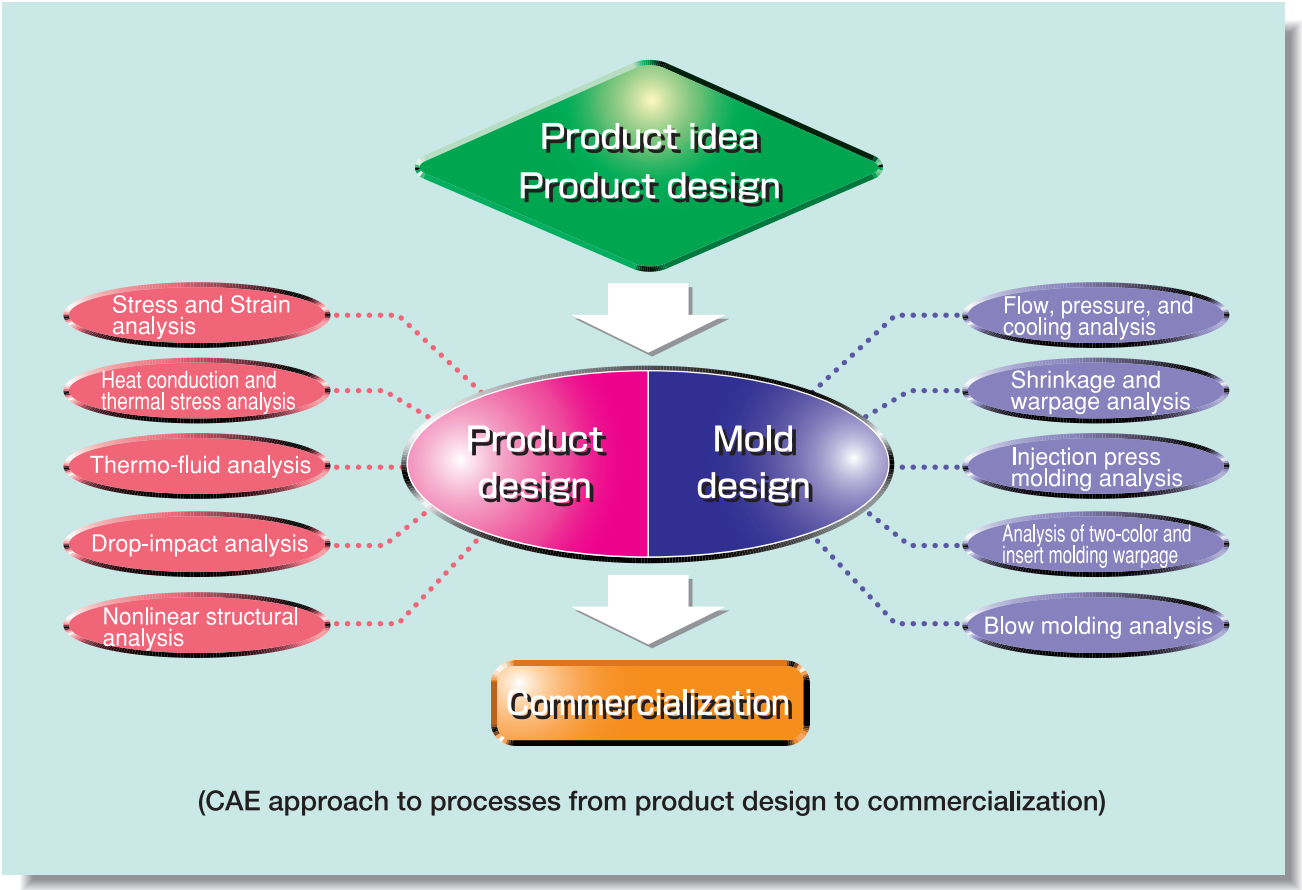
<Design Support>

CAE System

The quality that is demanded of plastic products has continued to become higher in recent years.
They need to be lighter, stronger, and more beautiful, and product differentiation has led to high-mix low-volume production, while their product life cycle has become shorter.
At Teijin, every day we promote the development and improvement of materials to suit our customers' needs. In addition, to meet their needs for development of low-cost and high-quality products in a short period of time, we provide support with Computer Aided Engineering (CAE).
It is used to carry out computer simulations to predict the strength a product needs and check and investigate any issues there may be with a mold design that relies on conventional experience and intuition. In this way, it makes it possible to greatly reduce the cost and development time required before a product can be commercialized. Furthermore, CAE is a design tool that has made great contributions in areas like investigating the limits of design and confidence limits and realizing more sophisticated products.
At Teijin, based on the wealth of experience we have gained so far in developing materials and our resin database, we strongly support your product development with CAE.



(CAE approach to processes from product design to commercialization)

＜Efforts for CAE＞

Seeing things from the perspective of the customer, we quickly select the best software, and determine the analysis accuracy by carrying out verification experiments that match the size of the actual product. In addition, if the existing software cannot offer a sufficiently accurate analysis then, if necessary, we collaborate with CAE software manufacturers and improve or customize programs; thus, we have a system that lets us rapidly and appropriately support our customers' product development.

Structural analysis of molded product

We predict whether or not a molded item can maintain enough Strength to only fulfill the function of the product by considering cyclic fatigue, creep deformation, and fiber orientation. Then we select the optimal materials, and investigate the required thickness and the need for reinforcing ribs.

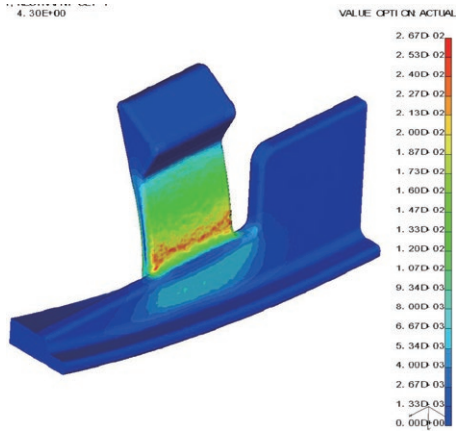


Diagram showing stress distribution of snap-fit item

Drop-impact analysis

We check the deformation pattern when a product is dropped or an impact load from a falling ball is applied to it, and check whether or not it can maintain enough strength to only fulfill the function of the product. Then we select the optimal materials, and investigate the required thickness and the need for reinforcing ribs.

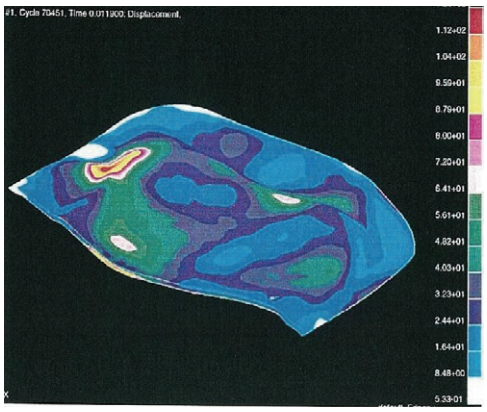
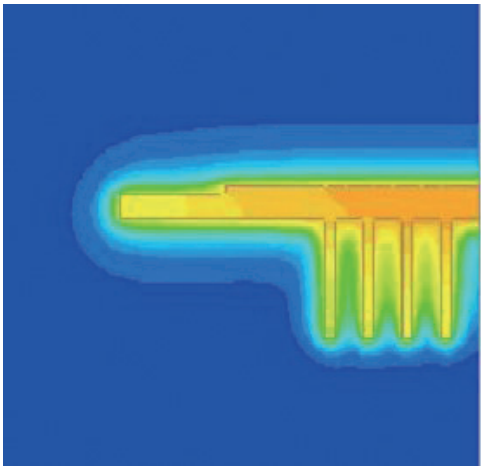


Diagram showing stress distribution of a vehicle roof

Thermal and fluid analysis

We predict changes in the temperature distribution inside a molded item by considering the convective state and change in temperature of the surrounding air, and consider the shape, placement and optimal material for heat sinks for resin products.



Temperature distribution of air in the vicinity of a heat sink of an LED light

Resin flow holding, pressure, cooling and warpage analysis

By predicting the resin flow process at the time of injection molding, it becomes possible to predict the gate layout that allows for simultaneous filling, to check the status of temperature and pressure at the time of inflow, to predict the position in which weld lines will be generated and to select a molding machine. In addition, it becomes possible to predict warpage and deformation of a product caused by uneven cooling of the mold, non-uniform pressure at the time of dwelling or anisotropic shrinkage due to the fiber orientation distribution.

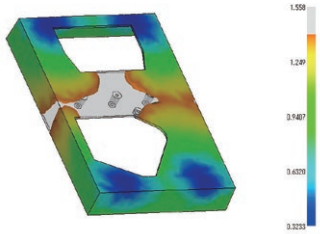


Diagram showing flow pattern

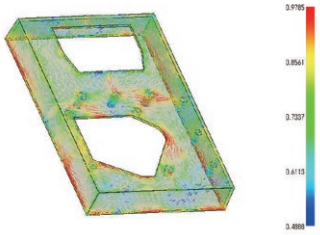


Diagram showing orientation distribution of glass fibers

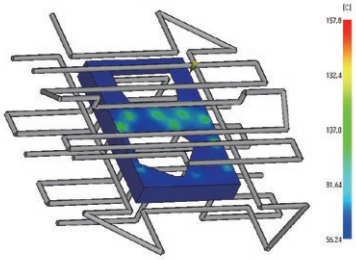


Diagram showing piping for mold cooling

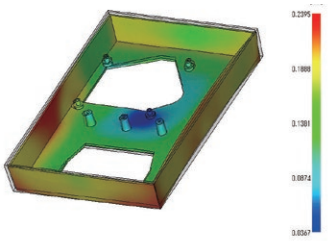


Diagram showing warpage pattern

Analysis of injection press molding

We can predict the resin flow process in a method of injection press molding that is suitable for processes such as automotive glazing, large and thin-walled molded items or thick-walled ones which require low strain. We can analyze the flow pattern, temperature and pressure conditions, and the press required at the time of inflow.

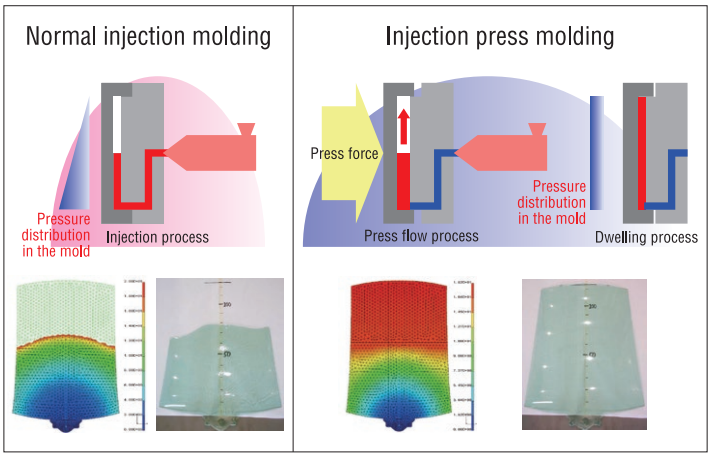


Diagram showing flow pattern for panoramic roof of car