

PLASTIC INJECTION

Case description: A simulation work was performed on a plastic injection molded part that consists in a set of 2 parts injected in the same mold with the aim of balancing the filling of the cavities.

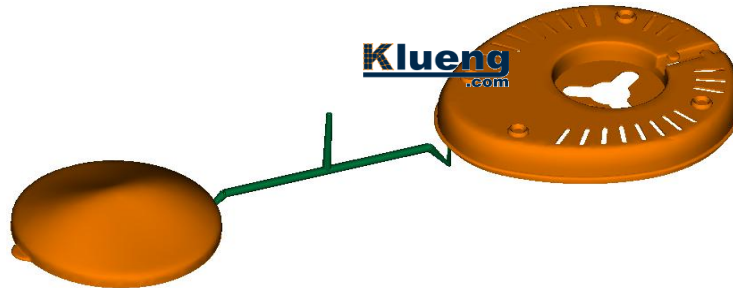


Fig. 1 – Geometry of the pieces and feed system

Development: Was made a finite element model of the set, including the original feed system, of great importance in this type of analysis (balancing in filling cavities).

To know the initial performance of the mold was run a simulation process with the current process conditions and injection system. The filling obtained was as follows:

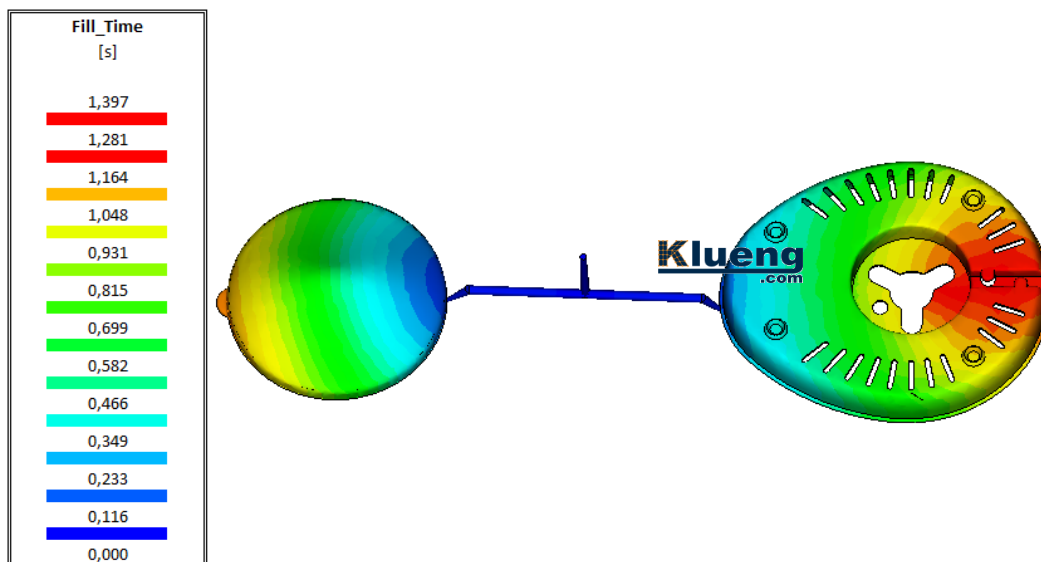


Fig. 2 – Fill time of the initial configuration

Noting the previous result it is evident that the cavities are out of balance, through numerical simulation can be obtained with accuracy the ideal size of the feed channels which will avoid this phenomenon, obtaining higher quality molded parts and an optimized process.

After a few design iterations was achieved modifying the cold feed system, the following filling profile:

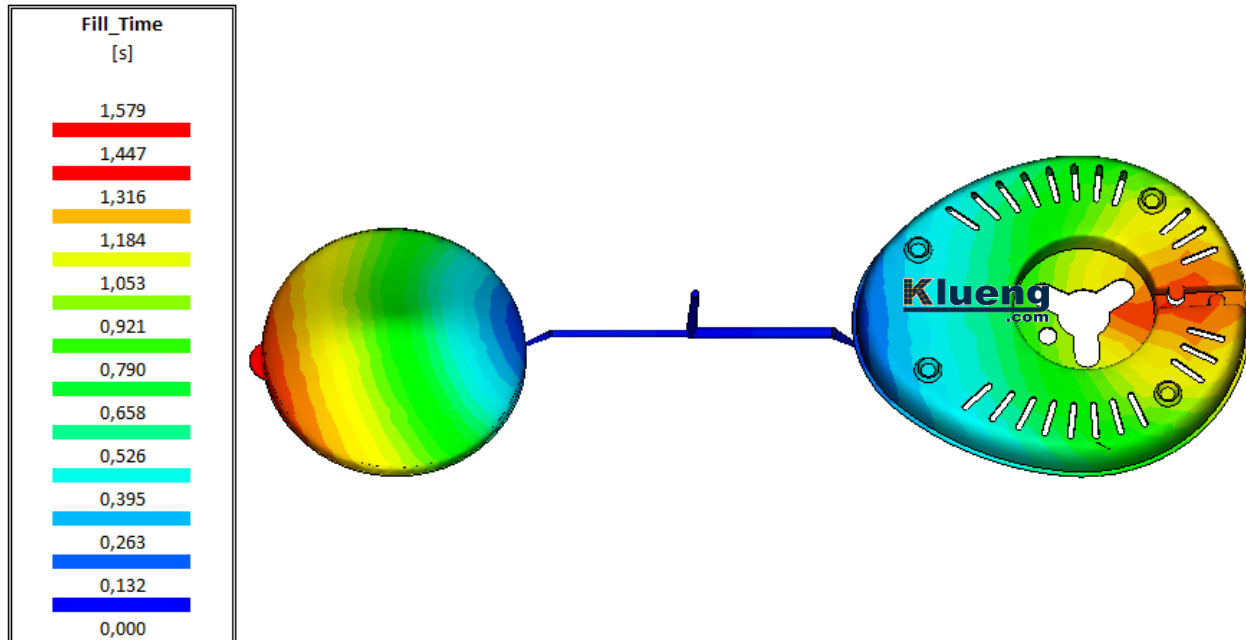


Fig. 3 – Fill time with the balanced cavities

Now the filling profile is balanced, minimizing the material overpacking in one of the cavities.

The improvement achieved can be seen for example in the reduction of the clamp force necessary to carry out the process (Fig. 4).

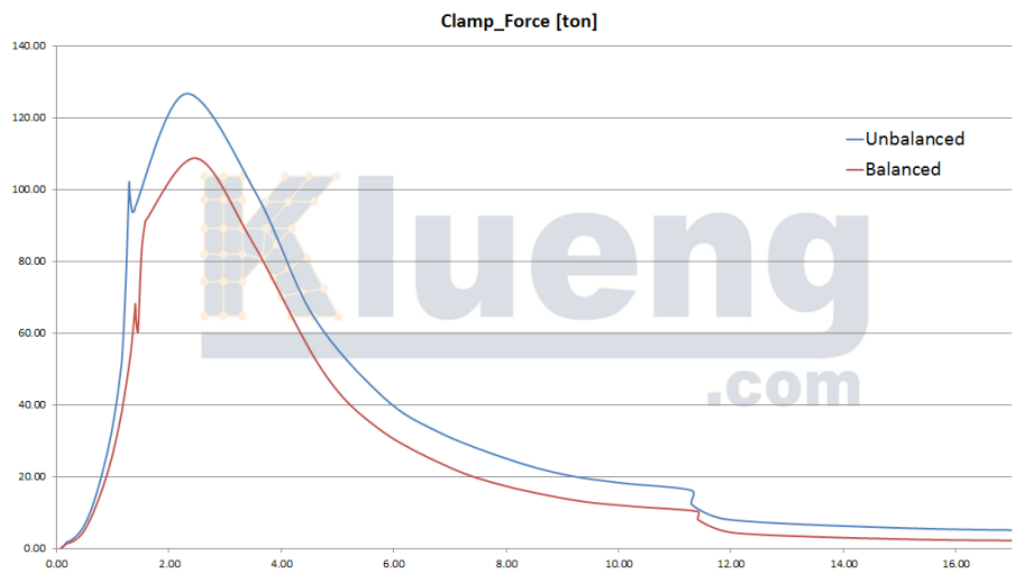


Fig. 4 – Clamp force necessary during the process

Conclusions: Using the available simulation tools an optimum balancing of the cavities was achieved, avoiding the overpacking phenomenon that appeared in the cavity that filled first.

The optimization was carried out through the dimensional modification of the cold feed system of the mold, machining it without the necessity of inserts implementation through removing material in the feeding channels and injection gates.

In less than a week the customer was able to improve the quality of their production through simulation technology, the mold was only one day without producing.

In the past the customer stated making these adjustments through trial and error, in this way the mold nonproductive time was 10 times higher and in the 15% of the adjustments made, mistakes in the process forced the design and the implementation of inserts.