ZW3D CAD/CAM WHITE PAPER

BOOSTING MOLD DESIGN WITH ZW3D

OVERVIEW

With the requirements of users continuously increasing, mold design at the present time faces more challenges than ever, such as the low efficiency in quotation, core and cavity separation, mold design and so on. This paper focuses on overcoming these challenges and seeking to make a mold faster.

Let's look at the general process of Mold design. It is composed of four stages which are quotation, mold design, testing and machining, and design changing.
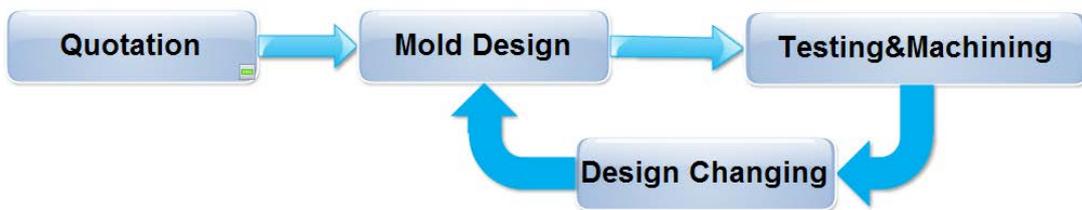
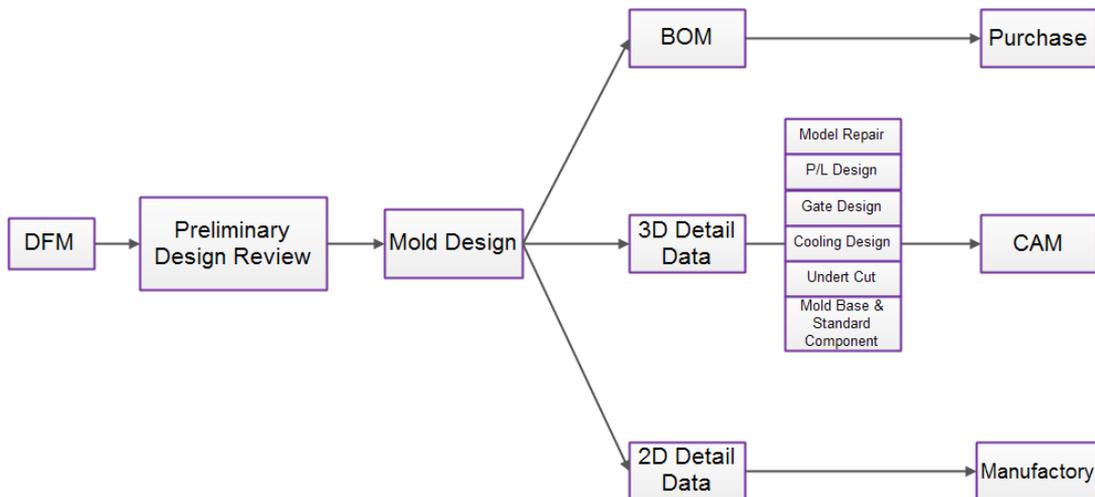Figure (1): Project developing flow chart

Figure (2): Mold design flow chart

The design challenges that we are facing today are involved in the whole design process. The key process includes: easy quotation, faster core and cavity separation, building the mold base standard for the company, easier standard parts and quicker electrode design and machining, etc. ZW3D functions as both perfect time saver for quotation and reliable booster for mold design, improving the mold design efficiency greatly.

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1. PERFECT TIME SAVER FOR QUOTATION

Quotation is the first step to evaluate ROI (return on investment). It is also a simple job of inquiring mass to generate the raw cost, which function is provided by most of the software. Challenges of the typical quotation include reading received files and inquiring mass property.

Reading files is the standard procedure of quotation. The perfect quotation tool should be able to read various kinds of file formats.

Inquiring Mass property is the key procedure of quotation. Normally speaking, quotation doesn't include complex technical procedure and requires no professional CAD users to handle this. But in reality, the files received from various customers are generated in different CAD platform. Naturally, data loss is inevitable while importing, leading to a tedious work of model healing, and core & cavity creation then. So, just for quotation, both business persons and engineers are needed, which is a huge cost of human resources.

Please take a look at the figures (3), almost all the software could inquire the mass if the receiving file is perfect solid. But it would be a problem if the file were a non-perfect solid, user might spend several days to fix, and create core & cavity then, which is not necessary during the quotation. With the Solid-Surface Hybrid Modeling technology, which allow users to create core & cavity without any healing, and get the mass directly.
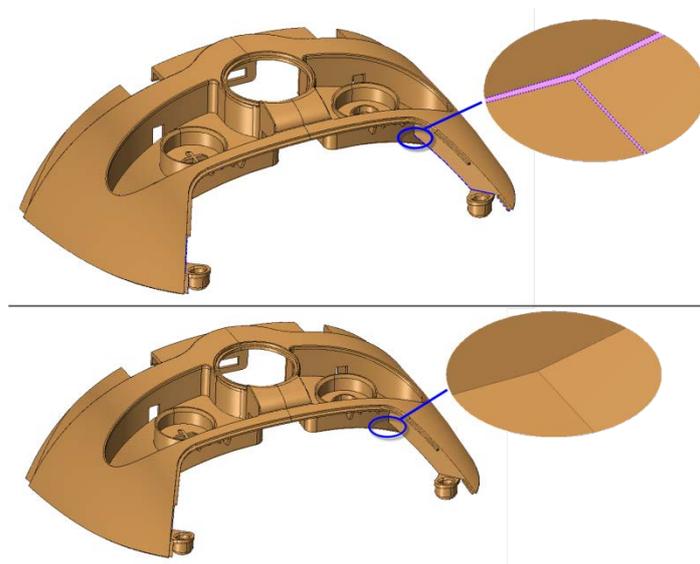

Figure (3): ZW3D works for both of them, but the others only works for perfect solid

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2. RELIABLE BOOSTER FOR MOLD DESIGN

Mold design is mainly composed of dealing with model repairing, core and cavity splitting, mold base design, electrode design, 2D detailing, etc. ZW3D can provide a productive workflow during these mold design procedures.
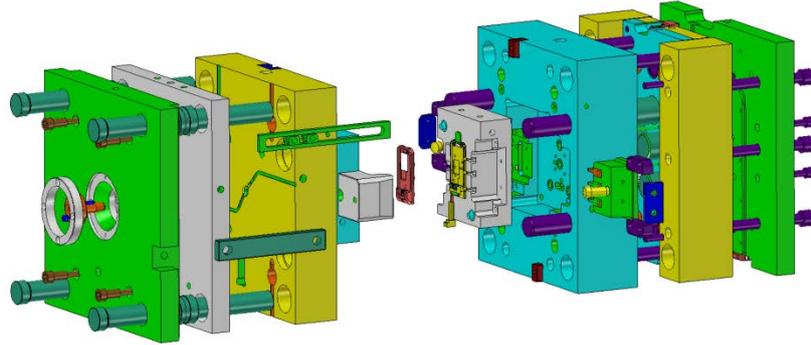

Figure (4): Plastic Mold Assembly

2.1. Faster Core and Cavity Splitting

The traditional way to split the mold is simply creating a face and then trimming it to core and cavity. Besides, two other approaches are commonly used to split the mold: using parting line and defining the region with different colors.
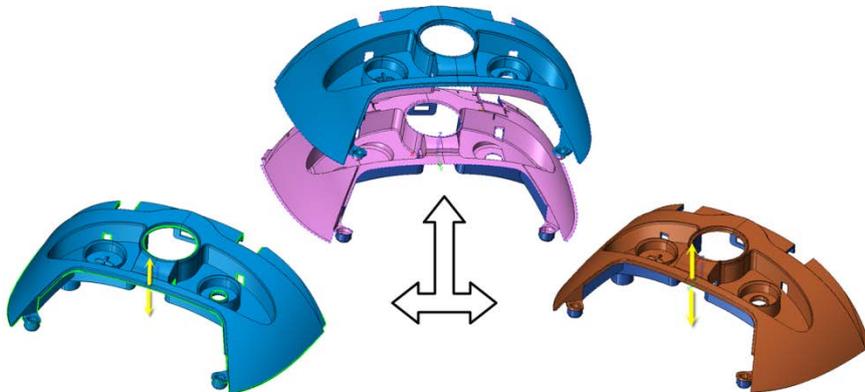

Figure (5):　Methods of defining parting lines and defining face colors

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In ZW3D, using the color to define the core and cavity region makes the spitting process simpler, as it is much easier to define the region compared to creating parting lines.
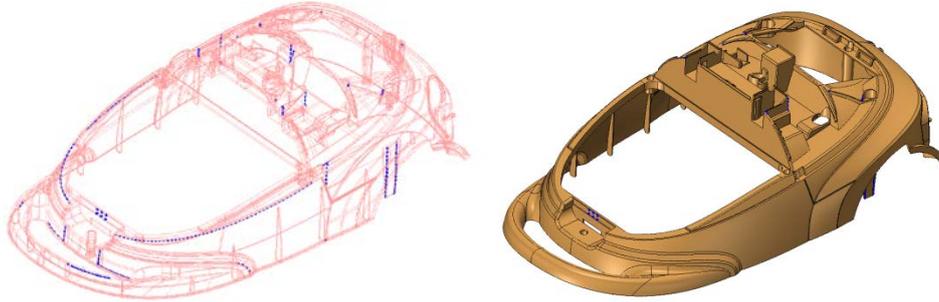

Figure (6): The part includes a lot of gaps in blue color

Typically, before the core and cavity splitting, engineers have to spend hours on healing t o transfer all surface features to solid. It can be more and more annoying if the part is quit e difficult to fix. In the complex situation like that, thanks to its hybrid modeling technology, ZW3D can help engineers to skip this time-consuming process and jump directly to the splitting part, regardless of the status of this part.
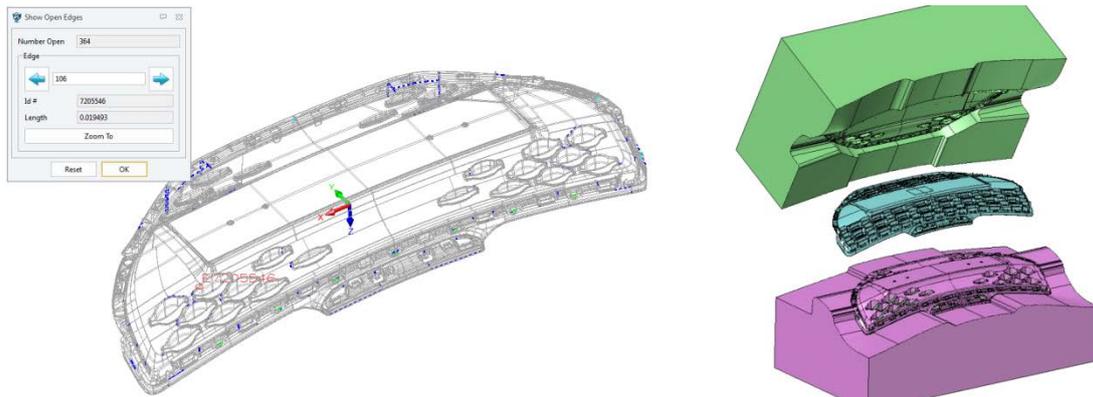

Figure (7): Open shapes can be split in ZW3D

2.2. Building the standard mold base for the company

Nowadays, with the power of globalization, mold designing doesn't have to come from scratch. Instead, most standard parts are available in the supplier chain, like mold base, screw, and so on.

To improve the mold design process, standardization is the key issue to reduce errors and cost. Using the ZW3D built-in mold base, it is easy to access and insert the mold base like

DME, Futaba, HASCO, LKM, etc.. Additionally to that，a customized data base of standard molds can be built by users.
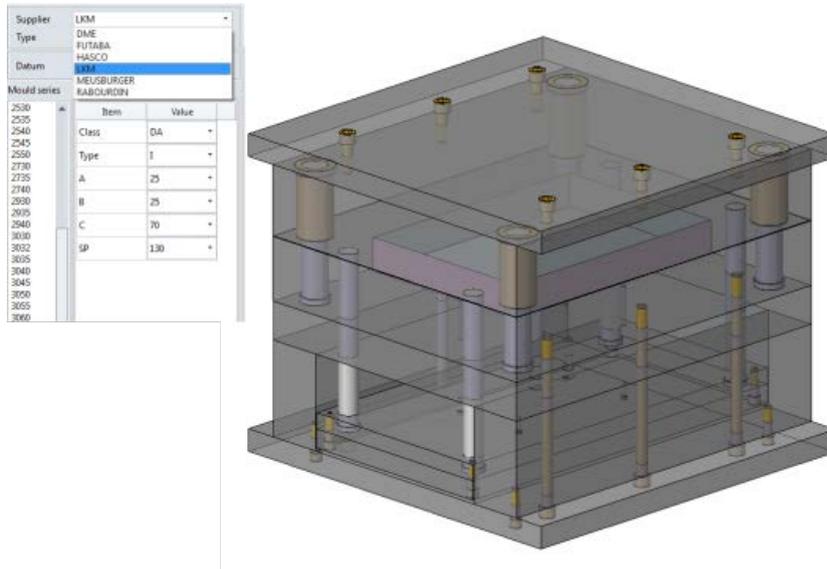

Figure (8):   Mold base library

2.3. Easier standard parts

During the mold design, a lot of standards parts would be used, including screen, ejector pins, pillar, slider, etc. The application and modification of standard parts is another approach to simplify mold designing.

Take ejector pins and locating rings for example:

1)   When the ejector pin is added, the hole of the core will be cut automatically.
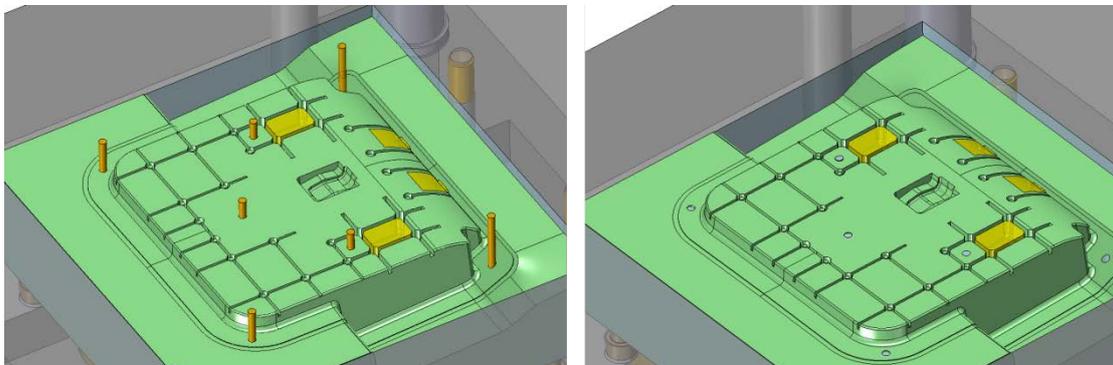

Figure (9): The ejector pins can be simply trim using only one operation

2) When moving the standard parts, the hole will be cut automatically.
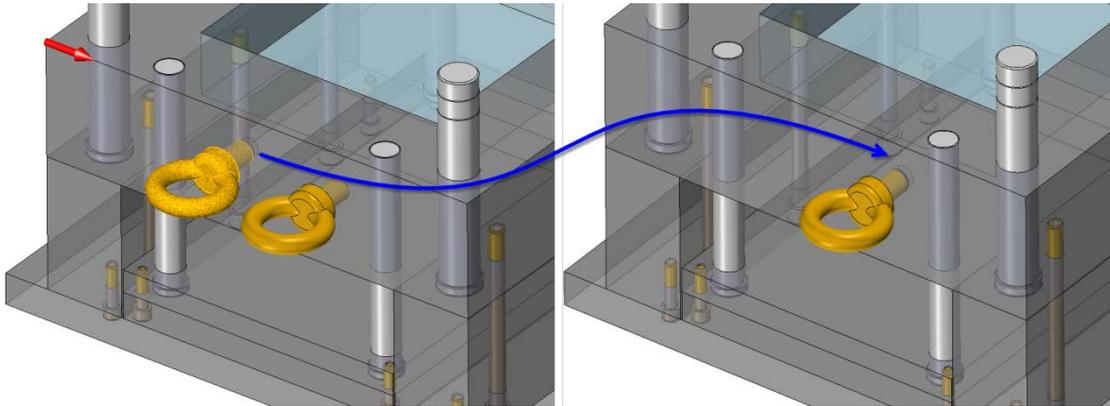

Figure (10): The change of the locating ring updated the mold base automatically

2.4. Quicker electrode design and manufacturing

Electrode design is quite simple in ZW3D. By using the built-in electrode command, it is easy to not only create an electrode but also create a batch of 2D sheet.
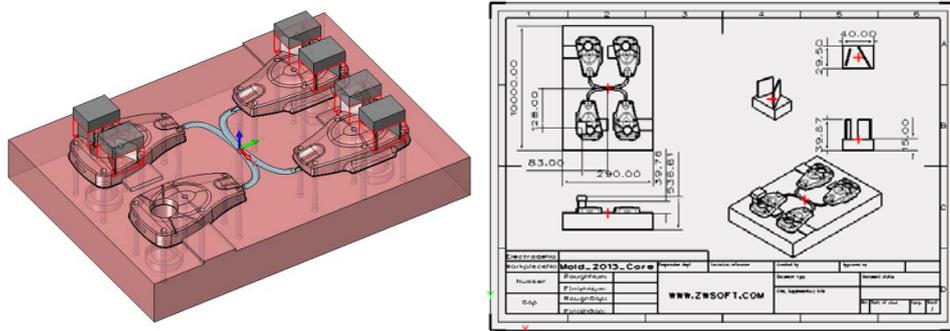

Figure (11): Electrode design and 2D drawing

Electrode manufacturing is simple through the use of a template. All similar electrodes can use the same template to generate the NC code for machining. With the power of an all-in-one CAD/CAM package, the change in the CAD can update the change in CAM immediately. Electrode design and machining can be finished without extra data transfer from CAD to CAM.
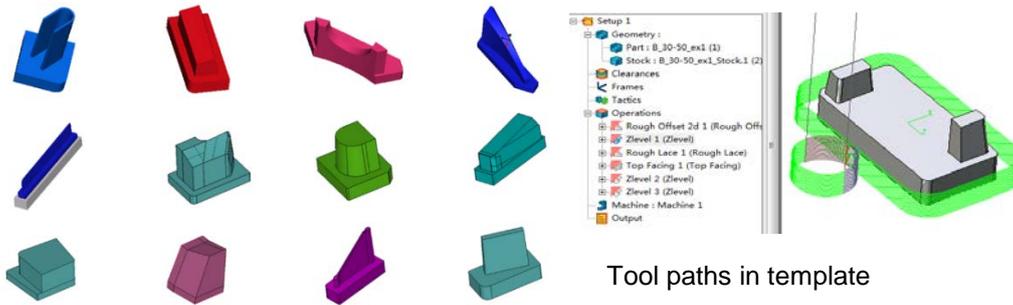
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Tool paths in template

Figure (12) The tool paths of similar electrodes can be generated by only one template

This is what ZW3D can do for the optimization of mold application, providing the handy workflow to speed up the design process.

3. CONCLUSION

With higher and higher requirements from users, ZW3D provides a perfect tool for mold design which enables you to evaluate ROI before the mold design commences, saving a lot of time and human resources during the quotation. During the Mold design, it is extremely fast to create the parting lines and parting faces that Core and Cavity can be split without healing the imported file to be a perfect solid. With the all-in-one CAD/CAM feature, electrode design and machining can be finished simply in one package without any data loss. The Mold solution of ZW3D is designed to make a mold faster, eliminate design challenges and increase the value of your design efforts.