Newsletter

BPO
we know how

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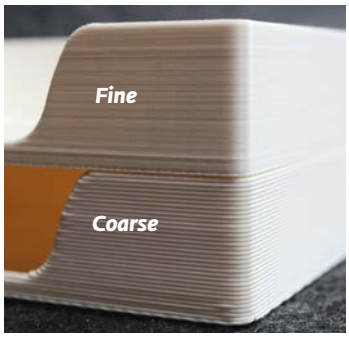
3D printing vs simulation:

"Could you please print my product idea?"

Increasingly we are being asked to print a rough product idea. This initial 3D print is then used to decide if the product is to be further developed. The print is often used to test – next to functional requirements and aesthetic design – the strength and stiffness.

As far as we are concerned, this is not (yet) the right course of action. During every phase of the development we use simulations to execute several iterations fast, efficient and accurate. In the long run, such a structured design process saves a lot of costs, reduces risks and shortens the development. 3D printing is best used where it is of added value for the process, for instance to judge the "look and feel", give the client an impression of the physical shape of the product, compare different solutions, or to check the fitment to an existing product assembly or existing production line. BPO has state of the art 3D printers as well as simulation software. This year we have bought one of the largest FDM printers available now, and this spring we have acquired Abaqus software next to our current FEM software.

print can have the look and feel of, for instance, a margarine tub. It has flexible side walls, just as an injection moulded part will have. For concept designs that are to be made in two components, we can make the printed prototype in two components. For instance, a PETG product with small bumps of TPU.



What to expect from a state of the art 3D printed prototype?

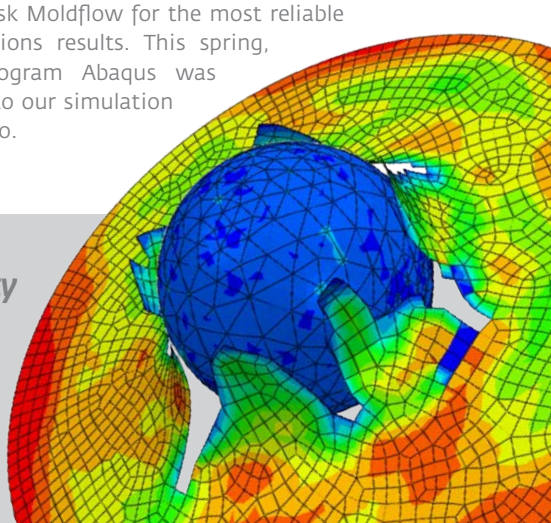
There is no such thing as a generic 3D printed object. Every 3D printing technique has its possibilities, advantages and limitations. Also, there are large differences in quality. BPO has advanced FDM printers, used to manufacture prototypes for our projects. We can print prototypes for packaging concepts starting at ***0.3 mm thickness***. The

For us, a 3D print is not limited to only one type of material or one colour. You can choose between the "traditional" ***ABS*** material, ***PC*** (good mechanical properties), ***HIPS*** (good properties for impact), ***ASA*** (good UV resistance), ***PA***, ***glass fibre reinforced PA***, ***PLA***, etc. Regarding colours there are even more options. Parts that require good surface quality and precision can be printed in a very fine resolution. Parts that do not require very even surfaces can be made using a coarser printing quality. This way larger plastic objects such as crates and pallets (up to ***800mm x 600mm x 400mm***) can be printed in a relatively short amount of time.

With the current techniques, it is not (yet) possible to create accurate texturing or a high gloss finish, without (relatively expensive) post processing. Next to this, the strength and stiffness of a 3D printed prototype is not entirely the same as, for instance, an injection moulded product. Strength and stiffness is still most accurately (and most economically) determined using simulations. One can think of drop test simulations or stacking load simulations. Long term effects of plastics can be easily considered using simulations, such as creep over time for stacking loads. BPO has the tools Marc, Apex and Autodesk Moldflow for the most reliable simulations results. This spring, the program Abaqus was added to our simulation portfolio.

Abaqus: drop tests, impact crash and residual safety

Abaqus is an exceptionally competent tool for the simulation of short, dynamic transient occurrences, like drop tests or impact crashes. Using Abaqus the behaviour of liquids in plastic bottles can be charted, also the residual safety of a product (the properties after damage by a drop or impact) can be determined in detail.



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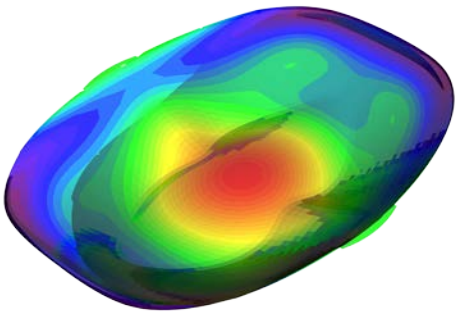
Oysterize

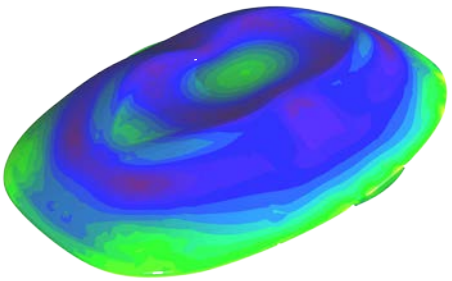
Oysterize is a new and innovative product that can be used to store delicate foods, such as soft fruits, small poultry and airy pastry in an almost complete vacuum. The Oysterize is made of two identical domed shells that can withstand the vacuum.

The food is placed in one of the two shells, the other shell is placed on top. The Oysterize can then be placed in a standard vacuum bag. A vacuum packing machine is then used to create an almost perfect vacuum (up to 99,8% using a professional machine).

Oysterize gives the opportunity to store products in vacuum that would normally be squashed if only a regular vacuum bag is used. The created vacuum limits bacterial growth, keeping products fresh for longer periods. Also, products that would normally oxidize quickly, like double-shelled beans, sliced avocados or salami slices, can be kept fresh in the Oysterize, without any further help. Lastly, the Oysterize is especially suitable for marinating, brining or infusing meats, vegetables and fruits: the vacuum accelerates these processes significantly. Consumers who already own a vacuum packing machine only need to add the two shells to their kitchen equipment. That makes the Oysterize a low-threshold addition to the professional kitchen.



Deformations in the product



Stresses in the vacuum-wrapped product

Nesting the individual parts

Rendering

Commissioned by entrepreneur Eric Bal, BPO developed the basic idea of Oysterize to an industrial product. Next to developing the special design, for which it was adamant to stay true to the sculptural shape of the basic idea, realising sufficient strength and stiffness was of the utmost importance. Using finite element analyses the shape of the shells was optimised so that these, while suffering as little deformation as possible, can withstand the large forces that an almost complete vacuum creates. Furthermore, the design was engineered in such a way that the two shells are identical, but because of the smart shape fit onto each other easily and are fixated during the vacuum process. To make sure the geometry is easily cleanable and can be kept hygienic, sharp edges have been eliminated as much as possible. The completely engineered 3D model and corresponding technical drawings have been delivered as result. During the development, BPO selected suitable suppliers and supported the process right up to the release for production.

Oysterize is available in the autumn of 2017 via the website oysterize.com.

Kunststoffen 2017

This autumn, BPO can again be found at the plastics fair "Kunststoffen" in Veldhoven, the Netherlands. The fair is planned for 27 and 28 September.

As usual, we will show the newest developments at our boot (129). This year, one of the projects on display will be the innovative heavy duty pallet SF800H, which has been developed for Smart Flow Europe by BPO.