Newsletter

BPO
we know how

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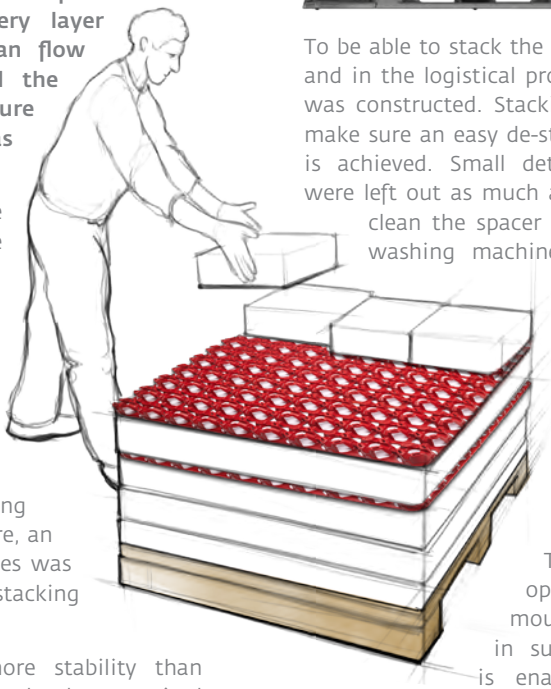
In this number: High-performance Freezer Spacer in warehouses – "Additive Manufacturing" is gaining ground – Visit BPO at "Moulding Expo" in Stuttgart

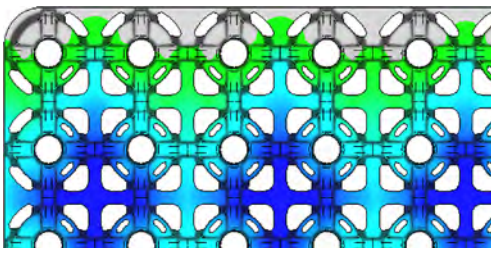
High-performance Freezer Spacer

Large plastic trays with the size of a pallet are used in large freezer warehouses to be able to freeze boxes filled with fresh products as quickly as possible. These spacers are placed between every layer of boxes, so cold air can flow between the layers and the required core temperature can be reached as fast as possible.



BPO has developed the new *Freezer Spacer* in close cooperation with Sell Plastics, an injection moulding company based in Nijkerk, the Netherlands. An important starting point in the development was that the new product had to be produced on an existing injection moulding machine of Sell. Furthermore, an optimal support of the boxes was required, so a stable pallet stacking could be achieved.

The new product has more stability than competing products and is also better suited for repeated use in the logistical chain, because of its construction. Tests have shown that the time required for freezing the content has dramatically reduced, meaning large savings in energy costs are achieved.

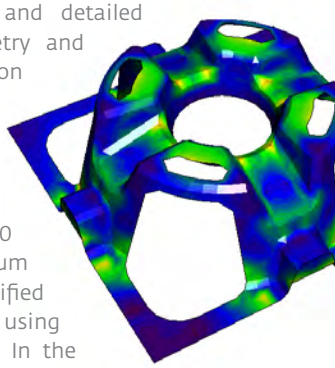


Moldflow simulation

The geometry is constructed from a pattern of cylindrical cells, dimensioned in such a way that a logical mathematical structure was created. The design is made specifically to have the possibility to produce both a EURO pallet sized as well as a UK pallet sized version using the same mould with exchangeable parts.

To be able to stack the spacer after production and in the logistical process, a nestable shape was constructed. Stacking ribs were made to make sure an easy de-stacking of the products is achieved. Small details and sharp edges were left out as much as possible, in order to clean the spacer as good as possible in washing machines designed especially for the new spacer. The used polyethylene (HDPE) is not only well suited for the low temperatures in the freezer warehouses but also for the high temperatures that occur during cleaning.

The geometry was optimised using injection moulding simulations, in such a way production is enabled on the newest injection moulding machine of Sell Plastics with a clamp force of 1200 tonnes. The optimal number and position of the injection points were analysed and detailed changes to the geometry and wall thickness distribution were made in order to achieve this.

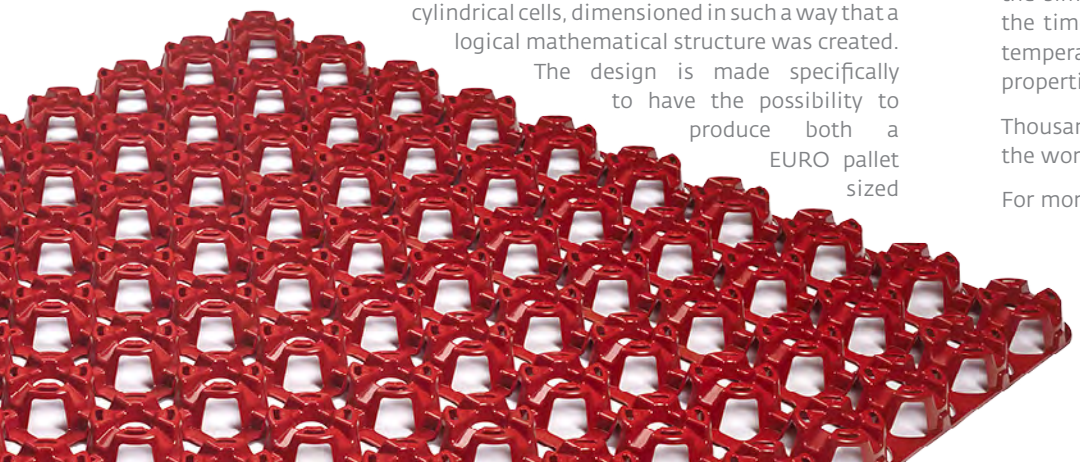


Simulation of material stresses

The maximum carrying load of the spacer is no less than 9,000 kilograms. This maximum load has been verified during development using finite element analyses. In the material description used for the simulations the influence of the time of loading and the low temperature on the material properties of the HDPE is accounted for.

Thousands of parts are currently in use all over the world, to complete satisfaction.

For more information: www.sellplastics.nl



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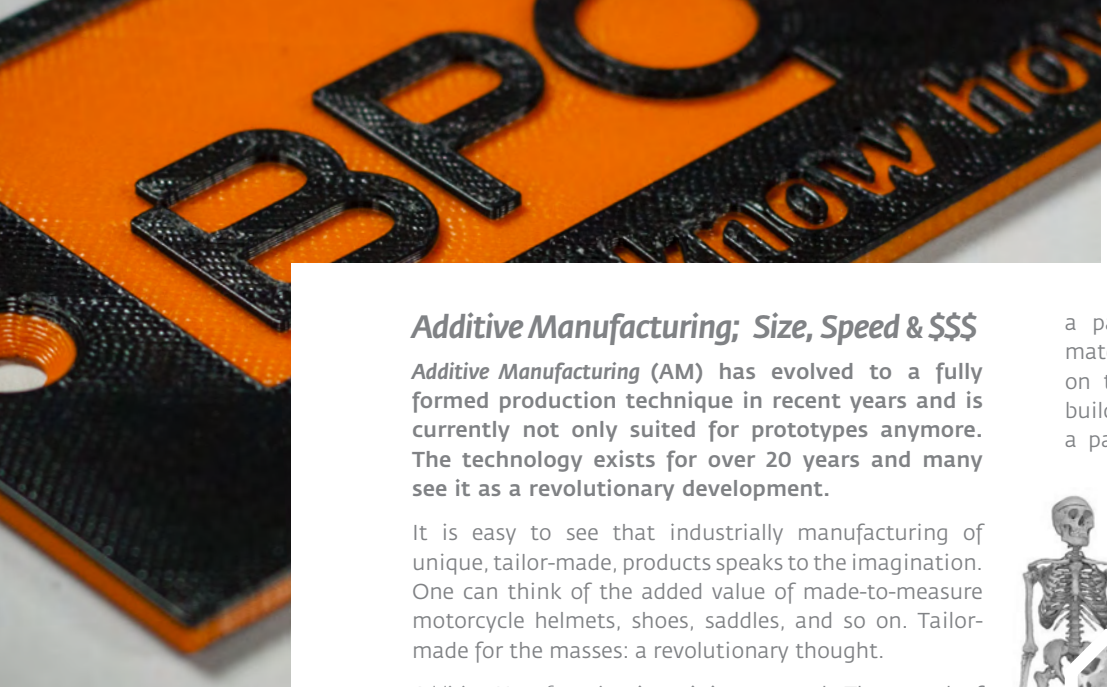

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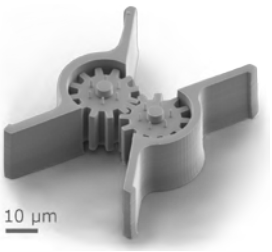
Additive Manufacturing; Size, Speed & $$$

***Additive Manufacturing* (AM) has evolved to a fully formed production technique in recent years and is currently not only suited for prototypes anymore. The technology exists for over 20 years and many see it as a revolutionary development.**

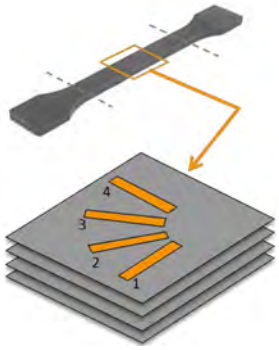
It is easy to see that industrially manufacturing of unique, tailor-made, products speaks to the imagination. One can think of the added value of made-to-measure motorcycle helmets, shoes, saddles, and so on. Tailor-made for the masses: a revolutionary thought.

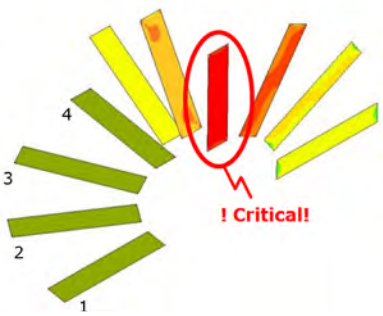
Additive Manufacturing is gaining ground. The speed of production is improving constantly and the cost of machines and material is, slowly but surely, reducing. Furthermore, AM is becoming more and more widely usable: both minuscule (couple of micrometers) and very large (couple of meters) products can be produced successfully using AM.



Miniscule sprocket
(AM technique, wordlesstech.com)

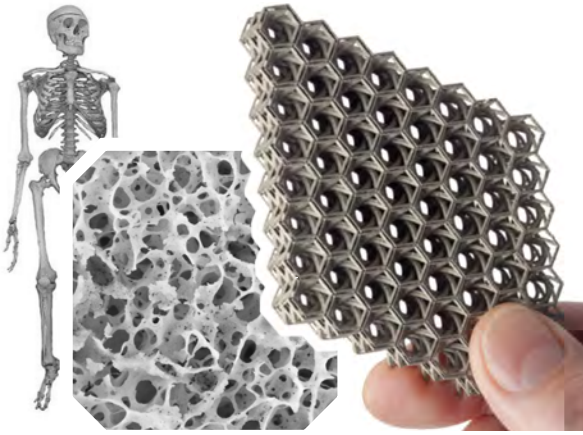
BPO sees *Additive Manufacturing* as a promising technology that has a lot of potential but also some limitations, just like the established production methods such as injection moulding, extrusion, blowmoulding and rotational moulding. BPO has gained valuable experience over the last ten years in the area of development, analysis, optimisation and production of AM products, for instance through projects for the European Union (EU). Using AM it is of the utmost importance that the design, material, use and manufacturing of the part is well thought out, just like for any other conventional production method.



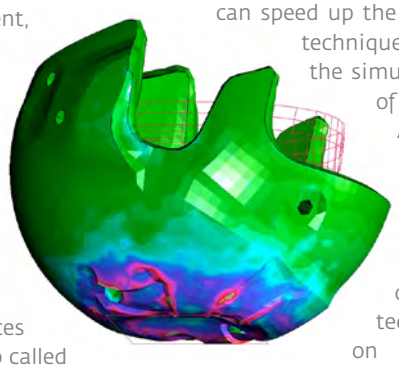


Critical stress dependent on layer orientation.

Additive Manufacturing introduces new possibilities. For instance, so called "microstructures" (combining high strength and stiffness with a low mass), based on the structure of human bones, can be produced through AM. New challenges arise as well with a technique like AM, for instance in the area of Computer Aided Engineering (CAE). Because the technique is based on building a part one thin layer at a time, the material properties are largely dependent on the layer orientation caused by the build direction. The build direction of a part produced with AM is critical for its functioning, just as the orientation of (glass)fibers in injection moulded products is critical. BPO can predict the deformation as a result of layer orientation for different materials and different geometries, using FEM calculations. CAE can speed up the implementation of AM techniques, because it allows for the simulation of the behaviour of products made using AM under the influence of the expected loads during its use.



Microstructures, modeled after human bone structures.



BPO supports the purposeful deployment of *Additive Manufacturing* techniques; BPO advises on the possibilities and limitations of AM, on the optimal way to use this production method for your products. One can think of the optimisation of a geometry, signaling and optimising critical loads, reduction of cost and improvements in performance.

MOULDING EXPO

Visit BPO at Moulding Expo

BPO will be present on the "Moulding Expo, *international trade fair for tool, pattern and mould making*" in Stuttgart, Germany. Our booth, **hall 6-D 17**, can be visited from T**uesday 5 May to Friday 8 May**.

More information on the Moulding Expo can be found via: www.messe-stuttgart.de/en/moulding-expo/