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3D TPU PROTECTIVE AND CUSTOMIZED BOTTOM PARKING MESH FOR MANUAL BLASTING MACHINES

HP INC

3D TPU Protective and Customized Bottom Parking Mesh for Manual Blasting Machines

Overview of the system

Currently, most of the 3D Printing technologies require from a system to help with the post-processing phase, enabling the whole part functionality and aspect. This commonly happens in a manual bead blasting machine, able to post-process different materials. Post-processing with this kind of technology, may lead in some occasions to part damage or breakage in small edges and features.

This following solution can be adapted to any kind of bead blasting machines which includes a tray where parts are parked or kept for post-processing.

Which are the problems that this system solves?

The presented solution solves issues like damaging raw parts during the bead-blasting process. This solution also lowers the weight in the tray where parts are placed or parked. It also reduces difficulties while cleaning complex parts to hold them, since operation is delivered by one person. No more need to introduce or use metal baskets holding parts inside the machine.

How does the systems work?

This disclosure proposes a solution to implement in bead blasting machines TPU trays where commonly parts are placed while cleaning a whole batch of them.

Most of the bead blasting machines presents a metal tray with perforations to allow the flow from the residual and removed material surrounding the parts and the abrasive itself.

While cleaning tiny and fragile parts in some occasion parts fell from the holders or operator hands hitting the metal tray, which sometimes ends up in damages or brokerages.

3D Printed TPU meshes would help in many ways to the blasting process in manual bead blasting machines. The main purpose is to protect the parts awaiting the blasting and the ones having the same process.

Besides this advantage, we could make use from the freedom to design meshes and shapes to create customized meshes or holders to make easier and faster the blasting process of certain parts production.

This meshes could be design with 3D lattices or topology bumpers to make them lighter and increase the performance for shock and impact absorption.

Here what most of the blasting machines implement:

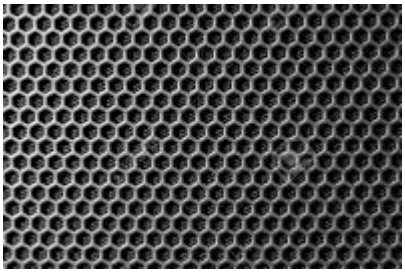

Figure 1. Metal bottom tray from a bead blasting machine

Another example from a lattice prism:

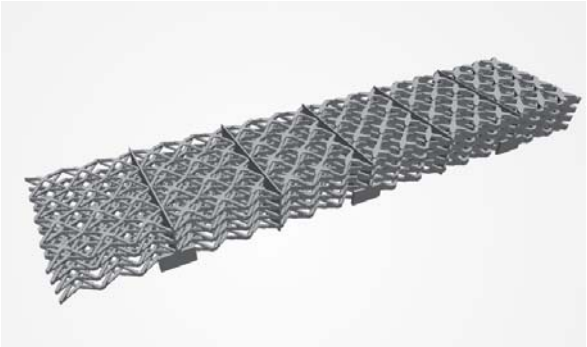

Figure 2. Example from a 3D Printed Lattice Structure with different section sizes and shapes.

Different parts could be assembled into a whole mesh with the right shape and dimension to fit in each specific blasting machine. 3D joints can be used to put together all the different pieces and parts without needing extra material such as special glues or extra components.

At the same time, due to maintenance operations, this tray is removed in some occasions to remove the residual particles in the bottom of the machine, which is quite difficult because of the size and weight from the metal tray.

The whole process could be automatized, being the design of the mesh, the very first step to implement. Depending on the part requirements, shape and size different approached could be taken.

Patterns could be designed to allow higher or lower, abrasive, residual material and air flowability.

From negative part shapes (negative molds), different designs could be added into the meshes, which is composed by different pieces, to fulfill the whole machine bottom area.

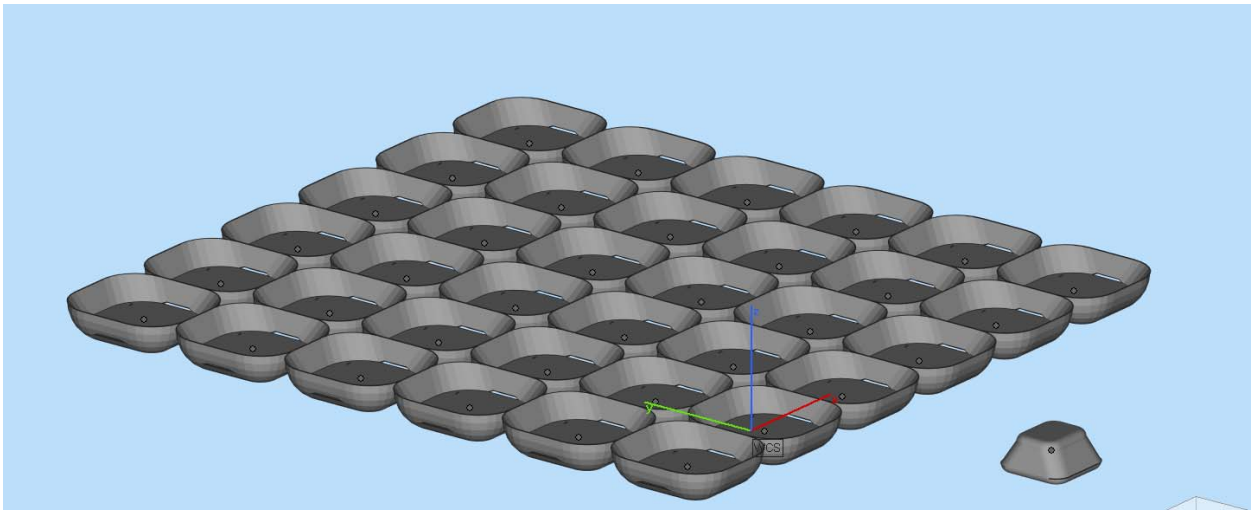

Figure 3. Example from whole TPU mesh adapted to the right 3D Printed PA12 part

In this example, the operation of holding parts would be easier, putting the operator a whole batch, just spreading the parts over the mesh. The mesh design would help to locate and orientate the parts to be cleaned easily.

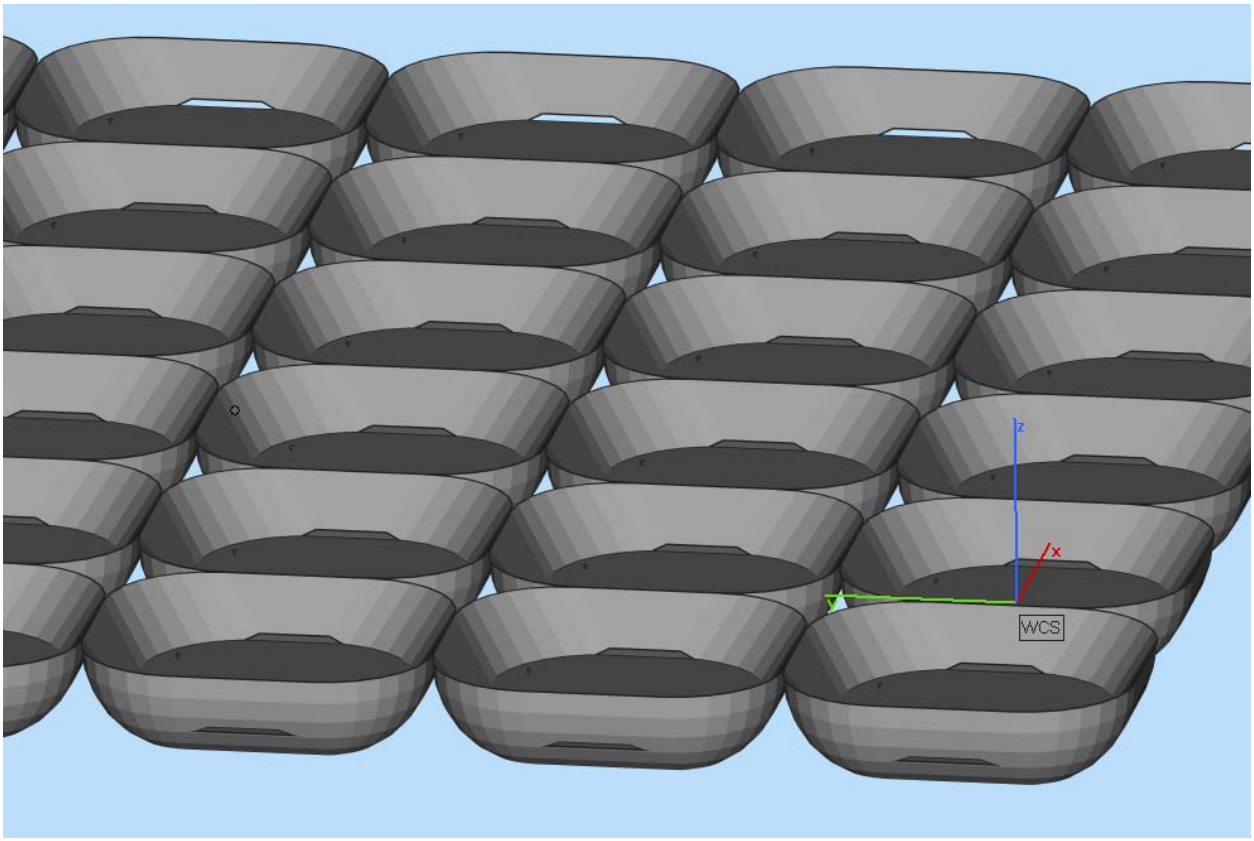

Figure 4. Closer view from the customized TPU mesh, for the indicated specific example

TPU mesh could be placed here:

Figure 5. On left side the original mesh, On the right side, the optimized TPU mesh

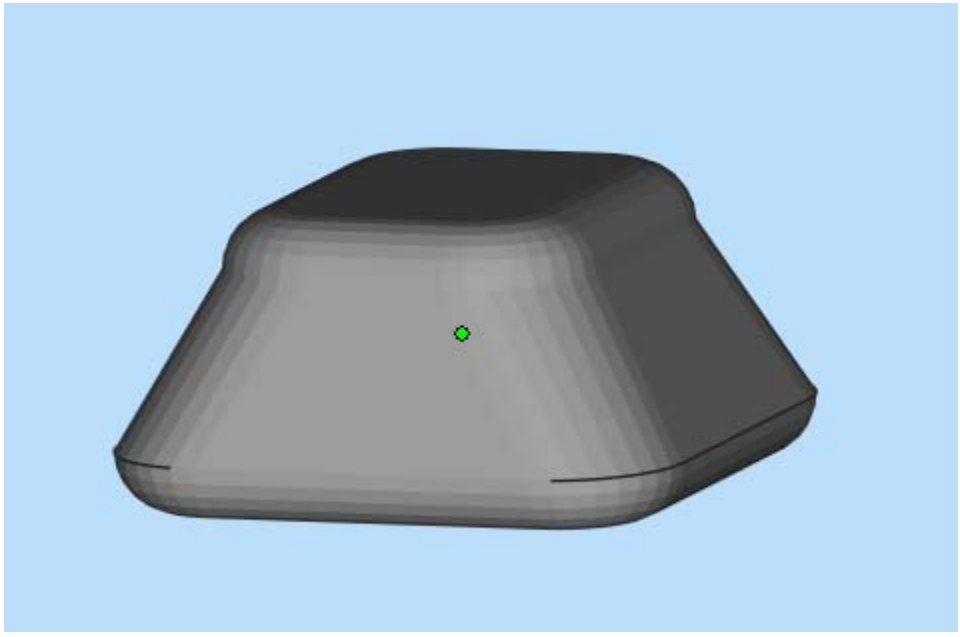

Figure 7. 3D Printed part to be cleaned in large batches. Mesh design has been adapted for this specific design

Which are the advantages on doing in this way?

- No damage to tiny or delicate parts while blasting them, since impact is absorbed comparing to metal trays
- Different shapes and designs to hold parts, helping with specific cleaning processes.
- Automatic process to design the mesh
- Lighter parking tray where parts are placed while blasting
- Change on the mesh tray design to avoid missing parts or damages
- Customize meshes for different type of blasting machines
- Same solution could be applied to other materials, which fulfill the same requirements
- Easier part transport after blasting process – Improvement in TCO
- Time reduction for blasting operations – TCO improvement

Are in the market other kind of solutions?

This solution could be applied to all bead and air blasting machines which incorporate a tray below the blasting pistol. TPU meshes can be printed with different designs and sizes, being assembled together from different pieces to achieve wider and larger areas. In addition to that, the possibility of implementing negative shapes as part of the mesh design, would help with the cleaning process from large production scenarios.

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