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PROCESS TO CLEAN A CHAMBER WHICH HAS BEEN OPTIMIZED FOR A FRONT DOOR SYSTEM

HP INC

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Process to clean a chamber which has been optimized for a front door system.

Abstract

It is desirable to from a machine structural point of view to have a front door opening for user access. It is also desirable to minimise a chambers volume to reduce the consumption of nitrogen for inerting as well as other reasons. The chamber volume is normally reduced by minimising the height of the chamber. This introduces a problem for user access for cleaning operations as the top of the chamber is too low to allow ergonomic regular maintenance activities.

This article introduces a process where an internal skin is included within the chamber. After a build, the powder settles on this surface. The internal skin can slide out of the chamber for easy access cleaning or the skin can be taken away from the chamber and replaced with a clean set of skins so that another job can begin immediately. The dirty skins which were removed from the chamber can be cleaned at a later time, when operator availability allows it.

Publication

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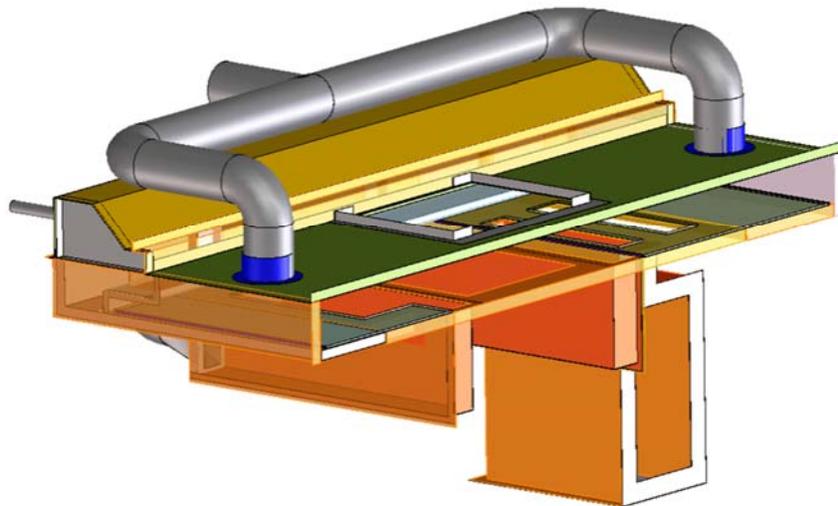


Figure 1: Minimizing the Z height of the chamber means that the cleaning operation is very difficult.

Without custom tooling the cleaning task could not be suitable for the required range of operator body sizes. Usually this custom tooling would take the form of vacuum clean adaptors although, in this case, even this would be an uncomfortable operation.

Automated cleaning is a possible solution but is costly and the technology is currently immature.

This publication discloses the following novel process for industrial machines:

1. Skins are included internal to the process chamber before a print job is started. They cover the horizontal surfaces which would otherwise suffer powder contamination.
2. The printing process can begin. The powdersol is only able to settle on the skins leaving the chamber walls clean underneath.
3. Post build, the internal skins are easily removed from the chamber.
4. An already clean set of skins can be immediately installed into the chamber and the next build started.
5. Outside of the chamber the powder contaminated skins can be fully cleaned with good access to all areas with the skins resting on a work bench. Also, the cleaning step no longer lies on the critical path and therefore does not delay the start of the following build.

The internal skins physically can be similar to a sliding tray on rails to aid the positioning when installing and ease the removal. They can be in a few major sections so that they are comfortable to handle.

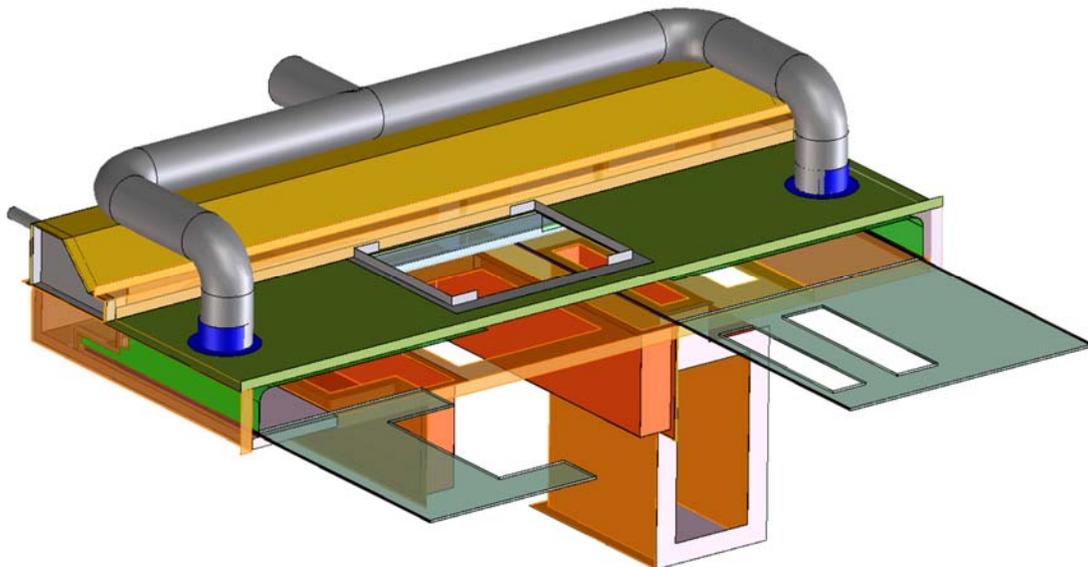


Figure 2: Example of how skins could slide out of the chamber. They could be cleaned in the position seen or removed for cleaning later.

Disclosed by Rhys Mansell, Esteve Comas and Mohammad Jowkar, HP Inc.