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Automatic Printed Part Removal

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Title: Automatic printed part removal

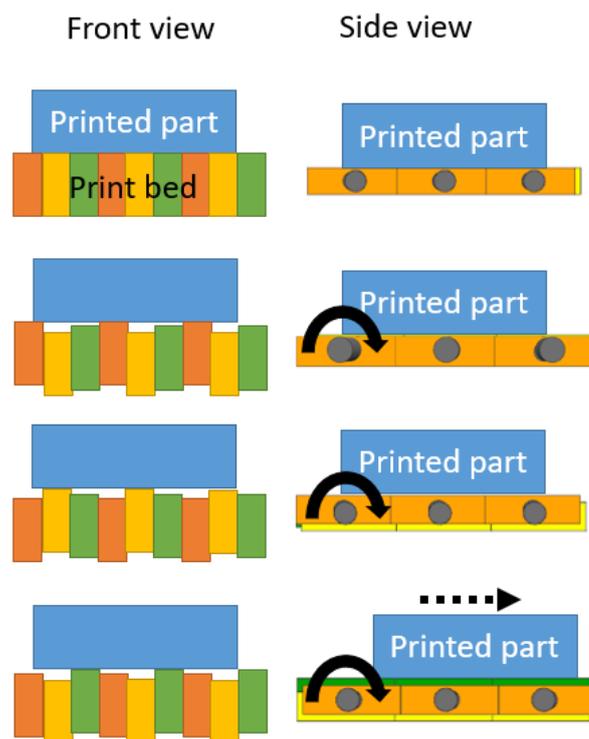
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This publication relates to the commonly known dilemma present when printing parts on a build plate of a 3D printing device, such as a Fused Filament Fabrication (FFF) printer. While a part is printed on a build plate (i.e. print bed), it should stick to the build plate, to get a proper print and to guarantee the right dimensions. But when printing is done, the printed part should not stick too firmly to the build plate, and it should be removable from the build plate without too much hassle.

Below, we will describe a solution to this dilemma which is inspired by a segmented cargo floor of a lorry trailer. In such a lorry e.g. 3 series of floor elements could move in respect to each other. When 2 floor elements move forward and the 3rd element moves backwards, the cargo on the floor will move forwards. Then another combination of floor elements is moved forwards, while one element will move backwards. In this way the cargo could be moved automatically.

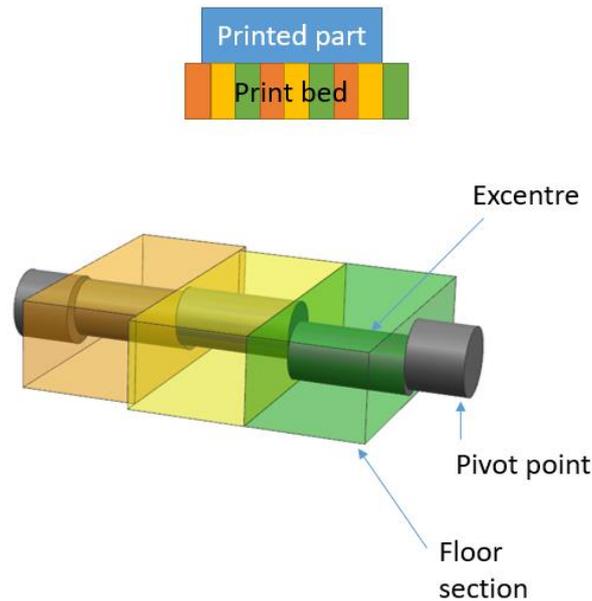
This cargo floor principle will actually not properly work for an FFF part removal from a segmented build plate having multiple floor sections. When for instance 3 section are used, 2 sections could lose their connection with the printed part, but then a 3rd section could still be attached to the printed part. To eliminate this problem, a new segmented build plate is proposed wherein a wave-pattern is created in upwards direction and wherein sequentially every floor section will be the highest/lowest section. In this way the printed part can get loose from the 'floor sections' (i.e. build plate).

In the examples below, the build plate is made out of several beam-shaped floor sections and several driving axes arranged through the floor sections, to create an eccentric motion. Such an eccentric motion creates a vertical wave pattern, and it also creates a circular motion in horizontal direction,



which will transport the printed part. This is because the upper floor sections will always move in one direction, while the return stroke will be a lower heights.

The build plate should also have a levelled situation with a flat upper surface so as to be able to create a flat print. This can be done by giving the different floor sections a different offset towards the excentre.



This will also lead to uneven horizontal section movements, but that is not a problem. All what matters is that all sections will be loosened from the bottom of the printed part and that there is some sort of motion so as to move the printed part from the build plate. The printed part may be received in or on a transporting line, so as to further transport the part for storage or post-processing. At the same time the 3D printer can start a next printing session without the need of any interference by a user. The picture below shows a perspective view of an example of the suggested print bed for use in a 3D printing device with three transparent part to show the eccentric driving axis parts.

