MOVABLE DIE COMPONENT FOR A PRESS DEVICE

[0001] The subject matter herein relates generally to movable die components for press devices. A press device includes die components used to form a work piece, such as a base assembly, a stripper plate and a punch assembly movable by a press ram toward the workpiece. The press device is configured for high speed stamping having many cycles per second. The workpiece, which is positioned between the base assembly and punch assembly, is formed during the pressing operation. A stripper plate is positioned between the base assembly and the punch assembly to pin the workpiece against the base assembly as the punch assembly is retracted. The stripper plate is spring actuated away from the base assembly to allow the stripper plate to move.

[0002] The spring actuated die components vibrate and rebound when moving and stamping the workpiece. The effects of the vibration and rebound intensifies as the speed of the pressing operation increases leading to accelerated wear and possibly die jams and product quality issues with the components formed from the workpiece. The vibration and rebound momentum of the movable die component is affected by the weight of the object. Heavier die components have more momentum and are affected by vibration and rebound.

[0003] The solution is provided by a press device as disclosed herein having reduced vibration and rebound effects on the movable die components during operation of the press device. A movable die component for a press device is provided that includes a plate body having a workpiece engagement surface configured to engage a workpiece formed by the press device. The plate body has a plurality of internal pockets completely enclosed by the plate body, the plate body being formed by a plurality of layers built-up on each other and being integral to form a unitary plate body, wherein the layers comprise a lower layer, a plurality of middle layers, and an upper layer, the internal pockets being provided in the middle layers, the lower layer covering a bottom of each internal pocket, the upper layer covering a top of each internal pocket. Optionally, the plate body may be formed by an additive manufacturing process, such as by forming a plurality of direct metal laser sintering layers. The direct metal laser sintering layers may include a lower layer, a plurality of middle layers, and an upper layer with the internal pockets being provided in the middle layers, and with the lower layer

WHAT IS CLAIMED IS:

1. A movable die component for a press device, the die component comprising:

a plate body having a workpiece engagement surface configured to engage a workpiece formed by the press device, the plate body having a plurality of internal pockets completely enclosed by the plate body, the plate body being formed by a plurality of layers built-up on each other and being integral to form a unitary plate body, wherein the layers comprise a lower layer, a plurality of middle layers, and an upper layer, the internal pockets being provided in the middle layers, the lower layer covering a bottom of each internal pocket, the upper layer covering a top of each internal pocket.

2. The movable die component of claim 1, wherein the plate body includes an upper cap and a lower cap covering the internal pockets.

3. The movable die component of claim 1, wherein the plate body includes support ribs extending between an upper cap and a lower cap, the support ribs separating the internal pockets from one another, the upper cap and the lower cap covering the internal pockets.

~~4. The movable die component of claim 1, wherein the plate body is formed by a plurality of layers built-up on each other and being integral to form a unitary plate body.~~

~~5. The movable die component of claim 4, wherein the layers comprise a lower layer, a plurality of middle layers, and an upper layer, the internal pockets being provided in the middle layers, the lower layer covering a bottom of each internal pocket, the upper layer coving a top of each internal pocket.~~

~~6~~4. The movable die component of claim 1, further comprising damping material at least partially filling the internal pockets, the damping material having a lower specific weight than a specific weight of a material of the plate body.

~~7~~5. The movable die component of claim 1, wherein the plate body is formed by a plurality of direct metal laser sintering layers comprising ~~a~~ the

lower layer, ~~a~~ the plurality of middle layers, and ~~an~~ the upper layer~~, the internal pockets being provided in the middle layers, the lower layer covering a bottom of each internal pocket, the upper layer coving a top of each internal pocket~~.