

# A revolutionary approach to tooling changeover on multi-level presses

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## 0. Abstract

Conventionally, tooling changeover on multi-level presses has been done either using costly and massive full die-set changeover systems, or inefficiently interchanging tooling and tool holders manually inside of the press.

A revolutionary new approach will be introduced in this paper, based on the use of a cartridge system with automatic mechanical coupling, that combines the advantages of traditional die-set changeover systems with the flexibility and low infrastructure and investment costs of manual tool changes.

The tooling can be assembled outside of the press on special fixtures, and then coupled in the press time-efficiently. It requires no special infrastructure to be built, ensures an unmatched process flexibility and guarantees a proper tool guidance, as the die-set guiding elements, measuring and control instrumentation remain always inside of the press during the tooling changeover.

## 1. Study of the situation

### 1.1 Basic methods to perform a tool change on powder compacting presses – methodology distribution by press size

We can identify are 4 basic methods to perform a tool change on powder compacting presses:

- Manual tool changeover inside of the press: the tooling is assembled and disassembled by the operator inside of the press, and the clamping is done by traditional means (rings, bolts, ...)
- External die-set without additional infrastructure: only one die-set is used. For the tooling changeover, the die-set is pulled out of the press, and then the tooling is disassembled, and the next one is assembled (outside of the press). During this time, the press is stopped for production.
- Semi-automatic or automatic die-set changeover system: in this method, at least two die-sets are used. The tool assembly and disassembly are done externally to the press on a die-set. The production is stopped only for die-set changeover.
- Quick clamping and referencing systems for tools: the tooling is assembled and disassembled by the operator inside of the press, and the clamping (and frequently alignment) of the tooling is done by quick clamping and referencing systems.

Research has been done to identify the different tooling changeover methodologies applied to the different press sizes. As the source, a sample of more than 300 presses delivered by Osterwalder between 2009 and 2018 was used.

Based on the product portfolio, the sample was divided in three “sizes”:

- Small :  $\leq 64$  ton
- Intermediate : 64 – 450 ton
- Large :  $\geq 450$  ton

The results of this research show the distribution of tooling changeover methodology as in Table 1: