

The minimum requirement for a modern tool & mold production:

The work preparation process and the detailed planning process as a basis for an efficient organization

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There is a vast amount of possible leverages to improve the organization of tool and mold makers in order to be prepared for present or future challenges. Despite known and routine analysis such as break-even calculations, there is a continuously growing tool set or methods to optimize production processes: E.g. industry 4.0, shop floor management for single part productions or phased, continuous production flow. All those topics are relevant and have to be considered for implementation at a time. The question simply is where to begin with.

A key to this problem might be to take into consideration the typical needs TOP Consult encounters at their customers sites:

- How to ensure a smooth flow of materials throughout the production until the assembly of the mold/tool
- This in regard to the best available technical plus economical production method for each piece of the bill of materials
- Each part quality checked beforehand of any assembly process
- A 100 % adherence of schedules – including a simple but informative overview of the parts being in production
- What is the current use of the available capacities? Is there any chance to pack an additional project on top or are the resources already maxed out by the ongoing projects?

Those are still the dominant top-

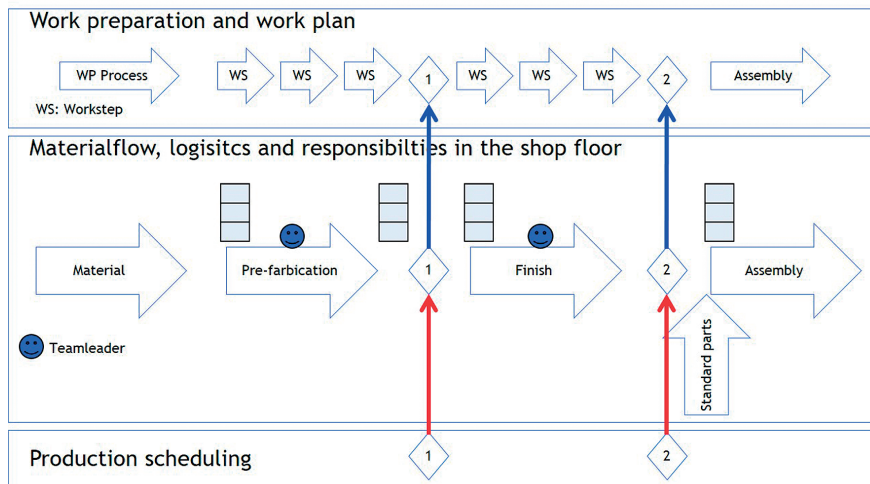
ics. But, at the same time, having those questions solved inherits huge possibilities for improvement – and this with considerably low effort and only minor adjustments. To attack those issues, it is obviously necessary to invest some energy in reconfiguring existent organizational structures – but only a small fraction of the added processes require in fact additional expenditure time:

- Doubts or unclarity in the shop floor about production sequences for one item manufacturing processes are always resolved – by the end of the day there is a tool or mold completed and ready for serial production. The only question is, at which point in time during the production processes those solutions are elaborated and furthermore, what is the quality of the documentation for the then defined procedure.
- In many cases necessary decisions and actions are taken by only a small fraction of the workforce. Moreover, many organizations do not encourage the involvement of their employees by design.

This means: an improved production process does not so much require more input, it is mainly about to move the input to the right slot during the production process of a mold. In a second step, it is then necessary to rearrange the output, or execution including responsibility if you will, to the staff in front of the workplaces. It is exactly this

integration of employees, which is of tremendous significance. Once organizations do accomplish a good integration of employee experience and decision making into their standards, there is also a measurable increase in motivation, reduction of through-put times and, last but not least, a leverage in the economic situation. On the other hand, in this first phase of the implementation, IT does only play a minor role. IT should in fact be the auxiliary it is meant to be. IT should not be used to compensate for missing leadership or, even worse, shape organizational processes, just because the software requires a certain pattern or behavior. This is even more true for change management processes and could potentially pose a risk for a complete failure of the necessary adaption.

So, what measures have to be taken? First, a standard production preparation process has to be implemented. This process has two major functions in the tool and mold makers organizations: Production sequences for the parts of the bill of material for every mold have to be elaborated, guaranteeing the frictionless flow of parts through the shop floor. In addition, crucial milestones for the parts have to be set. The second function is the integration of the shop floor staff at this point. This is only too often an underestimated role of good production preparation – in many cases it is not even identified as an important factor.



1/ Interaction between work preparation process, material flow and detailed planning process (Picture: Dr. R. Zwicker TOP Consult GmbH, Nürnberg, Germany)

Key employees, that is team leader of the main production technologies, have to be integrated and provide input and know-how to the part production. It is essential that there is a common agreement for the preparation process upon the ideal technical and economical sequence of production. This must be the final and obligatory step for every preparation process. The illustration displays the interaction of the information obtained by the preparation process. During the implementation, it is crucial to set up the planning of worksteps of parts of the bill of material according to the rules of the material flow. This means, transitions for responsibilities of milestones and their checkback have to be defined.

The entire process is valid for small tool and mold makers as well as for large internal organization units. In regard to the existing structures, the documentation for the preparation process can be done directly on the part drawing, on a mere document or making use of IT support (but only the IT fits exactly to the defined requirements). Regardless of the chosen means, the implementation of the preparation process can always be started without delay. Once this is done, the so generated information of production processes can be used

for a detailed planning of the shop floor capacities. Detailed planning means, assigning one work step of a part to a specific work place. There is no ideal granularity of the detailed planning – it is an equilibration between the necessary expenditure for the planning and the information required for a more sophisticated planning level. The adequate planning process takes into consideration the size of the shop floor, the general voluminal through-put, the diversity of production orders, the machine park etc. In over 20 years of experience in counselling and implementing such processes, TOP Consult has almost never elaborated the exact same process for its customers twice. It is always the challenge to meet the specific needs of every single customer.

The detailed planning should nevertheless always give the best possible answer to the question: Is this the correct part being processed at the most suitable resource in this moment? If it is the case, that this question is more frequently responded by a “yes”, it most certainly goes hand in hand with increased profitability. In order to do so, there is myriad of criteria to take into consideration:

- Clamping possibilities for the specific parts
- Machining time

- Milestones
- Availability of the processing tools and their conditions
- Overview on the actual workload but also the upcoming parts from other workplaces
- etc.

At this point the quality of documentation of the preparation process becomes crucial: Is every necessary piece of information listed and at hand at the workplace. If this is the case and the employee is encouraged to take his own decisions, the organization has taken a big step forward.

Just a brief comparison: This scenario is opposed by a constant interference of the production management. Every single decision requires consultation. This is by far a more inefficient process, which does not do justice to modern organizations of mold and tool makers. The production management is in this case almost paralyzed by the constant draught into the shop floor activities. It is unable to fulfil its generic tasks for the disadvantage of the entire company. What is true for the preparation process, is also valid for the detailed planning process. Simple tools should be the choice for support of the planning. Especially on this planning level, common software solutions are way too inflexible and uncomfortable to use. TOP Consult estimates two days of thorough elaboration with the employees of the shop floor in order to implement the work preparation process and the detailed planning. In other words, with the input of just 16 hours intense organizational development the output is a sustainably increase of efficiency in the production and thus profitability. During our events and seminars with the focus on planning processes for the tool & die makers branch we demonstrate pragmatic, “real life” realizations of different planning processes for all types of different productions.