In today’s precast facilities, production plans on paper still continue to constitute one of the most important sources of information for production staff members in spite of the fact that these kinds of documents boast obvious disadvantages when compared to digitized sources of depiction. Printed plans are quite unhandy, generally hard to overlook, confusing, ineffective in terms of time, expensive, and oftentimes do not mirror the latest state of the project that is in the process of execution. Precast Software Engineering (a member of the Nemetschek Group) and RIB SAA Software Engineering (a member of the RIB Group) are now proposing a new way of addressing this issue by means of their “SmartProduction – Paperless Production”, a software product paving the way to control and monitor a modern plant independent of printed plans and other documentation in the form of printouts. Together with two leading Austrian precasters, Oberndorfer Betonwerke and Maba Fertigteilindustrie, the first two reference projects have now been successfully commissioned and put into operation.

Increasing cost pressure and more demanding and volatile precast architecture in terms of shapes, coloration, and surface quality are continually challenging precasters to countercheck their production facilities in order to further develop them on the basis of new engineering and technological opportunities emerging in this industry. This entails that, along with an ever-increasing complexity of production steps to be carried out, the amount of information collected in individual production plans is bound to increase as well.

For quite some time, the classical DIN A3 printed paper plan provided has seen its limitation for the purposes that precasters need to address. Printouts make the transmission speed of information rather clumsy and slow and the flow of information only knows one direction. Unforeseeable and spontaneous modifications cannot be taken into account once printouts have materialized and documents have been released. In addition, the A3 format only offers limited possibilities of depiction for different layouts. The employment of larger printouts is unpractical as additional plotters are needed when it comes to A2 and larger formats.

Another aspect that should not be ignored is the time needed to prepare the plans and the never ending cost for printouts. Therefore, Maba Fertigteilindustrie decided to analyse and evaluate these additional costs for its 4-plant production facility located in Gerasdorf:

- 2,160 working hours per year
- 840,000 pages of DIN A4 paper plus printing costs per year

This was sufficient reason to start the SmartProduction project at Gerasdorf. Matched with the appropriate hardware, the Smart Station concept of RIB SAA Software Engineering was implemented. This concept is based on an iTWO MES master system and provides users with the following options at any of the incorporated stations:

- Freely definable contents at each workplace
- Automatic update of contents upon pallet change
- Special displays for
  - Pallet plans
  - Free plan zoom
  - Display of layers and details
  - Single pallet extraction
  - Material lists/parts list
  - Preview of upcoming production units
  - Destacking view – coloured attribution of elements to appropriate stack

Required time for preparing plans/year (number of hours)
“This digitized and interactive data processing will lead to an upgrade in collecting information in our factories and will hence remarkably facilitate our efforts in improving our efficiency during production. Each workstation can be converted into a so-called Smart Station where both hardware and software situations are superbly adapted to existing environments and individual production steps,” explained Christoph Mostler during his speech on the Engineering Days 2017 in Vienna.

Oberndorfer Betonwerke has also undertaken a new path of activities. Together with its software partners, Precast Software Engineering and RIB SAA Software Engineering, the company has embarked on a project aimed at changing over to paperless production. At its location in Gunskirchen (Upper Austria), the first preliminary testing workstation has been put into operation.

Wolfgang Gigelleitner, who heads the Engineering & CAD/CAM department at Oberndorfer Betonwerke, explains the decision for this change in the production process as follows: “The increasing demands on our products require an adaptation of our information flow to the individual stations of our production lines. Whereas formerly classical basement construction was in the foreground of double wall applications, it is nowadays complex residential, industrial and hall constructions that are predominantly carried out with double walls. In times when elements are boasting heights of up to

Oberndorfer decided on visualizing production plans using a beamer, which was placed in such a way that the digitized plan of elements is projected in such a manner that a direct view on the workstation is possible.
12.50 m, with geometries that leave nothing to be desired in terms of their structural behaviour and with a multitude of already integrated features, in such times, the printed production plans have long been exhausted their usability and possibilities.

In Mr Gigelleitner’s view, the advantages of digitized plan visualization are as follows: “With the new plans depicting our elements in real sizes and the possibility of automatically generating several predefined, station-related layouts per each element, this is the solution to meet these new challenges. Projecting the elements in max sizes increases their legibility for our staff members in production and thus has a positive effect on quality as well as productivity.”

Visualization by means of a beamer is just the beginning. This technology can also be used with other types of equipment and Oberndorfer will follow this path in their production activities in the future as well.

With the use of the freely configurable element plan in combination with Planbar, the CAD Software of Precast Software Engineering specifically developed for precast applications, production plans can be optimized for individual production steps or stations in that processes are broken up into step-by-step instructions to generate automated depictions of the same.

Linked with the appropriate MES/master computer, Planbar supplies production staff members only with those pieces of information - as detailed as necessary and as clear as possible - that are required to carry out the next production step. “The most important advantage of SmartProduction is its automated transmission of information from the technical planning department to the relevant station performing the production step. The visualization of the planning layout in the form of a step-by-step user manual allows complex construction elements to be broken up into compact partial planning layouts. This reduces the need for valuable and time consuming queries and substantially decreases the number of errors,” explains Werner Maresch, Managing Director of Precast Software Engineering.

Thanks to the changeover to paperless production, employees involved in the production process can have the plan needed at a given point in time displayed on a screen. The control of this display is carried out by means of a controller which enables the user to call for supplementary information directly from his workplace. The option of calling up any desired screen section and a zoom function provide a precise and detailed overview and allow for full control over details. Hence, limitations on account of format margins in planning documentation are no longer relevant.

Apart from a comfortable operation, the digitized visualization of plans offers a multitude of additional advantages over classical paper-based ones. For example, modifications at short notice originating from the technical department can be forwarded to production right away. As already mentioned, these detailed instructions and a correspondingly transparent documentation significantly reduce the number of errors in production to arrive at substantial savings in the time needed for this purpose and queries and uncertainties on the part of production staff members can be decreased and sometimes even eliminated.