# "FOUNDRY 4.0" Using FRP *Driving the Digital Transformation*

## (Part-2)

Second in a series of 6 Articles showcasing: "How foundries can move the Next Step into 'INDUSTRY 4.0' level"

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## Preamble

In **Part-2** of this series we continue to write about **foundries**, being the last frontier when it comes to digital transformation and digitalization of company processes; as ancient traditions carried forward by generations, and huge amounts of experience, may be replaced by modern state-of-the-art software solution technologies; making the industry attractive to **young** talent, providing room for legacy renewal and helping to rejuvenate. This part shall highlight: "How foundries can benefit from this revolutionizing trend, become operationally more successful, and take part in the "Industry 4.0" revolution everybody is talking about."

## Summary of Part-1

Those who have missed **Part-1** may contact the Authors for a copy of the publication; alternatively contact the publisher of FOUNDRY; and here is a short wrap up of what has been missed:

Planning and Control systems for foundries have been introduced, processes have changed, and these are now constantly being put to test. Many companies, however, still work with "traditional methods", and Excel is part of the daily struggle. However, you just cannot do things by "Rule of Thumb" anymore today. Cost transparency, material and energy efficiency and process security in real time, combined with the much quoted "fast time to market", have become essential; if foundries want to survive. **Digital transformation** in foundries is taking place right now. Foundry Managers of the future become IT-gurus as many computer based technologies must be mastered in parallel, it is not enough to know about just Methoding and Casting.

Standard Enterprise Resource Planning (ERP) Solutions continue to fail in foundries and foundry related processes as they do not cater for discontinuous special company processes all are facing. A new, adaptive solution, already used in many foundries in central Europe, is now launched in Asia and particularly in India. It's called: FRP = Foundry Resource Planning Solution Technology.

#### Now Let's Proceed in Part-2..

To achieve **FOUNDRY 4.0**, it will be essential to embrace – among many others – FRP solution technology. FRP is derived from the well-known abbreviation ERP which stands for Enterprise Resource Planning. But instead of an undefined "Enterprise", we focus exclusively on "Foundries" which have significantly different corporate processes compared to standard ERP systems users. This has led to the abbreviation **FRP** or Foundry **R**esource **P**lanning solution technology, taking care of ALL **foundry specific** processes – from inquiry to manufacturing, and ultimately to delivery of castings.

**Three Major Items** at the Heart of FRP Solution Technology are:

1. Resource Plan itself covering all foundry stages you can think of, and incorporating all foundry related processes and technologies. The Resource Plan is completely independent of materials and processes, and can handle everything from a single hand-moulded steel cast part of unlimited weight to mass produced DISA cast-iron parts churning out by the

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- 2. Backward Planning solution to locate bottlenecks and understand process short-comings, including backward or forward planning from machining requirements, back to raw materials purchase for core making.
- 3. Unique and exclusive availability of **Foundry** Information System (i.e. FIS), which is an online platform being able to showcase operational performance with holistic and helicopter view like visualisation displaying anything from order intake performance, to order tracking, to manufacturing bottlenecks, to follow ups on delivery, and feedbacks. FIS is almost unlimited in terms of what a foundry management wants to see and know at the tip of a Mouse-Click – available 24x7, and even on any mobile device.

#### Planning & Calculation (using a dedicated Resource Plan)

Product & Resource planning using the resource plan is at the heart of the FRP system, but it can also be a useful tool on its own if you want to calculate something quickly.

Compared to other systems **FRP** solution does not separate the work plan (or scheduler) from the parts list, but aligns itself to the way the foundry really works. All the resources needed to manufacture a certain cast part are displayed within a **tree structure**, in a multistep resources plan.

It doesn't matter whether it involves self-produced materials (models, cores, melt), purchased items (filters/ feeders, sand, external services) or services (moulding, cleaning, finishing). This makes it easier to duplicate and change parts, create new parts, or to update changed bought-in materials for several products.

# Production Planning and Control (PPC) (using the Resource Plan)

The FRP-PPC System is just the tool that any foundry needs for the operative and strategic planning of their production. With the FRP-PPC System both long and short term scheduling and capacity situations can be controlled and monitored quickly and reliably.

The FRP-PPC System's strengths are particularly suited for planning and synchronising moulding, melting and casting processes. It is suitable for different kinds of continuous and discontinuous processes which have to be synchronised, and for the availabilities and capacities which have to be checked in different types of foundries.

Listed below is the **overview** of the capabilities of this PPC system:

- Tool availability, preparation and provisioning
- Availability of moulding boxes and pits for mass castings
- Co-ordinating moulding shop and core production
- Taking into account pattern plate and core box allocations and combinations
- Provision of molten metal to several moulding shop areas in differing material qualities, and if necessary forming pouring batches
- Taking into account any cooling times needed
- Continuity and capacity of cast finishing treatment, possibly with external service providers
- Forming heat treatment batches
- Machining utilizations as a measure for casting production (if machine shop not running @ capacity)

The **FRP-PPC** System takes care of the requirements for all types of foundries, including both typical series producers as well as jobbing producers, down right to single piece manufacturing. The latest production plans can be accessed online or can be handed over to the plant control system, for example in the moulding plant, to control operations in the control centre. The calculation itself – always taking into account the Material Pricelists and Material Surcharges which have been entered – is just a "by-product".

#### Foundry Information System (FIS) (a New technology)

**Foundry Information System** is a fully integrated solution, however completely Internet and Web-enabled system for reporting without using programme forms. The FIS serves as a Management Information System (MIS) as well as a single point of information for the shop-floor. Due to its ONLINE nature it is available 24x7, and can be accessed remotely from anywhere.

Company managements can request for any customised reporting or visualization feature by the user/ administrator, although comprehensive key features are already available using a comprehensive display system.

A huge variety of standard reports and workflow components throughout the whole foundry process, e.g.

production & daily reports, scheduling results, etc. can be asessed and looked at and analysed for higher productivity and performance.

**FIS** incorporates completely Knowledge-based-Engineering (KBE) and Electronic Content Management (ECM) in production and planning up to 12 month ahead. It incorporates anywork instructions given and target values set at the point of operations on shift / daily / weekly / monthly schedules.

Any deviations from Process or Materials are fed back to the system to allow a post evaluation of the manufacturing process, and thus serving as a means to use **C**ontinuous Improvement **P**rocesses (**CIP**) as a base function.

**FIS** allows furthermore complete **P**roduct **D**ata **M**anagement (**PDM**), Lifecycle-Management (**LCM**), and through its database it maintains drawings, 3D data, process documents as well as any check on utilisation of patterns and machinery directly out of the system.

So, whatever the material or casting process, the **FRP system**, with its core functions on **Resource Plan** and **FIS**, links all foundry processes in one innovative, integrated and standard solution. This means foundry management have a comprehensive overview of all the processes in the company; while increasing transparency, efficiency and profitability.

**FRP** is developed with 30+ years' experience in Europe, and used in more than 300+ facilities and projects. It is now ready for APAC, with **India** at its core destination.

(to be continued)

#### Next Parts of the Article series will highlight :

- **Part 3:** What foundries face as an obstacle, and why Excel is no solution at all.
- **Part 4:** The benefits FRP provides and how to achieve foundry 4.0 in easy steps.
- **Parts 5 + 6:** The outlook to transform the industry into something technically and IT-wise advanced, and make the foundries a modern high tech enterprise that's fun to work in, and attract young talent.