

MANUFACTURING – Optimization and Simulation

Forecasting, planning and scheduling are your main ways to optimize the Factory and to improve your Return on Asset. How does Your Factory run? The team and technology ACT Solutions give you the direct path to the scientific factory management!

Manufacturing Optimization - planning and scheduling

The team and technology **ACT Solutions** give you the direct path to the **scientific factory management!**

Do you manage a production reality and do you need to safeguard its performances? Do you have to adapt the factory to emerging needs? Do you have to re-think processes or provide new investment? The production systems are characterized by dynamism (eg demand variability) and randomness (eg unavailability not provided from a machine).



This is the reason why it is not always easy to answer accurately to questions involving important implications both economic and operational. The dynamism

imposed by the market, the needs to combine quality and cost, the integration of factories in the Supply Chain forced to constantly study production processes. This may be the opportunity for constant improvement and for a maximum return on investment.

Planning and Optimization: the use of advanced planning tools to generate production plans that actually consider the capacity of the factory and all the constraints and logical process, to make optimum use of resources, reduce the time setup, easily reschedule production whenever necessary to have more control of the production process.

Supervision and Control: ACT Solutions provides systems for the supervision of factory and production lines, data acquisition systems, support for the selection of hardware and systems for automation.

Production Optimization. The factories are nodes into a more complex network. A Factory is affected by internal and external events as well as from randomness process. Just thinking to orders delayed or to failures of work center. One of the biggest challenges of the manufacturers is the improvements of their Assets Effectiveness. The Factory performances can be measured or estimated with **Key Performance Indicators (KPI)**, like **Work In Progress**, **Productivity**, etc.

These KPI depend on two different kinds of variables:

1. Variables that are not under control of the production managers (like orders);

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Production Companies use much energy and many resources to achieve the final products. **The way we use resources and assets is one of the fundamental keys to have success.**



This often requires changes within the organization even if the production remains the same. Our simulation tools allow you to reduce operational costs, improve performance of

production, to reduce the risks of investment. Why risk when can you use the virtual world to win the real way? ACT Solutions has a sole core-business: creating saving and rationalization of processes through models and algorithms. Contact us if only for a comparison!

The simulation model may include:

- a production line;
- a single cell processing;
- entire plant;
- factories more interconnected through a network with intermediate storage.

Simulators in production. To understand how a name or what the effects of a change of layout, the use of a simulator offers several advantages: less risk than the field test choices, is able to describe all the relationships between variables and parameters that are mutually influence and thus provide more accurate estimates compared to calculations made with the traditional spreadsheets. It's able to capture the dynamism of the process! Often evaluate processes with average reference leads to inappropriate considerations. The simulator of production gives the possibility to represent with what-if analysis, and the value of all indicators of technical and economic performance. If you are planning new investments, the simulator allows you to invest in security. The simulation model also might refer to a single cell in the process, a production line in a factory, to several companies in an interconnected network with warehouses. Also, if you're moving in the direction indicated by concepts such as lean or takt time thanks to the simulation can predict and measure the benefits, identify critical points that are on the way and how to solve them. Simulators for everyday use. In

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2. Variables that are in different ways under the control of production managers (like how to use resources). Optimizing the Factory means to find the optimal set of the variables that are, in some manner, under control of the production managers and that typically must respect some constraints. Optimizing means to maximize or minimize an Objective Function under predefined constraints. For example maximize the throughput with the 99% of orders on time, or minimize production cost maintaining the rate of 99% of orders on time.

The main elements have an impact on the Factory performances are:

1. The resources availability: work centers, operators, automated logistics equipments etc.. This typically are part of strategic decision played on medium and long terms. To support factory decisions, design and optimization on long term the Production simulation is a great opportunity. See also Arena Simulation and SIMIO.

2. The criteria adapted (daily) to allocate resources to jobs, that is, Planning and Scheduling. To support the daily run of the factory advanced Planning and Scheduling tools give You the chance to optimize the Factory. When these decisions take into consideration the real factory capacity (resources) then it is usual to talk about **Finite Capacity Planning** and **Finite Capacity Scheduling**. When the aim is to run production at lowest cost following the wave of the



demand we are referring to the “takt time” concept. Typically the Planning take into consideration medium terms (some weeks or months, depends on the process) and the Scheduling take

into consideration short term (hours, days or weeks, depends on the process). A key of success is having planning and scheduling level coordinated. On this point several software projects are failed. Moreover sometime there is a constant re-planning or re-scheduling activity in order to adjust dynamically the plans and the schedules to new situations that occurs and were not present before. In this case we can talk of real-time optimization.

ACT Solutions supports you with the correct specialistic competencies and technologies to introduce powerful and usable advanced planning and scheduling tools as well, when needed, a platform for forecasting models.

some cases, the simulator can be a daily decision support for evaluating the evolution of the near future (hours or days) out of the activities to be performed and calculate all performance indicators. In other cases, depending on how the production plan was implemented, these indicators are obtained by the scheduler, but hardly at that level you get the visibility offered by the simulator and take particular account of the phenomena of random noise that will inevitably impact on the process. The simulator, for instance, is able to calculate indices of risk associated with a production plan which express the probability that the plan is actually feasible. In some situations, the simulator can be called from MRP system or the system of supervision.

In short using keywords, this means:

- Maximization of the overall process;
- Reduced cycle time;
- Optimization of product mix;
- Reduction of operators;
- Improving the performance of delivery;
- Maximizing the use of equipment;
- Accurate sizing of the buffer;
- Optimization strategies for production control (Push to Pull);
- Reducing risk and justification of capital investment;
- Just in time;
- Customer Satisfaction;
- Lean production and takt time;
- Six sigma;
- Optimization of processes.

Why ACT Solutions? We were born to provide specialist support in the use of models and algorithms. The decision support is the only our core business. Our tools, including Arena and SIMIO, are among the most advanced and powerful. We can either guide you in training for internal use of simulation environments, and implement the simulator and educate your staff to use.

Arena Simulation is an important platform that allows Rockwell to create a virtual copy of your company, or your factory production line. **Arena Simulation and SIMIO** are powerful simulation platform that enables you to derive maximum value from your business and avoid unnecessary risks. For example, transforming the production process of the type of production that led to the demand-driven allows increased agility and flexibility that could not be obtained without a phase of profound functional engineering. ACT Solutions is partner with Rockwell Software®, a leader on the world market of scheduling tools with RSBizWare™ Scheduler™.