

Durable Consumer Goods

ARÇELİK

Innovative Production Systems at Arçelik

Product

Tecnomatix Plant Simulation

Business Challenges

Global factors affect building new facilities and distribution networks

The operational effects of seasonality in white goods

The challenge of foreseeing the effects

of changes on the shop floor by

manufacturing engineers

Problems in manufacturing are too

complex to solve with simple mathematical models

The challenge of allocating workers in order

to improve the efficiency in manufacturing

processes

Keys to success

Avoid redundant investments

Foresee the reaction of manufacturing

systems to changing demand rates

Estimate the impact of different test times on

on production plans

Optimize worker allocation

Consolidate the communication between

production engineering and automation services

Results

Avoided redundant investments

Achieved significant savings

Justified the need for investments

Experimented different scenarios without any physical installation

Determined optimal worker allocations

Commissioned effective automation systems

Turkey's leader, Europe's third biggest white durable goods company Arçelik, evaluates its resources and new investments effectively with Plant Simulation. Established in 1955, Arçelik offers products and services around the world with its 27,000 employees, 15 different production facilities in six countries (Turkey, Romania, Russia, China and South Africa), its sales and marketing companies all over the world and its 10 brands (Arçelik, Beko, Grundig, Blomberg, Elektra Bregenz, Arctic, Leisure, Flavel, Defy and Altus) serving products and services in more than 130 countries. As a pioneer in its sector, Arçelik, proceeds with innovation, sustainability and high efficiency at the business processes where engineering and technology have a particular importance.

Nihan Özşamlı, Industrial Engineering Specialist at Çayırova Washing Machine facility, says "We develop our technologies and optimize by using advanced analysis techniques in order to remain competitive". Along with powerful R&D and product management, Arçelik takes advantage of innovative manufacturing systems with regards to Industry 4.0, as well as considering sustainability management and effective human resources management.

The seasonality effect on demands and other global parameters play an important role on making the decision of new investments. However it is not easy to take into consideration all variables at the same time within a simple mathematical model. Despite the immense difficulty of considering all of the variables, when some of the them are overlooked then bottlenecks, delays and losses may occur. Therefore Arçelik conducts production capacity planning by taking into consideration internal and external dynamics that affect demand rates.

Arçelik was introduced to Tecnomatix Plant Simulation in order Arçelik's manufacturing engineers to be able to simulate its new and existing facilities including the equipments, physical and human resources and to analyze the materials flow.

Automation Systems Simulated and Necessary Precautions Taken

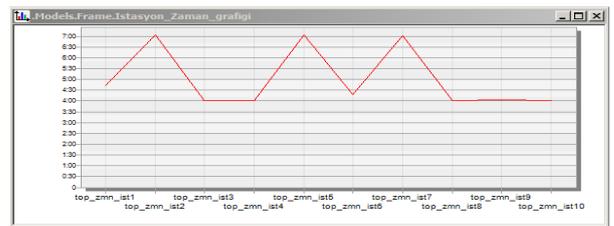
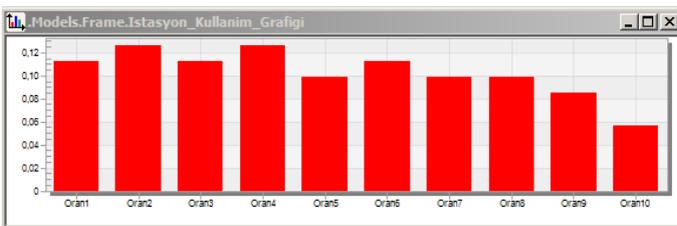
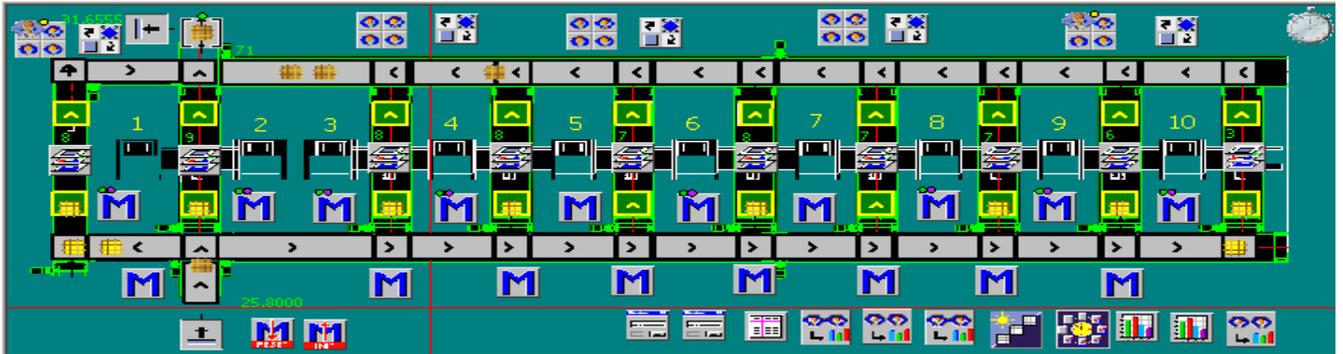
The contractor firms that provide automation services to Arçelik make design and manufacturing of the equipment and automation systems. With Plant Simulation, Arçelik conducts simulation studies of the automation systems which are designed by the contractor firms. Precautions required for successful commissioning are taken according to the simulation results.



Initial Investment Costs Determined and Significant Savings Achieved by Plant Simulation

Arçelik uses Plant Simulation effectively to determine its big investment plans, especially during the intense investment periods of the year. Estimated costs and investments are determined via the simulation studies prepared by the manufacturing engineers. Long before making an investment, the planned system is first modeled in Plant Simulation. Improvements to be made are tested via Plant Simulation, later the actions are taken. Nihan Özşamlı says “By preventing a lot of unnecessary investments and by having idea about the possible effects of the future investments, we are able to determine

the required actions to be taken. Without conducting any experiments in real life, we take into consideration the number of work stations, operators, test process time and takt time, therefore we estimate the maximum throughput and the optimum investment budget”. At the end of each assembly line at Çayırova Washing Machine facility, there are test function mechanisms and mandatory test procedures which every washing machine needs to pass. In the scope of the test procedures, there are parameters such as the amount of water that machines intake, whether or not the washing machine leak water and the RPM values. Also, there are other parameters with regards to effective allocation of human resources considering the number of operators allocated to the work stations and the time that operator spends at each station.



System Development and Logistics Specialist Altuğ Yılmaz says “In order to determine the optimal working principle and analyze the effects of multiple parameters such as the function test time, the takt time and the worker-machine allocations on the manufacturing, we create a simulation model and analyze the simulation output data. Simulation models create a virtual twin of the system and enable to evaluate multiple scenarios via experimental design methodology. Comparing the effects and costs of the alternative solutions, simulation helps to find the optimum solution without any prior set up cost and also provides significant time savings for the project implementation phase.”

Mustafa Çeliker, Industrial Engineering Team Leader in Bolu Cooking Appliances facility, says “This product is very useful at the design phases of manufacturing systems, because you have an idea about where to place the things, before start investing or even before creating the technical specifications”.

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Plant Simulation also draws attention with being user friendly and manufacturing oriented. Plant Simulation has built-in object libraries which most of them are in the manufacturing domain. Additionally, if the user wants to fully adapt his/her own system using custom objects instead of built-in objects, the software allows this. For instance, the objects that control and manage the material flow are modeled with custom objects and they behave exactly same as in the real system. In this case the flexibility of the program stands out. An operator can work at the shop floor with his/her laptop, enters the input parameter values and retrieves station utilization graphs and time plots using custom dialog boxes created by the Plant Simulation Dialog.