



## CASE STUDY

### VALUE OPPORTUNITIES

- IMPROVE BOTH INTERNAL AND EXTERNAL SERVICE LEVEL
- REDUCE PRODUCTION COSTS
- STANDARDIZE PROCESSES AND SYSTEMS FOR ASSEMBLY LINE SEQUENCING
- REDUCE MANAGEMENT COSTS OF IT BUSINESS SUPPORT TOOLS

### TXT E-SOLUTIONS RESPONSE

- OPERATIONS PLANNING & SCHEDULING
- SEQUENCING ALGORITHM, PART OF TXT'S DEMAND & SUPPLY CHAIN SOLUTION FOR AUTOMOTIVE

### RESULTS

- REDUCTION OF STOCK-OUTS THROUGH THE CREATION OF FEASIBLE SEQUENCES, BOTH IN TERMS OF INDUSTRIAL AND SUPPLY CONSTRAINTS
- REDUCTION IN PRODUCTION COSTS THROUGH MAXIMIZED LABOR SATURATION AND PLANT PRODUCTIVITY
- IMPROVEMENT IN SERVICE QUALITY, WITH QUICK REACTIONS TO CHANGES IN THE OPERATIONS SCENARIO



# Iveco

## OPTIMIZING ASSEMBLY LINE SEQUENCING FOR MAXIMUM EFFICIENCY

### COMPANY PROFILE

Iveco (Industrial Vehicle Corporation), a company of the Fiat group, plays a leading role in the production of industrial vehicles and diesel engines. Founded in 1975 following the merger of five important European brands (Fiat industrial vehicles, OM, Lancia special vehicles, Unic and Magirus), it has gained market share abroad with further acquisitions and mergers involving Pegaso, Seddon Atkinson Vehicles, Iveco Ford, Irisbus. Today Iveco is a consolidated and dynamic multinational entity with strong local roots wherever it has production facilities, offices or assistance centers. It is a leading edge company that sees innovation and environmental responsibility as its primary goals. The Group operates on an international scale across 18 production plants and 7 research centers totalling 36,000 employees. Worldwide, Iveco produces over 200,000 industrial vehicles yearly, along with more than 450,000 diesel engines. The wide range of vehicles manufactured includes trucks – light, medium and heavy – plus buses, special vehicles, fire fighting and military vehicles. Iveco of course produces diesel engines for trucks, but also for agricultural equipment, defense

vehicles, marine uses, electricity generators and other industrial applications.

### SUPPLY CHAIN CONTEXT

Iveco's industrial context features multi-tier production distributed across many European and non-European countries; Iveco internally produces a series of first-tier components, such as engines and axles for other plants in the Group, that use them to assemble the finished products.

The complexity of such a scenario requires integrated management of the logistics chain. The goal is to synchronize the production of first-tier components with the availability of the appropriate supply components and, simultaneously, with vehicle assembly line scheduling. In this context, assembly line efficiency, and therefore sequencing activities, play a key role. At each level of the internal supply chain, a reliable assembly line sequence must be established regarding assembly line planning.

When operational variations occur, this sequencing must:

- Remain feasible in terms of constraints and supply;
- Maximize labor saturation of plants;
- Optimize plant productivity.

*"For a context as complex and varying as Iveco's supply chain, we looked for partners who, in addition to proposing solutions based on versatile products, could also guarantee quick reactions and flexibility in meeting our needs. TXT and the OPS application perfectly respond to these requirements."*

Dario Castello, Information Systems & e-Business  
Supply Chain Management & Logistics Methods - Iveco

### THE CHALLENGE OF IVECO

With the goal of tackling the increasing complexity of its operations in mind, Iveco wanted to move away from no longer adequate legacy tools and non-standardized, manual sequencing procedures.

Assembly line sequencing was carried out at local plant level, which made management by the central information system and related logistics particularly difficult.

To reach the objectives of synchronization and efficiency, a re-engineering project for short-term planning processes has been started. This has led to the adoption of a flexible IT system, capable of adapting to varying industrial contexts (assembly of engines, axles, cabs, vehicles). The system is also able to ensure uniform sequencing processes and can be managed by central systems.

### WHY TXT?

For Iveco, the decisive factor in choosing TXT was the availability of a specific solution for assembly line sequencing and

optimization tailored to the automotive and heavy equipment industries. The use of Operations Planning & Scheduling constituted the first step in a strategy of adoption of standard application packages like TXT's solution for Automotive, which distinguishes itself for its high scalability and its ability to adapt flexibly to a great variety of production processes.

### THE SOLUTION

TXT's Operations Planning and Scheduling module installed at Iveco performs short-term scheduling and assembly line sequencing.

The solution provides the following:

- Guided definition of assembly constraints based on product characteristics (i.e. the number of cylinders in an engine or the color of a cab) and on balancing/mix constraints per line (such as: max. of 10 six-cylinder engines during shift 2 on line 4, or couples of same colored cabs at a distance of 3 positions);
- Establishment of the optimal sequence

*for assembly lines; considering the many simultaneous constraints and using sophisticated genetic algorithms;*

- User-friendly interface with the possibility of viewing the sequence with detail "slots" (using colors to identify product features) and of showing a solution effectiveness analysis;
- Ability to make a qualitative evaluation of the solution according to configurable indicators based on the plant's main KPIs;
- Easy and quick modeling of new products and implementations for new plants; thanks to the flexibility and configurability of the tool.

Extremely high flexibility and clarity in managing scheduling and sequencing constraints: those are the benefits reaped by Iveco. In addition, the simple and user-friendly interface allows for visual review of planning effectiveness. Other potential benefits include greater plant efficiency, reduction in stock-outs, lower production costs and higher quality of service.