

Success Story

A flexible and profitable assembly system for ventilation boxes

Duco

THE FUTURE
IS **GREEN**



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Company description

DUCO 'Ventilation & Sun Control' was started in 1991 and is now located in a modern industrial facility of 101,000 m² (spread over two sites) in Veurne (Belgium), situated along the E40 Ostend-Calais motorway. Today DUCO is a leading European producer of ventilation and solar shading systems for a healthy, comfortable and energy-efficient indoor climate.



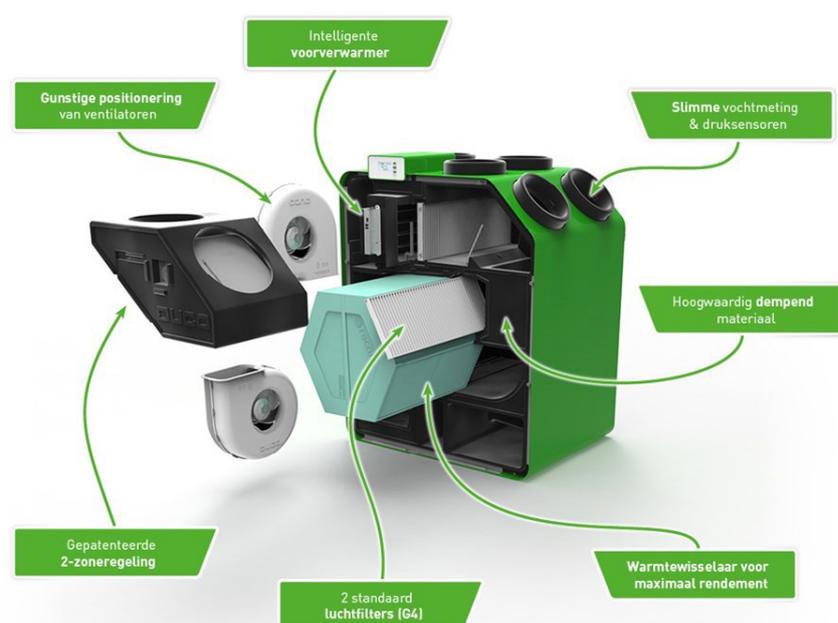
DUCO supplies oxygen to every building in a natural way. Bringing fresh air in directly via the façade, without complex supply air ducts, it provides a healthy indoor climate. A well-thought-out combination of basic ventilation, intensive ventilation and solar shading provides for an optimum air quality. DUCO delivers solutions for residential properties, offices, schools, or care centres

Motivation

The company experienced a large increase in demand and wanted to challenge the standard way of working to deal with this situation. To simply multiply their current production was not a solution, due to issues with available space and available technically skilled people.

Was re-organizing the setup enough? Was further automation or digitization the answer?

To get a good understanding of the current situation and to be able to dive into the possible setups, a mathematical model was created. Using data from the current setup and these models to calculate the different scenarios, several of the setups were



checked. In close collaboration with DUCO, what-if scenarios were developed to see how they could be optimized and simulated to show possible outputs and assignments of tasks to work cells. DUCO hopes to get a detailed insight and base plan to turn this increase in volume into a success.



Analysis

For the concerned product line, time measurements were performed with different operators.

Some initial findings from the time measurements and obvious improvements were carried out by Duco after which a new timing campaign was launched.

Using the knowledge of the product flow and the different timings of each step in the flow, several scenarios were calculated and the possible outcomes were simulated and displayed. The system tried to optimize the workload in a cell by dynamically assigning tasks to that cell.

The ramp up was also considered. In a first round of trials the optimal distribution was calculated for each setup. Although this produced an optimum for each quantity, the layout could change significantly when going from one threshold to another. Hence a second round of what-if scenarios was simulated taking into account an organic growth of the layout.

When moving from one layout to another, the number of changes and removals was added as a cost for the optimizer. This resulted in layouts that allowed for a ramp up (and if needed ramp down) that had a much smaller impact in space as well in work and resources needed to make the change, while maintaining the number of needed cells at an acceptable level.

Technical Realization

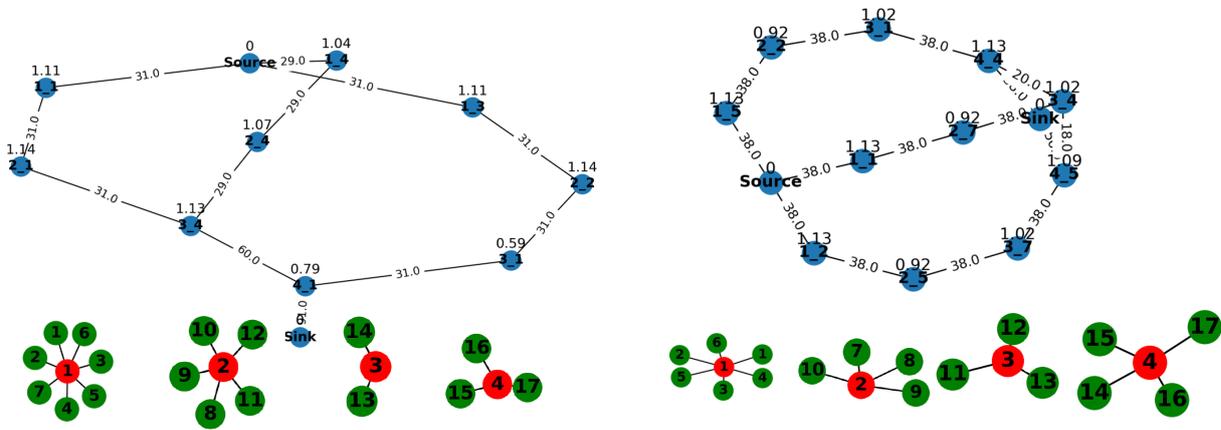
The project started with dividing the activities from four work cells into eighteen tasks that needed to be performed during the assembly.

When these were identified, a first measurement exercise was carried out.

This led to a quick win optimization that was implemented immediately.

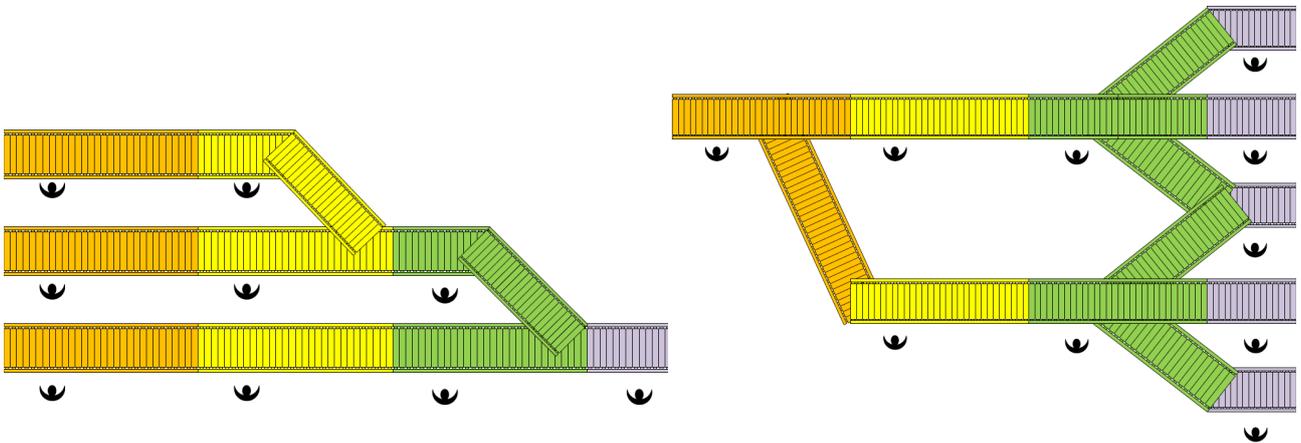
With the improved situation, a second round of time measurements with different operators was conducted and these results were used for a second round of calculations and simulations.

Using recurring meetings to discuss the results, the different what if scenarios were defined using the insights gained from the performed simulations. Depending on the needs, the simulation and optimization module was adjusted or complemented to allow the next series of what-if scenarios. The use of digital assembly instructions will assist the operator in showing which tasks are needed to be performed at a certain workstation.



Result

The results showed that, with a reshuffle of the tasks, the ramp up could be done with less effort than anticipated. The different what-if scenarios allowed to strengthen the business case and allowed for a business case definition that was based on facts, figures and calculations.



View from the employee perspective

The organic way the optimization was done, will allow the operators to carry out the tasks in an well defined way with clear objectives. It also allows for a line that is designed to buffer where needed and allow for a smooth flow. It also makes it possible for operators to become more specialized in certain tasks as these are grouped. Changing from one threshold level to another has a small impact, only some tasks are added or removed from any given cell thus leaving the operators with familiar tasks and a limited set of new tasks that need to be learned. To assist the operator even further, these changes are also reflected in the digital work instruction system that is available.

Interview

How could COTEMACO support you?

Duco was looking for ways to increase the production and wanted to investigate the different possibilities.

What was implemented and what are the benefits?

The production mapping and timing allowed for some quick wins that were implemented immediately. The model and calculations showed that we could increase our production capacity by grouping certain tasks and assigning these to a fixed number of similar workcells. This way the flow remained logical for the operators, the infrastructure impact is limited and with the help from the digital work instructions the switchover should be clear for the operators.

Were your expectations fulfilled – technical implementation?

The simulation showed that it should be possible to ramp up gradually without disturbing the layout too much or changing the current way of working dramatically. This gave us the confidence to implement this gradual approach rather than to just duplicate multiple times what was being used in production prior to the increase.

Were your expectations fulfilled – Support through COTEMACO?

Yes.



What is COTEMACO?

The project, which is an initiative of Interreg North-West Europe, aims to support around 60 SMEs in the automotive and food manufacturing industries with so-called „test environments“ and to encourage them to integrate collaborative robotic systems and digital technologies into their business. Accordingly, in addition to increasing production flexibility, the relocation of production abroad will be curbed and the number of jobs in manufacturing increased, which will generally lead to an improvement in the competitiveness of the companies involved.

In the project new technologies are implemented in application examples - the aim is to move from the prototype in the laboratory environment to the transfer to production, taking into account the legal situation and certifications.

You want to become part of COTEMACO too?

You are interested in further Best Practice implementations?

Then visit our website at:

www.robot-hub.org/cotemaco

Implementation partner:

