Kaneka: Production Planning Optimization

Case Study

Discover how Kaneka, a Japanese multinational chemical manufacturing corporation, uses Gurobi to automatically generate production plans that optimize manufacturing operations and output.

The Challenge: Improving the Efficiency of the Cutting Process

The cutting process is a pivotal part of the operations of Japanese multinational chemical manufacturing giant Kaneka. Essentially, this is a build-to-order process through which film produced in the previous process can be turned into products tailored to specific customers by cutting it to the necessary width and length.

For the planning team at Kaneka's Shiga Plant, creating production plans was a challenging endeavor – as planners and managers typically had to spend the bulk of their time every day putting together these plans manually. This was a complicated task that involved selecting materials, deciding on production sequences, and determining how and in what order to perform the cutting process.

This process of producing cutting plans, in particular, was laborious and – when performed manually – often resulted in various issues including complicated and time-consuming inventory data checks and coordination, reduced productivity caused by unnecessary switching between product types, and the tendency to select easily cuttable material (film) and leave other materials as long-term inventory.

About Kaneka

Kaneka Corporation is a Japanese multinational chemical manufacturing company that produces chemical products including resins, pharmaceutical intermediaries, food supplements, synthetic fibers, and fine chemicals.

Since its establishment in 1949, Kaneka has used a creative combination of people and technology to achieve consistent growth despite the constantly changing business environment. Kaneka provides value to people's lives with products used in goods that are essential to daily living, covering a wide range of business fields – from life sciences to food products and beyond.

Kaneka's Shiga Plant is set in a natural, historical location between the mountains and the lake in Otsu City, Shiga Prefecture. The Shiga Plant, which has forged close links with the local community, develops and manufactures unique electronics products including ultra-heat-resistant polyimide film and optically transparent film extensively used in information and communi-cations devices such as smartphones and displays. As 5G and digitalization change the face of society, Kaneka is working every day to evolve its products and production plants, providing the world with materials and solutions that will improve people's lives.

About MathCutting

MathCutting is a software solution – which was developed by October Sky, a leading provider of mathematical optimization solutions – that enables users to generate optimal cutting plans using the Gurobi Optimizer, the world's fastest mathematical optimization solver.

MathCutting is especially effective in dealing with the cutting stock (or cutting plan) problem, which involves determining how to cut various customer-specified sizes from standard-sized stock material – in order to minimize the amount of material wasted. Manufacturers in a wide range of industries (including steel, paper-making, chemistry, textile manufacturing) commonly face this cutting stock problem.

With the Gurobi Optimizer as the problem-solving engine of October Sky's MathCutting solution, the process of producing cutting plans (which, when performed manually, is a long and difficult process) has been automated and optimized – and these plans can be easily and optimally created by anyone.

About Gurobi

Gurobi produces the world's fastest and most powerful mathematical optimization solver – the Gurobi Optimizer – which is used by leading global companies across more than 40 different industries to rapidly solve their complex, real-world problems and make automated decisions that optimize their efficiency and profitability.

As the market leader in mathematical optimization software, Gurobi aims to deliver not only the best solver, but also the best support – so that companies can fully leverage the power of mathematical optimization (on its own or in combination with other AI techniques such as machine learning) to drive optimal business decisions and outcomes.

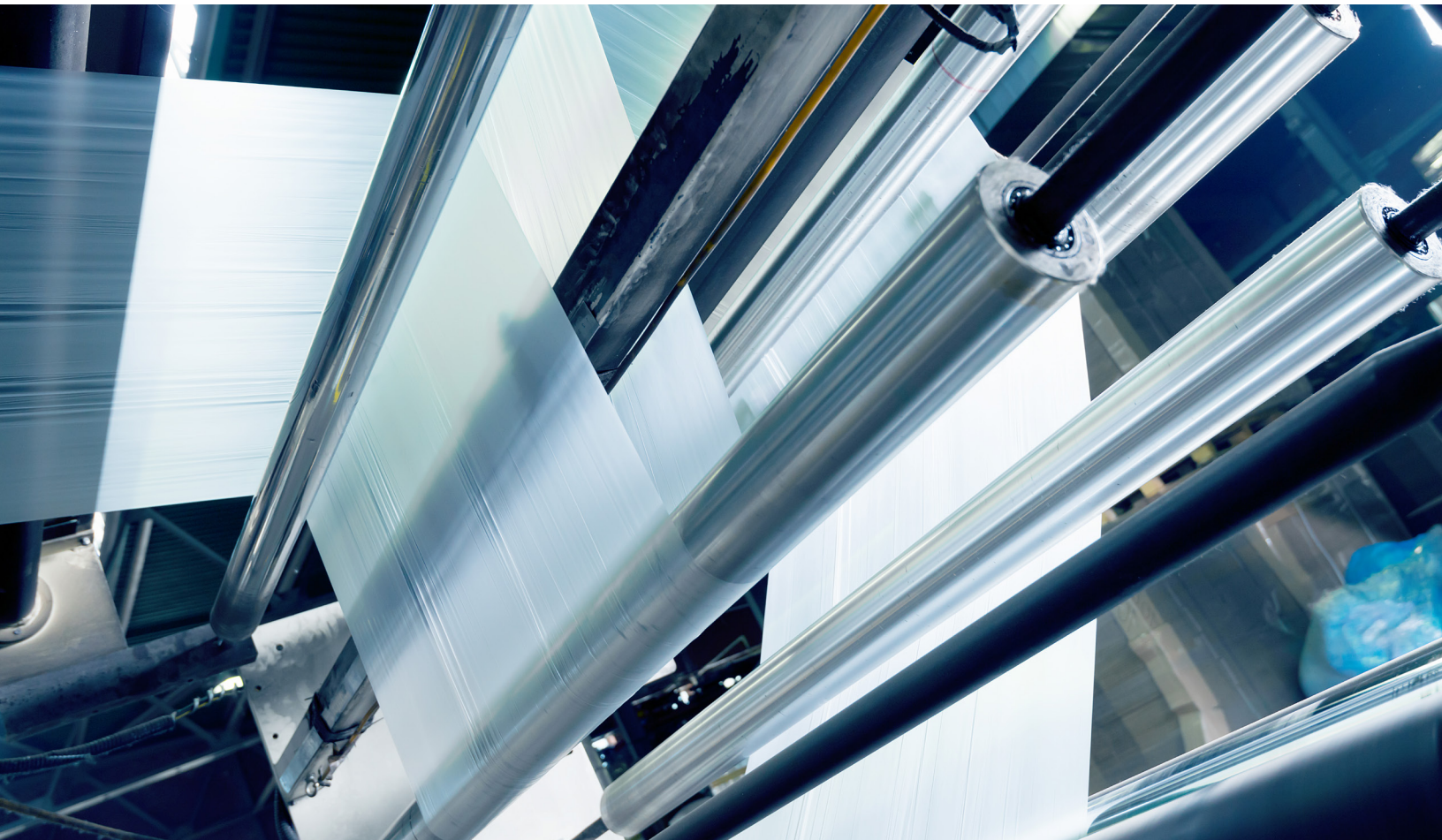Founded in 2008, Gurobi has operations across the USA, Europe, and Asia and has more than 2,500 customers globally.

The Solution: Optimal, Automated Production Planning with MathCutting

With the aim of boosting the efficiency of its cutting process, Kaneka decided to implement the Math-Cutting mathematical optimization solution – which is powered by the Gurobi Optimizer – at the chemical manufacturer's Shiga Plant.

MathCutting was deployed in the polyimide film-producing department at Kaneka's Shiga Plant to optimize the production planning process as well as the allocation of materials. Polyimide film is a material that is widely used in smartphones and tablets, and Kaneka has a wide-ranging lineup of different polyimide film grades.

Additionally, as Kaneka operates in a highly volatile market, reacting to fluctuations in customer demand is a huge challenge. To respond quickly to real-time changes in demand, Kaneka needed an agile, auto-mated production planning process in order to increase the efficiency of manufacturing operations, ensure on-time delivery of goods, and effectively manage inventory levels and production bottlenecks. With MathCutting, Kaneka is able to achieve these objectives with optimal, automated production planning.

The Results: Superior Productivity and Performance

Kaneka's introduction of the MathCutting mathematical optimization solution has proved to be a very smart move – this AI technology has fundamentally changed the company's processes and practices and helped foster greater efficiency and optimization across the organization.

With MathCutting, Kaneka can rapidly and automatically generate optimal production and cutting plans – and this has resulted in improved data utilization, delivery performance, and workforce productivity.

Indeed, the introduction of MathCutting has delivered numerous business benefits including:

- A dramatic reduction in the amount of time spent planning the cutting process.

- More precise cutting plans, leading to optimal utilization of materials.

- Improved productivity and output due to the reduction of unnecessary equipment downtime.

- Greater workforce efficiency, giving planners and other stakeholders the opportunity to focus on higher-value strategic initiatives rather than devoting their time to manual planning.

Kaneka: Production Planning Optimization

Case Study

Future Opportunities for Optimization

To attain and maintain a competitive edge in today's volatile business world, manufacturing companies must leverage AI technologies to automate and optimize their production planning and manage their production operations – so that they can handle constant fluctuations in demand and production disruptions in the most effective manner possible.

Kaneka is one company that has embraced and adopted these AI technologies – in particular machine learning and mathematical optimization.

By using state-of-the-art mathematical optimization technologies such as the Gurobi Optimizer to enable optimal production planning and plant control, Kaneka has realized significant business benefits.

As advances are made with IoT, AI, and digitalization, Kaneka believes that mathematical optimization will continue to be an essential technology for companies across different industries – as this AI technology empowers businesses to make optimal, data-driven decisions and improve the efficiency of their processes.

Kaneka also believes in the ongoing importance of humans and technology working together – as there's still a role for humans to play in deciding how to use the output generating by these AI solutions.

For More Information

Visit Gurobi.com, email info@gurobi.com, or call +1 713-871-9341.

October Sky Co., Ltd. is the domestic distributor of the Gurobi Optimizer in Japan. For more information, visit octobersky.jp or email info@octobersky.jp.