

4 Quality Improvements and Results

Achieving even higher quality by optimizing material flows

Implementation of the Autonomous Production System began in FY2020, starting with initiatives to support operators on the production floor.

By introducing the Autonomous Production System, the priority of actions is determined based on the operational objectives of the respective plant, and only the necessary options are presented. This enables the production floor to quickly take the optimal actions. As a result, a wide range of benefits has been achieved, including optimized repair costs through preventive maintenance that helps avert equipment problems, inventory reductions through more stable and efficient production, in addition to the stabilization of quality and improvements in productivity.

As the next step, the scope of system support is being expanded into the areas of production planning and logistics planning to optimize material flows across the entire value chain.

In production planning and logistics operations, product flows are managed on a lot-by-lot basis.

By reducing the quantity per lot and establishing flexible production and logistics systems, it is possible to shorten lead times, reduce inventory levels, and respond more quickly to fluctuations in demand.

However, there are also concerns that as lot sizes get smaller, the frequency of quality analysis through sampling simultaneously increases, thereby also increasing the workload of operators.

Optimization point ①

Cutting-edge inline sensors and soft sensors are used to address this at Daicel. By transitioning from conventional representative point management to continuous point management, the mechanisms for building quality into processes were strengthened while simultaneously eliminating the need for operators to perform sampling and quality analysis, thereby removing shipment delays caused by waiting for inspection results. As a result, this has led to shorter lead times and reduced inventories.

Optimization point ②

Furthermore, by reducing lot sizes and adopting continuous point management, visualization of quality during manufacturing was achieved, leading to improved quality accuracy. This enables more precise responses to the needs of customers requiring high quality grades, such as those for electronic component applications and high-performance materials. As a result, we can further strengthen our competitiveness.

In the future, the Autonomous Production System will be deployed beyond corporate boundaries to suppliers and customers to achieve even higher quality and efficiency by optimizing not only our own product chains but also entire supply chains.

Significant reductions in production costs and **strengthening** of manufac- turing competitiveness

through expansion of the implementation
scope of the Autonomous Production
System

At Daicel, it is estimated that once implementation of the Autonomous Production System is completed at the target domestic plants, it will be possible to reduce costs by approximately 10 billion yen per year. Until now, cost reduction effects have been limited mainly to the operational management domain. If system expansion proceeds as planned, it is expected to have effects such as inventory reductions in the production management domain and will also contribute to reducing losses due to equipment problems and other factors in the area of equipment management.

A further reduction in the workload of operators is also expected. By using the time freed up by the Autonomous Production System for creative work that only people can perform, it should also be possible to further enhance manufacturing competitiveness.

In addition, the various transformations brought about by implementation of the Autonomous Production System will provide strong support for the transition toward a market-in organization with customer needs as the starting point. Daicel will realize a proactive approach to production, anticipating customer needs and proposing solutions before customers make their requests.

Word List

Operators

These are on-site operators responsible for the operation, monitoring, and management of plants and facilities. They include field operators, who walk the floor conducting inspections on-site, and board operators, who monitor operating conditions, make judgments, and control operations from a control room.

Lead time

This is the total amount of time required from receiving an order until the product is completed and delivered. Shortening it contributes to improved customer satisfaction and productivity.

Continuous point management

This is a multi-traceability system for continuously monitoring and analyzing production processes, leading to the early detection of issues and improvements.

Lot

This is a unit group for products manufactured together at a specific time. It is used to manage and track products produced under the same conditions.

Sensors

These are devices that detect conditions, such as temperature, pressure, flow rate, light, and vibration, and convert them into numerical values. They are indispensable for automatic control and quality management in a plant.

Market-in organization

This is a management strategy in which product development and organizational operations are determined based on customer and market needs. It serves as a source of flexible ideas and competitiveness.