

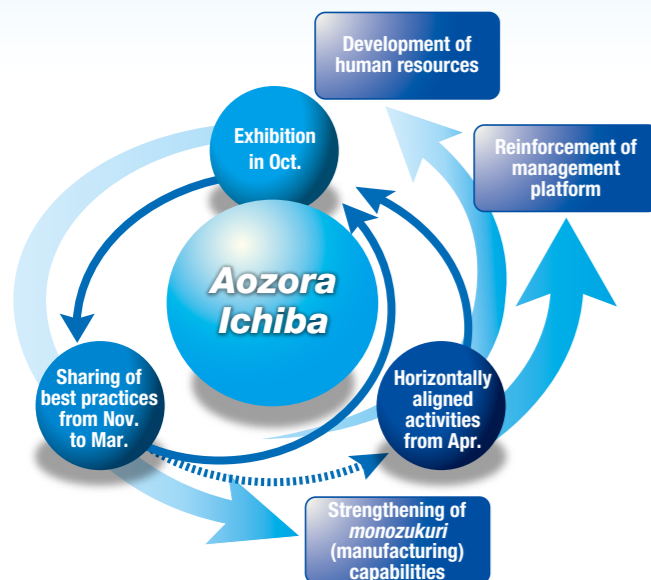
Kaizen (Improvement) Activities across Diverse Business Domains—A Force to Drive Constant Evolution

Aozora Ichiba, a Cross-Organizational Exhibition to Globally Share Kaizen Examples Generated in a Horizontally Aligned Manner across All Business Domains

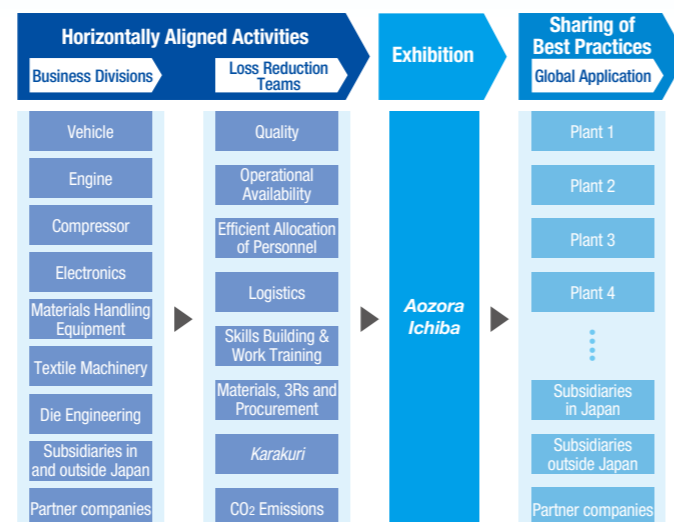


Building a robust, streamlined management platform is crucial for a company to survive and sustain growth in the ever-changing economic environment. Just as essential is constant business evolution that allows the company to flexibly respond to changes in customer needs and desired technologies, such as those resulting from the enforcement of more stringent environmental regulations, accelerated electrification and autonomous vehicle operations in the fields of vehicle and materials handling equipment businesses.

This Special Feature highlights an initiative called *Aozora Ichiba* (“open-air market”), which aims to share *kaizen* efforts globally among our consolidated subsidiaries and business partners and to reinforce the management platform of the entire Toyota Industries Group.



Aozora Ichiba Framework



Kaizen Embedded in Our DNA Underpinning Aozora Ichiba

Since its foundation, Toyota Industries’ spirit of *kaizen* has been passed down in its DNA. We have been promoting various types of *kaizen* initiatives that include QC circle activities by each workplace and Toyota Production System Jishu Kenkyu Kai (autonomous Toyota Production System study groups) in manufacturing departments. Our *Aozora Ichiba*, which is one such initiative, held its 16th exhibition in fiscal 2017.

Activity Approach of Each Loss Reduction Team

Quality Loss	Preventing both occurrence and recurrence of defects
Operational Availability Loss	Upgrading equipment and other maintenance activities
Efficient Allocation of Personnel Loss	Increasing the ratio of value-adding work through ingenuity in production processes
Logistics Loss	Improving in-plant logistics flows of products and parts
Skills Building & Work Training Loss	Increasing efficiency and standardizing work training
Materials Loss	Reducing secondary materials and other costs

In addition to the above, *Aozora Ichiba* also exhibits examples of various topics, including *kaizen* by *karakuri*, *kaizen* of business operations and sales expansion.

Starting Out as a Small Project

Aozora Ichiba started in 2002 for the purpose of reducing costs associated with the purchasing of secondary materials used in production activities, such as cutting tools, work gloves, hard hats and other supplies utilized within a plant. Business divisions gathered to compare secondary materials they had purchased individually and successfully cut costs by switching to less expensive products or making bulk purchases. Later, with the launch of emergency profit improvement activities following the global financial crisis triggered by the collapse of Lehman Brothers in 2008, the *Aozora Ichiba* project changed drastically. Under the strong leadership of top management seeking a more robust management platform, we expanded the area of activities and quickly transformed it into a Group-wide initiative.

Continued Evolution of Aozora Ichiba, Becoming a Place to Share Kaizen Ideas on a Global Basis

Aozora Ichiba, which has been evolving every year, is organized as follows. First, heads of manufacturing departments of each business division (Materials Handling Equipment, Vehicle, Engine, Compressor, Electronics and Textile Machinery, etc.) and the *Aozora Ichiba* administration office together select 10

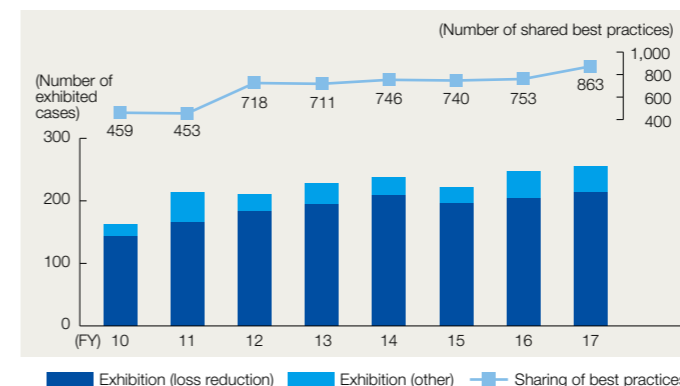
to 15 members to form six loss reduction teams in the areas of quality, operational availability, efficient allocation of personnel, logistics, skills building & work training and materials. Then, each team leads loss reduction efforts, which are horizontally aligned across business divisions, in its responsible area and works to generate *kaizen* ideas for a half year from April in accordance with its annual action themes. Their efforts culminate with the annual *Aozora Ichiba* exhibition, which displays a number of *kaizen* ideas, small ingenuities, more efficient work methods and other initiatives at production sites. The event literally serves as a market, in which participants from the Company as well as our consolidated subsidiaries and business partners from around the world earnestly look for and bring back applicable improvement examples to emulate in a way best suited for their respective workplaces and companies.

Tetsuji Ono, who is responsible for the handling of *Aozora Ichiba*, further explains: “Each team selects its own objectives and action themes at the beginning of a fiscal year under Toyota Industries’ Vision

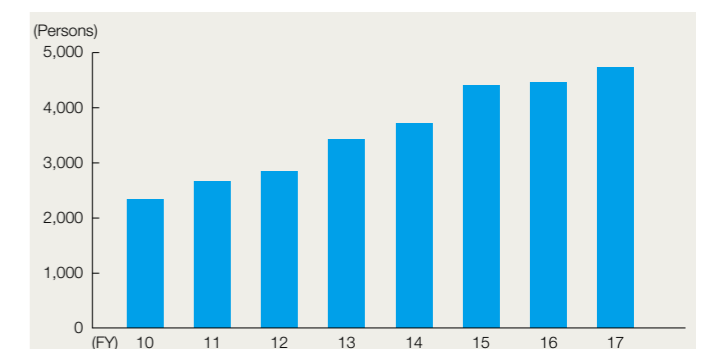


Tetsuji Ono
Project general manager, Operations Management Consulting Office, Production Control Department, Production Headquarters

Numbers of Exhibited Cases and Shared Best Practices



Number of Visitors



2020 and works toward the *Aozora Ichiba* exhibition held in October. During the event, we present *kaizen* ideas through exhibiting panels, actual items, videos and demonstrations of mock production lines to help visitors understand how well these ideas work and to promote the sharing of best practices in their respective workplaces. Presentations are conducted by persons in charge, not by managers at a higher level, which serves to raise motivation. In recent years, we receive more participants from our bases outside Japan and see more cases of best practices in Japan shared around the world. This is proof that the initiative has been growing steadily on a global basis.” The number of visitors attending the event has been growing each year, exceeding 4,700 visitors in three days in fiscal 2017.

Ono continues: “We regard the event simply as a place to present our efforts. More important is the process, in which teams work for a year and absorb the *kaizen* approach and techniques through the sharing of examples and problem solving. One-year team activities also give members a chance to grow as they draw inspiration from ideas and techniques that are different from those in their respective business divisions. These activities also present a valuable opportunity to build relationships with colleagues from other business divisions. At the same time, sharing both best practices and issues has taken our Company-wide *kaizen* approach to a higher level.”

The following presents specific *kaizen* examples of the Skills Building & Work Training Loss team and Quality Loss team from *Aozora Ichiba* in fiscal 2017.

Contributing to Shorter Skills Building Time and Improved Skills by Creating a Training Simulator That Reproduces Actual Work Environment

Sayuri Ishikawa of the Engine Division has participated in *Aozora Ichiba*'s Skills Building & Work Training Loss team ever since fiscal 2015. She recalls: “The experience has been a series of discoveries, while getting to know the different ways of doing things in other business divisions and plants.”

The team conducts activities under three loss reduction themes



Sayuri Ishikawa
Human Resources Development Working Group, Management and Development Group, Administration Office, Manufacturing Department No. 1, Engine Division



Practical training using hand-built assembly line training simulator

every year. Koichi Kawata, who had served as the head of the team, explains: “The first theme is to shorten the time required to build skills of workers new to manufacturing operations so that they can work on their own without supervision. This will reduce lost time for both trainers and trainees. The second is to prevent loss associated with quality defects or industrial accidents by acquiring good skills among workers. The third theme involves the elimination of waste caused by redundant or insufficient training and education.”



Koichi Kawata
Assistant general manager, Administration Office, Manufacturing Department No. 1, Engine Division

From fiscal 2015 to fiscal 2017, the team exhibited a training simulator that uses an automatic guided vehicle (AGV) to reproduce an assembly line process. The simulator has evolved over the course of three years. “A training environment that closely replicates the actual work site has contributed to reducing the time required for building and improving skills,” explains Ishikawa. Trainees have regarded the simulator favorably, noting its ability to provide realistic, “moving” training not possible in the conventional fixed-type training equipment. The sharing of the practice has been proceeding well, with plants in Japan and India adopting similar training simulators.

The team holds regular meetings, and members bring issues raised in the meeting back to their respective workplaces to generate *kaizen* ideas with their superiors and colleagues for the next meeting. Ishikawa recalls: “We have been adding improvements to the AGV training simulator every year, such as increasing the types of work it can train. This has been a meaningful experience for me to have in-depth discussions with members from other business divisions about the themes we had to tackle as a team, while incorporating views of many colleagues in my office.” Recognizing the positive results of their activities, Kawata adds: “We have achieved significant *kaizen* in terms of on-site education and training. Besides that, I think Ms. Ishikawa has grown since she joined the team, and communication has become more activated within our office as well. The *Aozora Ichiba* initiative has generated combined results.”



Manufacturing staff supporting loss reduction activities

Achieving Zero Defects Based on Kaizen Learned from Another Business Division

For the *Aozora Ichiba* exhibition held in fiscal 2017, Tsutomu Kato of the Electronics Division served as the head of the Quality Loss team. He points out: “Different business divisions manufacture different products, but analysis methods used to reduce and eliminate defects are the same. Since divisions use these methods in their unique, specific ways, we can learn and notice many things every time we see other divisions’ approaches. That’s why I find activities to reduce quality loss interesting.”

Kato continues: “Our team presented a *kaizen* example in



Tsutomu Kato
Manager, Manufacturing Section, Manufacturing Department, Electronics Division



Tablet device of the Engine Division, which the Electronics Division applied to its own *kaizen*



Tablet devices introduced by the Electronics Division

fiscal 2017 that applied a shipping inspection method employed in the Engine Division, which uses tablet devices to check products, to an assembly process of the Electronics Division.” Conventionally, the assembly process had been conducted using a procedure manual in paper form. The team developed a tablet device that displays instructions linked to the progress of the work. Using these devices installed at production lines, workers select parts and tools as instructed on the screen, and when that particular step is completed correctly, the system automatically switches the screen to the next step. “We just installed the devices recently, but we have already achieved zero defects in this assembly process,” adds Kato.

Another initiative in the Electronics Division also significantly contributed to the reduction of quality loss in fiscal 2017. Kato proudly explains: “We had been checking the quality of small printed circuit boards (PCB) both visually and by using automatic appearance testers, but sometimes defects had passed through these inspections. To reduce such defects, we started filming products with a video camera and displaying highly magnified images on a monitor. This has helped us increase our ability to detect defective products and reduce the inspection time to one-fourth of the time needed previously, while also reducing workers’ eye fatigue.”



PCB inspection at the Electronics Division

Kato also adds: “*Aozora Ichiba* means a lot, as its activities actually generate positive results and serve to extend and deepen relationships with members of other business divisions. It offers the chance to grow, and in turn enables us to recognize new things, and achieve better *kaizen*.” The team will follow its roadmap and continue to tackle issues for the next *Aozora Ichiba* exhibition in fiscal 2018.

Promoting Activities Group-Wide and Aiming for Further Growth

The *Aozora Ichiba* initiative has now extended its scope from manufacturing operations improvements to business operations improvements and sales expansion, becoming a widespread initiative deeply rooted within Toyota Industries. Masanori Shirahama sums up the *Aozora Ichiba* activities to date: “I think the entire Toyota Industries Group, promoted under the leadership of top management, now understands the importance of standardizing and maximizing *kaizen*. *Aozora Ichiba* has now become a very good opportunity for us to explore and take back ideas for the next improvements.”

Shirahama also stresses the significance of the initiative: “On a global scale, the number of participants from our bases outside Japan has been increasing steadily. For example, our consolidated subsidiaries in China have jointly held their own *Aozora Ichiba*, while subsidiaries engaging in the manufacture of materials handling equipment in North America and Italy have brought back best practices of *kaizen* examples and adopted them. The initiative has also shown positive effects in terms of human resources development, as it presents a chance for diverse people from different business divisions to work as a team. They gain new knowledge by visiting other divisions’ production sites, which facilitates out-of-the-box

thinking. People, experienced and young employees alike, from all departments in Toyota Industries and from our consolidated subsidiaries and business partners from around the world are now involved. As a result, the numbers of improvements and the sharing of best practices have been increasing every year. I believe that the *Aozora Ichiba* initiative has certainly raised the level of our *monozukuri* capabilities.”

Looking ahead, Shirahama explains: “We intend to facilitate more active collaboration between production sites and their upstream processes, which include design and production engineering, to enhance our workplace capabilities. By doing so, we aim to further strengthen our management platform and support the Group’s growth from the aspects of quality, productivity and human resources development.”



Masanori Shirahama
Senior technical executive, Production Control Department, Production Headquarters