Working Toward Production Innovations

Kunitoshi Kurihara Yoshinori Kobayashi

1. Introduction

Kangawa Works was completed in March 2009. The Servo Systems Division, 1st Production Department started production on servo motors and stepping motors. This factory combines Midorigaoka Works, Tsukiji Works, and Aoki Works, and many methods were developed in order to make Kangawa Works become the No. 1 motor manufacturing plant in the industry. This article introduces the efforts currently used in Kangawa Works while working toward production innovations, and the results.

2. Background of Efforts

In order to improve the profitability of the servo motor production lines that used Midorigaoka Works as a production base, every possible procedure innovation was enacted. One of these procedure innovations was the creation of an online system for production guidance and inspection. In order to develop those results even further and ensure stable profitability for the motor production department, it is essential to reduce costs even further and improve the supervision abilities of the management. External consulting was introduced and the "High-profitability Manufacturing Project" was started in January 2008.

3. Action Committees

Action committees were constructed upon starting these new activities (Fig. 1). The action committees involves five performance committees and includes the participation of cooperative committees from related departments, including the design, production technology, quality control, and material procurement departments, in order to execute high-profit manufacturing.

4. Setting Targets

"Overall efficiency" is used as the index for measuring productivity. With the overall efficiency as the target value for improvement, we can recognize the opportunity loss (through loss and waste) as calculated by the following formula.

Productivity index setting
Overall efficiency =
standard incentive man-hour ÷ total man-hour

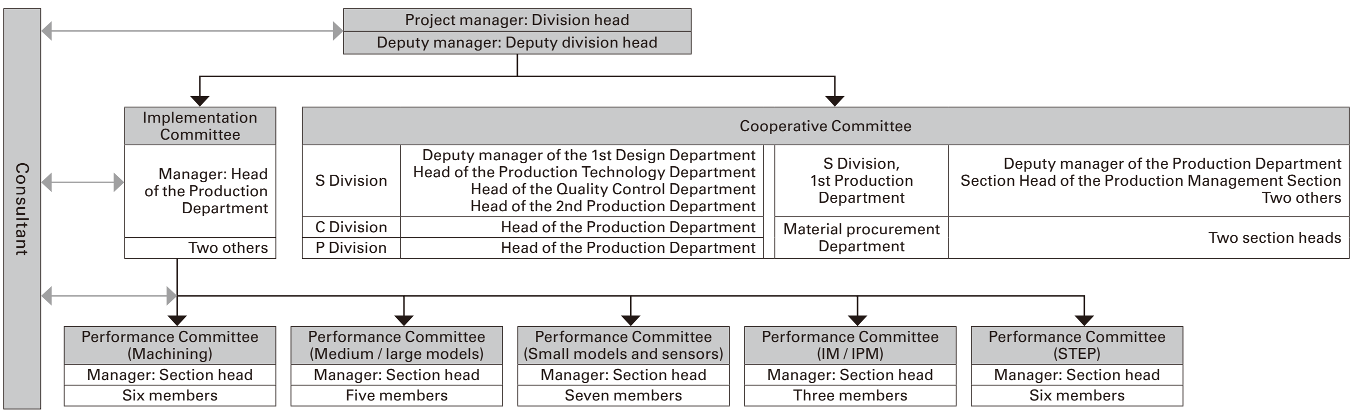


Fig. 1: Action committee diagram

Setting the productivity index at 100% based on the results from December 2007, we created a goal of reaching a productivity index of 150% by December 2008 as the first stage in these activities. In other words, we challenged ourselves with a goal of raising productivity by 50%. Therefore, the project team name was "Cyo-Puro-50" in honor of this goal. Furthermore, the current goal for the second stage is a productivity index of 180% by December 2009, thus making an effort towards a goal of even further improved productivity.

Fig. 3: Decision Panel

5. "Super Pro 50" Kickoff Meeting

After the preparation period passed in December 2007, a "Kickoff Meeting" (Fig. 2) was held with all members in January 2008 to orient all efforts towards the same goal. After members of each Performance Committee set specific action plans, systems, and targets and then expressed commitment to achievement, the project manager granted a decision panel (Fig. 3). This decision panel is displayed at the production line for each Performance Committee in order to constantly drum up the desire to reach the targets.

High-profit Manufacturing Kickoff Meeting

1. Opening greeting — Head of the Implementation Committee
2. Explanation of the chronology of the project launch and the intent — Project deputy manager
3. Techno Management Research Institute
   Greeting from the project coordinator — Mr. Takigawa, Head of Headquarters
   Greeting from the consultant — Mr. Maruta, Head of Headquarters
4. Introduction of the project members
5. Expression of determination — Performance Committee Managers
6. Granting of decision panels — Project manager
7. Chant slogans

Fig. 2: Kickoff Meeting Agenda

6. Scenarios for Achievement

Fig. 4 shows the scenario for achieving the target of this project.

Actions in the first stage (2008) call for the elimination of all waste, or in other words, everything that does not add to a process, in order to quickly produce results. By studying various methods for improvement, we had designed and inspected to include synchronized production and a good workflow. We immediately reviewed what did not work while expanding what did into the next process. Furthermore, we create innovations for logistics in Kangawa Works and create optimal process arrangement and process design.

Actions in the second stage (2009) include constructing a high-profit manufacturing system in Kangawa Works and developing the autonomous production system even further.

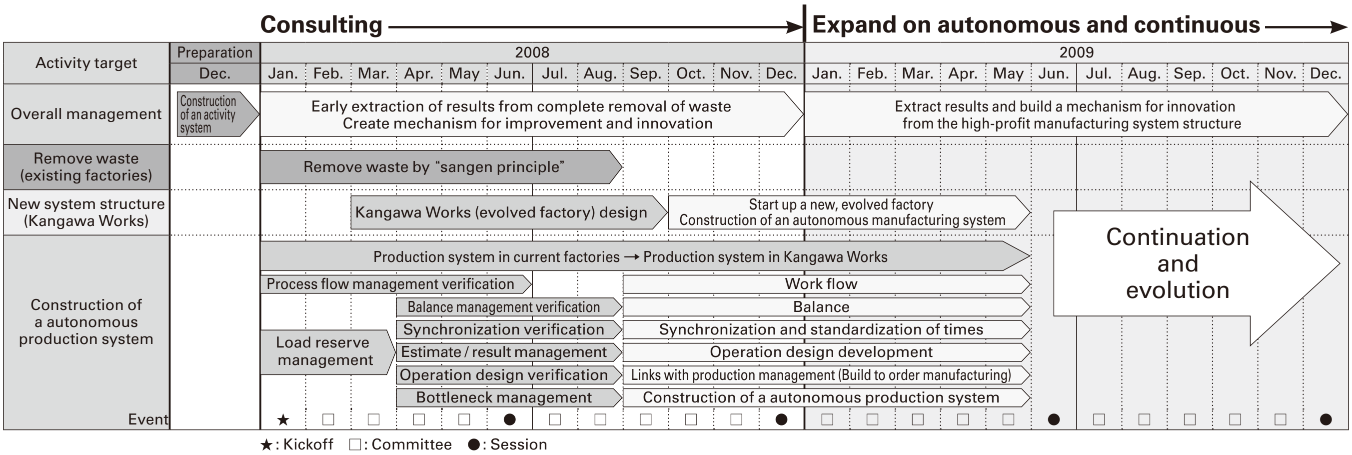


Fig. 4: Scenarios for Achievement

7. Brief of Activities

During the weekly consulting, the factory is encouraged to remove waste and make good use of people by adhering to the "the three actuals, Sangen Shugi" (go to the site, make a direct observation, and determine the facts). By finding and eliminating all waste, we can make improvements in order to create a flexible workforce that can fit into various production patterns according to demand. Furthermore, as the workforce becomes more flexible, the workers will find ways to remove new waste and make new improvements. In other words, this starts a cycle of high-profit manufacturing due to an active and involved workforce.

At the "Investigative Committee" held every day by each Performance Committee, the members work on three C improvements (C stands for both Challenge and Control). Ways to extract a problem, find the cause, and solve the problem are investigated in a short period of time. By picking up the pace of the efforts, the system is changed into one where the site can be improved with ease. For these activities, we established certain "Rules" so that we do not focus on past experiences or conventions, but instead decide to try new things.

- Do not talk about the past.
- Do not talk about other people.
- Do not say the word "can' t" .
- Do not say that there is no time.
- Do not say that there is no problem.

These are the "Rules" for action.

While C improvements work to immediately solve problems in the site, D improvements (D: Design and Development) and E improvements (E: Engineer) solve latent problems by systematically studying methods for solving problems. The Cooperative Committee takes part in planning this initiative, which produces results by taking steps to reduce the costs even in terms of the manufacturing technology and product construction.

Table 1. Examples and results of major initiatives

	Process name	Before	After	Results	Active workers
①	14 / 20-square ACM assembly	Inline takt production system Difficult to achieve line balance for each model, resulting in waste from idling and an excess in process flow	Single cell (cart) production system More suitable positioning of parts	No intermediate processes No idle time Minimal planning time Minimal operations	2
②	Large ACM assembly	Inline takt production system Difficult to achieve line balance for each model, resulting in waste from idling and an excess of mechanisms	Inline rabbit chase production system A process where one worker performs all of the assembly work on the line until completion, and then returns to the beginning, while other worker continuously work in the same way.	No intermediate processes No idle time Easy to conform to production changes	4
③	Step assembly	Direct line tact production system Large amounts of movement and many operations Design process for many people	Horseshoe-shaped cell production system Shortened processes Design process for few people	Minimize movement and operations Improvement operating rates due to design process for few people	3
④	Small ACMO winding connection	Batch production for each process Sitting operations Needed mechanisms between processes to prevent idling	Single cell (cart) production system Standing operations More suitable positioning of parts	No intermediate processes No idle time Minimal setup time Minimal operations	3
⑤	Large ACMO winding connection	Inline separated process system Large difference in the operation time for each process depending on the model, resulting in idling	Single cell (cart) production system More suitable positioning of parts	No intermediate processes No idle time Minimal planning time Minimal operations	2
⑥	Die-cast parts processing	Select and operate multiple processing devices Priority is left up to the operator, so there are delays for required parts	Lamp displays to guide operators in the Priority Devices clearly show where the operator should move next, resulting in improved operation rate	Optimum number of operators Schedule production possible	2
⑦	Material delivery	Operators search for each material location one at a time from a list Parts inventory control is all processed on PCs	Digital picking system constructed All of the corresponding material collection locations are displayed by lamps and up to seven operators can receive guidance at once Parts inventory control is processed on a PDA on the spot	Eliminated wasted movements and shortened movement distance Data processing no longer needs a PC	3

8. Examples and Results of Major efforts

While the goal is a productivity index of 150%, the results as of August 2009 are 144%. As you can see from the graph, the amount of production shows recovery. It creates the results of the "High-profit Manufacturing Project" initiative. In the future, we will continue to suppress the amount of investment while aiming to achieve improved productivity (Table 1) (Fig. 5).

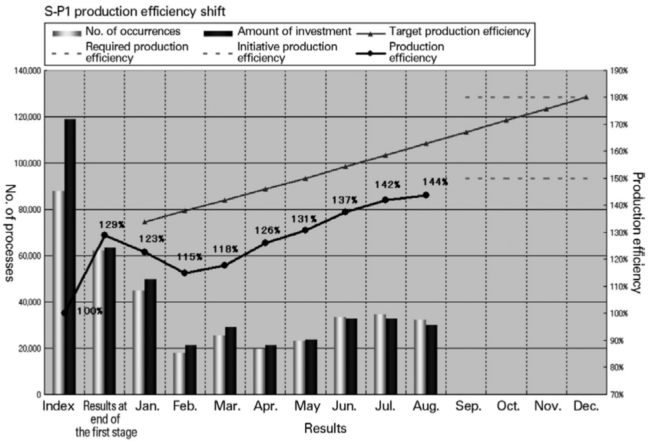


Fig. 5: Productivity efficiency shift

9. Interim Debriefing Session

The improvements achieved by each Performance Committee and a report on the results are presented every three months at an interim debriefing session. The project manager evaluates the achievements and these results are used as additional guidelines to the efforts (Fig. 6). At the interim debriefing session for the results spanning the time period from April to June 2009, Performance Committees that did not meet their productivity goals were evaluated severely and they were instructed to provide remedial action plan. All of the Performance Committees were advised to continue challenging themselves by infusing with confidence and energy (Photograph 1).

Interim Debriefing Session Agenda

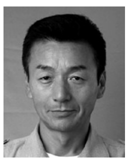
1. Opening — Implementation Committee
2. Progress report from implementation committee — Head of the Implementation Committee
3. Progress report from Performance Committees
   ① Head of the Machining Performance Committee
   ② Head of the Medium / Large Model ACM Performance Committee
   ③ Head of the Small Models / Sensor Performance Committee
   ④ Head of the IM / IPM Performance Committee
   ⑤ Head of the STEP Performance Committee
4. Progress report from the Cooperating Committees
   ① Production technology department
   ② Design department
5. Review — Consultant Mr. Maruta, Head of Headquarters
6. Overview — Project manager

Fig. 6: Interim debriefing session agenda

Photograph 1: View of debriefing session

10. Conclusion

This document has introduced the efforts taken towards "Working Toward Production Innovations" . In these efforts thus far, only part of the many problems that we have has been addressed, and the efforts to make improvements are not over. As this project enters the second stage, we will solve the remaining problems and new problems that appear in order to improve Sanyo Denki' s competitive edge.



Kunitoshi Kurihara
Joined Sanyo Denki in 1971.
Servo Systems Division, 1st Production Dept.
Worked on the management of the servo motor production.

Yoshinori Kobayashi
Joined Sanyo Denki in 1987.
Servo Systems Division, 1st Production Dept.
Worked on the management of the servo motor, stepping motor, and sensor production.