２０２３年度

デミング賞
受賞報告講演要旨

Cataler North America Corporation

1. Company Profile

1.1 Introduction

Cataler North America Corporation (CNA) is the Third overseas company of Cataler Group, presence in 2001 by Cataler Corporation 100%. CNA manufactures and supplies for an emission gas purification catalyst for automotive for mainly Company A, B, and C. With an annual production volume of around ** million units, it is the largest production base within the Cataler Group.

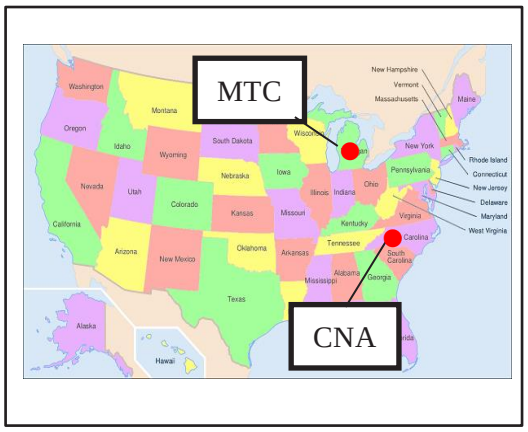
1.2 Overview

Established	January, 2001
Location	2002 Cataler Drive, Lincolnton, NC 28092 U.S.A.
Capital	USD 33 million
Shareholder	Cataler Corporation (CAC) 100%
Land	121,484M^2
Building	23,530M^2
Employee	342 (August 1, 2023)

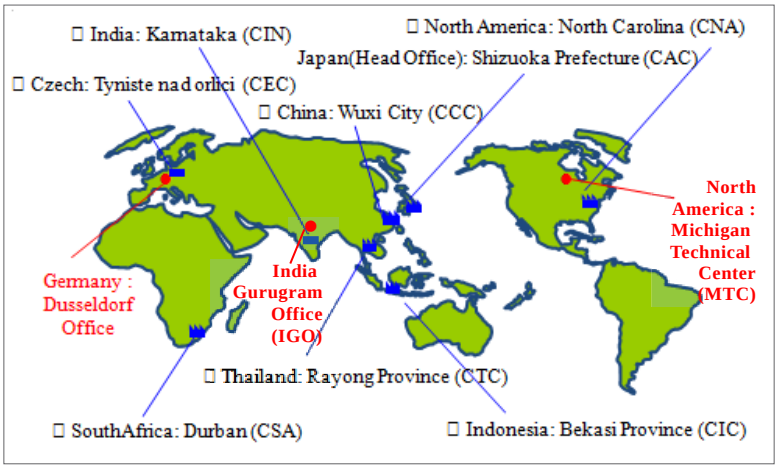
1.3 History

2001	Cataler North America Corporation was established in January 2001.
2002	Started launching catalyst of automotive.
2004	Obtained the first ISO/TS16949 certification.
2006	Second phase of plant expansion to take place.
2007	Introduced a new process innovation catalyst' ZECT.
2010	Third phase of plant expansion to take place.
2012	Received the first Quality Award from Company C.
2015	Received the first Quality Control Excellence Award from Company A.
2017	Achieved annual shipment of ** million units
2022	Satellite Plant was established in September 2022

[Location in U.S.A]



[Location of Oversea Sites]



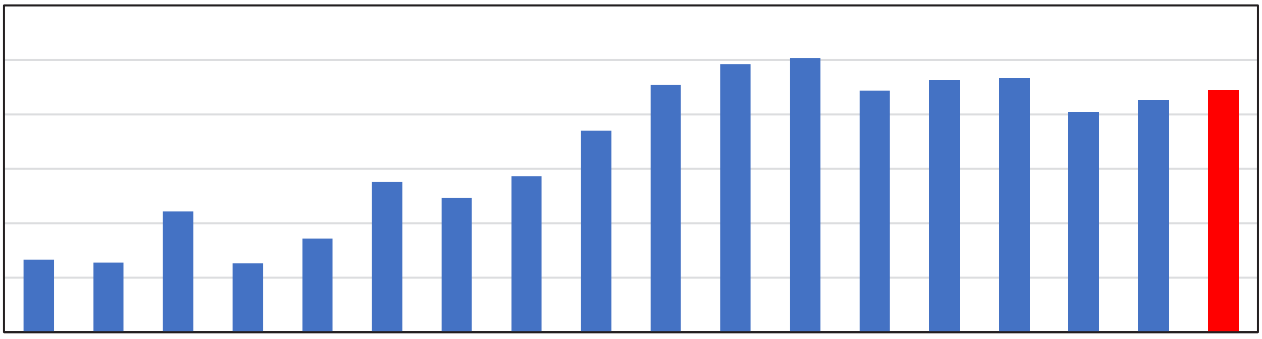


Fig.1.1 CNA Sales Quantity

1.4 Catalyst and unique characteristic

'Catalyst' an exhaust emission control device that reduces toxic substances from an internal combustion engine, namely; Hydrocarbon, Carbon Monoxide, and Nitrogen Oxide are transformed into and harmless pollutants ; Nitrogen, Water, and Carbon Dioxide by the oxidation and reduction action. In particular, Cataler Group holds the fourth largest share of the global market for its mainstay automobile catalysts and Company A holds the top share of the market for catalysts used in automobiles.

2. Organization, roles, and responsibilities

2.1 CNA Organization

CNA consists of three major locations: the head office (CNA), MTC, and Satellite plant, with 12 functional departments. Personnel numbered 327 as of August.

As for the management jurisdiction of the Cataler Group (overseas sites including CNA) and their role in the quality assurance system, functions such as corporate planning, sales planning, R&D, facility design, and quality assurance are placed at the head office (CAC), while overseas bases are positioned as production plants. Based on this division of roles, the organization of overseas bases is being developed.

Although CNA is a production plant, it also has a sales function. The reason being that the time difference from Japan and language skills are often major issues when aiming to expand sales in the NA market. Therefore, CNA has set up a sales office in Detroit and is conducting sales activities including local staff. It is more advantageous for CNA sales members to conduct specific sales activities in English, such as direct negotiations with customers in the U.S. and gathering information on customer value, so that they can respond quickly. MTC is under the jurisdiction of CNA and conducts sales expansion activities and technical sales for the North America (NA). However, since only CAC has development functions and make Cataler group sales master plan, it is necessary to supply input information necessary Company Decision-making at CAC, such as regulatory trends in NA, the status of sales and development, and feedback from North American customers. To do so, we are working in close collaboration with CAC. In addition, there is a clear division of roles in the quality assurance system. For each process in the quality assurance system, CAC is in charge of sales, advanced development, and product design, while the overseas offices are responsible for production preparation after product DR and quality assurance for mass production. (Fig.2.1)

In this way, the division of roles between CAC and the overseas bases is clearly defined, and they work together to ensure that their respective roles are carried out. In the future, CNA will consider transferring the functions of CAC to other overseas bases to develop business activities that are more in line with the customer's perspective while taking advantage of the advantages of local operations, and to promote management independence.

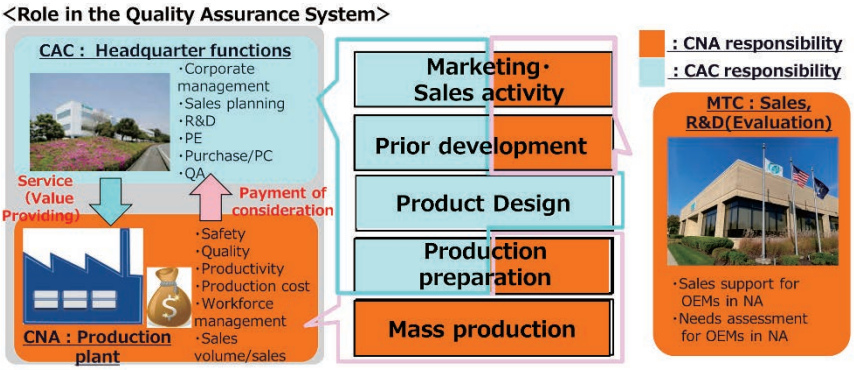


Fig.2.1 Division of roles in quality assurance

3. Management Objectives and Strategy

3.1 Hoshin formulation associated among the Cataler group

Fig.3.1 shows the relationship between the Hoshin system of the Cataler Group and the Hoshin formulated by CAC and overseas offices. CAC formulated the Global VISION 2025 and the Med/Long-Term Management Plan, which are deployed to each of its global sites. Global VISION 2025, which was formulated in FY2016, is a vision of what we should aim for as a global caterer based on the gap between where we want to be 10 years from now and our current situation, as well as our management issues. The Med/Long-Term Management Plan, which incorporates specific management targets and management strategies to be achieved in order to realize the global VISION 2025, was formulated in FY2020.

In principle, Global VISION is formulated by the CAC every five years and Med/Long-Term Management Plans are established every two years in principle. When issuing the Med/Long-Term Management Plan, CAC

analyzes changes in the business environment to date and sets Med/Long-term targets in view of the business environment five years from now. It also formulates a management strategy to achieve that goal. The Med/Long-Term Management Plan is composed of a business plan by product and an activity plan by functional area. Product-specific business plans shall be formulated based on sales plans formulated by the Sales Division at CAC as well as production plans, and capital investment plans shall be reviewed and formulated by relevant division at CAC too.

In addition, the "Global Cataler Hoshin" breaks down the Med/Long-Term Management Plan by year, and the Corporate Planning Department at the CAC serves as a facilitator, summarizing issues raised during executive training and other events and presenting them annually. The final "Global Cataler Hoshin" is then approved and issued by the board of directors and distributed to all overseas plants.

CAC formulates and deploys the global corporate Hoshin for a single year, and in particular, the implementation plan for the global corporate Hoshin outlines the implementation items to be undertaken by overseas sites. In this way, CNA has a system in which the direction of CNA and management issues are shared by the entire group.

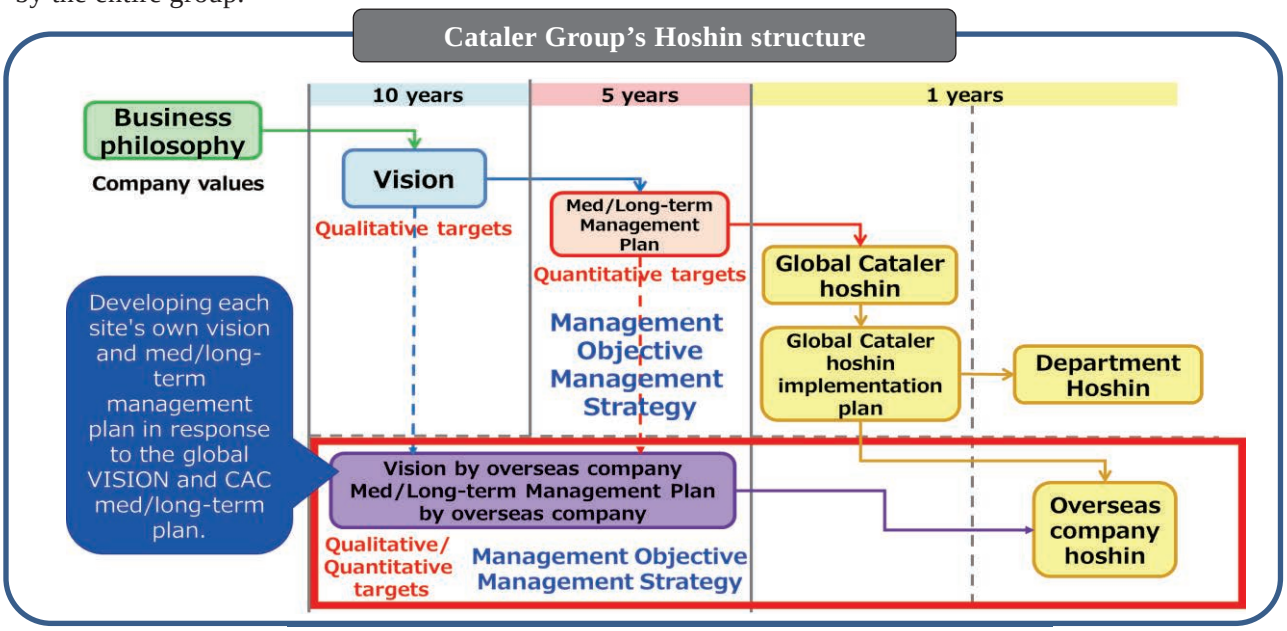


Fig.3.1 Cataler Group's Hoshin structure

3.2 CNA's VISION "SPARK 2030"

In fiscal 2016, the CNA Hoshin development method was changed in conjunction with the renewal of the Hoshin management system at CAC. The CNA corporate Hoshin has been formulated by incorporating top management's approach to the changing environment, while linking it to the CAC Hoshin (Global VISION 2025, Med/Long-Term Management Plan, and Global Corporate Hoshin). VISION 2025 represents the vision of the Cataler Group. So, CNA decided that we needed to better define the mission that we should work on.

As for changes in the external environment surrounding CNA, as in CAC, the source of revenue is 4-wheel/gasoline catalysts, and sales are dependent on Company A and B. In addition, in order to expand sales to new customers and maintain relationships with existing customers, it is necessary to introduce and strengthen functions such as R&D, prototyping, and evaluation in order to respond quickly to customer needs. On the other hand, CNA is the Cataler Group's largest production base, with plans to produce more than ** million units per year. In addition, due to circumstances specific to NA, it was difficult to secure human resources and the retention rate remained low, among other issues.

As for the internal environment, CNA recognized as a challenge the need to establish a management foundation by reforming the profit structure and strengthening the development of human resources, which the Cataler Group as a whole is working on. Based on these changes in the internal and external environment, the business structure surrounding CNA was clarified, and the values to be provided to customers and the organizational capabilities that are important in providing those values were examined.

As a result, CNA set the management goal of "SPARK2030 - Strive for CNA autonomy and sustainable

business success based on Cataler-TQM (Kaizen management). In order to achieve these goals, CNA has set up four management strategies: “Sustainable KAIZEN”, “Productivity by KAIZEN”, “American #1 company with KAIZEN”, and “Reborn by KAIZEN”. These strategies are shared within CNA, and we are working to achieve sustainable growth and success.

As for the relationship between VISION2025 and SPARK2030, VISION2025 is the vision of the Cataler Group as a whole, while SPARK2030 is a more specific statement of CNA's mission and is positioned as a branch from VISION2025. The outline of SPARK2030 is shown Table 3.1. As a specific Med/Long-term target, ** million units produced by CNA alone was set. This table is based on the Med/Long-term management plan set by the CAC. A value has been set at which the achievement of this figure will enable the Cataler Group to meet the profit targets set by the Cataler Group and the production targets for 4-wheel catalysts.

Table 3.1 Overview of SPARK2030

Management Objective	Management Strategies
CNA – SPARK 2030 **Strive for CNA autonomy and sustainable business success based on Cataler-TQM (Kaizen management)**	***1. Sustainable Kaizen*** ***2. Productivity by Kaizen*** ***3. American #1 company with Kaizen*** ***4. Reborn by Kaizen***

3.3 CNA Hoshin Development

As shown in Fig. 3.1, CNA has drawn up its own Med/Long term management plan based on VISION 2025, the Med/Long term management plan drawn up by CAC and SPARK 2030, CNA's VISION, and has drawn up a base Hoshin that breaks down into yearly plans to achieve the target value of ** million units per year in production and other The CNA has also drawn up its own Med/Long term management plan based on the Med/Long term management plan and CNA's VISION as SPARK 2030. From this, activities are developed by linking them to the annual Hoshin of each department.

CNA prepares annual Hoshin based on the Global Cataler Hoshin, which is created in conjunction with VISION2025, the Med/Long term management plans, and SPARK2030 and CNA’s Med/Long term management plans. CNA's Hoshin is being developed into Hoshin for each division. By conducting semi-annual company-wide inspections and quickly and accurately implementing the PDCA cycle to achieve specific results and effects, a system for Hoshin management and Hoshin formulation has been established and the direction CNA should take is shared.

3.4 Utilizing TQM to realize management goals and strategies

As described in Section 3.2, management objectives and strategies have been formulated by incorporating linkage with Group Hoshin and the thinking of the CNA president. Then, various activities incorporating the TQM approach are implemented to achieve the management objectives and realize the management strategies. Among them, seven priority activities that are considered to make a particularly significant contribution have been defined and are being strengthened. The seven activities are: (1) Strengthened Hoshin management, (2) Establishment of satellite plants, (3) MTC innovation, (4) Establishment of KAIZEN promotion department, (5) Quality assurance system to achieve zero complaints, (6) Continuous improvement of production and (7) CNA Human Resources Strategic Management and Training and Development Plan. Some of the activities are linked to those of the CAC, but CNA is also promoting its own innovations. We are confident that these activities will overcome the weaknesses of the CNA and directly lead to the realization of SPARK 2030.

4.1 Strengthened Hoshin management

4.1.1 Background

In promoting Hoshin management at CNA, CNA only formulated Hoshin based on materials developed by the CAC, which sometimes did not take into account the unique circumstances of NA, and there was a lack

of consideration of this point. There were issues in "analysis and adaptation to changes in the business environment" and "communication between managers and general employees.

To improve these issues, CNA began full-fledged improvement of Hoshin management and its deployment in 2018. 2020 saw the creation of SPARK2030, the CNA vision, but CNA faced issues in "linkage between upper-level Hoshin and lower-level Hoshin" in Hoshin deployment. Although a mechanism had been established to develop upper-level Hoshin into lower-level Hoshin based on the Hoshin management system, there was little awareness of SPARK2030 and the Group's global vision, which are higher-level Hoshin than the annual Hoshin. Therefore, until now, it has been unclear whether achieving the goals of the lower-level Hoshin would enable the Group to achieve the goals of the higher-level Hoshin. CNA began to work on this problem, believing that the measures, control items, and target values of the lower-level Hoshin were not rationally set in order to achieve the goals of the higher-level Hoshin.

4.1.2 Activities Status

(1) Restructure the CNA Hoshin structure

As mentioned in the background, CNA formulated SPARK 2030 in 2020, which depicts CNA's vision for the next 10 years and created company and departmental Hoshin that set single-year targets in line with SPARK 2030 and the global company Hoshin deployed by CAC, but there was no CNA Med/Long-term management plan that connected SPARK 2030 and single-year Hoshin. There was no Med/Long-term management plan as a CNA. As a result, it was unclear whether achieving the current year's goals would enable the realization of the desired image 10 years from now, and the linkage between the two was tenuous. This had the detrimental effect of making the basis for setting annual departmental Hoshin targets ambiguous. Although a mechanism had been established to deploy upper-level Hoshin to lower-level Hoshin based on the Hoshin management system, there was little awareness of SPARK2030 and the Group's global vision, which are higher-level Hoshin than the annual Hoshin.

Therefore, a Med/Long-term management plan was formulated, which breaks down SPARK 2030 even further and sets targets for the next five years. This plan clarified the four Kaizen strategies with more detailed items to be implemented and clarified the timeline for these items. The top management first prepared a rough draft of this Med/Long term plan, and then the plan was formulated with the input of local members. This has made it possible to respond to changes in the business environment in an earlier time span than before, since these changes will be considered when the Med/Long-term management plan is formulated, and also made it easier to understand what each department needs to do by when and what indicators should be used. In addition, by showing the linkage with SPARK2030 and the Cataler Group's global Hoshin in CNA's Med/Long term management plan, we have raised awareness that achieving these plans will lead to the achievement of not only CNA's goals but also those of the group as a whole.

In addition, the establishment of Med/Long-term indicators and target values provided a basis for setting target values when developing them into company and departmental Hoshin, and enabled each department to set target values more conducive to achieving future plans (Fig. 4.1.1).

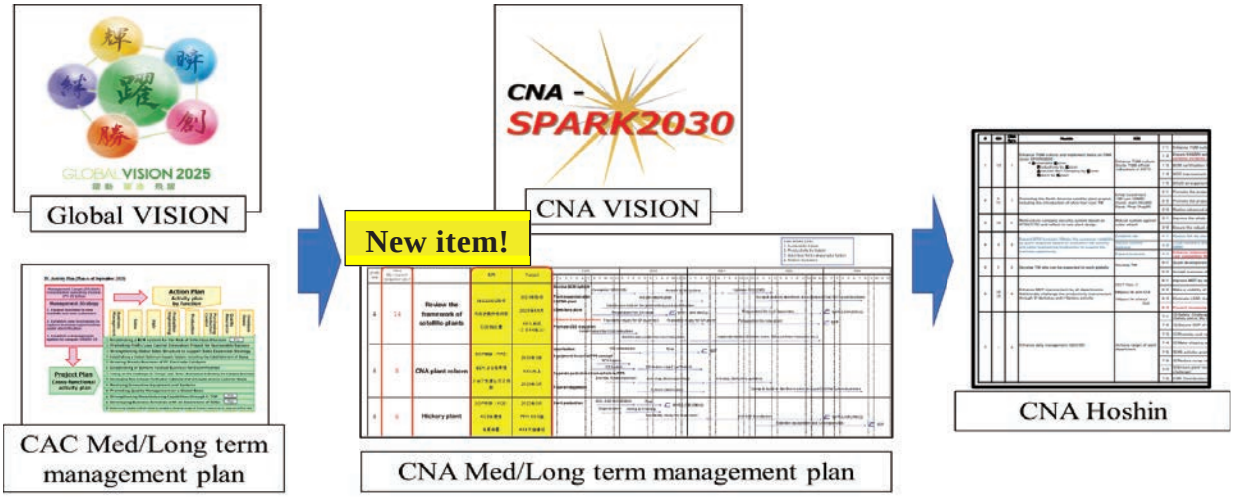


Fig. 4.1.1 CNA Hoshin structure

Regarding "communication" in Hoshin management, it is an important mission for all employees to understand the Hoshin "quickly" and "correctly," and to implement the formulated Hoshin and increase its effectiveness, communication must be strengthened. Therefore, we have improved communication by adding a direct, bottom-up element to employees. Specifically, explanations of company Hoshin were conducted annually, and top management explained the purpose of company Hoshin, as well as implementation and activity plans for each function, so that they could be accurately incorporated into each department's Hoshin. As a result, managers can quickly understand CNA's direction and implementation issues contained in CNA Hoshin. For general employees, each department head or supervisor directly explains and deploys CNA Hoshin and its explanation to his/her subordinates to ensure that they are familiar with and thoroughly understand CNA Hoshin and its explanation. In addition, during the formulation of departmental Hoshin, an opportunity was set up for the heads of all departments to gather and explain their own department's Hoshin. This allows the opinions of related departments to be taken into account, and by building horizontal ties, a system has been established that allows Hoshin formulation to incorporate a more flexible viewpoint.

(2) Improvement of inspection and evaluation methods of departmental Hoshin

In the past, inspection of departmental Hoshin was conducted twice a year at the biannual general review, where the details of the semiannual efforts and future moves were discussed. While there was no problem if the items listed in the Hoshin were progressing smoothly, there was a risk of not being able to catch up in a timely manner if there were delays or issues that had arisen in relation to the plans. In addition, each department Hoshin was evaluated only in terms of results, and there was no evaluation of the effectiveness of each method of proceeding, nor was there any review of the process, such as why it worked.

To address this issue, we first changed the review mechanism for each department Hoshin item and set up monthly opportunities for review of activities within the department. A format was also created to summarize the content of the review, and a system was established to allow each department to check the content of the review and to confirm the progress of important tasks as needed. In addition, an evaluation system based on the four-student model, which evaluates both processes and results, was adopted, and changes were made so that employees would have opportunities to look back on their own work processes. This system was designed to provide an opportunity to look back on the way they work and to regularly consider whether there is a better way to proceed, thereby providing an opportunity for further improvement.

		Target Achievement	
		Target Achieved	Target Not Achieved
Process Completion	Process Completed	**Student A** Process Completed Target Achieved	**Student C** Process Completed Target Not Achieved
	Process Not Completed	**Student B** Process Not Completed Target Achieved	**Student D** Process Not Completed Target Not Achieved

Fig. 4.1.2 Four Student Model for Hoshin Management

(3) Provide training on Hoshin management

Although we have established a system for Hoshin management, there was no place to explain the Cataler Group's Hoshin structure, VISION, CNA's SPARK2030, the Med/Long term management plan, and the connection between the departmental Hoshin formulated annually, and only some members understood these Hoshin. Therefore, there were some descriptions that prioritized filling in the format and did not seem to be aware of the connection with the higher level Hoshin.

Therefore, we first prepared educational materials for managers to understand the positioning of Hoshin management and daily management, as well as the Cataler Group's Hoshin system. This helped them understand that their work is connected to CNA's goals. In addition, CNA can explain again how to write departmental Hoshin, etc., to help them understand the connection with higher-level Hoshin, and make them aware of the setting of KPIs that lead to the achievement of target values set in individual items of the Med/Long-term management plan, etc. In addition to this manager-level education, we will also educate a wide range of people on the basic concepts of TQM, so that they can share their own work and CNA's future aspirations by introducing Catalyst's goals and CNA's current initiatives.

4.1.3 Effects of activities

All employees shared CNA's direction and the image of what CNA should aim for. Through this effort, we were able to inform the entire company of the overall picture of CNA's Hoshin management. Furthermore,

the linkage between upper and lower level Hoshin was strengthened and visualized, and the environment was changed to one in which work can be carried out with an awareness of the numerical contribution to CNA.

In addition, the adoption of the Four Student Model has made it possible to confirm the evaluation of processes that had not been visualized until now. Each department is now in the process of starting to evaluate processes and results, and each department is considering how to link these evaluations to the next step.

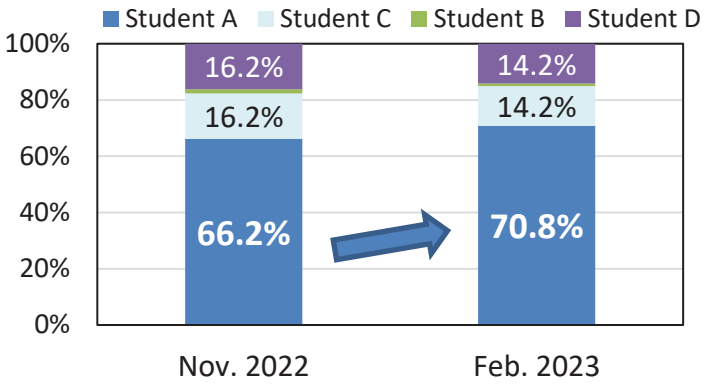


Fig. 4.1.3 Trends in four student model results

As a result, the percentage of Student A, which is ○ for both process and evaluation, has increased, and we assume that the monthly reflections are utilized in the next month's efforts and beyond.

4.1.4 Future plan

In the future, the consistency with CNA Hoshin will be further strengthened by reinforcing the review of the Med/Long-term and annual Hoshin. In addition, the evaluation method using the Four Student Model was adopted for the inspection of departmental Hoshin, but there are areas where actions after the review have not been clarified. We will clarify what actions are necessary in which phases and build a system that enables the PDCA cycle to be executed more efficiently. We will continue to communicate "the importance of understanding the Hoshin management mechanism and operating it appropriately" and move to a higher level by further developing education and tools for this purpose.

CNA aims to achieve its management strategy and goals with the participation of all employees by having everyone on the same vector and by thoroughly implementing Hoshin management. In this way, CNA will strengthen its management foundation over the next 10 years and achieve further growth as a company.

4.2 Satellite plant project (BCM)

4.2.1 Background

It is our social mission to continue to supply high quality products to our customers, and we need to ensure business continuity against various incidents. Also, we believe that a stable supply of high-quality products is one of the customer values we can provide. Currently, all production is done at one plant, so CNA was at risk of having all production stop if a problem occurred at this plant. CNA is building a satellite plant to have catalyst production capability at a separate location from the current plant. Reasons for this is to have backup production in USA in something drastic happens to current plant or equipment contained therein. In addition, if there is an increase in production in the future, it will be difficult to expand the current plant any further. In this matter, for future growth and BCM, we are in the process of establishing satellite plants.

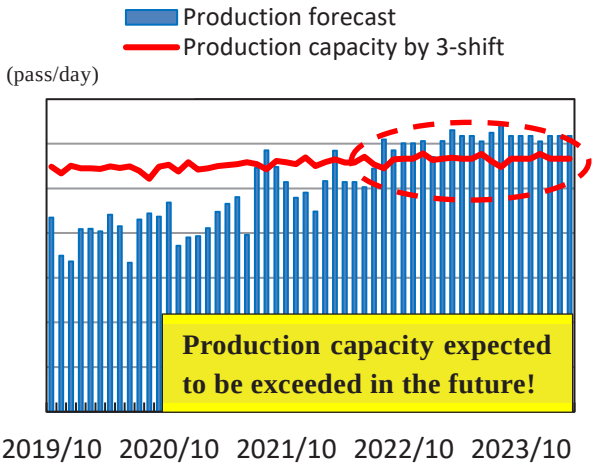


Fig.4.2.1 Production forecast as of 2019

4.2.2 Activities Status

(1) Strengthened of BCM

Currently, CNA is doing all of its production at one of its current locations, and if the plant were to be damaged by a disaster or other event, production would be impossible. Although the group has a backup structure in place in case of emergency, there are some special products that are manufactured solely at CNA, and it is difficult to back them up, which could lead to inconvenience to customers.

The first thing we did was to establish a structure that would allow us to use other facilities for production in the event of a failure in our own production facilities. In this way, even if a facility producing special base

material products suffers a failure, it can be backed up. However, this alone was not sufficient as a back-up provision, and there were concerns that the load could be concentrated and difficult to cope with in the event of a sudden increase in orders or machine breakdowns. CNA has been producing ** million units per year, but it had become difficult to increase the capacity further.

The establishment of this satellite plant near the CNA plant will ensure that, in the unlikely event that the first plant is unable to operate due to problems or a surge in orders, the plant will be able to cope with the situation with inventory and back it up with the satellite plant's production facilities. The site was selected based on the risk of a nuclear power plant and hurricanes 30 km away from the CNA. In addition, CNA is working to establish a BCM system based on the ISO 22301 standard to further strengthen these backup structures and responses in case of trouble.

In the future, we would like to encourage the introduction of more production facilities and increase production volume while reducing the load that has been concentrated on CNA.

(2) Establishment of a two-site production

As mentioned in the previous section, there are limited sites for production, but space had to be secured for the introduction of equipment for future new technologies. In addition to this, some of the CNA's current equipment has started to age and the risk of equipment failure is increasing. There was also a need for a planned overhaul of the infrastructure and equipment with a shutdown in the future. Currently, the CNA plant is operating at full capacity for three shifts to maintain production numbers, so it is necessary to coordinate schedules with customers, including the timing of equipment shutdowns for equipment maintenance and new product trials.

In order to address this problem, CNA began to consider reducing the production load by building a new plant. Currently, ** million units are produced at one site, but this will be transferred to satellite plants in stages, with a plan to transfer **% of catalyst production in three years' time to distribute the load.

The satellite plant will be equipped with a new facility called ACE, which will be explained in a later section, and is expected to achieve higher productivity. This will enable the CNA plant to cope with the planned overhaul of the plant, thus eliminating the concerns. The establishment of the new plant has also made it possible to cope with possible future increases in production and the introduction of new equipment associated with new technologies.

(3) Realization of an advanced plant

① Introduction of various systems at the time of new plant construction

In the new plant, various data such as daily production data and security information need to be shared with CNA. If a system similar to the current CNA system were to be installed in satellite factories and each plant were to be managed individually, it would be necessary to allocate personnel and install equipment accordingly, which would incur a large amount of cost. In addition, there was concern that information would not be shared in a timely manner and there was a risk of information outflow.

To solve that problem, satellite plant will be connected to CNA thru an E-LAN. This E-LAN will have 2 connections. One will be a primary and the other will be secondary. With this setup we will be able to run Satellite Plant as if it were in the same location as CNA. Using this type of connection also gives CNA the ability to run all financial systems, data collection systems, security systems, and management decisions from CNA. By using the hardware already in service at CNA we reduce the cost of the Satellite Plant. In running Satellite Plant as a part of CNA we reduce the amount of management head count needed to run Satellite Plant. This also helps keep IT headcount under control. Instead of adding two new members, we can reduce the addition to one member to help handle onsite technical needs. This member can also support the main facility with project management activities. This made it possible to introduce the satellite plant system without spending more than necessary capital investment and labor costs. In addition, since everything is connected on the system, the CNA can check the satellite plant's information remotely, making timely information sharing possible. Therefore, we can take advantage of the experienced team we have at CNA to offer advice or improvements to the equipment quickly without many backs and forth emails. The expected effect of this technology is that the Satellite plant will be able to quickly address issues that may arise with the equipment, avoiding the large learning curve that a completely new facility normally must deal with.

② Installation of new production equipment in new plants

One of CNA's challenges is to improve productivity. They are training workers, for example. To increase productivity, it is important to improve the skills of workers, but it is also necessary to improve the capabilities of the equipment side. However, it was difficult to further improve cycle time with the current equipment, and technological advances were needed to further increase productivity. That's why the satellite plant will also have new technology that is not currently in use at the CNA. The coating equipment has been redesigned from the ZECT design to ACE Coating. The ACE coating equipment is designed to have a shorter cycle time than the current equipment, even though the process itself is the same as the current line. This is expected to improve productivity by 20% compared to conventional equipment. The resulting productivity is expected to be higher than that of the conventional equipment, allowing for more effective production. In addition, manpower-saving efforts are being made to mechanize the loading and off-taking of base materials and to reduce the amount of work through human hands that was previously necessary. Conventionally, current lines are inspected for quality problems using team members. They are also instructed to report any abnormalities such as unusual smells or noises. However, on the ACE line, there are fewer members of the team who can see, hear, and smell. Therefore, monitoring equipment information can be used to predict equipment and catalyst abnormality. These trends can also be correlated with catalyst barcodes to flag suspect parts for additional or specific inspection. Even if there are few people in charge of a coating equipment, trends and data can give a much higher probability of knowing the likelihood of all parts than just the judgment of the person in charge.

In addition, because the equipment is modular, it can be reconfigured and expanded as needed. It will also have improvement in part handling motion, which reduces cost of equipment purchase, routing maintenance cost, and have fewer points of failure in operation compared to current design. Also, these changes help with the introduction of part handling automation, reducing the number of production team members required to operate the line. In order to introduce the equipment, visits were made to CACs and CECs that had started implementing the equipment in advance to hear about operational precautions and actual operating conditions, and to check the equipment on-site and in-kind. During these checks, not only the PES members in charge of equipment installation but also the members of Production who actually use the equipment accompanied them, so that they could also examine the points of concern when introducing the equipment to the CNA. Experienced CAC staff were also invited to install the equipment, and together with CNA staff, they identified problems in actual operation before proceeding with the installation to ensure no rework. We will begin trial and full-scale production using this equipment, but since there are some points that differ from the operations to date, work will be standardized and training for operators will be promoted.

Another item that helps productivity is the introduction of automated transport using Automated guided vehicle (AGV) to move parts between processes and storage areas (Fig.4.2.2). This will reduce material handling headcount needs, and also provide safer work environment with less risk of fork truck accident. This will also have a stacker crane for automated storage and retrieval of product. This will allow us to store more product in a smaller footprint compared to our current warehouse. In conjunction with the introduction of AGVs, the Satellite Plant has also introduced a walk-vehicle separation: at CNA, there are areas where there is no fence at the boundary between the walking and driving zones, and a pedestrian crossing has been installed across the driving zone, but safety was ensured where there is no fence at the boundary between the walking and driving zones, and a pedestrian crossing has been installed across the driving zone, but safety was ensured by the attention of members crossing and forklift truck operators. The satellite plant has been able to achieve a higher degree of safety through the introduction of safety gates and by preventing the flow lines from mixing in the first place. The introduction of the AGVs not only led to a reduction in the number of personnel involved in the transportation of products per shift, it also led to a thorough separation of foot and vehicle, which has made for a safer plant.

Fig.4.2.2 AGV image

4.2.3 Effects of activities

Equipment install is still on-going. Once completed, we plan to transfer most of Company A underfloor

catalyst coating to satellite plant once we have Process change requests approved, we can initially move about ** pieces per month to the new plant. This can be expected to increase capacity on the production facilities, which is high at CNA. From the perspective of BCM, even if CNA's head office is partially shut down due to a problem, the satellite factories can cover it. By using inventory at the CNA and production at the satellite plants, we can cover for about two weeks (Fig.4.2.3).

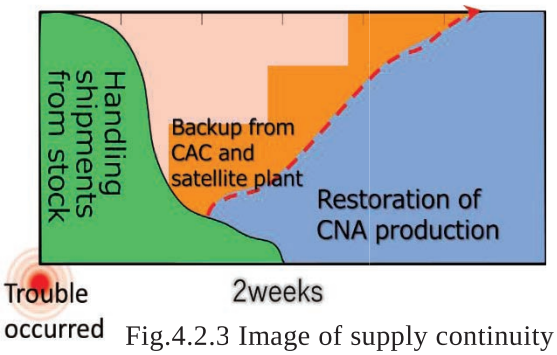


Fig.4.2.3 Image of supply continuity

The establishment of the Satellite Plant is also planned to shift the production volume from the centralized production at the CNA plant to the Satellite Plant. This shift will enable CNA to handle future increases in volume while spreading out the workload at the CNA plant.

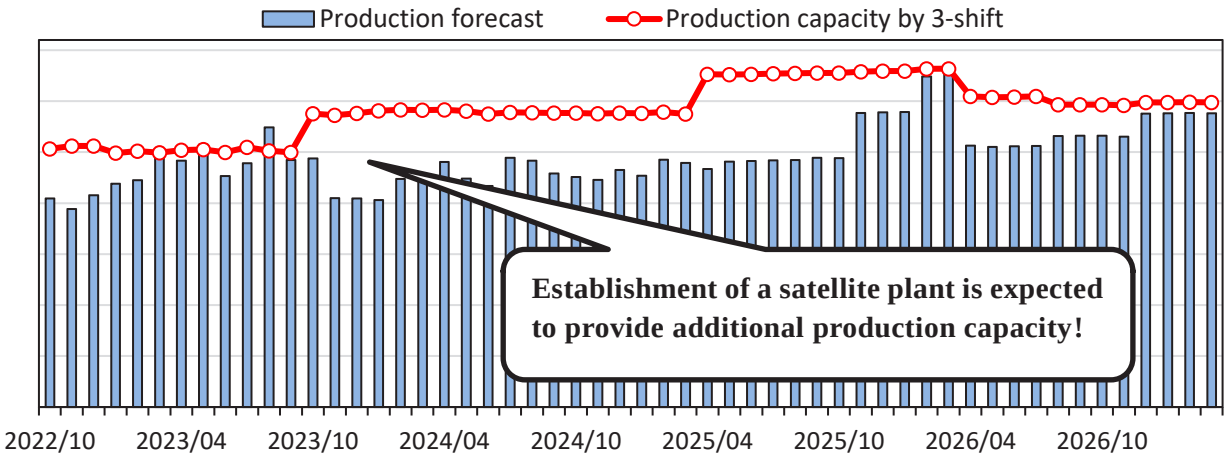


Fig.4.2.4 Expected trend of production

4.2.4 Future plan

We will proceed according to the schedule and establish a Satellite plant to enable more stable production. Develop plan to improve capacity or thruput where needed based on outcome from Global Production Control review with CAC. As the challenges of BCM, CNA is keeping the higher levels of imported raw materials due to the logistics issues. We are reviewing future demand with CAC and seeing how to support areas that show constraints. In addition, one ACE machine is currently being installed, and a second machine is being planned for future production increases. Since there is a concern that the function of BCM may be degraded due to the presence of multiple bases, we consider securing and maintaining the ability to execute as an issue and aim to acquire ISO 22301 certification within FY2023. We aim to become a company that can provide customers with peace of mind through continuous maintenance and improvement activities utilizing ISO 22301.

We are continuing this activity with continuous Kaizens to ensure that it can continue to provide its customers with the customer value of peace of mind.

4.3 MTC Innovation

4.3.1 Background

CNA is an auto parts manufacturer that focuses on automobile exhaust gas purification catalysts. CNA manufactures, and sells catalysts for Company A, B, C and E. The Michigan Technical Center (MTC) focuses on maintaining and creating new business with the help of our skilled sales and R&D team.

The global automobile market is transitioning to electrification to reduce CO2 emissions. CNA's conventional products are used for Plug-In-Hybrid Electric Vehicles (PHEVs) and Hybrid-Electric Vehicles (HEVs), but Battery Electric Vehicles (BEVs) will not require our main product (3way catalyst). Similar market changes will occur in NA within the next decade. Under these situations, it is necessary to strengthen our relationships with customers to maintain and develop CNA production and profitability.

Therefore, to accomplish SPARK 2030, we have established the Mitten Project. The Mitten Project consists of creating and implementing a testing laboratory, which includes increasing head count and strengthening sales activities to achieve a quicker response for customers. Owning our own lab can achieve customer

satisfaction by supplying more development resources and adding flexibility in our testing. We will also support new customers using this lab.

4.3.2 Activities Status

(1) Strengthen relationship w/customer and secure current business working together as a team

The Cataler Group needs to acquire more new customers in order to achieve VISION 2025, which requires technological development that anticipates global market trends and customer requirements 5-10 years in advance. Therefore, in 2016, a 'technology roadmap' was drawn up, which identifies the necessary technologies based on expected future market trends and customer requirements. In order to ensure that the construction and management mechanism of this technology roadmap is shared among the parties concerned and to ensure consistency with the sales master plan, the 'Selection and alignment process of the sales master plan and technology roadmap' was formulated and standardized in 2019. This process called "SCOOP" (Stream of process for Choosing and Orienting Optimum Plan with roadmap and masterplan) to select and align a master plan (future sales plan) and technology roadmap. The first factor in this process is the collection of market and customer information, patent searches, and competitor benchmarking. MTC is responsible for some of this market research and customer information collection. We are particularly focused on the NA market. We are involved in a variety of conferences and meetings with customers and suppliers. Through this communication, we also look for future needs and expectations of CNA.

This information is reported to CAC in Japan. Based on this information, future systems are forecasted. Then we prioritize and select development items to facilitate the development. From a sales perspective, we also select customers and programs to target for sales expansion.

By constantly repeating these cycles, we maintain our ability to meet our customers' expectations at all times. The quarterly Sales Strategy meeting is conducted in CAC where the information gained from all over the world are gathered and reported to the top management. MTC invites the two departments prior to the Sales Strategy meeting to update the latest analysis on market, technology, regulation as well as customer voices while CAC and MTC members communicate in daily basis. Both Sales and R&D departments conduct global meetings where global members gather in the same location to report each other and discuss.

(2) Gather info and build relationships with future potential customers.

In order to continue the production of ** million units per year, which is currently set by CNA, it is necessary to attract new customers, as this number is expected to decrease in the future due to the adoption of EVs. MTC is currently working to win Company D's business. Our mission is to address the issues and perform better than any other coaters. We are working with CAC's R&D team to propose catalysts that take these measures into account. Based on the postulated mechanism, we conducted numerous laboratory tests and selected materials. We have also perfected new configurations using these materials and confirmed that they are effective in actual vehicles. Through monthly technical meetings with Company D, we communicate our intensions to obtain early technical approval and participate in upcoming sourcing opportunities. We have also implemented a similar approach to purchasers by continuing to provide timely information to earn the trust of our customers. We know it takes a lot of time to gain trust. However, we will accomplish this through a variety of efforts. We have increased the frequency of communication and answers will be given in the shortest possible time. Finally, we will focus on technical presentations that are simple, easy to understand and directly answer their needs and requests.

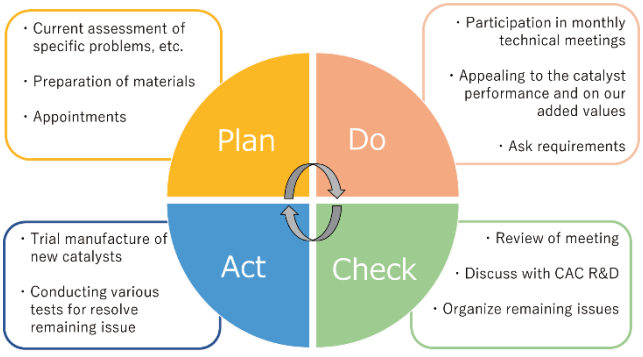


Fig.4.3.1 PDCA Cycle of MTC Efforts to Company D

(3) Establish Michigan Technical Center (MTC) to provide new added value to our customers.

We are currently using third-party laboratories to age and emission test technologies. In this process, a lot of time is spent on multiple schedule adjustments and sample handling. Third-party costs are also increasing

year by year. Some of the third-party laboratories that we use will possibly be exiting the emissions testing field to shift towards the BEV testing field, which furthers our reason to produce our own lab.

We discussed these issues internally and with CAC. We all agreed that we will need to have an evaluation laboratory of our own. This marks the beginning of Mitten project. In creating an evaluation laboratory, it will increase the flexibility of testing and making timely technology proposals to customers.

In addition, MTC will help develop better relationships by using this laboratory to conduct trials, discuss testing, and implement result with our customers and suppliers. The laboratory area will expand in the future, (Fig.4.3.2). It is possible the future lab area could be used for testing technologies other than three-way catalysts. Assessment of Fuel Cell Electric Vehicles (FCEV) and BEVs is an option. By having our own evaluation facility, we expect to be able to reduce the time required for sample handling by more than 50 hours per year, as well as to devote more time to scheduling and coordination.

Fig.4.3.2 Chassis Dynamo Equipment

The Mitten Project is not merely an establishment of a chassis dynamo equipment. As described earlier in MTC's Mission, we will maximize the use of vehicle evaluation functions by incorporating customer operations that reduce Internal Combustion Engine (ICE) personnel, linking it with development activities and train Global lab personnel for the future when ICE development shifts to emerging countries. To visualize the concept, MTC made MITTEN KOINOBORI.

The explanation of each phase is as follows.

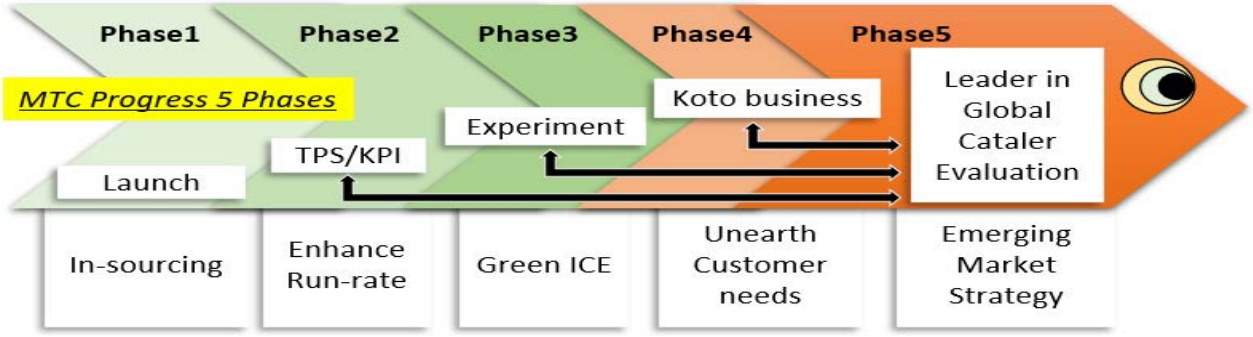


Fig.4.3.3 The Meaning of MTC KOINOBORI

Phase1: Launch

New lab technicians joined along with the lab manager dispatched from CAC. The trainings and peripheral preparations such as standard documents and calibration control systems are in place. We continue to strive for the launch without safety accidents through risk analysis.

Phase2: TPS/KPI

We will Yoko-ten the improvements from CAC from the earlier stage and try to mitigate the downtime. In order to quantify the rate of the operation, we will introduce the operational KPI. The total of four trainers are scheduled to come to MTC to enhance daily operation process.

We will utilize the equipment as much as possible with minimum "free time", we will be introducing the Robot Driver to run the long, complicated and skill-needed test cycles which will enable us to run the test regardless of manpower and skillset availability.

Phase3: Experiment

The automotive industry is shifting multi-fuel mobility in order to minimize CO_2 emissions coming out of cars. Electric cars are the focus of interest and it will gain certain share of light vehicle segments even in the US. But many customers started to discuss how to achieve Near-zero emission with ICE cars.

As often said, engine is not polluting but the fuel is. customers are discussing with fuel producers for bio-fuel and e-Fuel including synthetic fuel and hydrogen. Some vehicles that we own have already undergone the remodeling of the exhaust system enabling us to test future catalyst technology on the chassis dyno.

Phase4: Koto business

The puzzling paradox is that there will be multi-fuel development needed and much more technical

development will be required for customers but due to the EV development and its ever increasing investment, customers have to downsize the manpower in ICE development. MTC will offer extra chassis dyno evaluation services and emission test result analysis to customers.

Phase5: Leader in Global Cataler Evaluation

Launching MTC is the very first attempt to establish a testing center outside of Japan in the history of Cataler. The evaluation department, due to the absence of testing lab outside of CAC have had no experience in overseas operations. As mentioned above taking in customers ever increasing workload is important.

But the skillset required for running the chassis dyno will not be obtained overnight. MTC will be the incumbent center of global Cataler evaluation team. CAC members are exposed to non-Japanese environment and learn the operational and management skill. MTC local members are exposed to Cataler way in evaluation and lean the operational and management skill that will be needed outside of US.

4.3.3 Effects of activities

① One of our customers' concerns is to meet difficult regulations with a good performing catalyst and thereby reduce the use of PGMs. We will enhance our communication with our customers to bring out their latent needs. Then we earn their trust by achieving the PGM reduction they desire with our superior catalysts.

In recognition of these efforts and our efforts to date for stable quality, transportation and safety, we were able to receive the Overdrive Award from Company B.

② As we work more with Company D, we are learning their technical process and how they prefer to do business. We spend a lot of time developing the technology for Company D catalysts. However, our Company D activity has not yet led to an order. By strengthening our activities with Company D, we hope to gain Company D business in the future.

③ Currently, we have not completed the phase1 yet alas each member has already engaged in realization of all phases. Phase2 KPI discussion already started between Japan-US lab members. TPS implementation started bringing the idea of 5 F in conjunction with 5S in the facility. Phase3 experiment is being materialized by a project and the members are approaching other customers to collaborate together on Green ICE development. Phase4 Koto business discussion is in place. Phase5 leading the global Cataler evaluation started with three members in MTC already working together with Japan who seemed reluctant in supporting the activity in the first place largely because they had not had the opportunities to be exposed to such occasions are changing by declaring the dispatch of three experts in Summer this year. All the phases however are interlinked as internal and external environment grow as indicated in black arrows in Fig 4.3.3. We have the Plan and currently at the Do step. We will monitor and check the progress and change the progress plans accordingly by doing the PDCA cycle.

4.3.4 Future plan

Although the NA market is experiencing a tendency for BEV to increase, its speed remains uncertain. We are convinced that customers will still offer ICE as of 2030. Therefore, we will continuously support customer's activities to reduce the PGM amount and meet emissions standards. Through these activities, we will maintain and develop new business. We are continuing discussions for sustainable growth in the future. The MTC is working with the CAC to gather information in NA market for the CNA continued development.

4.4 Establish KAIZEN promotion department

4.4.1 Background

At CNA, while the production volume is very high, one of the issues was the occurrence of Large-Scale Scrap Event (LSSE) and the recurrence of many problems. Also, the ratio of LSSE in the total scrap is also very high, and it was necessary to aim at reducing the overall scrap rate by reducing LSSE (Fig.4.4.1). When a problem occurs, CNA tries to prevent recurrence by incorporating the problem into the standards, in addition to investigating and eliminating the true cause of the problem, but there is no system to check whether the problem has been solved, and

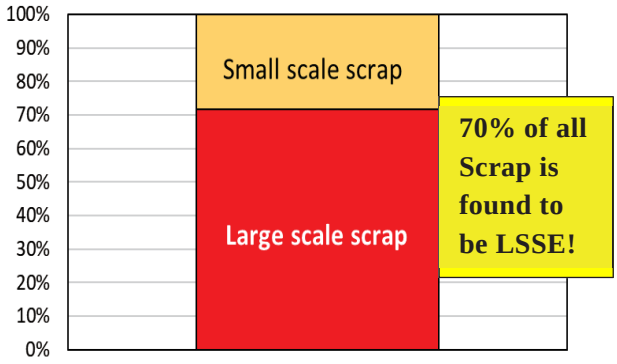


Fig 4.4.1 Catalysts scrap classification breakdown in 2018

it is left to each person in charge. In addition, the system for disseminating the standards that incorporate improvements to workers is also weak, and there are cases where the improvements that have been made are not being utilized.

In order to break through current situation, we launched the Kaizen Promotion Department and started building a system to prevent the recurrence of production problems. In the past, when a LSSE occurred, CNA took pride in rapidly naming the cause, and quickly implementing a countermeasure. However, with the emphasis on speed, the true root cause was sometimes missed. In the search for speed, many problems were "solved" by discussion in the conference room, rather than by taking time to go to the Gemba, gather facts by direct observation and hear the opinions of front-line employees. Human errors were handled by either coaching or writing more and more complicated work instructions. Both methods proved unreliable at preventing recurrence. The only form of follow-up was to wait and see if the problem recurred.

To break free from this pattern, we started building a TQM-based troubleshooting system intended to prevent the recurrence of production problems, and a training program based around solid work instructions and regular job observations.

4.4.2 Activities Status

(1) Establishing a system to prevent recurrence

As mentioned in the background, the recurrence of LSSE had become a major issue. Therefore, in order to create a system to prevent the same problem from recurring, we first organized the Kaizen Promotion Department to take the lead in implementing a series of processes. The members of the improvement promotion department include not only members with extensive experience in production lines, but also those with experience in PES and maintenance, so that improvement can be considered from various perspectives. This included planning the prevention of recurrence, completing the countermeasures, and educating and evaluating the related departments. The members of the Kaizen Promotion Department receive training on how to write work procedures and plan countermeasures before engaging in these cycles.

A small cross functional team formed to see if a troubleshooting approach might work better. This team would work together with various departments and team members to confirm the problem at the Gemba, find the root cause (often using an Ishikawa Diagram, 5-Why etc.), then fix the problem, confirm they had fixed it, and take steps to prevent recurrence.

This process allowed the Dispo Meetings to evolve into a PDCA-based process led by Kaizen and department heads and anchored in what we call the Scrap Database. Dispo Meetings are held at a fixed time every day to discuss LSSE. The Dispo Team plans and tracks tasks such as going to the Gemba, documenting root cause analysis, then tracking and closing short term corrective actions and long-term preventive actions. Results are reviewed monthly at the Recurrence Prevention Meeting management holds the Kaizen Department and the Dispo Team accountable for reducing recurrence of LSSE and for moving improvement projects forward from initial trials to completed projects that make things better. One of the common problems identified in LSSE was that work instructions were often incorrect, inadequate, too complex or missing. Previously, "training" often meant handing a written work instruction to a new team member, having them read the document, then start working. The process was never meant to work that way. Our work instructions are really "job breakdowns" intended to help the live trainer plan how they will teach a skill to an adult student. They allow the trainer to know that a student can both do and explain the important steps, key points, and reasons why they are doing the job a certain way. Now, our work instructions are so clear that

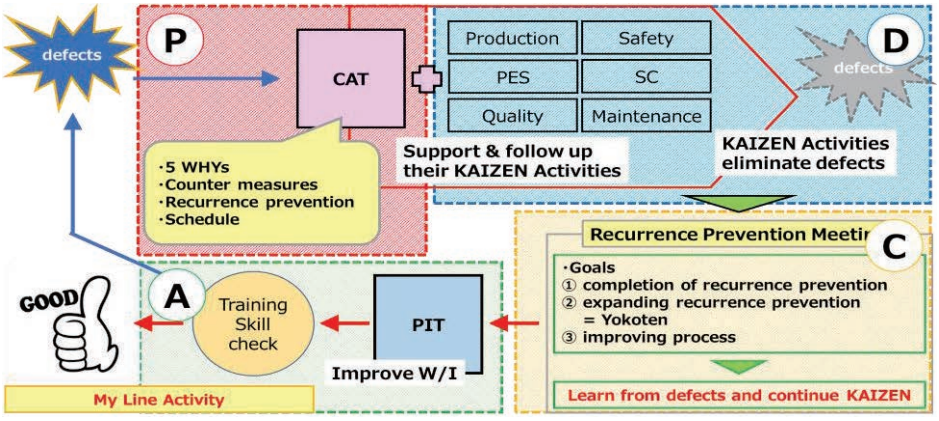


Fig 4.4.2 PDCA cycle image of Kaizen Promotion department

they also work great for doing job observations.

The PDCA cycle is implemented, with the Kaizen Promotion Department standardizing the implemented measures, disseminating the contents to the relevant departments, conducting training, and periodically evaluating the skills after the training is completed. An overview of this cycle is shown in Fig.4.4.2. First of all, we started working on the defects that have a large impact or occur repeatedly, and the number of recurring defects has been decreasing through continuous Kaizen activities.

(2) Prompt response to problems by the CAT team

At the Dispo meeting explained earlier, factor analysis and countermeasures are considered, and the person in charge of implementation is assigned to proceed with the response. In some cases, such as when equipment needs to be modified, there is not enough time in the department to deal with the problem, resulting in delays in responding. Therefore, we aimed to respond to various countermeasures without delay by having an experienced PES and maintenance person in the Kaizen promotion department respond. Especially when modification is needed, they often complete them by doing their own fabrication, welding etc. themselves in the Kaizen shop. By doing this work without using outside contractors we are able to cut costs and improve our knowledge of the equipment.

In addition to responding to problems after they occur, CAT team collects requests for Kaizen and small problems, mainly from production members. They consider, implement, and follow up on solutions. They also involve the team members in all steps of the Kaizen. This activity leads to solving small daily problems and preventing trouble from happening. Through this activity, the production team members working on the line can easily consult with CAT team about their small problems, and we have been able to build a good relationship with them.

The number of cases where countermeasures were delayed from the scheduled date and time has been decreasing due to the follow-up of countermeasure implementation at Dispo meetings and implementation of modifications, etc. by the CNA (Fig.4.4.3).

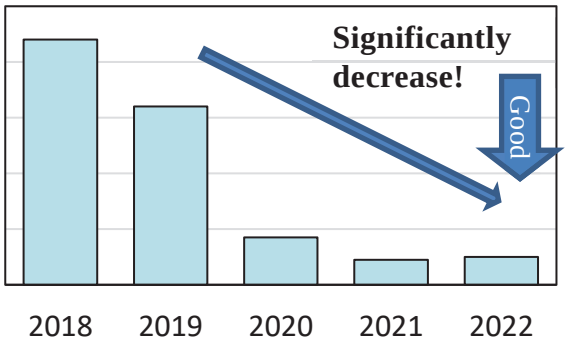


Fig.4.4.3 Trends in the number of measures that have missed their deadlines

(3) Improving the level of Work Instructions

The Production Instructor Team (PIT) is very involved in the development and revising of the documented processes. We revised/created/expired hundreds of documents in our first year of training. All PIT instructors have graduated from Training Within Industries (TWI) Job Instruction class. This course focuses on training method and simple step work instruction writing. Important steps are something that is easy for team members to remember, not something they need to reference on the document. PIT members have also all graduated from Job Methods and Job Relations. After our document training was completed, we systematically went through all work instructions for each process. We printed them out and arranged them in order of sequence. This helped us identify gaps in the standard, document B needed to start where document A completed. We also identified some overlapping instructions, which was contradictory in some cases. These issues were immediately resolved. We worked with Production, Quality, and Engineering to resolve any questions about which was the best practice to document. All training performed by the PIT team is performed with the work instruction in or on-hand, this allows us to identify any inaccuracies, or changes not captured. When these inaccuracies are identified we immediately revise the document.

We participate in engineering trials so we can learn the new process and train the appropriate team members. But this also puts us in the position to create and/or revise the documented process. We have created all work instruction for new product lines. This has given them the skills to create effective and concise documented processes.

Some documents are revised after specific scrap or safety events. During our cross functional Dispo meetings, we review the process and decide if it is strong enough. Work instructions need to be clear and not lead to any confusion. Sometimes scrap events can lead to the addition of key points on work instructions,

increasing awareness of potential scrap events.

(4) **Creating a system for evaluating the competence of production members**

CNA uses an On-the-Job Training (OJT) method. The associated OJT document includes all the appropriate training required. It also ensures that the team member has been trained and can perform the job without the supervision of a trainer. This OJT document includes a signoff for each skill, one for the trainee and one for the trainer. If done properly, this method is very effective in ensuring that nothing significant is missed. One issue that were encountered was from Team Members who were signed off in one area and moved to another. When they would return to their original area, many of the processes had changed or been forgotten.

What we needed was a way to track the skill level of members for each job. There is a large difference between someone who has been here for 10 years and someone who has been here for 3 months. Though both members are signed off, we wanted a system that could differentiate between the two. This system should also make it easy for a trainer to understand where the trainee is with each step in that job.

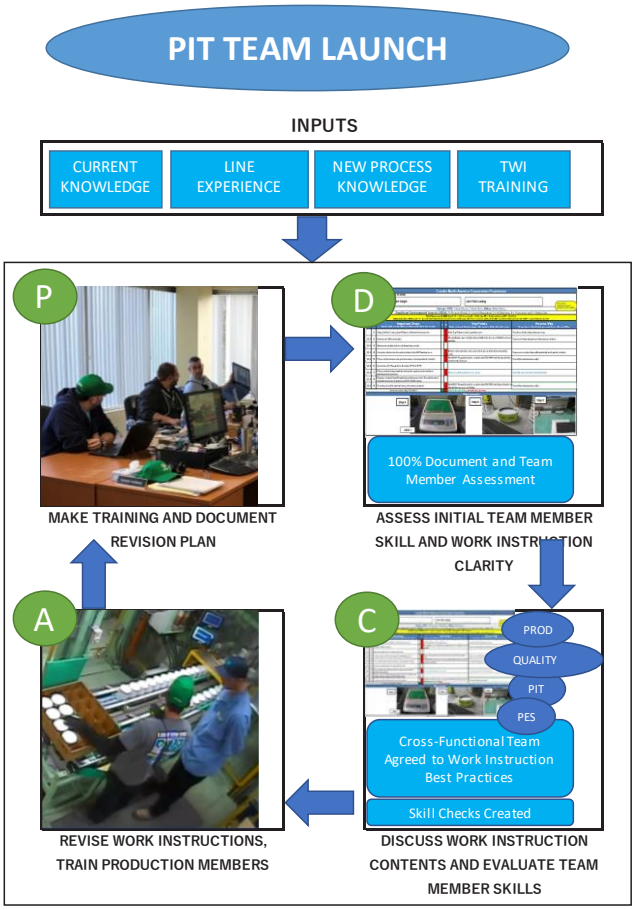


Fig 4.4.4 Image of the PIT team role

We created a Skill Check which includes all items from OJT documents, plus a few others that were determined to be important. Instead of a pass/fail we used Harvey balls to display skill levels on each job. Instead of just being signed off on the process, we could see the skill level and tailor our training to cover those processes in more detail. The frequency of these skill checks was set, minimum one evaluation per fiscal year. Many team members and team leaders have been with CNA for many years. These members needed only one skill check to ensure they are staying current with any changes to the processes. Members new to CNA or job require multiple skill checks to ensure the knowledge is increasing and that nothing is missed. After testing this skill check out on a few team members and team leaders, we made some adjustments to the skill list. The final result was a 3 page “Training Jacket”. The first page includes picture of the team member, the time in position, and the current and previous assignments. Page 2 lists all the processes, dates of evaluations, and scores on each process. This page is updated every time a skill check is performed. Page 3 list all the relevant work instructions.

Skill Checks have been revised a few times since they started. We have added new skill check points, as processes and responsibilities change for each job. They have been used by production to evaluate “job fit” and as a way to help identify team members for promotion.

4.4.3 Effects of Activities

As a result of the continuous implementation of the PDCA cycle for improvement, the number of LSSE have been decreasing this year, which has had a great effect (Fig.4.4.5). These results were directly related to the efforts of the cross functional Dispo team. We are also continuing to revise the work instructions. In fiscal 2019, there were many revisions and disposal of work instructions that had been neglected until then, and the number of cases became extremely large, but since then we have continued to revise the instructions and continue education. Standardization, training, and skill checks

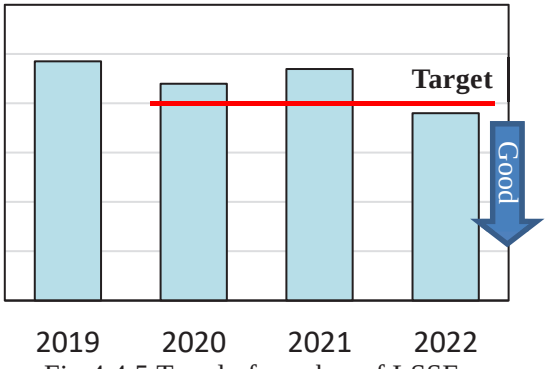


Fig.4.4.5 Trend of number of LSSE

are steadily having an effect, and the results of skill checks have improved compared to last year, so we believe that the PDCA cycle of standardization and training is working well. In 2022, there was no improvement in skills, but this was due to a large number of new hires, so that when viewed on average, the skills figures did not change significantly. However, we believe this is a result of the training provided to new hires, which maintained a certain skill level (Fig.4.4.6).

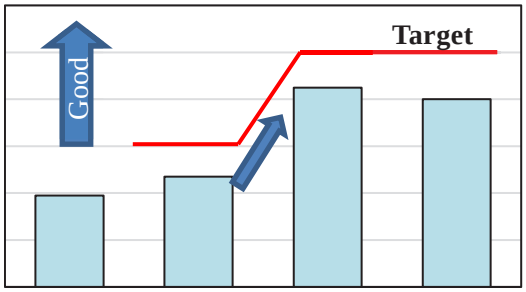


Fig.4.4.6 Trend of Skill level

4.4.4 Future plan

We will accomplish this by focusing our training efforts on anyone with lower scores. We will also be developing and fabricating more offline simulators to continue our proactive attack on scrap. In particular, we will continue to focus on chipping and spilling, which are common issues among new workers. Also, we will continue our activities to reduce the number of recurring problems to zero, continue to check the implementation status of measures that have been taken to prevent them from being forgotten. We would also like to start preventive measures. Since the number of LSSEs is on the decline, we will also work on improving Small Scrap in order to further reduce scrap rate. We will accomplish this by tracking all scrap by line, model, shift, etc. to find trends. We will continue our efforts to troubleshoot problems, reduce scrap, improve productivity, and make CNA a great place to work.

4.5 Quality assurance system to achieve Zero complaint

4.5.1 Background

We started production in 2002 and obtained ISO/TS 16949 certification in 2004. We have built a quality management system based on this certification and have improved the quality of our work by introducing Dantotsu activities and QC circles, etc...

As a result, zero outflow as well as recognition from customers for CNA's repeated excellent quality and delivery performance. This is accomplished by incorporating PDCA into process development to prevent outflow to the customer. This occurs internally to prevent external outflow. When problems do occur implement immediate control to process and develop recurrence prevention activities. In order to maintain the current status in the future, we need to understand which processes are functioning well and what are the success factors that have enabled us to achieve zero market complaints. Therefore, we will review the quality assurance system chart and strengthen the mechanism to guarantee products without fail.

4.5.2 Activities Status

(1) Quality building through continuous improvement activities

One of the major characteristics of the Cataler Group is that it has never had a market complaint or recall. If a catalyst product malfunction occurs, it is equivalent to a catalyst market claim, and in the worst case, it has a very significant impact, leading to a recall issue. To avoid this, the verification and control of good conditions are properly conducted at each step from development to mass production, and the outflow prevention by the quality gate is thoroughly implemented. (Fig.4.5.1)

When the Cataler Group starts up an overseas plant, it is relatively easy to introduce a system to ensure quality because many of the plants have the same equipment and product configuration as CAC, and the same quality assurance system as the CAC is implemented. For example, since equipment technology is common among Cataler group, the work procedures and QC process charts created at CAC for quality assurance can be directly applied to overseas entities. Also, from the perspective of preventing outflows, we have established a quality assurance process that will absolutely prevent

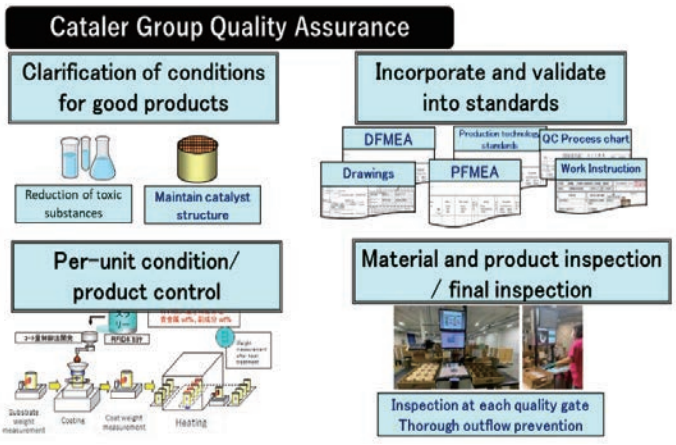


Fig.4.5.1 Cataler group quality assurance point

market complaints by building traceability to monitor necessary parameters in the production process and introducing a final inspection process.

(2) Create new Quality assurance system chart

All items explained the key points of quality assurance, but the processes that can meet the requirements of ISO/TS16949 are mainly described, and the key processes to achieve zero defects for each function, their linkages and the requirements for gate meetings, which are important for quality assurance, are not adequately presented. Was. Therefore, the aim was to identify the critical processes and timing for each function involved in product realization and to construct a quality assurance system diagram.

① Quality assurance system of the Cataler Group

Catalyst products are installed in automotive catalysts as emission gas purifiers. An emission gas purifier consists of a catalyst and an A/F sensor that detects the emission gas status. The function of the system is to reduce emissions containing harmful substances (HC, CO, NOx, etc.) to within the regulated limits, and malfunctions are detected by national inspections, periodic vehicle inspections by the end user and by the vehicle's own fault detection system. A malfunction caused by a catalyst corresponds to a market claim for the catalyst and, in the worst case, to a recall.

A major feature of the Cataler Group is that it has never had a market claim. This is because verification and management of good conditions are carried out properly at each step from development to mass production, and the quality gate prevents leakage. CAC is in charge of development and design, where design quality and verification to ensure durability reliability are carried out reliably. The characteristic that has the greatest impact on durability reliability is heat resistance, and the four key processes for ensuring heat resistance are as follows (Fig. 4.5.2).

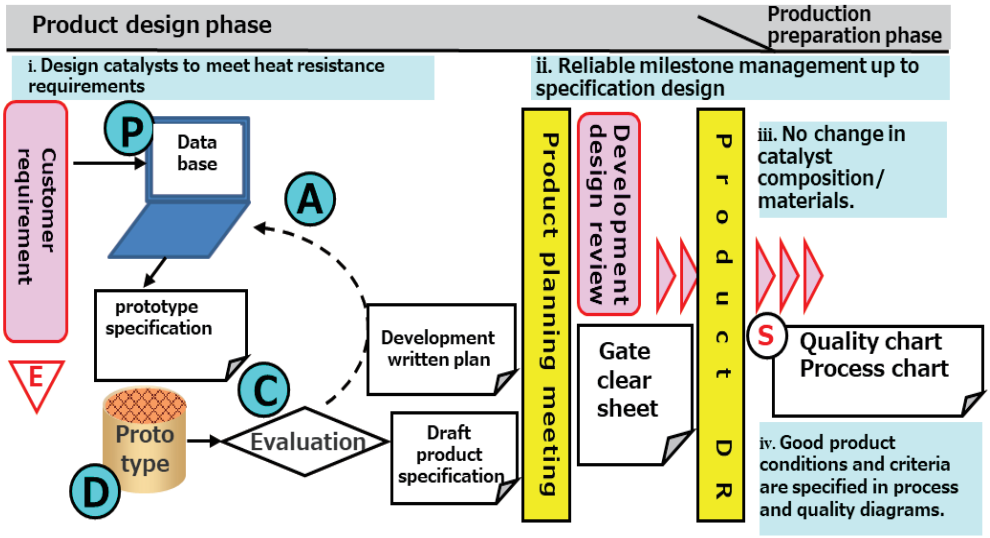


Fig. 4.5.2 Four key processes for ensuring catalyst durability and reliability

i. At the development planning stage, design a base catalyst that meets the heat resistance required by the customer, based on the durability D/B and material D/B accumulated through past development.
ii. Ensure milestone management up to specification design and visualize the achievement status of target values on the gate clear sheet.
iii. In principle, the basic configuration of the product and functional materials are not changed after the development design review. Scale-up studies will be carried out in the subsequent production standardization phase, but even if defects occur at that stage, verification and countermeasures can be concentrated on the changes made in the laboratory equipment and mass production facilities.
iv. Good product conditions and criteria to be controlled in mass production are specified in process diagrams and quality diagrams.

To date, we have achieved zero delivery failures with regard to important characteristics such as the amount of precious metals specified by our customers (hereafter referred to as 'E characteristics'). This is based on the thorough quality control of the characteristics affecting the precious metal quantity detected by past knowledge and FMEA. These characteristics related to the amount of precious metals are thoroughly known and thoroughly controlled by the planning of process plans for quality construction at the production preparation stage, the thorough prevention of leakage and traceability in mass production, and the display of these characteristics in control documents and check sheets at the production site, which are thoroughly known and

controlled by all employees. As a result, this has led to zero defects in the delivery of important characteristics (S, A defects). The important processes for building in the quality of these important characteristics are as follows and are clearly shown in the quality assurance system diagram (Fig. 4.5.3).

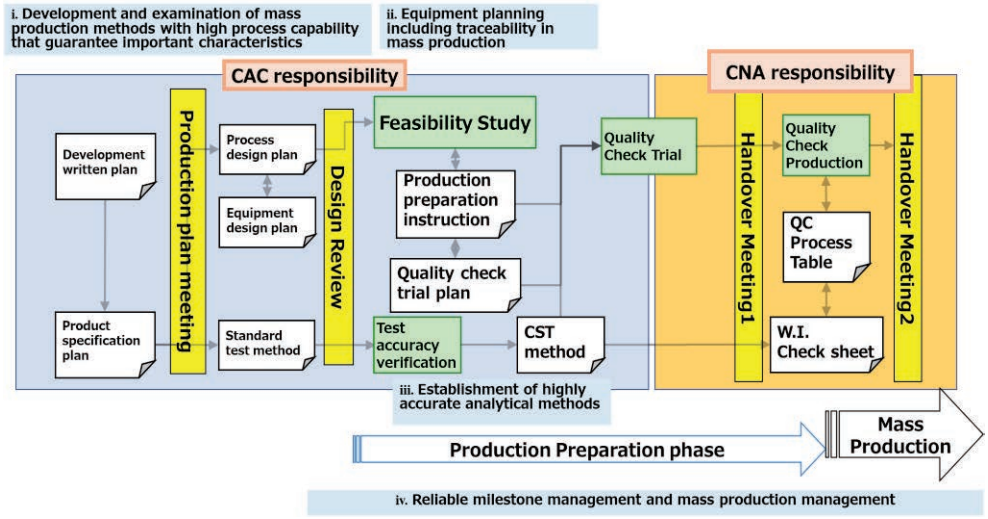


Fig. 4.5.3 Four key processes for the quality build-up of key characteristics

i. Develop and study mass production methods with high process capacity that guarantee the quantity of precious metals, through collaboration between R&D and production technology (concurrent engineering) at the advanced development stage.
ii. Design of on-line inspection to detect defects in precious metal content close to the processing point and establishment of a traceability system in units of one piece.
iii. Establishment of an analysis method with high analysis accuracy that can detect defects in materials, intermediate products and finished products.
iv. Reliable milestone management up to production readiness, verification of process capability at each phase, and daily management and change point management.

In order to prevent defective products from being passed on to the customer, a solid system is in place to ensure that inspection and final inspection during the production process and product audits by the quality control department are carried out, and a quality control system has been established to thoroughly prevent defective products from being passed on from the customer's point of view first. (Fig.4.5.4)

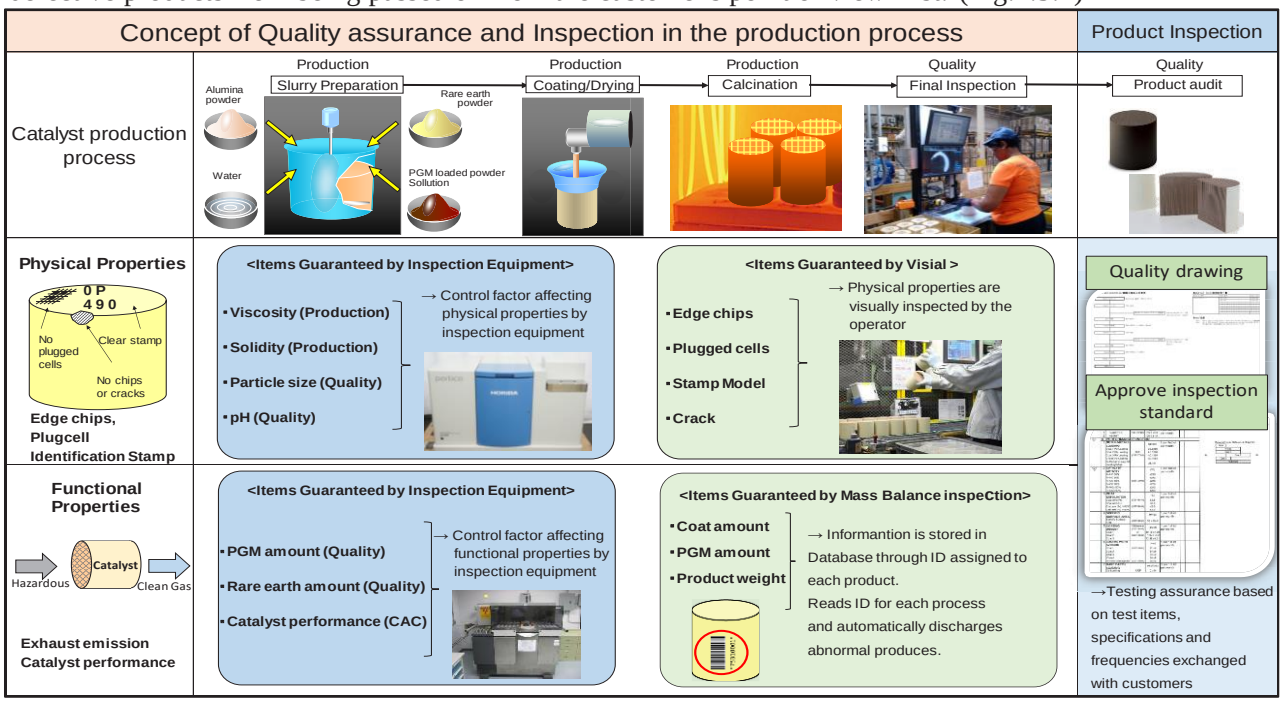


Fig.4.5.4 Inspection regime in the CNA

② Create new Quality assurance system chart

As mentioned above, CNA has established a quality assurance system and has achieved zero market complaints and zero delivery defects. However, the fact that we have been able to maintain our current good state is largely due to the experience of our members, which has been cultivated since CNA's inception. In

order to maintain the current good state in the future, it is necessary to clarify and clearly state the success factors. Therefore, we are clarifying a system to guarantee products with the involvement of related departments. The PES with support from the CAC, verifies and sets up quality confirmation trials, and the adequacy of good conditions is discussed at the production transition decision meeting to determine whether production is feasible or not. The PES then explains the process to the production department, prepares production check sheets, etc., and confirms the reproducibility of safety, quality, and productivity in the first production run of the first production run, the quality verification production run, and deliberates at the mass production transition decision meeting to make a decision on whether or not mass production is possible. After the transition to mass production, process capacity may not be maintained under the unavoidably set conditions due to changes during scale-up that cannot be verified at the design stage or production preparation stage, or due to the degree of variation. Therefore, an initial control period is established for mass production to check the stability of control items and make necessary improvements to stabilize quality as early as possible. New products are added to the initial control list and quality items are monitored for each lot. In particular, issues in new processes or at the production preparation stage, and past defect cases of products with the same specifications are clearly indicated in the list, and additional data are set as necessary. When abnormal trends or variations are large, automatically collected production records and product analysis results are analyzed to find the cause and implement countermeasures in cooperation with the relevant departments. Feedback is also provided to DRBFM and FMEA to prevent recurrence in the next model.

Since receiving the Deming Prize in 2015, the CAC has identified the key processes and timing of each function involved in product realization and has been working to reconstruct the quality assurance system diagram. This time, the quality assurance system in the CNA was created anew with reference to the quality assurance system chart reconstructed by the CAC.

The system chart sets up an initial management completion meeting and APQP weekly meetings, which were not previously described, and adds a process for following up open issues and taking action to ensure that the objectives of the readiness plan are not delayed. In addition, documents such as APQP, PPAP, PFMEA, WI and check sheets are completed before mass production and the PDCA cycle helps to solve prototype problems before mass production. In this way, we focus on preparation prior to mass production to create products that customers can rely on. Charts are reviewed and updated by CNAs when new processes are required or when recurrence prevention activities need to be recommended.

(3) Incorporate past problem recurrence prevention to prevent future issues

All daily production defects, regardless of their magnitude and impact, are registered in a system called the scrap database. Daily scrap events are reviewed in the Dispo meetings. In the scrap database, in addition to the location of the occurrence, the target products, the number of products, and the amount of loss, the cause of the problem, 5-why, the deadline for implementation of the countermeasure, and the person in charge can be registered, and progress is managed in daily meetings. LSSE and recurring events are tracked for root cause, corrective action and recurrence prevention using the scrap database. In planning countermeasures, not only the manager of the department in charge but also the person in charge is interviewed, the contents are checked, and the problem is confirmed on site to ensure more effective measures. Education is also essential to address the recurring human factor issues. They can experience the knowledge and importance of the process before entering the actual line to do the work. In this way, they can experience the failure and improve the attention of the workers. We will continue these activities to eliminate defects on a daily basis.

4.5.3 Effects of activities

We have been able to maintain zero outflows and zero consumer complaints, and as a result we have received quality awards from various customers. Since the establishment of CNA, we have seen zero market complaints, and we will continue to strive for zero market complaints in the future through QMS improvements and other Kaizen activity (Fig.4.5.5). In addition, LSSE is on a downward trend because of daily measures to prevent recurrence.

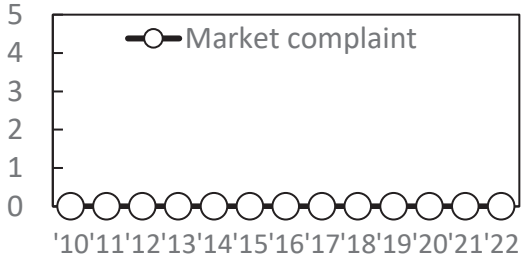


Fig.4.5.5 The number of market complaint

4.5.4 Future plan

We continue to work toward our goals of "zero market complaints" and "zero outflow to customers". Through activities in accordance with the quality assurance system chart, we aim to maintain zero market complaints and zero delivery defects. If a defect (rework) should occur, we will thoroughly prevent its recurrence and reflect it in the quality assurance system chart to innovate the quality assurance system into a more robust one. Although we have been able to maintain zero customer complaints, we are proactively working with the customer to create future satisfaction through design review, cost reductions, and program cooperation.

4.6 Continuous Kaizen of production

4.6.1 Background

Kaizen is considered one of the foundational pillars to continuous improvement. In production we use Kaizen in many ways to improve Safety, Quality, and Productivity. Daily activities include cross functional downtime review meetings, scrap and Dispo meetings, Go and See, tank farm audits, and shift handover meetings. We also participate in slurry improvement meetings to reduce downtime and scrap, Changeover improvement activities, TPM program, and S-Dantotsu activity. To achieve Productivity by Kaizen, we are continuously implementing these Kaizen activities.

4.6.2 Activities Status

(1) Production preparation process that builds in quality

① Management of smooth production preparation schedule linked with the CAC

In order to consistently produce only good products, it is important to build in quality in the production preparation stage and to maintain and manage it in the mass production stage. As shown in Figure 4.6.1, from the start of development to mass production, the CAC and CNA are working together to achieve this. At the start of production preparation, the CAC issues a production preparation instruction sheet, and a production preparation schedule is drawn up accordingly. Based on this, the production control department at CNA also formulates the production preparation schedule and manages the progress of production preparation. The progress and issues are confirmed at the APQP meeting once a week, and the information is shared with the CAC as needed. When transitioning to the next phase, a gate is set, and related departments gather to confirm that the transition requirements are met.

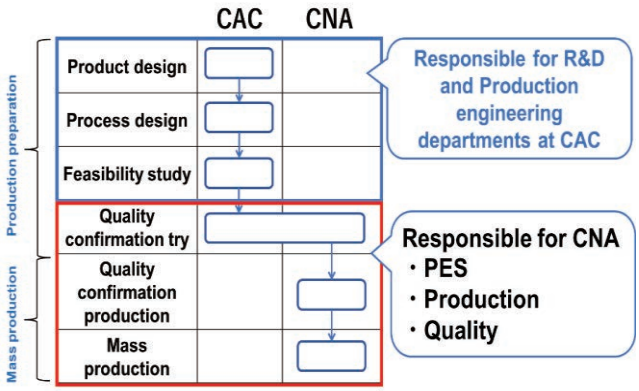


Fig.4.6.1 Division of roles up to mass production

If the migration requirements are not met, it is counted as rework, and the key activities for the number of gates that have been migrated and reworked are managed as KPI. The results are reported to CAC and shared as the global production preparation status, leading to a review of the system.

② Steady launch of new products

When launching a new product, we design the product and the process at the CAC and reproduce it in the main process of CNA (quality confirmation trial: QCT). QCT is jointly carried out by CNA's PES and engineers at the CAC, and 100% of the time, it can be launched within the set deadline.

One of the major factors that made it possible to launch reliably within the deadline was the accuracy of mutual communication. At CNA, based on our experience so far, we are conducting education centered on OJT in order to secure the necessary competence for the production engineering department. In addition, an environment has been established in which external training can be taken as necessary, and the ability of the production engineering department is at a certain level. In the future, we will increase the number of items to be implemented locally, such as the implementation of process design and the design/manufacture of jigs, in order to shorten lead times and reduce costs.

(2) Daily Kaizen activities have been incorporated into the daily routines of Production Management

In order to consistently produce good products, it is necessary to continue to do what has been decided without fail. Therefore, we went back to basics and clarified the daily management system for production

(Figure 4.6.2). This has made it possible to maintain optimal conditions at the production site by clearly defining what needs to be done by the organization and by checking the management items in accordance with those items on go and see etc.

At the end of each shift production leadership will handover information to the next shift to give them the best chance of success. This has been an evolving process starting from hand written notes, to a formal communication board, to now an electronic display showing real time situations. This information is now presented in a standard format in real time and with a quick review the AL's will know the status of each process, issue or follow up items, and any Safety or Quality issues.

We've also incorporated daily management go and see's into our daily routine. These Microsoft Form based audits allow us to check daily inputs are meeting requirements, TM's are following standard work, and offers a bridge of communication between leadership and employees.

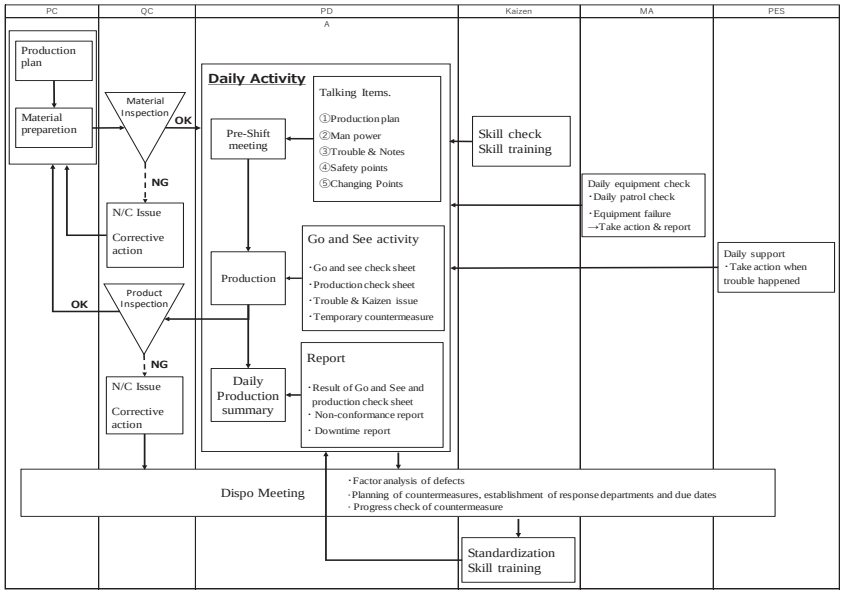


Fig.4.6.2 Daily production flowchart

However, even if you do exactly what you set out to do, problems can occur. Non-conformance reports are issued for abnormalities and defects in the daily process, and information is shared. Based on this information, we investigate the cause of the problem that occurred the day before the Dispo Meeting from the perspective of the phenomenon and location, etc., and plan to implement permanent countermeasures, recurrence prevention, and horizontal deployment to other processes. In addition, information other than one's own workplace is developed and shared at this meeting. All defects are managed by the Scrap database, especially LSSE and recurring events are tracked for and recurrence prevention using the scrap database. In addition, CAC informs the group of problems and improvement cases on an irregular basis. Urgent matters are immediately notified, and the equipment is stopped for confirmation. In addition, we work with related departments to select and implement improvement cases with a sense of urgency, thereby maintaining the production process in good condition at all times.

(3) Kaizen activities to increase productivity

Increasing equipment availability is essential to improving productivity. CNA classifies downtime into three categories: Malfunction down time (MDT), Other down time (ODT), and changeover (C/O). Among these, MDT and ODT include stoppages such as equipment breakdowns, which are often mechanical and cannot be resolved by the production department alone. In order to improve productivity, we are working on reducing the Changeover time, which can be controlled by the production department. In

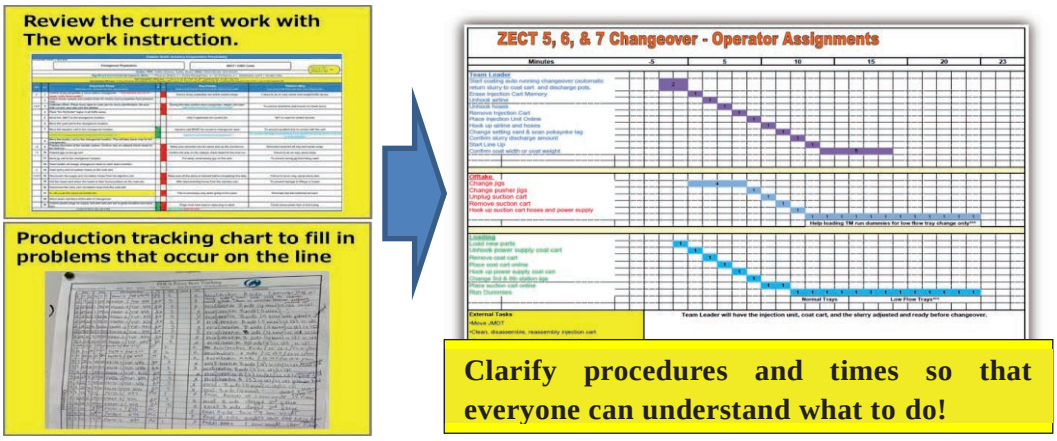


Fig.4.6.3 Point of Changeover Kaizen

the production of a wide variety of products, C/O is unavoidable. However, the impact on productivity is significant if wasted time is incurred during the C/O. The goal is to increase the amount of time available for production by reducing the amount of time spent on C/O

Each month we focus on one specific line to improve the C/O process. This allows us to narrow our focus and find the problems on each specific line. Standard work and C/O assignments are reviewed and revised based on those specific line's needs. This has shown to be much more successful than focusing on overall C/O time. The most common problem found is member's do not know what to do during C/O. To aid the TL's in providing direction for their members we created C/O assignment documents (Fig.4.6.3). TM's can look at chart and know what to do when. Based on this assignment sheet, we educate workers about change over, and have established a system that allows everyone to work in the same way and complete work in standard time. Recently, I have created an environment where I can make videos and check them repeatedly so that I can study the movements even if it is not the timing of the C/O.

(4) Development of S-DANTOTSU activities incorporating the concept of TPM

There is a limit to the cost reduction that relies solely on the reduction of precious metals. In order to continue to grow further, it was necessary to reduce loss and gain a cost advantage in addition to stable quality that reduces the waste rate by continuing to make improvements in the production process. It was considered necessary to promote improvement of all losses in the production process from a new perspective. So, we are starting in 2020 we implemented a Total Productive Maintenance (TPM) program in the production department. Principles of TPM ①Find it- Inspect, detect, and the correct defects using preventative, predictive and basic equipment care techniques. ②Fix it- Return the equipment to optimal conditions. ③Keep it fixed- Sustain and improve inspection and repair. Eliminate chronic problems. By taking ownership of our equipment, we can improve 5S, reduce downtime, and prevent breakdowns. Inflight inspections are completed weekly on all processes. ④"CLAIR" Clean, Lubricate, Adjust, Inspect, Repair is the backbone of our TPM activities. These are completed weekly by the Team Leaders and audited by the Area Leaders and TPM Specialist. In addition to the cleaning and inspections we also complete so autonomous maintenance tasks.

Through this activity, we were able to learn the importance of keeping equipment in good condition. Therefore, we started activities aimed at further evolving our activities, reducing the eight major losses, and improving productivity. That called S-Dantotsu activity. First, we selected CL12, which was known to have issue with Low productivity as a model line and started activities. About this activity, we called Rising Activity. As the investigation progressed, it became clear that High MDT, C/O, and ODT were problems as factors for low EOA. Since this has led to clear losses such as breakdown losses and other stoppage losses, we have started activities with the goal of first addressing these three factors that reduce the utilization rate, and then raising the EOA and productivity of the facilities. In order to reduce the rate of nonconforming products, CNA has set annual reduction targets and is promoting initiatives. In promoting these activities, members from production, production engineering maintenance, the Kaizen Department, and QC were brought together to establish targets for MDT, ODT, and C/O, respectively, and measures were implemented from a multifaceted perspective. By concentrating on one coat line for checking, we are steadily analyzing the occurrence of monthly losses and discovering and resolving the causes. In the future, similar activities will be continued on other lines, and analysis of other losses will also be promoted to improve EOA.

4.6.3 Effects of activities

Operational availability of ZECT, our main equipment, is on the rise thanks to continuous improvements such as C/O and the introduction of TPM (Fig.4.6.4).

Continued efforts to reduce C/O time have resulted in a downward trend compared to last year. The number of months below the X% target has increased, and we are seeing the effect (Fig.4.6.5). However, we have not yet achieved our target for annual C/O rate. We will continue to improve work efficiency by setting up assignments focused on specific lines and creating and optimizing C/O assignment charts.

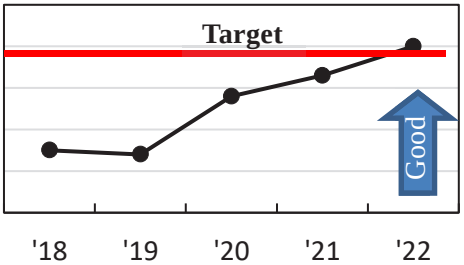


Fig.4.6.4 Trend of EOA

Since the start of the activities, the production department has been continuously implementing CLAIR activities. Although there were some delays due to insufficient numbers, 100% implementation was achieved by the end of the year. This activity is reviewed on a weekly basis to ensure that it is being implemented. As a result, they are able to keep the equipment in the correct condition and are able to notice abnormalities.

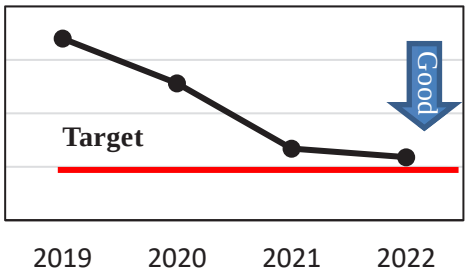


Fig.4.6.5 Trend of change over time

4.6.4 Future plan

Continue to use our cross functional teams to improve Safety, Quality, and Productivity. Continue Productivity KAIZEN activities, such as the CL12 Rising to be promoted this year and continue to improve productivity and other items that have not reached their targets. In addition, the MDT, ODT details of each equipment will be analyzed and activities will be developed to reduce each loss. For continuous improvement we must continue to dig deeper into the issues and doing that as a team will strengthen CNA as we prepare for future development.

Production at the new plant and new equipment is scheduled to start within this year, and the production department will also carry out new work. Even there, we follow the established procedures and continue to make Kaizens, aiming for a plant with higher productivity and less scraps.

4.7 CNA Human Resources Strategic Management and Training and Development Plan

4.7.1 Background

Since inception, CNA has been fully invested in the successful promotion and development of leaders within the organization. CNA believes that CNA's strongest asset is its employees. Our commitment is to create and provide an environment of learning and growth both professionally and personally. CNA has established long standing partnerships and secured funding through the local community college system to provide the best learning opportunities possible. CNA prides itself on providing new and innovative ways of earning, securing, and facilitating those offerings both in-person, online and also through outside vendors. The main goal is to ensure that all leaders in the organization have the support and resources they need to be successful and to maintain CNA's reputation of being a strong and competitive business.

4.7.2 Activities Status

(1) Visualization of future workforce planning

It is very important for organizations to plan their workforce according to their future growth and to organize the skills needed for this growth. The Management Steering Committee (MSC) meets twice a year to review the succession plan for current salaried headcount. In addition to these meetings, each department submits a labor budget for the current year and for three years forward indicating needed headcount based on growth. Currently, CNA is building a satellite plant for future expansion and BCM. Therefore, we need to plan for personnel and training separately from the traditional factories. So, we are currently looking at the staffing plan for the new facility, which needed headcount is viewed on a separate spreadsheet. In that spreadsheet, the competencies and skills required for the post, as well as the timing of the recruitment implementation are also listed. While this headcount would be considered "new headcount," It is very difficult to operate a satellite factory with only new personnel. So, it may very likely be a seasoned team member from CNA who is then backfilled with a newly hired team member at CNA so that the experience is spread across both locations. We plan to do this so that the initial operation can proceed smoothly. As of February 2023, key positions have been identified and staffed for the implementation process of new equipment for the satellite plant.

We will continue to build a system that can handle future growth by implementing personnel planning and training in accordance with the personnel plan discussed and prepared by the MSC.

(2) Change in recruitment policy to secure human resources

Prior to COVID, CNA maintained staffing at a functional level that was able to meet demand. This was achieved through various recruitment efforts including: temporary staffing, contractor recruitment, and permanent hiring. During COVID, CNA shut down operations for a period of 2 months to align with customer shutdowns. During this time, many economic incentives were given such as: state and federal unemployment and economic stimulus payments, which resulted in many people not returning quickly to the

workforce. With these payments, in some cases, exceeding wages, it made it difficult for industries throughout the US to recruit effectively. Additionally, where CNA had been one of the top wages for our area, surrounding companies began to raise their rates to remain competitive and attract the same job applicants and personnel. To remain competitive within the area, and in consideration of the location of the new plant, CNA completed a salary survey of the surrounding businesses. The survey showed that, while not inferior to other companies, CNA wages could be more competitive to attract applicants. In addition, inflation triggered by the aftermath of COVID had increased the need for higher salary levels. Feedback from employees that left in 2021 and 2022 also indicated that salary was one of the main factors in their departure. Therefore a 20% increase in the hourly rate was implemented, which was sufficient in comparison with surrounding companies. To keep wages fair, salaried staff also received an increase. With this change in wages, CNA saw employment growth at 15% in 4 months, gaining an additional 55 employees in that timeframe. Turnover also shrank from an average of **% (previous 4 months) to **% (recent 4 months).

Previously, CNA's primary recruitment efforts, for both hourly and salaried members, was to hire mainly people with experience in the work for which they were recruiting as permanent employees and train them over the med/long term. However, such needs were particularly high for members of the production line, and it was not easy to attract people. Therefore, CNA shifted its perspective and increased the level of temporary hires, even if they have no experience, and to train them in CNA's dojo and on the actual line to gain experience, before re-evaluating them and hiring them as permanent employees. These measures widened the recruitment frontiers and resulted in more personnel applying for jobs, leading to the hiring of CNA.

(3) Developing work instruction for positions within departments to assist in cross functional/specialized training

In response to CAC's C-HAM organizer requests for a more prolific Specialized Training initiative, CNA formulated a process for creating work instructions, based on the WISDOM (Work Instruction Sheet for Divisional Operation Management) model, for each position within salaried departments to help facilitate a more robust process for cross functional specialized training. PDCA is utilized to create these WISDOM and to monitor the effectiveness of cross functional training. Human Resources met with Quality (Lab/Internal Audit), Engineering and Finished Goods from May '21 – Sept '21 to plan and create WISDOM for their department's individual positions. Meetings were held monthly to identify the positions that needed WISDOM and then to create and establish the correct format. These newly created WISDOM will be introduced to the department for cross functional training to begin and then assessment and effects can be monitored and captured. The goal would be to have a more well-rounded workforce that can do multiple functions within their departments in the event there is a shortage in position or need for additional help in projects.

With the Quality and Engineering departments having functioned for the past year within these WISDOMs, we have seen an increase in cross functional support for times of staffing shortages. Specifically in the Quality department, Quality Engineers have the ability to work cross functionally in both Finished Goods, Lab, Disposition, and with suppliers and customers. Through this cross training, it has made the department more

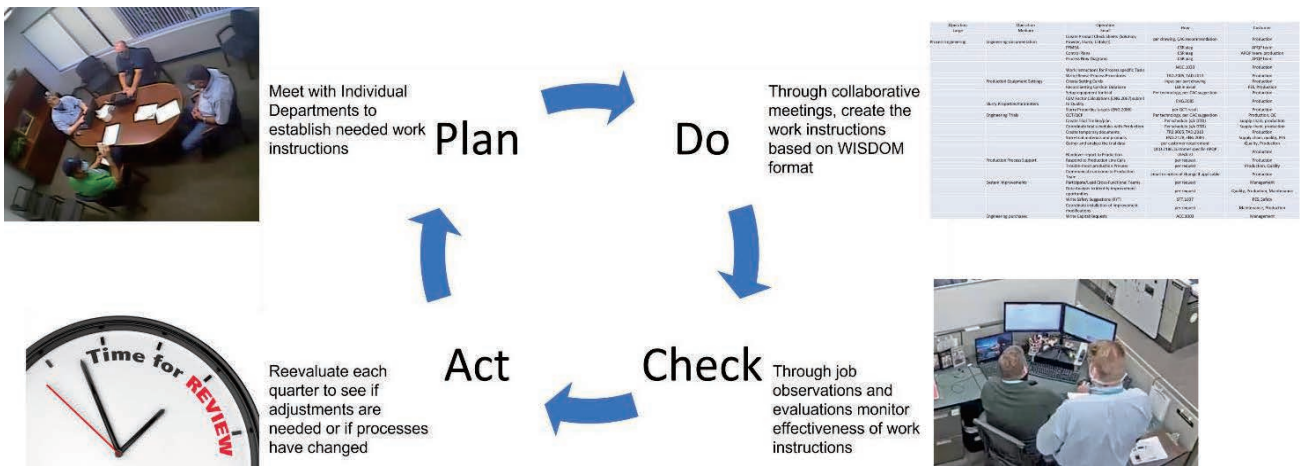


Fig.4.7.1 PDCA cycle of Specialized Training using WISDOM

diverse in being able to assist when issues arise and keep production supported. Another example is in the Human Resources department, each area of responsibility has been cross trained with another (i.e.: staffing/recruitment cross trained with training/DOJO and employee relations cross trained with payroll/benefits). This allowed the department to quickly respond to and support team member's needs.

(4) Enhancement of Human Resources Training for new employee

CNA provides each new employee with basic new hire orientation and training to ensure they understand the Safety, Quality and Productivity expectations of the business. Each employee is assigned an OJT record for both CNA objectives and their individual job responsibilities. This training is achieved with hands-on, testing, and job observations to ensure that the team member has all the resources and support necessary to perform safely and with a high-quality focus in their positions. In 2019 the Dojo, where a significant amount of offline training takes place, was relocated to a larger space to offer additional opportunities for hands-on training. A safety area was added to give team members a better understanding of safety issues that could present in the workplace. For example, training on how to handle heavy objects and how to be careful when lifting objects whose weight is difficult to recognize from their appearance, using actual containers. Additionally, as mentioned above, simulators of some of the machinery within the plant were set up so that team members can see how to properly handle equipment and parts. This is aimed at preventing defects that are likely to occur in new operators by providing training.

Fig 4.7.2 Safety area of Dojo

4.7.3 Effects of activities

The Satellite plant is currently being built and equipped according to plan.

We are in the process of acquiring personnel accordingly. So far, we have been able to hire the planned personnel without delay. Through these activities, the satellite factories can be set up smoothly and the CNA can operate without confusion.

Measures such as changing the recruitment policy and increasing hourly wages have had a significant effect in terms of recruitment and have eliminated the problem of insufficient numbers of production members, which at one point had a shortage of more than 50 people. In addition, the implementation of training for new recruits has enabled them to learn from the outset the points to pay attention to in carrying out their work, and they have been able to start production without significantly changing the incidence of defects such as Chips, which are likely to occur in less experienced members.

As a result of measures such as changes in salary amounts and better initial training, the turnover rate has remained low compared to the national and state averages, and CNA believes that it has had some positive effect on employee retention (Fig. 4.7.3).

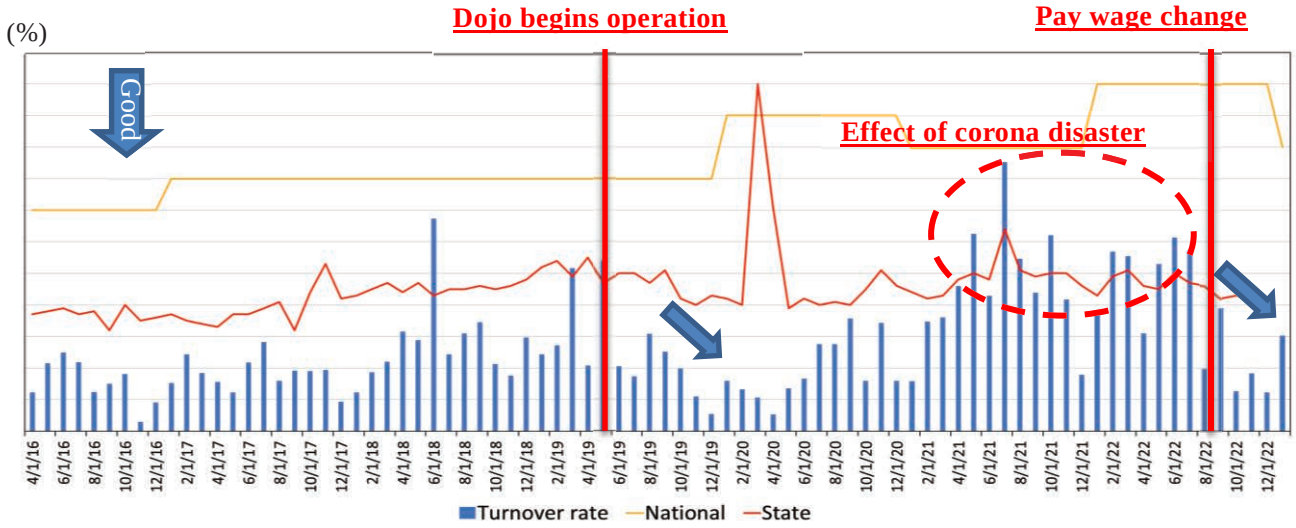


Fig.4.7.3 CNA Turnover rate in comparison to National Manufacturing and State Average

4.7.4 Future plan

Human Resources will work with the last remaining departments in the creation of work instructions for their roles to effectively establish a more prolific Specialized Training program (Finance, Kaizen, and Production). For FY2023, we will finalize work instructions for all departments positions. This will allow for us to move forward with C-HAM's objective to have all departments cross functionally trained in order to create a more stable business model in the event of turnover or other unforeseen circumstances that would leave a position vacant. Also, recruitment and employee satisfaction activities will continue to be implemented on an ongoing basis, with the aim of achieving better recruitment and turnover rates. We will continue to place high value on education and technical training opportunities through partnerships with the local community college systems and other technical training programs. We will focus on maximizing recruiting efforts both within our internal transfer and promotion process in addition to utilizing agencies that are equipped to attract, evaluate, and secure professional and skilled workforce.

Through these activities, we will continue to strengthen our organization and human skill development so that each team member can demonstrate his or her abilities and the organization can be efficient and effective.

5. Comprehensive effect

5.1 Tangible effect

In order to achieve the management objectives of SPARK 2030, appropriate management strategies have been formulated and TQM activities have been continued; the impact of TQM activities on management objectives and quality, and the impact on the measurement of the realization of management strategies are introduced as representative examples.

Status of management objectives and quality-related results through TQM

Although the production volume has been on a downward trend due to the production volume adjustment in the Corona disaster, CNA was able to maintain sales volume of more than ** million units to Company A, B, and C through customer satisfaction improvement activities led by MTC.

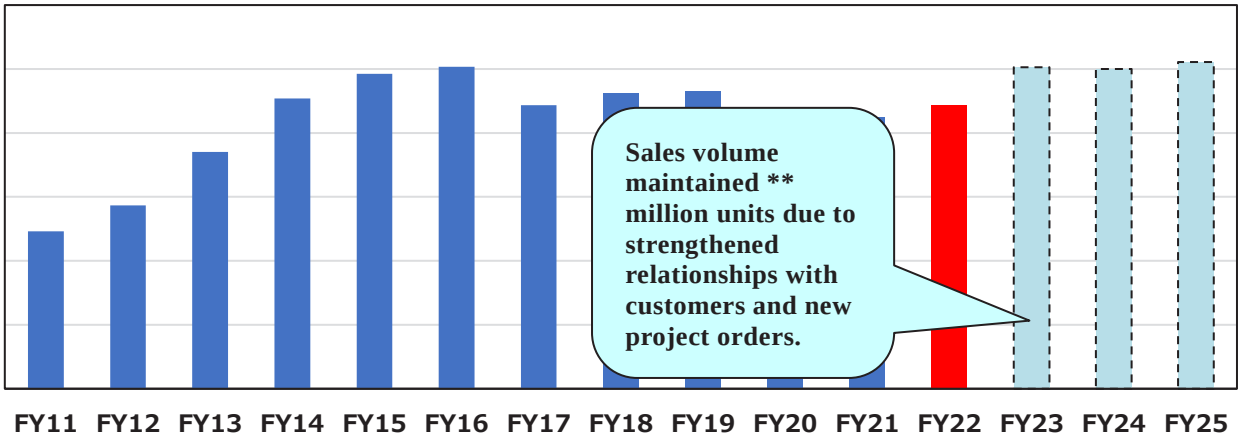


Fig.5.1 Sales Volume Trends

In terms of product quality, through the establishment of a quality assurance system and continuous improvement activities, CNA has achieved zero market complaints and zero occurrence of serious quality problems and has received the Company C Quality Management Excellence Award for ten consecutive years, earning high praise from customers and contributing to "Cataler Quality".

Table 5.1 Quality Award Status

Customer	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY	FY2022
Company C	Quality Award	Quality Award	Superior Quality Award	Superior Quality Award	Presidential Award	Excellent Performance Award	Exc Perfo Award	Superior Excellent Performance Award
Company B								Overdrive Award

Received consecutive quality awards for Cataler Quality.

First award in recognition of continued high Quality, Shipping, Safety, Cost, Innovation etc.

Effectiveness against KPIs set in the four management strategies

Sustainable Kaizen

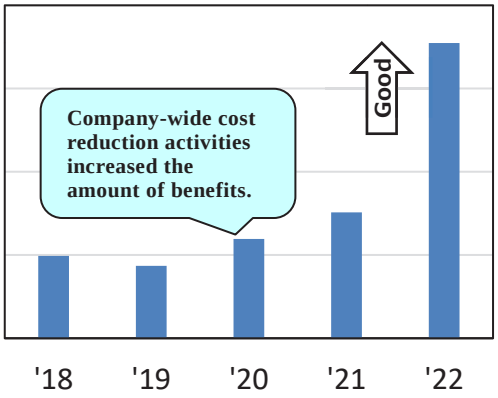


Fig.5.2 Cost reduction amount and number of items

Productivity by Kaizen

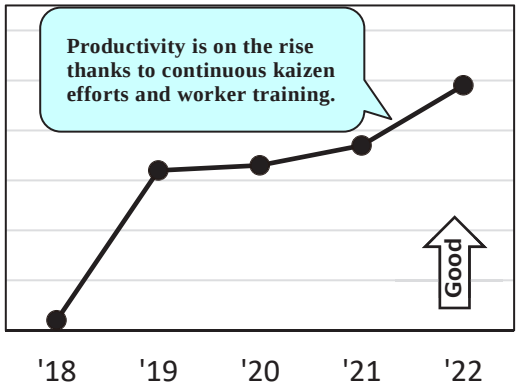


Fig.5.3 Trend of ZECT PPH Average

American #1 company with Kaizen

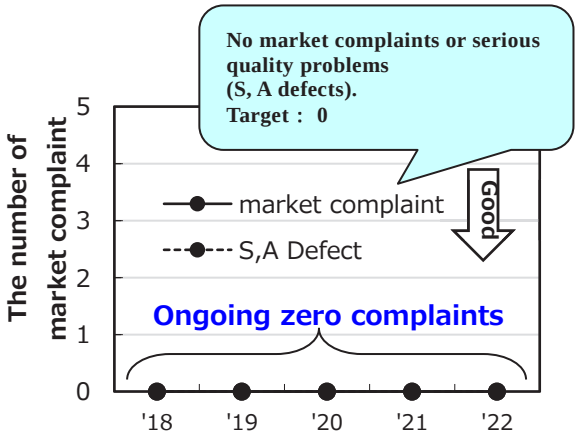


Fig.5.4 the number of market complaint

Reborn by Kaizen

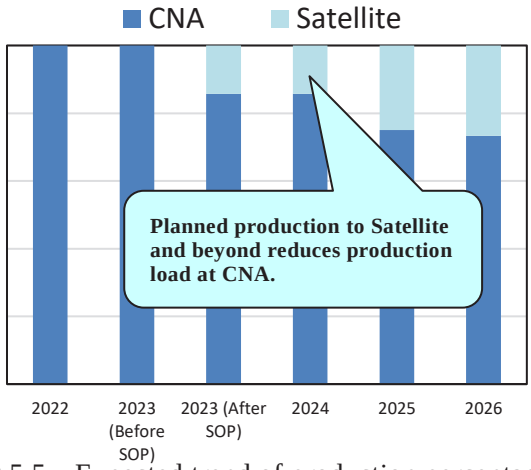


Fig.5.5 Expected trend of production percentage

Recognition from the community and customers

Table 5.2 Non-quality related Award Status

Customer	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022
Company C	Excellence partnership	Excellence partnership			Delivery & cost award Environmental stewardship			Commodity Leader	Commodity Leader
Community			Excellence in International Trade	Lincoln county industry of the year					Lincoln county milestone achievement award

We were able to receive awards for our contributions to customers and the community in non-quality related awards.

5.2 Intangible effect

① By formulating SPARK 2030 and clarifying CNA's direction and management goals, employees were able to promote TQM activities with a greater sense of ownership.

② Customer-first sales activities have strengthened relationships of trust with existing customers and built relationships of trust with new customers. It led to the continuation of Company A and C business, and we received an order the Company B project through 2031, we are expected to participate in the Company D competition.

③ Good cooperation with the local community and increased recognition from stakeholders. For example, Ongoing support and fundraising for Relay for Life, education in collaboration with local college etc.

④ The use of IT has led to higher profits, more efficient management, and improved communication.

⑤ The establishment and operation of systems for human resource development, including leadership training, improved the skills of each employee and enabled them to act autonomously.

6. Future plan

CNA aims to achieve its management goals by utilizing TQM tools and faithfully implementing the key measures set forth under SPARK 2030 which were revamped in fiscal 2019 and the CNA Med/Long-term management plan which were revamped in fiscal 2022. We will continue our TQM activities with the aim of further enhancing customer value through various Kaizen measures and achieving sustainable success.

The automotive industry is said to be in the midst of a once-in-a-century transition, and is undergoing major changes such as electrification, information technology, intelligence, and the rise of new businesses. Even in this changing environment, we need to continue to create and provide value that exceeds customer expectations. We aim to strengthen our BCM through the establishment of satellite factories and to further enhance our competitiveness through the Mitten Project. Through these activities, we hope to realize "SPARK 2030".

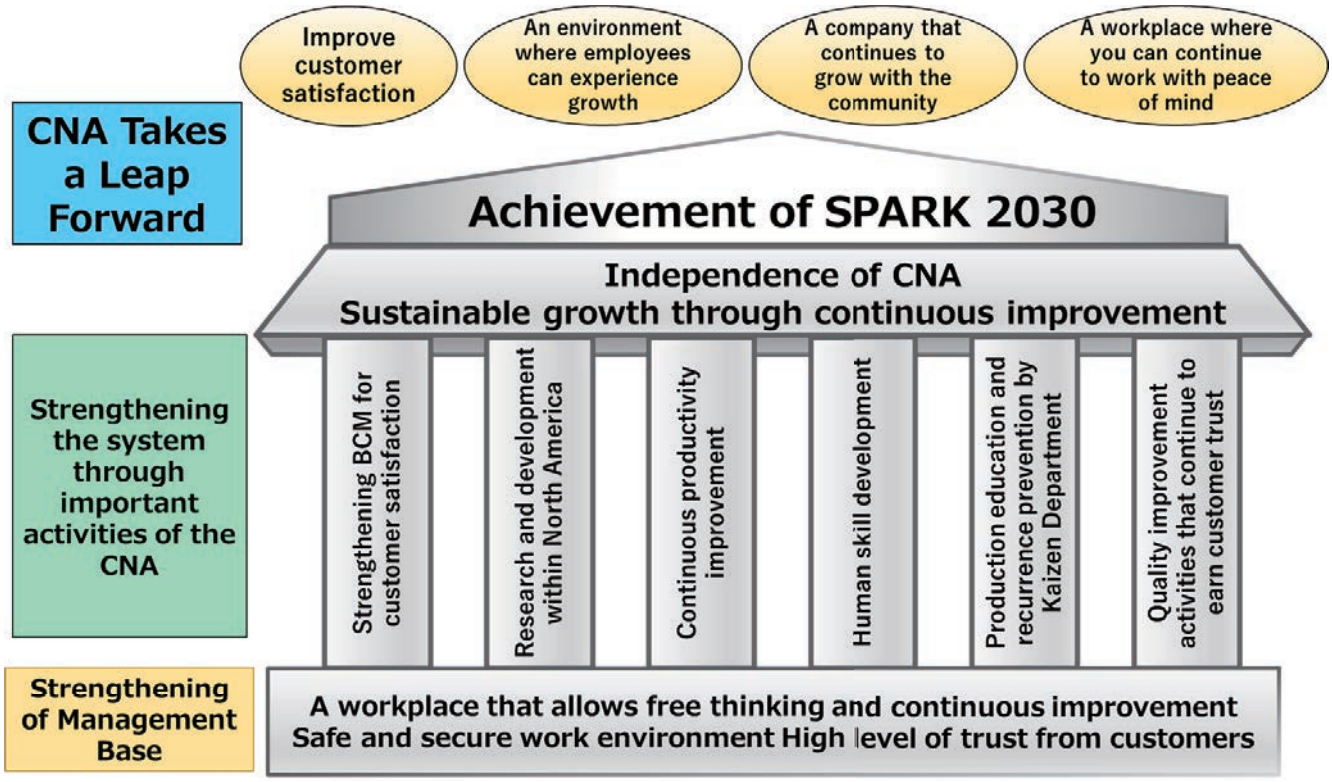


Fig.6.1 Future plan image of CNA

Glossary

Term		Definition
A	ACE	A nick name for the next-gen. mass production machine in the Cataler group. The equipment concepts are: A : Adaptive, Agile, Automation C: Cycle Time Improvement, Cost reduction E: Equipment
C	CAC	The official name is CATALER CORPORATION. The headquarters of the Cataler group.
	CEC	The official name is CATALER EUROPE CZECH S.R.O. One of the overseas entities (production sites) located in the Czech Republic.
	CNA	The official name is CATALER NORTH AMERICA CORPORATION. One of the overseas entities (production sites) in the U.S. (North Carolina).
D	Dantotsu activity	Quality improvement activities led by the production department and involving related departments.
	Dispo. Meeting	Abbreviation for Disposition meeting. Meeting every morning at 9:30 a.m. for all departments concerned to discuss LSSE, recent problems etc.
G	Global VISION2025	A Cataler group vision formulated in 2016 showing our "ideal state and vision" in 10 years (2025) and management issues. It is developed based on the management philosophy, external and internal environment, and employees' voices, and incorporated into the medium- to long-term management plan, company hoshin, and yearly hoshin.
H	Hoshin	Generally referred to as a policy, it is a specific direction of how to reach what is indicated in the VISION, etc.
L	Large Scale Scrap Event (LSSE)	A quality defect event with 10 or more scrap units.
M	MTC	The acronym stands for Michigan Technical Center. The lab in Detroit. Facilities for in-house testing of catalysts on actual vehicles, etc.
P	PES	Acronym for Production Engineering Service.
S	SCOOP	Acronym for Stream of process for Choosing and Orienting Optimum Plan with roadmap and masterplan. A process to define a system for the establishment and operation of the technology roadmap to be shared and ensured by all parties concerned, and to ensure consistency with the sales master plan.
	Scrap database	A database in which production defects are recorded when they occur. Not only descriptions and amounts of defects, but also the causes and countermeasures are recorded. Past defects and countermeasures can be reviewed.
	SPARK 2030	A vision formulated in 2020, showing CNA's "ideal state" and "management strategies" for the next 10 years (2030). It is formulated based on the management philosophy, external and internal environment, and employee feedback, and is developed into corporate hoshin and annual hoshin.
W	WISDOM	Acronym for Work Instruction Sheet for Divisional Operation Management. Kind of Staff Work Instructions.
Z	ZECT	Acronym for Zero Emission coat & quick Calcination with Traceability. A comprehensive mass-production machine that uses the ZEC process to minimize the loss of precious metals and other materials, shorten the firing process, and ensure product traceability.