

Only one year after the introduction of CAM-TOOL, Showa was able to reduce man-hours significantly.

SHOWA MOLD & ENGINEERING CO., Ltd

SHOWA MOLD & ENGINEERING made efforts to reform their mold & die manufacturing process in 2011. At that time with the introduction of CAM-TOOL, they achieved significant improvements in construction, and they also achieved efficiency through direct cutting.



Mr.Fukuyama



Head office

~ Efforts to reform Mold & Die Manufacturing methods ~

SHOWA MOLD & ENGINEERING is based in Tokushima, founded in 1937 as a manufacturer of precision equipment. They're designing and manufacturing the molds & dies of large plastic parts, including interior parts such as door panels and instrument panel of the car, and exterior parts such as bumper and extension headlamps, OA equipment, the main case frame of office equipment. They introduced CAM-TOOL, taking advantage of reform process in 2011, manufacturing group to operate the machine actually and CAM group worked on molds & dies manufacturing reform, and they have achieved significant results. Today, we interviewed to the representatives of each group and Mr.Fukuyama is a managing director advocate the process reform.

■ Starting of Process Reform

Mr.Fukuyama said, "Entering into a challenging environment for mold & die manufacturing, in 2011, I have arrived at SHOWA MOLD & ENGINEERING. My task was to reduce costs and shorten lead times for manufacturing molds & dies. I started a project to establish a new manufacturing process, and to review the existing methods of mold & die processing. I decided to review everything, including the CAM system, tools, cutting conditions, and cutting mode. We realized that there was a limit to improving cutting conditions, cutting mode, etc, with the CAM system we were using. so we changed the CAM system."

■ The Introduction of CAM-TOOL and the Improvement of NC data

We selected and introduced CAM-TOOL as we had previous knowledge of its existence. The process reform was initiated and started to accelerate substantially at that time. We have adopted a method of creating NC data by the manufacturing group and the CAM group working together. By learning about tools, cutting conditions, and cutting mode from the manufacturing group, the CAM group created NC data. The manufacturing group gave some feedback to the CAM group by monitoring the CNC milling, and improvements have been made to the NC data gradually.



■ The Benefits of CAM-TOOL - The Improvement of Rough Cutting

We have to use both short and long extension length tools, because our work pieces tend to be deep. When machining with short extension length tool by using previous system, we had to create a surface, in the model, to not interfere. By using "Avoid tooling interference" in CAM-TOOL, we could easily output NC data, that would not interfere.

Furthermore, we could reduce human error that occurs, when we defined the machining area manually. We were able to increase the proportion of good cutting conditions. In 2nd Rough Cutting, we can now cut the remainder of the previous process efficiently.



Mr.Murahara, Mr.Sugihara

Chattering has occurred, in the corners, using the previous CAM system. The cause of the overload was that the previous system could not detect remaining stock, accurately. Therefore we needed to remove the un-machined part in previous process gradually, so the number and type of tools increased. By using "Solid in previous process" of CAM-TOOL, we could detect remaining stock area, accurately. CAM-TOOL has functions to insert a corner R, and functions to output the cutter paths with a constant load on the tool. As a result, we were able to reduce the number and type of tools used compared to before.

■ The Benefit of CAM-TOOL —The Expansion of Direct Cutting

The CAM-TOOL system has an abundance of functions such as to decelerate before the corner, and to control the feed-rate according to the cutting load. By combining these functions, we were able to machine with long tooling extensions. Recently we realized stable machining with the conditions of the L/D ratio is 90(L-tool Length, D-Diameter). As a result, CAM-TOOL enabled us to be machining where we used to use electric discharge machining. We have succeeded in reducing electrode use, significantly.

For example, in the molds & dies with deep areas, the places to use electric discharge machining has been reduced to only one place. In addition, we were able to reduce the polishing process, which led to a significant reduction in lead time.

■ The Benefit of CAM-TOOL —Direct Cutting in Finishing Process

The data of CAM-TOOL enables us to output a smooth cutter path that is composed of uniform configuration points. Our molds & dies have depth in the shape. The projection length is longer in the finishing process. As a result of introduction of CAM-TOOL, we can machine stably with the long tool projection length, in the finishing process, by improvement of the quality in the semi-finishing process, and high quality cutter path. Therefore, in the case of deep molds & dies, we were able to use only one ball end-mill for each part of production and structure, because of the less tool wear. CAM-TOOL led us to the reduction of number of tools, and reduction of polishing process.



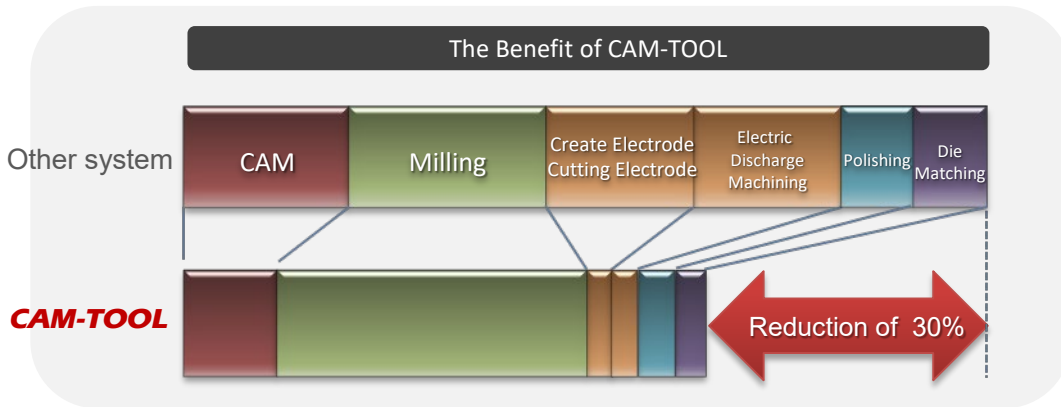
CAM Operation Room



Mold & Die that is direct cutting

■ Process Reform and the Benefit of CAM-TOOL

The process reform proceeded smoothly, and the way of manufacturing molds & dies also has changed dramatically. As a result, we have realized direct cutting in almost every process. Also the number of electrodes was decreased substantially. The ripple effect was that we could reduce the time of creating and cutting electrodes and also reduce the time of electric discharge machining. This allowed us to save much electrode-related cost. It would be no exaggeration to say that process reform was helped tremendously by using CAM-TOOL.



■ By Introducing CAM-TOOL

Mr. Sugihara said, "I have designed molds & dies since I entered the company. Everyday I was thinking about layout of molds & dies, and designing till I was asked to be in charge of CAM. It is different field, but is also one process of manufacturing molds & dies, so I decided to try. I started to learn the system from December 2011. I only received a basic explanation from the engineer of C&G Systems in the beginning, but I didn't take any training. I was able to master the system from receiving the data, to output the NC data, by myself. Now we are trying to operate efficiently by using new functions and shortcuts for the commands.

Changes occurred also in the CAM group. They became integrated with manufacturing group. They went to the machining site to actively watch the actual machining using the NC data they had created. This experience helped improve their programming, and they also met with the manufacturing group to discuss tooling types and issues. I could feel the improvement of this company. I can say that it is the effect of the introduction of CAM-TOOL, with its variety of cutter paths and the settings that allow smooth running tool paths."

■ CAM-TOOL from the point of view of Manufacturing Group

As soon as CAM-TOOL was introduced, we noticed the elimination of the tool chattering and machine vibration, that was present during machining before. We could now machine stably. So we've found that there is a room for improvement of the cutting conditions and cutting mode etc. The Manufacturing group then became integrated with CAM group. They worked at finding better methods of cutting, and tried new cutting mode that they didn't have before. They were able to obtain good results by feeding back the results of the try, and they could research more efficient cutting mode. In addition, not only was the cutting more efficient, the cutting results were also better than before. In comparison with the past, man-hours of die spotting has been reduced by 1/3 to one half. This is also the result of the introduction of CAM-TOOL.



■ The Strengths of SHOWA MOLD & ENGINEERING

Our company manufactures molds & dies of automobile lights, that are relatively small and deep. We used to use electric discharge machining, but we changed to direct cutting since steps occurs in the molds & dies. We realized that there was a better way to do it than our traditional way. Instead of being looked into in idea. We were able to realize machining with the projection length well beyond what we previously thought was reasonable, using common sense. I can say one of the strengths of our company, is the attitude to try uncharted territory.

Also, there is a history that we have been involved in manufacturing a wide variety of molds & dies from ultra-precision to large type like a motor vehicle. In recent years, the design capacity has grown. We are in the position to propose various ideas. In this strict environment of the molds & dies, we have the determination to survive, and we also give love to grow.

■ Current Situations

In the CAM group, it has become a hot topic of which tooling manufacturer is the best? When a new tool is released, some members inquire directly to the tool manufacturers so we can give them a try. We have increased the number of CAM-TOOL seats, gradually over the past year. Since the hole module of CAM-TOOL has also achieved positive results, we are now using 9 seats of CAM-TOOL. The old system was 20 seats initially, and is only 2 seats now. We are going to try to 5-axis machining, and electrode command soon, and also OM inspect.

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* This case was interviewed in March 2013

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