

# GP - LETTER

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## Case study of Simultaneous 5-Axis Machining

### NISSO KOGYO CO. LTD.

NISSO KOGYO CO. LTD. has been doing business in machining parts using 5-Axis machining.

Their cutting sample was exhibited at GP booth in JIMTOF 2008.

We interviewed them about how CAM-TOOL Simultaneous 5-Axis machining module played a role in making the sample.



Operator, Mr. Namura      President, Mr. Tatsumi

NISSO KOGYO CO. LTD.

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NISSO KOGYO has been doing business in high-precision machining of cavity and core for plastic/die-casting mold for automobile, and copper electrode. And they also work for developing/making prototype for parts with 3D shape. This time, we interviewed the president, Mr. Keiji Tatsumi, and cam-tool operator, Mr. Mitsutoshi Namura about how they've worked with CAM-TOOL.

**Mr. Tatsumi:** We mainly make prototype for complex parts which needs to be machined from multiple direction, or mold parts which high-precision is required. These days, shorter delivery date has been required more and more. We have spent a lot of money for facilities to meet customer's demand under the circumstances.

We only have ten employees, but we have five high-speed machines including 5-Axis machining function, Wire Cut, Electrical Discharging Machine, and even 3D measuring instrument to meet customer's any kind of requirements for any size of order promptly.

**Mr. Namura:** We also have enough facilities for processing modeling data. By using 3D scanner, we can input/output data of shapes without drawings or model data. We design 3D model or edit surfaces of complex shape in CAM-TOOL, and do modeling for machining in it as well. We think it is the very important work because the precision significantly affects the quality of surface finish.

#### ■ 3+2 axis machining

**Mr. Namura:** When we machine mold parts which needs tool that its Length is over 10D, since we had to machine with 3 axis machining program, we had to output information of direction and position of tool for set up manually for each program.



Mold parts



Mechanical parts

Parts machined in 3+2 Axis machining

**Mr. Namura:** We had to imagine where stock had been left and where tool collision had occurred, because we didn't have the 5 axis module which can simulate stock.

## ■ What brought you to purchase Simultaneous 5-Axis module?

**Mr. Tatsumi:** It was when I received the order of three teeth rotors. I created machining data in CAM-TOOL and machined in 3+2 machining as I had used to. These parts had three teeth, so it seemed it could be machined by dividing the shape into three and machining at each 120 degree. Undercut area existed however I divided the shape. And it led to adding processes to cut remaining area, as a result, steps are created on borders between the areas machined with different processes. To eliminate those steps, we needed to make tool move along the twisted teeth, and avoid tool collision. Then, we realized that we had nothing but using Simultaneous 5-Axis machining. We requested CAM vendors who distribute 5-Axis system to create machining data and did test cut at our shop to know which system was the best.



Three teeth rotors - 5-Axis Simultaneous machining

## ■ Demo data for cam-tool MX 5-Axis

**Mr. Tatsumi:** We heard CAM-TOOL Simultaneous 5-Axis module would be released in near future from GP Osaka office, so we requested them to create machining data from Roughing to Finishing. When we received their data, we found that they used 3+2-Axis machining focusing on the machining efficiency until second finishing, and in the final finishing, they used Simultaneous 5-Axis machining which tool moves along the longer direction of the tooth, and the whole circumference is divided into three to be connected smoothly.

## ■ Result of Simultaneous 5-Axis machining

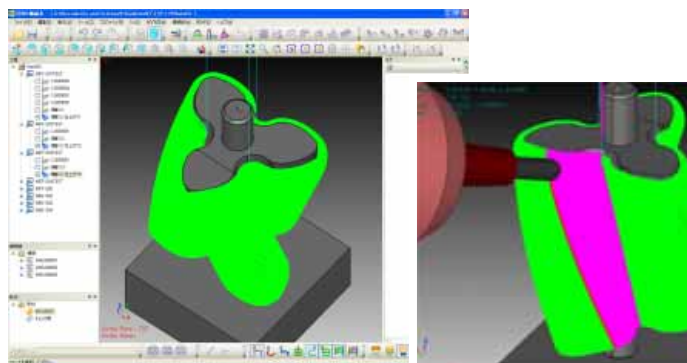
**Mr. Tatsumi:** The result of the surface finish using Simultaneous 5-Axis machining was better than the one of 3+2-Axis machining, and there were no differences at borders. We had test cut of Simultaneous 5-Axis machining with other several CAM vendors, and we found the surface finish machined by CAM-TOOL was the best with the highest precision. We didn't even imagine we could have gained such high-quality surface finish by using Simultaneous 5-Axis machining. That is how we determined purchasing 5 axis module.

## ■ Advantage of using simultaneous 5 axis module

**Mr. Namura:** In Simultaneous 5-Axis machining, the system automatically outputs information of positional control for setup and it led to reducing the number of operations dramatically. And we can confirm the simulation result, so the number of trial and error decreased. As a result, we became create more accurate machining data. Moreover, the shortest protrusion tool length can be output by using optimization function, so we could do reliable machining.

## ■ What do you think about operation of CAM-TOOL?

**Mr. Namura:** We took only one-day training, but I became used to the operation soon because I used to New CL Editor from Version 3.4 and only one thing I learned this time was the command to convert data into Simultaneous 5-Axis machining data. So, I didn't spent much time to learn the system. I received an order right after we purchased CAM-TOOL. I created machining data on it, and achieved the practical machining result.



Simultaneous 5-Axis Editor - Show tool/CL

## ■ How are you going to use cam-tool in the future?

**Mr. Tatsumi:** We think Simultaneous 5-Axis machining is nothing but a tool for our work. We will not use it for all cases. We will use 3+2-Axis machining as well according to the required precision or tolerance. Now that we have one more tool, we want to find our further possibilities and utilize it widely.

## ■ From GP

We gratefully thank for NISSO KOGYO CO. LTD. for their cooperation. We really look forward to seeing their new challenge.

\* When they created machining data for three-teeth rotor, they used a test version Simultaneous 5-Axis module, and now its official version has been released.