

From Subcontractor to Innovator – The Challenge of Making Unique Products –

Interviewer: Takamasu Kanji

OKANO Masayuki, 72 years old, was born in Higashi-Mukojima, in the eastern part of Tokyo, as the son of a die-maker. Thirty-three years ago, he succeeded his father's business and has always worked in the little factory in his own household. With his wife Yuki, his son-in-law Enmoto Kozo and three other craftsmen, the tiny firm became regarded as a champion in the metal processing sector in Japan. Okano Kogyo attracts a number of major high-tech manufacturers as well as NASA, while Okano is busy accepting requests for lectures and articles.

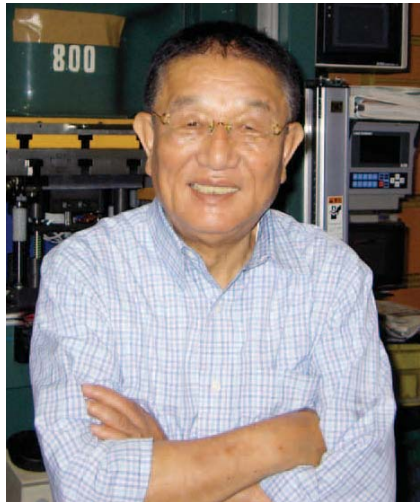


Achieving Independence from Subcontractors

You urged your father, the company founder, to pass down the management. How did this come about?

Okano: The industrial structure of punch and die was separated at that time in Japan. Press shops were the subcontractors of major manufacturers and die factories received orders from press shops. The hierarchical structure remains to this day. This means that we had little idea what the die was used for, and we merely worked on the drawings of major companies supplied by the press shops. We knew little about what the final products were like. On top of that, we received the payments that had been set by the press shops. My friend in a press shop who used the die I had made was already driving a car when I was finally able to buy a 250cc motorbike. Of course this was no fun at all.

Moreover, in the 1970s, metal die materials named superalloys, which are dramatically more durable and harder, had been developed. The usual dies wore down after several tens of thousands of presses and additional orders had to be placed, but the new dies could go for hundreds of thousands of presses without needing replacement. This is when I realized that there was no future in the



die business, unless something changed.

Since my father, born in 1904, was a stubborn old-fashioned person, he forbade me from trying my hand at presses at first, saying that it would cause trouble for the customer press shops. After consulting with my mother, I was finally able to get my father's permission to use the factory in the evening after his work was done. I accepted work that was too demanding or too cheap for other press shops to take on. When I started making a profit, my dad was shocked.

Is it really true that you fired all your factory workers when you became company president?

Okano: The seven people who were working for my dad were all old-fashioned craftsmen and only worked when they were in the mood. This attitude

simply did not suit my methods, so I asked them all to quit.

The Hitachi Cable work which was introduced by a sales office manager at a machine tool company, Amada, was the first order I received from a major company. I worked deep into the night to fill the order and then drove out to Tsuchiura, Ibaraki Prefecture, to deliver the product, arriving back home at dawn. I did that two or three times a week. My wife rode along to make sure that I did not fall asleep at the wheel, and the guard would let me into the plant at midnight. Among my father's customers, there had never been any guards posted at the factories, so even now I keep as a memento the building entry badge showing that I was the first person of the day to enter the Tsuchiura Works of Hitachi Cable. It is a family heirloom.

Did your business change after you began trading directly with major companies?

Okano: It was a huge change. I became able to calculate my own manhours and then negotiate the price. What was most gratifying was being able to ask customers what they wanted to create or what parts they were looking for, which really boosted my enthusiasm. You need this kind of information to understand what the objectives are and what needs to be done. I could grasp what technologies would be needed in the future. It was good to know through talking with the factory-heads of big companies that they were thinking about the exact same things that I was.

Utilizing Conventional Technology

The lithium ion battery case, which proved to be the determining factor in the downsizing of cell phones, brought you widespread fame. What was the key technology?

Okano: Although the lithium ion battery has a high output, it uses a liquid electrolyte, which means that even though the container is soldered shut, the dangerous contents will eventually leak out. To avoid this problem, a seamless container made by hammering out a single metallic plate was needed.

This technology was actually quite classic, a press technology known as deep drawing. It was not a special technology that would only be available at our company. Many years ago, we had produced something quite similar, a fluid tank for a cigarette lighter made of brass and steel, and that old die became the basis for our new product. My father always said that the time might come when our old dies could be used again, and this information really proved to be useful.

The most difficult thing about this battery case was the process for drawing the steel sheet into the deep cylinder without scratching the thin 2-micron chrome coating on top of it. While people might think that it would be better to first perform deep drawing on the steel sheet and then add the coating, it is actually even more difficult to coat the inside of the deep cylinder, and it also costs more. The determining factor was developing a suitable lubricating oil for the drawing process.

What kinds of oil have you made?

Okano: I went to Switzerland to find the best oil, convinced that there must be a truly fine oil to be able to make the

precision gears for their wristwatches. And then I compounded many different kinds of oils, to make one that has perfectly suited to make the battery case. Since lubrication oil has many fine-tuned aspects, even now we sell oil compounds suited to various uses.

The Constant Pursuit of New Products

Is the battery case for cell phones still one of your main products?

Okano: No, that was a job that happened more than 10 years ago. We only manufactured it for about a year and a half. When we reach a production level in the tens of thousands of units, we make automated manufacturing devices for dies and presses, and also film the operating process on videotape, and then sell it. While we called it a plant, it is really a production system that is not limited to hardware but also incorporates manufacturing software. If I sell it, then I will never again make that particular product myself. That is how I do things.

Once a manufacturing technology is established, the value of the product immediately falls. Lots of machinery must be installed to produce in large volume, and the number of workers must also be increased, which makes it extremely difficult to scale down the operation again when the technology becomes outdated. My father was a skilled craftsman, but never let the company increase in size. I am like that, too. Instead, I am always engaged in the development of new products.

How many kind of dies have you made to date?

Okano: I would say over 300. Not only steel dies, but titanium, other rare metals and metal netting. I have truly made

all kinds. They included orders from NASA and the US Defence Department through the services of Japanese trading companies. It takes years to create a plant, and we often travel overnight to plants to test manufacturing methods. Sometimes we sleep no more than three hours a night, but this is no problem because development periods are so much fun.

Many years ago, some customers complained that "you put too many zeros on your invoice." I replied, "if that's what you think, go and ask someone else to do it." Such complaints only show that the customer does not recognize the production system, or the value of that software.

How many plants have you sold?

Okano: While I have never really actually counted, I would say about 20 to 30 types.

When selling plants, how do you protect the manufacturing technology information that you have developed?

Okano: The number of patents we have had is not that high. All the patents were invented jointly with our customers, so we have no single patent under our company name alone. Even if we could independently obtain a patent, there is the possibility that someone would violate it, and a lawsuit might be filed. It would take years to obtain compensation, and even when we win, the technology would be out of date. By taking out patents jointly with major manufacturers, however, we can compete with anybody who has anything similar.

Anyway, even without patents, much of our manufacturing technology cannot be copied easily. There are many plants where we cannot find anyone to accept the contract, even when we want to outsource. They hold back because they will be unable to replace it on their own when the system stops working.

In development-oriented management, an unceasing flow of orders is vital to continue the company. How does a company of just six people search for new orders?

Okano: We are not doing anything special, but I have never proceeded on the idea that everything is all right as long as I myself am making money. My principle is to share the profits evenly with the person who introduced me to the job. I have to be nice to the person who dug the well. I am still in contact with that first Amada office manager. Since this is the stance that I have taken over 50 years of work, we have been able to win trust, if I do say so myself. As a result, I have had a constant supply of orders, and inquiries on a daily basis. Well, there was a time when I was really hooked on the development of a very difficult product, and my wife pointed out, "In all your work this year, you only made ¥35,000!"

*Photo :
Terumo Corporation, Japan*



The less painful needle, "Nano pass 33"

Dealing with the Challenge of an "Impossible Task"

The development of the less painful needle attracted a lot of attention this year.

Okano: That is an order from the medical equipment manufacturer Terumo. I was impressed by the idea of the person who came to see me. Conventional needles are made by using a press to curve out a steel sheet and make it into a pipe, and then stretching and thinning it out, and finally forming a tip on the end. When such needles are used, the skin of people using insulin shots for diabetes, for example, becomes hardened and rough, and they must undergo pain on a daily basis. The Terumo representative had truly wanted to reduce the pain of diabetes patients, and had designed the thinnest needle with a diameter of 0.2mm, or about the size of a human hair. He had spent more than a year searching for someone willing to take on the job, but the order had been turned down repeatedly as an impossible task. Then he came to us. While I thought it looked difficult, I estimated that there was a 60% chance of success, and took on the job.

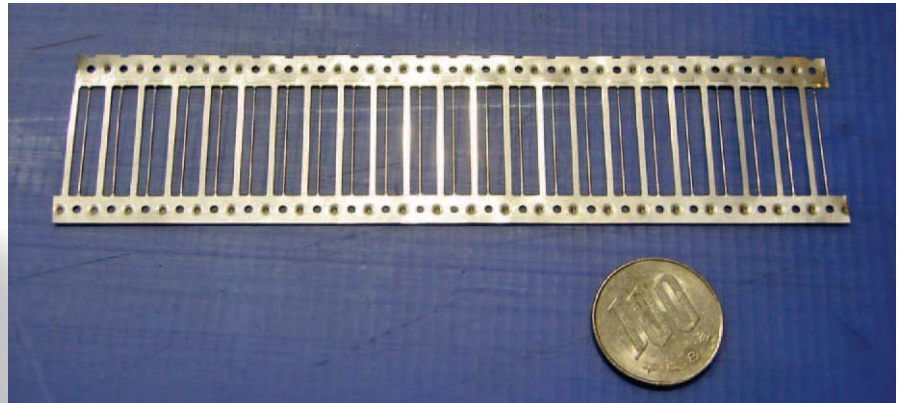
The needle with a diameter of 0.2mm

had to become a thin cylinder that tapered up to 0.36mm partway down its length, in the area where it connected to the medical dispenser. This shape is simply impossible to produce by using the pipe stretching method. We would have to make the shape using the press alone. Creating a tapered cylinder in one part from the metal sheet, while considering the shape that can avoid leaking the medicine, would be technologically difficult. Furthermore, because they are disposable pen-injector needles, we needed to have a system that could cheaply mass produce hundreds of thousands of needles.

Though I thought hard about this, it was Enmoto, my son-in-law, who really worked hard here. We used a university supercomputer to calculate the shape. While Terumo began selling the product in July of this year under the name of Nano pass 33, Enmoto has been saying that the manufacturing system is still not perfect. Five years have already elapsed since we first heard about this topic. It is my sincere wish that this product will spread throughout the world and bring happiness to everyone.

Do you have any other development orders in addition to the needle?

Okano: We are developing two other products. I cannot reveal the details, but I think they will both be groundbreaking. As we do not charge customers until products are completed, we cannot



The ultra-thin needles are created from a steel sheet using the press alone

survive on only development projects. So, at the same time, we are working on another 20 to 30 punch and die orders.

Management Philosophy of a Downtown Venture Champion

How do you learn about technology?

Okano: I learned about dies from my father. The method was looking and learning from his work – and getting cuffed sometimes along the way. My father used white chalk to make rough drawings on the floor to think about processes. I can of course follow drawings, but I think it is strange to say that just because there is no drawing that one cannot make an object. It is true, though, that some people complain that there are certain processes that only I can do.

I never learned about the job at school. I hated school, so I often skipped out. Before the war, there was an entertainment quarter known as Tamanoi in Mukojima. In place of school, I used to learn things from various people there. I learned deeply about people's open and hidden sides, about mutual deception, and social obligations. This knowledge became useful later on when I was managing a business.

At the suggestion of a senior craftsman, I bought a German technical book, *Die Design Handbuch*. It was 40 years ago, and for 20 years, I opened it up every day and looked at it. I sometimes open its pages even today. I cannot read German because I have never learned it, but I can look at a technical drawing and easily understand what it is about. It is a really well-designed textbook.

You have written four books, and often appear in magazines, and are frequently asked to give lectures. What sort of topics are your readers and listeners looking for?

Okano: I never prepare a text for the lectures. I look out at the people who have come to listen, and talk about specific experiences that I have had. Two years ago, I gave 100 lectures, and last year I reduced that to 70. The topic that people find most interesting is those fact that truant students or those who are isolated in factories should be given a purpose or something. I say that organizations filled with flatterers will go under.

With the economic rise of Asian countries, there is concern that Japan's industry may become hollowed out. The concentration of small and medium-sized manufacturers as seen in such places as downtown Mukojima is said to be the foundation of Japan's industrial strength. What do you think about this?

Okano: In my immediate neighborhood, the number of factories has closed. One of the biggest problems is the lack of successors. Since factory owners' children see the hardness and thanklessness of these jobs, many of them do not want to succeed their parents. Maybe they also hate the smell of oil.

What is needed in order for the concentration of technology in these kinds of places to be continued into the next generation?

Okano: If we were only making something just as the customer asks, we would be no match for China, since Chinese labor is extremely cheap. We have to be able to develop something on our own. I think the most important point in technology development is the sensitivity of the engineer. Being sharp is necessary. Merely sitting at a desk at school will not polish it. Today, it appears that the wholehearted play I



The Order of the Rising Sun, Gold and Silver Rays

enjoyed as a child has disappeared. The only way to learn wisdom or to gain sensitivity in life is to learn outside of school. I think that parents have a big responsibility here.

I am truly lucky that my son-in-law Enmoto voluntarily agreed to work with me. He was a Nikon engineer, and said that he would come to work in my company for several years after he got married. At first, I did not think that he was serious. Until that time I thought that I would quit working at 55. So I renovated our factory, which was leaking rain, and bought new machinery and then after that engaged in various developments to work with him.

You were given a tremendous award last year, the Order of the Rising Sun, Gold and Silver Rays.

Okano: I was honestly very surprised when I was first told about it. Because I had really spent a whole life that was like Tora-san, a popular movie character who is nonchalantly connected with society like a Bohemian. Outside of work I had felt rather inferior. Nevertheless, my wife and I were together invited to the Imperial Palace, and I received the award from the Emperor. When I thought that maybe a guy like me had been able to be of some slight service to society, I was honestly very happy. **J.S**

Takamasu Kanji is an editor and biographer. He is also a senior advisor to the foreign editor of the New York Times.