



## Interviews with Mid-Level Managers from Key Minebea Production Departments

### Ball Bearing Business Unit

**In the years since its establishment, Minebea has built up a tradition of manufacturing excellence in the ball bearings business. Minebea has also achieved a balance between profitability and growth, which it has long maintained.**

**A part of Minebea's business portfolio since its establishment, ball bearings indisputably remains a core business in terms of sales and income. The ball bearings business also gave rise to a distinctive business model that features manufacturing operations overseas, a high percentage of parts produced in-house and a horizontally organized production management system encompassing 10 plants around the world.**

**Interviewer: From the Ball Bearing Business Unit, we welcome Susumu Kawahara, Hiroyuki Kato and Yoshitake Matsui. Thank you for agreeing to be interviewed. Kawahara, Kato, Matsui:** Thank you for asking us.

**Interviewer: Ball bearings demand an incredibly high level of precision, but they have a very simple structure don't they—two rings, one on the inside, one on the outside, and some balls. A layperson might be forgiven for thinking that as long as you have the basic design, all you have to do is carefully follow the specs. But there is more to it, isn't there?**

**Kawahara:** You're right, the configuration of a ball bearing is extremely basic. In addition to the parts you've mentioned, there is a retainer, which keeps the balls in place, and a shield, which protects it against contamination from foreign substances. All you need to add is oil or grease, which acts as a lubricant, and your ball bearing is complete. At first glance, it all looks very simple, but as someone who has been in this business for many years, I can tell you that I am constantly amazed at the speed at which performance requirements evolve. The explosive growth in demand for ball bearings in the past is attributable to several key applications. These include household VCRs and spindle motors for PC hard disk drives. To develop ball bearings appropriate for each of these applications, we had to overcome some pretty significant technological hurdles. One time it might be enhancing high-speed rotation performance, while another time it might be lengthening useful life or reducing noise. My generation is the one that perfected the original spindle motor bearing through endless trial and error on the production floor.

Today, fluid dynamic bearings are definitely preferred for these applications, so the task for us is finding a way to pass our experience and accumulated expertise on to the next generation of engineers.

**Matsui:** In the area of production, I am primarily responsible for assembly processes. We get a wide range of parts and are responsible for putting them all together into products. All of the parts we use are reliable. Every part is produced in line with our specifications and well within the tolerance limit for quality. That said, no two finished products are exactly the same. Each customer has different requirements. The assembly process is responsible for making whatever adjustments are necessary to ensure our products meet these requirements. This is the spirit with which we approach our jobs.

**Kato:** The precision of ball bearing processing is measured in submicrons. The most critical consideration is raceway roundness. Even if you use the same equipment and the same materials, the result will vary from hour to hour—all within the tolerance limit, naturally. Yields are never 100%, either. When you look at it that way, you start to see that the challenge of improving manufacturing processes really is infinite. Of course, there are also other crucial challenges, like shortening the cycle time, so it's not like you can just take it easy and still ensure a quality product.

**Interviewer: Minebea has outlined a new vision, that of a company which leads the competition through manufacturing excellence. Coming from the division that is essentially responsible for Minebea's tradition of manufacturing excellence, what does this vision mean to you?**

#### Susumu Kawahara

Employee since April 1982  
Manager of Manufacturing  
Engineering Section,  
Bearing Manufacturing  
Department  
Ball Bearing Business Unit



# Minebea's Strategy

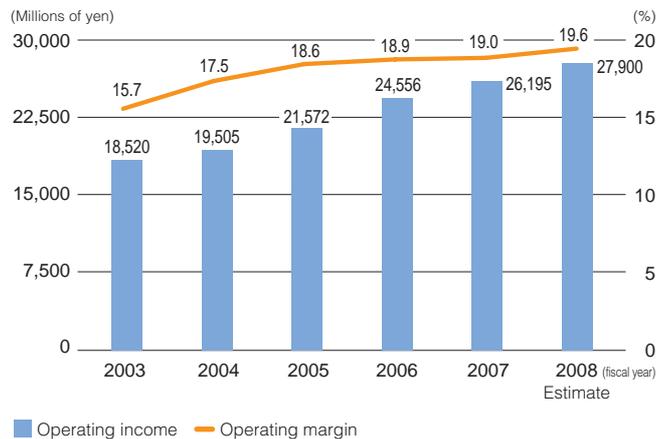
**Kawahara:** I think you can look at the concept of “Leading the competition through manufacturing excellence” as the cumulative result of a lot of small efforts. After all, our products are small and simple. It’s important to create a manufacturing culture that recognizes the value of persistence. Just to give you an example, in the cutting and grinding processes, we use a significant number of dies and biting and grinding jigs. We are getting into trade secrets here, so I can’t go into more detail. Even though we don’t have anyone who is a real pro in this area, we have pursued a number of initiatives on our own, including recycling and altering the shapes of these dies and jigs to reduce costs.

It’s been only three years since these efforts began, but in that time we have succeeded in reducing the cost of raw materials used in the manufacture of ball bearings to one-third of what it was three years ago.

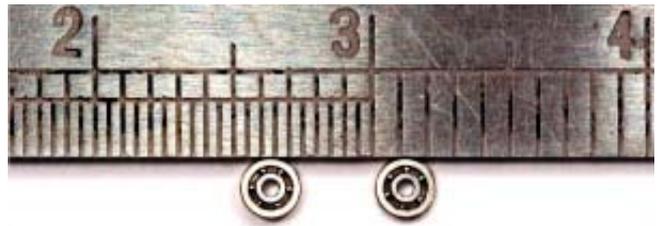
**Kato:** Aside from everything else, with ball bearings we are dealing with absolutely huge production volumes. Minebea alone manufactures more than 200 million pieces a month. If we can shorten the grinding time, for example, by 0.1 second per piece, you can see how much of an overall time saving that would be. We can take that time we’ve saved and plow it back into production. So as you can see, it is more than a question of just adding more equipment.

**Matsui:** To lead the competition you need rivals. In business you need other companies that are equally competitive. The Ball Bearing Business Unit is fortunate in that our 10 plants around the world compete with each other. This creates considerable tension, which in turn does put pressure on people, but it also drives us to take on new challenges.

## Operating Income and Operating Margin in the Machined Components Segment



## Miniature Ball Bearings with Outer Diameter of 2.2 mm



### Hiroyuki Kato

Employee since April 1980  
 Manager of Grinding Section,  
 Bearing Manufacturing  
 Department  
 Ball Bearing Business Unit



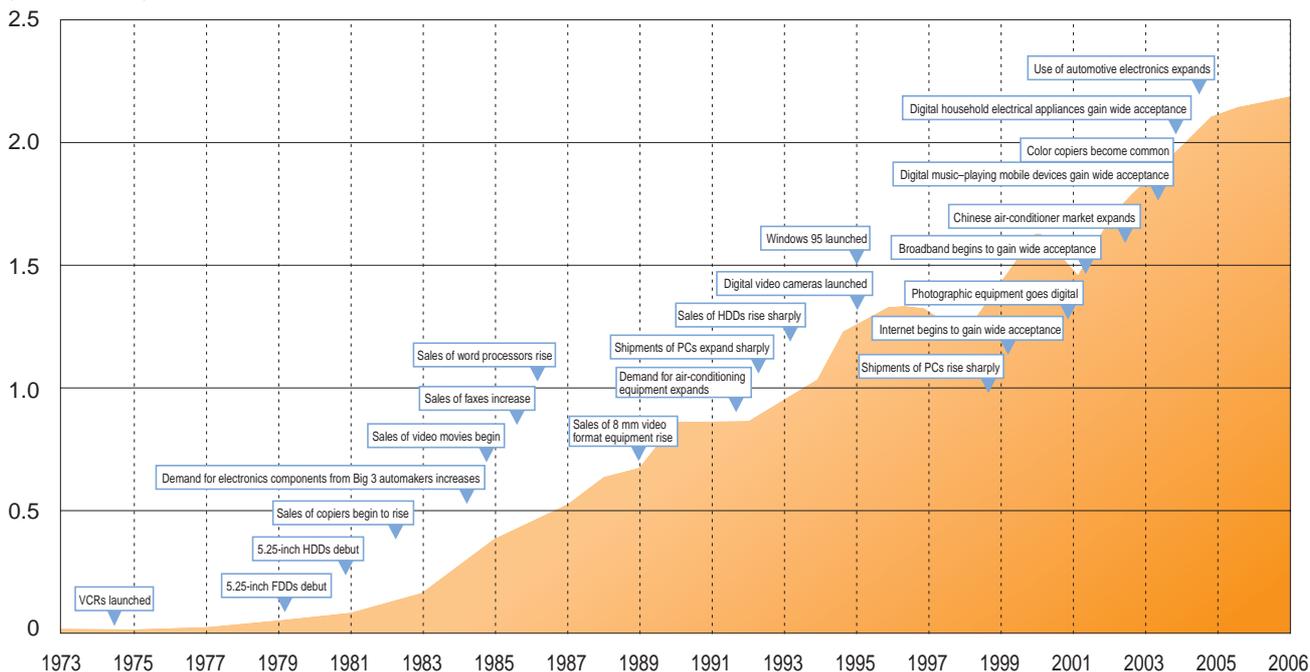
### Yoshitake Matsui

Employee since March 1984  
 Manager of Assembly Section,  
 Bearing Manufacturing  
 Department  
 Ball Bearing Business Unit



### Ball Bearing Shipments

(Billions of units)



**Interviewer:** In closing, management has also expressed the need to rethink manufacturing from the most fundamental aspects. How will you address this challenge?

**Kawahara:** A passive approach—looking around for something to model ourselves on, or expecting someone to give us a manual to follow—won't accomplish anything. In May of this year, we completed our smallest bearing ever. This was in response to a specific request, of course, but deep down I think we wanted to test ourselves, to see just how far we could go. Taking on new challenges like this allows us to reaffirm that we are on the right track, that our approach is the right one. The most fundamental aspects of production are part of what we do every day and always will be, and to me they are something that we should constantly rethink and revise.

**Matsui:** In my experience, Minebea offers young employees a fertile ground in which to seek out and take on challenges. So it is up to each group to identify issues and work together to find solutions. Such broad-based efforts are crucial in manufacturing.

**Kato:** This is something I learned from my predecessors, but people tend to think that machining is all about base levels and benchmarks. There are many ways to look at it, but in my opinion what is most important is to isolate those things that are absolutely essential to product quality. If your focus is wrong, you will never be able to manufacture a quality product. Manufacturing is an incredibly broad field. I think it is important to focus on the front lines and set one's own benchmarks.

**Interviewer:** Thank you again for taking time from your busy schedules to speak to us.

**Kawahara, Kato, Matsui:** Thank you.

