THE WORLDFOLIO

Japan

Heavy rare earth free magnets are pulling the market towards sustainability

Hajime Amano, President, Daido Electronics Co., Ltd.

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As a rare earth magnet specialist, Daido Electronics' products are key to the automotive sector, including EVs, factory automation, and the medical field. President Hajime Amano talks to us about Daido Electronics' efforts to leverage its three decades of experience to develop heavy-rare-earth-free magnets, or ones that use as little heavy rare earth as possible. This, he explains, is the answer to concerns about sourcing the precious and limited resources used to make some of the world's most powerful magnets.

What is the current sales ratio of your products?

About 50% of our sales come from our hot deformed magnets, which are used for traction motors for EVs and motors for factory automation robots, with 20% coming from sintered magnets, used for traction motors for EVs and auxiliary motors for vehicles, and 30% from bonded magnets, used for vehicle sensors.

Could you explain how the COVID-19 pandemic has impacted you and if and how you have recovered?

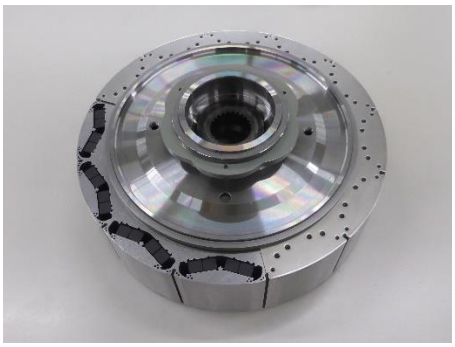
The initial plan was to just have steady growth, but with COVID-19, there was a dip. We were able to recover from that in late 2020, and we achieved high sales in 2021. Therefore, we are focusing on increasing our sales, targeting 150% by 2025 and 200% by 2030. We have been growing since 2017, and that is because we were able to launch the business of magnets for EV traction motors and expand our share in the market.

You celebrated your company's 30th anniversary last year. What mid-term strategy have you put in place to continue the growth that you are experiencing with the rare earth magnets business?

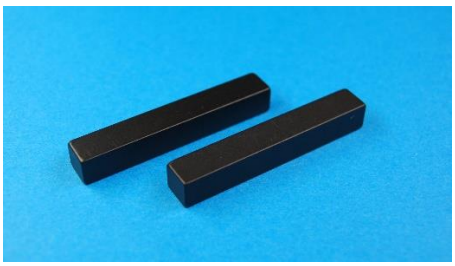
As a strategy, we will produce a wide variety of NdFeB magnets, one is bonded magnets, second hot deformed magnets, third sintered magnets. In addition, we have been developing SmFeN bonded magnets with our parent company, Daido Steel. With these lines of products as a strength, we will respond to customers' various applications.

The automotive industry is your biggest customer, using your magnets in steering column assemblies, and is currently undergoing a large shift from traditional engines to EVs. How are you adapting to these industry changes?

There are several trends in the automotive sectors, the shift to EVs and autonomous vehicles. More of our products are incorporated in new vehicles, for example sensors, actuators, and so on, so we are foreseeing to undergo an expansion. In particular, traction motors and generators require quite a lot of magnets, so we are much more focused on motors and generators in order to grow our business.



Traction motor with heavy-rare-earth-free magnets



Hot deformed magnet made not using heavy rare earth.

Is there any other type of application that you are looking to expand into?

We are now focused not only on automotive and home appliances, but also on medical fields. Currently, we are receiving an increasing number of orders from US companies, and we expect the market to grow.

How will you reach those end users in the US?

Mainly, our sales department conducts market research and sales. The Daido Steel group has a sales department in our Chicago office which deals not only with our magnets but also with other departments such as the Technical Support office. We also have a Frankfurt office in Europe whose role is similar to the Chicago one.

Since 1994, you have had a factory in Thailand. You have two factories in China, in Guangdong and Jiangsu. What benefits do these international locations bring to your business?

Our main focus will continue to be Japan and the Japanese affiliated companies going overseas. In the past, our factories in Thailand and China were established due to our collaboration and partnership with Japanese affiliated companies.

In the factory in Thailand, we provide products to tier one users of European car manufacturers. We have acquired certificates to provide products and components to them. Those European companies

have factories all over the world. We have been producing our products for Asian and North America customers. Moreover, in the US, we have acquired land in Ohio, expecting to start the magnet business for EV traction motors in the near future.

Would you be interested in expanding your international locations?

We currently want to focus on strengthening our facility in Japan. We have some spare land within our compound here, so we would like to upgrade this by adding more facilities there. In the future, many overseas locations will be an option, but we are not really thinking about it now.

The Japanese population has the oldest average life expectancy in the world, of 85 years. Almost a third of the population is over 65, which means a reduced labor force and less demand for products in general. How has this declining demographic affected your company and how are you reacting to this challenge?

We have two approaches. Firstly, we standardize a product as much as possible and introduce a lot of automation so that we are not dependent on the personal skill of the craftsman or engineer. Secondly, there are some products which require high technology, high skills, and a lot of experience, and it is important for us to pass down that knowledge within our company.

As a manufacturer of rare earth magnets, what is the essence of *monozukuri* and what does it mean to your company?

The strength of our company in terms of *monozukuri* is that we have been differentiating ourselves from other companies by not using heavy rare earth metals. Also, we can cater to a wide range of fields including some niche fields as a result of our application of the *monozukuri* philosophy.

China has a really strong hold on the mines for rare earth metals and the Chinese government threatens to impose controls on them, especially in the political spats between Beijing and Tokyo. We know that in response, Japanese companies are looking to offset this risk by reducing the amount of rare earth metals used in their magnets. How does this affect your company?

There are two types of rare earth; one is heavy and the other one is light rare earth. In terms of heavy rare earth, the Chinese are dominating the market, however with light rare earth you can procure the material not only from China but from the US and Australia as well. Heavy rare earth material can only be procured from South China, so as you say, it is politically risky. In addition, as there are few resources of heavy rare earth metals, we must make effective use of this limited resource.

In general terms, it is necessary to use a certain amount of heavy rare earth. For example, when making magnets for EV traction motors, adding heavy rare earth magnets allows the product to acquire the required magnetic properties. However, we are trying not to use heavy rare earth metal and only focus on the light rare earth material.

How are you going to transition to using lighter rare earth metals? Are you looking for partnerships in research and development with universities or other companies, perhaps overseas, that could help you develop these technologies?

Primarily, our focus is to develop a product free of heavy rare earth in-house, by ourselves. We have been collaborating with Daido Steel in developing a heavy-rare-earth-free product, such as hot deformed magnets. The hot deformed magnet is our unique technology, and we received an award from the Ministry of Economy, Trade, and Industry for it. One of its applications is for use in traction motors and we have been able to expand in that sector.

The use of sintered magnets is the most common manufacturing method in EV motors, and unfortunately, they must use heavy rare earth metal to acquire the required magnetic properties. We will continue to develop hot deformed magnets that do not use heavy rare earth metals, and if very high magnetic properties are required, we will provide the sintered magnet with less heavy rare earth.

Could you explain the other great points of this new unique processing method?

As we have already explained, we can make magnets without heavy rare earth, and at the same time, we can reduce CO2 emissions during magnets' production. Hot-deformed magnets consume less power, so their CO2 emissions are halved compared to sintered magnets.

Let us say we come back to interview you again on the last day of your presidency. What would you like to have achieved by then?

My objective as the president is to make the world of magnetics more sustainable. I consider that magnets with heavy rare earth do not offer much advantage in terms of sustainability.

My goal is to make a sustainable method of magnet production and spread that method around the world so that people will change their mind in making more sustainable magnets. And as a company, the switch to EVs in the automotive industry can be considered a once-in-a-hundred-year phenomenon, so it is very crucial for us to ride that wave and provide new products that are appropriate to the field. And of course, that is not only the EV industry, but also other fields such as the medical one. We would like to continue our innovations in expanding and enlarging the application of our magnets.