

The World's Largest Fireworks Unite People in the Community

Interviewer: Takamasu Kanji

IN Japan, aestival evening fireworks displays take on the importance of a national event. During the hot and humid summer months of July, August and September, there are several hundred large-scale fireworks shows across the country, and children also enjoy miniature fireworks in their own gardens. Enjoying fireworks is a tradition that dates back to the 17th century in Japan. The starring role in any fireworks show is a certain pyrotechnic that releases a thunderous sound in the dark sky, blooms into a large spherical flower, and continues to change colors. These Japanese-style or chrysanthemum fireworks are widely appreciated around the world. The round shell was initially developed in Japan and has been developed to a high degree since then. We interviewed Honda Masanori, President of Katakai Enka Kogyo Co., who is also President of the Japan Pyrotechnics Association. He is deeply involved in producing and orchestrating this fleeting art form in the sky and one of his company's fireworks has been acknowledged in the Guinness Book of Records.

When the Japanese think of fireworks, we immediately imagine ones that explode in a perfect sphere. Are foreign fireworks shaped differently?

Honda: Tube-shaped shells are predominately used in Western Europe. The history of fireworks in Japan began with the use of military technology brought in from the West in the mid-16th century, namely guns and gunpowder, for public amusement. Based on surviving illustrations from the past, it appears that, for 270 years, starting in the 17th century, gunpowder was the principal component of fireworks, and the resulting colors were mostly limited to orange and red. Round shells were developed by the end of the Edo Period (1603-1867).

After the Meiji Restoration in 1868, a new kind of explosive was brought into Japan from Western Europe, and as a result, fireworks became more colorful. By loading smaller shells into a larger one, they devised ways to create time lag ignition, and to produce more colorful displays that included green, blue and white, in addition to red. Eventually people competed to develop even bigger shells. The bigger the shell, the more spectacular the explosion.

How was the round shell developed in Japan?

Honda: Foreign fireworks are produced by pressing explosive into containers with machines while Japanese ones are



Company president Honda and the 4-shaku dama

produced by kneading explosive and making molds. When a round shell explodes and burns in the sky, it has a beautiful spherical shape when seen from any direction on the ground. The Japanese word for fireworks, *hanabi*, is composed of two characters, meaning "flower" and "fire." As this word implies, the round shell creates a beautiful display that looks like a huge flower blooming in the night sky.

Technically speaking, a firework is composed of various types of explosive, metallic powders that emit light, and

substances to aid combustion. The ingredients are combined and stiffened with paste, and the combustion timing is controlled in units of seconds. An iron cannon is used to launch the fireworks, and explosive is prepared at the base of the cannon. When the explosive is ignited, the shell is launched into the sky by gas tension. At the same time, a fuse on the shell is also ignited, and when the shell reaches the proper height, it too detonates, sending the balls called *hoshi*, or stars, packed inside the shell in all directions for multiple explosions of light. We have spent many years developing various techniques in order to achieve the proper timing and control for this series of explosions and combustion. Also, since a perfect spherical firework display cannot be created unless the same type of *hoshi* are burnt out at precisely the same time, it is very important to make sure that the *hoshi* packed into a shell are all the same size.

Inside a large shell, there are smaller shells that create second and third explosions. This requires very exact timing, and the round shell was developed by special paper techniques and paste materials that originated in Japan.

Did the Japanese develop new techniques?

Honda: In the past, Japanese paper, *washi*, was employed for making shells in Japan. Today, plastic is also used in shell production. However, for a large

fireworks show, over 10,000 fireworks are launched into the sky, and the large amount of falling debris would create an environmental problem. Therefore, with the help of a local company, Fugetsu Co., we are producing shells from recycled paper. Since these shells are put together using paper, any debris that cannot be collected afterwards is easily biodegradable.

Paste is the other essential ingredient for making fireworks. It is mixed with the explosive in order to form the ball shape and obtain the proper strength. Each company has its own technique for using paste. My company actually uses local *mochi-gome* (sticky rice). We first prepare mochi rice cakes, then toast them and break them apart, before heating them again and making paste once more. Although this takes a bit of effort, it produces the ultimate paste. If the adhesive strength is neither too weak nor too strong, a beautiful hoshi combustion will not be achieved.

What kind of explosive and light-emitting substances are used?

Honda: The light-emitting substances in the hoshi include magnesium, copper, aluminum, titanium, and other metal oxide powders, or barium nitrate. When the three primary colors of light are combined, a white-colored flame is produced. In order to control the combustion time, chemicals are added to promote combustion, and paste is used for stiffening the material into round hoshi before being dried. Some hoshi are made up of several layers, which enables them to change colors as they are burning.

How many kinds of Japanese fireworks are there?

Honda: There are too many to count. Basically, there is a limitless variation to the designs that a craftsman can create by changing not just the size of the firework, but also the colors, number of explosions, and the combustion times.



Sectional view of Japanese round shell fireworks. (left) Environmentally-friendly shells made of recycled paper. (right)



Names are given to each different type. Some fireworks shows in Japan, such as the ones in Omagari, Akita Prefecture, or in Tsuchiura, Ibaraki Prefecture, are also competitions for the fireworks industry. Every year we try to come up with exciting new fireworks displays.

I have developed computer software that allows you to see what kind of fireworks display can be produced using hoshi with certain substances packed in a certain way. However, as I mentioned earlier, there are many minute factors involved. Due to factors like wind and atmospheric conditions at the time of launch, each year there are only a few fireworks that end up displaying exactly as they were designed.

A big fireworks show consists of an amazing number of fireworks - up to 15,000 in some cases. How do you decide the kind and content?

Honda: Tokyo Disneyland and other amusement parks have fireworks shows every evening, and fireworks are used as part of various other events. Therefore, the objectives and effects of fireworks have become more diverse in recent years. Nevertheless, for a large show it is important to have dramatic interpretation. In order that the spectators do not get bored, it is important not only to vary the size and color of the fireworks, but also to plan the combination and progression of the shows. In this area, we still need to learn from the fireworks industry of Western Europe.

How big is the Japanese fireworks industry?

Honda: Due to the large amounts of explosive involved, both the manufacturing and igniting of fireworks require government permission. Currently there are 370 companies that belong to the Japan Pyrotechnics Association. Among them, about 100 companies specialize in selling and launching fireworks, not manufacturing. My company employs 30 people, and it is one of the larger companies in the industry. The total annual sales of the industry, including small personal fireworks, amounts to ¥10 billion.

The fireworks industries around the world mainly consist of small companies, except in China. The Chinese industry has large fireworks manufacturers with 800 employees that actively export around the world, using low production costs to their advantage. About 60% of the world production of fireworks comes from China. Even in Japan, almost all the small personal fireworks sold are now imported from China. However, Japanese companies maintain superior technology for large-scale fireworks, and only about 20% of these fireworks are imported from China today.

Are small companies better suited to do business in the Japanese market?

Honda: From a purely business perspective, a major reason that companies stay small in this industry is that the capital

Photo : Ojiya KankoKyukai



The world's biggest firework, a 4-shaku dama

turnover ratio is so low. Fireworks consumption is overwhelmingly concentrated in the summer season. Moreover, due to the use of the explosive, it can be very dangerous if the manufacturing and storage of products does not adhere to strict safety management.

Since fireworks production is a unique industry with a 400-year history, it tends to be more cleidotic than other manufacturing sectors. However, it is still essential to actively adopt new technology and various experiments from other industries. In addition to fireworks design, I have also developed special software for production and inventory management. All of these required a fair amount of capital investment.

Please tell us about the history of Katakai Enka Kogyo, and its current management.

Honda: When my father took over this local company, Katakai Enka Kogyo had been ready to close due to the lack of a successor. I am the second-generation owner of the business. Although I graduated from university and worked in sales at a food products company, my father persuaded me to join his business, and I have now been in the fireworks industry for 20 years.

As you would soon realize if you visited our company, we are situated right behind Asahara Shrine, which is on a hilly area outside of town. In fact, we use an empty lot beside the neighboring field in order to launch fireworks. The factories are all divided into small buildings. Since we handle explosive materials, we follow strict government regulations and perform the explosive preparation, drying, and shell manufacturing in separate buildings. Natural sunlight is

also used for drying the component hoshi and burst charge. However due to the long winters and the three meters of snow in this region, we have a drying room, and a room for storing the finished products, which are completely separated and remotely located for security.

Fireworks production continues throughout the year, but we also employ about 50 part-time workers in the summer to help handle the added work related to fireworks shows. For a large show, it takes a minimum of three days including the preparations and ensuing cleanup. Since shows have been concentrated on weekends in recent years, we find we have our hands full just covering customers in our part of Niigata Prefecture. Of course we also carry out plain sales of fireworks products, but we do not know where they will be launched. We produce 100,000 fireworks per year, big and small.

Tell us about the 4-shaku dama, the world's biggest shell.

Honda: Our company's 4-shaku dama¹ (120cm-diameter shell) is the biggest in the world, weighs 420kg, and is launched 800m into the air, creating an explosion with a diameter of 800m. The noise is so powerful that you can feel it reverberating in your stomach. It is a special firework, and we only produce two of them each year as votive offerings for the neighboring Asahara Shrine. In general, the diameter of a firework is actually the inside diameter of the firework cannon. Therefore, the outer diameter of the shell is slightly smaller than its description. In 1980, we began to develop and launch the largest firework. Katakai Town still holds the record for creating the 3-shaku dama in 1891, but it was different from the ones we currently make. I first produced the 3-shaku dama and then started taking on the challenge of the 4-shaku dama in 1984. However, I experienced a lot of failed attempts in the beginning. I was always apologizing after launching fireworks that exploded

Notes : 1) Shaku is a Japanese unit of length, about 30cm.

before reaching the proper height.

This was because I could not easily perform experiments. Today the firework design is finally stabilized, and we launch it from a five-meter long cast iron cannon buried in the ground. It takes about a year to produce the firework. I slightly modify each design of the 4-shaku dama we produce.

I have heard that the fireworks of the Katakai Festival at Asahara Shrine are totally unique.

Honda: Katakai Town has a population of 6,000 and is part of Ojiya City. In the Edo Period, it was an ending point for water-borne trade along the Shinano River, and was part of the Shogunate's territory. I believe the Katakai Festival² has created a sense of local identity for the townspeople. Being born and growing up here, I did not fully realize this until I began to work outside town.

The Katakai Festival is held for two days on September 9 and 10 every year, and the central focus is a Coming-of-Age ceremony. Former graduates of Katakai Junior High School that have reached the age of 20 build portable shrines several months in advance, and during the festival they parade them around town greeting their seniors and asking them for recognition as adult members of society. It is one of the so-called rites of passage. Then finally they have their own fireworks launched at the festival. Each group of young adults that turn 20 in the same year acquire their own group name, and they keep in touch with each other, even when some of them leave town. The next biggest group after age of 20 group in the festival is called *kanreki*. Every year, those who turn 60 get together and sponsor fireworks, as part of the festival.

In addition to that, some people also light fireworks in the years that are traditionally considered to be unlucky in Japan, which are age 33 for women and 42 for men. Individuals and families also dedicate fireworks to mark various turning points in their lives such as a wedding, the birth of a child, or the

passing away of a parent. Moreover, local companies and schoolteachers as well as people from outside the town sponsor their own fireworks. In any case, the fireworks are offered to Asahara Shrine instead of monetary donations.

In November 2004, our region suffered major damage as a result of the Niigata Chuetsu Earthquake. In the festival of the following year, many fireworks were dedicated with the message "let's work together for recovery." How do people know about the messages attached to the fireworks? Well, at the festival an announcement is made for each firework as it is sent up and program brochures are provided. There are also fireworks with very personal messages. Last year a young man launched a firework with the proposal, "Forgive me all the trouble I have caused you, but I want to be with you. Will you marry me?"

I think a fireworks festival that runs for two consecutive nights is quite unique. An impressive total of 15,000 fireworks are launched in two days, many of them large shells. At the end of the festival, a 4-shaku dama is launched in celebration of the group of young people turning 20 that year. The final firework is always launched at 10 pm.

Local people have a lot of enthusiasm for this festival, so when faced with the prospect of Katakai Town losing its fireworks factory, my father realized the urgency of keeping the tradition alive. I too, took over this business with the idea of preserving the festival for future generations. Fortunately my son, Kazunori, has started working at the company, and I believe the Katakai fireworks tradition will continuously be passed down to future generations.

That is how we are able to enjoy fireworks made in Katakai as part of a festival for the people of Katakai, and it has been recognized in Japan as one of the few remaining true living festivals. However, this does not mean that the festival is closed to outsiders. Special box seating can be purchased by 15,000 people, and these seats are almost fully booked a year in advance for both

nights. The festival attracts over 100,000 regular spectators as well. Last year a TV drama was aired that featured the festival as part of the story. The film crew and actors launched their fireworks, along with other outsiders who dedicated numerous fireworks with messages of encouragement for a speedy recovery after the Niigata Chuetsu Earthquake. Therefore, the festival is basically open to anyone from anywhere in the world.

If I send up a firework at the festival, how much must I contribute?

Honda: For a 1-shaku dama, the contribution used to be ¥46,000. You can estimate the contribution for other types of fireworks based on that. I am often asked how much it costs for the 4-shaku dama, but there is no answer to that question. We can only make two in a year, and there are no extra cannons. These people and groups in the town contribute to the cost of these fireworks, and in fact our company also bears part of the cost as the manufacturer. The 4-shaku dama is the crowning glory of the festival. Therefore, it is not possible to put a commercial price on it.

What are you working on for the future?

Honda: I think there is still a lot more room for improvement in the show's dramatic interpretation. Also, I would like to actively incorporate new computer technology.

Through my work with the Japan Pyrotechnics Association, I am involved in addressing ways to increase safety for the manufacturing and launching of fireworks. Since the laws and regulations concerning fireworks in Japan have been unchanged for over 50 years, I am working to have them revised to better reflect the current situation. **JS**

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2) Katakai Festival fireworks video available at http://www.katakai.org/05/05hanabi_e.htm