



JQR Select Japanese Skills

Capture Gold With an Iron Ball The Master Craftsman Who Makes Olympic Medal-Winning Shots

Photography/Satoru Naito, Text/Kyoko Ohtsu



Everyone knows that equipment plays a major part in rewriting sporting records and achievements. It's also well-known that these achievements are built upon the support of skilled craftsmen in the background who make the equipment. When elite athletes use equipment that is thoroughly familiar, with capabilities they have mastered, they can maximize their potential. The uproar and debate over swimsuits at the Beijing Olympics is still fresh in people's memory. Swimmers from many nations wore a new type of swimsuit that contributed to a string of competition records being broken.

All top-class athletes prefer to look after their own gear. It is understandable that they don't like their unique, custom-made pieces—their trade secrets, so to speak—being touched by anyone else.

Not many people are aware, however, that in the sport of shot put, competitors do not use their own shots. Another little-known fact in Japan is that the shot put is the very first event in the Olympic Games.

Athletes usually arrive one week before the start of competition to practice with the official shots that have been delivered to the ground. This is the first chance they have to handle the shots that will be used in the competition and decide which one they want to use. In

other words, they cannot use the personal favorites they train with regularly. This means that the pre-competition selection of shots is a very serious business. No one knows better than the athletes themselves that the choice of shot can make a difference of one to two meters tossing distance.

The current international weight standards for shots are set at 7.26kg for men and 4.0kg for women. Only five companies which meet these criteria are officially recognized suppliers of shots for the Olympics.

Japan has its own master craftsman of shot making: Masahisa Tsujitani, president of Tsujitani Industry Co. Ltd. Shots made by Tsujitani were used by all gold, silver and bronze medalists at the Atlanta 1996, Sydney 2000, and Athens 2004 Olympic Games. In other words, every competitor who won a medal at these Games chose to use Tsujitani's shots.

Constant Research

Tsujitani reached this level after a long, hard slog of trial and error.

In 1964 he was asked by the president of a certain company to make hurdles. Tsujitani produced a revolutionary design, using wire to attach the height adjuster weights, that is still used today for 90% of the hurdles in Japan. In due course he was also asked to produce

shots, a request he nonchalantly accepted. That was how it began.

"In the past, differences of a 100 grams or so were no problem as long as shots didn't go under the standard weight," said Tsujitani. But in 1980, the Japan Association of Athletics Federations adopted strict international standards, which meant that the permissible weight error had to be within a mere 20 grams. About ten Japanese companies were making shots at the time, but almost all pulled out of production at that point.

"It's difficult to measure weight, and difficult to shave it off. If you're trying to shave off 10 grams, it's not as though you can tell by looking. Shave off too much and you only waste the supply of cast metal."

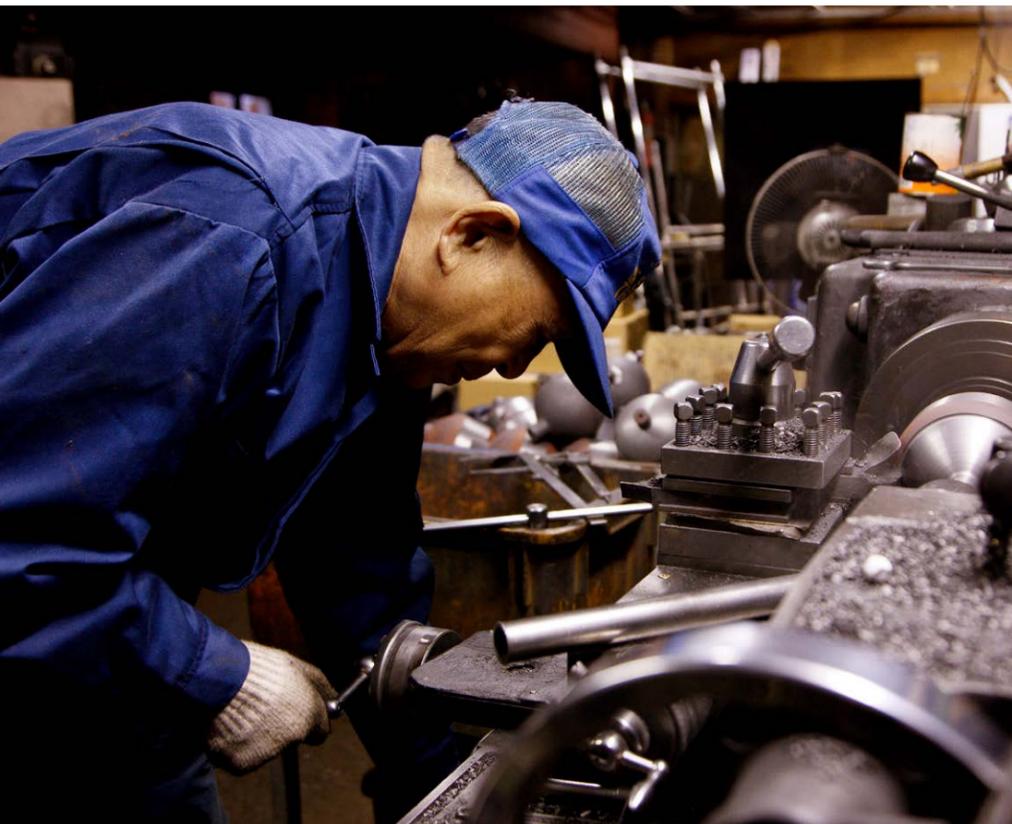
Tsujitani tried to write his own process manuals. When craftsmen want to produce one hundred pieces of work, they make the first ten, write the process manual, then make the other ninety. But Tsujitani found that "no matter how precise a record I made, I got weight defects in twenty to thirty out of the ninety." Then he tried having them made at a factory with a computer-controlled NC (numerically controlled) lathe. This time more than 70% turned out defective.

Tsujitani spent a year making the shots over and over again, painstakingly trying to create a manual, but "the weight changed every time. I was in a bind,



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Shots are made on one machine. Tsujitani almost never looks at the shot while he is honing it, relying only on what he senses through his hands and ears (left). The shot pattern is delivered from the factory with a boss attached (the "ear" parts). Tsujitani goes through fourteen steps to transform it into a shot with the center of gravity in the center. During this process he uses his instinct to make the cuts, using a cutting-off tool to finally trim off the boss and complete the process (upper right). Shelves packed with tools and implements (bottom right).



because I realized a manual was totally ineffective," he recalled. "Even so, I'd accepted the job so I couldn't just brush it off and say 'I can't do it.'" The craftsman's spirit had been ignited in Tsujitani.

A New Start

Tsujitani resolved to start again from scratch. He began by ordering shots manufactured in seven countries, used by medal-winners in the Olympics. These he split in two. Metal casts contain many impurities, so he wanted to investigate what components were in the prize-winning shots. He got quite a surprise, however, when he looked inside them. In some he found cavities, in others he found lead had been inserted. He guessed that the reason the overseas shots were so colorfully painted was to cover up the evidence of post-production fine weight adjustments. When Tsujitani saw these he set himself a new goal: "I wasn't going to be beaten by those kind of tricks. I wanted to make shots without any kind of cheating."

No Cheating

Having made this resolution, Tsujitani

set out to study metal casting from scratch. He decided to train at a local foundry. It was lucky for him that there were skilled artisans in the city of Kawaguchi in Saitama prefecture, which had grown up around metal casting foundries.

"It took me a year to figure out why my techniques hadn't worked," he said. Metal casting ingredients are made up of 40% new pig iron, 45% scrap metal collected by scrap merchants, and 15% general steel that comes out of building sites and the like. These are all melted down together, becoming a mixture of a lot of different ingredients. The molten metal cools over time, but he realized that the way in which the temperature dropped varied greatly in different conditions and seasons. So of course the rate of contraction would change, and the size and density of the finished product is always different.

Another thing that Tsujitani learned was that when the metal casting hardens, the density of the upper part is low, while that of the lower part is high. This means that even if a shot is honed roundly and evenly all over, the center of gravity is not necessarily in the same place as the center of the shot. Placing the center of gravity in the center is

actually the most important part of shot-making, and the most difficult to get right. The benchmark of a good shot is not having the weight within the stipulated weight standards, but matching the center of gravity with the center of the shot. If the center of gravity in an iron mass is off by even one millimeter, the shot will not fly straight, or the tossing distance will be limited. While Tsujitani thought about how to keep the weight within the standards, he also kept in mind placing the center of gravity in the center of the shot.

When it comes to this problem, the NC lathe, which excels in making things of uniform appearance, has no role, and a craftsman's instincts are all that can be relied on. The master craftsman is indeed a treasure to be guarded.

Tsujitani's skill derives from his keen sense of the sound and color of metal casting, as well as the pressure transmitted to his palm through the hand grip as he works the machine.

From long years of experience working a lathe, Tsujitani can tell how hard metal is from the sound. An amateur could not tell them apart, but Tsujitani can hear five different levels of sound. Shaving hard sections produces a high sound,

while softer sections create a lower sound. If there are both hard and soft parts inside the shot, the center of gravity and actual center of the shot will be different. Specific gravity is heavier in the harder sections, and therefore those parts can be shaved more to align the center of gravity with the actual center. The surface of harder sections of metal casting become shiny when shaved, while softer sections are duller in color. Tsujitani is proficient at distinguishing hardness from variations in luster and color.

The deciding factor is his ability to sense pressure through the handle of the cutting machine. In fact, when Tsujitani is honing a shot, he almost never looks at it. When rounding off a shot on the copying lathe, he listens to the sound, checking hardness through the pressure on his hand in order to pin down the center of gravity. Because he uses his hands to sense minute variations in hardness, he makes sure to take good care of them. Before going to bed he applies hand cream and puts on gloves. People apparently comment that the softness of his hands makes them look like they don't belong to an artisan. "It's important to connect your own body with the objects you make," he says. "If you do that you can study it thoroughly, and be able to make things other people can't."

By gaining sure control over three senses, Tsujitani was able to produce the same shot almost completely, every time. He then took his shot to the International Association of Athletics Federations in Monaco, who gave it their official recognition.

Success Born from Disappointment

With the International Association counting on the quality of his products, and having received his authorization from the judges, Tsujitani delivered the regulation number of shots to the 1988 Seoul Olympics. He watched the shot put finals on television from his home. His shots should have been easy to tell apart since they were not colored, but the only shots he saw on the screen were colored. Nobody used Tsujitani's shots.

"It doesn't matter how much praise the shot gets, if no one uses it that's failure. Complete failure," Tsujitani said with

regret about his feelings at that time.

The shots he delivered four years later at the Barcelona Olympics, had a unique touch; the surfaces were inscribed with fine lines. Two years prior to the Barcelona Olympics he studied fingerprint characteristics from as many as fifty people. Based on this he added lines to the surface which fit human fingerprints. Shot put athletes from the Tsukuba University Track Club tried the shot out for him and gave him their opinion. As he'd expected, the overwhelming response was that fine lines made the shot much easier to throw. He felt confident about the next Games. As he'd done four years previously, he followed the finals on television. But again, he couldn't see any finalist using his shots.

Later, however, he heard from an official who'd been in charge of equipment that all of Tsujitani's shots at the ground had been taken by competitors the day before the contest. At least their usability had been recognized by the athletes. Four years later at the Atlanta Olympics, all eight competitors who advanced to the finals used Tsujitani's shots, and set new records.

Under Suspicion

This success drew worldwide attention to Tsujitani's shots, with European media flocking to his factory to report. "Why do your shots fly?" they asked, and were hardly satisfied with the answer "because they are handmade." Suspecting that there must be some kind of device or trick inside, they went so far as to ask him to split one in half for them to see.

Strangely, the same thing Tsujitani had done ten years earlier was now being asked of himself. "I split one open to show them there was no trick or device inside."

Cutting a shot open in front of people raised the credibility of the Tsujitani brand even more.

Thus Tsujitani's shots went on to be chosen regularly by athletes at the 2000 Sydney and 2004 Athens Olympics, where world records were also broken. The one time Tsujitani did not submit shots, at the Beijing Olympics, was the only time that no shot put records were broken.



Raising Levels of Japanese Technology

Having had the quality of his shots recognized worldwide, Tsujitani received a request for technical guidance from a major American sports equipment manufacturer. He turned it down, but a month later an agent presented him with an offer of 20,000 US dollars per week. He agonized over this before flatly refusing.

Then, two years later, he was notified by the International Association of Athletics Federations that putting lines on the shots was an infringement, and told to leave them off. This could be taken as another form of pressure. He refrained from inscribing lines from then on, and at the Athens Olympics the following year his ability to deliver results remained unchanged.

Why did he refuse such an exceptional offer for his technical guidance?

"Well I did wrestle with that" he says, "but these days Japan is passing its technology on to other countries too easily. If Japanese technology was holding its own that'd be okay, but effectively there isn't even any economic return. Look what a hard time of it small and medium Japanese companies are having now."

"Another thing is, I couldn't have made a world-leading product on my own. The foundry owner and workmates in the foundry town where I studied iron taught me so much. And what's more, they never once charged me for materials when I made one failure after another. I couldn't abandon people like that to go off and say 'I made it big in America.' Isn't life more pleasant if you stay loyal to the people you owe, rather than go off chasing money?"

Tsujitani is now seventy-seven years old. The shots he once held in one hand now feel heavy to him when he holds them with two. All he hopes for now is the meteoric rise of a Japanese shot putter to capture medals.

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