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Abstract

Oshima Shipbuilding is one of many mid-size Japanese companies that are major global players in niche markets. This essay tells the Oshima story in the context of the global shipbuilding industry's cycles, changing competitors, and evolving technologies. The industry is subject to wide, rapid swings in demand and pricing, primarily for exogenous reasons. Oshima, a builder of mid-size bulk carriers, has survived, and even prospered, through productivity growth, technological innovation, and earning a reputation for quality.

Oshima Shipbuilding Company

Hugh Patrick

Many mid-size Japanese companies are major global players in niche markets. This essay is about one such firm. It is a company whose plans have routinely been overwhelmed by events, at times tossing it about like a ship in a major storm. Yet it has not just survived, it has come to prosper – though always precariously in an industry as turbulent as the seas its products sail.

The Oshima Shipbuilding Company, Ltd, describes itself as "a small-scale but world-class shipbuilder." It builds bulk carriers, which are ships that carry loose, usually homogeneous cargo that is often loaded with the help of gravity. There are many types, some highly specialized, transporting coal, ore, grain, caustic soda, and the like, as well as rolls of paper and steel pipes. Oshima specializes in mid-size bulk carriers, which range from 40,000 to 120,000 DWT depending on cargo. It has about a 6 percent global market share, and since it does not produce Cape-type large bulk carriers, it has about a 10 percent global market share of the niche in which it competes. Considering the number of competitors, this is significant.

Oshima was established in 1973 and went through a very difficult first 15 years. By 1987 the company was essentially bankrupt. However, despite not having enough orders to sustain production, it was bailed out by its three corporate shareholders and its creditors – with the injunction to become profitable by 1991 or be liquidated.

The company's present strong position is a result of its decision in 1991 to focus on building mid-size bulk carriers. It has substantially invested in upgrading production facilities, in design innovations and customizing, and in R&D to reduce fuel costs. Oshima is probably the most efficient producer of bulk carriers in Japan, and is highly competitive globally.

Box 1
Measuring Ships

Deadweight tons (DWT) measures in metric tons the amount a ship can safely carry. For a bulk carrier, about 96 percent is cargo. The remaining 4 percent is for fuel, freshwater, ballast water, crew, and provisions.

Gross tons (GT) is a measure of a ship's interior volume in 100 cubic feet. More specifically, it is the capacity of the spaces within the hull and of the enclosed spaces above the deck available for cargo, stores, passengers, and crew, with certain exceptions, divided by 100. Thus, despite being a "ton," the measure has nothing to do with weight. GT are determined by formulas set by international convention to replace actual physical measurement of each ship. The latter is a gross registered ton (GRT). The two measures are quite close in most cases.

Compensated gross tons (CGT) was developed by shipbuilder associations beginning in the 1970s to provide a measure of shipyard activity that is more useful than the gross ton or deadweight ton. CGT is computed from GT using values determined by the type of ship. For an exhaustive discussion, see OECD 2007.

Cranes are essential in the production process. Crane size is measured in metric tons (t).

Box 2
Classifying Ships

There are a variety of ways to classify ships, with purpose, size, and special features being the most common. Size is the focus here.

Classifying by size has historically been in reference to the constraints imposed by waterways, especially man-made ones with locks, although the Straits of Malacca is too shallow for the largest oil tankers. The Suez Canal has no locks, but depth and width matter.

The Panama Canal is the principal constraint. As a result, ships are divided into Panamax, which can transit the canal, and Post-Panamax, which cannot. The formal constraint is a beam no more than 32.2 m, and length up to 230 m. Depending on cargo, fully loaded vessels generally are not more than 80,000 DWT. Completion of new locks, now expected in 2015, will allow much larger ships; new Panamax ships are already being built by Oshima and others.

There are many size groups on either side of the Panamax divide. Most vessels currently built by Oshima are in a niche called Supramax, which has become popular since 2001. These are 50,000 – 60,000 and up DWT, usually with five cargo holds and deck cranes so loading and unloading need not rely on port facilities. Oshima also builds Handymax, which are bulkers of 35,000 – 50,000 DWT. Looking ahead, because of their efficiencies, Oshima will move up to ever-larger ships.

Seawaymax (maximums of 226 m long, 7.92 m draft, and 28,502 DWT) are the biggest vessels that can transit the locks on the St. Lawrence Seaway. Oshima builds this class.

Some classifications arise from a specific port's facilities. Thus, there is the Kamsarmax, a type of Panamax. The important bauxite shipping port of Kamsar in Equatorial Guinea cannot handle ships longer than 229 m and of about 82,000 DWT. Oshima builds this class.

[end of boxes]

This essay is divided into three parts: an overview of the company and shipbuilding industry, their development, and their current and prospective situation. The first part describes Oshima's location and shipyard, and the nature of shipbuilding. The sections on development cover the firm's (and industry's) history from its 1970s roots to the beginning of the 21st century. The final part looks at the company and its prospects, with sections on labor force, competitiveness, and government policy, as well as on Oshima's non-shipbuilding ventures.

Part 1 Overview

Like many mid-size Japanese companies, Oshima is essentially a family firm. The founding Minami family owns 60.9 percent, Sumitomo Corporation (its external sales representative) holds 34.1 percent, and Sumitomo Heavy Industries, Ltd, has 5 percent. (The family interest is held by Daizo Corp.)

Oshima is in its fourth generation, including a predecessor firm, Osaka Shipbuilding, which patriarch Shunji Minami founded in 1936 in Osaka. The Osaka yard was bombed during World War II, but by 1947 had been rebuilt. Given Japan's need for raw material imports, the resurrected company specialized in bulk carriers. By 1970 it was operating three slipways at full capacity to produce nine ships of 33,000 deadweight tons (DWT) annually.

Shunji's son Kageki Minami had the ambitious vision of building a new shipyard, six times larger, in a much less congested area. So, he began searching for possible locations. In light of the burgeoning global demand for oil and its transport, his business plan focused on building large oil tankers in addition to bulk carriers.

The result was formal creation of Oshima Shipbuilding Company in 1973, the first new shipbuilding entrant in postwar Japan. The name reflected the location of the new yard on Oshima Island, one of seven sites that competed to attract Osaka Shipbuilding.

The Family

The Minami family has exercised control over Oshima both by ownership and by having a senior family member as president or chairman.

Oshima's founder, Kageki Minami, was the first president. He became chairman and CEO in 1981 when Shozo Doi, a former vice president of Sumitomo Heavy Industries, became president. In 1989 Kageki's son Sho became president, and Tsutae Hyodo of Sumitomo Heavy Industries became chairman. In 1990 the founder passed away. In 2005 Sho Minami became chairman, having recruited Tadashi Nakagawa from Toyota to be president. In 2009 Sho's younger son Hiroshi became president. Kageki's elder son, Nobuyuki, is president of Daizo, the company that owns the family's stock in Oshima. He worked at Oshima for a while, and his son does now.

In a long-standing Japanese practice, when first Kageki and then Sho had only daughters, the daughters married men who were adopted into the family and took the Minami name. Hiroshi, who married the younger of Sho's daughters, has two young sons.

The Location

Oshima island is about 13 kilometers square (not quite four times the size of New York's Central Park) on the Nishi-Sonogi peninsula in northwestern Kyushu. Just over 60 km (90 minutes' drive) northwest of Nagasaki City, it is some 30 minutes by hydrofoil or an hour by ferry or car (about 40 km) from Sasebo (long a major port). Japan has many islands named Oshima – it translates as "big island," though all are rather small. The island is now a town within Saikai city in Nagasaki Prefecture. The shipyard is at 33˚03' N 129˚38' E.

The island's economy was originally based on fishing and farming. It became prosperous from 1935 when Matsushima Tanko KK opened a coal mine. MTKK was reorganized after the war as Mitsui Matsushima Coal Mining Company, Ltd, which in 1952 opened a second mine on another island. Mining peaked in 1959. By 1970 Oshima's mines were all closed, leading many to move away. The population declined from over 18,000 in 1960 to less than 6,000, and the island had only limited school and other local facilities. The remaining inhabitants were desperate to attract a new source of employment, and courted Osaka Shipbuilding with attractive terms.

There is a good natural harbor some 20 meters deep, and a warm climate so that production can continue in winter. The island had not suffered a major earthquake in 2,000 years, but is subject to periodic typhoons. The coal mining company's site was available, including a power plant. Nagasaki prefecture has long been a center of shipbuilding and related industries, and was supportive.

The Shipyard

Oshima's shipyard is built on 76 hectares. Much of this was the unused site of the coal mine, but about 30 hectares was created by filling in the bay. Part of the hill inland from the site was leveled to provide fill and otherwise increase the flat area. Of this, not quite 5 hectares on fill was added in the mid-2000s for block storage and a new grand assembly, as well as a third mooring berth.

The yard's work-flow is efficiently organized in a U. Moving counter-clockwise from the dock at the top of the U's left side, steel plates are unloaded, cut, and put together into ever-larger blocks. The bottom of the U is where painting and outfitting is done. Once open, in the mid-1980s these areas were roofed to improve working conditions and protect the equipment and work-in-progress.

The right side is the dry dock. The largest in Japan, technically it is two parallel docks, but when unflooded it looks like one big dock. Up to four ships can be assembled at once. The dry dock and adjacent storage area are spanned by three large gantry cranes. Most impressive is the 1,200t Goliath, with a span (between the rails) of 145 m (about twice the width of a soccer field). Installed in 2008, it lifts the major blocks such as the bow into place. There also are two 300t gantry cranes and a number of tracked jib cranes.

The Industry

The essence of shipbuilding lies in cutting, bending, and shaping pieces of steel sheets and sections, then assembling and welding the pieces into increasingly larger blocks. Throughout the process, accurate measurements are essential so that every piece and block fits precisely into position. Production utilizes a great deal of specialized machinery combined with skilled labor.

Using Oshima as an example, a 60,000 DWT bulk carrier has some 46,000 steel pieces cut from about 1,850 sections and 1,350 steel plates (some as much as 22.5 x 4.5 meters. which is about twice the size of the average Manhattan studio apartment). These 46,000 pieces are assembled into 3,600 pieces, then into 60 blocks, and then into 20 blocks. These 20 comprise the ship's structure from hull to bow. They are lifted onto the dry dock for final assembly. Preparation of the outer surfaces and painting

with special epoxy paint to protect against corrosion is an important part of the process. Also while in the dry dock, the ship is outfitted.

The production process consists of 123 sequential lines, with teams led by supervisors, group leaders, and highly skilled workers. The teams compete based on various performance measures, with top-ranked performers honored within the company.

The sheer size of the assembled blocks and the equipment to move them is overwhelming. Although the assembly process is broadly similar to that for automobiles, the parts are as much as 10,000 times heavier, and more of the components are customized; shipbuilding is far from a standardized assembly line operation.

In the 1970s most shipbuilding work (aside from the engines) was done at the shipyards, but specialization in components means that now half or more of a ship's value is provided from outside. Material and components such as ballast systems come from a global network of suppliers. All this must be carefully coordinated, which leads to close ties between suppliers and shipyards.

As an example of the logistics, consider four gantry cranes ordered from a Finnish company for installation on a ship built for a Singapore firm. The crane structures were manufactured and assembled in China, then barged to Oshima, while the main mechanical components, electrical control systems, and drive units were produced in Europe.

The economics are such that shipbuilders rarely build on speculation of an order. The entity ordering a ship usually will have at least an initial user in mind, and there is a trend toward large shippers owning their own vessels (as has long been a custom with tankers). Many orders are quite narrowly purpose-built. For example, in August 2014 Oshima delivered a 60,000 DWT carrier specialized to transport salt from Mexico to North America under a 15-year charter. Special features include gear for discharging the salt.

Shipbuilders routinely work with a ship classification society. They are specialist firms that develop the design, construction, and material standards, and oversee the construction of ships. At the simplest level, historically they are not unlike building inspectors. Ship classification is based on three main elements: setting standards (classification rules); verifying compliance with standards (approval of specifications and drawings, surveys, and testing); and documenting compliance with standards (survey reports, classification certificates). Their principal trade organization, the International Association of Classification Societies (IACS) works on global standards with the International Maritime Organization (IMO, a United Nations specialized agency). Both IACS and IMO are based in London.

Supervision contracts are also common. Providers are specialists firms offering on-site design, engineering, and project management service during a ship's construction and outfitting. Some Oshima projects involve working with a supervising contractor.

Once an order is agreed upon, it takes about 18 months for Oshima's design department to design the ship to the owner's specifications, and the purchasing department to arrange for delivery of materials. The actual shipbuilding process takes about eight months, culminating in the assembly of the final blocks at the dry dock in only seven days. Once launched, the final outfitting and sea tests take another two weeks.

Economics of scale are normal, and important. The larger the size, the lower the cost of production per DWT, and hence the lower the cost of transporting cargo. The price of 75,000-77,000 DWT bulk carriers are only 30-50 percent more (depending on the year) than the price of a 30,000 DWT carrier.

Part 2 Oshima's Development

Since Oshima's establishment in 1973, global ship demand has grown substantially, but with dramatic volatility. For Japanese builders, the yen's appreciation from 360 yen/dollar in 1970 to a peak of 80 in 1995, and then its weakening but with major fluctuations, before stabilizing at about 100 from early 2013 to summer 2014 has exacerbated the swings in global demand by directly affecting price competitiveness.

Rising rapidly in the postwar period, global ship production peaked in 1975 at 34.2 million gross tons, of which Japan's share was 50 percent. In the next four years global production declined some two-thirds and experienced a three-year rebound that still left 1982 production at less than half the 1975 peak. It then dropped to 10.9 million gross tons in 1988, when Japan's share was 37 percent. Global production then rose substantially (although not steadily – there have been 3 minor downturns since the 1988 trough), finally surpassing the 1975 peak in 2003. (Data in this section are primarily from the Shipbuilders' Association of Japan.)

There was a great ordering boom in 2005-08, and global production reached 96.4 million gross tons in 2010, a new peak. Although Japanese production also increased absolutely, amounting to 20.2 million gross tons in 2010, its global share had declined to 21 percent. By mid-2014 production was estimated to have dropped 20-30 percent, leading to the closing of many yards and a shift to work on off-shore oil related structures (World Shipyard Monitor 2014 Jun 20).

The history of Japan's modern shipbuilding industry began in early Meiji with active government involvement, a policy approach that has persisted to the present. The government's postwar industrial policy was first to encourage the industry's development and then to adjust to overcapacity by forcing Japanese shipbuilders to consolidate and downsize.

Building on the shipbuilding skills developed before and during World War II, in the early postwar period the government recognized shipbuilding as a potentially highly competitive industry. Japanese shipbuilders were very successful in the expanding global market by the 1960s: by 1968, Japanese shipyards produced half of the world's ships. But the companies then had to cope with the realities of domestic and global overcapacity when demand dropped. To prevent excessive expansion of production capacity, by 1970 the Ministry of Transport (MOT) mandated that medium-size shipbuilders such as Osaka Shipbuilding could only expand in cooperation with larger shipbuilders.

The development of global overcapacity from the mid-1970s put strong pressure on non-competitive shipbuilders in Europe, and then in Japan, to retrench. From the mid-1990s, Korean shipbuilders came to be major players, based on lower labor costs and government support. In the 2000s, China has become a major shipbuilder. Japan lost its lead as the world's largest shipbuilding country by orders to South Korea in 2005 and dropped to third behind China in 2006. China took the top spot in 2009 and in June 2012 had a 39 percent market share (IHS Fairplay 2012).

Of the three major categories of vessels – tankers, containers, and bulk carriers – Japan is now competitive only in bulk carriers of all sizes, with a global market share of close to 40 percent.

Roots

Kageki Minami had come to know Shozo Doi, senior managing director at Sumitomo Heavy Industries, a major shipbuilder. The two met with a senior official at trading company Sumitomo Corporation in 1971 to plan the establishment of a new shipbuilding yard, which became Oshima. In July 1972, the government authorized the construction of the Oshima shipyard, but with the understanding that Osaka Shipbuilding would close its three slipways within five years and shift its operations to the new company.

Oshima Shipbuilding was formally created on February 7, 1973, a a joint venture owned 50 percent by Osaka Shipbuilding, 25 percent by Sumitomo Corp, and 25 percent percent by Sumitomo Heavy Industries.

Osaka Shipbuilding shut a slipway in February 1973 and a second in November 1977, leaving it with one. In 1980 it purchased another shipbuilder and closed it to allow both Osaka and Oshima to remain in business. Osaka closed its third (last) slipway in September 1987. With that, the Minami family's shipbuilding interests were concentrated in Oshima.

Osaka Shipbuilding continued as the company holding the Minami interest in Oshima. In April 1993 it merged with Osaka Aerosol Industries Corp and Nichimoly Century System I Co, Ltd. Osaka Aerosol had evolved through name changes and mergers from Aerosol Industries Corp, founded in August 1954. Nichimoly had evolved from Nippon Molybdenum, founded in July 1958. Osaka Shipbuilding had provided Nippon Molybdenum additional capital in October 1964. Osaka Shipbuilding changed its name to Daizo Corporation in August 2000. Daizo's other activities include making bicycle parking facilities, operating a beer garden in Tokyo's Ginza district, growing olives in Kagawa Prefecture on Shikoku (the Toyo Olive Co, Ltd), and building tug boats in a small facility in Osaka.

A Bright Future Fades Quickly

With contracts to build 12 large oil tankers, the future looked bright for the new company. In anticipation, the groundbreaking ceremony for the new yard was held December 12, 1972.

Osaka Shipbuilding under Kageki Minami managed the shipyard and most purchases; Sumitomo Heavy provided essential technology for oil tankers, including design skills; and Sumitomo Corp took sole responsibility for selling the ships and for arranging production and sales finance. Importantly, the three owners guaranteed all bank loans made to Oshima.

The owners' optimistic expectations were subject to immediate shocks far beyond their control. On February 12, 1973, less than a week after Oshima was formally established, the US devalued the dollar. Japan moved to a floating exchange rate, the yen appreciated by 10 percent, and Oshima took a substantial exchange rate hit on its initial contracts.

Then, in October 1973, the global oil crisis emanating from the Middle East significantly raised oil prices, reduced oil demand, and accordingly the need for, and price of, oil tankers. Devastatingly, two of seven of Oshima's initial tanker orders were cancelled, and the other five were fundamentally revised to smaller vessels (one oil tanker and four bulk carriers). Less of a long-run vision and deep commitment would have destroyed most new companies, but Oshima survived.

Thus, the company started operations on June 1, 1974, and launched its first vessel on February 28, 1975, an 89,000 DWT oil tanker.

Oshima initially planned to have a workforce of 2,700, including on-site subcontractors, when operating at full capacity. In anticipation, it bought land on Oshima Island to build housing for its employees and their families, but the land was never needed for that. To obtain a highly skilled labor force, in early 1974, Osaka Shipbuilding helped 600 of its 1,800 employees move to Oshima, together with some 600 spouses and children. They took trains to Sasebo, and then ferries to Oshima. In 1999 a bridge directly connecting Oshima Island to the mainland was opened, making it easier for workers to live on the mainland, as most do.

By early 1975, Oshima had hired 1,804 employees, directly and through subcontractors, just as the oil tanker orders evaporated. The company negotiated with its company union for dramatic reductions: laying off 1,009 workers by October 1979, and cutting monthly compensation while increasing working hours for those who remained.

The yard was formally completed on June 11, 1975, costing ¥31 billion, significantly over its original cost estimate of ¥17 billion.

The Ministry of Transportation (MOT) issued downsizing directives in November 1976 and November 1977. In 1978 there were two more rounds of downsizing. On August 1, 1979 the Japanese Fair Trade Commission (FTC) allowed the shipbuilding industry to establish a recession control that continued for 20 months.

Refocus and Persevere

With its oil tanker strategy in shreds, Oshima had to dramatically change its business plan. It struggled to do so. In desperation, it took orders for all kinds of vessels, from tugboats, semi-submersible heavy-load vessels, and car carriers to large cargo carriers. In 1977 it diversified into producing steel structures mainly for bridges, a profitable line that came to contribute 10 percent of net sales in these first decades.

Oshima did obtain orders for four 27,000 DWT bulk carriers and four 16,000 DWT general cargo ships, to be paid in yen and delivered in 1977 and 1978. However, with global demand decreasing again, Oshima had to accept significant price concessions in order to prevent orders from being cancelled. In addition, in late 1977 claims regarding production quality emerged. Some ships suffered excessive vibration and the quality of the hull painting was questioned, (In 1985 Oshima built huge sheds and moved painting inside.) To the extent there actually were problems, Oshima rectified them.

In a bizarre claim, one buyer asserted Oshima knew that the yen would be revalued to the detriment of the buyer. Four years of litigation later, a US Federal Court in New York found in Oshima's favor.

"Tentatively encouraging signs" appeared in late 1979, and in 1980 a mini-boom began for the industry. Still, MOT decreed another round of downsizing in February 1980, and the FTC sanctioned continuation of the cartel. Beginning in 1981 demand was strong enough for prices to rise. Oshima began hiring, and in July 1981 restored salaries, bonuses, and the work week to their earlier levels. The recession cartel ended on March 31, 1982.

Oshima suffered substantial financial losses in its early years, with a record ¥7.1 billion net loss for fiscal 1978 (ended March 31, 1979). But as demand turned up and costs were cut, the company became somewhat profitable. Nonetheless, by March 1984 Oshima had an accumulated net loss of more than ¥10 billion, and had ¥30 billion in loans guaranteed by its shareholders. The shareholders increased paid-in capital from ¥1.5 billion in 1973, to ¥3 billion in 1975, ¥6 billion in 1977, ¥9 billion in 1980, and ¥12 billion in 1983.

Global marine transport demand began to weaken in 1982, and in 1983 prices softened as expanded global capacity, especially in Korea, took its toll. However, an order from Sanko Steamship in March 1983 mitigated the impact on Oshima, allowing the company to be profitable that year.

For this industry contraction, rather than laying off workers, Oshima in 1985 contracted with 14 companies in the burgeoning automobile industry to dispatch 60 percent of its own workers for short-term and longer-term assignments over the next 3½ years. Some 70 percent went to Nippondenso (now Denso). At the same time, Oshima kept its subcontracted workers, even though they did not have the same employment commitments Oshima had with its regular workers. However, as before, wages were substantially cut, first by increasing the number of annual working hours with no increase in compensation, then, in 1987, monthly wages were cut 9.8 percent, and the annual bonus reduced to only one month (rather than the usual two).

Sink or Swim

On April 1, 1987 the FTC again allowed shipbuilders to establish a recession cartel for one year, subsequently extended through September 1989. In June 1987, MOT ordered shipbuilders to dismantle 20 percent of their production capacity. By March 1988 only 26 shipbuilding companies in 8 corporate

groups remained, from 44 companies in 21 groups before the downsizing; some 24 percent of capacity had been scrapped. Oshima itself became one of the six largest groups.

Oshima's financial conditions had become precarious. In December 1987 the three owners dissolved the company, wrote off all their ¥12 billion paid-in capital, and recapitalized Oshima (technically, its legal successor with the same name) with ¥6 billion ($49 million). The owners stated that, if the company did not become profitable within four years, Oshima would be liquidated. The red ink continued, and by March 1989 losses amounted to almost half of the new capital injection, with poor prospects for profit in the coming year.

Ultimately, Oshima benefited from both government policies and a global demand upturn. In 1989 Oshima obtained orders for 17 40,000 DWT general bulk carriers, 2 46,000 DWT open bulk carriers, 2 car carriers, and 2 wood chip carriers. By April 1989 it had brought back all its skilled workers contracted out to the automobile industry. To boost worker morale and performance, Oshima restored its wages and bonuses to pre-1987 levels, but retained the longer working hours. The new orders ensured Oshima's survival, but profitability was only achieved shortly before the 1991 liquidation deadline. In April 1991, Oshima returned to its earlier standard work year of 2,025 hours.

In April 1991, Oshima's bankers, seeking to curtail expenses, demanded that Oshima reduce its borrowing as a percentage of sales, and pay down loans.

Kageki Minami's strong leadership and long-run vision had seen the venture survive and begin to prosper. He died in January 1990, and in his will provided for a substantial bonus to Oshima employees. Kageki's son Sho became president in June 1989. Cash flow had become a high priority. Sho's approach was to obtain as many new orders as possible, even at low prices, in expectation that steel and other material costs would drop and Oshima could continue to increase its productivity. Moreover, new orders generated cash since they were accompanied by up-front payments, well before production actually began.

This is when the company's competitive advantage in producing bulk carriers became key. In 1991 Sho announced Oshima would henceforth specialize in the bulk carrier niche, to the consternation of some of its marketing and sales staff. Given its very large dry dock and ample adjacent space, Oshima planned to double its production capacity from 12 ships per year to 24, and achieved this target in 2001.

However, the yen began appreciating in January 1993, going from 124 yen/dollar to a shocking peak of 79.8 yen/dollar in April 1995. On January 6, 1994 Oshima announced an emergency cost-cutting and productivity increasing campaign, which was formally launched July 1. While sales in yen decreased slightly, earnings dropped much more since many contracts were in dollars.

Still, profits were sufficiently strong that by the end of fiscal 1993 (March 1994) cumulated deficits had been eliminated. The company finally had positive retained earnings on its balance sheet. Nonetheless, on June 1, 1994 the three shareholders increased their paid-in capital to ¥7.5 billion. The company made small profits in fiscal years ending March 1995 and 1996: the emergency campaign had succeeded. As a result, in August 1998 Oshima returned the ¥1.5 billion capital increase injected in 1994.

During the campaign, the company had flown the international maritime Z flag, indicative to Japanese mariners of a sense of urgency. The flag came down January 6, 1997, three years to the day of its raising. The company considers this one of its three most-historic days – the others being the companies establishment on February 7, 1973 and the formal name change to Oshima Shipbuilding on January 1, 1988.

Restructuring

In 1998-99, Oshima was hit yet again. The global downturn saw demand for bulk carriers stagnate and prices drop by 30 percent by 2002. Korean shipbuilders became increasingly competitive. Oshima responded by cutting prices while increasing productivity sufficiently to make small profits. While the 40,000 - 60,000 DWT bulk carrier had become the core Oshima product, it began to obtain orders for 60,000 - 80,000 DWT vessels. It also began to produce 90,000 DWT, and eventually even larger, coal carriers.

By 2000 Oshima was sufficiently strong that the three owner companies were able to end their guarantee of Oshima's bank loans, thereby reducing their contingent liabilities. Oshima was no longer simply a subsidiary of Osaka Shipbuilding, which had evolved into Daizo Corp, a broadly diversified firm.

In August 2002 the ownership structure was altered, with Daizo (the Minami family) increasing its stake to 60.9 percent, Sumitomo Corporation increasing its share to 34.1 percent, giving it veto power in decisions, and Sumitomo Heavy Industries, which was having difficulties of its own, reducing its share to 5 percent. As part of this, a ¥400 million share buy-back reduced paid-in capital to ¥5.6 billion. Sumitomo Corp. has continued as Oshima's sole sales representative.

Part 3 Oshima Today

Prices for new bulk carriers swing dramatically over a global business cycle, and notably so in the solid growth period up to the financial crisis and Great Recession of 2008-09. For example, the price for a

newly built 75,000 – 77,000 DWT bulk carrier, $20.5 million in 2001, jumped more than 2½ times to $55 million in 2007, then dropped sharply to a trough of $25.8 million in 2012, before rising modestly to $27.8 million in 2013, and slightly more so far in 2014 (Clarkson Shipping Review and Outlook, Spring 2014).

Oshima produces 80 percent of the niche market of open hatch bulk carriers (OHBC). (OHBC have hatches almost the full width of the ship. This allows more-rapid charging and discharging of cargo.) It builds the largest open hatch bulk carrier with a gantry crane, the largest with a jib crane, the largest ships capable of transiting the St Lawrence Seaway, and the largest bulk carriers capable of operating in icy conditions such as the Arctic Ocean. About 70 percent of ship sales are to foreign owners, 30 percent to Japanese. In terms of the volume of all types of ships built, in 2013 the Oshima shipyard was the fourth busiest in Japan, and the tenth busiest in the world. It has the largest order book of all Japanese shipbuilders.

Table 1

	Number of ships per year	Sales in ¥ billion	Sales in $ million	¥ per $ yr ave
1974 Jun- 1983 Feb	6	First 50 ships took 105 mos from date operations began		
1983 Mar- 1990 Jan	7	Next 50 took 83 mos		
1991	8	35.7	265	134.7
1992	9	46.5	367	126.7
1993	10	50.1	451	111.2
1994	11	43.8	429	102.2
1995	14	45.5	484	94.1
1996	16	49.5	455	108.8
1997	19	51.7	427	121.0
1998	17	50.5	386	130.9
1999	20	56.4	495	113.9
2000	21	59.1	548	107.8
2001	24	60.2	495	121.5
2002	23	61.7	492	125.4
2003	23	61.9	534	115.9
2004	29	71.1	657	108.2
2005	28	71.8	652	110.2
2006	27	75.2	647	116.3
2007	31	96.6	820	117.8
2008	30	105.3	1,018	103.4
2009	31	177.0	1,891	93.6
2010	33	142.6	1,624	87.8
2011	35	152.7	1,914	79.8
2012	34	141.4	1,772	79.8
2013	36	130.9	1,341	97.6
Fiscal years ending Mar 31 of following calendar year				

Table 1 presents data on ship deliveries and sales. Sales measured in dollars declined from one year to the next in 11 of the 22 years through March 2014, and ship production declined in 7. Sales

peaked at $1.9 billion in 2011, helped by contracts with pre-recession high prices. In 2013 sales were $1.3 billion; 36 vessels were built, a record number. At its peak in 2008 the order book was 5 years. The backlog had fallen to 3½ years in early 2014, but that is still above the normal 2½ to 3 years.

Pursuing a cautious financial policy of retaining profits in anticipation both of future downturns in demand and expansion of its capacity, by 2014 Oshima had accumulated cash reserves of some 40 percent of total assets. Further, the company had planned to be profitable at even a considerably higher exchange rate, so the summer 2014 rate of about 100 yen/dollar has generated substantial operating profit windfalls.

The Labor Force

As of 2014. 2,482 people worked at Oshima, 1,239 regular employees and 1,243 subcontract workers. Of these, 1,943 are directly engaged in ship construction (720 regular plus all 1,243 subcontract workers). There are 103 supervisors as section chiefs and group (production team) leaders. Workers are classified as highly skilled (black belt), intermediate skill (brown belt), and entry level (white belt). About 90 percent have brown or black belts. The design department, which develops new production methods and customizes ships to buyer specifications, has 178 engineers and technical workers. Company-wide administration employs 178. In addition, guest workers from Vietnam (105) and China (53) are hired for three years under the government's foreign worker trainee program. Workers nominally retire at age 60, but 80 percent are rehired; 105 employees are over 60.

Of Oshima's 86 female employees, 47 hold administrative staff positions and 32 are dockyard workers. One supervisor works in the dockyard, reporting directly to top management. Three women are design engineers and three are technical workers doing process control in the design department. Shipbuilding is a skill best gained from experience. Many workers started after high school. Using teams of 20-30 workers with a mixture of skill levels provides opportunity for learning by doing and by example. All of the dock workers have high school degrees. Including technical college, 70 percent of the supervisors have college degrees, including five with Master's degrees and two PhDs. 18 of the female employees have a B.A. degree, and one an M.A. Overall, about 23 percent of employees have college degrees (including technical college).

To be hired, would-be dock workers must complete special training in welding and cutting steel and other basic materials. Those entering the design and management track are required to work in the dockyard itself for one year to understand both the production process and the important roles of the

workers. Oshima is a strong firm expected to grow in its niche, so the company is successful in recruiting young engineers.

The subcontracting companies and their workers are closely integrated into the production process. For example, in the seven presentations at different work units in my shipyard tour, four were made by team leaders from subcontracting companies. Both Oshima and subcontractor workers wear the same work clothes and have the same belt skill identification system. I was told they receive the same wages. The main difference is that, unlike Oshima workers, subcontractor workers do not have permanent employment guarantees. This provides Oshima considerable flexibility to reduce labor input should there be a large downturn in orders.

Government Policy

In 2003, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT, the successor to MOT) developed guidelines for shipbuilding industry policy aimed at establishing a sustainable competitive advantage (OECD 2006). The vision was to maintain domestic capacity of one-third of world market demand and increase technical capabilities. Although the latter has happened, the Japanese share is well below one-third.

As the decade drew to a close, MLIT created a joint government-industry working group – the New Shipbuilding Policy Review Committee – to develop ideas for the industry's future, concentrating on helping to strengthen competitiveness, as well as achieve more sustainable and comprehensive growth. Besides shipbuilders, the committee included the marine equipment industry, shippers, trading companies, financial institutions, and academics, A final report (the "New Comprehensive Policy on the Shipbuilding Industry") was published in 2011.

A core part of the proposals for promoting competitiveness was developing environmental technologies, including LNG fueled ships. Many of the other points are predictable, such as expanding production capacity outside Japan to avoid currency risk. (For a summary, see OECD 2013, p 17-18; the full report is only available in Japanese.)

Competitiveness

Oshima's main competitors today are in China, which now has an almost 50 percent share of bulk carriers. Korean shipbuilders have a negligible bulk carrier share. They have concentrated on container

ships, including huge vessels such as Maersk's Triple-E class reported to cost $190 million each, and on off-shore oil rigs.

China's strong price competitiveness is eroding as wages rise and the yuan appreciates. Oshima planned for costs and pricing at a yen/dollar rate of 80, so with the yen at 100 or higher, it has a good cushion. But the essence of Oshima's success lies in high productivity, compensating for higher wage rates relative to its major competitors in China. Its employees and subcontractors produced the highest output per worker, 262 compensated gross tonnage (CGT), of all shipyards in Japan in 2012.

Oshima vessels are highly regarded for reliability and durability, which commands an initial price about 10 percent above Chinese competitors and even larger differentials on the resale market. Thus, the resale price for Chinese vessels 5 to 7 years old is about 30 percent less than for Oshima ships of comparable size and age. Oshima formally guarantees its ships for one year. It can do this because construction defects leading to recalls are infrequent. The owners of Oshima's ships tend to keep their ships for a long time.

Design and R&D capabilities are strong. Each ship is customized to accommodate buyer needs. The company is continually enhancing the performance and other characteristics of its ships. As part of this, Oshima is beginning to install a monitoring system on its ships to provide detailed information on actual operating conditions and performance for each ship, thereby generating data for further innovations.

Japanese shipbuilders have long been focusing on more fuel efficiency to compete. To this end, Oshima, Imabari Shipbuilding, and others have supported global fuel-use standards, similar to mileage ratings for cars. Oshima has deployed several technologies to reduce fuel consumption per ton/mile, including a high performance propeller, structural fins on both sides of a ship, a more efficient ship bow, and a low-friction paint for the hull. Reflecting their fuel efficiency, Oshima's bulk carriers generate 20 to 30 percent fewer CO2 emissions than the International Maritime Organization's Energy Efficiency Design Index (EEDI), the global standard.

An air lubrication system that can reduce fuel consumption by 3 to 5 percent is being developed with Japanese shipping line NYK and others, with financial support from the Japanese government. To reduce friction between the ship hull and the seawater, the system scavenges combustion air from the main engine's turbocharger and exhausts it on the vessel's bottom. The air bubbles act as a lubricant. The technology was used on a 91,000 DWT coal carrier, the MV Soyo, built by Oshima and launched in 2012. In 2011 Archer Daniels Midland Company ordered three 95,000 DWT dry-bulk carriers using the technology. Initial costs are still high, but pay-back periods are favorable.

Oshima is part of a joint industry project launched in 2009 by the University of Tokyo that is exploring the use of sails. These post-Panamax ships will have large, computer-controlled retractable fiberglass or aluminum alloy wings. The goal is 50 percent less fuel consumption than a conventional motor vessel of the same speed and deadweight.

Also in the works is the ECO-Ship 2020. Announced in 2011, this project between Oshima Marine Innovation Centre and DNV-GL is an LNG-fueled open hatch bulk carrier featuring innovations such as Oshima's patented Seaworthy Bow (which is designed to be efficient at a range of drafts), the air lubrication system, a waste-heat recovery system to generate electric power, and hatch covers made of a composite material that weighs about half traditional steel covers. (DNV-GL, formed by the merger of an Oslo-based and a Hamburg-based group, is the world's largest ship classification society and a consultancy.)

Venturing Overseas

Oshima has had a long and complex relationship with Chinese government transportation officials and Chinese enterprises engaged in shipbuilding. In 1964 Chinese officials visited Kageki Minami at Osaka Shipbuilding, and exchanges began. In 1976 Oshima began providing technical assistance to China, and hosting Chinese trainees at its shipyard; this continues. Oshima eventually began to import riggings from Chinese producers. Chinese companies no longer supply riggings, but do supply some equipment, tools, and other supplies. In 1993 Oshima and Osaka Shipbuilding jointly established a trading company in Shanghai to handle orders; it became Daizo's wholly owned subsidiary in 2006, and was liquidated in 2010.

As orders increased rapidly after 2002, Oshima began to consider building a shipyard in Vietnam. Sho Minami was also concerned that, in the long run, it would be difficult to attract Japanese workers to shipbuilding because it was one of the 3K jobs (the English equivalent is dirty, dangerous, dull). Over time, planning for the Vietnam project became more serious, and in 2010 a 304 hectare site was selected in Cam Ranh Town. (There was a major US base in the area at one time.) Press reports in March 2012 indicated the yard would cost about $180 million and build vessels of 38,000 – 56,000 DWT.

However, in December 2013, Oshima withdrew from the project. Ship prices were very low, and new supply substantially exceeded demand, making investment in a new shipyard unattractive, especially abroad with the yen having weakened to about 100 yen/dollar. In June 2014 it was

announced that the Korean Samsung Group would take over the project, and is expected to invest $500 million.

In October 2013 Oshima joined Mitsubishi Heavy Industries, Ltd (MHI), trading company Mitsubishi Corp, and two other Japanese shipbuilders in a consortium with Brazilian partners in support of Brazil's off-shore oil exploitation program.

Other Ventures

Oshima has several other businesses on the island: a hotel and two small agricultural-based projects: shochu and tomatoes.

Recognizing the need to house guests when ships are launched, and to entertain potential buyers during visits, a venture was created to operate a guest house as soon as the shipyard opened. However, the deterioration of the business environment led to postponement of construction. The project was revived in 1979, and the Oshima Island Hotel Nagasaki opened in March 1983 with 40 guest rooms. Over the years the hotel was refurbished and expanded, and then closed in mid-2011 to be replaced. On May 16, 2013 the company-owned, elegant Olive Bay Hotel opened. Although it has just 32 rooms, the hotel includes a chapel and banquet facilities to attract weddings and other guests not associated with shipbuilding – the design brief to noted architect Kengo Kuma was "to create a relaxed retreat that responded to the natural beauty of the location in an intuitive manner." It actually does sit in an olive grove, though these are not the olives of the Daizo affiliate.

Island farmers have long grown sweet potatoes, and local government officials decided to help them by building a distillery to produce shochu. However, licenses are approved only for private-sector companies. The officials approached Oshima, which eventually agreed to have its hotel subsidiary participate in establishing Nagasaki Oshima Distillery in 1985 in partnership with a local sake producer and the town of Oshima. Eventually Oshima Shipbuilding became the largest shareholder. Two varieties of shochu are produced.

The company owns 2.2 hectares of land near the shipyard which it had initially intended to develop as housing for employees, but never needed. In 1985 the distillery company set up a division to grow a special variety of tomatoes originating in the South American Andean region. Tended by a few dozen workers, some 64,000 plants are grown in greenhouses emulating the arid conditions of the Andes. Because of their firm flesh, the tomatoes sink in water (most tomatoes float); are two to three

times sweeter than ordinary Japanese tomatoes — and are delicious. Harvest is early January to early May.

Sailing Ahead

Oshima management anticipates opportunities for further growth over the longer run. Global demand for bulk carriers will continue to increase because of population growth and, especially, GDP growth, notably in major emerging economies. Oshima's vision in 2003 for 30 years later (2033) included building 8 ships per month (100 annually), and having a 50 percent bulk carrier global market share. To accomplish this, Oshima would have to double the size of its shipyard, including building a second huge dock. Bulk carriers will become larger, as the Panama Canal widening project is completed and port facilities are expanded to accommodate them. Further improvements in technology and materials will generate further productivity increases; for example, adhesives will largely replace welding. Ships will require even fewer crew members.

In the more immediate future, Oshima plans to build 35 ships in 2014, 40 in 2015, and 48 annually by about 2020. To achieve this, the company in fall 2014 added a new 1,200t crane at its dry dock. This allows a 20 percent increase in annual production, in part by reducing construction time. In a September 2014 interview in an industry journal, Hiroshi Minami said the yard continues to focus on bulk carriers, noting that the strategy allows optimizing production systems and developing a loyal customer base. "Some leading Western and local shipping companies that operate their own vessels would only order Oshima-built ships. We are proud to have customers that are nicknamed 'Oshima-collectors'," he said.

The long period of poor prospects and continued low prices for the industry has led to a shadow on the industry's future: an emerging shortage of skilled workers. Employment by members of the Shipbuilders' Association of Japan dropped from over 140,000 in 1976 to 35,000 in 1989, recovered to 54,000 in 2009, and was about 47,000 in 2013 (Apr 1 data for regular employees of shipbuilding divisions and contractors, including staff; SAJ 2013, p 29).

MLIT launched a study group in August 2014 to discuss the employment of women and the training of multi-skilled workers. The Maritime Innovation Japan, established in April 2013 by Oshima, Imabari Shipbuilding, and others to develop manufacturing technologies is also seeking to address a shortage of designers and development personnel, as well as of shipyard workers.

Part 4 Conclusion

Oshima has been successful specializing in bulk carriers because of ongoing advances in ship design, including customizing to owner requirements, and improvements in technology, reinforced by investments to upgrade its facilities. By the mid-1990s, Oshima had established a good reputation in terms of performance, quality, and reliability of its 43,000 – 47,000 DWT Handymax size bulk carriers. The company subsequently developed a series of 52,500 – 55,000 DWT Supramax bulk carriers, and has sold more than 100.

In the five years prior to the 2008-09 recession, ship contract prices doubled and orders increased significantly. So, with a 5-year order book, considerably more than the normal 2½ to 3 years, Oshima was profitable every year from 2008 to 2013. However, since 2008, bulk carrier contract prices have fallen by half and global orders flattened. Indeed, after years of a strong yen and declining demand, there were concerns that the Japanese shipbuilders would run out of work in 2014. In contrast, Oshima, with its reputation for quality and fuel efficient ships, has continued to obtain a healthy flow of new orders. And now a weaker yen is helping, so Oshima should remain profitable in the coming five years.

Oshima's history has created its current capabilities and competitiveness, and naturally will shape its future. While its quality, productivity, and costs are under Oshima's control, it cannot control the huge cyclical swings in demand for ships or the yen's exchange rate against the Korean won and Chinese yuan.

Given Oshima's strong technology, competitive position, large financial reserves, and ambitions, the company will very probably be able to do well even at the low prices of its present back order book, especially if market projections that the yen will not strengthen significantly in the next several years are correct.

At a May 23. 2013 panel discussion on the industry's future, Oshima president Hiroshi Minami thrust his fist into the air and proclaimed "Japanese ships are being re-evaluated. Long live Made in Japan!" With spirit like that, I expect Oshima to continue to grow and be successful, even during downturns of global demand. It certainly is a company to watch.

Endnotes: Acknowledgements, Company Visit, and Sources

I visited the Oshima shipyard on May 26 and 27, 2014 with Hirofumi Maki and Keisuke Shimizu of The Development Bank of Japan. DBJ has long had a financial relationship with Oshima and arranged my visit. We lodged at the company-owned Olive Bay Hotel near the shipyard.

We received extensive presentations by President Hiroshi Minami and senior executives including Eiichi Hiraga (executive vice president), Yukio Suzuki (executive vice president), Kengo Hatanaka (managing director and shipyard general manager), Shinichi Murakami (a senior executive advisor), Tatsurou Iwashita (director and general manager of the design department), Hitoshi Andou (director and general manager of the accounting and financial department), and Shoki Sato (a senior advisor who served as interpreter where necessary). Their enthusiasm for their company was infectious, and their willingness to help me understand it and their industry was wonderfully instructive.

At dinner on May 26, a video on the company's early tumultuous and difficult history was shown. The following morning there were briefings on shipbuilding, design innovation and R&D, and company performance. There followed a visit to the shipyard, where the shipbuilding process was explained, including presentations by several dockyard group leaders.

On May 27 I attended the naming ceremony for the 55,700 DWT bulk carrier Matsu Arrow, which included a Shinto ceremony to protect the ship, its captain, and the crew as it embarks on its voyages.

The history in this essay draws heavily on documents and materials provided by Oshima, especially its 2010 English-language book, Oshima Shipbuilding's First Thirty Years, a translation and slight updating of its Japanese-language book published in 2003.

I received substantial, helpful materials in English describing the production process, the different types of bulk carriers and their functions, and Oshima's technological innovations. One set of comparative data with other Japanese and major foreign shipbuilding companies were derived from the Japan Ship Exporters Association and The Shipbuilders Association of Japan.

This essay exists in major part through the active research efforts and pro-active editing of Larry Meissner. He assiduously searched a wide range of public sources to unearth information both about the shipbuilding industry and Oshima Shipbuilding Company.

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