Judging from its ship design, an assumption can be made that our ship model represents one particular type of ship used in Japan during the Edo period (1603-1868): Bezaisen. It is a general term that refers to a type of ship structure commonly used in that period for trading and transporting vessels on the sea. Although until the early Edo period shipbuilding in Japan had adopted techniques used in building western-style ships or Chinese junks, due to the government’s closed-door policy enforced in 1635, which prohibited the people to go abroad, ships for long-distance ocean sailing were no longer built from then on (Kojima, 2012: 103). It was not because the government banned building those kinds of foreign-style large ships, but because there was no need and incentive to build such a large ship for a foreign voyage. (Kojima, 2012: 108-9) Therefore, its closed-door policy led Japan to develop its own shipbuilding techniques and characteristics in unique ways. In this light, it can be said that shipbuilding in this period of Japan is one historical indication of the policy and that existing ship models are symbolic information about it. Presumably considering that our ship model is a type of Bezaisen, a coastal trading vessel mainly intended for transporting cargos, this article aims to illustrate its unique way of shipbuilding and also its characteristic structural functions as a cargo ship.

Hull Structure

In the light of shipbuilding, what differentiated Bezaisen from western-style ships of the same period was its hull structure. Amongst a couple of characteristics, the most distinctive
component is *kawara*, the bottom of the vessel made of large planks, which has the same function as keel/keelson as a base of hull structure. Although *kawara* is almost equivalent to keel/keelson, it is not single-timbered but rather flat-bottomed (Sugita, 2003: 5 and Damian, 2010: 68). *Kawara*, being composed of wide and flat planks, at the bottom makes it easier for *Bezaisen* to be easily maneuvered even against a strong side wind and also to be stable on the land when it needs to be repaired (Kojima, 2012: 117).

Another characteristic part of hull structure of this type of ship is a series of strakes that form a base. *Nedana* (or *kajiki*), being directly fixed to the edges of *kawara*, is correspondent to garboard strakes. *Nakadana*, the middle strakes that angled away from *nedana* and *uwadana*, the upper strakes that are similarly angled away from *nakadana*, together form a wider and bigger space at the bottom of the ship (Sugita, 2003: 5 and Damian, 2010: 81). What reinforce each of these strakes are a series of *funabari*, deck beams, which are also fixed for each level of strakes, because the ship does not have any interior bulkheads. Thanks to these strakes and beams, *Bezaisen* have a wider base with little obstacles at the bottom of the ship so that the ship can load more cargos and that cargos are easily moved inside it (Kojima, 2012: 116).

Furthermore, with respect to loading and carrying cargos, it has other functional features as a trading vessel. One is the deck formed with wooden boards that can be easily removed. Although this feature makes the ship more efficient for loading and unloading cargos, it is also a shortcoming in that it allows seawater and rainwater to intrude inside the deck. Another feature is *goshaku*, a series of short strakes that are directly fixed to aft of the stempost (Damian, 2010: 94-5). Although these strakes form part of the sides of the ship’s hull, they are also removable so that it becomes a path through which cargos can be easily loaded and unloaded (Figure 1). The rudder is also easily shipped and unshipped by using a bar directly connected to the rudder so
that the ship can get moored quite close to the port even in shallow water without getting it broken (Sugita, 2003: 6) (Figure 2).

Added to these functional features, *Bezaizen* is also characterized by its decorative features such as *kakitatsu* (lattice railings) (Figure 2) and *nagasagari* (a hanging tassel) (Figure 1). Although it is considered that lattice railings were originally built for ship construction purpose, it had become more like decorations after *hagitsuke*, which was built above upper strakes to reinforce ship structure, was added.

![Figure 1: Goshaku and Nagasagari](image1)

![Figure 2: Lattice railings and the rudder](image2)

Propulsion (Mast and Sails)

As reproduced in our ship model, *Bezaizen* have two different sized sails, *moto-ho* and *yaho*, but some ships were not equipped with the latter, a small one, because it was rather secondary (Kojima, 2012: 117) (Figure 3). *Moto-ho*, a big one, is made of a series of strips attached side by side. A gap between each strip prevents a sail from getting broken even in the strong wind and also effectively functions so that a ship can smoothly sail even against the wind. In contrast to the sail that can be only manually lowered by a sailor climbing up to the mast, the sail on *Bezaizen* can be lowered down by a sailor who is on the deck by using *Semi* (a pulley) on the tip of the mast and *rokuro*, a turning windlass that is located inside the deckhouse. *Rokuro* is
also used to load and unload *demmabune*, a small boat that *Bezaisen* is equipped with (Kojima, 2012: 118). Furthermore, just like the deck and *goshaku* that are removable, the mast is also built to be easily hoisted and lowered. As can be observed on our ship model, the mast has a cylinder-like base at its bottom called *tsutsudate*, with which the mast is lightly standing (Figure 4).
Bibliography

