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Salvaging of the Costa Concordia

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Salvaging of the Costa Concordia: A study of the greatest salvage operation in recent times

Abstract

Salvage is the act of saving a property in peril at sea irrespective of whether the property being saved is insured or not. This paper examines the salvaging operation of the Costa Concordia which ran aground with more than four thousand passengers and crew. Costa Concordia's grounding is also briefly discussed and touched upon. More generally, the paper highlights the operations that were undertaken to salvage the ship. The paper charts the phases of the steps undertaken by the salvors to salvage the ship which has been termed as one of the greatest salvage operations. With the help of the case study on Costa Concordia the concept of maritime salvage will be comprehended.

Key Words:

Salvage, ships, salvaging operation

Introduction

The Costa Concordia was a *Concordia-Class* Italian cruise ship which is owned by the Carnival Corporation. It was operated by the Costa Crociere and was built in the Fincantieri Sestri Ponente Yards, Italy. On the 13th of January, 2012 the ship ran aground after its hull was damaged by striking a rock in the Tyrrhenian Sea. The resultant gash of 50 m on the port side of her hull, resulted in flooding of the engine room which was the cause of power loss to her propulsion and electrical system. She grounded 500m north of the village Giglio Porto. Salvage operation began in the month of April 2013 in which underwater support platforms were built to support the ship. The ship was then rolled upright in a operation which is known as 'parbuckling'. Refloating of the ship was done in the month of September in the same year. The overall operation culminated with the ship arriving in Genoa for scrapping in the month of July 2014.

1. Building the Platforms

The Costa Concordia is known as the largest salvage job to date. At 290 meters long and 13 decks high it was no small task to build the platforms. The first step of this process was to right the ship. Major ship salvage company Ardent's (TITAN Salvage) vast experience was used to undertake this process. Due to the proximity to the rocky shore they were very limited in manoeuvrability of their equipment. The first phase was how to stabilize her since they did not know the extent of damage to the hull or if it would hold up. To prepare it they built three large subsea platforms (1,000 tons) and two smaller platforms to stabilize the vessel after righting. For the platforms to be secured they had to drill 0-25, 2 diameter sockets into the

seabed. In order to secure they built blister tanks (4-5 stories tall), they were sunken into place and fitted like a brace. Sponsons were installed on the port side in order to create a better setup for stabilization during parbuckling. The parbuckling force (6,800 tons) provided by 32 strandjacks, were mounted on the sponsons and pulled on the three largest platforms. In order to right the vessel we needed to move it 65 degrees, with careful planning we achieved a rotation of 3.6 degrees per hour for 19 hours. When the vessel reached about 35 degrees the sponsons were flooded and gravity helped with the roll. After completing the righting, the ship was secured to the platforms for winter.

2. Parbuckling of the Concordia

Parbuckle means a loop of rope arranged like a sling, used for raising or lowering casks and other cylindrical objects.

Parbuckle salvage, or parbuckling, is the righting of a sunken vessel using rotational leverage. A common operation with smaller watercraft, parbuckling is also employed to right large vessels.

For a brief history on parbuckling, In 1943 USS Oklahoma was rotated nearly 180 degrees to upright after being sunk in the attack on Pearl Harbor, this being the first instance where parbuckling was used to right a ship. Oklahoma weighted about 32,000 metric tons. Twenty-one electric winches were installed on Ford Island, anchored in concrete foundations. They operated in unison. Each winch pulled about 20 short tons (18 metric tons) by a wire operated through a block system which gave an advantage of seventeen, for a total pull of about 6,480 metric tons. In order to increase the leverage, the wire passed over a wooden strut arrangement (a bent) which stood on the bottom of the ship about 40 feet (12 meters) high. Oil had been removed from the ship through the bottom. The ship was lightened by air inside the hull. There was a large amount of weight in the ship which may have been removed prior to righting. About one-third of the ammunition was taken off together with some of the machinery and the blades of the two propellers were also taken off, but more to avoid damage to them than to reduce weight. Tests were made to check whether restraining forces should be used to prevent sliding toward Ford Island. It was indicated that the soil under the aft part of the ship prevented sliding, whereas the bow section rested in soupy mud which permitted it. To prevent sliding about 2200 tons of coral soil were deposited near the bow section. The ship rolled as it should have and was right-side up by 16 June 1943, the work having started 8 March 1943.

The Italian cruise ship Costa Concordia was also successfully parbuckled off the west coast of Italy in September 2013 in a similar way.

The parbuckling was accomplished in three phases:

1. Freeing the hull

The hull of Costa Concordia rested on two spurs of rock, and was severely deformed from the weight of the ship pressing down on the spurs. This phase began when the

strand jacks exerted force and the ship started to return to an upright position.

2. Phase of rotation using cables

This phase began when the hull lifted from the seabed. Rotation continued by tensioning the cables operated by the strand jacks, and continued until the sponson water intakes reached sea level.

3. Rotation by ballasting with sponsons

The hull continued to rotate, pulled down by the weight of seawater added to the sponsons. The strand jacks and cables went slack. Redundant systems were designed as a guard against failure. For example, two seawater inlet valves were provided to each sponson.

3. Refloatation

The re-floating process took around five days. 30 huge steel hollow boxes, or sponsons, attached to either side of the Concordia were pumped full of compressed air to give the ship buoyancy. Crews raised the ship two meters in the first six hours before moving the ship off of its underwater platforms.

Crews then checked it for fissures, cleaned it and attached the flotation devices on each side together under the bottom of the boat with giant chains and cables, creating a false bottom.

Workers then raised the decaying cruise liner one deck at a time by pumping more air into the sponsons. Each deck took approximately six hours to raise and clean.

3. Towing

The ship was towed after being refloated to Genoa where she was cut up and her steel was sold and recycled.

Conclusion

With this it can be understood that the salvage of the Costa Concordia was no less than a herculean task which was successfully completed by her salvors. The total cost of removal of this wreck amounted to 1.5 billion dollar. Finally after righting she was taken to Genoa where she was scrapped and sold.

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