

THE ROYAL GULF CRUISE SHIP

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Abstract

Cruise ships are usual for coastal cities around the world. Jeddah, which is city close to the Red Sea coast is a perfect location for cruise tourism. It will be a point of attraction and enrichment for Jeddah as a tourist city. Thus, this work proposes the development of a royal gulf cruise ship at Jeddah, Saudi Arabia. In this work, four case studies related designs of cruise ships were referred. From the analysis of the case studies, for the current proposed royal gulf cruise ship, the estimated area of the cruise ship in total is 30175 m². Furthermore, The project will host 900 passengers, and around 420 crews. In addition, the cruise ship is designed to accommodate 380 suite rooms as 54% of the estimated cruise space is comprised of the suites. On the other hand, the facilities of the cruise ship includes public area, such as restaurants, shops game rooms, aquarium, theatre, private areas such as suites, crew room, bridge and captain area. In terms of the cruise ship's overall design, the hull's design comes in a free-flowing nature and mimics the waves of the sea.

Keywords--cruise ship, design, tourism, gulf region, Saudi Arabia

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INTRODUCTION

Cruise tourism industry remains to be a significant region of global development [1]. Nowadays, the number of cruise lines and cruise choices has increased, indicating a general trend in the recreation industry [2]. Cruise ships are intended more for tourism and pleasure, with larger cabins and large areas for socializing. These cruise ships are used to transport groups of travellers from port to port, where the journey starts and ends, along a specified path and generally designed to delight the tourist along the way [3].

One of the world's most remarkable cruise ships is RMS Titanic [4]. It was a British passenger liner that sank in the North Atlantic Ocean in 1912 after colliding with an iceberg during its maiden cruise from Southampton, UK to New York City, USA [5]. At the time of its construction in 1909, the Titanic was the largest ship ever built and designed by Thomas Andrews. It was almost 269 m long, 25 stories high and weighed an incredible 52,310 tons [6].

The Titanic has been designed with electric elevators, a swimming pool, a squash court, a Turkish bath and a gym with a mechanical horse and a mechanical camel [7]. Therefore, as the years went by, the intention was to make cruise ships as a tourist destination rather than just a vehicle. This will accommodate tourists looking for a cruise travel experience that includes luxury services such as restaurants, theatres, swimming pools and comfortable accommodation for travellers at a typical holiday spot [8].

Jeddah is one of Saudi Arabia's significant urban communities, situated in the area on the Red Sea coast. The city has turned into a financial focus of business and economical trades. Furthermore, it has a significant port which is utilized for import and export of goods [9,10]. Since Jeddah is the biggest port on the Red Sea coast, tourist development is encouraged at this region [8].

The port acts as an excellent tourist spot for cruise ship in Jeddah City that will increase the financial position of Saudi Arabia. Thus, this work proposes the development of a royal gulf cruise ship

that will be a tourist attraction in the port of Jeddah, Saudi Arabia.

CASE STUDIES

For this work, four case studies related to the designs of cruise ships have been referred. The case studies chosen are:

- Oasis of the Seas
- Eoseas Cruise Ship
- Ms Europa 2
- Unique Circle Yachts

Oasis of the Seas

Oasis of the Seas was designed by Atkins Global, NB&D, RTKL, Water field Design Group and Wilson Butler Architects (Figure 1). It has the distinction of being the largest commercial ship to be constructed. It has a passenger capacity of 5400 people and crew members of 2165.

The length of the cruise ship is 364 m with beam length of 66 m. The ship has an enormous range of accommodation including suites, family suites and staterooms. The design builds around a concept of 7 neighbourhoods, each with its own neighbourhood personality and charm. The concept of the Central Park, the "neighbourhoods" include the Boardwalk, the Royal Promenade, the Pool and Sports Zone, Vitality at Sea Spa & Fitness Center, Entertainment Place and Youth Zone: 2666 square-meter just for kids and teens with Kids Avenue, a central boulevard connecting various themed play areas; a nursery for infants and toddlers; a theatre just for children.

Furthermore, it is considered to be the first ship not only to have balcony cabins facing the ocean, but also balcony cabins facing the inner courtyards where all the activity is. It's also the first cruise ship to have a park and a diving swimming pool. The facilities of this cruise ship includes public rooms such as lunges, library, internet center, entertainment center, sport and activities area such as outdoor pools, sports courts, fitness center, ice skating area and miniatyre golf, spa and wellness, children play area, duty free shops, laundry center, business center and medical center.



Figure 1. Oasis of the Seas

Eoseas Cruise Ship

Eoseas Cruise Ship was designed by STX Europe as a part of the Ecorizon program in collaboration with Stirling Design International (SDI) (Figure 2). It is a green cruise ship concept. It has a passenger capacity of 3311 people and crew members of 1089. The length of the cruise ship is 305 m with width of 60 m. The ship consists of a mixture of traditional and new technology. They wanted to develop a concept of a low environmental impact cruise ship. Their main design goals are to reduce greenhouse gas (GHG) emissions by 50 percent. The ship is a pentamaran hull design. The double hull design allows the ship to have long promenade decks with direct access to passenger cabins. It will include 1,403 passenger cabins and 555 crew cabins. The huge sails on the ship are made to catch a lot of wind and therefore wind energy makes a significant contribution to the vessel's propulsion power. These sails will develop the concept of innovation in sails. It also provides shade on the top deck for people. The ship's double glass skin will function as solar panels generating electricity for the ship. Using highly efficient multi-stage evaporators, fresh water is generated onboard and reverses osmosis. The ship will feature an advanced wastewater purification system to treat gray and black waters. An absorption chiller absorbs rainwater from the top decks. It uses engine-generated heat. In addition to ship design, there is a pool deck consisting of lots of sunbathing areas and easy access from glass-enclosed elevators to the rest of the ship. Its green features include extensive use of natural lighting, the use of photovoltaic panels, air film injection to reduce friction and the generation of fresh water by highly efficient multi-stage evaporators.



Figure 2. Oasis of the Seas

Ms Europa 2

Ms Europa 2 is developed by STX Europe, Saint-Nazaire, France (Figure 3). It has a passenger capacity of 516 people and crew members of 370. The length of the cruise ship is 225 m with beam length of 27 m. For its personal service, high gastronomic standard, individual travel program and excellent interiors, MS Europa 2 is considered one of the best luxury cruises in the world. It's a cruise with all the promises of a yacht and the serenity of a small resort. It specializes in family and golf cruises. It has a variety of suites with a different size range and all suites

on board have a spacious balcony. The ship's design concept follows current design trends and is a successful mix of casual, modern luxury and stylish ambience with state-of-the-art technology. Life on board sets its own standards: more lifestyle and fewer cruise rituals contribute to a more informal atmosphere. Also, the low number of passengers ensures that exclusiveness and relaxation are guaranteed. The design has an increased focus on wellness and fitness, as well as a varied entertainment program. Sustainability plays a major role in this ship's design. It's the First Cruise Ship with EEDI (Energy Efficiency Design Index) Certificate. It is designed with a hull that cuts fuel consumption by about 18% compared to other ships of similar size. The frequent use of marine diesel with a sulfur content of just 0.1 percent significantly reduces sulfur emissions. In addition, Europa 2 is the world's first cruise ship with SCR catalysts, which reduces nitrogen oxide emissions by nearly 95 percent. It has a special cleaning system that prevents the ballast water tanks from spreading foreign flora and fauna. For reducing CO₂ emissions by 31% compared to ships of a similar size. The facilities of this cruise ship includes 7 gourmet restaurants, tea and coffee specialties, art gallery, library, theater with 3D cinema screen, games, sports and creativity programs, gym and spa and golf simulators.



Figure 3. Ms Europa 2

Unique Circle Yachts

Unique Circle Yachts was designed by architects Zaha Hadid and engineered by Blohm+Voss (Figure 4). The length of the yacht is 90 m with beam length of 16 m. Zaha Hadid and Blohm+Voss have transformed yacht design by creating an innovative concept and developing this vision into a fully maritime design that offers dynamic new possibilities for naval architecture. The overall design is informed by fluid dynamics and ecosystems underwater. The original exoskeleton design is an interwoven network of supports that vary in thickness and give a natural aesthetic to the external appearance of the yacht, intended to evoke the structures of natural marine formations. This exoskeleton connects the different levels and decks as opposed to most other yachts designed in a strictly traditional horizontal order.



Figure 4. Unique Circle Yachts

PROGRAM ASSUMPTION AND SPACE DETAILS

Based on the project's area calculations, design capacity standards, and estimated number of users, the expected area in total is 30175 m², including 20% circulation. Table 1 shows the total areas of each space separately. Furthermore, for the electrical, mechanical, and engine rooms, the estimated area is 4 000 m². These areas are defined according to the design of the hull which includes the length and the width of the ship. So the areas of these rooms are based on the size of the ship at the end, because they will be placed in the bottom of the ship

Table 1. Cruise ship space details

Facility	Total Net Area (m ²)	Total Gross Area (m ²)
Administrative Area	1100	1320
Suite	14610	17000
Spa and Fitness	950	1440
Kids's/ Teens' Area	315	378
Restaurant, Bars and Cafes	2400	2880
Entertainment facilities	2100	2520
Crew facilities	3000	3600
Outdoor activities	1500	1800
Other facilities & services	620	745
Total	25145	30175

Thus, the estimated area of the ship was around 30,175 m². The project will host 900 passengers, and around 420 crews. Figure 5 shows the percentage of each area within the cruise ship. Based on Figure 5, 54% of the space is comprised of suite. The details of all the other spaces are shown in Figure 5.

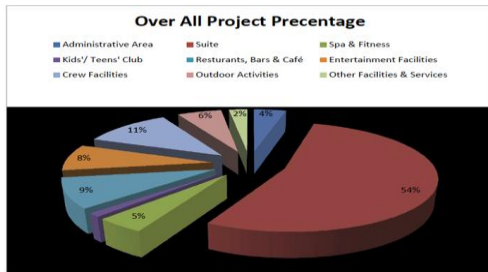


Figure 5. Unique Circle Yachts

PROJECT DESIGN

Figure 6 shows the zones of the proposed cruise ship. This cruise ship will have the following facilities, which includes public area such as restaurants, shops game rooms, aquarium, theatre, private areas such as suites, crew room, bridge and captain area. Furthermore, the facilities of the cruise ship will include outdoor activities such as swimming pools, roof garden and stage area.

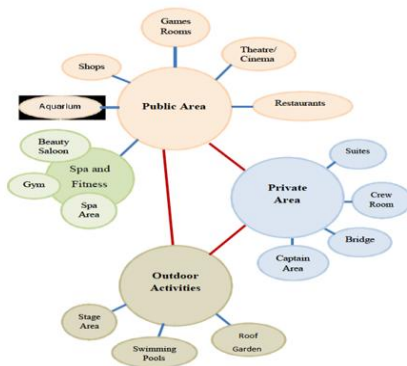


Figure 6. Zones of the proposed cruise ship

Figure 7 to Figure 9 shows the various perspectives of proposed design of the royal gulf cruise ship. This cruise ship will accommodate 380 suite rooms. The ship will include up to 3 restaurants, 1 cafe and 4 bars. Crew rooms are generally located below decks - meaning below the water line - and usually lack windows. The ship will include 420 crews. The ship's wheelhouse is a glass-enclosed room. It is located on top of the largest deck. Also, the chart room and the radio room are located inside the wheelhouse but the bridge itself includes the bridge wings on either side of the wheelhouse and is located at the front end of the deck of the ship and takes up the entire width of the ship and, indeed, extends over the sides to give the officers a better view when docking. Furthermore, the basic detail about the engine room of the cruise ship is its location. Because of stability, the heaviest weights of ships must be placed at the lowest possible place, and engines are usually mounted above the keel. The lowest decks of the ship are almost entirely full of machinery. An area that creates enough power to drive such a huge vessel through water needs to be really big and very often engine rooms occupy at least three decks. But rather than long halls stretching hull lengths, machinery is divided into smaller sections-one houses main engines, and another contains air-conditioning system. This separation is for security reasons. If a hull or fire penetration occurs, multiple compartments help to contain the damage. On the other hand, the design of the ship will accommodate 6 life-boats. 3 life-boats will be placed on both side of the ship. On the other hand, the cruise ship also includes propelled wastewater purging framework to treat and reuse waters. An assimilation chiller retains water from the top decks. It utilizes motor created heat. Furthermore, there is a pool deck comprising of heaps of sunbathing zones and simple access from glass-encased lifts to the remainder of the ship. Its green highlights incorporate broad utilization of normal lighting, the utilization of photovoltaic boards, air film infusion to decrease grinding and the age of crisp water by exceptionally effective multi-arrange evaporators. In terms of the overall design of the cruise ship, the design of the hull comes in a free-flowing nature and mimicking waves of sea. It gives an idea of the volume that the ship's body encompasses and a rough feeling of how much space it could include in its vast structure.



Figure 7. Main overview of the royal gulf cruise ship



Figure 8. Back view of the royal gulf cruise ship

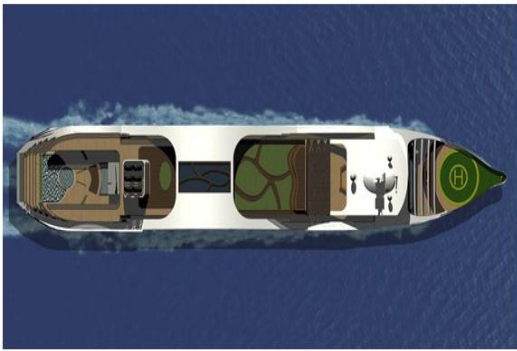


Figure 9. Top view of the royal gulf cruise ship

CONCLUSION

This work has proposed the development of royal gulf cruise shipat Jeddah, Saudi Arabia. The estimated build area of this cruise ship is 30175 m². In terms of the design, this cruise ship has a free-flowing nature and mimicking waves of sea. This cruise ship will be a one stop tourism spot which will comprise all of the exciting features of cruise tourism. The development of this cruise ship is expected to enhance the cruise tourism industry in Jeddah and the economic status of Saudi Arabia.

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