

## Review on Palm Island

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**Abstract:** The **Palm Islands** are two artificial islands, Palm Jumeirah and Palm Jebel Ali, on the coast of Dubai, United Arab Emirates. As at November 2014, only Palm Jumeirah has been completed. This island takes the form of a palm tree, topped by a crescent. When complete, Palm Jebel Ali will take a similar shape; both islands will be host to a large number of residential, leisure and entertainment centers and will add a total of 520 kilometers of non-public beaches to the city of Dubai. The creation of the Palm Jumeirah began in June 2001. Shortly after, the Palm Jebel Ali was announced and reclamation work began. A third island was planned and construction started, but this project was later remodeled and renamed to Deira Island. Palm Island Developers asked Royal Haskoning in the autumn of 2000 to design the crescent breakwater, surrounding their planned man-made Palm Island at the coast of Dubai, UAE. The main function of the breakwater is to protect the beaches and small marinas of the island against incoming waves from the Arabian Gulf.

**Keywords:** *Breakwater, Overtopping water, Recreational Island, Marinas*

### 1. Introduction

The **Palm Islands** are two artificial islands, Palm Jumeirah and Palm Sheikh Ali, on the coast of Dubai, United Arab Emirates. As at November 2014, only Palm Jumeirah has been completed. This island takes the form of a palm tree, topped by a crescent. When complete, Palm Jebel Ali will take a similar shape; both islands will be host to a large number of residential, leisure and entertainment centres and will add a total of 520 kilometres of non-public beaches to the city of Dubai. The creation of the Palm Jumeirah began in June 2001. Shortly after, the Palm Jebel Ali was announced and reclamation work began. A third island was planned and construction started, but this project was later remodelled and renamed to Deira Island.

Ocean colonization (or Ocean colonisation) is the theory and practice of permanent human settlement of oceans. Such settlements may be seasteads floating on the surface of the water, or exist as underwater habitats secured to the ocean floor, or in an intermediate position.

One primary purpose of ocean colonization is the expansion of livable area. Other possible benefits include expanded access to undersea resources, novel forms of governance (for

instance micronations), and new recreational activities.

Lessons learned from ocean colonization may prove applicable to space colonization. The ocean may prove simpler to colonize than space and thus occur first, providing approving ground for the latter. In particular, the issue of sovereignty may bear many similarities between ocean and space colonization; adjustments to social life under harsher circumstances would apply similarly to the ocean and to space; and many technologies may have uses in both environments.

Construction on the palm islands began in 2001. Divers surveyed the seabed and workers constructed a crescent-shaped breakwater from blasted mountain rock. The Crescent of Palm Jumeirah stands a little more than 13 feet above low tide sea level and sits in 34 feet of water at its deepest point.

Sand, covered by an erosion-preventing water-permeable geo-textile, makes up the breakwater's lowest layer. One-ton rocks cover the sand, and two layers of large rocks weighing up to six tons each cap the structure. A "toe" placed by a floating crane sits inside the Crescent. The breakwater also has two 328-foot openings on each side to eliminate stagnation in the 16 narrow, deep channels. These gaps allow water to completely circulate every 13 days.

Although five workers were swept away by a wave and one drowned, the designers at Nakheel believe the breakwater will protect the palm island from average gulf weather and even an enormous storm. They even suggest that villas barely 10 feet above sea level will be safe from the rising seas of global warming.

## **2. Necessity for new structural design and construction systems**

- Building an artificial island in the Arabian Sea would seem like an overly ambitious dream to most, but for one of the wealthiest countries in the world, it was one of several ambitious projects that have come to make the country one

of the top luxury and tourist destinations in the world.

- The construction of the Palm Jumeirah was a feat of engineering, but did not come without its challenges. An immense amount of sand and stone was used, and it all had to be placed in precisely the right location.
- The island was designed to withstand both the forces of nature and the forces of the city being built on top of it, all within a strict deadline.
- With construction of the island complete, the post construction impacts can be observed. Of particular interest are the impacts on the island, the surrounding geography and the ecosystem. It has been speculated that the island is sinking—a claim debated by the developer and explained as being a natural settling process that will not have any long term negative effects.
- The island is, however, being eroded, and is causing increased erosion of the surrounding geography. It has also disrupted or destroyed parts of a naturally occurring ecosystem, and will likely continue to do so until all of the land reclamation projects are complete.
- The developer is taking steps to remediate these issues, and in some cases, improve them to a level beyond what was seen before the island was built.
- The Palm Jumeirah is an impressive project, and should now act as a tool for other similar projects in Dubai and the rest of the world. Knowing the challenges of building an artificial island can be helpful in figuring out more efficient and effective construction methods.
- Knowing the postconstruction impacts will give rise to future designs and methods that help reduce these types of impacts. With these ideals in mind, ambitious projects like the Palm Jumeirah can continue to grow and

evolve, producing even greater feats of engineering.

### **3. ADVANTAGES OF PALM ISLAND**

1. It helped in increasing the tourism for the country which increased the economy.
2. The structure is free from concrete construction. So the construction is ecofriendly.
3. It solved the problem of land for the construction near sea shore.
4. The structure is made up of sand and stones mainly so it construction doesn't affect the environment.
5. The structure can provide extra land for the construction of villas, flats, parks, shopping malls, and other facilities.
6. It provides an aesthetic look to the sea line of the country.

### **4. REFERENCES**

1. "The Palm Jebel Ali (Palm Islands, Dubai) - Property Development". The Emirates Network: Ten Real Estate. 2007. Retrieved 2007-02-11.
2. "Dubai's Palm and World Islands - progress update". *AMEInfo*. 4 October 2007. Retrieved 2007-10-28.
3. "Environmental Impacts of Pals Islands".
4. "Dubai's Artificial World Islands Are Killing Corals and Pushing Nature Out of the Sea".
5. "Dubai's artificial islands have high environmental cost". Mongabay.
6. "Dubai Palm Island | HQ Travel Guide". hqtravel.net. Retrieved 2014-01-25.
7. "YouTube - The Palm Island, Dubai UAE - Megastructure Development". youtube.com. Retrieved 2014-01-25.
8. [http://crpg.stanford.edu/publications/articles\\_presentations/Ambika\\_Rose\\_Orrill\\_Dubai\\_multicultural\\_construction\\_projects.pdf](http://crpg.stanford.edu/publications/articles_presentations/Ambika_Rose_Orrill_Dubai_multicultural_construction_projects.pdf)
9. "Construction of the Islands - The Impact of the Palm Islands, United

Arab Emirates". sites.google.com. Retrieved 2014-01-25.

10. "HowStuffWorks "Palm Island Construction"". adventure.howstuffworks.com. Retrieved 2014-01-25.
11. "The World is sinking: Dubai islands 'falling into the sea' - Telegraph". telegraph.co.uk. Retrieved 2014-01-25.
12. "Palm Island Dubai - Palm Tree Island Megastructure Construction". enggpedia.com. Retrieved 2014-01-25.
13. "Palm Islands , Dubai — 8th Wonder Of The World | Prime Arena". eb.archive.org. Retrieved 2014-01-25.
14. "Palm Islands, Dubai - Compression of the Soil". cdmsmith.com. Retrieved 2014-01-25.
15. "The Palm - Design Build Network". designbuild-network.com. Retrieved 2014-01-25.
16. "Engineering Challenges: Palm Island". engineeringchallenges.blogspot.com. Retrieved 2014-01-25.
17. "Will the Gulf's manmade islands sink into the sea? - Your Middle East". yourmiddleeast.com. Retrieved 2014-01-25.