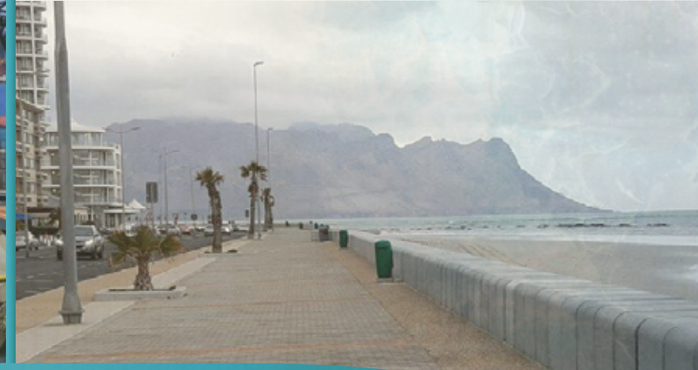

Marine and Coastal engineering is the study of the ocean and rivers and its surrounding environment. It also involves the study of the structures that are meant to reflect, absorb or to deflect the forces inflicted by waves, currents and ships. A large portion of marine and coastal engineering involves trying to predict how oceans and rivers react to external influences i.e. wave surges, sediment transport, sea level rise and wave propagation.

1. What does a Marine and Coastal Engineers/ Planners do?

From a Municipality point of view, the role of its coastal engineers is to protect all public infrastructure by means constructing new coastal defences or the maintenance of existing interventions. The role also entails a lot of key stakeholder engagement and management, as well as project management. Consultants model and calibrate existing and future coastal systems and design coastal infrastructure considering their impact on those systems and vice versa. They study hinterland trade networks and the connections to Ports and optimise the development and layouts of Ports.

2. What are the challenges in Marine and Coastal Engineering?

Marine engineering plays a pivotal role in the economy as it directly influences the productivity of our ports and coastline. By ensuring our ports are growing and can handle larger volumes of goods, we can ensure that economic growth is sustained and contribute to job creation. The problem of climate change is real and its effect is evident on every coastline in the world. Our biggest challenge is tackling the issue of sea level rise and ensuring that the current and future infrastructure is able to resist the rising sea levels and the problems that it brings about.

3. What does the future of Marine and Coastal Engineering entail?

The future of the field will likely see professionals adapting existing infrastructure to effects of climate change in various forms, ensuring coastal areas are protected or retreating where possible. Designing with nature may be a trend in which natural structures such as reefs and sea grass may be used in place of traditional structures. The Ports system remains of vital importance to global trade and economic development and a trend towards larger ships would require adapted port facilities. Artificial intelligence and machine learning could also be used in Ports to improve efficiencies.

The future can entail having automated beach response systems implemented and known hotspots whereby camera imagery and computer algorithms can predict when beaches are vulnerably to storm erosion and thereby the infrastructure located behind the beaches are at risk from a future storm event. These systems can then send out notification to the engineers and disaster management.

4. Can you list a few typical projects that I might work on as a Marine and Coastal Engineer?

- Breakwaters, groins, revetments, sea walls and wave interaction
- Berths, quays and jetties and ship interaction
- Dredging and channels
- Oil and gas terminals
- Dry docking systems
- Shore protection and coastal environmental engineering
- Sub-sea pipelines
- Port, fishing & small-craft harbour and residential/recreational marina planning
- Estuary and environmental management, dune field stability and beach dynamics
- Flood protection, storm-surge, hurricane and tsunami protection
- Sedimentation transport
- Seawater intakes and marine outfalls
- Tidal pool construction and upgrades
- Beach access construction

5. How do I become a Marine and Coastal Engineer?

To start of you require a BSc or BEng degree or a similar BTech equivalent in Civil Engineering. A formal master's degree in marine and coastal engineering is offered at Stellenbosch University and international universities such as Delft University of Technology in Netherlands. Alternatively you may gain the skills by joining a specialist marine engineering firm.

6. I do not have a degree in Civil Engineering. What next, if I'm interested in Marine and Coastal Engineering?

Ideally, a civil engineering degree or diploma would allow you to enter the engineering aspect of the field. Alternatively, other qualifications exist if you wish to enter the construction side. The field is multidisciplinary and there are various professions working in the space. If the field interests you, get involved by contacting port and coastal companies, contractors or government agencies such as municipalities or SOCs like Transnet.

7. Contact details of the division.

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