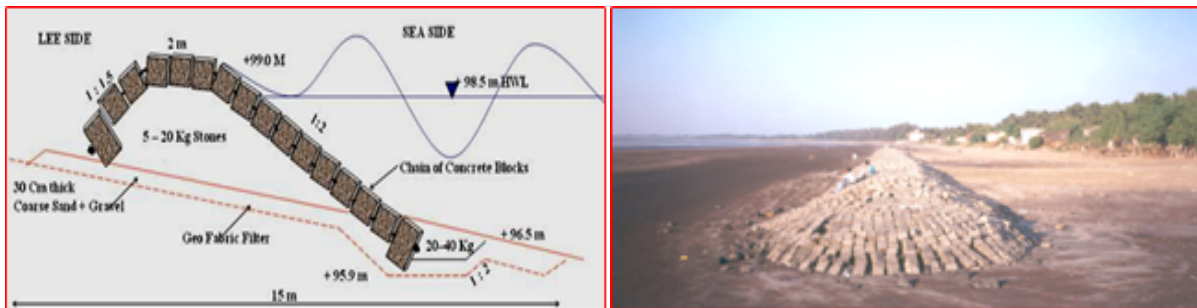


## INNOVATIVE TECHNIQUES FOR COASTAL PROTECTION

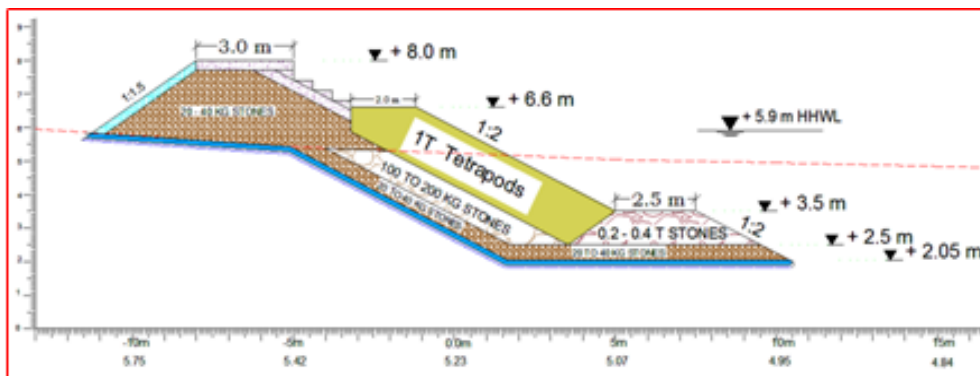
The solution to mitigate the coastal erosion involves widely used hard measures viz. construction of seawalls, groynes, offshore breakwater etc. The materials required for the conventional construction various sizes of stones, Tetrapods, etc. The coastal protections are site specific and require thorough planning of the projects. The designer tends to evolve innovative methods of coastal protection considering the project requirements and constraints of availability of materials, manpower, beach space available for construction, cost of the projects, time required for the construction etc. Few innovative methods have been evolved at CWPRS considering the specific site conditions. Use of chains of concrete blocks, seawall with embedded steps in the armour for tourists beaches, Geo-container/Geo-textile tubes for the protection works, Offshore reefs, steep slope stabilization techniques for estuarine bank etc.

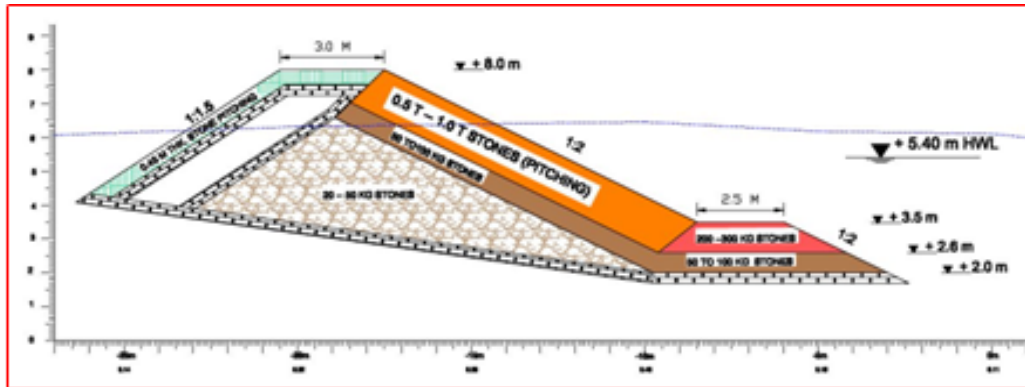
## Chains of Concrete Blocks

The Chain of armour blocks were used at Udwada in Valsad District, Gujarat and at Dahanu in Maharashtra.



### Design of Seawall:

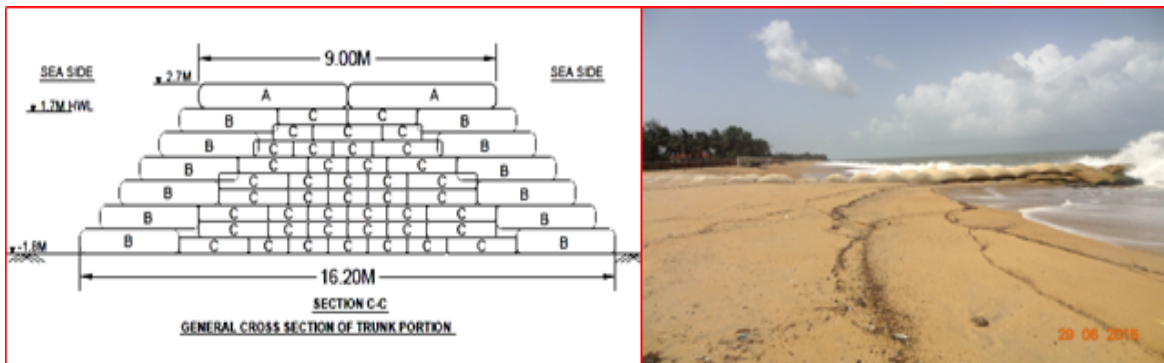




Design of seawall with embedded steps in the armour for the protection of the tourists beaches considering the aesthetics of the site at Kelwa beach, Maharashtra.

## Soft Solutions

The nearshore berm with Geo-container constructed for the sustainable coastal protection works at Ullal, Mangalore under ADB project.



The groyne field with Geo-textile tubes constructed for the coastal protection works at Deobaug, Maharashtra



## Offshore reef

The Offshore submerged reef constructed for the sustainable coastal protection works at Ullal, Mangalore under ADB sub-project.



