Deeply immersed vertical Tsunami barrier are needed which reflect most of the impulse waves. However, the reflectivity should be reduced by surface roughness in order to prevent total reflection which may harm opposite coast. This roughness would cause partial dissipation of the wave energy inside the vertical barrier.

Deep-sea construction using conventional concrete technology is in principle possible in view of behaviour studies of concrete in marine environment (Al-Amoudi 2002; Mehta 1991; Stark 1995). However the challenge increases significantly with increasing depth of the sea. There is therefore a need for a novel approach for barrier construction and to find a solution to eliminate or at least reduce the Tsunami risks, to prevent the formation of harmful Tsunami waves when the pressure waves reach reduced water depth at the coast, and to prevent flooding from high storm surges.

Summary of Invention

According to a first aspect, there is provided a barrier against impulse waves such as Tsunami and/or against high sea waves comprising a wall extending preferably 20 m to 500 m, maximum 4 km below sea level, a wall of which the lowest end is adapted to be fixed on the sea floor or in the ground, said wall being furthermore designed to be stabilized in a substantially vertical position and to be protected against erosion above sea level by hanging and replaceable surge stoppers or wave deflectors.

According to a second aspect, there is provided a method for constructing a barrier according to the first aspect, said method comprising the following steps:

- lowering of fence(s) with anchors into the sea by assistance of weights,
- connecting the fences horizontally by formerly inserted and fixed vertical steel pipes, preferably filled with concrete, and connecting steel rings,

- horizontally fixing said anchors by rocks or concrete blocks inserted from above,
- filling the coast side of said fence with rocks and/or similar materials and a top soil layer to gain new land.

List of Figures

Fig.1 : Vertical Tsunami barrier with reflected shock waves and gained new land (schematic cross section).

Fig.2 : Schematic cross section of seafloor with break of continental shelf and dependence of wave velocity ***c*** to water depth ***h*** (lower section) and to wave height ***A*.**

Fig.3: Terrace of Tsunami barriers (schematic cross section).

Fig.4: Tsunami barrier with a gap for navigation (schematic cross section).

Fig.5: Schematic view of a steel fence lowered from a roll on a pontoon.

Fig.6: Steel beam chain with horizontal side arms and anchors.

Fig.7: Vibration shock to densify the fence- rock barrier by a heavy hammer plate of which the height can be adjusted (schematic cross section).

Fig.8: Vertical wall at the coast by excavation (schematic cross section).