



Coastal protection – tetrapods optimization



Tetrapod (from Greek tetra- 'four' and -pode 'foot'), are a particular form of wave-dissipating concrete blocks, they are used to prevent erosion caused by weather and longshore drift, primarily to enforce coastal structures such as seawalls and breakwaters.

Tetrapods are made of concrete, and use a tetrahedral shape to dissipate the force of incoming waves by allowing water to flow around rather than against them, and to reduce displacement by interlocking.

Contrary to traditional concrete blocks, which can easily shift due to the force of the waves, concrete tetrapods are a very effective way to break waves, as water can flow between them. This diminishes the force of the incoming water, with waves losing force and impact.

The main idea in this project is to optimise the (a) local material and (b) global infrastructure of tetrapod organisation, in order to potentially increase life-time and improve durability of tetrapods (meaning not only control and improve protection but also potentially decrease the cost). An optimised organisation could break and potentially guide waves, while be durable and cheap. The project has two possible directions (hence a potential of two separate Master's projects):

- a) optimise tetrapods on a material level: research possibilities of improving materials' properties while decreasing cost. Mechanically, looking at materials, subject to different types of loading (from statical to dynamical, potentially from deterministic to stochastic).
- b) optimised global structure of tetrapods organisation, potentially depending on site-specific water wave pattern.

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