

DETAILS OF INTERESTING CLAIM

No: DOIC 60 (CAR)

Type of Insurance:

CAR

Description of damaged item:

Unreinforced tetrapods protected harbour structures

Cause of Loss:

(7) Storm

Claim Cost

2 m USD

Description of Incident and Loss Prevention Measures initiated:

Unreinforced heavy tetrapods of 50 tons each protected harbour Structures and buildings as well as the adjacent shore sections.

During the construction period a storm caused waves the height and/or intensity of which exceeded the normal action of the sea. A considerable number of tetrapods were displaced and, to a lesser extent, had arms sheared off and had to be replaced.



Outline the interesting or unusual aspects of this claim or problems experienced during settlement:

A harbour in Asia being part of a multi billion industrial project, which may be taken as a representative illustration for any other storm, exposed harbour constructions as in any other part of the world.

Depending on the design of the tetrapods and the number of interlocked layers the values may be 5 m to 15 m USD/km. Tetrapods are usually produced in high quality mass concrete which is adequate for their purpose. Only in very rare cases there is a reinforcement required only to cater for special handling procedures. At a later stage reinforcement might mean corrosion problems and a reduced life expectancy. As a consequence the shearing strength of unreinforced tetrapods is limited.

Tetrapods are chosen in the shallow sea where the depth rarely exceeds 8 – 10 m. They are usually placed in various layers according to a predefined placement order on a specially prepared stone bed which is roughly horizontal or on slopes of stone packing in front of concrete structures. Usually there is no special treatment of the underground such as removal of sediments, replacement by graded material and subsequent underwater compaction.

Consequently there is a certain risk of sliding. Using straps or ropes instead of hooks generally eliminates the risk of shearing off during placement. The most important exposure for the tetrapods is storm, which causes waves beyond the design speed, i.e. what is considered to be beyond normal action of the sea. This exposure is of particular relevance during the placement of the tetrapods, as in this phase they do not yet interlock according to the design, have freedom to move and may be dislodged due to the action of waves.

There was an exclusion of abnormal action of the sea in the policy, however as often is the case, it was not possible to clearly determine the wind speed and wave heights during the time the loss occurred.

In this case the costs did not get out of hand as the production equipment, formwork etc. was still on site. This loss was indemnified with 2 m USD

In certain cases the placement of caissons should not be performed during known regular storm seasons or in case of storm warning.

Normal action of the sea should be clearly defined in the policy, e.g. by agreeing on a certain critical value of the wind speed and wave height. In case these are agreed there should be adequate measuring appliances which must be operational at all times and allow for unambiguous measurements.

(From [Engineering Insurance Exposure related to Wet Risks](#) - IMIA Paper WGP50(07)E)