**Wave simulation for the design of an innovative quay-wall: the case of Vlora’s harbour**

by Alessandro Antonini, Renata Archetti, Alberto Lamberti

Dear members of NHESS Journal Editorial Board

we appreciate the efforts you have invested in our manuscript. We have addressed the concerns raised in the review process. Following is an itemized list of Reviewers' comments and our response to each. Responses are presented in black to distinguish them from reviewer comments in red. Moreover, general English language and punctuation have been thoroughly inspected and improved.

We trust that you will now find the manuscript acceptable for publication in NHESS Journal.

Sincerely yours,

Alessandro Antonini, Renata Archetti, Alberto Lamberti

# General comments

The English language requires a revision, due to the presence of a several errors. Just a few examples are given below (see specific comments).

General English language and punctuation have been thoroughly inspected and improved.

The proposed quay wall is considered “innovative” (see for instance the title). The reason why the structure is innovative should therefore be explained. I believe it is related to the construction technology, and therefore I suggest to provide a plan view of the structure.

We thanks the reviewer for pointing this out, a plan view as well as frontal view of the structure have been added to the text in Figure 11.

The final optimal solution is in my opinion not very effective: in my experience (based on physical model testing) a better performance should be obtained using the “typical” absorbing quay configuration, i.e. with the rubble mound crest level above the mean water level, in order to induce wave breaking. May be artificial units such as tetrapods should be used instead of natural stones. I guess that most readers will be surprised to see that in the final configuration, your designed rubble mound crest is 1 m below the water level. I strongly suggest that the typical configuration is investigated, or at least discussed, to avoid possible critiques to your work.

We thanks the reviewer for his noticeable comment. We agree with his point of view, but we would like to highlight the main two reasons that led us to adopt a non-standard configuration.

1. Around the Vlora area, natural and good quality stone was available with a reasonable price, thus we excluded the use of artificial blocks.
2. The height of the rubble mound slope was strongly limited by the cell length restrictions imposed by the upper structure costs.

Therefore, our final choice was a compromise between efficiency and costs restriction. The rubble mound slope configuration is evident that is not efficient as much as a standard one, but is still able to generate dissipation on the incident waves as shown through the small values of reflection coefficient. We believe that our final design is a good choice/compromise considering the available financial means, the dimension of the new wharf and the exploitation of the local natural stone.

In this light, a paragraph where the main structure features are justified and explained has been added to the text.

Several figures are too small and the legend cannot be read even at maximum zoom.

We thank the reviewer for this valuable comment. Nearly most of the figures quality have been improved.

# Specific comments

## Abstract

Include in the abstract the objective of the paper

We thanks the reviewer for his suggestion, the objectives of the paper have been added to the abstract

Say where is Vlora (=Albania)

Location of the city of Vlora has been added to the abstract

Add comma at the end of this paragraph: “Due to the particular geography and topography of the Vlora’snBay”-> “Due to the particular geography and topography of the Vlora’s Bay,”

Comma has been added

Rather than “non-reflective quay wall” I suggest ”absorbing quay wall”

Non-reflective quay wall has been changed in absorbing quay-wall

Rather than “allows the identification” I suggest “allows for the identification” (I’m not sure, though).

Correction has been done

## Introduction:

The rule «the singular form of nouns should be used when they function as adjectives» should be followed where appropriate (three year old boy, and not three years old boy, and therefore I believe waves conditions should be wave conditions; coastal structures design practice should be coastal structure design practice. . . this type of error is very frequent in the manuscript).

This type of error has been thoroughly inspected and corrected through the text

a widely number of methodology -> methodologies; (widely number? It looks overstated)

Correction has been applied to the text

“new concept of quay wall” A figure is needed pointing out the peculiarities. It is not clear what is the innovation.

New figure 11, highlighting different views and parts of the structure, has been added to the manuscript

an anchors and piles foundation system. . . a) it is incorrect in English; b) Where is the anchor?

a) Correction to the sentence has been applied to text

b) The anchor has been highlighted in figure 11

Aim is showing? The English looks incorrect to me. Please correct.

The sentence has been cancelled from the text

## Modeling of the armor slope.

Can you give some sort of evidence that the numerical model is able to reproduce the dissipations due to possible breakings on the rubble mound (the mound that is present in the cross section of the quay wall)? This ability seems necessary for the optimisation of the absorbing quay structure.

We thank the reviewer for pointing this out, comparison of the reflection coefficients with physical experiments on a very similar structure has been added to the text in order to highlight the capabilities of the numerical simulations.

## Tables and figures

Table 4 presents a Tr=100 for two directions. Can you make a reference to a complete statistical analysis?

A description of the statistical and empirical analysis adopted to identify the southern wave conditions has been added to the text

Figure 11: Innovative quay wall section: add a front view to clarify the structure

Frontal view as well as plan view have been added to igure 11.

Figure 20: legends are not visible

Quality of figure 20 and related legends has been improved