

## Faculty of Maritime Engineering and Marine Sciences

### Ship Dynamics

**Course project: Ship response to an irregular sea**

**Aug.20<sup>th</sup>, 2020**

#### **Group work:**

**Objective:** To determine the influence of different geometrical and operational characteristics on the response of an inter Galápagos islands high speed craft in irregular waves.

**Process:** Preliminary results will be presented during the XXIV Naval Engineering Student Technical Sessions on Friday 4<sup>th</sup> of September 2020. So for that date, all groups must submit a report with preliminary results.

**Calculations:** Each group will be provided with a different ship lines plan in Rhino format, which may be imported, as was explained in class, from MaxSurf to develop the required ship motion calculations. Also with this lines, you may develop hydrostatic calculations required for the dynamic response.

Using the module Motions from MaxSurf computer software, calculate the following ship response parameters: vertical acceleration of points along the ship, and, pitch and roll angles. Use the maximum velocity that the program allows, using strip theory. For operational parameters, consider variation of sea state level (1, 2 and 3), **load condition (full: 8.52 and partial: 6.39 tons)**, and, trim (0 and +/- 5 cm).

- i) Evaluate the motion sickness using ISO standard, considering distances to travel from Santa Cruz to Isabela. Consider waves coming from the bow.
- ii) Calculate and compare rms values for pitch angle, with waves coming from 135°.
- iii) Calculate and compare rms values for roll angle, with waves from 135°. Evaluate results from ii) and iii) using published values, for example in PNA vol. III, and in Fridsma's report.
- iv) Summarize results from all groups, and analyze the influence of deadrise angle on the dynamic response of the craft.

**Report:** It must be written in English, maximum 5 pages long, Times New Roman 11 type, in the attached format. It will be evaluated: aesthetics of the report (25%), theoretical introduction and experimental design (30%), and, result analysis and conclusions (45%).

**Oral Presentation:** It will be evaluated according to the rubric employed for the NESTS.

**Project evaluation:** The written report represents 75% of the grade, while oral presentation, 25%.

**Deadlines:** a preliminary report must be presented during the XXI NESTS by Friday 4<sup>th</sup> of September. **On the day of the second evaluation, Thursday Sept. 10<sup>th</sup>, final report of the project must be submitted.**