UNDERWATER ENVIRONMENT SOUND SPEED MODELING

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Abstract: *The paperwork presents the results collected and modeled regarding the sound speed variation in the marin environment. Measurements aimed to raise speed sound-depth profile on 9 alignments (in the port of Constanţa). There were also made comparisons between data received through direct measurements of sound speed and sound speed computation. The modeled results are to be used as entrance data in the transmission loss modeling.*

Keywords: *underwater sound, data acquisition, sound speed modeling.*

1. Introduction

It is known that ships radiates noise in all frequency bands, with the highest sound levels at the lower frequencies (below 150 Hz). Research noise navigation in the last decades provides some information on noise levels in different operational conditions (eg. speed, type of vessel). Information on the characteristics of noise coming from ships and its distribution, with respect to the locations and movements of marine organisms, are important for understanding the potential influences on marine life.

Controlled noise reduction generated from the global navigation must be achieved by implementing noise limits or guidelines for individual vessels and harbor's economic activities. Any criteria related to noise, framed in the limits established by the Marine Strategy Framework Directive, should be defined in consideration of the existing technology. In order to obtain noise reduction, criteria must be included in the shipbuilding standards and integrated into the design and construction of a ship.

2. General background for conducting the measurements

In the described context was performed the measurement and the modeling of the variation of the sound speed in the marine environment. The variation of the sound speed in the marine environment is used in the data entry in modeling underwater noise of the transmission loss. Have been set a procedure and a program to be conducted the measurements.

2.1 Data on the procedure for measuring the underwater sound speed

In the procedure were taken into account several criteria:

- setting the noise source: noise source was a rig tender that perform drilling activities.
- setting the measurement locations: the distribution of measuring locations was set large enough distances towards the activities, so that at least one measuring location to be representative of the general conditions of ambient noise, excluding any noise from the activity.
- measuring time: time of day when measurements are made was such that have considered the following items:
  - hours when the activity takes place;
  - possible changes in the noise level of the activity due to declared schedules;
  - typical daily change in the noise levels due to meteorological elements and daily activities of transport;
  - need to evaluate the noise levels during the day, evening and night.