The 10th International Conference on Coasts, Ports and Marine Structures (ICOPMAS 2012)
Tehran, Iran, 19-21 Nov. 2012

EVALUATION OF TWO METHODS BOUSSINESQ THEORY AND MILD SLOPE EQUATION IN THE CALMNESS OF THE PORT BASIN (CASE STUDY: SOUZA PORT, SMALL MULTI-PURPOSE PORT DEVELOPMENT PROJECT)

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Key Words: Port Calmness, Wave Diffraction, Boussinesq Theory, Mild Slope Equation, Souza Port.

Introduction

One of the most important parameters in determining the percentage of troubled days is an effective port, Vessels affected by the height of a wave pool that the client cannot receive the necessary services in the pool. The height of the wave function of vessels tonnage and the user has access to the pool. For example, wave height permitted for vessels with a tonnage of vessels with a tonnage less than the above, is less. The sensitivity of the system loading and unloading vessels are flexible (such as oil vessels), is less than the longer waves. And the wave height permitted for these vessels will be relatively higher.

Today, using a method known as boussinesq theory and common ports is acceptable in order to assess the calm pond. But due to the advantages and disadvantages of each of the equations in intermediate and shallow waters, Review other equations and methods in order to choose the best method for layout design and the port seems to be necessary. Accordingly, the method results in this study (boussinesq Waves Theory) with the results of the numerical solution of a mild slope equation (Mild Slope Waves Equation) will be compared to the port Souza.

Position of Port

One of the breakwater and small multi-purpose port development plan, Souza is the breakwater. Sousa's position along the asphalt road south beach island (about 30 km southwest of Qeshm) and in the opposite Larak Island (West Larak Island) is located. The proposed project is located in Qeshm Island, Persian Gulf in southern Iran and the entrance is located. The island has a length of 116 km and average width is 11 kilometers an area of about 1491 square kilometers and covers. Souza on the southern shore island in latitude 26 degrees and 46 minutes north and longitude 56 degrees 4 minutes east is located From the East to the West Pier Rigu and processing of fish and older leads to the breakwater. Larak island of Qeshm Island is located in the South East to the island about 20 kilometers away is Souza. Souza and location coordinates and location of construction projects is given in the table below.

Table 1) the proposed location for construction of breakwater

Longitude	Latitude	Point Name
56° '4 3"	26 ° 46 ' 38"	ساحل سوزا

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Fig. 1) location for construction of breakwater

Problem Description

As was stated in this study we investigate the scattering phenomena and the calm harbor basin Souza boussinesq theory and the theory of two mild slopes equation is used. These two effects of shore (shallow areas) and the port areas will be analyzed simultaneously published on the waves. In these areas, shallow phenomenon, diffraction, refraction and reflection occur in irregular waves these equations can be varied in the range, with deep and complex geometry, this phenomenon has been investigated. And shall consider the model built. Mike21 and two modules of the software for the numerical solution of equations are used BW and EMS.

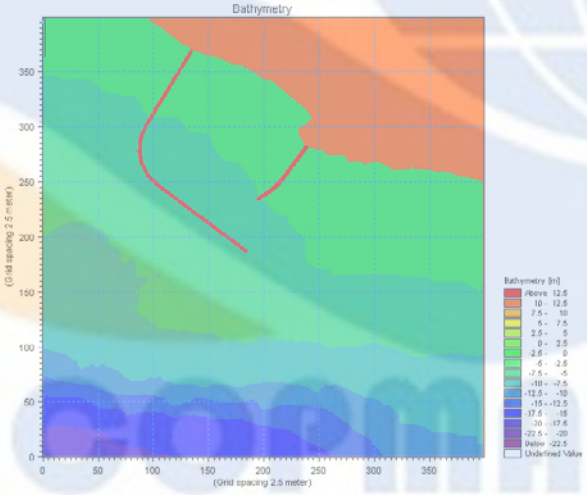

Fig. 2) Bathymetry File

Boussinesq Theory

The linear theory is assumed that the sine wave, if it is not in reality and in vitro and sharper wave crest and the bottom is wider. Since the linear theory can take in some of the non-linear phenomena, and also because of the theory of nonlinear wave wares used.

The proposed nonlinear theories, the theory of long wave theory is also known boussinesq. boussinesq equations by Madsen and Sorensen 1992 for wave propagation from deep water to shallow water, which is solved by numerical solution of these equations Mike is a software module BW.

boussinesq one variable equation which in 1872 provided the following:

$$\eta_{tt} - h\eta_{xx} - \left(\frac{3}{2}\frac{\delta}{h}\eta^2 + \frac{\mu^2}{3}h^2\eta_{xx}\right)_{xx} = 0$$

Mild Slope Theory

Gentle slope of the linear theory of wave equation is derived by Berkhoff 1972. This equation can calculate the wave propagation in the sea bed with a gentle slope. In order to solve these equations, parabolic method (Parabolic) and elliptical (Elliptic) provided that parabolic solution can not consider the phenomenon of wave diffraction. But solving the elliptic equation with a gentle slope to the phenomenon of diffraction phenomena of refraction (Refraction) and creep (Shoaling) considers.

Conclusion

As mentioned earlier, the theory of nonlinear wave equations used boussinesq expected in the diffraction phenomenon is seen with higher precision, the results of elliptic equations with a gentle slope above results have been compared. As shown in Figure 3 is the diffraction theory of waves in the pond with a gentle slope, although less accurate than the nonlinear method boussinesq theory, the results are acceptable.

Linear elliptic equations of the gentle slope of the cost and time with this method of modeling the nonlinear theory is boussinesq Therefore, the difference between the results is acceptable.

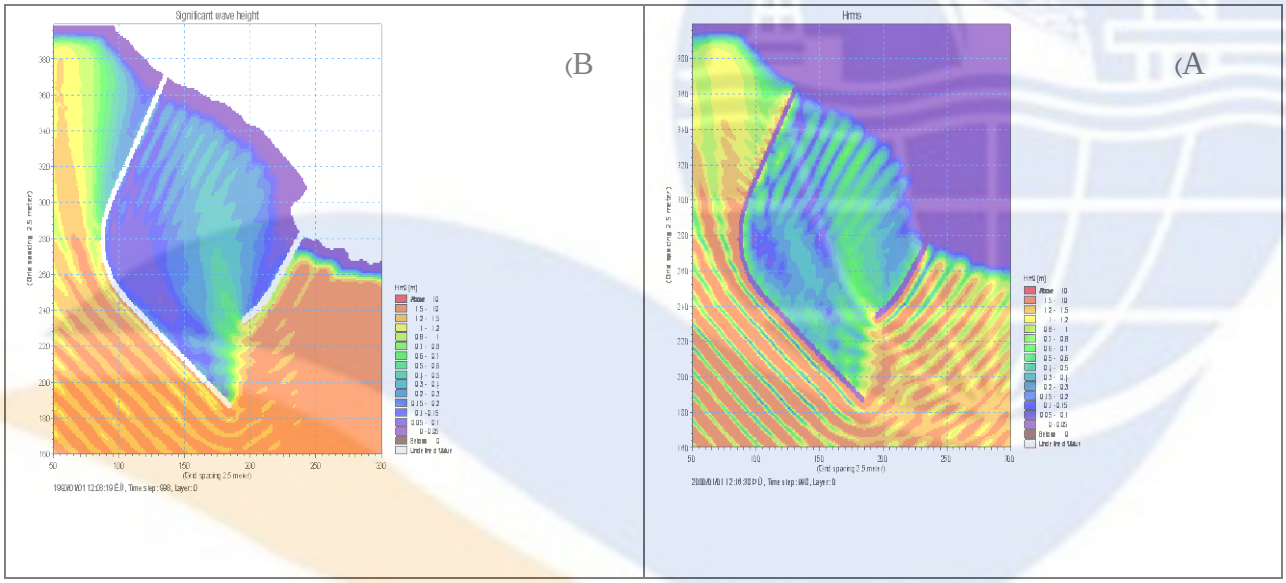

Fig. 3) Wave Diffraction: A) Boussinesq Theory B) Mild Slope Equation

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