MODELLING OF SEDIMENT TRANSPORT IN BERIS FISHERY PORT

Samira Ardani **Mohsen Soltanpour**
K.N. Toosi University of Technolog **K.N. Toosi University of Technology**

s_ardani@sina.kntu.ac.ir soltanpour@kntu.ac.ir

ABSTRACT
Seventeen years old Beris Fishery Port is located in southeastern of Iran, 85km east of Chabahar (Figure 1). The main breakwater is extended from south to north where the secondary breakwater is in east-west direction. The port is suffering from two mechanisms of sedimentation, i.e. sedimentation at the head of the main breakwater and remarkable change of shoreline position at the back of the secondary breakwater which may endanger the port entrance in future.
The equilibrium state of Beris Bay is developed first. The parabolic shape equation is used as the best fitting curve to be fitted to the actual shape of the bay. MEPBAY software was employed to fit the parabolic curve in static equilibrium state. On the other hand, the existing aerial photographs were compared to understand the long-term evolution of the bay.
PMS module of MIKE21 was used for the numerical modeling of wave transformation from deep water to shallow areas. Nearshore wave characteristics and the wave direction at the tip of the main breakwater were obtained from wave transformation model. The outputs revealed that the nearshore directions of wave components are not perpendicular to the coast resulting to a longshore sediment transport along the coastline. HYDROSED software was employed for the modeling of currents and sediment transport. The potential longshore sediment transport (LST) was obtained by HYDROSED and it was compared with the actual LST rate found from the comparison of hydrographic surveys.
Specifying the LST rate as an input value, GENESIS software was finally employed for the prediction of Beris shoreline position in different years. The computation was continued until the shoreline comes to a dynamic equilibrium state. The final shape of the bay was in good agreement with the actual shape of the bay.

INTRODUCTION
A crenulate shape bay consists of three parts, i.e. a straight section that connected to downcoast headland, middle curve section that can have spiral, parabolic or hyperbolic tangent shape and the circular part beside the upcoast headland. A number of empirical equations have been proposed for the middle part of the curve shape bays. They include logarithmic spiral (Yasso, 1965; Silvester, 1970-1974), parabolic (Hsu and Evans, 1989), modified parabolic shape (Tan and Chew, 1994; Gonzales and Medina, 1999-2000) and hyperbolic tangent (Kraus and Moreno, 1999). Here, the parabolic shape was used for fitting to the actual shape of Beris Bay.
Bays may exist in static or dynamic equilibrium states. In static equilibrium, there is no sediment transport along shore and downcoast tangent line is parallel to wave crest. Although the shoreline does not change in dynamic equilibrium shape, a longshore sediment transport exists along the shoreline.
The form and stability of crenulated shape bays depends on two factors: the wave condition and the supply of sand to the bay from the upstream bay and from a river. Sediment transport mechanism is such that the amount of sand Q_B from upcoast headland passes and moves along the bay. If a river exists as shown in figure 2, the sand quantity Q_R is added to the studied area. These sediments transport to downcoast. Thus the sediment rate at downcoast is $Q_B + Q_R$ and a 2D complicated process governs. The direction of sediment transport depends to the incoming wave condition. The bay has a stable condition until there is no change in $Q_B + Q_R$. If the sediment value changes due to the change of upcoast bypass or river sediment input, the bay shape changes resulting accretion or erosion along the coastline.