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PAITON KITISUNTORN : SEDIMENT TRANSPORT AND NAVIGATION PROBLEM IN
LOWER NAN RIVER. THESIS ADVISOR : ASSO.PROF.CHIPANT RUKVICHAI, Ph.D.,
MR.PRASERT MILINTRANGKON AND MR.FUENG PANICHKIT

There are two main objectives in this research. It aims at the study on hydraulics of sediment transport which causes changes in the lower reaches of Nan River between Taphan-Hin (Km.478) and Pak Nam Pō (Km.379). Secondly, it aims at the study on the problem concerning with navigation in the river, especially deposition in navigation channel. The study covers the field surveys on sediment transport and river hydraulics during June-December 1992 and the study using the HEC-6 simulation model.

The study results conclude that the Lower Nan River is an alluvial river with its bed slope 1:13,000 and 120-300 m width. Within the 99.8 km study reaches, there are about 195 bends. The bed material is mainly medium sand with 0.20-0.48 mm. size which has a low potential for being transported. After the completion of Sirikit and Naresuan Dams, the average daily flow is about 50-1,000 m³/s at Taphan-Hin and the Manning n is 0.018-0.0325. The transport of suspended sediment is highly correlated with mean velocity and discharge. The bed sediment transport depends on the energy slope. There is deposition of sediment found in most reaches just downstream of the river bends and the groin structures. Many river banks at the outer bends and at the banks opposite the groins are scoured by the river current and groundwater seepage.

The HEC-6 computer model is employed to simulate the long-run changes in 30 year for 3 cases of the river conditions, i.e. under natural condition, with the improvement project in 1986-88, and with a proposed structure controlling the water level at Pak Nam Po. The Meyer-Peter and Muller Formula is selected for the calculation of bed sediment and the average daily flow during 1986-1992 is used. It is concluded that more river changes are expected with the improvement project than under the natural condition. With the control structure at Pak Nam Po, The river changes are less and navigation is possible all year round.

About the navigation in the Lower Nan River, the main problem is found to be the deposition at the ends of the river bends and the groin structures. Furthermore, the minimum flow of 90 m³/s is required to maintain the lowest water level expected by Harbour Department. On average, there are about 48 days per year with the river flow below the required flow.