

Monitoring beach morphological changes and coastal, sediments balance in Chao Samran Beach, Changwat Phetchaburi

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Abstract: Chao Sam Ran beach, Phetchaburi province is well known as one of famous tourist beaches for a long time. This beach is facing with coastal erosion problem leading to loss of local economy and some infrastructures. In 2007-2009, 15 breakwater seawalls were constructed by Marine Department for 4.5 km along the coast to mitigate erosion problem. These breakwaters cause some coastal morphological changes. In place where breakwaters are located, tombolos built to connect the land and breakwater. However, the construction of heavy structures into the sea remains controversial that whether or not it can be solved the erosion problem.

This study aims to monitor long- and short-term morphological changes and coastal sediments balance by two approaches. First, analysis in satellite images and aerial photos was carried out in order to monitor horizontal spatial changes by measurement of shoreline moving rates from year 1994 to 2014. This long-term monitoring for 20 years covered before and after breakwater construction. Second, short-term beach profiling was set up to monitor sediments balance early and during Northeast monsoon. In this study, the study area was divided into 3 coastal sectors: north, middle and south.

As a result, satellite image and aerial photos interpretation before breakwater construction (year 1994-2006) reveals that the distance of shorelines in the northern part has increased from the reference line (1994 shoreline) with the rates of 1.00 m/year; whereas in the middle part has increased 1.28 m/year and in the south part has decreased 0.71 m/year. During breakwater construction (year 2006-2010), the distance of shorelines in the northern, middle and southern parts has increased with the rates of 3.76, 2.10 and 1.57 m/year, respectively. After breakwater construction (year 2010-2014), shorelines in the northern part has decreased with the rates of 0.37 m/year, whereas in the middle and southern parts has increased with the rates of 0.007 and 1.45 m/year, respectively. Results of beach profiling between bar and bay showed that the bar morphology has less slope than the bay both in early-monsoon and during-monsoon periods. During monsoon period, beach has been stable and offshore sediments have transported into nearshore zone. Furthermore, there is the scour of sediments at the breakwater base which rip currents may occur.