sand is pushed toward the entrance from all directions, not just alongshore. Since this often occurs in a matter of hours, it is clearly a short-term phenomenon in relation to what was described earlier. Furthermore, a unique set of conditions are required to bring about closure, i.e., the flood phase of flow through the inlet under a low range of tide, high onshore wind, storm waves of high energy but low steepness which will carry sand ashore, sufficient storm duration, insignificant fresh water outflow through the inlet, shallow depths at the entrance and others. Because no thorough field or laboratory investigations involving so many parameters have been carried out, we do not, at the present time, have engineering criteria for stable inlet design against storm closure.

It should be noted that the phenomena associated with long-term stability and short-term stability, or closure, clearly overlap to some extent, and that the distinction is, to an extent, a matter of convenience only. Clearly, the onshore-offshore sediment motion as well as the frequency of storm occurance have a role in characterizing long-term stability. It is however reasonable to use such time-average parameters as the annual mean wave power, rate of littoral drift, tidal characteristics and prism in defining long-term stability. On the other hand, any criterion on closure must involve the intensity and duration of the storm.

Long-term stability criteria have been proposed by O'Brien (1931), Escoffier (1940), Bruun (1966), O'Brien (1971), O'Brien and Dean (1972), Johnson (1973), Mehta (1975) and others. All these criteria assume that sufficient sand is available to alter the inlet flow cross-section in response to the hydraulic conditions. This situation ideally exists only in the case of unimproved inlets on sandy coasts (Fig. 3 (a)). When jetties are successfully constructed to cut off the natural flow of littoral drift, the sand