PRINYA NUTALAYA: Is Bangkok Sinking?

The talk was delivered by Dr. Prinya Nutalaya to an audience of about 60 members and guests of the Society on the 28 July 1983 at the Department of Geology, University of Malaya. Dr. Nutalaya is internationally well-known for his revealing and detailed studies of Bangkok's subsidence and for his dynamism and wisdom as well. Not surprisingly, with such rare qualifications he has recently been elevated to Professorship in the Division of Geotechnical and Transportation Engineering, Asian Institute of Technology, Bangkok. Not surprisingly, as all that is good comes in lots of three in Thai beliefs, Dr. Nutalaya has been elected President of the Association of Geoscientists for International Development and President of the Geological Society of Thailand. Not surprisingly, all these rare achievements happened within the last three years.

The talk was, of course, divided into three parts - the cause, the effects and the solutions. The project to study subsidence in Bangkok was started about a decade ago and one of the major problems faced was the lack of reliable benchmarks in the Bangkok area. Earlier accurately levelled benchmarks were, of course, affected by subsidence. So a major survey and levelling project was initiated starting from a station at sea-level at the isthmus part of Thailand. Strict accuracy was demanded and accurate benchmarks were determined for various stations in the Bangkok area. Recording stations were established to monitor the rate of subsidence.

TECHNICAL TALKS

Top: E.J. Cobbing (arrowed) having discussions at tea.

Middle: Prinya Nutalaya with his talk on Bangkok.

Bottom: Azhar Hj. Hussin & Nuraiteng Tee Abdullah and Cretan Evening.

The Bangkok metropolitan area is underlain by the Bangkok Clay which overlies sandy aquifers below. Widespread and apparently uncontrolled withdrawal of water from the aquifers below the Bangkok Clay has resulted in dewatering the Clay causing extensive areas of ground subsidence. The studies enabled a subsidence bowl to be delineated which covers the Bangkok area largely east of the Chao Phraya River. Within the subsidence bowl, a subsidence rate of more than 10 cm/year has been recorded.

The effects of subsidence are very visible in the Bangkok area. Flooding is a major problem. At present a urban centre in the Bangkok area is witnessing more days under water than above per month. Tall buildings in Bangkok standing on deep piles become progressively taller by the year as a result of subsidence of adjacent areas. This unexpected growth has made it necessary to add extra steps to permit access easier and more welcoming. Besides easily noticed damages like development of cracks in buildings, ground subsidence has also caused not easily notice, but nevertheless very irritably felt, damages like breakage of plumbing and drainage systems. Distruption of water supply has left parts of Bangkok without water for long periods. Disruption of smooth outflow of used water is just as bad.

The subsidence can be arrested by pumping back water which has been withdrawn. The overlying clay does not permit any downward percolation of water. Water has to be pumped into deep wells to get back into the aquifers. One source of water could be the Chao Phraya River. Control of groundwater withdrawal, perhaps by levying a charge, would be helpful and would provide funds for the pumping programme. Alternative source of water supply would reduce groundwater withdrawal as well. The problems faced by the programme to arrest the subsidence is obviously not only geotechnical.

It is hoped that with enlightenment, steps will be found to prevent further subsidence and the second coming of the Venice of the East. As all good things comes in three, it is hoped that the great city of Bangkok will celebrate the 300th Anniversary very much above water and in a grander scale than the 200th Anniversary just passed.

T.T. KHOO