

Geotechnical Aspects of Man made Island Construction for Airports

Amir Ahmad Sadr^{*1}

* Civil Eng. Phd, University of Tokyo, IIS

¹ Dynatec Co., Design, Numerical Analysis Section

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Background and Aim : Japan's Metropolitan areas are one of the most densely populated areas in the world. Regarding mountainous topography of country, there are a few places within the area to construct a new airport. As a remedy, several airports have been to constructed on man made islands like Kansai, Kobe and Haneda Airport. As the sea bed at those sites mostly are consisted of soft highly plastic clay deposit, after constructing airport the consolidation and secondary consolidation settlement could be around ten meters during 100 year period of airport life time. Predicting this settlement correctly is vital for serviceability of airport.

Discussion and Conclusions: Consolidation is a phenomena on which with loading and drainage water soil deforms (Settles) noticeably with time. This phenomenon is specific fine texture soil like clay or silt. In 1925, Terzaghi presented a novel theory and methodology for describing it. This theory is widely adopted and used up to now. In Japan, there are many detail researches to improve this theory (Like Sekiguchi Otha Model) and also there are several construction methods to control this settlement (Sand well Drainage, asymmetric Depositing ...). There are many successful projects already constructed and observed settlement agrees well with prediction.

However the theory and experimental methods need more improvement. For example, in Kansai airport case, even the settlement prediction was based on newest available theory and best resources, during last 10 years after construction the settlement deviates significantly from prediction and if current trend continues for next several decades, airport needs to be elevated several meters. The main reason is attributed to excess settlement of a stiff clay layer, which theoretically was considered impossible to have any displacement.

Innovation and Importance: In Iran along Caspian Sea and part of Persian Gulf Shore, there are geotechnical difficult sites, where some infra structure needed to be constructed. Using experience and Japan frontier geotechnical achievement can save our national resources by avoiding failures.