CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Final settlement at Gelora Bandung Lautan Api Stadium are predicted by developing Settlement Rate Function and comparing it with Asaoka's method and Terzaghi's one-dimensional consolidation method. In order to predict accurately, several trials were conducted observing the effects of soil condition and data utilization on predicted final settlement and to determine the most optimal procedure for calculating soil settlement. Several findings could be pointed out from the analysis results as follows

- It is found that based on Asaoka's method, secondary compression begins from 70-80% degree of consolidation. This finding is suitable for use in the Settlement Rate Function, spesifically in separating the settlement rate function curve in R-t space.
- For soft soil with significant secondary compression, Settlement Rate Function can predict accurately as long as the secondary compression has appeared and soil settlement rates are not fluctuating.
- Separating the primary and secondary compression phase in Settlement Rate Function will predict final settlement more accurates because the rate of secondary compression is not affected by the declining rate of primary consolidation.

- The minimum and optimum time interval to predict soil settlement and predict the beginning of secondary compression accurately is 20 days.
- In order to obtain accurate C_v value, trial and error based on sample settlement versus time space can be performed by matching it with the lab test results.

Based on the results, it can be concluded that the Settlement Rate Function with a time interval of 20 days predicts settlement more accurately by separating primary consolidation and secondary consolidation function to prevent the declining rate of primary consolidation affecting the rate of secondary compression. To facilitate future research, the following recommendations are offered based on conducted analysis

- Thorough analysis is needed to determine soil consolidation parameters correlation with Settlement Rate Function and Asaoka's method coefficient in its respective formula.
- The beginning of secondary compression may vary based on the soil characteristics, thus one firstly needed to determine the settlement at the beginning of secondary compression from Asaoka's method.

REFERENCES

AL-Zhoubi, M.S. (2010). "Consolidation Analysis Using the Settlement Rate-Settlement (SRS) Method", *Applied Clay Science* 50, 34-40

Ameratunga, J., Sivakugan, N., and Das, B.M. (2016). *Correlations of Soil and Rock Properties in Geotechnical Engineering.* Springer India

Arafianto, A. (2022). "Application of Asaoka's Observational Method Considering Creep Settlement and Settlement Rate Approach for Settlement Prediction of Embankment on Soft Soils", *International Symposium on Practical Applications of Ground Engineering for Embankment of Soft Soils,* 2022, GEESS 2022, Malaysia, October 18-20, 23-27

Asaoka, A. (1978). "Observational Procedure of Settlement Prediction", *Soils and Foundations Vol.*18, No. 4, 87-101

Budhu, M. (2011). *Soil Mechanics and Foundation Third Edition.* John Wiley & Sons, Inc. United States of America

Craig, R.F. (1983). *Soil Mechanics.* Springer New York

Das, B.M. (2019). *Advanced Soil Mechanics Fifth Edition.* Taylor & Francis New York

Indraratna, B., Balasubramaniam, A.S., and Balachandran, S. (1992). "Performance of Test Embankment Constructed to Failure on Soft Marine Clay", University of Wollongong 1992, 12-33

Liong, G.T. (2022). "Consolidation Parameters – Alternative to Casagrande and Taylor Methods", *International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE),* 2985-2990.

Mesri, G. and Huvaj-Sarihan, N. (2009). "The Asaoka Method Revisited*",* *Proceedings of the 17th International Conference on Soil Mechanics and Geotechnical Engineering*, 131-134

Olek, B.S. (2019). "Critical Reappraisal of Casagrande and Taylor Methods for Coefficient of Consolidation", *Korean Society of Civil Engineers* 23(9), 3818-3830

Rahardjo, P.P, Wijaya, M., Alvi, S.D., and Wijaya, Y.Y.C. (2022). "Prediction of Settlement and Creep of Soft Foundation Soils under Trial Embankments Based on Proposed Settlement Rate Function and Numerical Model", *International Symposium on Practical Applications of Ground Engineering for Embankments on Soft Soils*, 2022, GEESS 2022, Malaysia, October 18-20

Robertson, R.K., and Cabal, K.L. (2014). *Guide to Cone Penetration Testing for Geotechnical Engineering*, 6th edn. Gregg Drilling & Testing, Inc., Signal Hill, California

Schofield, A., and Worth, P. (1968). *Critical State Soil Mechanics.* Cambridge University. England

Tewatia, S.K., and Bose, P.R. (2003). "Discussion on *"*A Study on the Beginning of Secondary Compression of Soils*"* by R.G. Robinson". *Journal of Testing and Evaluation*, Vol. 34, No. 5

Tewatia, S.K., Bose, P.R., Sridharan, A., and Rath, S. (2007). "Stress Induced Time Dependent Bahvior of Clayey Soils"*,* *Geotechnical and Geological Engineering*, 25:239-255