CHAPTER 5
CONCLUDING REMARKS

5.1 Conclusions

In this study, a slope stability model has been analyzed thoroughly using the Material Point Method to study its failure mechanism along with the techniques which can be used to produce effective and efficient results. A fairly extensive theoretical bases for numerical simulation with focus on Material Point Method also discussed in the theses. The review also includes theoretical bases on constitutive models and landslides problems and analysis.

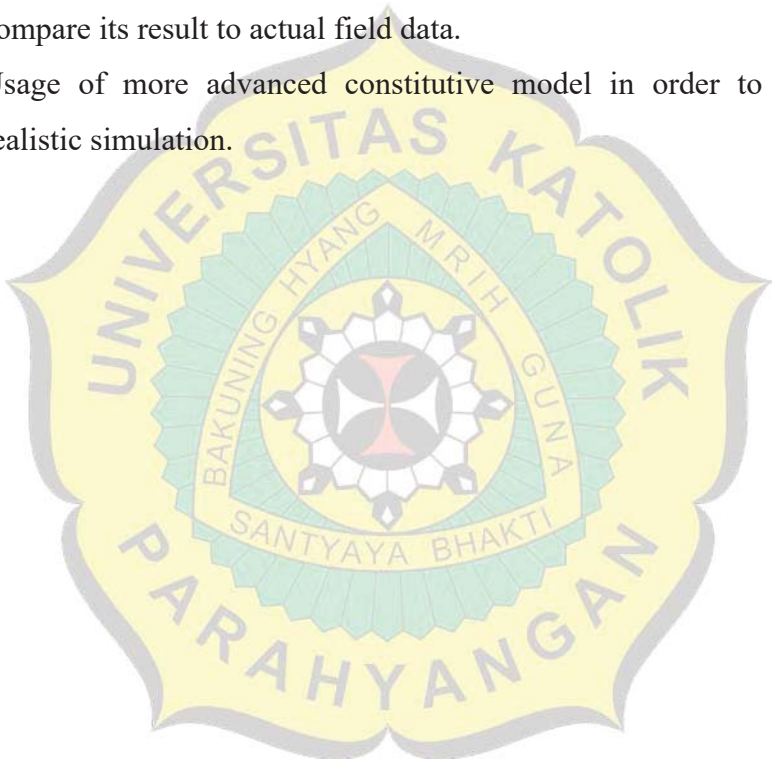
From the simulation made with both Material Point Method and Finite Element Method, some conclusion can be made as follows:

1. In the simulation with small strain deformation, Material Point Method is able to produce fairly consistent results compared to the Finite Element Method results. However, some significant difference appeared mostly caused by different type of mesh shapes.
2. In the simulation with extreme loads (i.e., large strain deformation), slope failure mechanism is observed and can be divided into 3 part. First, bearing capacity failure. Then second, mobilization of land mass. And lastly, deposition of soil mass as the load penetrates further into the ground.
3. With the available load (i.e., 390 kPa), slope failure only manifested in the soil with shear angle smaller than 35 degree. Both the 35° variation and 40° variation does not show any significant land mass movement.
4. Explicit formulation of the conventional Material Point Method causes it to be prone to numerical error due to convergency. To mitigate this, a larger damping ratio and a smaller time increments can be utilized. However, computational cost should be considered since smaller time increments increase the computational cost exponentially.

5.2 Future Works

Based on the works done in this thesis, some works which can be done in the future includes:

1. Usage of different Material Point Method interpolation such as the GIMP and CPDI to investigate its role to mitigate numerical error in the simulation. Future works also can utilize implicit formulation of the Material Point Method for similar purpose.
2. Implementation of Material Point Method in a real case scenario and compare its result to actual field data.
3. Usage of more advanced constitutive model in order to create more realistic simulation.



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