VI. CONCLUSION AND SUGGESTION

6.1. Conclusion

Based on the result obtained from the simulation of Tuned Mass Damper (TMD) on the 20 story building, TMD has been proven to be able to reduce the response of a structure affected by dynamic loading. The effect of the TMD in reducing the response of a structure is deeply connected and affected by its parameters that consist of mass, damping and stiffness. Therefore, optimization of mass, damping and stiffness is needed to be able to reduce the response. The genetic algorithm was used to optimize the parameters of the TMD.

The mass ratios play an important role in reducing the response. The higher the mass ratio, which is the mass of the TMD, the more significant the reduction of the response is. Ten different mass ratios were chosen to be applied on the structure for this project. The chosen mass ratios are within 1% - 10%. From the ten mass ratios of TMD applied on the structure, as expected the structure with the 10% TMD provided the lowest displacement.

From the result of simulation in the building that experienced El Centro 1940, Kobe 1995, Hachinohe 1968 and Northridge 1994 ground accelerations, show the effectiveness of TMD in reducing the vibration on the building. The displacement of the structure without TMD in El Centro 1940, Kobe 1995, Hachinohe 1968 and Northridge 1994 ground accelerations are 0.2438 m, 0.3162 m, 0.3118 m and 0.6925 m, respectively. The acceleration of the structure without TMD are 6.545 m, 1.567 m, 4.31 m and 1.59 m, respectively. When applied with the 10% TMD, the displacement reduced by 18.95% to 0.198 m, 7.6 % to 0.293 m, 31.75% to 0.213 m and 20.10% to 0.554 m. For the acceleration reduced by 90% to 0.655 m, 90% to 0.157 m, 90% to 0.431 m, 90% to 0.159 m. The simulation of the optimized TMDs subject to earthquake

ground accelerations show that the TMDs can reduce the displacement and acceleration of the building effectively.

6.2. Suggestion

Recently in Indonesia, the development of high rise building is visible in many places especially in big city. As Indonesia is located in the one of area with most earthquake in the world, special attention towards improving the resistance of structures toward earthquake should be done. Vibration control system such as tuned mass damper has been proven to be able to reduce the respond of a structure affected by dynamic loading such as earthquake. More studies regarding vibration control system is needed to provide more understanding about vibration control system such as TMD itself. By understanding more about TMD, it may be applied in Indonesia to produce a better earthquake resistant structure.

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