BAB V
KESIMPULAN

Berdasarkan dari hasil analisa dan pembahasan yang telah diuraikan sebelumnya, maka diperoleh beberapa kesimpulan sebagai berikut :

1. Dengan menggunakan metode elemen hingga 3 dimensi, respon getaran pada lantai fleksibel dapat dianalisis.
2. Menurut prosedur panduan desain yang dikembangkan oleh Murray et al. (1997), perhitungan frekuensi alami lantai tanpa pengaku = 0,45 Hz sedangkan nilai frekuensi lantai dengan menggunakan pengaku sebesar 5,44 Hz.
3. Dengan teknik pemodelan elemen hingga menggunakan program ETABS versi 8.3[1], nilai frekuensi alami lantai tanpa pengaku adalah 0,49 Hz sedangkan frekuensi alami lantai dengan pengaku sebesar 5,26 Hz.
4. Besarnya perpindahan yang terjadi pada tengah bentang lantai yang ditinjau sebelum dipasang pengaku sebesar sebesar 1,18 cm sedangkan untuk lantai dengan pengaku lendutan terbesar terjadi pada titik 32 yang berada di tengah bentang dengan perpindahan maksimal sebesar 0,36 cm.
5. Dimensi pengaku dalam analisa dapat digunakan karena mengurangi tingkat getaran yang terjadi pada lantai, dimana frekuensi yang terjadi telah berada pada nilai sebagai dasar kriteria yang dikembangkan oleh ISO 2361 – 1 dan 2. Sebagai perbandingan dengan menggunakan dimensi pengaku 2L30x30x3 diperoleh frekuensi alami lantai 4,91 Hz.

DAFTAR PUSTAKA

Aalami, B. O., 2010, *"Vibration Design of Concrete Floors for Serviceability",* ADAPT, Technical Note, Your Partner in Structural Concrete Design.

Allen, D. E., Rainer, J. H. dan Pernica, G., 1997, "*Vibration Criteria for Long-Span Concrete Floors*", NRC Publication Archive, National Research Council of Canada.

Allen, D. E. dan Pernica, G., 1998, "*Control of Floor Vibration*", Construction Technology, Canada

Arfiadi, Y., 2012, "*Vibration Control of Flexible Floor Systems*", Paper ID: 77, Department of Civil Engineering, Atma Jaya Yogyakarta University, Yogyakarta.

Carson, R. G., Waldrom, P., dan Williams, M. S., 1994, "*Review of Vibration Guidelines for Suspended Concrete Slabs*", Canadian Journal of Civil Engineering.

Chopra. A. K., 1995, "*Dynamics of Structures : Theory and Applications to Earthquake Engineering*", University of California at Berkeley, New Jersey.

Clough R. W. dan Penzien J., 1993, " *Dynamics of Structures* ", International Student Edition, McGraw Hill Inc, New York.

Elnimeiri, M. dan Iyengar, H., 1989, "*Composite Floor Vibration: Predicted and Measured*", Steel Structure, ASCE, San Francisco, USA.

Da Silva, J. G. S., 2008, *"Vibration Analysis of Long Span Joist Floors Submitted to Human Rhythmic Activities"*, www.intechopen.com

Ellingwood, A. dan Tallin A., 1984, "*Structural Serviceability : Floor Vibration*", Journal of Structural Engineering 110 (1) : 401 – 418.

Gunawan, R., 1990, "*Tabel Profil Konstruksi Baja*", Penerbit Kanisius, Yogyakarta.

Gunung Garuda, P. T., 1999, "*Products Catalogue, Engineering Service Center*", Cibitung, Bekasi.

Hanagan, L. dan Murray, T., 1994, "*Experimental Result From The Active Control of Floor Motion*", First World Conference on Structural Control, Los Angeles, California.

Hanagan, L. dan Murray, T., 1995, "*Active Control of Floor Vibration : Implementation Case Studies*", Proceedings of the 1995 American Control Conference.

ISO 2361.1., 1997, "*Evaluation of Human Exposure to Whole-Body Vibration : General Requirements*", Geneva : International Standards Organization.

ISO 2361.2., 2003, "*Evaluation of Human Exposure to Whole-Body Vibration – Continuous and Shock Induced Vibration in Buildings (1-80 Hz)*", Geneva: International Standards Organization.

Krauss, C. A., 1997, *"Floor Vibration Design Criterion For Colm-Formed C-Shaped Supported Residental Floor Systems"*, M. S. Thesis, Virginia Polytechnich Institute and State University, Blacksburg, Virginia

Ljunggren, F. dan Agren, A., 2004, *"Perception from Simulated Multiple Frequency Floor Vibration"*, To be submitted for publication in Journal of Sound and Vibration.

Maurenbrecher, P. M., 1997, "*Induced Vibration from Buildings: from People to earthquakes*", Delf University of Technology.

Murray, T. M., Allen, D. E., dan Ungar, E. E., 1997, *"Floor Vibration Due to Human Activity"*, Steel Design Guide Series No. 1, American Institute of Steel Construction, Chicago.

Naeim, F., 1991, *"Design Practive to Prevent Floor Vibration"*, Struktural Steel Education Council, Steel Tips, California

Pan, T. C., 2008, *"Evaluation of Floor Vibration in a Biotechnology Laboratory Caused by Human Walking"*, Journal of Performance of Constructed Facilities © ASCE

Saidi, I., Haritos, N., Gad, E.F., Wilson, J.L., 2006, "*Floor Vibrations Due to Human Excitation – Damping Perspective*", Earthquake Engineering in Australia, Cambera.

Sladki, M. J., 1999, *"Prediction of Floor Vibration Response Using the Finite Elemen Method"*, M. S. Thesis, Virginia Polytechnich Institute and State University, Blacksburg, Virginia

Supriyadi, B., 2008, "*Pengaruh Beban Sejumlah Orang Bernyanyi dan Berjoget Bersama Pada Struktur Lantai Gedung Berbentang Panjang (Studi Kasus Gedung Graha Sabha Pramana Universitas Gajah Mada)*", Media Teknik, Vol. III/2, pp. 121-124.

----------, 2002, "*Integrated Building Design Software An Introduction to ETABS*", Computer and Structures, Inc., Berkeley, California, 2002.

----------, 2002, "*Integrated Building Design Software Composite Floor Frame Design Manual*", Computer and Structures, Inc., Berkeley, California, 2002.

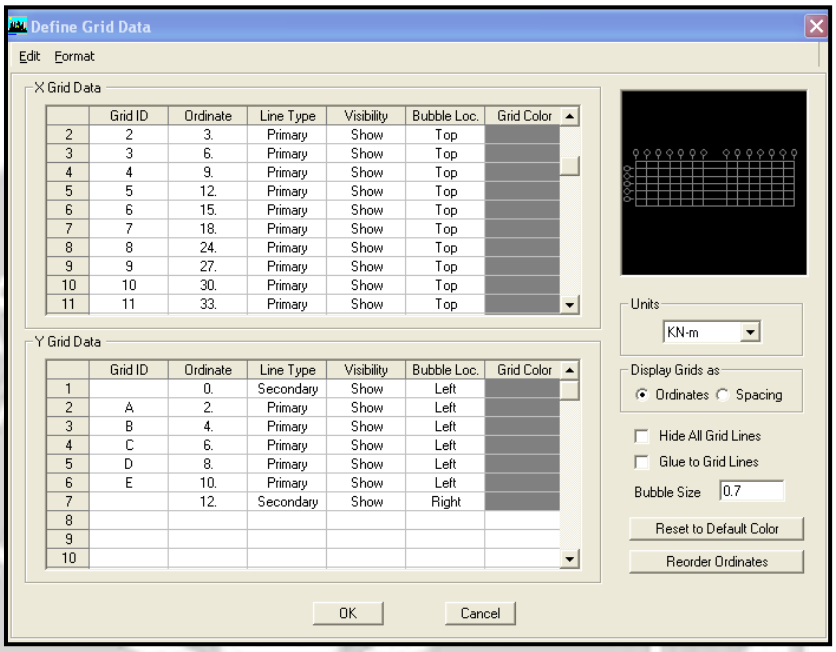
----------, 2002, "*Integrated Building Design Software Steel Frame Design Manual*", Computer and Structures, Inc., Berkeley, California, 2002.

----------, 2002, "*Integrated Building Design Software Steel Joist Design Manual*", Computer and Structures, Inc., Berkeley, California, 2002.

Lampiran :

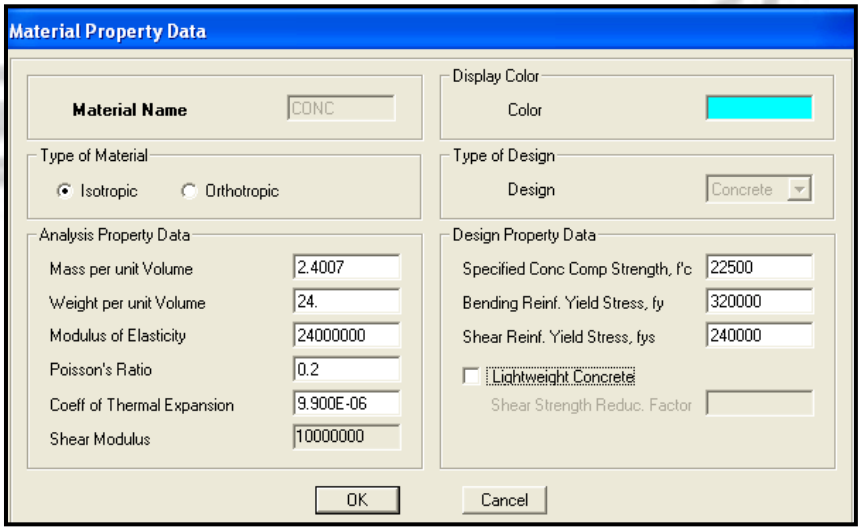
Langkah-langkah merencanakan model struktur :

1. Membuat sistem koordinat :

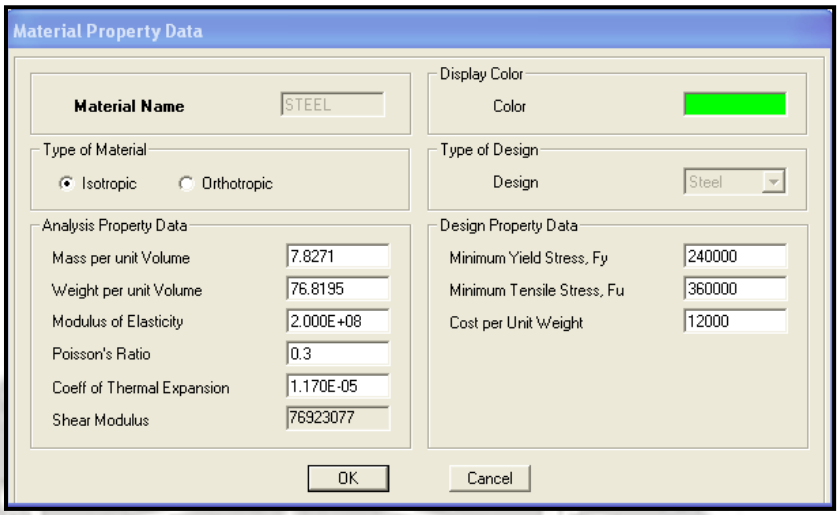


Gambar 41. Menentukan data grid

2. Menentukan material

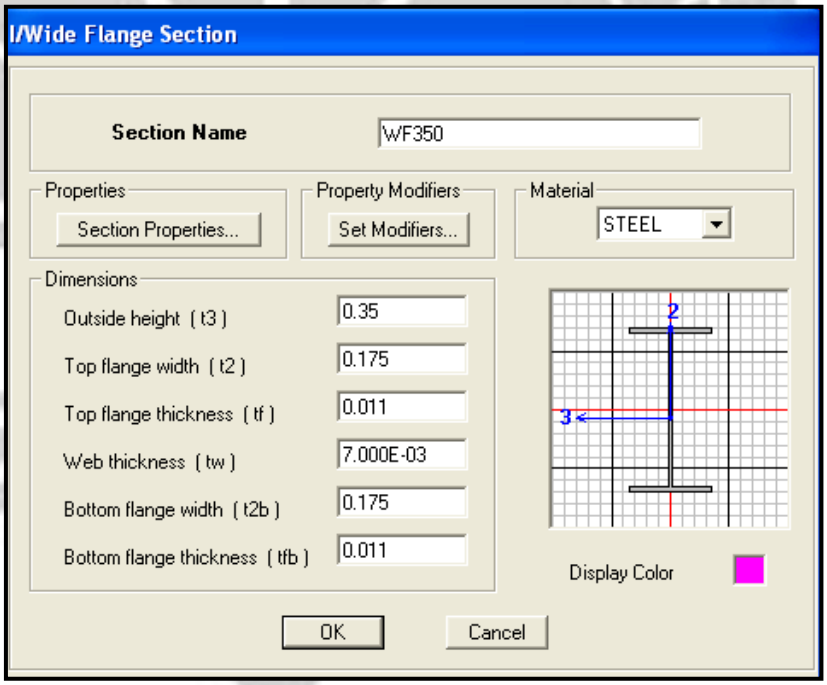


Gambar 42. Menentukan properti material beton bertulang



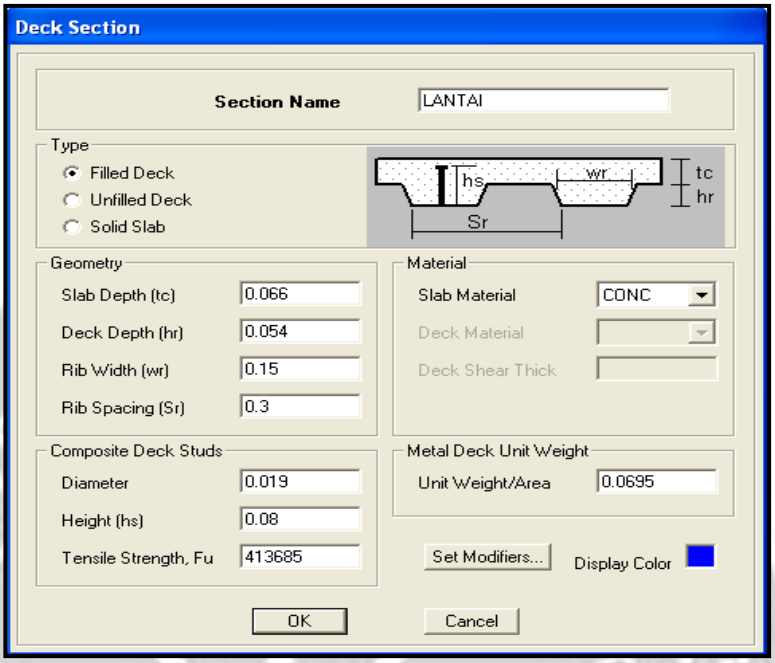
Gambar 43. Menentukan properti material baja

3. Menentukan elemen batang



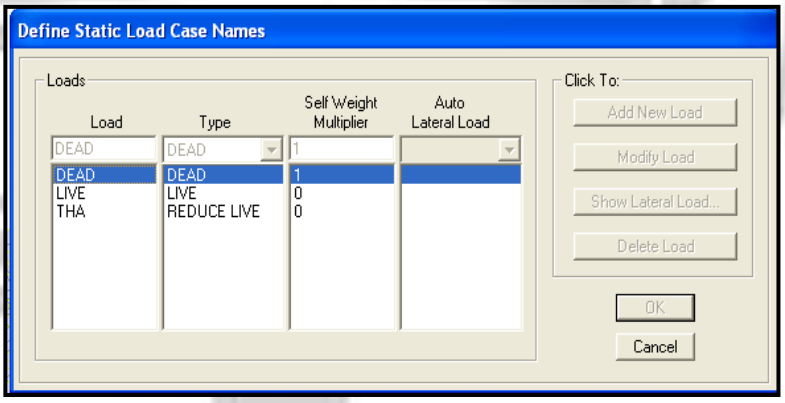
Gambar 44. Menentukan properti batang

4. Mendefenisikan elemen pelat lantai



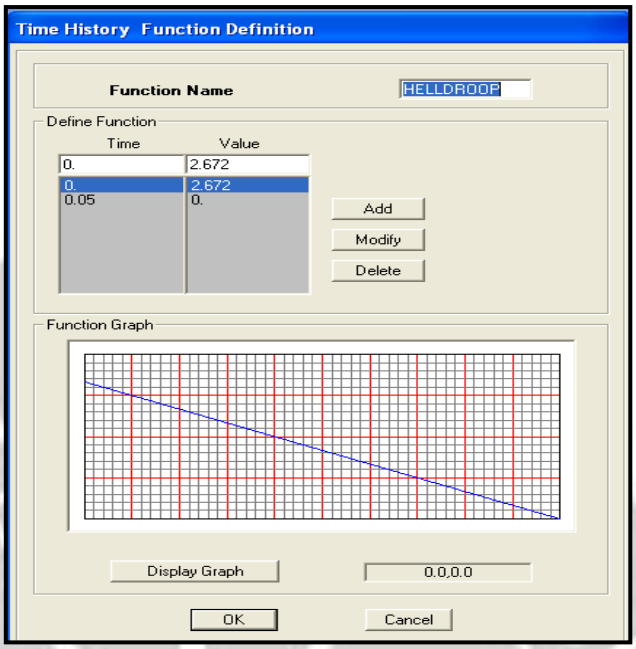
Gambar 45. Menentukan properti pelat lantai

5. Menentukan beban



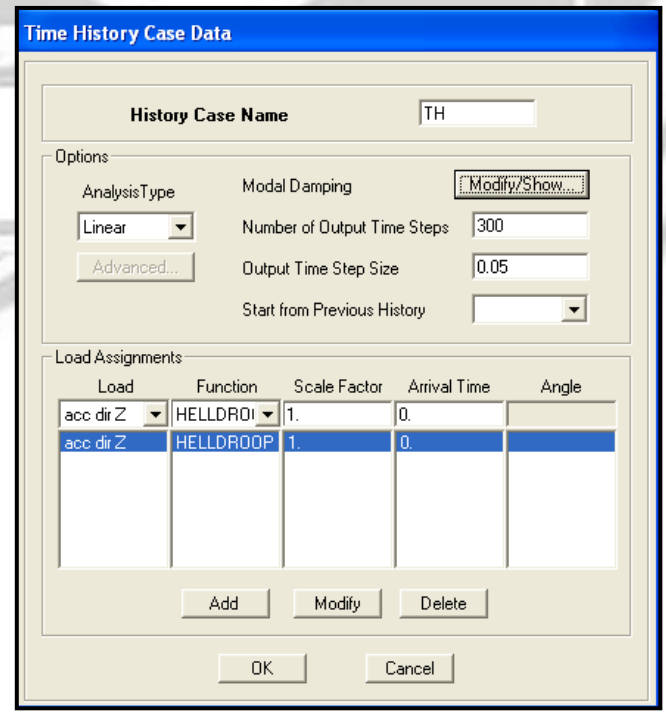
Gambar 46. Menentukan *load cases*

6. Menentukan fungsi analisa riwayat waktu



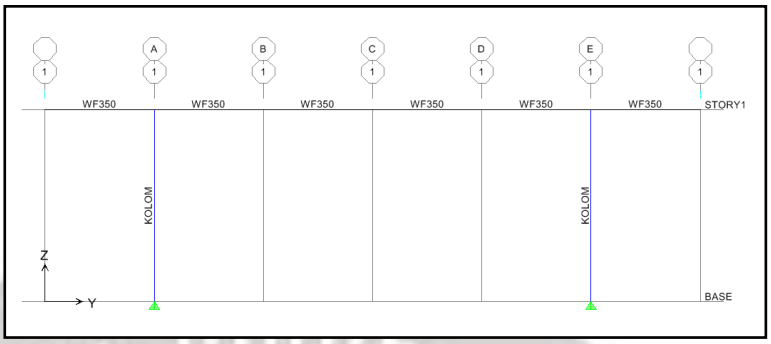
Gambar 47. Menentukan fungsi beban dinamik

7. Menentukan beban riwayat waktu



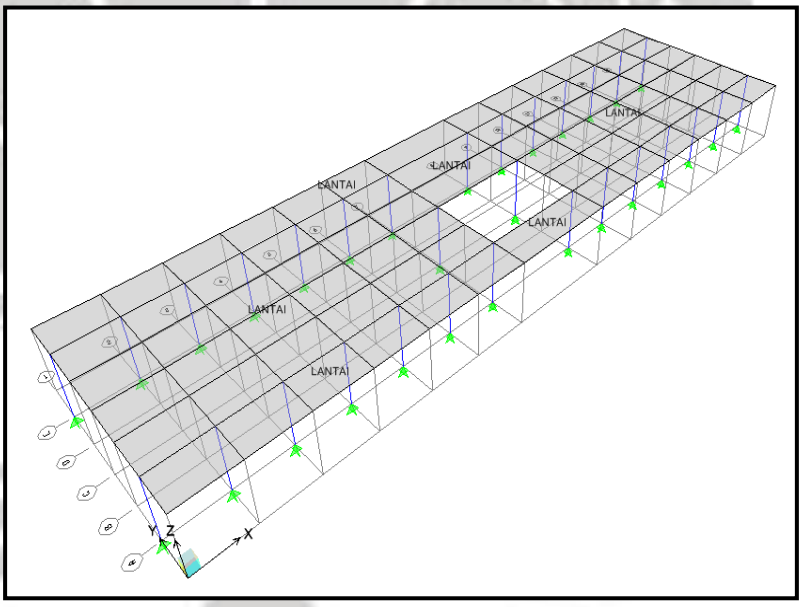
Gambar 48. Menentukan beban dinamik

8. Menggambar elemen batang



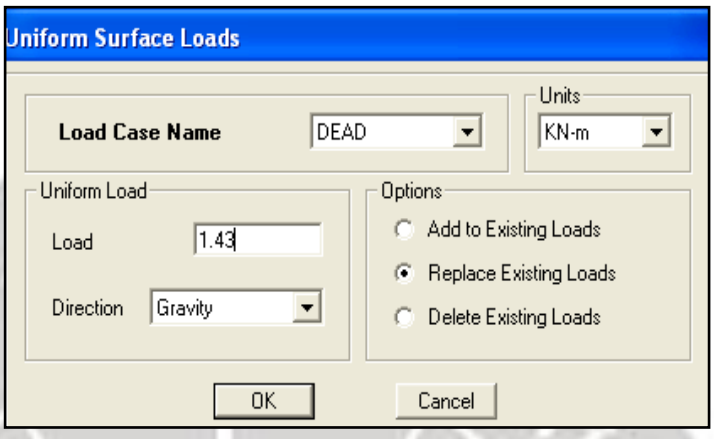
Gambar 49. Menggambar properti batang

9. Menggambar pelat lantai



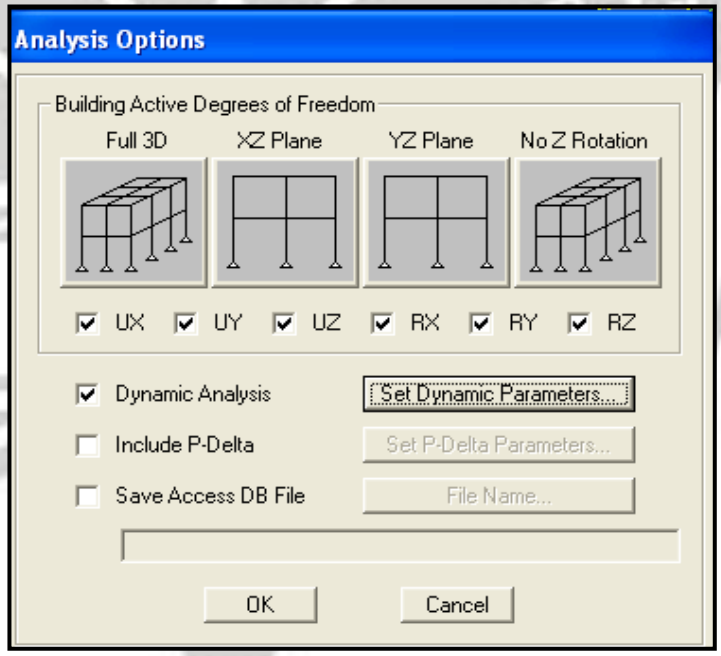
Gambar 50. Pelat lantai

10. Pembebanan



Gambar 51. Menentukan beban pelat lantai

11. Analisis



Gambar 52. Pilihan analisis