Concrete Design with SCIA Engineer
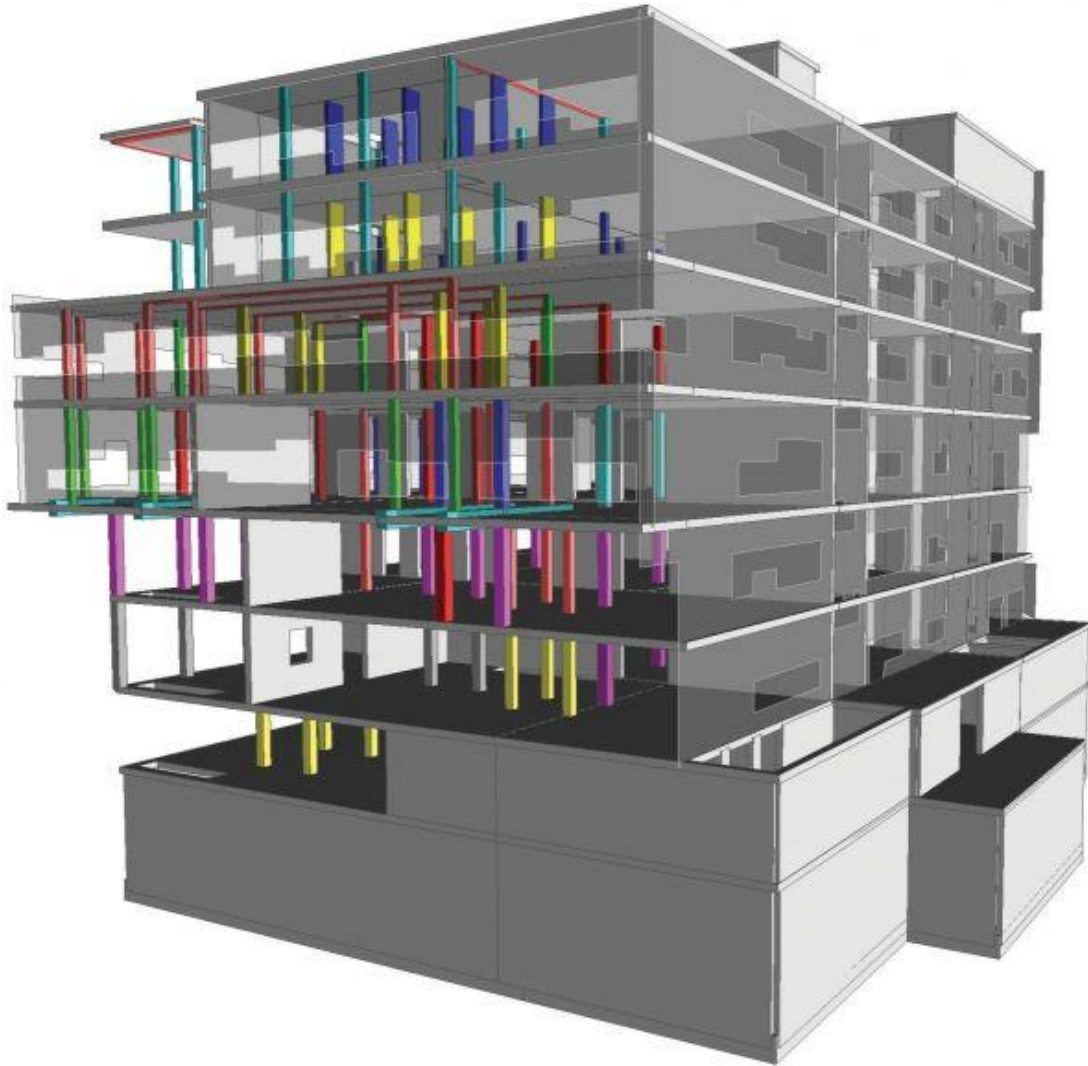
Process for calculation

1. New > Select New Project > Analysis > OK

2. Project data > Basic data > Material (Concrete)

    > Functionality > Dynamics > Seismic

    > Stability

    > Subsoil (Soil Interaction, Pad foundation check)

    > Property modifiers

    > Structural model

3. Setup > Mesh

4. Setup > Solver

5. Setup > Concrete solver

6. Main > Structure > Modelling/Drawing > Import DWG, DXF, VRML97 or

    Main > Line grid and storeys > 3D Line grid or File > Import > IFC 2x3

7. Storeys

8. Cross-sections

9. Main > Structure > 1D member

    > 2D member

10. Connect Members/nodes

11. Layers (Για όλες τις διατομές και πλάκες ανά όροφο)

12. Main > Structure > Model data > Section on beam

13. Connect Members/nodes

14. Main > Structure > Model data > Support > surface (el. foundation)

15. Main > Structure > Model data > Property Modifiers 1D (0.5)

    For 1D members below ground (0 <) change ''Mass factor'' to 0*.

16. Main > Structure > Model data > Property Modifiers 2D (0.5)

    For 2D members below ground (0<) change ''Mass factor'' to 0*.

* ''Mass factor'' has to be zero (0) because foundations and basements have no movement

    because according to codes they are non-sway members.

17. Connect Members/nodes

18. Check structure data

19. Main > Load Cases (Selfweight, Dead, Dead-Partitions, Dead-Roof, Live)

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20. Main > Load Groups (Permanent, Dead-Partitions, Dead-Roof, Variable)

21. Main > Loads > Dead > Surface load > on 2D member

    > Live > Surface load > on 2D member

    > Dead-Partitions > Line force > on 2D member edge

22. Mesh generation

23. Main > Dynamics > Mass groups (Selfweight, Dead, Live)

24. Main > Dynamics > Combination of mass groups (Add All > OK)

    > For ''Dead'' and ''Live'' loads below surface (also with ground floor) are NOT added to the ''Combination of mass groups'' because masses bellow ground surface are NOT calculated.

    > For ''Live'' loads for seismic combination above ground (0+) > Used Coeff. = 0.3 (Auto)

    > Code: $\Psi_{Ei} = \varphi \times \psi_{2i} = 0.3$ (Residential $\varphi = 1$, $\psi_2 = 0.3$) - Table A1.1 + A1.2(B) (CYS)

25. Libraries > Loads > Seismic spectrums

    > Period

    > Eurocode

    > Code parameters > AgR*γi, q factor, Subsoil, Spectrum (Type 1), Direction.

26. Main > Load Groups (Together, Seismic)

27. Main > Load Cases (Seismic > Dynamic > Seismicity > CQC)

    > Seismic X => X=1, Y=0, Z=0

    > Seismic Y => X=0, Y=1, Z=0

28. Main > Combinations (ULS B, ULS C, SLS, Seismic X (0.3Y), Seismic Y (0.3X)).
    At ''Seismic'' Combinations do NOT add ground floor or basement ''Dead'' or ''Live'' loads.

29. Main > Stability combinations (Selfweight, Dead, Live)

30. Main > Result classes > TOTAL (ULS, Seismicity)

    > DYN (Seismicity)

    > GEO (ULS Set B, ULS Set C)

    > SERV (SLS-Char, SLS-Quasi)

31. Calculation > Modal

32. Main > Results (Modal Participation factors Wxi, Wyi, Wzi_R >= 0.90)

33. Main > Load Cases (Predominant mode >Automatic > Mode shape for Wxi, Wyi)

34. Calculation > Test of input data (Δημιουργεί τις σωστές μάζες ανά μέλος που έχει Line force) Το ίδιο γίνεται και με το ''Mesh generation''.

35. Calculation > Batch analysis (Linear, Modal, Stability)

        Solver setup > [Use IRS in case of 2 storeys or more](#)

36. Main > Results

37. View > New animation window > Play

38. Calculation > Batch analysis (Linear, Modal, Stability)

39. Main > Concrete > Design defaults

40. Main > Concrete > 1D member

                      > Member buckling data

                      > Concrete slenderness

41. Main > Results > Beams > Internal forces on beam

    If beams are Ribs > Properties > Rib/Integration strip (√)

42. Main > Results > 2D member

43. Main > Results > 2D member > Integration strip (Strip foundation)

44. Main > Concrete Advanced > 2D member > Member design > Member design ULS

                             > Properties > Use scale isolines

45. Main > Concrete > 1D member Member check

                > Check of non-prestressed concrete

                > Overall check

                > Check response

                > Check capacity

                > Check deflection

46. Main > Concrete > 1D member > Member design - Design

47. Main > Concrete > 1D member > AMRD > Member design - Design

                            > Reinforcement design or

                            > Redes (without As)

48. Main > Concrete > 2D member > Reinforcement 2D

49. Engineering Report for concrete results

Για την γεωμετρία θα χρειαστεί να ενεργοποιήσετε:

- Snap mode   🖱️   ή   **Snap mode**

- View > Set view parameters > Set view parameters for all

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Ακόμη και αν εισάγατε αρχείο CAD στον κάνναβο σας προτιμότερο θα ήταν να δημιουργήσετε και κάνναβο ''3D line grid''.

Concrete foundation

50. Remove supports

51. Main > Structure > 2D member (Wall=Shell, Slab=Plate)

52. Main > Structure > Model data > Support > surface (el. foundation)

53. Main > Structure > Model data > Property Modifiers 1D (0.5)
    For 1D members below ground (0 <) change ''Mass factor'' to 0*.

54. Main > Structure > Model data > Property Modifiers 2D (0.5)

    For 2D members below ground (0<) change ''Mass factor'' to 0*.

  * ''Mass factor'' has to be zero (0) because foundations and basements have no movement

    because according to codes they are non-sway members.

55. Libraries > Load > Seismic spectrums (q-factor for concrete)

56. Connect Members/nodes

57. Check structure data

58. Analysis > Batch analysis (Linear, Modal, Stability)

59. Main > Results > Beams > Internal forces on beam
                              > Properties > Rib/Integration strip (√)

60. Main > Results > 2D member

61. Main > Results > 2D member > Integration strip (Strip foundation)

62. Main > Concrete > 2D member > Member design > Member design ULS
                                        Properties > Use scale isolines

63. Main > Concrete > 2D member > Reinforcement 2D

64. Connect Members/nodes

65. Check structure data

66. Analysis > Test of input data

67. Analysis > Batch analysis (Linear, Modal, Stability)

68. Main > Results

69. Engineering Report for steel results

70. Engineering Report for concrete results

Για την γεωμετρία θα χρειαστεί να ενεργοποιήσετε:
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- View > Set view parameters > Set view parameters for all

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