Course Title: **Hands-on Training for Using CSi software: ETABS, SAFE and SAP2000 for ABCDEFG Consultants Pte Ltd**

Duration: **4 Days**

Synopsis: This comprehensive 4-days hands-on training gives a complete overview of how to use the CSi software for analysis, design and detailing of building structure (RC and Steel). The course will cover static and dynamic analysis of structure subject to gravity, wind, seismic loadings. Advanced analysis features like Sequential Construction, Second-order Analysis, Modeling with imperfection, and Cracked analysis option will also be discussed and demonstrated. All design of Steel and RC framing will be done according to Eurocode 2 and 3 with Singapore National Annex. Seismic analysis will be based on Eurocode 8.

Training Schedule:

Morning Session: 9:00am-1:00pm

Afternoon Session: 2:00pm-6:00pm

Day – 1:

RC Building Analysis and Design with ETABS2015

Time	Event
9:00 AM	1. Understanding and using ETABS's GUI and framing FE objects to create a building model a. Defining frame sections, slab sections and wall sections. b. Import geometry/grids from DXF c. Multiple towers modeling
10:00 AM	2. Overview of FE objects for modeling a 3D FE building model. a. Element forces b. Shell stresses and forces c. Support restraints and links d. Meshing and line constraints
11:30 AM	3. Modelling a 3D RC building a. Static Load Analysis b. Modeling for cracked sections properties c. Modeling RC joints with Rigid Zone and End length offset d. Modeling floor with Virtual membrane and Structural shell
1:00 PM	LUNCH BREAK
2:00 PM	3. Modelling a 3D RC building (Continuation) e. Modal Analysis f. Second order analysis g. Buckling analysis h. Sequential Construction Analysis for Transfer System i. Time dependent material properties j. Modeling for imperfections k. Optimization with Virtual Work Diagram.
4:30 PM	4. Design and detailing for RC frames and walls with EC2. a. Reviewing element forces b. Reviewing Pier and Spandrel forces c. Review RC detailing
6:00 PM	END OF DAY 1 PROGRAM

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Morning Session: 9:00am-1:00pm

Afternoon Session: 2:00pm-6:00pm

Day – 2:

Steel Building Analysis and Design and Seismic Analysis with ETABS2015

Time	Event
9:00 AM	1. Modeling of typical steel building a. Modeling of Steel joints with Panel zone b. Modeling deck sections c. Simplified P-delta analysis d. Designing frame with Auto-selection list e. Designing steel framing and composite beam
11:00 AM	2. Overview of Structure Dynamic a. Dynamic properties of structures b. Effects of Resonance c. Effects of Damping d. Dynamic footfall analysis
1:00 PM	LUNCH BREAK
2:00 PM	3. Seismic analysis of an RC building with EC8 a. Structural Dynamic Overview b. Different types of seismic loadings i. Equivalent Lateral Forces Method ii. Response Spectrum Analysis iii. Response(Time) History Analysis (Introduction) c. Modeling a 20-storey high-rise RC building considering seismic effects i. Mass definition ii. Check mode shapes and fundamental periods iii. Checking base and storey shears iv. RC frames and walls design with EC8 v. Drift checks
6:00 PM	END OF DAY 2 PROGRAM

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Training Schedule:

Morning Session: 9:00am-1:00pm

Afternoon Session: 2:00pm-6:00pm

Day – 3:

RC Floor Analysis and Design with SAFE2014

Time	Event
9:00 AM	1. SAFE GUI overview a. Design strips b. Review of slab stresses c. Meshing of slabs d. Modeling of supports columns and walls
10:00 AM	2. Modeling of Floor systems a. Beam-Slab floor b. Flat slab/plate with and without drop panel c. PT-slab d. Slab edge release e. Punching shear check and shear reinforcement design
1:00 PM	LUNCH BREAK
2:00 PM	3. Modeling of foundation a. Raft on grade b. Raft on piles
3:00 PM	4. Nonlinear analysis a. Cracked b. Cracked and Long-term effects c. Allow Uplift
4:30 PM	5. Analysis, Design and Detailing of floor system
6:00 PM	END OF DAY 3 PROGRAM

Day – 4:

Structural Analysis and Design with SAP2000 v18

Time	Event
9:00 AM	1. Understanding and using SAP2000's GUI
10:00 AM	2. Overview of SAP2000's FE objects a. Line - Frame b. Area - Membrane/Plate/Shell c. Solid
11:30 AM	3. Advanced analysis with SAP2000 a. Section-cut to obtained shell's design forces b. Stage Construct Analysis c. Joint Pattern Loading d. Moving loads and influence lines e. Buckling analysis of thin shell structure i. Buckling factor for steel design f. Non-linear modeling of pile-spring (Linear-plastic) g. Modeling of cable elements with automatic initial shape generator h. Modeling of PT tendon as force and element
1:00 PM	LUNCH BREAK
2:00 PM	4. Steel frame design with EC3 a. Auto-selection list and design for group b. Displacement Optimization c. Direct Analysis of Steel Structure i. Second order analysis ii. Account for imperfection
3:30 PM	5. Modeling of a combined RC and Steel factory structure
5:00 PM	6. Introduction of dynamic analysis with SAP2000
6:00 PM	END OF DAY 4 PROGRAM