Step by Step Procedure to Add Time Histories to ETABS for Linear Analysis

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Step # 1: Add Time History Function from File

Add 3 Pairs of Time Histories Following the Procedure Outlined in the Figures Below.

Step # 2: Define Linear Time History Cases

Add the three Time History Functions Following the Procedure Outlines in the Figure Below.

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Specify U1 and U2 for Orthogonal Components

Specify Name of the Time History Load Case

Specify"Acceleration"

This should be multiple of Interval Between Data Points in the Function File. It can be equal to "Dt" in text file of the function or integer multiple times "Dt"

Specify Linear Modal

Click To Add Functions Defined in Step # 1. The Two Functions Should Belong To the Same Earthquake

Specify 386.1 assuming that in/sec 2 units are invogue for the model. Change These scale factors later to match minimum codal base shear values.

Specify the Total Number of Steps in the Text File of the Function

Step # 3: Run Time History Load Cases & Re-scale Them To Meet Codal Minimum Requirements

Select SAPFire Options and Run the Load Histories

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Use This Option If The Model Contains Errors. This Option Will Take More Time

Use This Option For Speedy Run, After The Model IS Deemed to be Free of Errors

Display Tables, Compare Base Shear with Equivalent Load Force Method (ELF) Procedure, Readjust Scale Factor of Time History Load Cases if Required. Repeat Analysis. Iterate Until the Base Shear of Time Histories Compare with Base Shear of the Equivalent Load Force Method.

Take Absolute of Min and Max Values of Time History Load Case For Each Direction. Compare This Value With Equivalent Load Force Case. Adjust the Scale Factor For Each Time History Load Case, As and If Required. Note, Scale Factor For Load Cases For U1 and U2 Directions Are Always Identical.
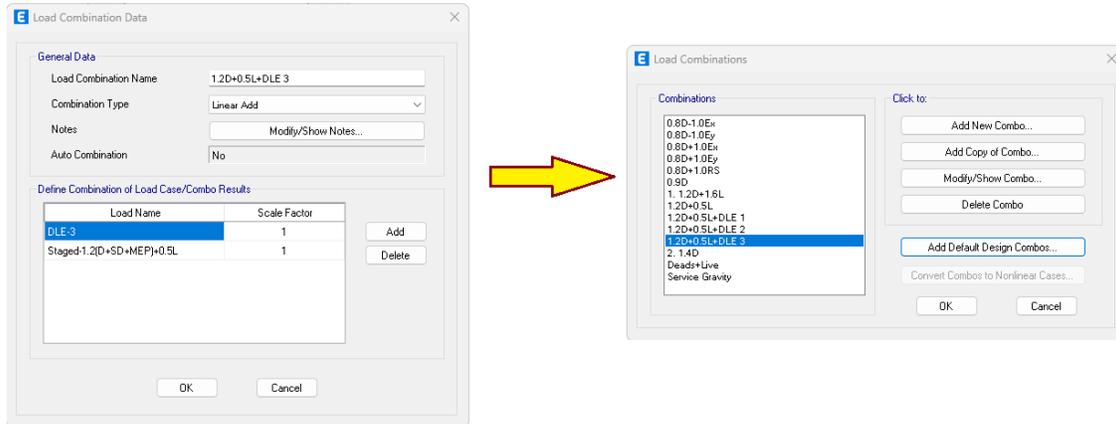
<u>Note:</u> Ensure that the Modal Mass Participation Factor of All Nodes is At Least 90% In Each Direction Before Rescaling of Base Shear.

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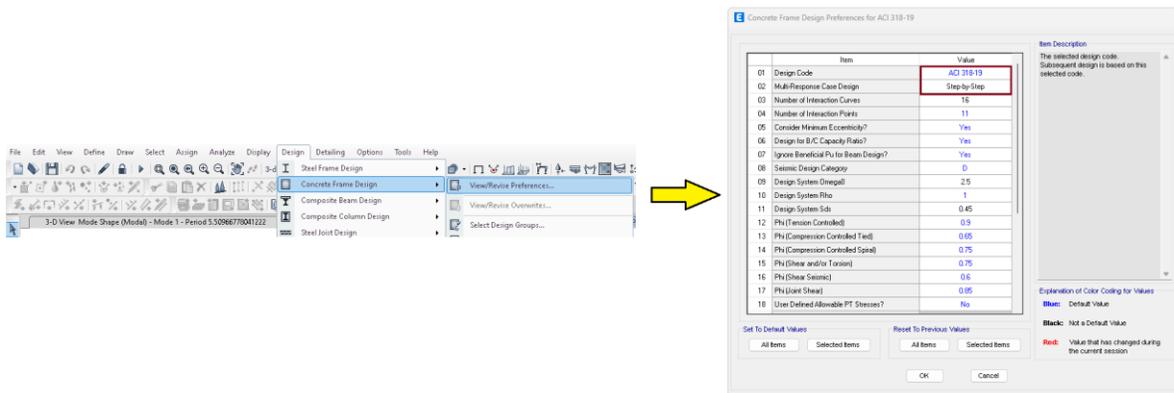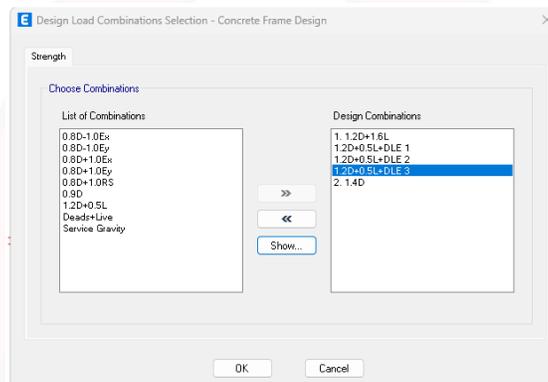
Step # 4: Design

Add Each Time History Load Case to Gravity Load Case Using "Linear Add" Option.

Add the Time History Combinations to Design Combinations

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Run The Concrete Design Module

Notes:

1. Modeling of raft along on area springs with super-structure might require substantial space on your hard drive. The storage requirements of the model will decrease substantially if the superstructure is modelled on fix supports.

2. Getting the following message simple means that the code expected a zero value at the start of the time histories. At least some of the values in the time histories are non-zero, which are ignored.
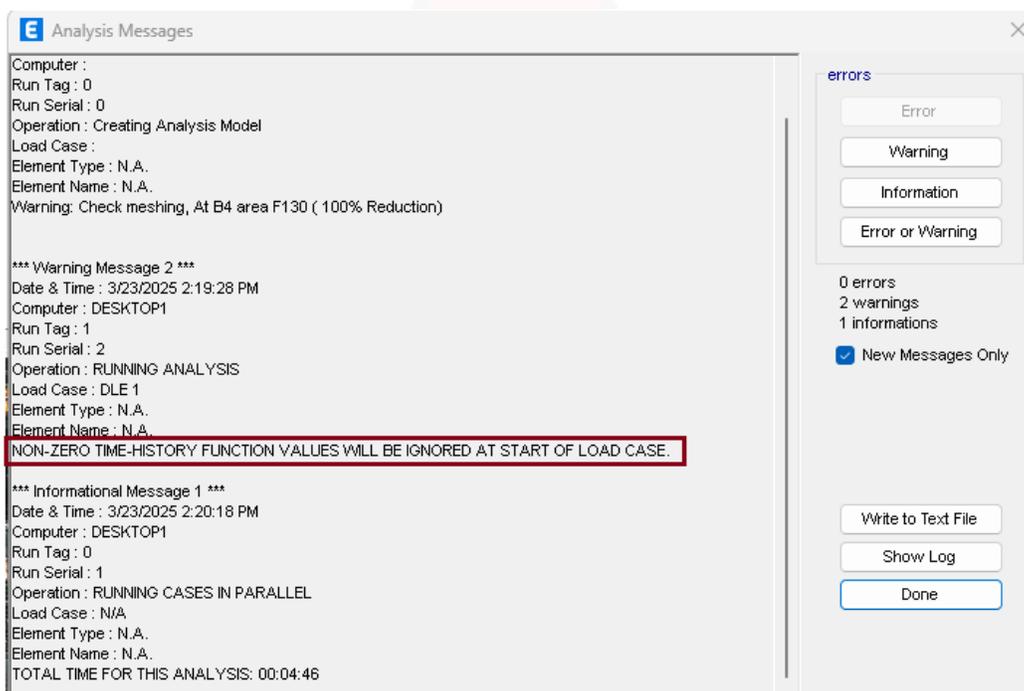
3. The analysis, design and display of base shears can take upto 30 minutes, which is normal. A better system (especially SSDS) can reduce this time substantially.

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