**24\_Defining materials**

First thing while working with any element is to have its material properties known.

For example here we are working on concrete and steel elements. These two materials are most commonly used. And we need to define their properties. To do this click on define menu and then material properties or just click on this shortcut.

Here you will see predefined material you can edit or delete them or add new materials. Let's add a 50mpa strength concrete. We will be putting concrete strength as 50 n/mm2 so it is important to change units to n-mm. In ETABS 2013, ETABS 2015 and from safe 12 you can choose custom units for different items and there is no need to change units each time as we are doing here in ETABS 9.

Anyway, click on add material and we will see more details about this material. Enter here the name of the material.

Select concrete as type of design.

Type of material is isotropic.

Here we will put concrete strength as 50mpa

And long reinforcement yield strength as 420 mpa

This is for shear reinforcement yield strength. We will keep it same as 420

This was all for design purposes.

For analysis we must edit these parameters.

Most important of which is modulus. Here we will put e = 4700 under the root f'c that is 4700 under the root 50 which gives 33200mpa approx.

Second most important thing is to input wt per unit volume so that ETABS can calculate self weight of the structure. We have assumed normal weight concrete of 24 kn/m³ and to input 24 in this field we must click ok and go back to main screen and change the units to kn-m.

Now we can put 24 in weight per unit volume field. Mass is important in dynamic analysis. Here we can put mass equal to 24 divided by 9.81. We can put this directly in this field to give the final value equal to 2.446. Press ok.

Now we have defined c50 concrete.

Structural steel can also be defined in the same fashion.

There are some limitations on upper and lower limits of material strength. You can find this in ETABS help.