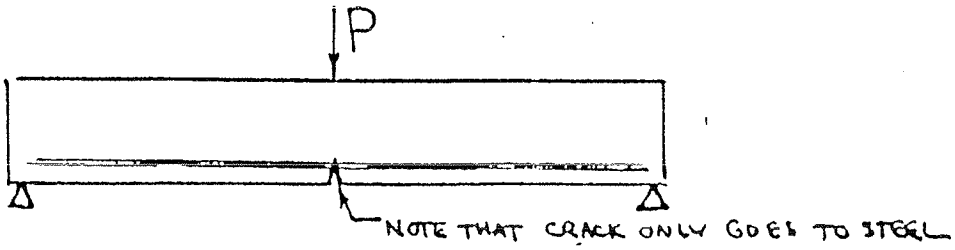

fig. 3-4

If the design load P is increased beyond the designed capacity of the beam the steel will start to stretch (just like a rubber band). The crack will extend past the steel to the compressive zone.

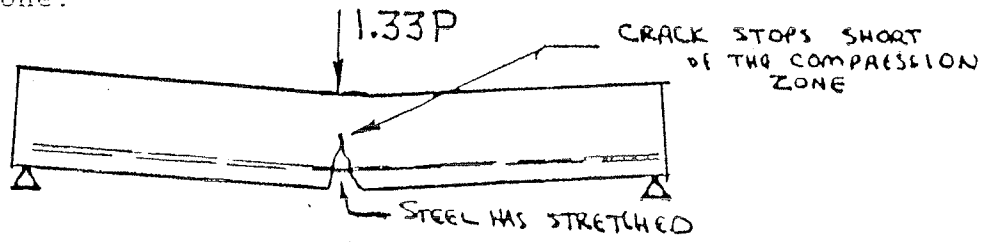

fig 3-5

If the yield strength of the steel has not been reached, then the beam will go back to its original shape after the load is removed. The crack will close up so that it is almost invisible.

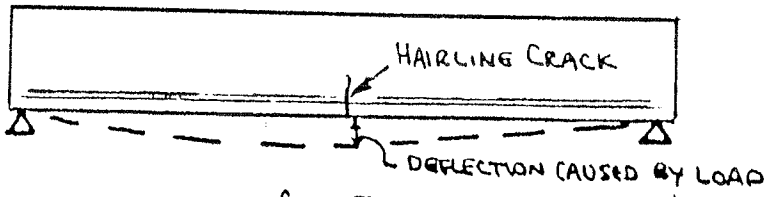

fig 3-6

If the yield strength of the steel has been exceeded then the beam will remain permanently deflected and be considered unusable.

The important point to remember from this discussion is that the beam has not failed once a crack has appeared. Cracks must appear before the steel will start to do its job. The cracks do not pass all the way through the beam but under the design load will only extend to the steel.