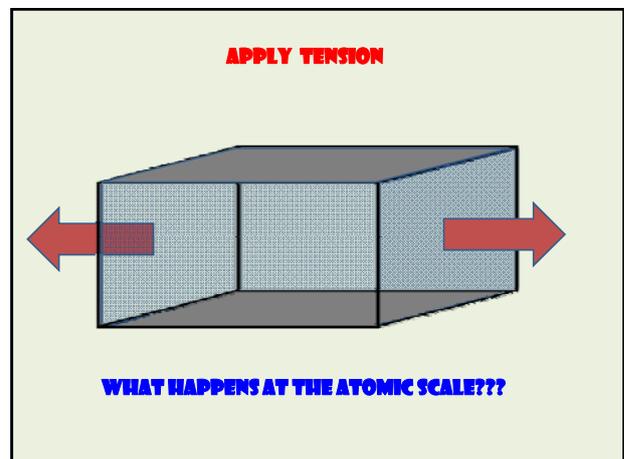
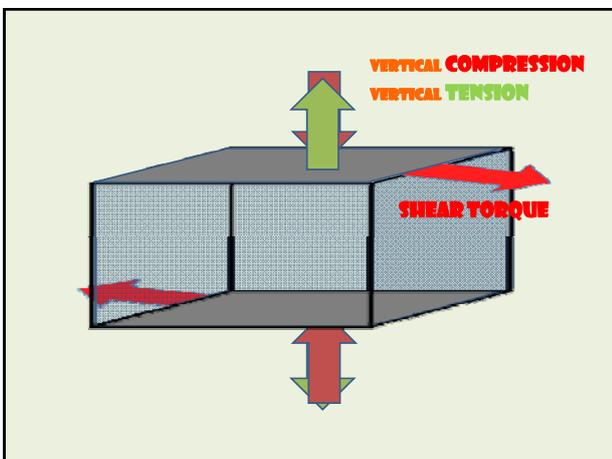


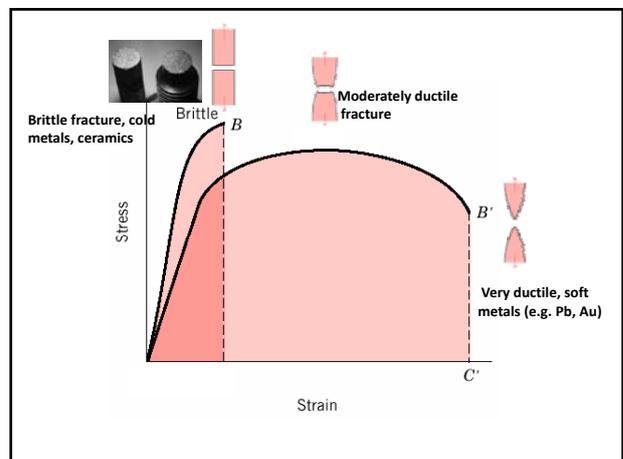
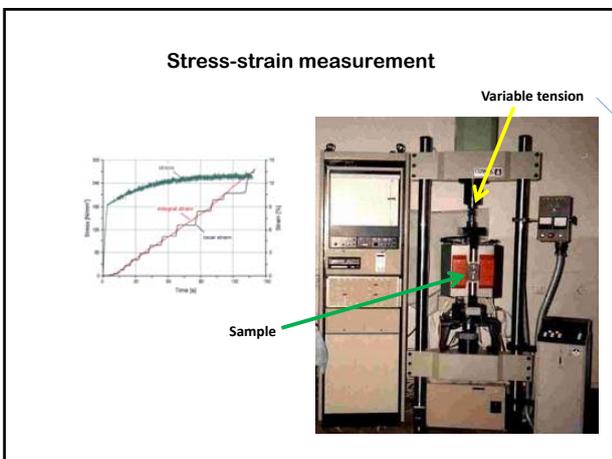
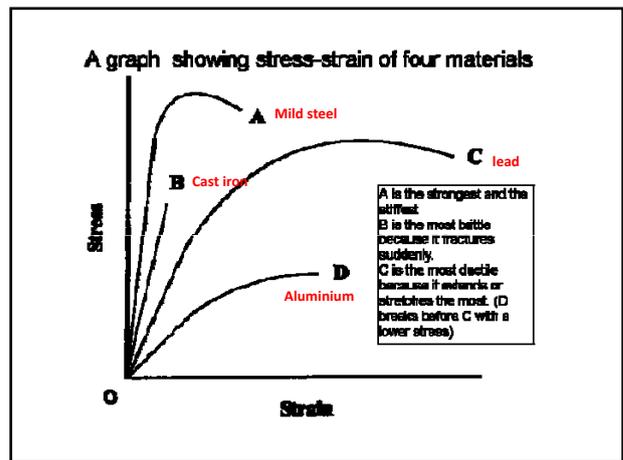
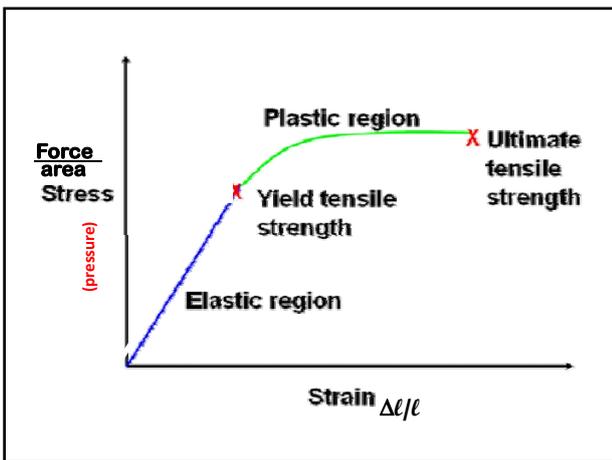
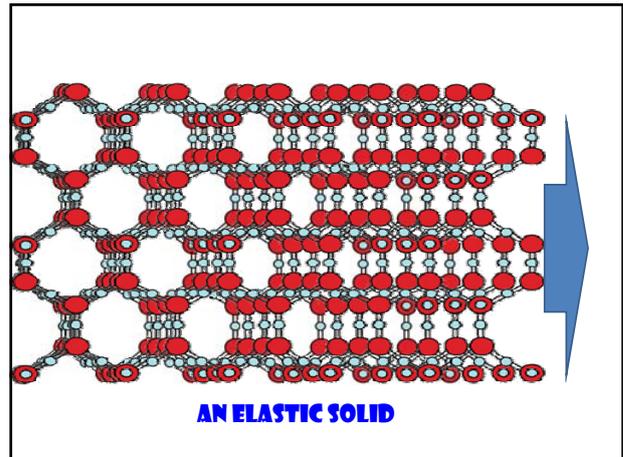
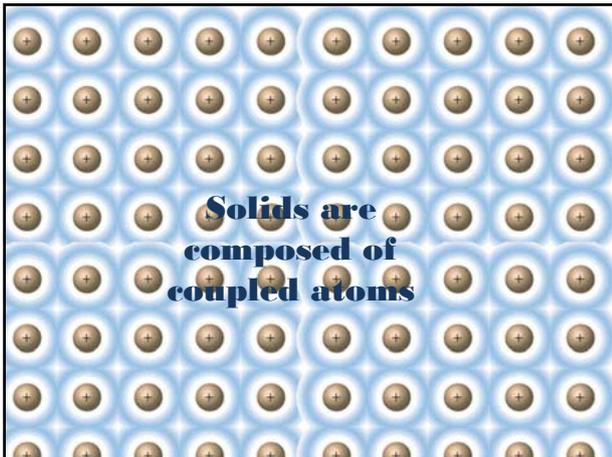


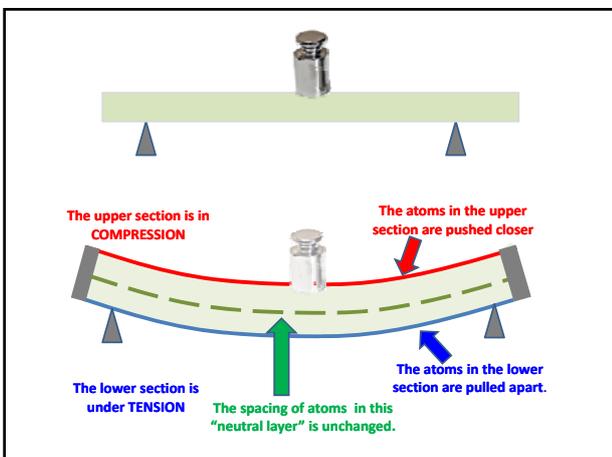
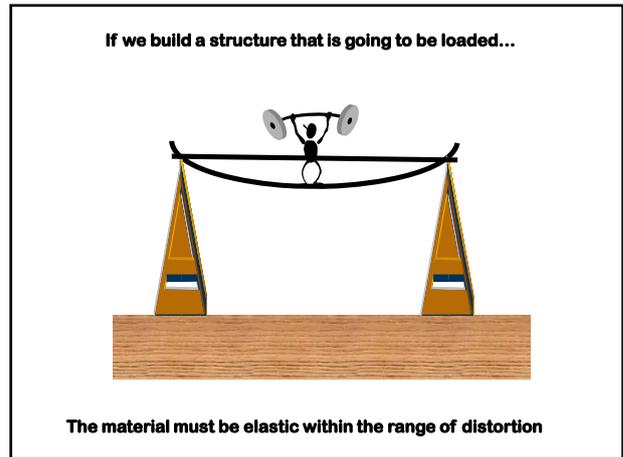
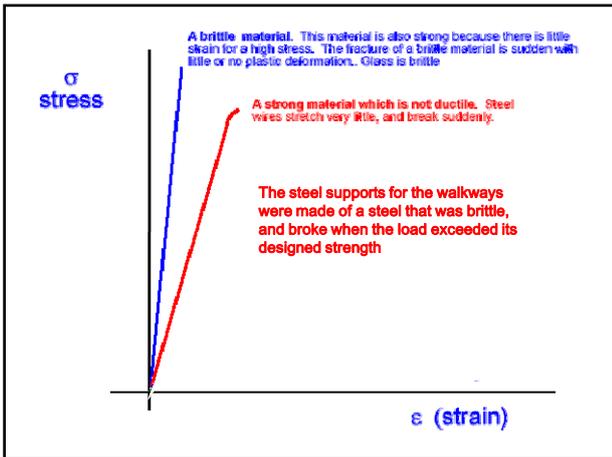
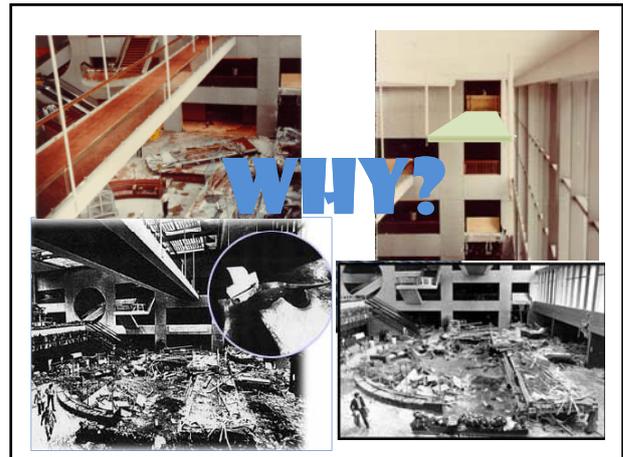
*What material should we use.... Bridge? Ship? Opera house?*

	straw	wood	stone	steel
<i>Strength:</i> Tension	👍	👍	👍	👍
Compression	👍	👍	👍	👍
Bending	👍	👍	👍	👍
<i>Elasticity:</i> Does it return to initial state?	👍	👍	👍	👍
<i>durability:</i>	👍	👍	👍	👍

*How do we determine the properties of the materials?*







### The Tacoma Narrows Bridge

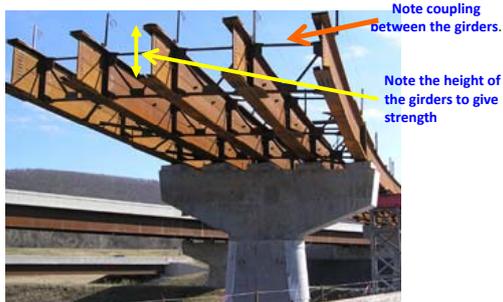


LOOKS GREAT...DOESN'T IT???

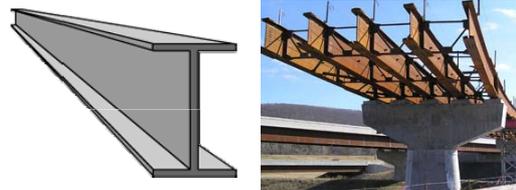
### NOW THERE ARE TWO OF THEM!



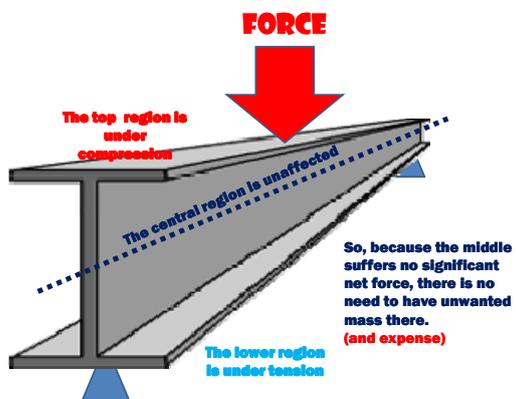
Let's look at the type of load-bearing beams that are used in a typical bridge.



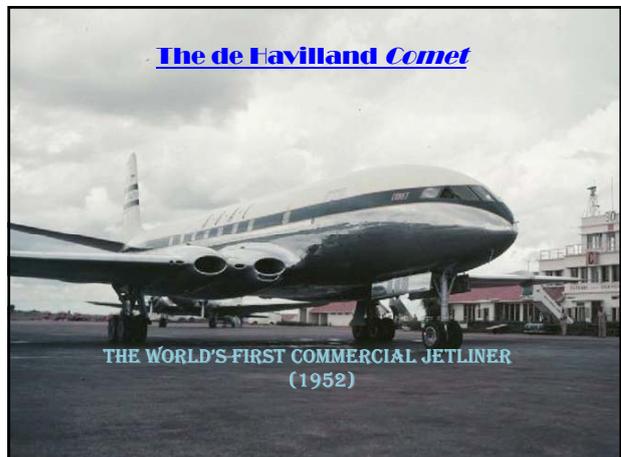
Did you notice.....  
the cross section shape of the girders?



Why aren't they solid rectangular in cross section?



### The de Havilland Comet

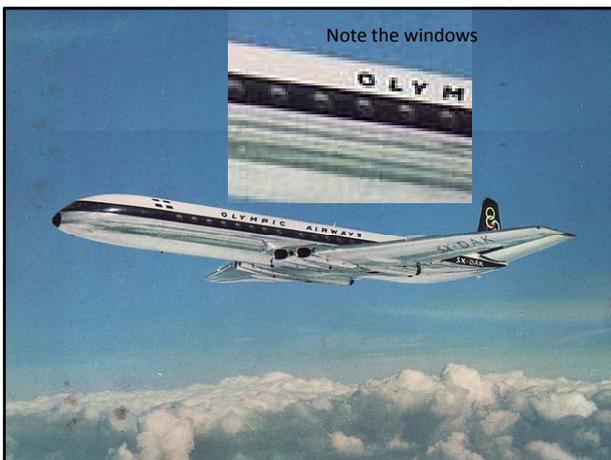


1952  
 Comment on pressurization ,  
 1<sup>st</sup> commercial jetliner  
 3 Broke up in flight in the 1<sup>st</sup> year of commercial flight. **video**  
 What was the cause?.....mention structure of materials

The failure was a result of **metal fatigue** caused by the repeated **pressurisation and de-pressurisation** of the aircraft cabin.

Also, the supports around the windows were punch-riveted which may have caused the start of fatigue cracks around the rivet. Unlike drill riveting, the imperfect nature of the hole created by punch riveting caused manufacturing defect cracks which may have caused the start of fatigue cracks around the rivet. Square corners provided centres for stress.  
**Ask what shape are Plane windows**

Again we have a situation where continual stress and relaxation leads to metal fatigue.



**SUMMARY**

All solids under stress have successively regions of

- . elasticity,
- . plasticity
- . rupture.

The characteristics of solids can be determined experimentally.

Materials must be chosen to be suitable for the project.

Continual cycling of a solid can produce metal fatigue