

 **Solution: Use Principle of Virtual Work**

- In an energy-conserving system (i.e., elastic materials), the energy stored in a body due to the quasi-static (i.e., slow) action of surface and body forces is equal to the work done by these forces ...
- Implication: if we can formulate **stored energy** as a function of the deformation of a mechanical object, then we can determine how an object responds to a force by determining the shape the object must take in order to **minimize the difference  $U$**  between the stored energy and the work done by the forces:

$$U = \text{Stored Energy} - \text{Work Done}$$

- Key idea: we don't have to reach  $U = 0$  to produce a very useful, approximate *analytical* result for load-deflection

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