

## *Rib-shortening in the case of arches.*

In a two hinged arch, the normal thrust which is a compressive force along the axis of the arch will shorten the rib of the arch.

This in turn will release part of the horizontal thrust.

Normally, this effect is not considered in the analysis (in the case of two hinged arches). Depending upon the importance of the work we can either take into account or omit the effect of rib shortening.

This will be done by considering (or omitting) strain energy due to axial compression along with the strain energy due to bending in evaluating  $H$ .

## Temperature effect

- \* Consider an unloaded two-hinged arch of span  $L$ .
- \* When the arch undergoes a uniform temperature change of  $T$  °C, then its span would increase by  $\alpha L T$  if it were allowed to expand freely.
- \*  $\alpha$  is the co-efficient of thermal expansion of the arch material.
- \* Since the arch is restrained from the horizontal movement, a horizontal force is induced at the support as the temperature is increased.

