

Thermal Loads in Bars

It can be shown that a uniform temperature change, ΔT , in a bar causes an additional load source of

$$\{C_{AT}\}^e = EA\alpha\Delta T \int_L^e \frac{d(\frac{1}{2}x)}{dx} dx$$

For the two, three, & four node bars

$$\{C^e\}_{\Delta T} = EA\alpha\Delta T \begin{Bmatrix} -1 \\ 1 \end{Bmatrix}$$

$$\{C^e\}_{\Delta T} = EA\alpha\Delta T \begin{Bmatrix} -1 \\ 0 \\ 1 \end{Bmatrix}$$

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