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EXAMPLE AND SUMMARY

A short summary about the conductive heat transfer and solving the same exercise with L=0.4 m, A=20 m², ∆T=25 and k=0.78 W/m K using both simple method and using resistance concept.

METHOD 1

$$\therefore \dot{Q} = kA \frac{\Delta T}{L}$$

$$\therefore \dot{Q} = 0.78 * 20 \left(\frac{25}{0.4}\right)$$

$$\therefore \dot{Q} = 975\, W$$

METHOD 2

$$\therefore R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.02564 \frac{℃}{W}$$

$$\therefore \dot{Q} = \frac{\Delta T}{R_{wall}} = \frac{25}{0.02564} = 975.03\, W$$

Short summary about the conductive heat transfer:

Conductive heat transfer is a conversation of any kind of energy through direct interaction between particles of a substances containing temperature difference. It usually occurs in solids, liquids and gases. Heat transfer through the wall of any building can be studied as stable and one dimensional.

According to the Fourier’s law of heat conduction, the rate of heat conduction through a plane wall is…...

1. Directly proportional to the average thermal conductivity (willingness of material to transfer heat), area of the wall and the temperature difference.
2. But, inversely proportional to thickness of the wall means the thicker the wall, the less heat gets transferred and vice versa.