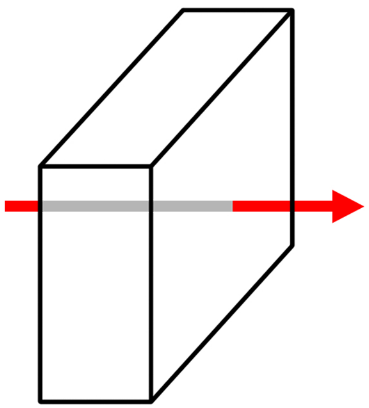
WEEK 01

Technical Environmental Systems Weekly Submissions

A short summary about the conductive heat transfer and solving the same exercise with L= 0.4 m, A= 20 m^2, DeltaT= 25, and K=0.78 W/mK using both simple method and using the resistance concept.



A=20m^2
L=0.4m
ΔT=25°C
K = 0.78 W/mK

- The heat transfer through the wall can be simulated as steady and one-dimensional. The temperature of the wall in this case depends on one direction and can be expressed as T(x). x→T(x) is a linear function.
  In the steady operation, the rate of heat transfer through the wall is constant.

Simple Method

$$Q = KA\frac{\Delta T}{L}$$

$$= 0.78W/mK \times 20m^2 \times \frac{25K}{0.4m}$$

$$= 975\ W$$

Resistance Concept

$$R = \frac{L}{KA}$$

$$= \frac{0.4m}{0.78W/mK \times 20m^2}$$

$$= 0.0256\ K/W$$

$$Q = \frac{\Delta T}{R}$$

$$= \frac{25K}{0.0256\ K/W}$$

$$\approx 975\ W$$