

$$S_o = \frac{e_o}{e_w}$$

$$e_o = S_o \times e_w = 0.7 \times 1000 = 700$$

$$P_{\text{friction}} = \frac{700 \times 9.81 \times 500 \times 10^{-3} \times 163.23}{1000}$$

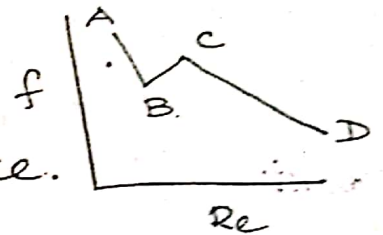
$$= 560.45 \text{ kW}$$

Team 2

Friction Factors (f)

It is a dimensional less term. It depends upon following parameters

- (i) Reynold's number
- (ii) Relative roughness of pipe surface.



For laminar flow

$$f = \frac{64}{Re}$$

For turbulent flow,

$$f = \frac{0.316}{(Re)^{\frac{1}{4}}}$$

$$f = \frac{4f'}{Re}$$

Coefficient of Friction: (f')

Function of Reynolds number.

$$(f') = \frac{16}{Re}$$

$$f = \frac{0.079}{(Re)^{\frac{1}{4}}}$$

Moody's Diagram:

Moody diagram developed by Prof. Lewis. F. Moody, shows the variation of friction factor f with the governing parameters, viz. the Reynolds number of flow and the relative roughness $(\frac{\epsilon}{D})$; where ϵ - absolute/average roughness and D - diameter of pipe.

Used to determine friction factor for commercial pipes.

→ Please go to page.no. 17.