

-: ASSIGNMENT :-

-: Name :-

M. Arsalan

-: ID :-

14506

-: Subject :-

Highway and transportation

-: Department :-

B-Tech Civil

Q Calculate the actual length of the Runway from the following data.

⇒ Airport elevation : R.L = 100

⇒ Airport reference temperature : 30°C

⇒ Basic length of runway : 800m

⇒ Highest point along the length : R.L = 98.2

⇒ Lowest point along the length : R.L = 95.2

Solution :-

∴ Correction of elevation :-

The basic length is to be increased at the rate of 7% per 300m elevation above mean See-level.

$$\therefore \text{Correction for elevation} = 800 \times \frac{7}{100} \times \frac{100}{300} = 18\text{m}$$

$$\left. \begin{array}{l} \text{length of runway after} \\ \text{Correction for elevation} \end{array} \right\} = (800 + 18) = 818\text{m}$$

∴ Correction for temperature ∴

$$\left. \begin{array}{l} \text{Standard atmospheric} \\ \text{temperature at mean sea-level} \end{array} \right\} = 15^{\circ}\text{C}.$$

Taking the temperature gradient as equal to 6.5°C per 1000m rise in elevation, the standard temperature at the airport site will be:

$$\text{Temperature at R.L., 100} = 15 - \left[6.5 \times \frac{100}{1000} \right] = 14.3^{\circ}\text{C}$$

$$\left. \begin{array}{l} \text{Difference between airport} \\ \text{reference temperature and} \\ \text{standard atmospheric temperature} \end{array} \right\} = (30 - 14.35) = 15.65^{\circ}\text{C}$$

Applying Correction at the rate of 1% for every 1°C .

$$\begin{aligned} \text{Correction for temperature} &= \left[\frac{1}{100} \times 818 \right] \times 15.65 \\ &= 128.017 \text{ Say } 128\text{m} \end{aligned}$$

$$\text{Corrected runway length} = (818 + 128) = 946 \text{ m}$$

$$\text{effective gradient} = \frac{\text{R.L } 98.2 - \text{R.L } 95.2}{800}$$

$$= \frac{3}{800} \text{ or } 0.003$$

Applying Correction for the effective gradient at the rate of 20% for each 1% effective gradient:

$$\text{Correction for gradient} = \left[\frac{20}{100} \times 946 \right] \times \frac{0.003}{1}$$

$$= 0.56$$

$$\text{Actual length of runway} = (946 + 0.56)$$

$$946.56 \text{ m} \dots \text{Ans}$$

-i-checki-

$$\left. \begin{array}{l} \text{Total Correction for} \\ \text{elevation and temperature} \end{array} \right\} = (18 + 128) = 146 \text{ m}$$

$$\text{Percentage increase} = \frac{146}{800} \times 100 = \boxed{18.25}$$

According to ICAO, this should not be more than 35% .