

Assignment

Name

Zohaib Khan

ID

14821

Submitted to

Sir Abif

Subject

Highway and transportation
engineering

Q calculate the actual length of the Runway from the following data

⇒ Asfrest elevation : R.L = 100

⇒ Asfrest referance 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 sea level.

$$\therefore \text{Correction for elevation} : 800 \times \frac{7}{100} \times \frac{100}{300} = 1800 \text{ m}$$

$$\begin{aligned} \text{Length of runway after correction for elevation} \\ = (800 + 18) = 818 \text{ m} \end{aligned}$$

Correction for temperature:-

Standard atmosphere temperature
mean sea-level = 15°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.

$$\text{Temperature at R.L. } 100 = 15 - \left(6.5 \times \frac{100}{1000}\right) = 14.35^{\circ}\text{C}$$

Difference between airport reference temperature and standard atmospheric temperature = $(30 - 14.35) = 15.65^{\circ}\text{C}$

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

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

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

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

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

Applying correction for the effective gradient at the rate of 20% for each 1% effective gradient.

$$\text{Correction for gradient} = \left(\frac{20}{100} \times 946 \right) \times \frac{0.003}{1}$$
$$= 0.56$$

$$\text{Actual length of runway} = (946 + 0.56)$$
$$= 946.56 \text{ m Ans.}$$

check:-

Total correction for elevation and

$$\text{Temperature} = (18 + 128) = 146 \text{ m}$$

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

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