

Tutorial Chaining/Taping

1. A 30 m long chain was found to be 15 cm too short after chaining 1500 m and then found to be 30 cm too long after chaining a distance of 3200 m. Find the total distance chained, assuming that the chain was of correct length at the beginning of the work.
2. The slope length measured by a chain between ground points A, B, C and D were found to be $AB = 220$ m, $BC = 260$ m, $CD = 50$ m. If the RLs of these points are $h_a = 268$ m, $h_b = 260$ m, $h_c = 270$ m, calculate the correct horizontal distances of AB, BC, and CD.
3. A steel tape of nominal length 30 m was used to measure a line AB by suspending it between supports. If the measured length was 29.861 m when the slope angle was $3^\circ 45'$ and the mean temperature and the tension applied were respectively 10°C and 100 N, determine the corrected horizontal length. The standard length of the tape was 30.004 m at 20°C and 44.5 N tension. The tape weighed 0.16 N/m and had a cross sectional area of 2 mm^2 . $E = 2 \times 10^5\text{ N/mm}^2$ and $\alpha = 1.12 \times 10^{-5}\text{ per }^\circ\text{C}$.
4. Determine the correct length of a line reduced to the M.S.L. when recorded length with a tape hanging in catenary at a tension of 85 N and at a temperature of 22°C is 30.071 m. The difference between the ends is 0.42 m and the site is 2000 m above M.S.L. The tape had previously been standardized in catenary at a tension of 50 N and at a temperature of 27°C , and the distance between the two ends was 30.035 m. Given that the weight of tape = 7 N, Cross section area = 3.9 mm^2 , Coefficient of expansion (α) = $1.12 \times 10^{-5}\text{ per }^\circ\text{C}$, $E = 2 \times 10^5\text{ N/mm}^2$, Radius of Earth = 6370 km.