

Deck Elevation Program (“DECKELEV”)

Description: DECKELEV (meaning "Deck Elevations") computes bridge deck elevations required for setting concrete deck forms. The user is given the option of having elevations computed at 10 foot intervals along beams or only at the intersections of beams and transverse lines (piers and abutments). Elevations are adjusted to camber for beam deflections.

Theory: Concrete forms must be set to compensate for beam deflections. In practice, a table of "theoretical adjusted grade elevations" is included in the plans for the contractor to use in deck form construction. The elevations are typically calculated at 10 foot intervals "as you walk the beam". Elevations start at significant transverse lines, such as centerlines of bearings at abutments and centerlines of piers, and proceed "upstation" to the next transverse line. In the field, a survey team shoots elevations at each point in the table and fillet heights are computed for setting the forms and are marked at each spot.

The program solves for the intersections of transverse lines and beam lines and computes stations and offsets of each point. The user is asked to input deflections due to the weight of concrete at quarter points along the beam between transverse lines. The program fits a fourth order polynomial through the quarter point deflections;

$$y=c4*X^4 + c3*X^3 + c2*X^2 + c1*X,$$

where "X" is measured along the span between transverse lines and c1 thru c4 are constants.