



www.discoverlivesteam.com

© 1999-2000

JGH Technologies and Discover Live Steam.comDo
not copy or reproduce.

Track Construction Projects

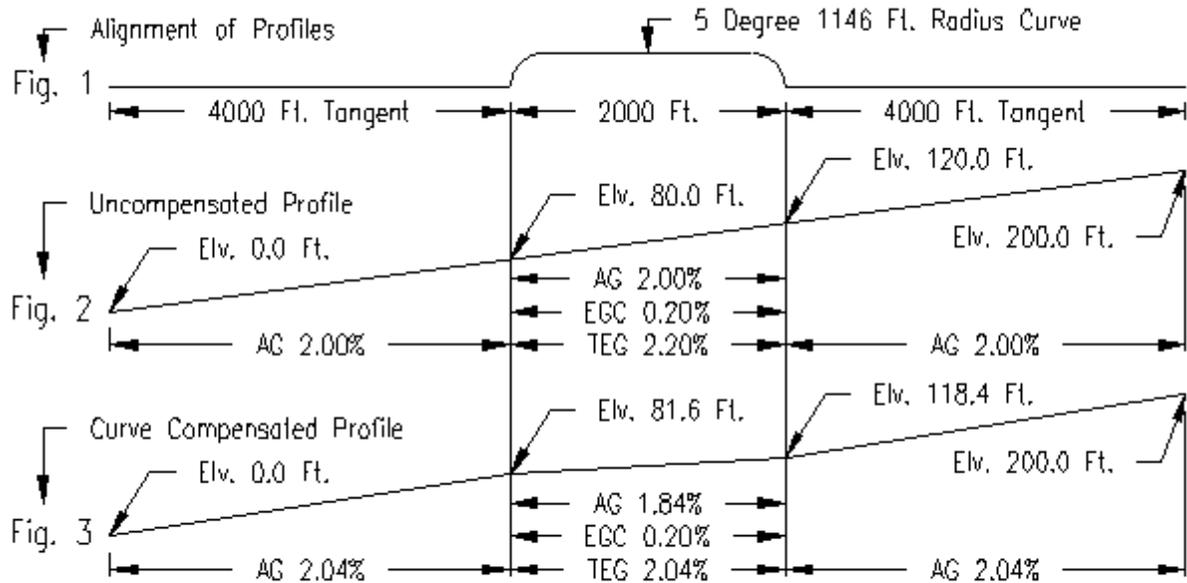
Track Radius Caculations

by [Jeffrey G. Hook](#)

Curve Resistance Compensation

In the United States grade is expressed as footage rise per 100 feet of distance, and instead of radius the sharpness of a curve is expressed as degree of curve based on a 100 foot chord. The fact that both are based on 100 foot distances allows for curve resistance to be easily converted to an equivalent percentage of grade resistance. Curve resistance in full size practice is generally accepted to be 0.8 lbs. per ton of train weight per degree of level curve. From the previously posted formula for grade resistance it will be found that a grade of 0.04% will produce a resistance of 0.8 lbs. per ton, therefore each degree of level curve may be thought of as producing the equivalent resistance of a 0.04 % grade on tangent track.

Fig. 2 illustrates a section of track from Elv. 0.0 to Elv. 200.0 on a constant 2.0% grade with a 5 degree curve in the middle. The combined curve and grade resistance on the curve produces the equivalent resistance of a 2.20% grade on tangent track. Although the curve has the same actual grade as the tangents before and after, the curve is considered the ruling grade for this section of track because it's total resistance (2.20%) will determine the maximum tonnage that a given engine will pull up the section of track between Elv 0.0 and Elv. 200.0.



AG = Actual Grade (Grade Resistance)

EGC = Equivalent Grade of Curve Resistance = 0.04% per Degree of Curve

TEG = Total Effective Grade Resistance on Curve = AG + EGC

Fig. 3 illustrates the principle of curve compensation where the grade of the tangent track before and after the curve is increased in order to decrease the grade of the curve, thereby making the combined curve and grade resistance on the curve equal to the grade resistance on the tangent track. The ruling grade is now 2.04% and comprises the entire section of track between Elv. 0.0 and Elv. 200.0.

[Jeffrey G. Hook](#)
[JGH Technologies](#)

Gauge Compensation for Curves (7 1/2 gauge track)

The following is note Number 6 from D&R track drawing DRTRK2-D which can be viewed at www.jghtech.com/html/drtrk2-d.html (Dimensions in inches.)

The minimum gage of unguarded track may not be less than designated below:

Tangent to 150 foot radius curved track,
 track gage shall not be less than 7 1/2

Curved track less than 150 foot radius,
 track gage shall not be less than 7 9/16

Curved track less than 80 foot radius,
 track gage shall not be less than 7 5/8

Curved track less than 60 foot radius,

track gage shall not be less than $7 \frac{11}{16}$

Curved track less than 45 foot radius,
track gage shall not be less than $7 \frac{3}{4}$

These track gage specifications will accommodate D&R engine 284, a 1.5 inch scale 2-8-4 Berkshire, which has a length of ridged wheel base of 30.4 inches, outside gage of flanges of 7.4375 inches, total lateral motion of 0.0625 inches and all wheels flanged.

Main line curves on the D&R are generally not less than 70 foot radius. One sharp curve in the yard leading to the turntable is around 50 foot radius.

D&R and AREA track drawings also contain the following note: Front and rear trucks must have sufficient swing for radius of curve to operate on gage of track given.

[Jeffrey G. Hook](#)
[JGH Technologies](#)
