Horizontal Curves *Cont.*

The distribution of forces between each of the three individual rolls can be proportioned and defined by the following equations.

$$F_{TI} = \frac{b_{w1}}{BW} \times F_T$$

$$\require{cancel}\xcancel{F_{TI} = \frac{b_{w1}}{BW} \times F_T} \qquad F_{TC} = \frac{B_C}{BW} \text{ x } F_T$$

$$F_{TO} = \frac{b_{w2}}{BW} \times F_T$$

Where b_{w1} is the length of belt in contact with the inside idler wing roll and b_{w2} the length of belt in contact with the outside idler wing roll. b_c is the length of the idler center roll. Resolution of these individual roll applied forces into their normal and parallel components can be accomplished as well.

Normal Forces

$$F_{TNI} = F_{TI} \cdot \sin(\beta + \alpha)$$

$$F_{TNC} = F_{TC} \cdot \sin(\alpha)$$

$$F_{TNO} = F_{TO} \cdot \sin(\beta - \alpha)$$

Parallel Forces

$$F_{TPI} = F_{TI} \cdot \cos(\beta + \alpha)$$

$$F_{TPC} = F_{TC} \cdot \cos(\alpha)$$

$$F_{TPO} = F_{TO} \cdot \cos(\beta - \alpha)$$

Tests and practical experience have shown that the total parallel force is an accurate quantification of the radial force due to tension at the section. The total destabilizing or motivating force therefore can be expressed by the following equation.

$$F_{TP} = F_{TPI} + F_{TPC} + F_{TPO}$$