Tension Management *Cont.*

Values of f are for design use under normal startup and running. This includes an allowable transient Te up to 150% of steady state operation. Though full pulley slip is not considered an acceptable design, occasional local slip (see pulleys below) between the belt and pulley is considered acceptable and inevitable in worse case environmental conditions. In the case of muddy or with thick material films, f should be decreased by 20% (Multiply f by 0.8).

Figure 6.60 shows general concept of ΔT for pulleys. T_m can be either T_1 or T_2 since the pulley torque, opposite the direction of increasing T, can be with or against the direction of belt movement. At the same time, tension consistently changes from T_1 to T_2 in the direction of belt travel, independent of which is larger.

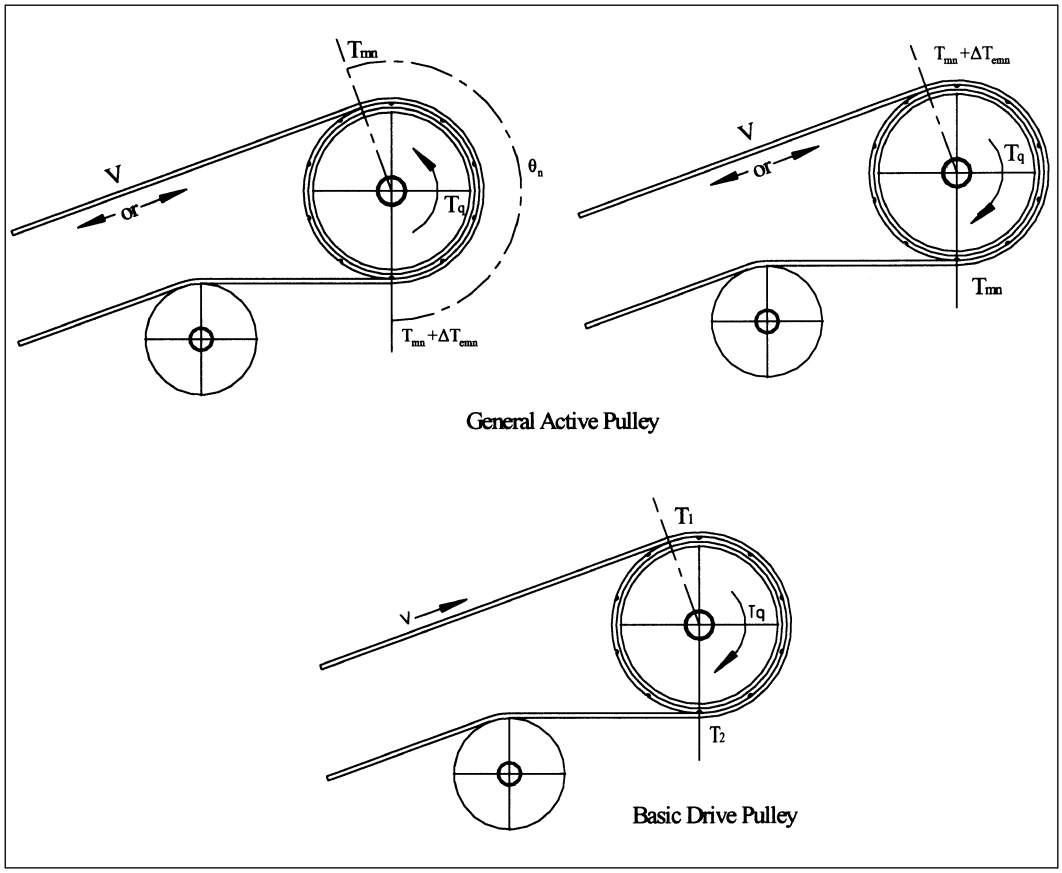

Figure 6.60
Active and general pulley convention and terminology

It should be noted that ΔT_{en} is that needed for belt movement or provided by the drive/brake This must be less than ΔT_{emn} to prevent the probability of slip.

For many cases, the belt will have an angle of wrap, θ_n, around the active pulley of about 180 degrees or that needed to return the belt conveniently. Often, it will be necessary to arrange a drive that uses an angle of wrap greater than 180 degrees. This is accomplished by the appropriate positioning of a snub pulley, which can extend the angle of wrap to approximately 240 degrees. If a greater angle of wrap is necessary, it may be necessary to use a multiple-pulley drive.

With basic head driven, inclined or level conveyors as shown in Figure 6.60, T_1 consistently drops to T_2 in the direction of rotation and braking torque is less than driving torque. In this case, a wrap factor, C_w, is useful for manual design purposes. C_w is the effective ratio $T_2/\Delta T_e$ derived for use with common combinations of f and θ.

$$C_w = \frac{1}{e^{f\theta} - 1.0} = \frac{T_2}{T_e} = \frac{T_2}{\Delta T_e}$$

Figure 6.61
Equation for Wrap Factor, C_w