3.2.4 SPEEDS

The calculation of maximum allowable passenger train speeds on curves and thru special trackwork is defined in AREMA Chapter 5. This section is intended to guide the development of passenger train speeds given the unique considerations of shared use corridors up to 90 mph (track Class 1-5). For information regarding considerations on high speed corridors above 90 mph (track Class 6-9), see AREMA Chapter 17.

Train speed considerations can be categorized as either defining the maximum authorized train speed over a given track segment (e.g. subdivision limits) or defining localized permanent speed restrictions within the track segment.

When establishing the maximum authorized train speed, the following should be considered:

- overall track conditions (maintenance class as defined by 49 CFR Part 213)
- overall corridor characteristics such as profile, curvature, at-grade crossing density,
- passenger equipment characteristics,
- agreements with freight operators or federal agencies that dictate speeds.
- design of equipment planned for use on the corridor (CFR 213.329)

Conditions that can impose localized permanent speed restrictions include but are not limited to:

- curve geometry that is atypically restrictive,
- special trackwork such as turnouts and diamonds,
- roadway at-grade crossings and associated detection circuit lengths,
- underpass bridge ratings,
- train control signal aspects.

On shared use corridors where the freight operator is the owner, the maximum actual superelevation (Ea) and maximum unbalanced superelevation (Eu) is likely restricted to be below what would otherwise be optimal for passenger train performance. As described in AREMA Chapter 5, freight railroads establish the maximum unbalanced superelevation for freight trains to optimize the rail/wheel interface and minimize maintenance requirements. Passenger train equipment is typically permitted to operate at a higher unbalanced superelevation and traverse the same curvature at a higher speed but causing additional wear on the high rail and increasing maintenance costs. The designer may be inclined to increase the actual superelevation to reduce the unbalanced elevation for passenger trains but should be aware that freight operators will limit actual superelevation. Slow moving freight trains operating on curves with high superelevation can experience negative unbalanced elevation and incur significant wear on the low rail. Also, draft (tension) forces within a freight train can more easily cause railcars to overturn and derail in high superelevation curves.

The same principle of wheel/rail interface optimization applies on shared use corridors owned by the passenger operator, but the passenger operator is in the position to determine what is an acceptable amount of maintenance necessary to support the higher passenger train speeds.

On tangent sections of track that could permit passenger trains to operate significantly faster than freight trains, the maintenance class of the track segment should be considered. If the freight operator desires to be subject to a certain maximum maintenance class (as defined by 49 CFR Part 213), passenger train speeds on tangent track that escalate the maintenance class above the desired maximum are not likely to be permitted.

The diverging route thru special trackwork such as turnouts and crossovers often requires a reduction in passenger train operating speed and is determined by the method described in AREMA Chapter 5. An iterative process of checking turnout/crossover sizes against desired train performance and physical space available for installation can be employed to optimize passenger train operations thru special trackwork.

Train control signal systems, where designed by the freight operator, are likely based on the braking characteristics of freight trains. Passenger trains may be required to reduce speed earlier than necessary to comply with signal aspects designed for the breaking performance of freight trains, adding time to schedules. This may be an unavoidable situation where breaking occurs on significant grades, however, it is important to identify these locations early and incorporate the associated delays into train performance modeling.