## 17.2.10 Distribution of Live Loads to Substructure Units

See 17.2.9 for additional live load guidance regarding bridges with raised sidewalks. In the transverse direction, the design truck and design tandem should be located in such a way that the effect being considered is maximized. However, the center of any wheel load must not be closer than 2 feet from the edge of the design lane. The transverse live load configuration for a design truck or design tandem is illustrated in Figure 17.2-20. Pedestrian live load may be omitted if trying to maximize positive moment in a multi-columned pier cap.

As a reminder, always be aware to apply loads correctly. For example, for continuous spans the loading to the pier originates from the live load reaction rather than the sum of the live load shears of adjacent spans.
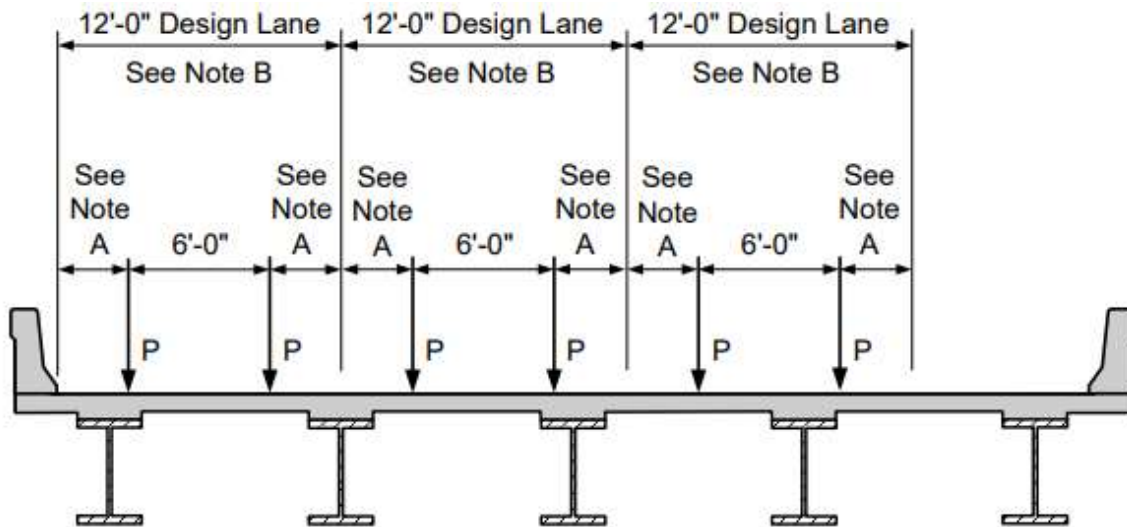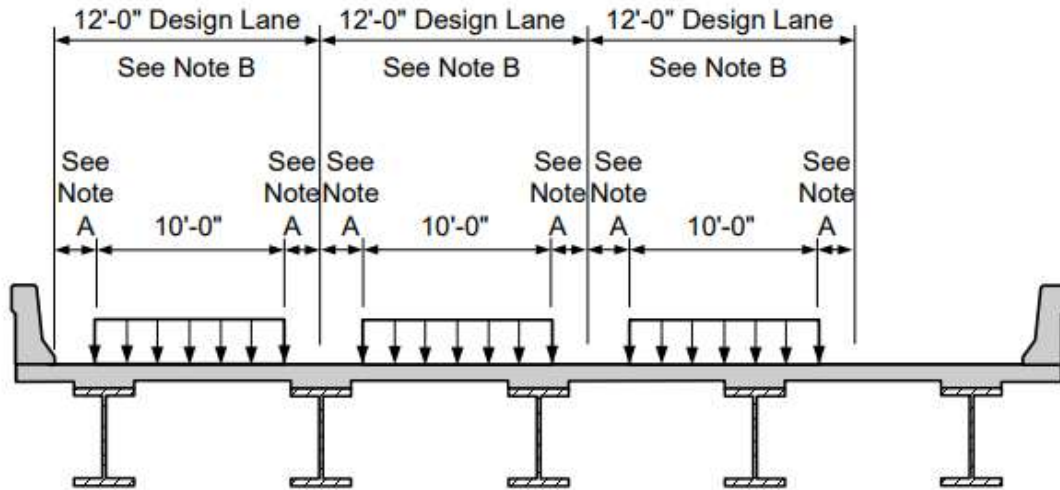

P = Wheel Load

Note A: Position wheel loads within the design lane such that the effect being considered is maximized; minimum = 2'-0".

Note B: Position design lanes across the roadway such that the effect being considered is maximized.

Figure 17.2-20
Transverse Configuration for a Design Truck or Design Tandem

Similarly, the design lane is distributed uniformly over the 10-foot loaded width. Since the design lane is 0.64 kips per linear foot in the longitudinal direction and it acts over a 10-foot width, the design lane load is equivalent to 64 psf. Similar to a design truck or design tandem, the 10-foot loaded width is positioned within the 12-foot design lane such that the effect being considered is maximized, as illustrated in Figure 17.2-21. The 10-foot loaded width may be placed at the edge of the 12-foot design lane.

Note A: Position 10'-0" lane loads within the 12'-0" design lane such that the effect being considered is maximized; minimum = 0'.

Note B: Position 12'-0" design lanes across the roadway such that the effect being considered is maximized.

Figure 17.2-21
Transverse Configuration for a Design Lane

When live load reactions are calculated at substructure units different methods of distributing the loads are used for the axles on the substructure and for the axles in the spans. The load to a girder for an axle directly over the substructure unit is based on simple beam distribution between the girders. The reactions for the axles located within the span are based on the shear distribution factors.

WisDOT policy item:

A 10 foot design lane width may be used for the distribution of live loads to a pier cap.

For use in design of the foundations, the live load reactions should be tracked for both the Strength and Service load cases, as well as with and without the dynamic load allowance (IM). Note that the IM is not applied to the lane load portion of the live load reaction, so the reaction without the IM cannot be factored out of the reaction with IM.