

TO: All Design Section Staff
 FROM: Bijan Khaleghi
 DATE: February 8, 2013
 SUBJECT: Placement of Post-tensioning Tendon and Anchorage Placement

This design memorandum provides guidance for placement of post-tensioning tendons and anchorages in bridge superstructures.

All post-tensioning anchorages in webs of box girder or multi stem superstructures shall be vertically aligned. Multi plane anchor systems may be used to avoid a staggered anchorage layout. If a staggered layout must be used, the plans shall be reviewed and approved by the Bridge Design Engineer.

To ensure maximum anchorage efficiency, maximum fatigue life and prevention of strand breakage, a minimum tangent length at the anchorage is required to ensure that the strands enter the anchorage without excessive kinking.

To prevent excessive friction loss and damage to the prestressing sheathings, adherence to the minimum tendon radii is required.

Table 1 and Figure 1 present the required minimum radius of curvature along with the required minimum tangent lengths at stressing anchorages. Deviation from these requirements needs the approval of the Bridge Design Engineer.

Table 1: Minimum tendon radii and Tangent length

Anchor Types	Radii, ft.	Tangent Length, ft.
½" Diameter Strand Tendons		
5-4	7.5	2.6
5-7	9.8	2.6
5-12	13.5	3.3
5-19	17.7	3.3
5-27	21.0	3.3
5-31	22.3	4.9
5-37	24.0	4.9
0.6" Diameter Strand Tendons		
5-4	10.6	3.3
6-7	12.8	3.3
6-12	16.4	3.3
6-19	20.7	4.9
6-22	22.6	4.9
6-31	26.4	4.9

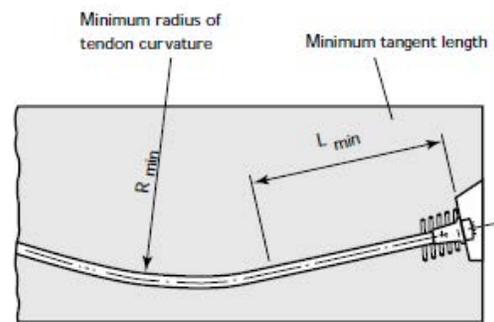


Figure 1: Tangent Length and Tendon Radii

Background:

The design policy requires WSDOT Post-tensioned bridges to comply with the industry standard for placement of post-tensioning tendons, tendon radii, and minimum tangent length at the anchorages. The implementation of this policy results in safer post-tensioning operation, lower construction cost, and fewer post construction repairs.

If you have any questions regarding these issues, please contact Tim Moore at (206) 805-5440 (MooreT@wsdot.wa.gov), or Bijan Khaleghi at 360-705-7181 (khalegb@wsdot.wa.gov).

cc: Mark Gaines, Bridge Construction - 47354

F. Posner, Bridge and Structures – 47340

BDM Update:

Add the following to the end of 5.8.1-D Layout of Anchorages and End Blocks:

All post-tensioning anchorages in webs of box girder or multi stem superstructures shall be vertically aligned. Multi plane anchor systems may be used to avoid a staggered anchorage layout. If a staggered layout must be used, the plans shall be reviewed and approved by the Bridge Design Engineer.

To ensure maximum anchorage efficiency, maximum fatigue life and prevention of strand breakage, a minimum tangent length at the anchorage is required to ensure that the strands enter the anchorage without excessive kinking.

To prevent excessive friction loss and damage to the prestressing sheathings, adherence to the minimum tendon radii is required.

Table 1 and Figure 1 present the required minimum radius of curvature along with the required minimum tangent lengths at stressing anchorages. Deviation from these requirements needs the approval of the Bridge Design Engineer.

Table 5.8.1-4A: Minimum tendon radii and Tangent length

Anchor Types	Radii, ft.	Tangent Length, ft.
½" Diameter Strand Tendons		
5-4	7.5	2.6
5-7	9.8	2.6
5-12	13.5	3.3
5-19	17.7	3.3
5-27	21.0	3.3
5-31	22.3	4.9
5-37	24.0	4.9
0.6" Diameter Strand Tendons		
5-4	10.6	3.3
6-7	12.8	3.3
6-12	16.4	3.3
6-19	20.7	4.9
6-22	22.6	4.9
6-31	26.4	4.9

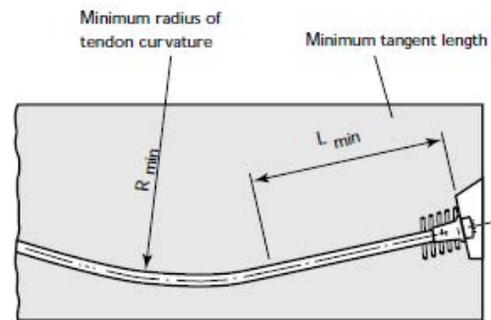


Figure 5.8.1-4A: Tangent Length and Tendon Radii

