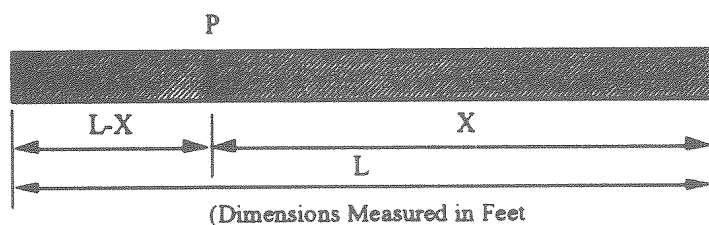# APPENDIX G6B—FORMULAS FOR MAXIMUM SHEAR AT ANY POINT ON SPAN (NO IMPACT INCLUDED) (SIMPLE SPANS ONLY)

Type Load	$\dfrac{L-X}{L}$	Formula for Maximum Shear[a]	Length of Truck	Minimum	
				$L-X$	X [b]
3	0–0.500	$V = \dfrac{25\left(X-7.44\right)}{L}$	19 ft	0	19 ft
3S2	0–0.500	$V = \dfrac{36\left(X-18.61\right)}{L}$	41 ft	0	41 ft
3-3	0–0.500	$V = \dfrac{40\left(X-23.90\right)}{L}$	54 ft	0	54 ft

(Dimensions Measured in Feet

where:

V = Shear at a point P which is $L-X$ distance from end of span in kips per wheel line

[a] These formulas are applicable only when dimension X exceeds total length of truck.

[b] For spans where dimension X is less than the minimum, the maximum shears are to be determined from statics.

APPENDIX H6B—FORMULAS FOR MAXIMUM SHEAR AT ANY POINT ON SPAN (NO IMPACT INCLUDED) (SIMPLE SPANS ONLY)

Type Load	$\dfrac{L-X}{L}$	Use for Girder Lengths	Formula for Maximum Shear[a]	Minimum	
				$L-X$	X
HS-20	0–0.500	Under 42 ft	$V = \dfrac{36\,(X - 4.67)}{L} - 4$	14	14
		42 ft to 120 ft[b]	$V = \dfrac{36\,(X - 9.33)}{L}$	0	28
HS-15	0–0.500	Under 42 ft	$V = \dfrac{27\,(X - 4.67)}{L} - 3$	14	14
		42 ft to 120 ft[b]	$V = \dfrac{27\,(X - 9.33)}{L}$	0	28
H-20	0–0.500	To 35 ft[b]	$V = \dfrac{20\,(X - 2.8)}{L}$	0	14
H-15	0–0.500	To 35 ft[b]	$V = \dfrac{15\,(X - 2.8)}{L}$	0	14

[a]   All values based on standard truck loadings.

[b]   Truck loading does *not* govern shear beyond the lengths specified. Use lane loading.


(Dimensions Measured in Feet)
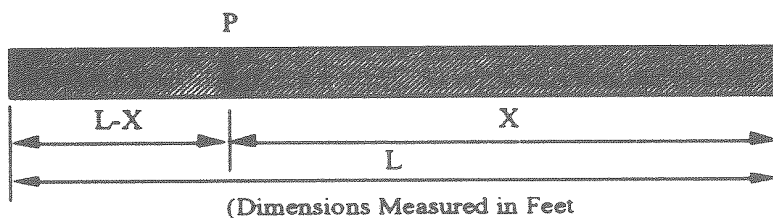
where:

V =   Shear to left of point P in kips per wheel line

APPENDIX I6B—FORMULAS FOR MOMENT SHEAR AT ANY POINT ON SPAN (NO IMPACT INCLUDED) (SIMPLE SPANS ONLY)

Type Load	$\dfrac{L-X}{L}$	Formula for Maximum Moment at P	Minimum		(1)	(2)
			$L-X$	X		
3	0–0.340	$25(X-7.44)\dfrac{(L-X)}{L}$	0	19.0	3	Rt
	0.340–0.500	$25(X-3.44)\dfrac{(L-X)}{L}-34$	4.0	15.0	2	Rt
3S2	0–0.211	$36(X-18.61)\dfrac{(L-X)}{L}$	0	41.0	5	Rt
	0.211–0.354	$36(X-11.39)\dfrac{L-X}{L}-55$	11.0	30.0	2	Lt
	0.354–0.500	$36(X-7.39)\dfrac{(L-X)}{L}-106$	15.0	26.0	3	Lt
3-3	0–0.175	$40(X-23.9)\dfrac{(L-X)}{L}$	0	54.0	6	Rt
	0.175–0.3125	$40(X-19.9)\dfrac{(L-X)}{L}-28$	4.0	50.0	5	Rt
	0.3125–0.396	$40(X-11.10)\dfrac{(L-X)}{L}-138$	19.0	35.0	3	Lt
	0.396–0.500	$40(X-3.9)\dfrac{(L-X)}{L}-252$	20.0	34.0	4	Rt

(1) Axle No. at P

(2) Truck facing

(Dimensions Measured in Feet)
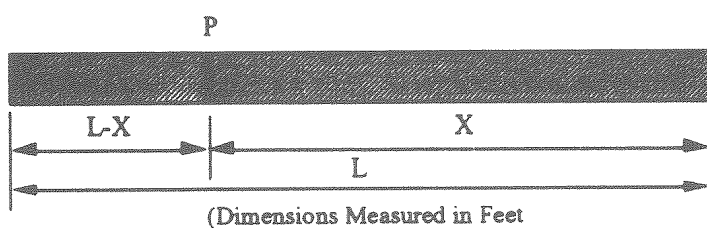
Moments in ft-kips per wheel line at a distance $L-X$ from end of span.

Formulas are applicable when entire truck is on span.

APPENDIX J6B—FORMULAS FOR MAXIMUM MOMENT AT ANY POINT ON SPAN (NO IMPACT INCLUDED) (SIMPLE SPANS ONLY)

Type Load	$\dfrac{L-X}{L}$	Formula for Maximum Moment at P	Minimum		Max L[a]
			$L-X$	X	
HS-20	0–0.333	$\dfrac{36(L-X)(X-9.33)}{L}$	0	28	—
	0.333–0.500	$\dfrac{36(L-X)(X-4.67)}{L}-56$	14	14	144.5
HS-15	0–0.333	$\dfrac{27(L-X)(X-9.33)}{L}$	0	28	—
	0.333–0.500	$\dfrac{27(L-X)(X-4.67)}{L}-42$	14	14	144.5
H-20	0–0.500	$\dfrac{20(L-X)(X-2.8)}{L}$	0	14	56
H-15	0–0.500	$\dfrac{15(L-X)(X-2.8)}{L}$	0	14	56

(Dimensions Measured in Feet
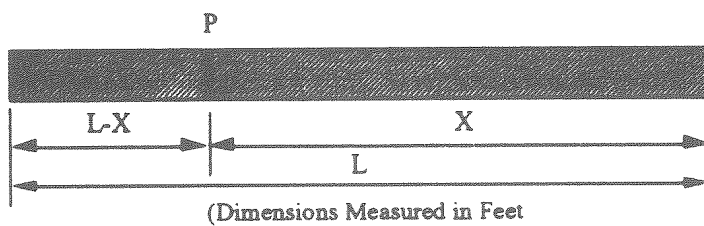
Moments in ft-kips per wheel line.

These formulas are applicable when all loads are on the span.

[a]   Span lengths greater than this value are controlled by lane loading.

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