Elastomeric Bearing Design
AASHTO LRFD Method A Design ~ English Units

Based upon 4th ed. AASHTO LRFD through Interim 2009 revisions.
Spreadsheet applies to rectangularly shaped bearings only. All boxed entities must be input by user.

Units: in, kips, psi unless noted otherwise
Coordinates: x, L are perpendicular; y, W are parallel, to the primary rotation axis. Usually W>L.

INPUT DATA

Date: 10/6/09 **Designer:** ABC
Job Title: All Pass Case

G_{min} (psi)	= 200		P_{DL} (kips)	= 2	
G_{max} (psi)	= 220		P_{LL} (kips)	= 1	
F_y (ksi)	= 2		Δ_s (in)	= 0.8	
ΔF_{TH} (ksi)	= 2		θ_x (rads)	= 0.5	
h_{cover} (in)	= 0.250		θ_y (rads)	= 0.5	

BEARING DESIGN

	Max/min allowable		Actual values	
Area (in^2)	≥ 2.4	P_{TL} (kips)	= 3.00	
L (in)	≥ 0.40	Area (in^2)	= 36.00	
W (in)	≥ 0.40	**L** (in)	= 6	OK
σ_{TL} (psi)	≤ 1250	**W** (in)	= 6	OK
		σ_{TL} (psi)	= 83	
h_{ri} [TL] (in)	≤ 4.50	σ_{LL} (psi)	= 28	
S [TL] (-)	≥ 0.33			
S (-)	**> 16.91**	**h_{ri}** (in)	= 0.010	OK
		S (-)	= 150.00	
N lay [Δ_s] (-)	**< 110.0**	h_{rt} (in)	= 0.62	
N lay [θ_x](-)	**< 35639999.0**			
N lay [θ_y](-)	**< 35639999.0**	**No. of int. layers** (-)	= 12	**NG**
N lay [$Stab_x$] (-)	≤ 142.8	No. of shims (-)	= 13	
N lay [$Stab_y$] (-)	≤ 142.8			

Steel Shim Requirements

h_s [service] (in)	**< 0.001**	**h_s** (in)	= 0.0005	**NG**
h_s [fatigue] (in)	≥ 0.000	h_{st} (in)	= 0.007	
h_s [minimum] (in)	< 0.063			

METHOD A DESIGN PROCEDURE DISALLOWED PER LRFD SECTION 14.7.6.1 (S^2/N > 22)

Compressive Deformation

E_c (psi)	≈ 28350000	
$\delta_{DL\text{-initial}}$ (in)	≈ 0.00	
δ_{LL} (in)	≈ 0.00	

[δ_{DL} and δ_{LL} values are approximate and based upon Commentary Eqn. C14.7.5.3.6-1.]

SUMMARY

L =	6.00 in	Approx. weight =	1.03 lbs
W =	6.00 in	Allowable shear displacement =	0.31 in
Unloaded height =	0.63 in	Maximum shear force =	3.96 kips
Loaded (DL) height =	0.63 in	(prog. by R. Dornsife; WSDOT; 2008)	