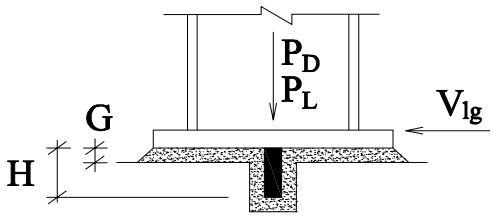
Design of a Shear Lug for Base Plates Subjected to Axial and Shear Loads



Loads

Dead Load, P_D=			120 kips
Live Load, P_L=			150 kips
Shear Load, V_w=			55 kips

Base Plate Material Properties

Grade:	SEL("Material/ASTM"; NAME;)	=	A36
Yield stress, f_{yp}=	TAB("Material/ASTM";F_y;NAME=Grade)	=	36 ksi

Column, Base Plate and Pedestal Dimensions

Concrete strength for pedestal (f'_c):

f'_c=			3 ksi
Base plate depth, N=			14 in
Base plate width, B=			14 in
The coefficient of friction, μ=			0.55
Shear lug width, W=			8 in
Grout depth, G=			1.0 in

The Portion of The Shear which can be Transferred by Friction Equal to μ:

V_{lgu}=	$1.3*V_w - \mu*(0.9*P_D)$	=	12.1 kips

The Required Bearing Area

Φ_c=			0.60
A_{lgu}=	$\frac{V_{lgu}}{0.85*\Phi_c*f'_c}$	=	7.9 in^2

The Height of The Bearing Portion

H=	A_{lgu}/W	=	0.99 in

Base Plate Thickness

M_{lgu}=	$\frac{V_{lgu}}{W}*\frac{H+G}{2}$	=	1.5 kip*in
t_{lg}=	$\sqrt{\frac{4*M_{lgu}}{0.9*f_{yp}}}$	=	0.43 in

Summary: Use Shear Lug with the Following Minimum Dimensions

Depth=	H+G	=	2 in
Width=	W	=	8 in
Thickness=	t_{lg}	=	0.43 in