

LOAD DATA

BRACER, BRACER LITE LOAD CHART

REV 3 – 9.13.10

Tests were conducted at Mississippi State University by the direction of Professor R. Ralph Sinno Ph.D., P.E. in accordance to tests sponsored by the MBMA. "X-bracing Anchorage Connection," Journal of Structural Engineering, ASCE, Vol 119, No. 11, November 1993.

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WEB THICKNESS	ROD DIAMETER	² ROD TENSILE STRENGTH (Min - lbs)	SLOT SIZE Width x Length	BRACER SIZE AND WASHER SL = StressLok FW = Flat washer	LOAD (lbs) ULTIMATE 30° & 45° rod angles	FAILURE MODE
1/8" (TB-2)	5/8"	16,700	1.062" x 2.125"	#1 BRACER & FW	20,750 (30°)	4
				#1 BRACER & FW	19,500 (45°)	1 & 4
				#1 BRACER & SL	18,000 (45°)	1 & 4
				#1 Oval BRACER & SL	17,000 (45°)	1 & 4
	3/4"	24,700	1.062" x 2.125"	#2 BRACER & FW	29,500 (30°)	1 & 4
10ga (TB-1)	1/2"	10,500	1.062" x 2.125"	#1 BRACER & FW	12,600 (30°)	1
			.750" x 1.750"	#1 BRACER & SL	10,580 (45°)	1
	5/8"	16,700	.750" x 1.750"	1/2" BRACER LITE & SL	10,750 (45°)	1
	3/4"	24,700	1.062" x 2.125"	5/8" BRACER LITE & SL	15,580 (45°)	1
	7/8"	27,700	1.062" x 2.125"	#2 BRACER & FW	29,100 (30°)	1 & 4
9ga (Corle)	1"	36,400	1.062" x 2.125"	#2 BRACER & FW	33,500 (30°)	1 & 4
3/16 (TB-4)	1/2"	10,500	1.312" x 2.625"	#3 BRACER & FW	36,350 (30°)	1 & 4
			5/8"	16,700	1.312" x 2.625"	#1 BRACER & FW
	#1 BRACER & SL	16,600 (45°)			1	
	#1 BRACER & FW	22,600 (30°)			1	
	#1 BRACER & FW	19,760 (45°)			1	
	1.250" x 2.625"	#1 BRACER & SL	22,750 (45°)	1		
		#1 Oval BRACER & SL	18,250 (45°)	1		
	3/4"	24,700	1.312" x 2.625"	#2 BRACER & FW	28,800 (30°)	1
				#2 BRACER & SL	26,200 (45°)	1
				#2 BRACER & SL	25,800 (45°)	1
3/4" BRACER LITE & SL				23,250 (45°)	1	
7/8"	27,700	1.312" x 2.625"	#2 BRACER & FW	37,300 (30°)	1	
				38,300 (45°)	4 & 7	
1/4" (TB-7)	5/8"	16,700	1.312" x 2.625"	#1 BRACER & SL	18,400 (45°)	1
				#2 BRACER & FW	30,600 (30°)	1
	3/4"	24,700	1.312" x 2.625"	#2 BRACER & FW	29,300 (45°)	1
				#2 BRACER & SL	26,000 (45°)	1
	7/8"	27,700	1.312" x 2.625"	#2 BRACER & FW	38,200 (30°)	1
					40,200 (45°)	1
	1"	36,400	1.312" x 2.625"	#3 BRACER & FW	39,500 (30°)	4
1-1/4"	58,100	1.312" x 2.625"	#3 BRACER & FW	70,000 (30°)	1 & 4 & 5	
5/16"	7/8"	27,700	1.625" x 3.500"	#3 BRACER & FW	40,500 (45°)	1
					56,000 (45°)	7
	1-1/4"	58,100	1.625" x 3.500"	#3 BRACER & FW	71,000 (30°)	3 & 4
					52,500 (45°)	2 & 7
	5/16" web with 1/4" backup plate: 4.875" x 5.500"	1-1/2"	69,300	1.625" x 3.500"	#4 BRACER & FW	71,000 (30°)

TEST PHOTOS



Failure Modes

- Mode 1: Tensile fracture of the bracing rod
- Mode 2: Compression fracture of the BRACER
- Mode 3: Punching shear fracture of the web plate beneath the BRACER washer.
- Mode 4: Excessive flexure deflection of the web plate of the column section.
- Mode 5: Failure of the fillet weld between the web plate and flange of the section adjacent the BRACER.
- Mode 6: Nipple disengagement from the web slot.
- Mode 7: Nipple shear fracture.

Notes

1. The flange thickness was stiffened over previous tests with a 3/8" plate and welded to the outside of the existing flange.
2. Minimum Rod Strength based on Grade 2 bolt per SAE J429 .

Test at 45° rod angle – Report dated February 18, 2005

Test with STRESS-LOK and BRACER II at 45° rod angle – Report August 26 2008 (SL= StressLok)

Test with OVAL BRACER II. STRESSLOK at 45 rod angle – Report September 13, 2010

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"Procedures and calculations in the literature for the design of x-bracing anchorage can be used with confidence when specifying and selecting ductile iron oval BRACER hillside washers." Statement by Dr. Ralph Sinno Ph.D.