DESIGNING WITH REIDBRACE

Reidbrace is designed to the loading limits which are given in our 07/08 Design Guide (Table 1.). Apart from the RBRACE32, RBRACE is limited to the minimum ultimate strength of the Reidbar. This is 15% higher than nominal yield of Reidbar, 500MPa.

Table 1: INDIVIDUAL CHARACTERISTIC STRENGTHS - min ultimate strength in kN

RBRACE Size	MINIMUM ULTIMATE STRENGTH IN kN - INDIVIDUAL COMPONENTS				Reidbar	
	RBRACE Banana	RBRACE End	Reidbar FULL NUT	Reidbar HALF NUT	Min Yield	Min UTS
12mm	>116	>65	79	34	56.5	65.0
16mm	>116	>116	141	60	100.6	115.6
20mm	>181	>181	220	94	157.0	180.6
25mm	>282	>282	344	147	245.5	282.3
32mm	>430	>462	462	241	402.0	462.3

Our philosophy has been that rod bracing does not have the ability to work under a compressive load and be an energy dissipating element in a way that is expected of a primary seismic member, it is a tension only element.

Even as a secondary seismic resisting element every time the brace is forced past its yield stress it will stretch more and distribute more loading to the primary members. Its energy/work ability is limited to a finite amount (max extension x Fy) unlike a member that can work in compression as well.

500E grade reinforcing which is Reidbar, has a uniform elongation of at least 10%. Therefore, on a 10m brace it can stretch at 1000mm before necking failure occurs. This amount of deformation in a building can have significant P-Delta effects and needs to be fully accounted for with regard to other building members, stability etc.

Because of this limitation, a rod bracing system we believe is more suited to an elastic system of restraint and therefore the REIDBBRACE system was designed accordingly.

From the Christchurch earthquakes we have the sense that in some instances rod bracing/ REIDBRACE has being used inappropriately for seismic members.

When considering seismic bracing NZS3404 has the over strength for capacity design for 450MPa bracing as 1.3 which is more than the 1.15 limit of the REIDBRACE system. Statistical records from Pacific Steel who manufactures Reidbar show that the maximum ultimate strength of Reidbar to be 1.3.

We have surveyed all the test data on REIDBRACE that has been accumulated over the past five years and find that the 12, 16 and 20 RBRACE systems have a characteristic strength that exceeds 1.3Fy. The RBRACE25 and RBRACE32 systems however perform below 1.3Fy but greater than the characteristic strengths given in Table 1 above.

From the earthquake there have been examples of Reidbar yielding, connecting pin falling out, shaking loose of the Reidbar nuts leading to the loosening of bracing.

As a result of this, we have worked to make the installation instructions clearer.

This includes eliminating the need to bend the clip that holds the pin, an operation easily forgotten, and replaced it with one more easily secured.

We have seen on-site installations of Reidbrace where the banana has not been centralised on the bracket. In order that the load is spread evenly over the forks, installation of washers either side of the bracket is imperative so total movement does not exceed 6mm.

After a testing programme, a tab washer and spring system has been introduced to ensure more positive shake proof restraint on the connecting and lock nuts. The engineer will be able to visably see that the correct torque has been applied during the install.

We recently updated our product data sheets, CAD drawings and installation instructions to incorporate the new features. These are posted on our website and links to videos (YouTube) are also available.

For more technical information, please contact Terry Seagrave, Reid Design Engineer on terrys@reids.co.nz or 021 790 962.

INSTALLATION SPECIAL CAUTION:

The Reidbrace must be centralised on the bracket to ensure central loading forces.

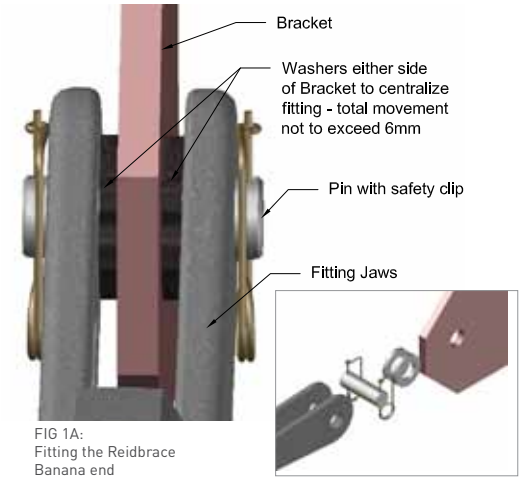

FIG 1A:
Fitting the Reidbrace Banana end

FIG 1B:
Install of washers when packing is required.