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Forensic Failure Analysis, Materials Engineering, Consulting & Testing

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Re: Load Testing of M20 Blind Bolt Assemblies

TorqNut™ supplied MTi with M20 blind bolt assemblies with M20 torque-nuts for mechanical load testing to simulate potential field use scenarios. To simulate end user scenarios the client specified the testing using five different ASTM A36 structural steel plate thicknesses (1/8", 3/16", 1/4", 3/8", & 1/2"). The M20 blind bolt assemblies were tested in both a sheer load and a tensile load.

The assembly in Figure 2 was loaded in tension until the bolt pulled through the hole in the thinner plate. The maximum load was recorded. Results are tabulated with Figure 2.

The assembly in Figure 3 was loaded in shear until the hole in the thinner plate notably elongated. The maximum load was recorded. Results are tabulated in Figure 3.

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Figure 1: Photograph of the client supplied M20 blind bolt assembly with a M20 Torqnut prior to installation and testing. (client supplied photo)

Table 1 Tensile Testing		
Plate thickness	Ultimate Load (lbft)	Mode of Failure
1/8"	3,480	Bolt pull Through
3/16"	16,200	Bolt pull Through
1/4"	23,410	Bolt pull Through
3/8"	28,900	Bolt pull Through
1/2"	38,100	Bolt pull Through

Figure 2: Photograph of the M20 blind bolt installed into the tensile test fixture prior to testing. Table 1 provided the maximum

load to pull the bolt though the narrower plate of different thicknesses. (Photo 20357-N01)

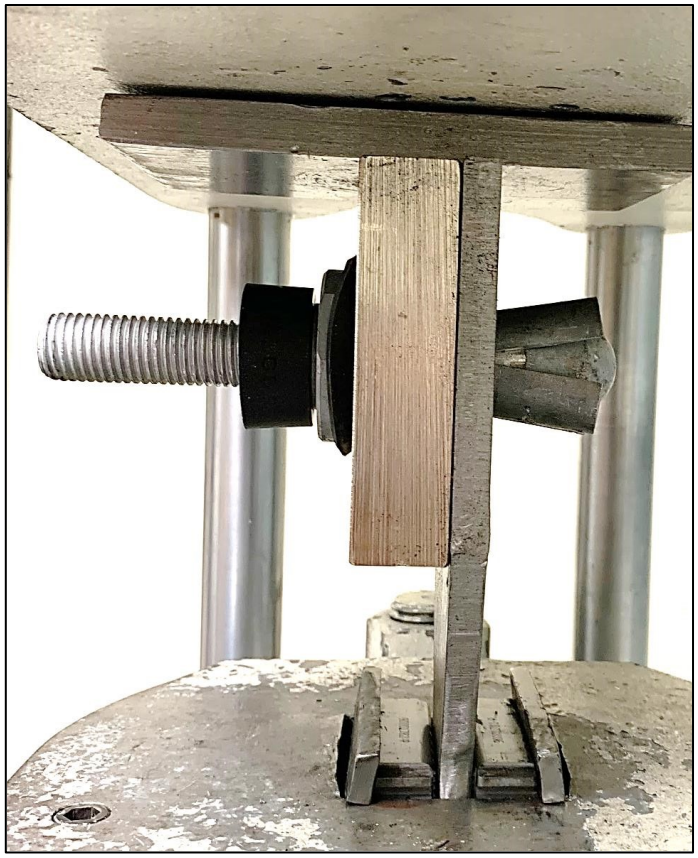

Table 2 Shear Testing		
Plate thickness	Ultimate Load (lbft)	Mode of Failure
1/8"	9,920	Elongation
3/16"	18,250	Elongation
1/4"	26,200	Elongation
3/8"	35,000	Elongation
1/2"	36,500	Fixture Failure

Figure 3: Photograph of the M20 blind bolt installed into the sheer test fixture prior to testing. Table 2 provided maximum shearing load to significantly elongate the bolt hole in the plate of various thicknesses. (Photo 20357-N05)