

DPRCG 2024 CONVOCATION

Going Down the Tubes

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THE VALUE OF
TRUST

Cast of Characters

- **Big Bucket Minerals:** Owner and operator of terminal facility which transfers raw mining materials to and from ship to shore
- **A-Plus Operators:** Operated the transfer facility
- **Mighty Fine Design:** Structural engineer/insured
- **Nuts & Bolts Contractors:** General contractor that performed upgrades
- **Drew Pachinko:** Truck driver injured when tubes collapsed

The Project

- Bulk-handling minerals terminal at a port transferring minerals to and from ship and shore
- Upgrade of two “tube galleries”
 - 10’ wide tubes with conveyors inside
 - BC-1 was 100’ long and rose from ground level up to 40’
 - BC-2 was 475’ long and suspended from 25’ up to 175’

The Project



Mighty Fine's Scope / Contract

- Structural engineer on project
- Master Service Agreement
 - Contractor shall rely on its own examination and investigation of the conditions at the site.
 - Indemnity **arising out of the work performed**, including negligence **and** breach of contract
 - Waiver of subrogation

Mighty Fine's Scope / Contract

- Insured provided proposal to replace BC-2 (higher tube)
 - BC-2 was the newer tube
 - "Determine Added Weight"
 - "Check Existing Supports and Tube"
- Later, Insured offered proposal for BC-1
 - BC-1 was older; was supposed to be replaced earlier but Owner delayed
 - No detailed scope items such as for BC-2

What (happened?)

- BC-2 collapsed onto BC-1



So what (happened?)

- Both tubes damaged
- No minerals could be transferred via these tubes
- One tube hit the cargo portion of a dump truck (not the cab, but the driver was injured)



Assertions

- Owner never retained an expert and simply relied on an “it’s either design or construction” approach
- Due to the amount of damages, parties agreed to independently investigate
- Insured felt failure was due to improperly fastened bolts
 - Selected by GC
 - Bolt tip shears off when properly tensioned
 - Design called for dimensions of bolts, but no further details

Assertions

A325 Tension Control Bolt System

Product Description

The Tension Control bolting system has quickly become the most widely used method of fastening high strength structural bolts. The use of it and economic benefits has provided tens of thousands of projects with consistent, reliable, and economical steel connections. The TC bolt is formally recognized by the AISC (American Institute of Steel Construction) and the RCSC (Research Council on Structural Connections) as an approved installation method.

The Tension Control System consists of one each: A325 TC Bolt, A194 2H Heavy Hex Nut, F-436 Flat Washer

Key advantages of the Tension Control assembly include:

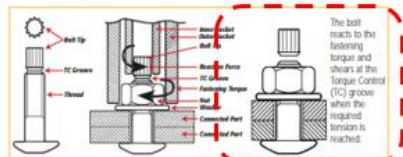
- Cost effective, one operator, single sided installation
- Lightweight, non-impacting installation tools
- Visual inspection
- Pre-certified, matched and tested assemblies
- Reliable and efficient bolt tensioning
- Bolt tension is not dependent on operator skill or tool settings.

Installation

1. Place the bolt into the connection with the washer under the nut.
2. Slide the inner socket over the bolt tip and the outer socket over the nut. Press the trigger switch. The outer socket will rotate and tighten until the bolt reaches the required tension.
3. When the proper bolt tension is reached, the tip of the bolt will shear. When the tip of the bolt shears, pull back on the wrench until the outer socket is no longer engaging the nut.
4. Push the ejector lever to discharge the sheared bolt tip.
5. Catch the sheared bolt tips to prevent them from falling below.



3/4"-10 Diameter			7/8"-9 Diameter			Mechanical Requirements		
LENGTH	ITEM CODE	QTY	ITEM CODE	QTY	DIAMETER	MIN. TENSILE STRENGTH (KSI)	MIN. TENSILE STRENGTH (MPa)	
1-3/4"	75C3758N325/TC	300						
2"	75C308N325/TC	280	83C208N325/TC	200	3/4" x .10	28	40,100	
2-1/4"	75C2258N325/TC	270	83C2258N325/TC	190	7/8" x .09	39	55,450	
2-1/2"	75C258N325/TC	250	83C258N325/TC	180	1" x .08	51	72,000	
2-3/4"	75C2758N325/TC	250	83C2758N325/TC	180				
3"	75C308N325/TC	240	83C308N325/TC	170				
3-1/4"	75C3258N325/TC	210	83C3258N325/TC	150				
3-1/2"	75C358N325/TC	200	83C358N325/TC	140				
3-3/4"	75C3758N325/TC	200	83C3758N325/TC	140				
4"	75C408N325/TC	170	83C408N325/TC	140				
4-1/2"	83C458N325/TC	120						
5"	83C508N325/TC	100						
5-1/2"	83C558N325/TC	100						
6"	83C608N325/TC	100						



MAKITA® MAK 6922NIB
Impact Shear Wrench

Anti-slip mechanism, tool won't start until inner sleeve engages with bolt tip

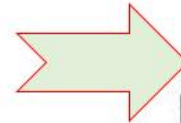
- Compact and light weight
- Handy tip lever for ejecting sheared tip
- Rubber bumper for tool body protection

SPECIFICATIONS		INCLUDES	
Capacity Bolt Drive	5/8", 3/4", 7/8"	Outer Sleeve	3/4" (16422-0)
No Load RPM	18	Inner Sleeve	3/4" (16423-0)
Torque (ft. lbs.)	400	Outer Sleeve	7/8" (16424-0)
Length	9 1/2"	Inner Sleeve	7/8" (16422-0)
Net Weight (lbs.)	10.6	Impact Wrench	(16049-0)
		Tool Case	(15047-0)

Determining Proper Bolt Length

WELD SIZE (INCHES)	TO DETERMINE THE PROPER BOLT LENGTH ADD TO THE CAPTIVE LENGTH
3/4"	1"
7/8"	1-1/8"

*Excluding washers, the lengths determined by the use of this table should be rounded up to the next 1/4"



The bolt reacts to the fastening torque and shears at the Torque Control (TC) groove when the required tension is reached.



Assertions

- Facility operator argued the problem was Insured's specification of 3/4" bolts instead of 1" bolts
 - This change was requested by the GC, but not documented
 - Dismissed argument that improper tension was the issue
- GC kept promising an expert report, but never provided one
- Insured's retained expert was highly qualified:
 - Disagreed that improper tensioning was the issue
 - Felt 3/4" bolts were sufficient
 - **BUT analyzed the project and concluded that the existing supports were insufficient!!**

Damages

- Clean up and demo: \$1.35M
- Repair and replace tubes: \$9.4M
- Incremental ship loading labor: \$7.2M
- Additional Security: \$42K
- Direct Commercial Losses: \$57M
 - Realized as of mediation: \$26M
 - Up to time facility would be fully operational: \$31M



Liability

- Insured was to have determined added weight and checked existing supports in its contract
 - **BUT:**
 - GC sent email that it checked all supports and only found one area of concern that it would address
 - Owner had hired independent engineer which inspected silos and concluded they were structurally sound
- Contractual Terms
 - Indemnity “arose from its work”

Liability

- Other experts were blaming Insured
 - Risk of at least 1% allocation
 - \$75M claim, but only \$2M policy
- Don't forget about the PI plaintiff



Lessons Learned

- Know and live up to contractual obligations, especially if they might relate to life safety issues!
- If relying on another entity for your scope, verify reliance with client, check the other party's analysis, and amend your contract.
- Don't get caught up in one analysis during review and evaluation of claim.
- Know your jurisdiction (joint and several liability) and do what you can in your contract to remain liable for only your design.
- Limitation of liability can make a real difference.

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