

# LOHR



# LOHR



TENSION CONTROL

# [R]EVOLUTION

**LEADING THE FASTENER REVOLUTION**

# BOLT HEAD LOT ID FOR TOTAL TRACEABILITY

Lohr's head-stamped Lot ID and single-sheet certification give you complete, permanent traceability, from the factory to the final installation!

## WHY IT'S SMART

- The ONLY mill-to-connection traceable tension control bolt
- Stamped-in Lot ID for quick reference or inspection—even out of the keg or installed
- Single-sheet certification simplifies paperwork
- Provides you with the ultimate QA/QC record
- Reallocate surplus stock. No identification/certification mysteries, so surplus from one job can be tracked and reallocated to your next project!

## HOW WE DO IT

Bolt, nut and washer lot traceability begins when the material arrives at the factory. Material is sample tested upon arrival to verify the mill certification.

Prior to the start of manufacturing, a traceable, unique **LOT ID CODE** is assigned for specific lots of material that will be used to produce the bolt, nut and washer assemblies. Heat code information is kept with the products throughout the manufacturing process.

At the start of manufacturing, the assigned ID code is stamped right into the head of every SMARTHEX™ TC, 1-1/8" A490 Thick SMARTHEX™ TC, and Hex Traceable bolt. This code can then be traced back to the actual heat lot of material used for manufacturing, even after the bolt has been installed at the job site.

## TRACEABILITY IN ACTION!

A massive earthquake shook kegs of SMARTHEX™ bolts off their storage pallets and out of their kegs, mixing multiple lots. Our customer could sort and salvage them, thanks to the permanent traceability of SMARTHEX™ head-stamped Lot IDs.

A sudden tornado struck a freight truck carrying Lohr bolts. The driver escaped to safety, but the abandoned truck was flipped upside-down. Although the damage to the vehicle was extensive and the kegs were broken open, Lohr's traceable bolts could be sorted and used.

These two cases are dramatic illustrations, but you don't have to suffer a natural disaster to appreciate our traceability! Traceability is equally important and effective under ordinary job site circumstances.

Issues with installation, testing, or records? You can quickly identify and track any Lohr bolt back to its cert—any time, any place—even **after installation**. This streamlines job site testing and saves thousands in lost time, record keeping, labor, and inventory control on large, extended projects. Whether you're testing connections or re-allocating surplus stock, our total traceability saves you time and money.

**It just makes sense.**

**INSPECTION CERTIFICATE**

Certificate No.: 0981130002-1  
 P/O No.: LSF 3701  
 L/C No.: N/A  
 Date issued: 2010/04/14  
 Date Shipped: 2010/03/08  
 Date Tested: 2010/02/23  
 Date Manufactured: 2009/12/26

Customer: LOHR STRUCTURAL FASTENERS, INC.  
 Description: A325 SMARTHEX T/C BOLTS, NUTS, WASHERS  
 Patent No.: US6872041B2  
 Size: **3/4-10UNCx2**  
 Surface Condition: PLAIN  
 Set Lot No.: **0990224001**  
 Qty Manufactured: 289,800 SETS  
 Marking: Bolt: A325TC, L.F., IAW, MFG LOGO  
 Nut: DH, MFG LOGO  
 Washer: F436, MFG LOGO

Quantity Shipped: 173,880 SETS  
 Lot No: W0981130002  
 Grade: TYPE 1

**1. Chemical Composition (%)**

Division	Spec.	Min.	Max.	C	Si	Mn	P	S	Cr	Mo	Ni	B	Cu
				x100	x100	x100	x1000	x1000	x100	x10000	x100		
Bolt	Spec.	Min.	Max.	30	10	60	--	--	--	--	--	5	--
				52	30	--	40	50	--	--	--	30	--
Heat No.	Spec.	Min.	Max.	32	26	78	15	7	--	--	--	20	--
				20	--	60	--	--	--	--	--	--	--
Nut	Spec.	Min.	Max.	55	--	40	50	--	--	--	--	--	--
				41	7	76	12	28	--	--	--	--	--
Heat No.	Spec.	Min.	Max.	--	--	40	50	--	--	--	--	--	--
				19	7	39	6	--	--	--	23	--	
Washer	Spec.	Min.	Max.	--	--	--	--	--	--	--	--	--	--
				19	7	39	6	--	--	--	23	--	
Heat No.	Spec.	Min.	Max.	19	7	39	6	--	--	--	23	--	--
				--	--	--	--	--	--	--	--	--	--

**2. Mechanical Properties**

Division	Unit	Min.	Max.	Hardness		Specimen Tensile				Yield Strength	Wedge Tensile Load
				n=8	n=4	Surface	Core	Yield Strength	Tensile Strength	Elongation	Reduction of Area
Bolt	Spec.	Min.	Max.	HRC	HRC	--	--	--	--	30,700	49,500
				25	34	--	--	--	--	48,323	52,426
Results.	AVG.	Min.	Max.	HRC	HRC	30	N/A	N/A	N/A	47,002	50,978
				32	31	--	--	--	--		
Wedge Angle	AVG.	Min.	Max.	--	--	--	--	--	--	--	( 6° )
				--	--	--	--	--	--	--	--
Tested By	AVG.	Min.	Max.	--	--	--	--	--	--	--	--
				31	--	--	--	--	--	--	--

**2.2 Nut**  
 - Lot No: P0990105001  
 - Grade: GR.DH

Division	Unit	Min.	Max.	Hardness		Proof Load	
				n=8	n=4	lb	lb
Bolt	Spec.	Min.	Max.	HRC	HRC	24	58,450
				38	45		
Results.	AVG.	Min.	Max.	HRC	HRC	26.8	GOOD
				30.4	GOOD		
Tested By	AVG.	Min.	Max.	--	--	30	****
				--	--	--	--

**2.3 Washer**  
 - Lot No: P0980805001  
 - Grade: TYPE 1

Division	Unit	Min.	Max.	Hardness	
				n=8	n=4
Bolt	Spec.	Min.	Max.	HRC	HRC
				38	45
Results.	AVG.	Min.	Max.	HRC	HRC
				41.5	41.8
Tested By	AVG.	Min.	Max.	--	--
				42	--

**3. Assembly Lot Tension Test**

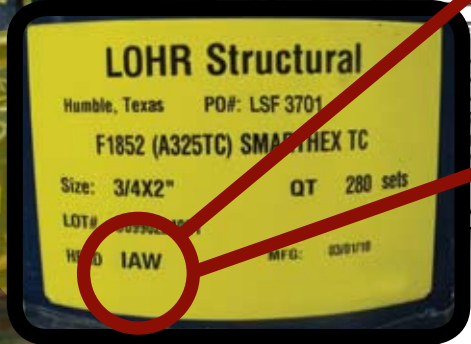
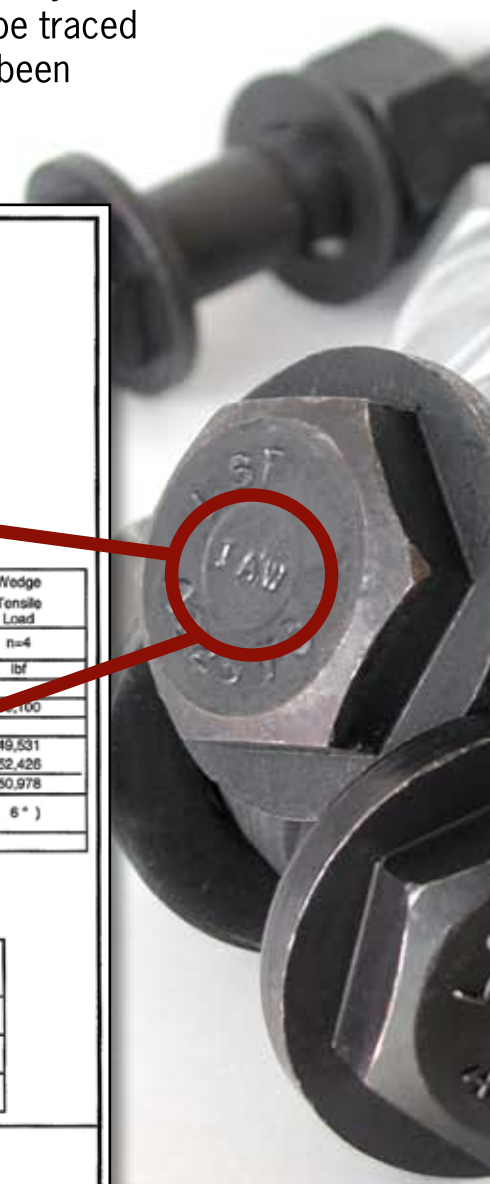
Division	Unit	Min.	Max.	Axial Tension	
				lb	lb
Bolt	Spec.	Min.	Max.	29,400	33,750
				33,750	37,125
Results.	AVG.	Min.	Max.	35,438	35,438
				35,438	35,438
Tested By	AVG.	Min.	Max.	--	--
				--	--

**4. Visual & Thread Inspection**

Division	Appearance	Thread
Nut	OK	OK
Washer	OK	--

Manager of Quality Assurance Dept.

The Lot ID traces every Lohr bolt back to its certification and lot, allowing easy reallocation of surplus stock to other projects.

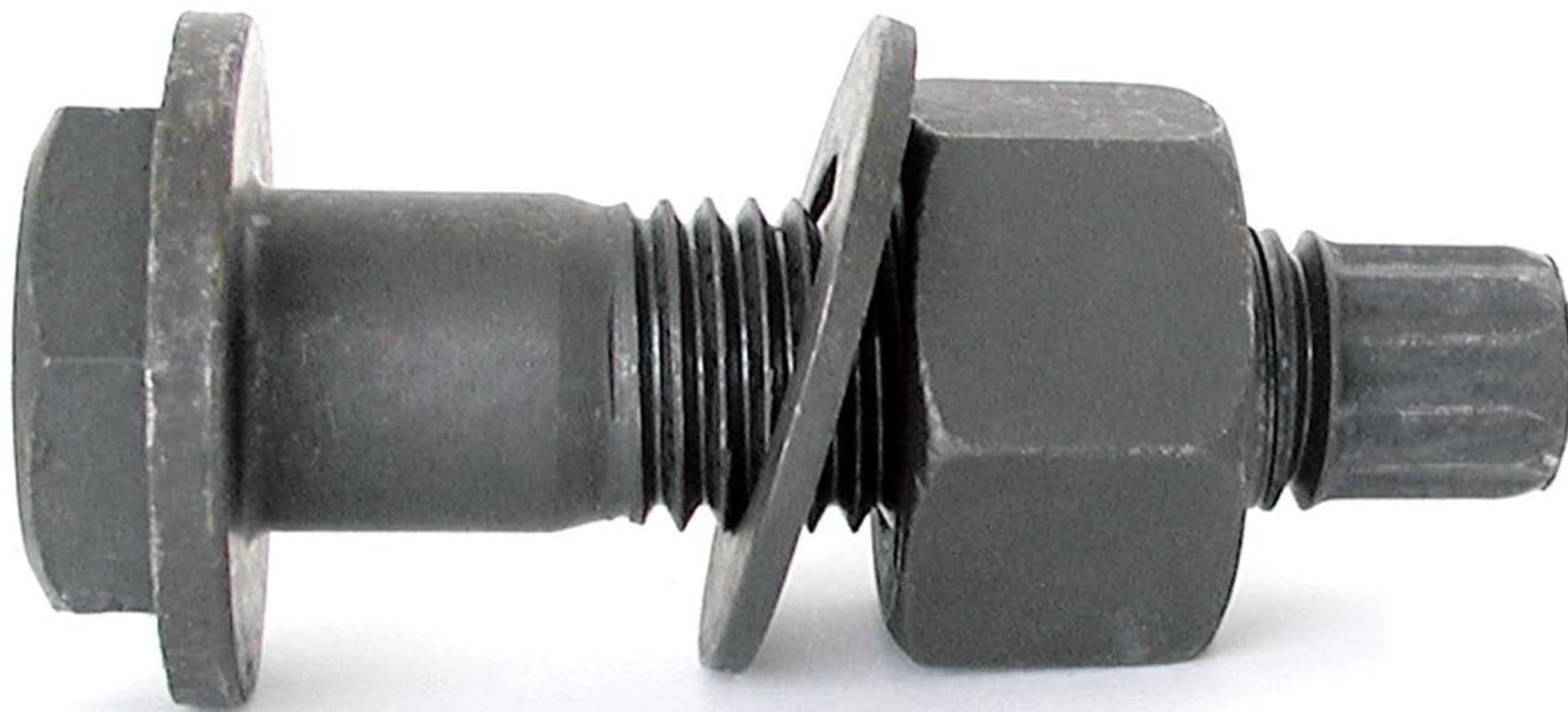




# SMARTHEX™ TENSION CONTROL BOLTING

Combines the structural integrity and installation ease of our original large-head tension control bolt with the versatility of a hex head

## OUR ORIGINAL PATENTED SMARTHEX™ TC



### WHY IT'S SMART

- Pre-assembled, matched and tested sets reduce waste
- Head-stamped Lot ID offers permanent traceability
- Convenient one-man installation reduces labor and fatigue
- No torches necessary to burn out rollers or thread-damaged bolts
- Enhanced accessibility: Hold the wrenching surface and use turn-of-nut procedure if inadequate clearance prevents use of electric installation tool
- Eliminates rollers: Use the wrenching surface to tighten if damaged threads cause rolling
- Easy disassembly: Just hold the built-in wrenching surface and loosen nut
- More efficient testing: Wrenching surface simplifies removal from test equipment—no more cutting out rollers!

### HOW WE DO IT

The genius of the patented Lohr SMARTHEX™ lies in its dual nature.

The top half resembles an old-fashioned hex-head bolt, giving SMARTHEX™ all the advantages that iron workers appreciate from a standard hex: a wrenchable surface, easy removal from connections and test equipment, and extra insurance against unexpected installation problems.

The bottom half presents a washer-sized bearing surface equal to that of a hardened flat washer. This large bearing surface eliminates the need for a second washer on short slotted and oversized holes.

## OUR PATENTED 1-1/8" A490 THICK SMARTHEX™ TC

### WHY IT'S SMART

All the benefits of the original patented Lohr SMARTHEX™ TC (left), plus:

- Eliminates second washer in greater than 1" diameter A490 installations in oversized or short slotted holes in an outer ply, reducing materials and freight costs
- Additional 5/16" grip reduces required bolt length, increasing your savings!

### HOW WE DO IT

We designed the new 1-1/8" Thick SMARTHEX™ TC to eliminate the need for a separate 5/16" hardened washer required under the head when A490 bolts with a diameter of greater than 1" are used in connections with oversized or short slotted holes in an outer ply. The new bolt has our basic patented SMARTHEX™ TC head design with a thickened washer formed as part of the bolt head. Elimination of the 5/16" washer also provides an additional usable 5/16" grip on each bolt.



Rivet Head TC requires two 5/16" thick washers in the same application.

Patented Thick SMARTHEX™ TC requires just one 5/16" thick washer, gaining 5/16" of grip.

### Testing

Karl H. Frank, Ph.D., P.E., studied and tested the ability of the Thick SMARTHEX™ TC to replace the separate 5/16" washer that the AISC currently requires under the bolt head for bolts greater than 1" in diameter on short slotted and oversized holes.

### Conclusions

The Thick SMARTHEX™ bolts, with integral thick washer formed with the head, performed better than a standard bolt with a separate 5/16" washer. The plastic deformation of the plate material under the washer head of the Thick SMARTHEX™ bolt was less than 0.0005" in the A36 test plate. The Thick SMARTHEX™ TC bolt prevents excessive deformation under the bolt head and does not require a separate washer.



# HEX TRACEABLE

Head-stamped Lot IDs and pre-assembled, matched sets bring Lohr's convenience, savings, and permanent traceability to hex heads

## WHY IT'S SMART

- No erector bolt makeup costs
- Buy exact quantities
- Reduce thread damage during shipping
- Streamline ordering: No ordering separate components from multiple sources and getting stuck with component excesses or varying delivery dates.
- No more waste or counting out for project delivery
- Reallocate Surplus Product: With our head-stamped Lot ID traceability, surplus doesn't have to mean scrap. Our Lot ID gives you a built-in means of tracking surplus stock, matching it effortlessly to its certs, and reallocating it to future jobs. No hassle with mismatched components or counting out—you'll have an immediate count.
- Simplify inventory: Track all components with one count.

## HOW WE DO IT

Introducing the first conventional (non-tension control) hex head bolts manufactured as pre-assembled, matched sets with permanently traceable Lot IDs! For those who prefer conventional bolting but want Lohr's famous traceability, 1-page certs, convenience, and savings.

### Permanent Lot ID for Total Traceability

An identifying Lot ID stamped directly into the bolt head during manufacturing guarantees you total traceability from the mill to the connection. And because the same Lot ID applies to the whole matched set from a single manufacture, your paperwork savings are exponential.

### Assembled, Matched Sets

Each pre-assembled set includes a Lot ID-stamped hex head bolt, F436 washer, and A563 DH lubricated nut. No more hassles over multiple sources and certs for multiple parts. No more nightmare paperwork conducting pre-installation verification tests with numerous possible combinations.

### 1-Page Certification

Like our patented SMARTHEX™ TC bolt sets, our new matched hex sets provide the convenience of single-sheet certification to streamline your paperwork, tracking and testing. Instead of tracking three separate items, you track a single assembly.



# DACROMET® COATING

Smart, economical, corrosion-defying alternative to galvanized

ASTM has approved the use of DACROMET® on A490 fasteners. DACROMET® has unparalleled resistance to salt, humidity, solvents and other corrosives—without hydrogen embrittlement. DACROMET® even costs less than galvanized!

For projects requiring corrosion protection, we recommend DACROMET®, the leading water-based inorganic metal finishing system recognized globally as a proven and cost effective alternative to electro, hot-dipped and mechanical platings. DACROMET® can be applied to a variety of substrates in order to provide corrosion protection to ferrous metals.

DACROMET® compositions are proprietary water-based coating dispersions containing metal oxides, metallic zinc, and aluminum flakes. The zinc and aluminum platelets align in multiple layers, forming a metallic silver gray coating. Applied as a liquid material, the coating becomes totally inorganic after curing at 610°F/321°C.



## CORROSION RESISTANCE AFTER 1000 HOURS OF SALT WATER SPRAY



DACROMET®



Hot-dipped galvanized



Mechanically galvanized

DACROMET® is a registered trademark of Metal Coatings International.

## WHY IT'S SMART

- Dramatically out-performs galvanized in saltwater.
- Hydrogen Embrittlement Free: Absence of acids or electrolysis in the coating process assures freedom from hydrogen embrittlement, commonly associated with the galvanizing process.
- Four-Way Corrosion Resistance:
  1. Barrier Protection: Overlapping zinc and aluminum flakes provide an excellent barrier.
  2. Galvanic Action: Zinc corrodes to protect steel.
  3. Passivation: Metal oxides in matrix slow down corrosion reactions of zinc and steel.
  4. Self-Repairing: Damaged areas in the coating fill with zinc oxides and carbonates.
- Bimetallic corrosion resistance accomplished by concentration of aluminum within the coating.
- Paint Base: DACROMET® is a base for most paints, including electro-deposited paint.



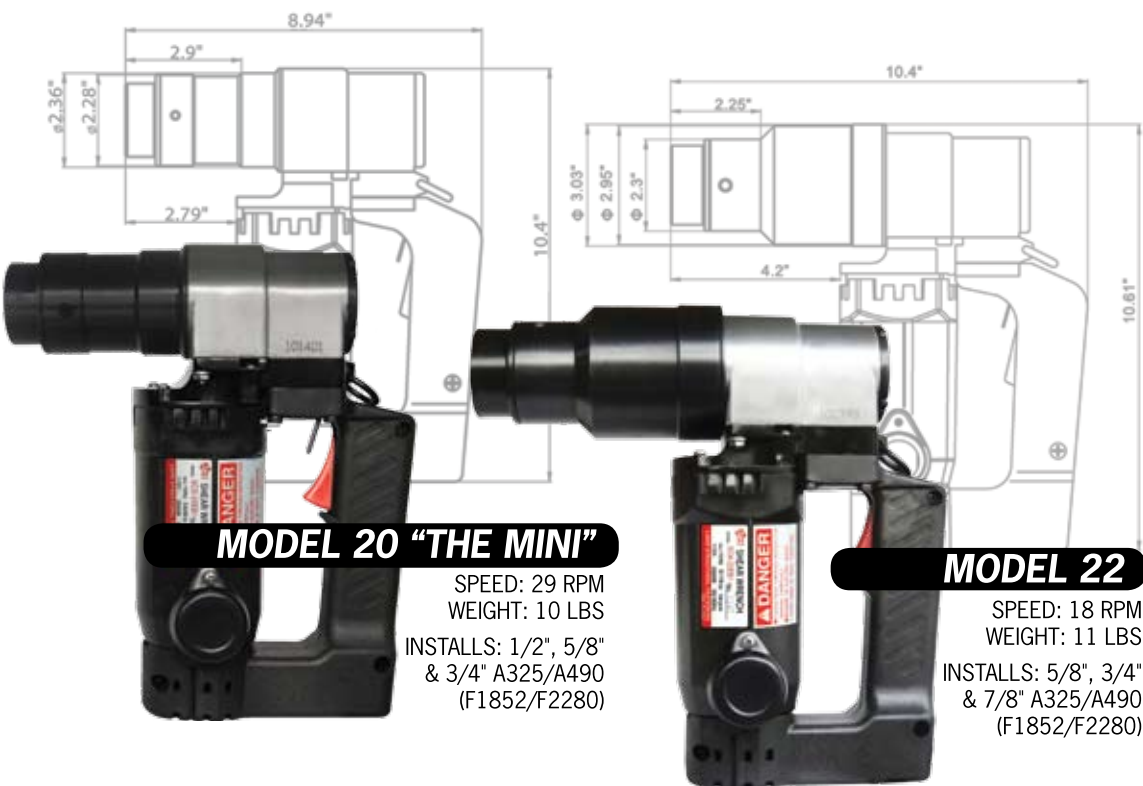
# ALL-NEW TOOLING

First major improvements to tension control tooling in 25 years!

## ALSO AVAILABLE

**MODEL 30**  
 INSTALLS up to  
 1-1/4" A325/A490  
 (F1852/F2280)

**MODEL 36**  
 INSTALLS up to  
 1-1/2" A325/A490  
 (F1852/F2280)



**MODEL 20 "THE MINI"**

SPEED: 29 RPM  
 WEIGHT: 10 LBS  
 INSTALLS: 1/2", 5/8"  
 & 3/4" A325/A490  
 (F1852/F2280)

**MODEL 22**

SPEED: 18 RPM  
 WEIGHT: 11 LBS  
 INSTALLS: 5/8", 3/4"  
 & 7/8" A325/A490  
 (F1852/F2280)

**MODEL 24**

SPEED: 15 RPM  
 WEIGHT: 14.5 LBS  
 INSTALLS: 3/4", 7/8" & 1"  
 A325/A490 (F1852/F2280)

**MODEL 27**

SPEED: 9 RPM  
 WEIGHT: 15 LBS  
 INSTALLS 3/4", 7/8",  
 1" & 1-1/8" A325/  
 A490 (F1852/F2280)



**HARDENED  
 STEEL (NOT  
 ALUMINUM)**

**INTERCHANGEABLE  
 MOTOR/HANDLE  
 FITS ALL 5 TOOLS**

**PROTECTIVE  
 METAL BRUSH CAP**

**TIE-OFF  
 LOOP**

**MORE  
 SPACE**

## LOHR'S NEW TENSION CONTROL INSTALLATION TOOLS

Over the last 25 years, tension control bolts have seen many dramatic improvements. But until now, TC installation tooling has stood still.

To meet the demands of the modern TC industry, Lohr brings its **TENSION CONTROL [R]EVOLUTION** to TC tooling. Like our SMARTEX™ bolt, **it just makes sense.**

Unique features:

- Interchangeable motor/handle fits all five tools
- More space between the motor and the handle
- Tie-off loop just above the handle
- Brush width and length increased for longer life
- Replaceable brush guides
- Metal caps protect brush screws and brushes
- Durable, lightweight heat-treated steel (not aluminum) used for the back plate and joining the motor to the gear drive

**ALL MODELS AVAILABLE IN 110 AND 220 VAC.**

## HAND INSTALLATION TOOLS

**MODEL 24HT**

2-PIECE HANDLE  
 AVAILABLE  
 SOCKETS:  
 7/8", 1"

**MODEL 20HT**

EXTENDABLE HANDLE  
 WITH KNUCKLE JOINT  
 AVAILABLE SOCKETS:  
 1/2", 5/8", 3/4"

## LOHR'S NEW NUT BUSTERS (NUT REMOVERS)

Current RCSC requirements mandate more testing than ever. If you've ever tried to remove a 1-1/8" A490 from a Skidmore, you'll appreciate our new **NUT BUSTERS**.

Instead of two men, a six-foot breaker bar, and a lot of time and muscle, you get one-man, effortless removal in about three seconds. Simply place a **NUT BUSTER** on the nut, drive it for about three seconds, and the nut is loose!



**MODEL 20NB**  
 3/4" SOCKET

**MODEL 22NB**  
 7/8" SOCKET

**MODEL 24NB**  
 1" SOCKET

**MODEL 27NB**  
 1-1/8" SOCKET



# PROJECT HISTORY

Over thirty years of fastening steel around the globe



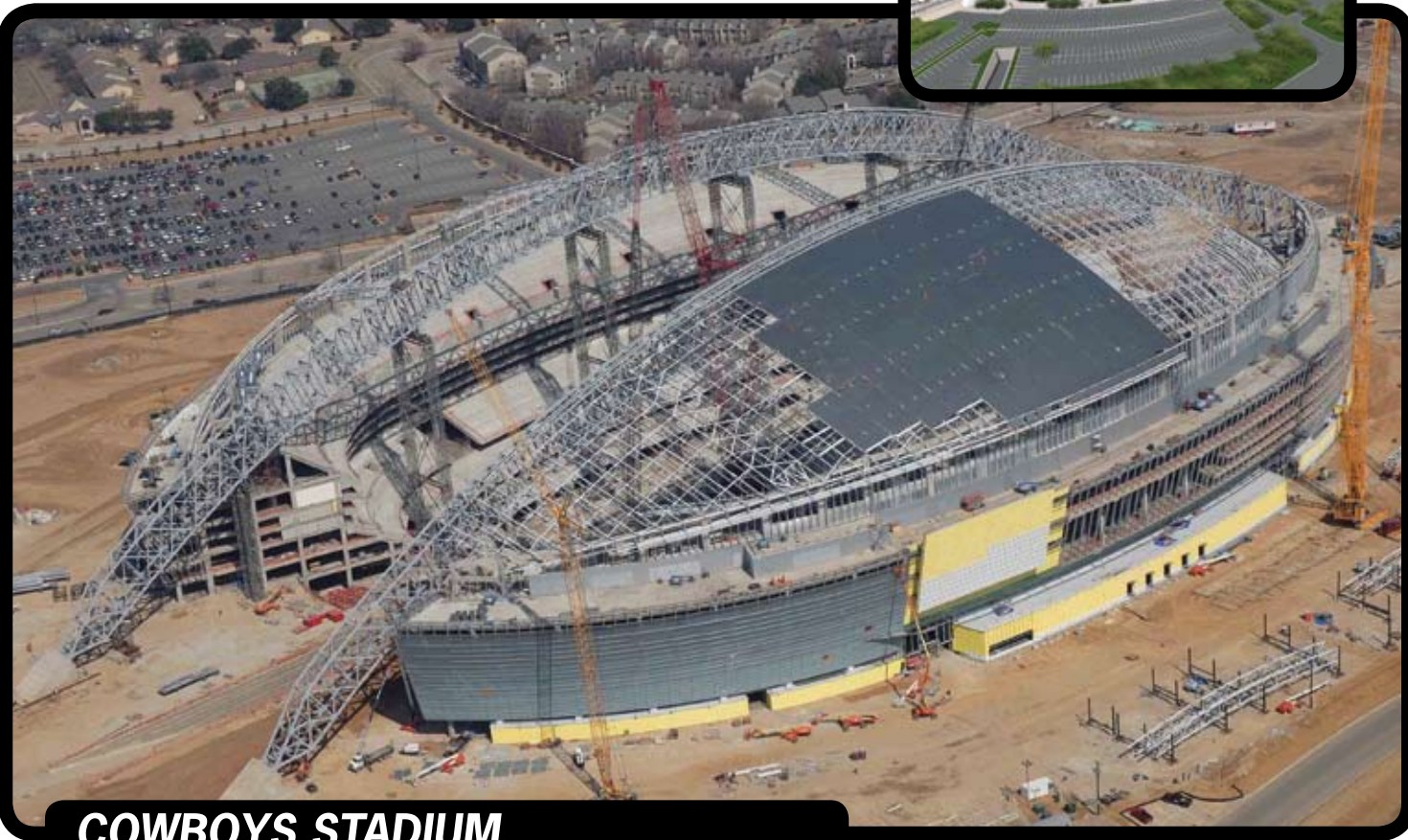
**FOUNTAINBLEAU HOTEL TRUSS**

Las Vegas



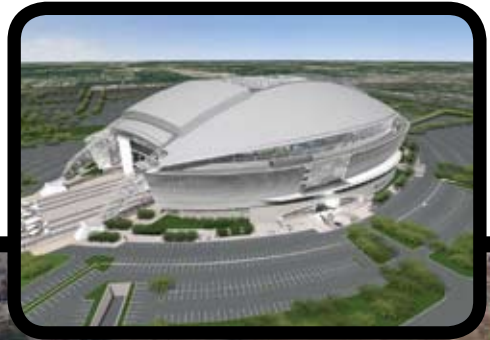
**BAY BRIDGE BYPASS**

San Francisco



**COWBOYS STADIUM**

Dallas



**JIN MAO TOWER**

Shanghai



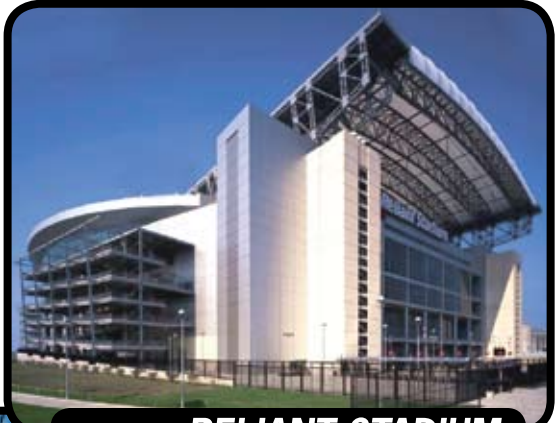
**PEPSI CENTER**

Denver



**COLTS STADIUM**

Indianapolis



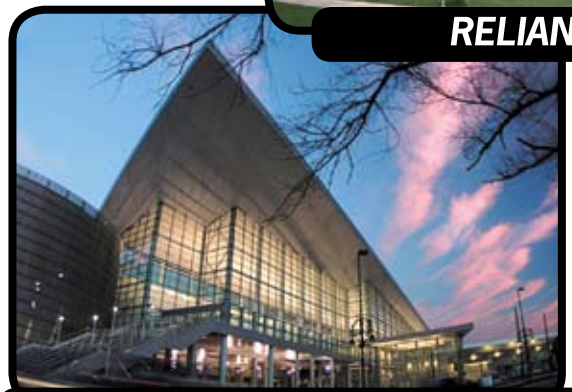
**RELIANT STADIUM**

Houston



**MINING PROJECT**

South America

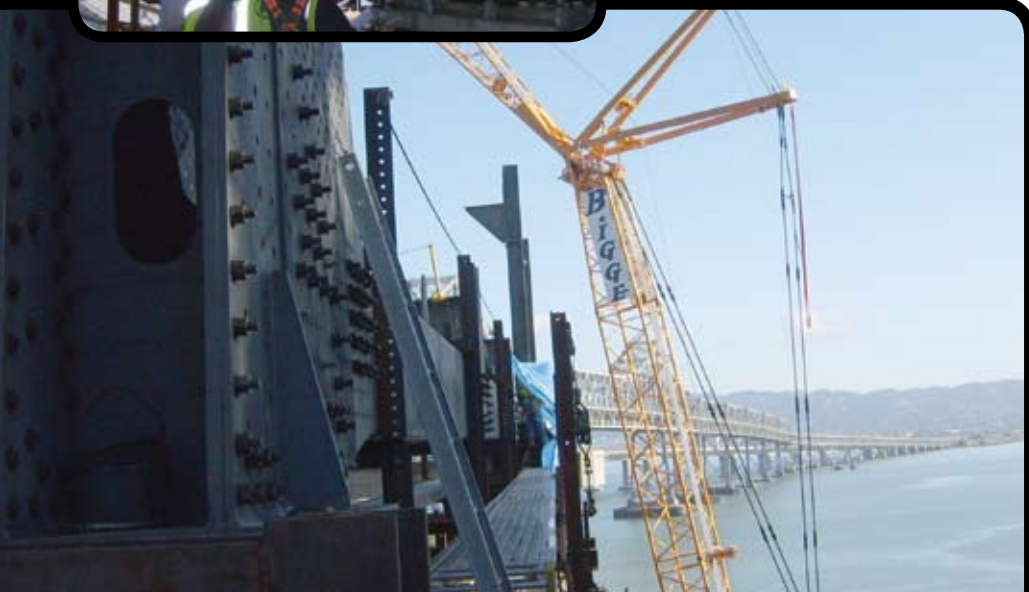


**COLORADO CONVENTION CENTER**

Denver



Super-truss: Lower edge of super-truss at ground level (above), and being hoisted into place (left).







# ONE-STOP SHOPPING

**IF YOU NEED IT, WE CAN GET IT! See us for...**

## ABOUT US

### Our company's history and philosophy

Our founder was one of the first to introduce tension control bolts to the U.S. market in 1973. In 1985, we launched our innovative large head tension control bolt—a full five years before the competition followed suit. That original large head design became the industry standard. In 2002, we redefined that standard with our patented SMARTEX™ TC bolt.

Never content to follow the pack, we believe in product innovation, unsurpassed service, and a forward-looking business philosophy.



Loading a flatbed with kegs of Lohr bolts outside our Houston-area warehouse.



Our 40,000+ square foot Houston Headquarters stocks one of the world's largest inventories of tension control bolts.

### LOHR STRUCTURAL FASTENERS

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