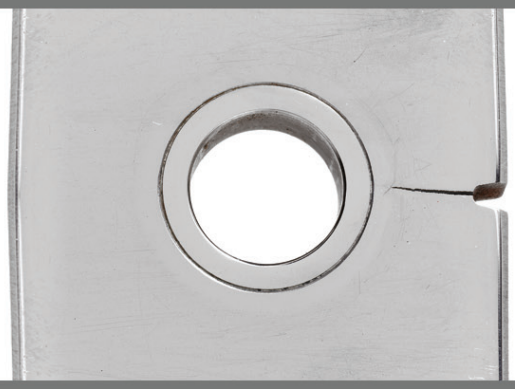
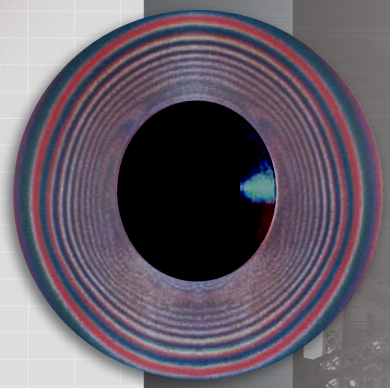
StopCrackEX™

Extend the Fatigue Life of Drill Stops by Over 10x



PROCESS BENEFITS:

- Arrests the growth of small cracks in holes
- Cost-effective alternative to redesign of the structure
- Installed bushing allows for positive visual inspection
- Simple and easy-to-use one-sided operation
- Reduces maintenance and inspection costs



Cold expanding bushings into drill stops for high performance bridge maintenance

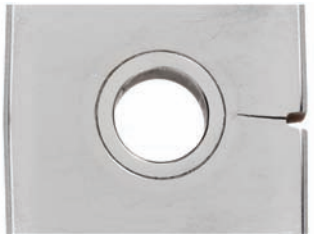
FTI®
FATIGUE TECHNOLOGY

StopCrackEX™

FATIGUE LIFE ENHANCEMENT OF DRILL STOPS IN METAL STRUCTURES

Many fatigue cracks in bridge structures are drill stopped to repair the bridge. However, drill stopping may only stop a crack from growing for a short time. FTI's StopCrackEX System cold expands a bushing into a drill stop, propping the hole and imparting residual compressive stresses around it, protecting it from cyclic loads. This large zone of residual compression around the drill stop greatly reduces or arrests crack growth, even when the drill stop misses the tip of the crack. Independent, third-party testing has shown that this repair method extends the fatigue life of the drill stop by over ten times.

StopCrackEX is based on FTI's Cold Expansion System and products that are being used by virtually every commercial and military aircraft manufacturer worldwide to extend the fatigue life of holes in metallic structures. FTI's 40 years of engineering expertise has lead us to become the world leaders in expanded products.

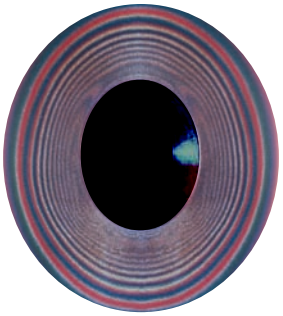


StopCrackEX cold expands an interference fit bushing into a drill stop

WHAT IS COLD EXPANSION?

Cold Expansion is accomplished by pulling a tapered mandrel through a pre-fitted, lubricated bushing (or sleeve) inside a hole in aluminum, steel, or titanium. The lubrication inside the bushing reduces mandrel pull force, ensures uniform radial expansion of the drill stop, and allows one-sided processing.

Cold expansion of a hole counteracts its fatigue-prone characteristics by creating a compressive residual stress field around the hole, effectively shielding the hole from the cyclic tensile stress loads that cause cracks to grow. Design engineers use cold expansion to reduce the stress concentration factor associated with a hole, thereby improving the fatigue and damage tolerance of a structure. These permanent compressive stresses surrounding the hole mitigate crack growth, extend the fatigue life, and improve the integrity and safety of the structure.



Zone of compressive residual stress surrounding a cold expanded hole as seen through a polarized filter.

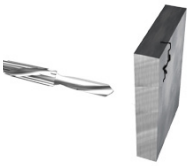
STOPCRACKEX STANDARD KIT

INCLUDED IN STANDARD KIT:

- Starting Drill Bit
- Starting Reamer
- 1/2" Diameter Bushings (Various Lengths)
- Combination Check Gage
- Mandrel
- Mandrel Gage
- Jaw & Nosecap
- Puller & Handpump*
- Small Toolbox & Durable Case

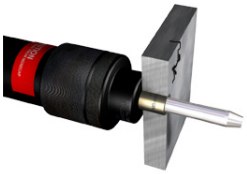
**Optional Electrical PowerPak Available*

STOPCRACKEX INSTALLATION PROCESS



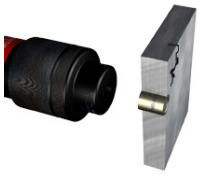
Drill and ream the drill stop

Place the bushing onto the mandrel and insert mandrel into puller unit

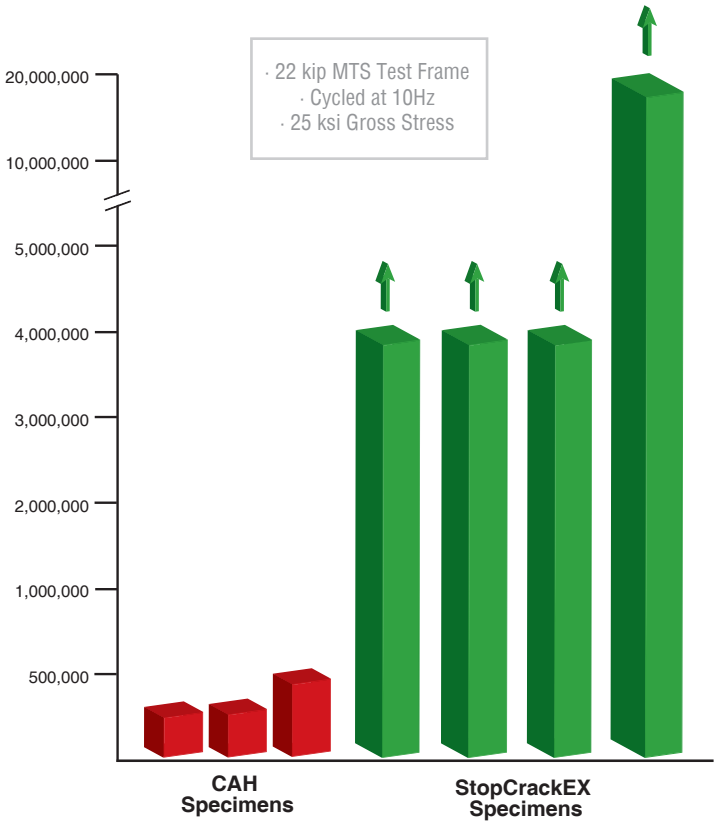


Insert the bushing/mandrel into the drill stop

Activate the puller unit and expand the bushing into the drill stop



Bushing is now installed into the drill stop



INDEPENDENT TESTING RESULTS

A third-party testing facility was contracted to conduct a series of independent fatigue tests investigating the effectiveness of the StopCrackEX process in stopping fatigue cracks in bridge steel.

The StopCrackEX process showed over a 60 times improvement for crack reinitiation and specimen life when compared with the crack arrest holes (CAH).

Notched Specimen

Pre-Cracked Specimen

StopCrackEX Repair

Crack Arrested

SPECIMEN	CRACK LENGTH*	RADIUS*	CYCLES TO BREAK HOLE	CYCLES TO REINITIATE CRACK	REINITIATED CRACK LENGTH*
#1 Crack Arrest Hole	0.298	0.05	17,500	230,000	0.145
#2 Crack Arrest Hole	0.265	0.05	6,000	250,000	0.14
#3 Crack Arrest Hole	0.264	0.05	7,000	440,000	0.149
#4 StopCrackEX	0.29	0.05	580,000	4,000,000	No Crack
#5 StopCrackEX	0.285	0.05	250,200	4,000,000	No Crack
#6 StopCrackEX	0.265	0.05	700,000	4,000,000	No Crack
#7 StopCrackEX	0.262	0.05	210,000	20,000,000	No Crack

**All lengths measured in inches*

ADDITIONAL FTI SOLUTIONS

Fatigue Technology is the industry leader in providing real-world solutions to cracks in metal structures caused by aging, corrosion, and cyclical stresses. StopCrackEX is only one solution to a wide variety of offerings that Fatigue Technology can provide the bridge maintenance industry.

By cold expanding holes and introducing the benefits of compressive residual stresses, fatigue critical joints and structures can be re-lifed and repaired back to maximum performance. Anywhere from re-sizing damaged bolt holes back to nominal size, to increasing the fatigue life of a gusset joint, cold expansion technology can save on maintenance costs and time while providing the critical safety enhancement for today's bridge maintenance needs. Cold expansion is also an excellent insurance against increase service loads and traffic volume.

Please call FTI if you have any problems with metal fatigue, cracking, bolt hole damage due to cyclical stress or corrosion, or any situations with structural joints. We are confident we can help with an innovative and cost saving solution.





FTI's corporate headquarters and manufacturing plant is located just 5 minutes from the Sea-Tac International Airport and 10 minutes from downtown Seattle, Washington.

FTI SERVICES

Fatigue Technology is the world leader in cold expansion technology. We have pioneered this science since 1969 and have advanced the cold expansion process to develop cost savings ideas for production simplification, manufacturing and maintenance time-saving, and improved aircraft structural performance. We offer our customers a full range of services to support their applications.

THESE SERVICES INCLUDE:

- On-site product support
- Technical training
- Engineering/design support
- Product and materials testing
- Research and development services
- Field repairs and upgrades

(Please contact us to discuss your current application.)

FATIGUE TECHNOLOGY®
A PCC Company

CORPORATE HEADQUARTERS

401 Andover Park East
Seattle, WA 98188-7605 USA

Phone: 206.246.2010
Fax: 206.244.9886
Email: sales@ft-infrastructures.com

www.ft-infrastructures.com

OFFICES:
Atlanta, GA
Dallas, TX
Los Angeles, CA
Oklahoma City, OK
Salt Lake City, UT
Washington, DC
Broughton, United Kingdom
Hamburg, Germany
Toulouse, France

REPRESENTATIVES:
Australia
China
India
Israel
Italy
Japan
Singapore
Spain
South America

US and foreign patents pending for StopCrackEX System