



**SECURE ASSEMBLY AND ECONOMY OF JOINTS UTILIZING TAPTITE 2000® SCREWS
AND "ANTI-CROSS-THREADING" SCREWS** *by Peter Egger*

Due to the mechanization and automation of the screw-driving process, incorrectly driven screws occur repeatedly when using traditional metric ISO fasteners, requiring correction and costly repairs - if they are indeed permissible.

In addition to the screw "chewing up" or cross-threading the thread, caused by swarf, welding beads, paint and other forms of contamination, the "forming" and "cutting" of the existing thread due to the screw having been misaligned when it was started, is one of the primary causes of faulty joints.

With more stringent industrial requirements for quality and product liability exposure being real concerns today, there is no longer any tolerance for assembly error. Therefore, attempts have been made to eliminate cross-threading by using different fastener tip designs and/or adding starting aids in the nut member threads.

The real breakthrough in preventing cross-threading in automotive assembly actually occurred in 1964. Thanks to the development of TAPTITE® screws and their application in the Ford Mustang automobile, it was possible to reduce the incidence of cross-threading when attaching the seatbelts from approximately 10% to 0% and eliminate repair costs! Today, TAPTITE 2000® are the standard thread-forming fasteners specified in Ford's Worldwide Standard with the brand name/trademark being clearly noted to exclude any possibility of substitution, ensuring process security in assembly.

TAPTITE® screws were developed to reduce assembly to increase the quality of the fastening joint and eliminate the need to tap the nut member. The concept is so simple and yet so effective. Each TAPTITE® screw is not only a tool to form the nut thread as would a forming tap, but also an element in the final assembly. The TRILOBULAR® form of the screw's cross-section prevents it from loosening, and hence expensive forms of securing it in place, such as micro-encapsulated adhesives on the threads, are not necessary.

Due to continuing cost pressures, the automotive industry showed greater interest in employing innovative and cost-saving fastening techniques. Therefore, specially designed "anti-cross-threading" screws were introduced and aggressively marketed in the automotive industry as a solution.

The following analysis considers the question of whether it is possible to eliminate cross-threading entirely and how doing so with certainty might be achieved.

Secure assembly

Statement: "100% certainty of preventing "Cross-Threading"

Fundamentally speaking, it is impossible to guarantee this statement if a screw is to be driven into a thread when practical economics are considered! Research by a leading German automaker showed that joint security depends very greatly on the insertion alignment angle and the nominal size of the screw. With an alignment angle from 0 to 6° and screws larger than M7, it is possible to achieve "almost" 100% joint security. But even at a placement angle of 8° security was reduced to 80%, and it dropped off rapidly as the placement angle increased. In the case of M6 screws "only" 90% security was achieved at 6°, and there was no difference when compared to a normal ISO screw at 7°! *(cont. on pg. 3)*

REMINC STAFF

- Laurie Mandly Chairman & CEO
- Tim Egan President
- Ken Gomes VP - Marketing/Engineering
- John Reynolds Mgr. - Fastener Engineering
- Don Fosmoen Mgr. - Manufacturing Engineering
- Dennis Boyer Senior Project Engineer
- Suzanne Lilly Administrator - Int'l. Properties
- Beth Rondeau Dir. of Financial Administration
- Marena Boyadjian Executive Assistant
- Bobby Budziskek Lab Technician
- Ralph Barton Associate



**SPOTLIGHT ON
LAURIE MANDLY**

Laurie Mandly is Chairman and Chief Executive Officer of REMINC and CONTI. Laurie holds a Bachelors Degree from Boston College and has been associated with REMINC and CONTI since 1986, at which time her late father, Arthur Bancroft, acquired the companies. In her current positions, as Chairman and CEO, she oversees all company operations and directs corporate financial matters.

R E G I S T E R

"REMINC/CONTI Worldwide Licensee Meeting"

(Excerpts from a presentation given at the Global Licensee Meeting in Europe on April 4, 2008 by REMINC/CONTI Chairman and CEO Laurie Mandly)

First I would like to thank you all for being here and attending CONTI's 33rd Annual Licensee Meeting. I am proud to say that this is CONTI's first global licensee meeting. REMINC and CONTI have always been global companies, but during the past 5 years CONTI and REMINC have expanded their worldwide staff and presence to better respond to our licensees' requirements. We are continually striving to be the best fastener licensing company in the world.

Forty-five years ago my late father and CONTI/REMINC founder, Art Bancroft, paved the TRILOBULAR™ program's road to success, and it is the same road that we at REMINC and CONTI still follow today. My father would often say that CONTI's and REMINC's licensees do not sell screws, but cost savings, as the fastener is just the means to that end. Having an application engineering capability and a pro-active product manager or "Champion" are integral components for success. Above all, persistence is crucial! We truly believe that our products provide a win-win situation for the end user and the licensee. The end-user achieves assembly cost-savings and the licensee gains a profitable sale.

We have always believed in the principle of working together to achieve a common goal. The presentations given today follow this rule of support. CONTI and REMINC are here to support and assist you. New products are being invented, application studies are continually being conducted, technical and marketing support is freely provided and we are always available for problem solving. CONTI and REMINC employees go to end-users with and without our licensees to get our products incorporated into standards and designed into new or problematic applications. All CONTI and REMINC employees are working on your behalf every day. Utilize them. If we work together as a team, sales of TRILOBULAR™ and REMFORM® fasteners will increase.

I would like to briefly recap your day

and offer some thoughts to leave with you.

CONTI Director, Barry Hittner, confirmed that the management succession plan set in motion some time ago by Art Bancroft is now in place. Ralph Barton has retired after 15 years of service and Tim Egan has been elected President of REMINC.

Peter Kammüller, Director-Market Development at CONTI, presented you with the philosophy that if individuals understand their contribution to the whole, they are much more motivated and enthused about their contribution to their ultimate goal. Everyone must feel positive about their contribution to the whole. We are motivated to work together with you, our licensees, to achieve the common goal of increased fastener sales.

TRILOBULAR™ and REMFORM® program sales growth statistics were reviewed by Tim and Peter. We hope you found these figures informative and as was stated, CONTI and REMINC have a goal of 15% sales growth in 2008, and we are working diligently to achieve that target. Tim and Peter showed you that the potential for expanding applications and increasing sales is enormous and we have just scratched the surface. They encouraged us all to work together to achieve increased sales of the program products.

Other speakers gave examples of our joint efforts with licensees in promoting all TAPTITE® products, especially TAPTITE 2000®, FASTITE® 2000™ and REMFORM® screws, have started to show very positive results. These results are reflected in the increase of sales and pieces for these products, especially in Europe and Asia. These results were achieved because of the support provided by CONTI and REMINC's dedicated employees combined with the efforts of several aggressive licensees, our TAPTITE® Champions!

CONTI Director, Bob Flanders, spoke about how licensing has evolved and changed over the years, from merely

granting permission to use an individual's patent or a trademark to a full-fledged business relationship between licensor and licensee, approximating a joint venture, with mutual expectations and responsibilities, to better provide solutions to end-user problems.

Ken Gomes, VP-Marketing & Engineering, introduced our new fastener, MAGTITE® 2000™, designed for certain magnesium applications. This product resulted from an expressed need to find a suitable fastener to thread-form into magnesium, a light weight metal being used universally today.

Mr. Freeman from Price Waterhouse Cooper gave you an excellent presentation- "Global Overview and Trends in Automotive Manufacturing". Mr. Freeman provided you with a global outlook for the automotive industry including its many challenges.

Finally, Ralph informed you how the global economy is impacting our industry. CONTI and REMINC firmly believe that this period of economic adversity provides opportunities for cost-saving applications. Consequently we have several marketing initiatives in motion, in North America, Europe and Pan-Asia, all getting positive results.

Don Fosmoen, Manager-Manufacturing, described how the CONTI/REMINC staff's extensive travels are providing "in-person" licensee support, at an even higher level than previously. We are highly motivated and very optimistic that by working together we will continue to progress and succeed.

Again, thank you all for your attendance today. If you have any questions on today's presentations, do not hesitate to contact us. I wish everyone here all the best, and remember, CONTI and REMINC are here for you.

SECURE ASSEMBLY AND ECONOMY OF JOINTS UTILIZING TAPTITE 2000® SCREWS . . . (cont. from pg. 1)

The one and only system that can guarantee the elimination of cross-threading is that of TAPTITE® screws, more specifically the latest generation TAPTITE 2000® design. Since with the TAPTITE® system, the nut member is unthreaded to begin with, it is impossible to “chew up” or cross the thread! The TAPTITE 2000® screw is not only the fastening element but also the thread-forming tool. In blind holes the “stabilizing point threads” of the TAPTITE 2000® thread-forming tip typically result in an insertion alignment angle of less than 5° before the thread is formed.

Saving time and money by using anti-cross-threading screws

Statement: “Doing away with manual placing and starting”

This statement, referring to anti-cross threading fasteners, is correct if one is comparing them to normal ISO fasteners however when using TAPTITE® screws manual placing and starting are eliminated completely as the fastener can be inserted and driven solely by the power-driver.

Statement: “Doing away with repair costs due to incorrect screw-driving”

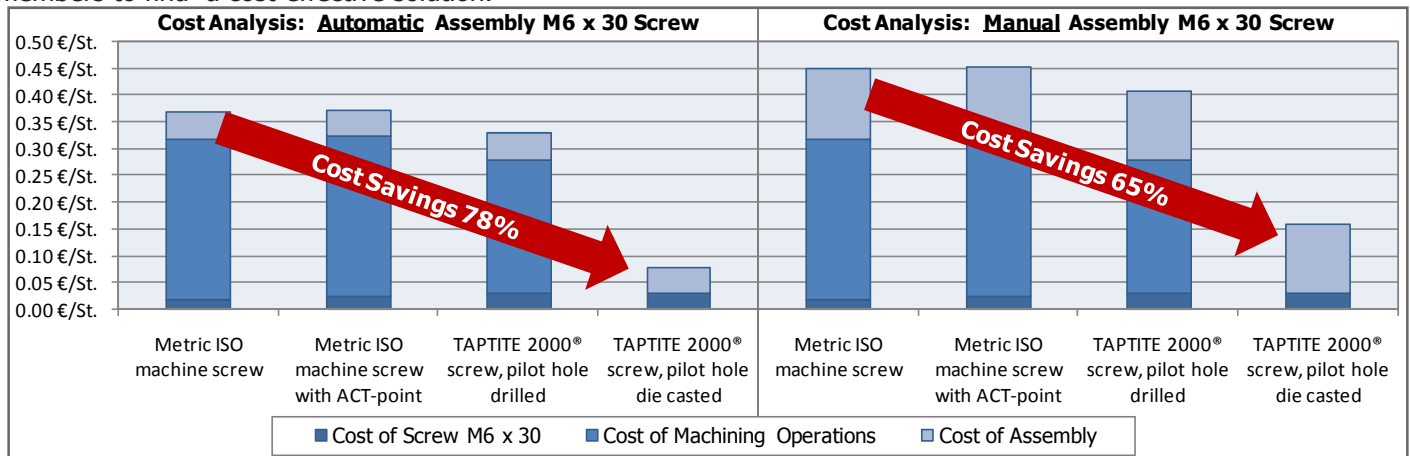
This statement is only partially correct, since it is not possible to guarantee 100% correct installation with anti-cross thread fasteners. With TAPTITE® screws, there are never any repair costs because cross-threading is impossible when the screw is inserted and driven into an unthreaded nut member.

Statement: “Screw tightening speeds of 9,000 rpm and higher...”

It is only possible to achieve the correct, pre-calculated pre-tensioning forces in joints when using much lower rotational speeds. In addition, even with good lubrication, the danger of the screw “chewing” the thread greatly increases with ISO screws as the rotational speed increases. It is widely acknowledged that the time for driving in screws is only a small percentage of the entire joining process and hence does not significantly affect the cost of assembly!

In conclusion, using “anti-cross-threading screws” may reduce installation costs when compared with ISO fasteners. However, cross-threading still cannot be eliminated with absolute certainty! The extra cost of the anti-cross-threading screws themselves does not reduce the overall assembly costs when compared with the total assembly costs using TAPTITE® fasteners. The argument that “there are no longer any repair costs thanks to the use of anti-cross-threading tips” only applies partially by comparison with ISO screws, but not by comparison with TAPTITE 2000® screws. Repair costs as a result of cross-threading can be eliminated with absolute certainty by the use of TAPTITE 2000® products.

To maximize the cost-saving potential in assembling metal components up to this time no alternative fastener design even approaches the efficiency of the family of TAPTITE 2000® fasteners. If you are serious about reducing assembly costs, we strongly suggest you contact one of our licensed fastener producers or one of our REMINC technical staff members to find a cost-effective solution.



ATC point = Anti-Cross-Threading point
 Data source ARNOLD-MAHLE study, used with permission.
 Cross-recessed pan head screw ISO 7045 M6 x 30, 8.8 costs: ISO machine screw 0.02€/pc., ISO machine screw + ATC point: 0.023€/pc., TAPTITE 2000® screw 0.03€/pc.
 Machining operations costs: Drilling, thread cutting and cleaning (include also proportional costs for energy, quality, set-up area and maintenance)

REMINC Responds! Fielding the Questions

Q. Can TAPTITE 2000® screws cross thread at assembly?

A. Absolutely not, as TAPTITE 2000® fasteners form their own threads in un-tapped nut members.

Q. Can a TAPTITE 2000® fastener be used in a pre-tapped nut member?

A. Yes, the TAPTITE 2000® thread form was designed to fit the envelope of a 6H(metric) or 2B(inch) nut member.

Q. Can a machine screw be installed into a tapped hole created by a TAPTITE 2000® fastener?

A. Yes, the TAPTITE 2000® thread form was designed so a 6g(metric) or 2A(inch) standard thread form would fit within its envelope.

REMINC Training / Brochure Request Form

Name:

Company:

Address:

Please Check:

- Contact me regarding a training visit
- REMINC General Products Catalog
- TAPTITE 2000® Products Application Guide
- TAPTITE 2000® Product Brochure
- REMFORM® Product Brochure
- TRU-START® Product Brochure
- FASTITE® 2000™ Product Brochure
- "54 Ways TAPTITE 2000® Fasteners Lower the Cost of Assembly" Request Form
- Receive Newsletter by e-mail

Mail this form to REMINC at 55 Hammarlund Way, Tech II, Middletown, RI 02842 USA or fax it to (401) 841-5008

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