

Washers Roundup

compiled by the Editors at *Fastener Technology International*

Suppliers have responded to our call for the state-of-the-art in washers and washer technology.

Self-Locking Washers

Information from **Saint Technologies, Inc.**, Winston-Salem, NC, USA, says, "In the aerospace and defense industries, weight, reliability, safety, maintainability and life-cycle costs are critical aerospace requirements. Historically, safety wire has been the standard for securing hardware against the shock and vibration in challenging aerospace environments. However, safety wires' numerous disadvantages remain a concern. Design engineers and maintenance technicians have been calling for a better solution. REALLOCK solves safety wires' problems and is widely used today in critical aerospace applications from next generation fighters to missiles. REALLOCK provides a superior alternative, saving weight, slashing installation man-hours, increasing reliability, improving maintainability, reducing complexity, and cutting life cycle costs.

"REALLOCK locking washers are highly engineered, patented components that replace safety wire in critical applications. They consist of a spring material that provides two independent lock tabs to allow the engaging nut to rotate over the tabs. One tab immediately springs back to its original position which prevents the nut from reverse rotation. The second tab provides a force bias on the nut. When the nut is rotated an additional 30 degrees, the tab that was biased is now allowed to return to its original height, thus preventing the nut from reverse rotation. The other tab is then biased against the nut. This process continues until the desired torque on the nut is achieved.

"There are numerous methods of securing the REALLOCK to prevent rotation during the installation process such as: Internal and external tabs, cross hardware assemblies, and "D" slots as used on connectors.



REALLOCK locking washers.

"REALLOCK's patented washers have a proven twenty-year history of design features that make them superior to safety wire. Among its most striking advantages are they install in a fraction of the time of safety wire; about the same amount of time it takes to add a washer to a bolt assembly. It requires no special tools or training, and its quicker installation and removal means it saves maintenance costs during the life cycle of the component."

"For more information or to see 3D visualizations of REALLOCK, visit the website below."

www.reallock.net

Taking the Next Step in CAD Files Availability

Malin Ringvall, Group Marketing and Communications Director at **Nord-Lock Group** in Sweden, reports, "To make it easier for engineers to incorporate Nord-Lock Group technologies early in the design phase, Nord-Lock Group products are now available on two globally leading CAD platforms: Cadenas and TraceParts.



"Moving forward, engineers can access virtual designs in 2D and 3D of Nord-Lock® washers on both platforms, while Superbolt® mechanical tensioners will be made available on Cadenas. Through this extended availability, engineers have improved opportunities to fit two of today's leading bolt-securing technologies into their projects and applications."

"With our new presence on Cadenas and TraceParts, we've taken a significant step forward in making it far easier for manufacturers to consider Nord-Lock products early in the design process. I'm excited to see the impact," says **Sebastian Källsbo**, Product Specialist at Nord-Lock.

Ringvall continues, "Engineers will be able to access CAD files of the entire standard product range of both

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Nord-Lock and Superbolt, along with dimensional data, drawings, and product pictures. Additional product information, such as frequently requested compliance info and TARIC codes, will also be available. Cadenas and TraceParts are also superior from a technical standpoint, as they offer integration and plug-ins for the most common CAD software.

"By expanding digital touchpoints, Nord-Lock Group aims not merely for increased accessibility but also to streamline the entire collaboration process. In line with Nord-Lock Group's strong customer-focused approach, the addition of TraceParts and Cadenas marks a significant step forward in how the group originating from Sweden provide data and support. With it, Nord-Lock Group takes both convenience and customer experience to the next level.

"The Nord-Lock Group believes that no one should have to question the integrity of the mechanical systems that play such a critical role in our way of life. As a global leader in bolting solutions, we strengthen public and industrial infrastructures with high-quality, safe and innovative solutions that will change the face of modern living for decades to come." *www.nord-lock.com*

Combating Embedment Relaxation in Bolted Joints with Belleville Washers

George Davet, President and Chief Engineer, **Solon Manufacturing Company**, Chardon, OH, USA, says, "If the Earth shrank to the diameter of a cue ball, it would be smoother than a cue ball. This can be hard for some to believe, given the massive peaks and valleys on the Earth's surface. The point is that every surface has a certain amount of roughness. Even seemingly smooth metal surfaces can have peaks and craters under high magnification. **Figure 1** shows an aluminum bar using a SEM.

"Bolted joints are widely used in engineering applications to create secure mechanical connections. However, one of the common challenges affecting the long-term reliability

of these connections is embedment relaxation. This phenomenon results in a loss of preload over time, potentially leading to joint failure, leakage, or reduced structural integrity. This white paper explores the causes of embedment relaxation and outlines best practices to mitigate its effects.

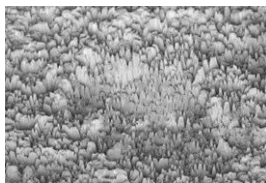


Figure 1

"Embedment relaxation is the gradual loss of bolt preload due to microscopic flattening of surface roughness, material creep, or local yielding under compressive stress. It primarily

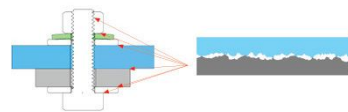


Figure 2



Figure 3

occurs at the contact interfaces of the bolted components, including between the bolt head and the joint surface, the nut and joint surface, and within the joint material itself. **Figure 2** shows a bolted joint and a magnified view of the many interface surfaces of the assembly. In the unloaded state, the surfaces only make contact at the high spots.

"Under high load, these high spots yield (**Figure 3**). The red lines show that the point contacts are spread over a larger area. Ultimately, the stresses are reduced to an equilibrium state where embed-

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