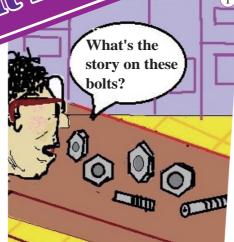
TE BOIL FORG Illustrated by Thomas Doppke

> The Adventures of Hardware Doc and His Faithful **Assistant Bolt Boy.**

The Case of the **Popping Bolt Heads.** 



Doc, these are plain, old zinc plated bolts used on a trailer. The heads just fall off by themselves. Sometimes within minutes. They Oh No! were OK'd by C.Ghost.



## **H2 Prevention Rules**

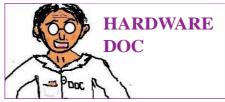
- 1. Bake immediately after plating. A delay as little as 1/2 hour can be fatal.
- 2. High hardness parts(<HRC35) are very susceptible.
- 3. Don't design joints that load high stress areas (underhead & thread runouts).

This is a case of hydrogen embrittlement. H+ ions are generated in the acid bath & plating tanks. If it is not baked off it combines to form H2 gas in small pockets & cracks. When the pressure builds up the metal ruptures. That Corrosion **Ghost should be eliminated** from any future fastener engineering work!

Who's got the popcorn?

How does that embrittle thing work?







**BOLT BOY** 



This cartoon column is the first and innovative cooperation between Fastener World Magazine and Thomas Doppke. It will run as cases are presented to Hardware Doc. Send your problems to this magazine and Doc, and his companion Bolt Boy will help in the fight against the foes: Torque Thug, Corrosion Ghost, The Fatigue Fiend and the other gremlins against fastener correctness. E-mail your questions for Hardware Doc to design@fastener-world.com.tw