

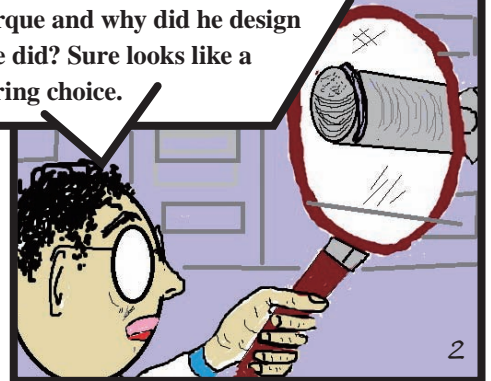
Case: Broken Bolt

Illustrated by Thomas Doppke

The Adventures of
Hardware Doc and
his Sidekick,
Bolt Boy

The case of the broken bolt.
The client swears that torque
was correct but bolts are
breaking in service after only a
few weeks.

Look. Bolt Boy, this bolt failed through
fatigue. Look at the little curved "bench"
marks. A sure sign of fatigue failure. Also,
it failed through the first thread, one of the
weak points in a bolt. What dose the client
have to say about the joint? Why did he
choose the torque and why did he design
the joint as he did? Sure looks like a
poor engineering choice.



Doc, I tried to talk to him but he
listened to that Fatigue Fiend because
he wanted to save some money. He said
every thing would be OK the way it
was. -Bolt Boy

What's a little
banging going to
hurt? Save some
money and let it go.
Believe me, I know
all about this. Yes, I
do!!

Always follow
good engineering
practices. Safety over
speed. Listen to me,
your conscience

Save Money
The Boss

Holding up
the Plant.

Hurry! Hurry!

Doc's Rules for Fatigue Free Design

1. Cyclic impacts, even if they do not exceed preload, will cause fatigue. Reduce cyclic banging.
2. Know what the impact value is, often this is overlooked or not even thought about.
3. Bolt weak points are underhead and at first thread (runout). Do not have joint boundaries at runout thread.
4. Increase bolt size to increase pre-loading. Sometimes a torque increase will help. But do not count on it.
5. Changing grade of bolt may help.

I have circled the bad
engineering items on the
client's drawing. Can you
take care of this?



Ow, Ow, Ow!

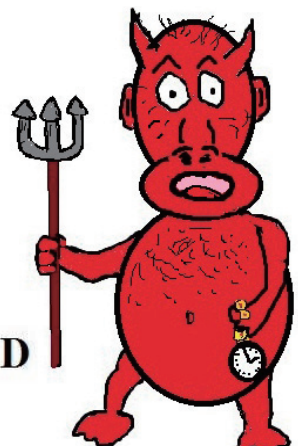
And don't ever
come back you
lying devil.
Goodbye!!

HARDWARE DOC

BOLT BOY

FATIGUE FIEND

The Fatigue Fiend Leaves
Town (for now)



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