THE HOBSON Update

Volume 19

From the desk of Peter Hobson

A Question of Quality

Hobson Engineering celebrates its 70th year in 2005, representing 70 years of supplying quality fasteners and 70 years of standing by our products. A lot has changed in 70 years, a lot has changed in my 20 years, but one thing that has not changed at Hobson Engineering is our commitment to supplying quality products that meet the standards they are supplied under.

The buzz word in the nineties was "Quality Accreditation". Every company was scrambling to get accredited, with clients believing if their suppliers were accredited they had nothing to worry about as the product they were purchasing was all "A OK !!!". As the second fastener company in Australia to be accredited with Standards Australia to AS9002 (the first being WJ Smith who is no longer in business), we as a company were caught up in the hype as well. The mania surrounding quality accreditation has now long passed and in my opinion the whole process did nothing to improve the actual quality of the product supplied. Naturally one could produce a piece of paper stating the product was adhering to a standard, but in reality it meant, and still means little.

The only thing that does matter in the subject of quality is the actual product itself. The whole quality system means nothing if the product is of inferior quality and does not meet the standards it was sold under.

I strongly believe, in general terms, the quality of fasteners sold in Australia has been decreasing over the last 5 years. The virtual withdrawal of Ajax Fasteners from manufacturing fasteners for the general market means that 98% of fasteners sold in Australia are imported. This in itself is not a problem from a quality viewpoint, however with increasing pressure on prices most product is now being imported from China and not Taiwan and Korea. For commercial grade products such as Class 4.6 bolting this is not a serious problem, with many quality manufacturers capable of producing product that meet the standards for which they are sold under. However, in my opinion, heat treated high tensile product is a completely different scenario. We took the decision to withdraw from the smaller diameter Grade 8 bolting market (probably the largest market in the fastener industry) as we could not source product from China that we were comfortable selling. To continue importing from Canada and Korea meant we could not compete on price, and rather than lowering our quality standards we took the difficult decision to withdraw from the market. We then experimented with AS1252 structural assemblies from China, purchasing from a factory that had been supplying the Australian market for many years and is well regarded. Every shipment was independently tested by a specialist metallurgist in Australia before being released for sale. Each shipment was barely meeting the

Inside this issue:

Australian Standard and as one would expect from the law of probability, a shipment failed. As the bolts were stamped with our head marking we scrapped them in Australia rather than return them with a risk of the company resupplying into our market. The response we received from this supplier was "we have been supplying XXXX for years and they have never rejected a shipment and we will not refund the cost". We no longer import any high tensile bolts from China as I do not feel comfortable supplying this product into the Australian market, and to carry out comprehensive testing is not practical. To carry out a simple hardness test or a single random tensile test is not sufficient to warrant a product. Of most concern to me was that test certificates supplied by these Chinese suppliers had no correlation to the product at all, chemical compositions were vastly different to those results obtained by us and hence one must question whether they were legitimate test certificates. Certainly during my many visits to Chinese manufacturers their ability to trace steel lots through their factories was very dubious.

I am not implying that all high tensile bolts supplied from China do not meet the standards, however we have been unable to find supply that we are willing to risk our name on, having built this up over 70 years.

Many of you would be aware of the "Counterfeit Fastener Act" that was passed as law in America to overcome this very problem, after major difficulties were experienced during the first Gulf war with fasteners failing on military equipment. These failed fasteners did not meet the relevant standards and in some cases were consciously marked with the wrong head markings. I believe it is just a matter of time until a major incident in Australia occurs along the same lines. Perhaps of greatest concern to me are the beginnings of sub standard B7/2H petrochemical studbolting from China being sold into our market. Hobson Engineering only sources its raw materials and petrochemical fasteners from the world's most experienced and respected companies and will not be changing this philosophy. Yes, we can import product from China at a significant price advantage, however our extensive testing and numerous factory visits have made us determined not to sell this product. The cost of a batch of B7/2H assemblies failing in service could be devastating in cost and human life. In the scheme of a petrochemical plant, the cost of fasteners is minor and not worth taking a risk on product that does not meet the ASTM standards. Remember it is not sufficient to have a piece of paper (test certificate) stating the product meets a standard and it would certainly be little help in a major failure. Fastener companies hold product liability insurance which would not even cover the cost of loss of production in a Petrochemical plant for a day, assuming they have insurance at all! The requirements of B7 studbolts under the ASTM standards, although having a strength Class of 8.8, are a lot more onerous than other bolting standards. I have personally seen counterfeit B7 studbolts being made in Chinese factories from carbon steel and although they may meet the hardness and tensile requirements of ASTM A193 Grade B7. They DO NOT meet the elongation, reduction of area requirements and above all are not made from AISI 4140 alloy steel, which has been chosen for its particular characteristics and is critical for use in pipe flanges.

Hence to summarise, Hobson Engineering has built up a reputation of supplying quality fasteners into the Australian market over 70 years and has even withdrawn from lucrative markets because we were unwilling to compromise quality to compete on price. We are committed to supplying B7/2H product that fully adheres to the ASTM standards and will not take the easy option of supplying inferior product because we can make more money. We certainly have the contacts and ability to import these products from China and supply at significant discounts, but we will not do so! There is a lot more to a B7/2H assembly than just a hardness test and a piece of paper. Don't take the chance and risk a major failure by purchasing from new entrants who do not understand what they are supplying.

Recommended Service Temperatures of some Common Coatings

Use of coated fasteners at temperatures above approximately one-half the melting point of the coating is not recommended. Some guidelines follow:

Zinc	210˚C
HDG	210˚C
Inorganic Zinc Silicate	210˚C
Xylan 1424	205˚C
Cadmium	160˚C
EM 1PX1 (Moly)	130˚C

"Sex is one of the nine reasons for reincarnation. The other eight are unimportant"

Rockwell Hardness Testing of Fasteners

The Rockwell hardness test is the most common test performed on fasteners as almost all fasteners have a specified hardness requirement. A correct hardness figure does guarantee that a fastener fully adheres to the required specification, however a non-conforming result definitely confirms it does not! It is very important that the hardness test is performed correctly to obtain a reliable and meaningful reading that will stand up to scrutiny.

Hardness testing is determining a material's amount of resistance to being permanently deformed by a precisely shaped indenter under a precise amount of weight. The Rockwell hardness testing machine actually measures the depth of the indentation made in the material and converts that to a reading on what is called a Rockwell Hardness Scale which is shown on the tester's indicator at the conclusion of a test. The most commonly used scale is the Rockwell C scale, with the Rockwell B scale being used to a much lesser extent. The Rockwell C scale is measured using a diamond indenter under a 150kg load. This involves a simple three step process, see figure 1. A correctly prepared sample (see below for details) is placed in the Rockwell machine and a preliminary load, called the minor load, is applied to the specimen. Next the test load, called the major load, is applied to the specimen. Finally the major load is removed and the number exhibited on the tester's indicator dial is the specimens Rockwell hardness. Conversion tables exist to compare the readings with approximate tensile strengths of fasteners and are included in the Hobson Technical Publication based upon ASTM A370.

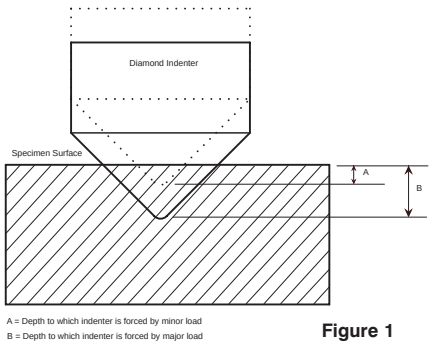


Figure 1

Detailed test procedures are published in ASTM F606, however following is an abridged procedure that will give quick and reliable results. It is extremely important that the test fastener is properly prepared before doing a hardness test. This involves sanding or grinding two opposite surfaces of the fastener so that they are smooth and parallel. The surface should be removed to a depth so that all plating and any slight surface decarburization is removed. Bolts can be tested by preparing both extreme ends of the parts or by preparing two opposite flats of the hex. Nuts should always be tested on their face and never across the flats as they may flex inwards resulting in low hardness readings. If a part shows any decolourisation after cutting, grinding or sanding it has probably become too hot and will distort the hardness readings.

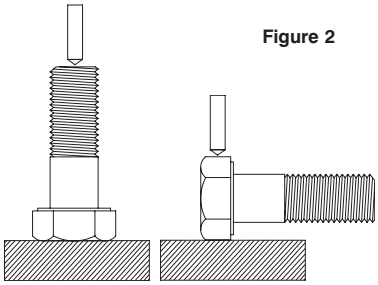
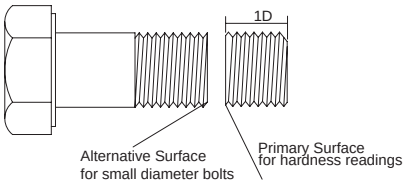


Figure 2



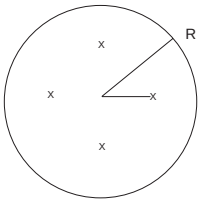


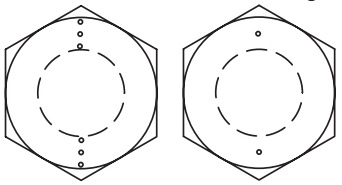
Figure 3

On bolts 3/8"unc and larger the hardness readings should be taken at 4 places 90 degrees from one another, refer figure 2. The average of these four readings should be recorded as the part's hardness. In the situation of a dispute the readings should be taken at the mid-radius (r/2) of a transverse section through the threads taken at a distance of approximately one diameter from the point end of the bolt, refer figure 3.

Non-heat treated nuts are to be tested at two positions 180 degrees apart midway between a corner of the hex and the inside diameter of the nut on the face or bearing surface, refer figure 4. The average of these two readings is the hardness to be recorded.

Heat-treated nuts are to be tested with six indentations, three on each side as shown in figure 4. Position #1 is as close as possible to the inside diameter and position #2 is midway between the inside diameter and the outer corner. Position #3 is as near to the corner as possible. The average of the six readings is the hardness value to record.

Figure 4



Heat Treated Nut Non-heat Treated Nut

A Reflection of Management

My thanks to John Jacobs for this little thought provoker.

A man in a hot air balloon realised he was lost. He reduced altitude and spotted a woman below. He descended a bit more and shouted "Excuse me, can you help me ? I promised my friend I would meet her an hour ago for our monthly rendezvous, but I don't know where I am ".

The woman below replied. "You're in a hot air balloon hovering approximately 20 metres above ground. You're between 40 and 41 degrees north latitude and between 59 and 60 degrees west latitude".

"You must be in Information Technology" said the balloonist.

"I am" replied the woman, "How did you know?"

"Well" answered the balloonist, "everything you told me is, technically correct, but I've no idea what to make of your information, and the fact is I'm still lost. Frankly, you've not been much help at all. If anything, you've delayed my trip"

The woman responded, "You must be in Management"

"I am, but how did you know?"

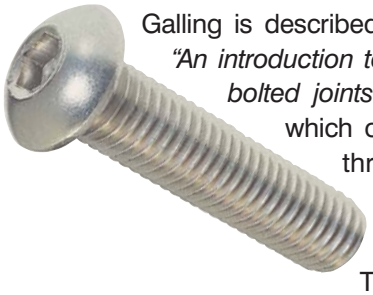
"Well," said the woman, "you don't know where you are or where you're going. You have risen to where you are, due to a large quantity of hot air. You made a promise, which you've no idea how to keep, and you expect people beneath you to solve your problems. The fact is you are in exactly the same position you were in before we met, but now, somehow, it's my fault!"

New Racking for our Sydney Warehouse

Our Castle-Hill warehouse, or as we affectingly refer to it as NS1 (NSW, Sydney,1), is undergoing a revitalisation to accommodate our ever increasing stainless steel fastener range. We have added a further 2,176 pallet spaces giving us a total of over 10,000! We are committed and very focused on providing a superior stainless steel product range with a stock depth that is unmatched.

Our automatically guided picking forklifts will be able to swiftly travel the 90 metre lengths of racking to ensure product is dispatched on time by our dedicated warehouse staff. It is little use having the product in stock if it cannot be dispatched on time!

How to stop Galling on Stainless Fasteners



Galling is described by John Bicford in his book *"An introduction to the design and behaviour of bolted joints"*, as a cold welding process which occurs when male and female threads come in such close contact that an atomic bond can form between them".

Thread galling is portrayed by the Industrial Fastener Institute as being most prevalent with fasteners made of stainless steel, aluminum, titanium, and other alloys which self generate an oxide surface film for corrosion protection. During fastener tightening, as pressure builds between the contacting and sliding thread surfaces, protective oxides are broken, possibly wiped off, and interface metal high points shear or lock together. This cumulative clogging–shearing–locking action causes increasing adhesion. In the extreme, galling leads to seizing - the actual freezing together of the threads. If tightening is continued, the fastener can be twisted off or its threads ripped out.

Suggestions for dealing with galling in stainless fasteners:

Slowing down the installation rpm.

Lubricating the internal and or external threads. The lubricants should contain substantial amounts of molybdenum disulfide. Use silicon grease where stainless bolts are used in aluminum. Fastener coatings such as Molykote or Xylan also provide a solution for galling.

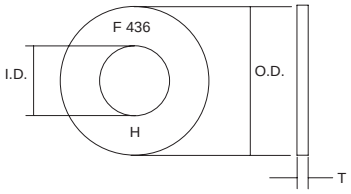
Using different stainless alloy grades for the bolt and the nut reduces galling. The key here is mating of materials having different harnesses, this is because different alloys work harden at different rates. 400 series stainless steel nuts work well on 316 stainless bolts, and a cheaper alternative combination of 304 & 316 has also shown useful results.

Thread roughness affects galling, the rougher the thread flanks. The greater the likelihood galling will occur. Generally it is the internal thread that has the rougher thread (threads are cut) and hence contributes most to galling. Most stainless bolts have rolled threads.

N E W P R O D U C T S

We now stock ASTM F436 Unified Type 1 Hardened Circular Washers - ZYP (Zinc Yellow Plated). This new product compliments our Metric Sampson Plain Washer range. Contact Sales now to place your first order.

ZYP SAMPSON WASHER™ (ASTM F436) - UNIFIED			
Bolt Size	OD (mm)	ID (mm)	Thickness (mm)
1/4"	15.88	7.14	1.7
5/16"	17.48	8.74	1.7
3/8"	20.65	10.31	1.7
7/16"	23.42	11.91	1.7
1/2"	27.00	13.49	3.5
5/8"	33.35	17.48	3.8
3/4"	37.31	20.65	3.8
7/8"	44.45	23.83	4.0
1"	50.80	28.58	4.0
1-1/8"	57.15	31.75	4.0
1-1/4"	63.50	34.93	4.0
1-3/8"	69.85	38.10	4.0
1-1/2"	76.20	41.28	4.0
1-3/4"	85.73	47.63	5.8
2"	95.25	53.98	5.8
2-1/4"	101.60	60.33	7.4
2-1/2"	114.30	66.68	7.4
2-3/4"	127.00	73.03	7.4
3"	139.70	79.38	7.4
Hardness: 38-45 HRC			



SAMPSON WASHER™ - METRIC			
Bolt Size	OD (mm)	ID (mm)	Thickness (mm)
M8	18.0	8.5	2.30
M10	22.0	10.5	3.00
M12	26.0	13.0	3.20
M16	32.0	17.0	4.50
M20	40.0	21.0	4.50
M22	44.0	23.0	6.00
M24	48.0	25.0	6.00
M27	56.0	28.0	8.00
M30	60.0	32.0	8.00
M36	72.0	37.5	8.00
M42	85.0	43.5	8.00
M48	98.0	49.5	8.00
M52	100.0	53.2	10.00
M56	105.0	62.0	10.00
M64	115.0	70.0	10.00
Hardness: 38-45 HRC			

"I never resist temptation, because I have found that things that are bad for me never tempt me"
George Bernard Shaw

...Because Quality Matters

HOBSON
QUALITY

Demand supply from the people who have set the benchmark for quality fasteners in Australia since 1935!

Supply your clients with confidence!

HOBSON – The Only Choice In Quality Fasteners

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HOBSON QUIZ

Detective Work

Four suspects, Jack Black, Sid Dark, Alf Grey and Jim White, are being interviewed at the scene of a murder. Each of them is asked a question to which their answer is given below. Only one of the answers is the truth.

Who committed the murder?

Jack Black: ***"Sid Dark committed the murder."***

Sid Dark: ***"Jim White committed the murder."***

Alf Grey: ***"I didn't commit the murder."***

Jim White: ***"Sid Dark is lying."***

Farmer Giles

"How many livestock have you Farmer Giles?"
"All cows but four." he replied
"All bulls but four." he replied
" Have you any horses?"
"I have as many horses as cattle, not counting the chickens!"
"Have you many chickens?"
"I'm not sure how many chickens I have."

How many livestock did Farmer Giles have?

END

Twenty-six cards, each featuring a different letter of the alphabet, are placed face down on a table and turned over at random one by one. What are the chances that the final three cards to be turned over will spell out the word **"END"** ?

Answers to Issue 18 Quiz

Amoebas Answer: 2 hours and 1 minute.

Something in Common Answer: "They can all be prefixed with men's names to form another word: Jackass, Rayon, Tomboy, Bobbin, Nickname, Leeway".

Odd One Out Answer: "equation" The others contain the five vowels A, E, I, O, U in the correct forward or reverse order.

"War is like love. It always finds a way" – Bertholt Brech

HOBSON QUALITY

BREAKING STRENGTH COMPARISON