

THE HOBSON

Update

Volume 17

From the desk of Peter Hobson

Hobson Lotus: Prodsport State Championship

Unfortunately we have been plagued this year with car problems which has resulted in far too many DNF (did not finish) results to seriously challenge for the championship. A special thanks to our sponsors:

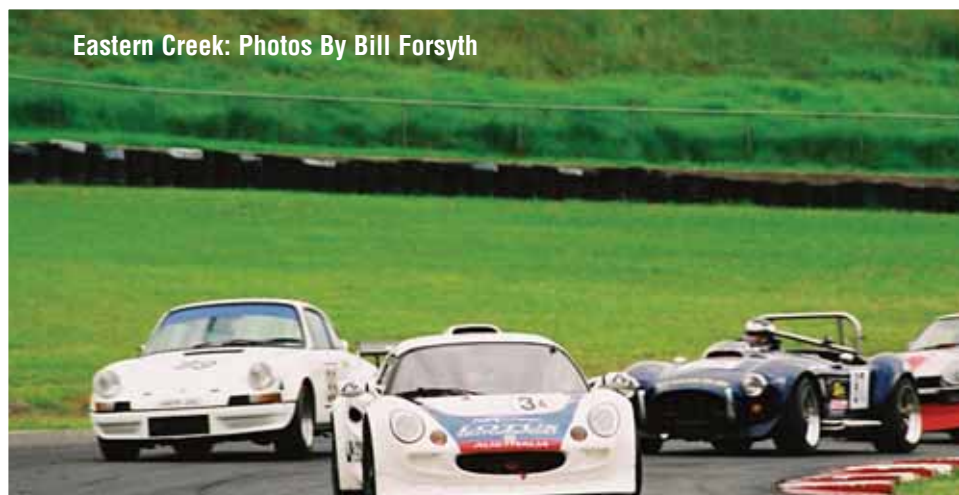
- Ajax Fasteners
- Industrial Galvanisers
- Atlas Steels
- Milltech

With a new dry oil sumped and stroked engine I am hoping the Lotus will prove to be reliable as well as fast...if not then we will be campaigning an Ultima GTR, which will be featured in the next newsletter.

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Eastern Creek: Photos By Bill Forsyth



The *Hobson Update* is a publication of Hobson Engineering Co. Pty Ltd.

For more information on any products or services that we offer, please contact us:

PHONE

(61-2) 9899 3366

FAX

(61-2) 9899 5551

EMAIL

sales@hobson.com.au

WEB SITE

www.hobson.com.au

HEAD OFFICE

PO Box 667

Castle Hill NSW 1765???

AUSTRALIA

Brisbane Branch:

62 Murdoch Circuit
Acacia Ridge
QLD 4110

Perth Branch:

1 Purdy Place
Canning Vale
WA 6155

Melbourne Branch:

469 Hammond Road
Dandenong
VIC 3175

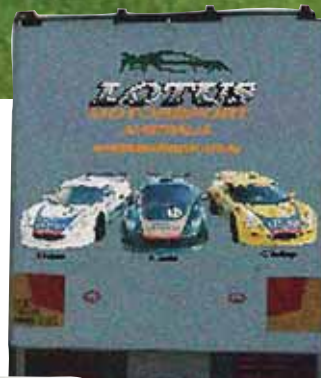


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Eastern Creek: Photo by Bill Forsyth



The Lotus Transporter



Kevin Retires

Kevin Chappell, known affectionately as our "special projects" man; "Mr. Fix-it"; or the "Lotus guru", calls it a day.

Someone commented to me, "What ever will you do when Kevin retires..." This pretty much sums Kevin up - a man who never enjoyed being idle will be keeping just as active assisting his son in his new building company.



Kevin's final farewell



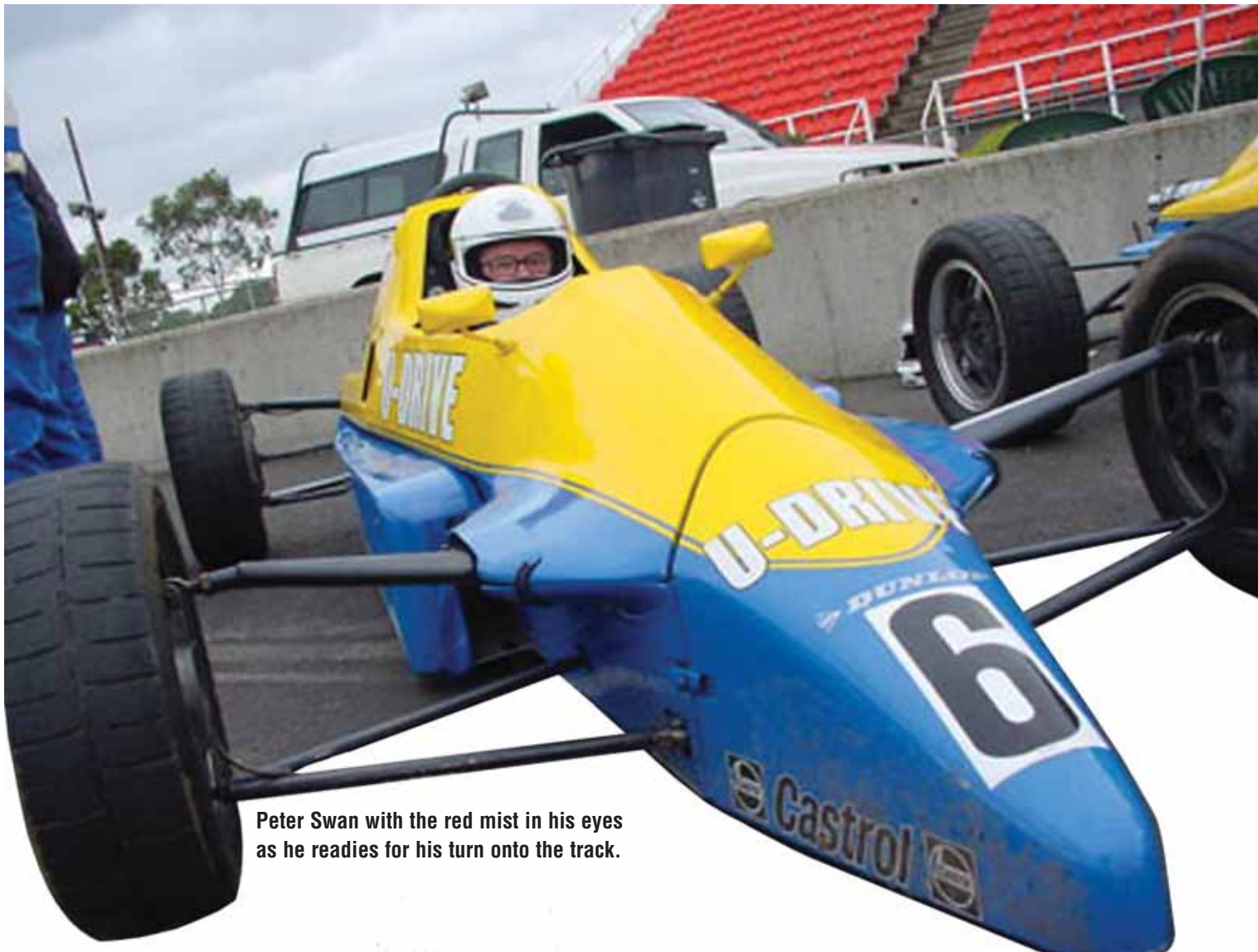
Kevin's farewell gift. A chrome plated crankshaft from the Hobson Lotus Elise. The inscription reads "Thanks for your great efforts over the years. We all hope you keep on 'cranking' in your retirement. From the Pit Crew at Hobson's".



THE ANSWER TO THE LATERAL QUIZ IN VOLUME 16

The answer of course was that Bill was late for a meeting and Issy was covering for him. Alan Manche from W.D.S. won the bottle of scotch for being the first in with his correct answer.

Melbourne Formula Ford Day



Peter Swan with the red mist in his eyes as he readies for his turn onto the track.



Zoom zoom – Brett Kelly, Jason Myers and friends.



"Drop the clutch NOW!!!" – David McGillivray about to set a Coventry Lap Record.



Mark Graham at his fastest!! (Note the dare devil show he is putting on with the steering wheel removed).



Mark Graham looking contented after his stint in the stationary car.



Shannon & Richard playing pit crew.



Shannon from Economy Bolt amazed at the efforts of Mark Graham.



"Get out... It's my turn!!!"



Peter Rodwell and Mark Hawkins

Why do bolts break?

Obviously there are many reasons why a bolt may fail, many as a result of a subtle design fault in a joint. Perhaps one of the simplest yet most frequent, especially among novice designers, is the absence of a flush bearing surface.

The most important factor in the strength of a joint is the amount of preload. When a bearing surface of the bolt is not flush with the joint the fastener tends to vibrate loose and hence reduces preload in the joint until failure occurs. Another similar failure scenario is when proper clearance is not made for the fillet radius between the shank and head of the bolt. If this clearance is not adequate (provided by a chamfer in the hole) then the bolt will seat on this fillet radius and the corner of the hole rather than utilising the whole bearing surface. This will cause a concentration stress riser in the fillet radius leading to the fastener failing. This failure being greatly accelerated by vibration in the joint.

As a general rule bolts normally fail due to one of four causes: Overstress, fatigue, corrosion or

hydrogen embrittlement. We will not go into any depth in this article in hydrogen embrittlement as we have covered it in some detail in previous editions of the Hobson Update. We are able to supply past editions to those who are interested.

Overstress may occur as a result of bending, shear, tension or compression forces or a combination of all of these. Tensile load is normally the main consideration that results from a combination of preload and in-service load. The preload compresses the joint while the service loads are external and are often cyclic in nature. If the tensile loads exceed the bolts yield limit, it will stretch the bolt past its elastic limits and permanently deform the bolt. This results in the preload unable to be regained; similarly if the external load is greater than the ultimate tensile strength of the bolt it will break.

Preload is achieved through torquing the bolt while over-torquing the fastener will reduce its axial tensile strength. Torquing to yield can maximise joint bolt preload however bolts should

not be torqued to yield unless there is sufficient difference between yield and ultimate tensile strength.

Shear loading exerts a force perpendicular to the bolt's longitudinal axis, which results in a single shear stress that is approximately 65% of ultimate tensile stress. Fastener preload affects the integrity of a shear joint. The lower the pre-load, the easier it is for the joint planes to slip, placing them in contact with the bolt. Designing a shear through the thread is definitely not recommended because stress concentrations occur at the thread roots.

Bending stress is another load that bolts are subjected to in addition to tensile and shear loads. Bending stresses occur when bearing and mating surfaces are not perpendicular to the bolt's longitudinal axis.

It has been estimated that 85% of all fastener failures is through fatigue. Fatigue in bolts is caused by cyclic loads that can cause bolts to fail at loads less than their rated tensile strength. Fatigue life depends on the

number and magnitude of loading cycles. As the fastener is subject to stress eventually a crack will occur, just as it does when one bends a paper clip backwards and forwards. The crack occurs at the fastener's most vulnerable point; the maximum stress concentration area. The crack spreads until eventually complete failure occurs. If not replaced, most dynamically loaded fasteners



Simple errors resulting in catastrophic failure.



Substantial wear on the threads indicates movement due to incorrect preload.



Failure point. Note wear on bolt shank.



Note ZP nylon insert nut on HDG bolt.

will suffer fatigue failure; it is just a matter of *when* rather than *if*.

Another cause of bolt failure is corrosion, which can take a variety of forms including chemical decomposition, galvanic corrosion from dissimilar metal contact and stress corrosion cracking. Fractures in these failures typically start as cracks at surface corrosion pits.

We have had a case recently where some of our Hobson AS1252 structural bolts failed. All bolts were found to be fully adhering to AS1252-1983 as one would expect, but the reasons for the failure make for very interesting consideration.

Reasons for failure were:

- All bolts, nuts & washers displayed evidence of



Washer showing evidence of substantial movement in the joint.

extensive movement during service. The threaded regions on a number of the bolts were deformed due to the joined sections having moved. All failure surfaces displayed ratchet and beach marks, typical of high cycle fatigue.

- The incorrect nuts were used with the HDG AS1252 structural bolts, the bolts having a Class 8.8 strength rating while zinc plated mild steel nylon insert nuts were used with a property class of below 6.

A future Hobson Team Driver?



My seven year old son Matthew, with feet barely reaching the pedals, complaining that 6HP just isn't enough. Then again, I guess no driver thinks he has enough power!!

QUIZ

The first correct answer to BOTH the following puzzles will get a bottle of scotch.

1. Eight balls numbered 1-8 are placed into a bag and then drawn out at random one by one and the digits written down to form an eight digit number. What are the chances that the number so formed will be a prime number?
2. The height of the Eiffel Tower is 150 metres, plus half its own height. How high is the Eiffel Tower?

Vale

Brian Jones



The first half of 2002 has proven a sombre and difficult time for all of us at Hobson's. In January we lost Paul Marshall, our Queensland State Manager, in a tragic accident.

And so it is with deep sadness we now record the passing of Brian Jones at age 46 following a short struggle with cancer.

Brian was a career fastener professional, cutting his teeth at McPherson's Ltd before moving on to A.E. Baker & Co. where he eventually became Fasteners Manager in the eighties. His progress through the ranks then led to a stint as Administration Manager where his strengths in dealing with people were strongly noted.

Over the many years in dealing with Brian, his attributes as a person who consistently displayed empathy towards others, coupled with an intelligent and thoughtful approach to any situation, always shone brightly.

Brian's efforts in establishing our Brisbane operation were of the highest order. His depth of product knowledge, ability to promptly and efficiently meet any challenge confronting him and the decency with which he treated his staff proved the recipe for an outstanding success.

Brian was full of the virtues we so greatly admire – a generosity of spirit, honesty and a high degree of humility. He inspired us all with the courage and dignity he displayed, particularly toward the end of his illness.

He will be greatly missed by colleagues and family alike.

Threaded Rod Manufacture

Hobson Engineering has been manufacturing threaded rod in Australia ever since it was first conceived and hopefully this tradition will continue for the life of the company.

However, due to capacity problems that have resulted from industry consolidation in the plating sector, we have no alternative but to subsidise our manufacture in Sydney with imported product. Our Brisbane manufacturing facility will not be affected by this change and will continue to manufacture all its

requirements of product that it has traditionally done.

Hopefully this capacity problem in Sydney will be solved, but until then we can assure you that the entire product we sell is of the highest quality, whether it is manufactured by us or only sold by us.

Once again, it is our hope that this is only a short-term measure as our manufacturing facility at Castle Hill is of world class, and manufacturing product in Australia has always been our focus.