Rick Eisele
Ann Arbor, Michigan
Southeastern Michigan Austin-Healey Club

REAR SPRING WEDGES FOR ¼-ELLIPTIC SPRITES

As many of us have found, when you buy new rear springs from Moss Motors or Victoria British they have too much arch to them which raises the back of the car up. This just doesn't look right. I have heard, and tried, several different solutions, most of which are either time consuming or dangerous. Yes, I have de-arched these springs by taking them apart then putting each leaf between two blocks then hitting them with a sledge hammer, while wearing my crash helmet. Wow, do they ever bounce around the garage when you do that!

Anyway, I have found a solution to lower the rear of the car without a lot of work. You can buy Leaf Spring Caster Wedges from your local NAPA store. I actually used these on my Bugeye for three or four years without any problems. The wedges are 4 3/8-inches long and are for 1 ¾-inches to 2-inches wide springs. You will need to file or grind the sides to clear the U-bolt, and the narrow end to clear the two bolts that go through the front of the spring.

These are zinc alloy shims and have a breakaway groove so you could just break it off and it will be narrow enough to fit without grinding for the U-bolt. The part numbers are:

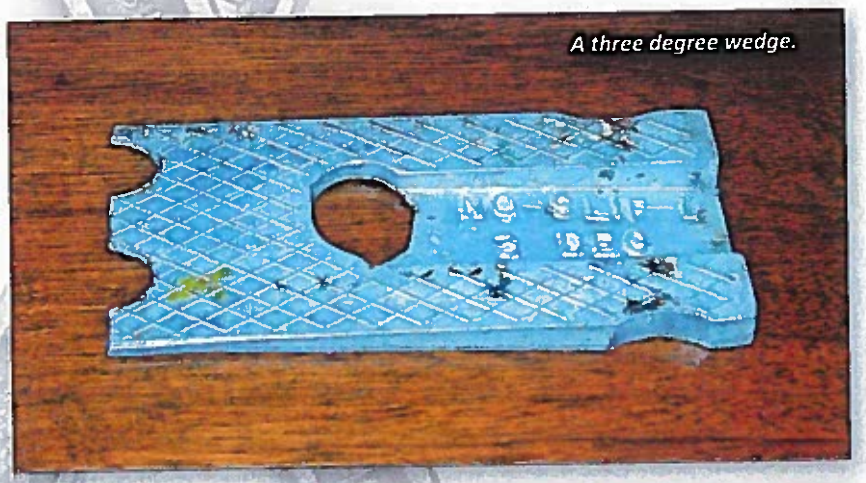
264-4100 – 1/2 degree
264-4101 – 1 degree
264-4102 – 1 1/2 degrees
264-4103 – 2 degrees
264-4104 – 2 1/2 degrees
264-4105 – 3 degrees
264-4106 – 3 1/2 degrees
264-4107 – 4 degrees
264-4108 – 5 degrees
264-4109 – 6 degrees

I used the 3 degree wedge and it seemed just about right for my car, but I was also using the 340# springs on the front which lowered the front of the car by about one inch. You don't need to modify or change the stock mounting bolts or the U-bolt for these to work. The price I got from NAPA's website was $11 per set.

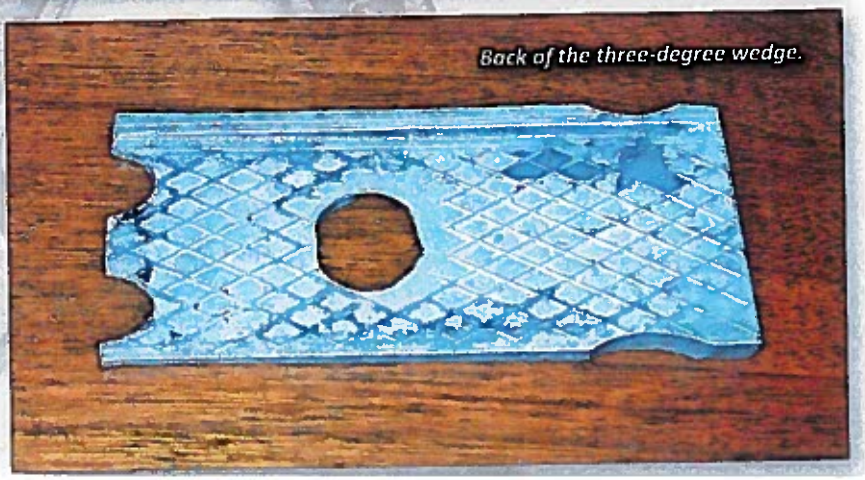
One of the things that you must do if you use these wedges is, once the car is ready to go, drive it around for a few miles, then re-torque the spring bolts. It's probably a good idea to do this two or three times just so everything is set in place and secure.

Oh, your local NAPA store won't have these in stock, at least the one down the street from my house didn't, so they will have to order them, which should take only a couple of days.

HM



A three degree wedge.



Back of the three-degree wedge.

Bugeye Concours Corner

George Marinos
Northeast Region

"Bugeye Concours Corner" discusses information regarding original specifications of the Bugeye Sprite, and is a forum to address questions regarding authenticity. Bugeye Concours questions or comments should be sent to Concours Corner, C/O George Marinos, 105 Thornbury Avenue, Glen Rock, NJ 07452 201-445-3124.

QUESTION: Is the vacuum advance painted or unpainted?

ANSWER: The distributor clamping base assembly (part 3H2138) was painted engine color as was the vacuum unit with actuating arm (part 47H5520).

QUESTION: Were the seat covers glued on to their frame?

ANSWER: No. The seats were attached with clips. The back rest or Squab assembly (fancy British term) was held together at the rear base with seven trim clips. The cushion assembly was held together with a total of 20 trim clips.

QUESTION: Did the bottom windshield weather stripping touch or go over the wiper blade plinths?

ANSWER: Upon inspection of an unrestored example it appears that the weather stripping did indeed extend over the wiper blade plinths by about 1/4".

QUESTION: Please pardon a stupid question from a neophyte Bugeye enthusiast, but what do the heads of the various screws and bolts actually look like; i.e., pan head, fillister head, etc.

ANSWER: Not so stupid. A picture is worth a thousand words. Credit to Clarke Spares and Restorations for this illustration.

QUESTION: I read in the concours standards that there should be a date on the four way brake line connection. I can't seem to find a date on mine. Where should I look?

ANSWER: The date should be on the bottom of the stop light switch.

QUESTION: Was there any packing between the rear bumperette brackets and the body?

ANSWER: Yes. There is packing between the brackets and the body.

Where to find: Original style black battery tray. Sports & Classics, Darien, CT, 203-655-8731 has available for the 3000 a black Bakelite tray (their part # Bat 7305) which matches the Bugeye tray except for the length. Cutting approx. 1 1/8" from the length and fusing the two sides back together will produce a high quality end result. Those in the know strongly suggest NOT attempting to cut the Bakelite yourself but farming it out to an appropriate professional.

Original Equipment Tools Supplied with Sprites

Figure 1. Original tool kit with a reproduction tool bag.

By AHCUSA Member, Robert Hall

Tool Kits, Part 3

The rest of the story...

In the November-December 2011 issue of the Austin-Healey Magazine, Roger Moment published a two-part series about tool kits. Part 1, "Original Equipment Tools Supplied with New Healeys," detailed the tool kits supplied with the 100, 100-6 and 3000 model cars. Moment followed that up in the January-February 2012 issue with Part 2, "BMC Supplemental Tool Kits." Both of these articles contain a wealth of information and many valuable tips for anyone wishing to put together an original-equipment tool kit for any of the Austin-Healeys. This article is intended to supplement Moment's articles with details about the original tools supplied with Austin-Healey Sprites, from the Bugeye to the Mark IV.

My interest in original-equipment tools began in 1975 when I purchased a 1960 Bugeye as a summer project. After having it towed home, I began a thorough cleaning and, to my surprise, found two tiny tools – the Lucas screwdriver and feeler gauge and the tappet and sparking plug feeler gauge – in dirt under the boot liner. I wondered what other tools came with the car. It would take me 35 years to answer that question. Over those years, I slowly built a library of references for the Austin-Healey Sprite. Three of those references document original-equipment tools: the "Restoration Guide and Inspection Standards for the Austin-Healey Sprite," published by The Austin-Healey Concours Registry and revised January 2001; "Original Sprite and Midget, The Restorer's Guide" by Terry Horler, 2011; and the BMC Service Parts Lists. Not surprisingly, each of these three sources is incomplete and contradict one another.

Austin-Healey Sprites were produced from 1958 until 1970 when Healey parted with British Leyland. A small number of Austin Sprites were produced in 1971. During all Sprite production, only two different tool kits were supplied; one for most of the Bugeye production and the other for the late-model Bugeyes to the Mark IV. There were a few changes in suppliers and part numbers, and for cars fitted with wire wheels had a hub wrench and hammer included in lieu of the wheel brace and hubcap remover. Some of the tools match ones in the kits for the 100-6 and 3000 models of the same years.

Original Equipment Tools Supplied With Sprites

Figure 5. Jacks found in late Mark II, Mark III, and Mark IV Sprites.

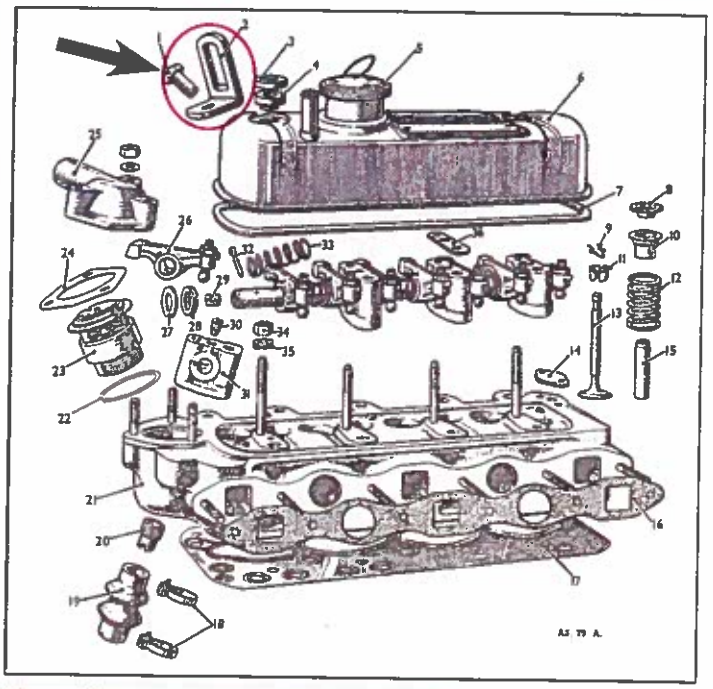
Neither of the inverted T jacks is marked. The ratchet for the earlier inverted T jack (the orange-red tool in Figure 5) is marked "PAT. No. 397042." The ratchet for the later inverted T jack (the black one in Figure 5) is marked "PATENT APPLIED FOR, TO RAISE, HEBEN" on one side and "METALLIFACTURE LTD, TO LOWER, SENKEN" on the reverse.

The last variation found in the tool kits was for those cars fitted with wire wheels at the factory. Wire wheels became a factory option shortly after the introduction of the Mark II Sprite with the 1098cc engine (HAN7). These tool kits included an octagonal wrench for the hub nut and a hammer in lieu of thehub cap removal lever and wheel brace. Figure 6 depicts a reproduction octagonal wrench and hammer. Moment's article in the November-December 2011 issue of Austin-Healey Magazine includes detailed information on the varieties of hammers furnished with Austin-Healey tool kits.

ure 6. Wire wheel tools included in factory tool kits.

Optional Tool

One option tool available from BMC was a pair of engine sling brackets. Illustrations of these brackets are in the



◀▲ Figure 7. Engine Sling Brackets (see Figure 2). Photograph courtesy of Curtis Arndt

original Austin-Healey Sprite Series AN5 Workshop Manual. They also first show up in the service parts list with the 10 CG pages for the Mark II as part no. 2A 329. They are on the same page as the valve cover. Because they were illustrated in the AN5 Workshop Manual, they were likely available for the Bugeyes. The engine sling brackets are painted the same olive-green as the Bugeye engine. Figure 7 is a photograph of the engine sling brackets

Concluding Remarks

Assembling an original kit for the Sprites can be accomplished with time and patience: Buyers must be careful and know what they are purchasing. I have seen many tool kit tools offered as original Bugeye tools that are not. Original tool bags in good shape are very hard to find; fortunately for this item, some very good reproductions are available. If you have questions, comments or can fill in some information on the change points for jacks and hubcap levers, please email me at Hall22553@comcast.net. Finally, I would like to thank Roger Moment and Curtis Arndt for their valuable assistance with this article.

Sprite Tool Kits

The tool kit for the first production Bugeye (chassis No. 501) into July 1960 (chassis No. 42199) contained the following 11 items:

1. Jack - Lifting (2A5472)
2. Spanner - Ratchet - Jack (2A5627)
3. Pump - Tyre (3H2274)
4. Gun - Grease (13H50)
5. Brace - Wheel (2A5626)
6. Screwdriver and gauge - Ignition (3H2648)
7. Spanner - Tyre Valve (2H1683)
8. Spanner - Box - Sparking Plug (2A5379)
9. Gauge - Feeler - Tappet and Sparking Plug (2A5419)
10. Screwdriver (2H4614)
11. Bag - Tool (2A5412 and 11H169) seam welded plastic

Several of these tools contain manufacturers' markings. The jack, jack ratchet and wheel brace are marked "KING DICK, MADE IN ENGLAND." The jack ratchet is also marked "TO RAISE" and "PATENT PENDING" on one side and "TO LOWER" on the other. The jack is painted black or red; the jack ratchet has a black-oxide finish or is zinc plated; and wheel brace may have a black-oxide finish or be painted black or red. The sparking plug spanner and screwdriver also have a black-oxide finish. The tire pump is marked "SUTTY MADE IN ENGLAND" on the bottom. The ignition feeler gauge is marked ".014 .016 LUCAS." The tappet and sparking plug feeler gauge is marked ".025SP" on one side and ".012TC" on the other. The one shown is actually marked TG and came from a 1960 Bugeye. This is likely a mis-stamp from the supplier. The grease gun is marked "TECALEMITE Cat. No GC3020." The tire valve spanner is brass and unmarked. The tool bag is seam-welded plastic. These tools are shown in Figures 1 and 2.

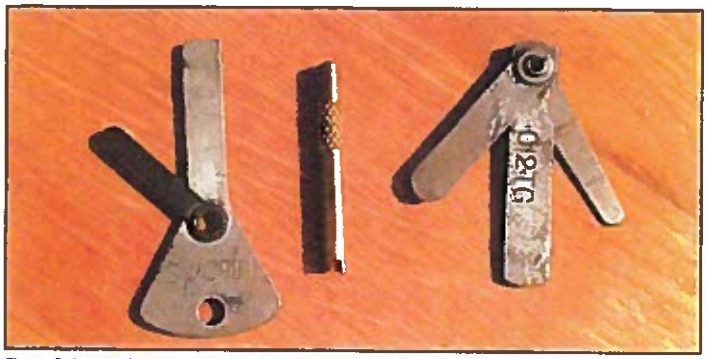


Figure 2. Screwdriver and gauge – Ignition, Spanner – Tyre Valve, Gauge – Feeler – Tappet and Sparking Plug.

The second tool kit was reduced to only seven items. The grease gun, tire pump, screwdriver, ignition screwdriver and feeler gauge, tappet and sparking plug feeler gauge, and the tire valve core spanner were all dropped. In place of these items, a hubcap remover and tommy bar for the sparking plug box spanner were added. These new tools were unmarked. In the original kit, the screwdriver was intended to remove the hubcaps and turn the sparking plug box spanner. The sparking plug box spanner was also changed from one 3 inches long to a 5-inch long tool, such as the one furnished with the 3000s. The hubcap remover, tommy bar and sparking plug box spanner are all zinc plated.

This tool kit included:

1. Jack - Lifting (2A5472)
2. Spanner - Ratchet - Jack (2A5627)
3. Brace - Wheel (2A5626)
4. Lever – Hub Cap removal (ACA5432)
5. Spanner - Box - Sparking Plug (1B8995)
6. Tommy Bar – Box Spanner (ACA5216)
7. Bag - Tool (AHA5506)

Figure 3 is a photograph of the hubcap remover, tommy bar and the 5-inch sparking plug box spanner that replaced the grease gun, tire pump, screwdriver, ignition screwdriver and feeler gauge, tappet and sparking plug feeler gauge, and the tire valve core spanner.

Figure 3. Replacement tools kit from a late Bugeye tool kit.

Tool Kit Variations

Two varieties of the hubcap lever are documented. The Service Parts Lists have three different part numbers and two illustrations for the Lever – Hubcap Removal (ACA5432, 11H1051 and 11H1686) but does not specify any change points. The lists do specify that 11H168[illegible] was a replacement for ACA5432 and 11H1051 when stock exhausted (W.S.E.). Figure 4 is a photograph of a Hubcap Removal Lever that matches the Service Parts List illustration for parts No. 11H1051 and 11H1686. It is unclear whether this hubcap remover was furnished with new cars.

Figure 4. Hub Cap Removal Lever part number 11H1051 and 11H1686.

Three varieties of the Jack and Jack Ratchet have been identified, yet the Service Parts Lists identify only two part numbers for the jack (2A5472 and BHA4368) and two part numbers for the jack ratchet (2A5627 and ACA9932). The change point for these part numbers was identified as HAN7-32388, which was in June 1963 during the 1098cc Mark II production. Driver's Handbook and Workshop Manual illustrations suggest that this change point was when the A-Fram[illegible] jack (Figure 1) was replaced with an inverted T jack. Both types were painted either black, red-orange or gray-blue. Figure 5 is a photograph of the two varieties of the inverted T jacks with their ratchets.

Fastener List

compiled by Bob Kitterer

I still have a list but:
a) I am not positive that the list is still complete.
b) It only covers bolts and screws for which stainless could reasonably be substituted. It does not list head bolts, connecting rod and bearing bolts and most of the suspension bolts.
c) It is for my car which is not stock, of course how many of us are?
d) It does not tell you where the part is used and I doubt that I can remember.
Finally, my car is now just used as a street cruiser and as such I can safely do things that may be hazardous to your health if you push or race your car. I will leave the discussion of SS vs various grades of steel, washer or not to washer to other folks.------Bob and Ann
'60 Bugeye, original owners

1960 Sprite Nuts, Bolts, etc. There are no guarantees that this list is complete or that the sizes and quantities are correct.

Item No	Item Size	QTY REQ
1	Brass Nut 5/16-24	8
2	Cable clamp 1/2	3
3	Cable clamp 1/4	10
4	Cable clamp 1/8	2
5	Cable clamp 3/16	5
6	Cable clamp 3/8	1
7	Cable clamp 5/16	2
8	Cable clamp 5/8	1
9	Cu Washer #8	6
10	Grommets 1 1/4	1
11	Grommets 1 1/2	1
12	Grommets 1 5/8	1
13	Grommets 3/8	1
14	Grommets 5/8	3
15	Grommets 7/8	3
16	Grommets 9/16	7
17	Hose Clamp 1 1/2 (#16)	2
18	Hose Clamp 1 3/8	2
19	Hose Clamp 1/2	2
20	Hose Clamp 3/4	4
21	Speed Nuts Flat 1/8	17
22	SS Button Head 1/4-28 X 1/2	25
23	SS Castle Nut 3/8-24	2
24	SS Castle Nut 7/16-20	2
25	SS Hex Head 1/4-20 X 3/4	1
26	SS Hex Head 1/4-20 X 5/8	1
27	SS Hex Head 1/4-28 X 1	28
28	SS Hex Head 1/4-28 X 1 1/8	6
29	SS Hex Head 1/4-28 X 1 3/8	1

30	SS Hex Head 1/4-28 X 1/2	28
31	SS Hex Head 1/4-28 X 3/4	6
32	SS Hex Head 1/4-28 X 3/8	6
33	SS Hex Head 1/4-28 X 5/8	60
34	SS Hex Head 3/8-16 X 1	2
35	SS Hex Head 3/8-16 X 1 1/4	2
36	SS Hex Head 3/8-16 X 4	2
37	SS Hex Head 3/8-16 X 5	1
38	SS Hex Head 3/8-24 X 3 1/2	1
39	SS Hex Head 3/8-24 X 3 1/4	1
40	SS Hex Head 3/8-24 X 1 1/2	4
41	SS Hex Head 3/8-24 X 1 3/4	2
42	SS Hex Head 3/8-24 X 2	4
43	SS Hex Head 3/8-24 X 4	6
44	SS Hex Head 5/16-18 X 1 1/2	4
45	SS Hex Head 5/16-18 X 1 3/4	3
46	SS Hex Head 5/16-24 X 1	10
47	SS Hex Head 5/16-24 X 1	4
48	SS Hex Head 5/16-24 X 1 1/4	16
49	SS Hex Head 5/16-24 X 1 5/8	1
50	SS Hex Head 5/16-24 X 1 7/8	3
51	SS Hex Head 5/16-24 X 2 1/2	2
52	SS Hex Head 5/16-24 X 2 1/4	2
53	SS Hex Head 5/16-24 X 3	2
54	SS Hex Head 5/16-24 X 3/4	21
55	SS Hex Head 5/16-24 X 3/8	2
56	SS Hex Head 5/16-24 X 4	2
57	SS Hex Head 5/16-24 X 5/8	15
58	SS Hex Head 5/16-24 X 7/8	12
59	SS Hex Head 7/16-20 X 1 5/8	4
60	SS Hex Head 8-32 X 1/2	7
61	SS Lock Nut 1/4-28	
62	SS Lock Nut 5/16-24	12
63	SS Nut 1/4-28	2
64	SS Nut 10-32	12
65	SS Nut 3/8-24	2
66	SS Nut 5/16-24	19
67	SS Nut 7/16-20	4
68	SS Nut 8-32	1
69	SS Phillips Flat Head 1/4-28 X 1 1/4	4
70	SS Phillips Flat Head 1/4-28 X 1 1/8	20
71	SS Phillips Flat Head 1/4-28 X 1/2	6
72	SS Phillips Flat Head 1/4-28 X 5/8	10
73	SS Phillips Flat Head 10-32 X 1/2	2
74	SS Phillips Flat Head 10-32 X 3/4	10
75	SS Phillips Oval Head 10-32 X 1/2	6
76	SS Phillips Oval Head 10-32 X 3/8	10
77	SS Phillips Oval Head 10-32 X 5/8	5
78	SS Phillips Pan Head 1/4-20 X 1 1/8	2
79	SS Phillips Pan Head 1/4-28 X 1/2	33
80	SS Phillips Pan Head 1/4-28 X 3/4	2
81	SS Phillips Pan Head 1/4-28 X 5/8	20
82	SS Phillips Pan Head 10-32 X 1	15
83	SS Phillips Pan Head 10-32 X 1/2	12

84	SS Phillips Pan Head 10-32 X 3/4	4
85	SS Phillips Pan Head 10-32 X 3/8	4
86	SS Phillips Pan Head 10-32 X 5/8	2
87	SS Phillips Pan Head 10-32 X 7/8	10
88	SS Phillips Pan Head 12-32 X 3/8	6
89	SS Screw Sheet Metal #5 X 1/2	12
90	SS Screw Sheet Metal #5 X 5/16	6
91	SS Screw Sheet Metal #6 X 1/2	20
92	SS Screw Sheet Metal #6 X 1/4	6
93	SS Screw Sheet Metal #6 X 3/8	6
94	SS Screw Sheet Metal #6 X 5/16	6
95	SS Screw Sheet Metal #8 X 1/2	6
96	SS Screw Sheet Metal #8 X 3/4	2
97	SS Sheet Metal Oval #4 X 1/2	100
98	SS Socket Head 1/4-28 X 1/2	25
99	SS Washer Split Ring #10	14
100	SS Washer Split Ring #8	3
101	SS Washer Split Ring 1/4	32
102	SS Washer Split Ring 3/8	6
103	SS Washer Split Ring 5/16	47
104	SS Washer Star Lock #10	10
105	SS Washer Star Lock #4	2
106	SS Washer Star Lock #8	2
107	SS Washer Star Lock 1/4	28
108	SS Washer Star Lock 5/16 X 5/8 OD	14
109	SS Washer Flat #10	6
110	SS Washer Flat 1/4	33
111	SS Washer Flat 1/4 X 1 OD	1
112	SS Washer Flat 1/4 X 3/4 OD	9
113	SS Washer Flat 3/8	6
114	SS Washer Flat 5/16	44
115	SS Washer Flat 5/16 X 1 1/4 OD	4
116	SS Washer Flat 5/16 X 1 OD	1
117	SS Washer Flat 5/16 X 5/8 OD	4
118	SS Washer Flat 5/16 X 7/8 OD	4
119	SS Washer Flat 7/16	4
120	"Stud, Steel" 5/16-24 X 1 5/8	6
121	Trim Wars her #10	2
122	Trim Washer #4	50
123	Wave Washer 3/8	2

The Austin-Healey Experience

www.ahexp.com

MG Midget & Sprite Front Wheel Bearings

Article written by Norm Kerr - Published on 2010-11-29
Austin-Healey Experience Library - Service:Suspension and Wheels Section

Many people have reported problems with ill fitting Midget front wheel bearings and short life spans, and some incorrect information has been floating around about what works / does not work, and whether the spacer can be eliminated, and so on. I wrote this to try and gather all of the information together into one place on this subject, including the input from a lot of people who have worked on this over the past year or so.

This article is written in several parts:

Intro, and Figure 1, as a quick means for anyone to grasp the key things they need to know when servicing / replacing the MG Midget Front Wheel Bearings.

Attachments 1, 2, 3 are more in-depth, to answer any questions about the "why", and attachments 4 and 5 are the original drawings from RHP.

Introduction

The whole MG Midget front suspension is "unusual", the lower pivot uses a threaded pin, and the kingpin assembly requires frequent, careful greasing to maximize its relatively short life.

The front wheel bearing system is also unusual (refer to Figure 1). It uses ball bearings, like modern cars use, but they are assembled in a way that depends on several components to control their proper fit. They are very difficult to remove from the hub without separating them, which damages the balls and races if that happens. As a result of this design, all of the parts must be checked carefully BEFORE assembly.

There is no reason why the front wheel bearings on a Midget shouldn't last the life of the car, as they use a very liberal design (the pitch between the bearing centers is >1.5", where modern cars weighing twice as much have half of that), but they often fail early due to improper fitting.

This subject was not much discussed in the manuals because the OEM bearings were still readily available, and when using those it is simply a "fit and forget" design. Unfortunately, those OE bearings have become scarce, and expensive, so suppliers have tried substituting "equivalent" bearings that cause fitting issues; wheels that wobble, brake rotors rub on calipers, or bearings that fail quickly.

The purpose of this article is to provide a guide for folks replacing their front wheel bearings so that they all can experience the maximum life out of these parts.

Original bearing part numbers, with these you should have no trouble *. (refer to RHP drawings attached)

per bearing:

34/LJT 25 made by "RHP UK" (original Austin/Morris part number: 2A 4299) 39/LJT 25 is equivalent, with a resin cage. Both of these have the all important 2 ~ 3mm radius to clear the stub axle fillet

radius at its base.

Outer bearing:

3 MJT 17 made by "RHP UK" (original Austin/Morris part number: 2A 4178) 11/MJT 17 is equivalent, with a resin cage.

* Two key points about the bearings listed above: - they are "face adjusted", which means that their inner and outer races are machined to be < 0.001" from each other, crucial for preventing too-loose / too-tight fit in the hub. - the inner bearing has a ≥ 2mm radius so that it won't interfere with the stub axle fillet radius when installed.

Two confirmed sources for the original bearings are:

1. Ransome and Marles: http://www.ransomeandmarles.co.uk/

2. Bearings Impex Queen Street Crewe Cheshire CW1 4AQ Tel.01270 585211

What about cheaper bearings from "the usual sources"?

There are cheaper bearings around. Moss, and the usual suspects, sell "equivalent" bearings *. But to avoid trouble, or when in doubt, fit the original bearings listed above, instead.

* When ordering bearings, most suppliers use the generic part numbers listed below (note that these are not the original Austin/Morris part numbers):

- GHB 129 (inner) — GHB 128 (outer) — GHK 1294 (kit, including seal and split pin)
  But when ordering these numbers, what bearings are actually supplied?

- NSK: 7303BEAT85SUN / 7205BEAT85SUN
  SKF: 7303BECBP / 7205BECBP
  These NSK and SKF parts are supposed to be face adjusted, but if you try to use them, make sure that they also have the needed ≥ 2mm radius to clear the stub axle.

What about tapered bearings?

As noted later, you will see that tapered bearings can be used. IF they have the necessary radius to clear the base of the stub axle, AND the spacer is used between the inner and outer bearing, and if the whole assembly is then properly shimmed to keep the 0.002 ~ 0.004" play the bearings require after the hub nut is torqued. The advantage of tapered in this case is that they can easily be removed from their outer races for shimming of the assembly (and that is why the larger, heavier, more recently designed MGB used them!).

The instructions for how to shim them are based on the MGB hub, which is almost the same as the Midget's, except for the fact that it is designed to be shimmed, and the Midget is not (refer to attachment #2).

What is the spacer for?

The spacer is required for max stub axle strength and fatigue life (refer to attachment #1).

Why replace the wheel bearings?

1. Wire wheel hub replacement (because worn splines require new hubs). You can try to remove your good bearings from your old, worn hubs, but if they come apart, they've been damaged and their life expectancy is shortened (no one can say by how much, even the bearing makers admit that, they just know that some damage has been done by the force of the separation, peening flat spots on the balls and/or into the races).

2. Play in the bearings (as opposed to play in the kingpin / A-pan assembly from wear in those parts), identify which is the cause by a "wheel wiggle test" with and without the brakes applied (if it goes away with the brakes, it is worn bearings, if it does not go away, it is worn suspension joints).

Note that these bearings are not designed to be periodically removed and re-greased the way American cars were in the '60s and '70s. According to John Twist at University Motors, the most common issue he finds in MG wheel bearings is a lacking of grease at the outer bearing, which is easily remedied by adding some more. He said that in all of his years of MG service, he's "never seen an inner bearing that did not have enough grease".

So, for instance, when removing the hub to replace the brake rotor, if there is no sign of worn bearings before starting, just keep everything real clean, check the outer bearing has enough grease, and put the hub back without disturbing the bearings.

How to remove?

Ideally, drift the outer bearing out by moving the spacer over so that it presses on the outer race (very difficult to do), and then removing the inner bearing is simply a matter of pressing on its outer race with a drift. Or, "pop" the bearings so that the balls fall out, and then decide whether to risk re-using them, or buy new ones instead.

How to confirm the parts are OK before re-assembly?

1. If the bearings are not confirmed to be "face adjusted", you can inspect them like this: - load the outer race 5.5lbs axially. - measure the levelness of the inner race x outer race (thrust face of outer race must be 0.000 ~ 0.001" above the inner race). Reference RHB drawings (attachments #4 & 5).

2. Measure the fillet radius at the base of your stub axle (typically 1.5 ~ 2mm), and make sure the radius on the inside of the inner race of the inner bearing is ≥ 2mm. It can be very difficult to measure these accurately without a radius gage set. Alternatively, you can trial-fit the inner bearing to the stub axle, by itself. Confirm that NO gap exists between the bearing and the load face of the stub axle. This confirms that the radius clears the fillet.

3. Some of the new wire wheel hubs being sold have an unnecessary fillet radius where the OUTER bearing belongs (reference attachment #3). Confirm your new hubs don't have this flaw. I got bad parts this year from both Victoria British (US) and from Leacy (UK), but got good ones, finally, from Moss (US). Other than this radius, all three pairs looked identical to each other, including the manufacturing sticker on the flange. VB and Leacy refunded my money, but showed no interest in trouble shooting the root cause of the bad parts, and will probably just sell them to someone else...

4. Confirm that the spacer is exactly 1.500". The MG spacers were face ground originally to be spot on, but some DPO may have cut / sanded them down on your car to fit non-standard bearings in the past. If your spacer is too short, your new bearings will be crushed by the nut torque and have a short life.

How to assemble everything properly?

1. Grease the outer bearing and press it into the hub (see Figure 1 for orientation).

- use a ⌀ 1 3/4" drift.
- do NOT press on the inner race (doing this will damage the balls/races)

2. Confirm it is FULLY driven home by measuring the distance from the inner race to the "shelf" that the inner bearing seats against. This should be 1.496" ~ 1.498". If you get more than 1.500", your bearings will be crushed by the hub nut torque and have a short life.

3. Insert the spacer
   - apply some grease around the outside of the spacer, between it and the hub.

4. Grease the inner bearing and press it into the hub (see Figure 1 for orientation).
   - use a ⌀ 1 15/16" drift.
   - do NOT press on the inner race (doing this will damage the balls/races)

5. Lubricate the seal lip and press it into the hub (see Figure 1 for orientation). - use a ⌀ 2" drift. - shop manual calls for engine oil on the lip of the seal.

6. **DO NOT** pack the area between the seal and inner bearing with grease because when the bearings heat up the grease will expand and if this space is already full the grease will be pumped out past the seal and it will fail.

7. Check the stub axle for nicks / burrs where the bearings go, and where the seal runs.
   - smooth surfaces will help assure the bearings come off easy next time, and avoid seal wear.

8. Assemble the brake rotor to the hub

9. Assemble the hub assembly to the stub axle
   - don't damage the seal by catching it on any sharp edges.

10. Torque the hub nut (15/16" socket) to 46 ft-lb, or until the next castellated nut lines up with the hole (up to 70 ft-lb).

11. Install the split pin and the grease cap
    - do not pack the grease cap full of grease (for the same reason as #6, above).

Figure 1

1. The MGB has a spacer inboard of the inner bearing. This spacer does two things, it deals with the large fillet radius at the base of the stub axle, and it provides the sealing surface.

   A midget has no spacer at the base, so it is very important that whatever bearing is used for the inner bearing HAS the proper radius for it to go all of the way on. This necessary radius is 2mm, and most modern bearings only have a 1mm radius, meaning that they will not fit properly. The difficult thing about this point is that it is not something you can "see", unless you trial fit your bearing onto the stub axle before you press the bearing into the hub. If you do this check, you can confirm that it seats fully against the face of the stub axle with 0.000" gap. Any gap here that is not accounted for will move your brake rotor outboard (may interfere with the caliper, in severe cases), can cause your lip seal to "fall off" of its sealing surface (rendering it useless), and, most importantly, will create a stress riser that could possibly cause your stub axle to experience a fatigue failure. Shimming this area will prevent the stress riser, but does leave the first two concerns.

2. The MGB uses tapered roller bearings, the Midget uses ball bearings (20 deg angular contact ball bearings).

   Tapered roller bearings can be installed and then removed easily. The freeplay of the whole assembly can be measured with the nut torqued, then they can be removed to adjust the shim thickness behind the outer bearing. Very accurate, and very easy to work with. Ball bearings, on the other hand, can not be removed from the hub once they have been installed. Removing them is very difficult without ruining them (if, when pressing them out, the inner race comes free of the outer race, the balls come out and damage is done to the balls and the races which may lead to premature failure). It is maybe possible to re-use them, but it is risky and the manufacturer (and the Machinery's Handbook) recommend against doing it.

3. The MGB hub assembly is shimmed for the proper bearing freeplay, the Midget is not designed to be shimmed.

   The Midget hub was a "fit and forget" design, "good enough for a low weight, low powered, low cost car". Once the bearings are pressed into the hub, it is unlikely that you will get them out again without separating them. Therefore, the parts used in the Midget hub must be confirmed to be the right shape BEFORE you put them together. If they are not right, they won't last.

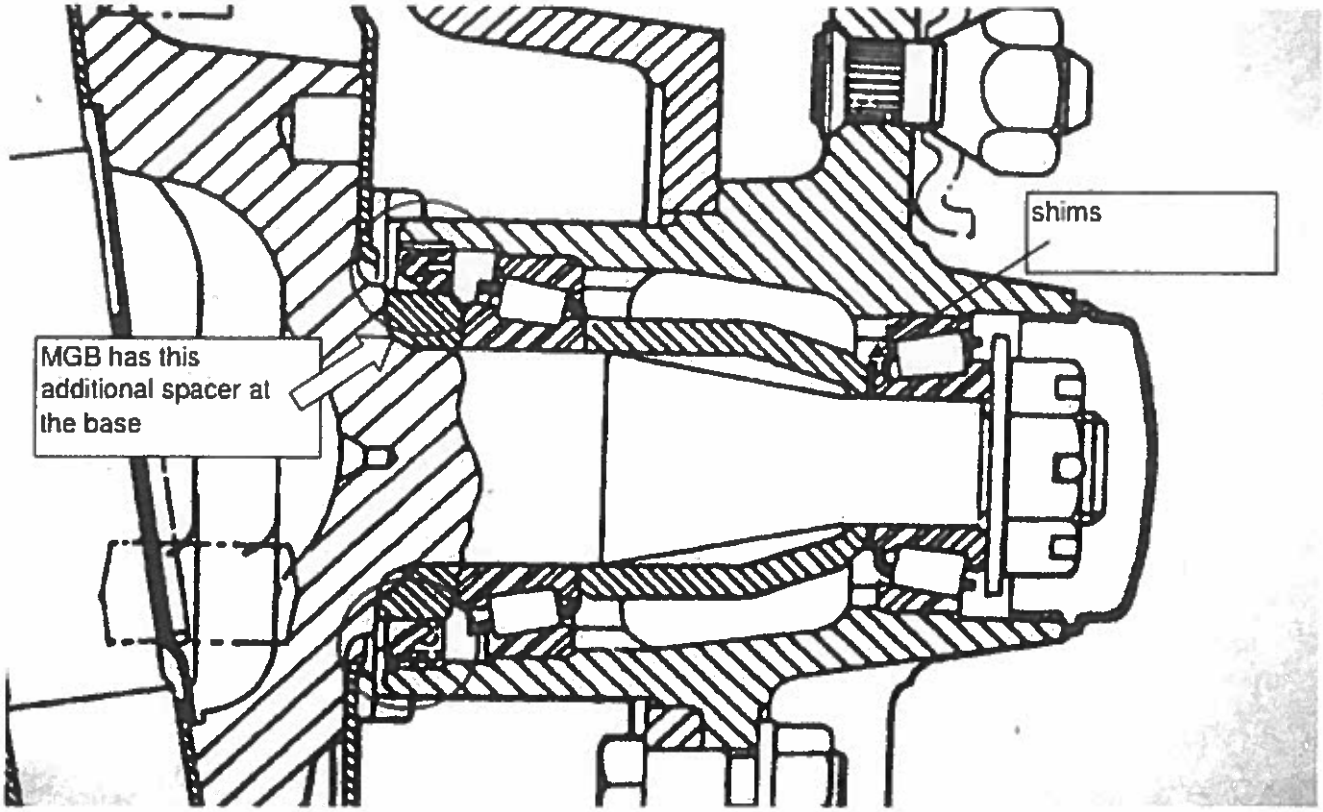
4. This "fit and forget" design is the 3rd difference to the MGB hub.

   The MGB is meant to be shimmed until it is correct. But, for the Midget, It is very important to confirm the bearing shape, the hub shape, and the middle spacer shape are all correct, before assembly, in order for your new bearings to last. The OEM bearings from RHP were face adjusted to within 0.001", this means that the inner and outer races are the same thickness. If your bearings are not RHP (or Ransome and Marles, their successor), then you must confirm what the face difference is and adjust for that during initial assembly. The problem with doing this is that the bearing must be gauge loaded to 5.5lbs for measuring. Probably easier, then, to use the RHP OEM bearings, 3MJT17 and 34LJT25. MGB shimming method.

Notes:

1. Both the B and the Midget have a spacer between the two bearings. This is very important structurally, because it creates a "pipe" to carry the loads and has a much larger diameter than the stub axle alone (providing 1.7 times the section modulus). The shape of this "pipe" also smooths out the section changes along the length of the stub axle, helping to minimize the stress riser at its base.

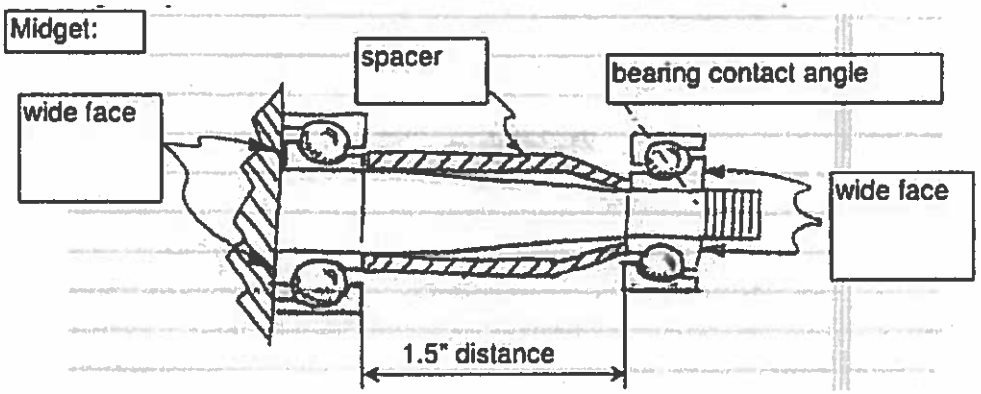
2. When the hub nut is torqued, that "pipe" is carrying the load. If the spacer is too short (say, a previous owner sanded it down to take up worn bearing play), the new bearings will then be over tightened, leading to their premature failure.



The Factory Manual is quite clear on the need for a particular end-float i.e. 'free play' to be present with the type of taper roller bearings used in the MGB. Anyone who tells you to apply a pre-load of X lb ft (i.e. the opposite of end-float) or whatever is wrong. That may be correct for other automotive applications, but not for the MGB. Some say that you don't need shims in the front hubs, some even say you don't even need the spacer. They are mistaken, you do need them because the act of clamping the inner races, shims and spacer between the hub nut and the base of the axle spindle significantly increases its strength.

Compare the MGB with the Midget front hub:

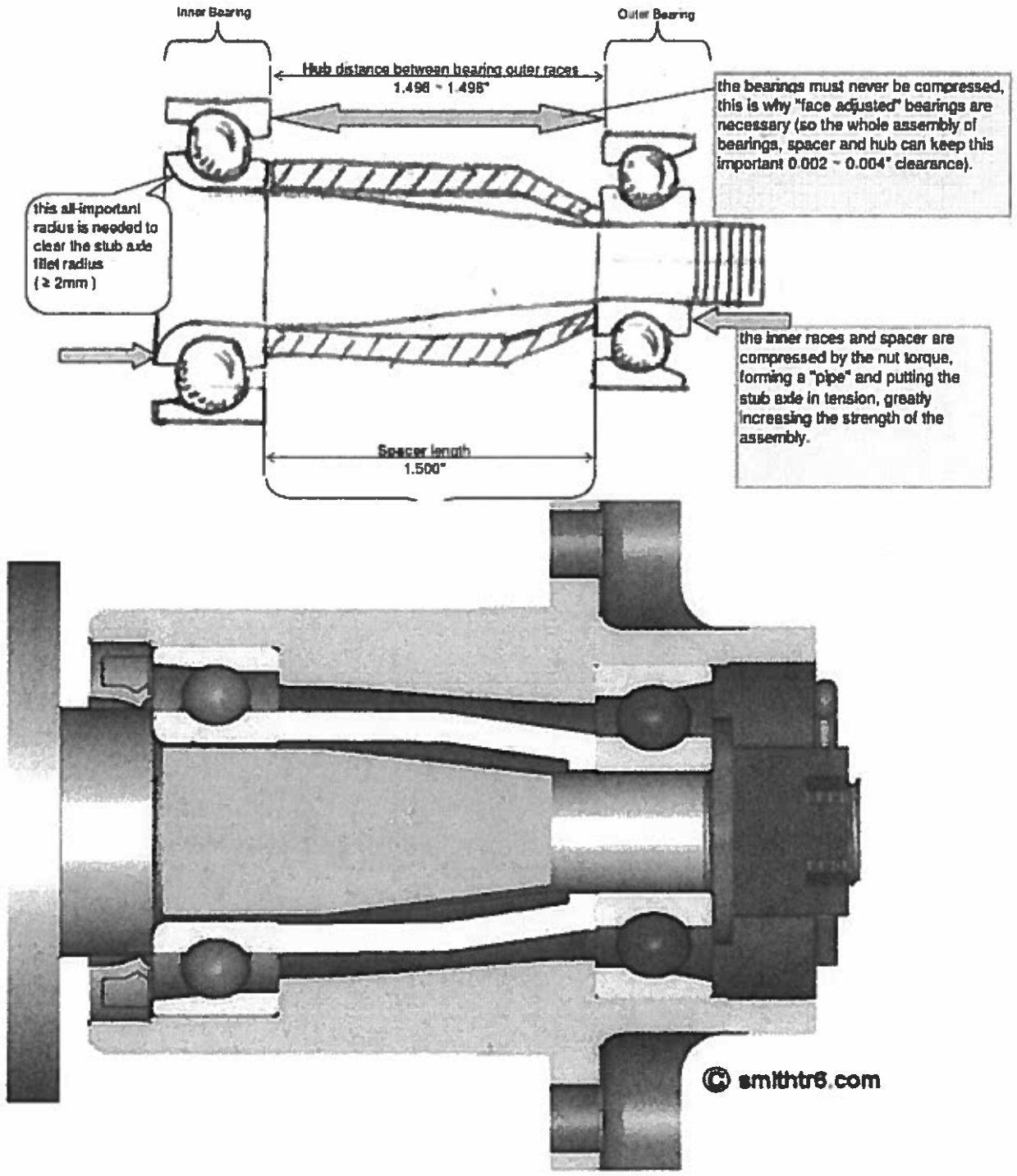
Note that the bearings are positioned the same way, though these are ball bearings, their races are loaded diagonally, with the outer races installed towards each other, just like the B:



Detailed MGB shimming instructions.

The MGB shims come in three sizes: 0.003, 0.005 and 0.010. Ideally, a dial gauge* is used for estimating end- float and confirming it. Roughly 0.060" is a typical starting point for shimming an MGB hub assembly.

Figure 1



Attachment 1 - Stub Axle Modulus Study

View MG Midget Stub Axle Modulus Study PDF

Attachment 2 - MG Midget vs MGB Hub Bearings

The MGB hub is structurally the same setup as a Midget, but there are **three key differences**:

1. When replacing bearings assemble everything lightly oiled first (i.e. without grease) as it keeps things cleaner and is easier to set the end-float.
2. The order of parts on the axle is: oil seal collar - inner race of inner bearing - spacer - shims - inner race of outer bearing - bearing retaining washer - nut.
3. The first time you assemble the parts onto the hub leave out the shims and tighten the nut until the bearings drag slightly (not bind) while rotating, to snug the bearings to each other in the hub.
4. Now fit the shims between the spacer and the outer bearing. The objective is to add and subtract shims until you get an end-float of .002 to .004.
5. Keep juggling shims until you get two combinations that are ideally only .001 apart where the thinner combination gives no end-float and the thicker gives perceptible end-float i.e. -0.001 to +0.001. Use the lower combination and then add another .003 shim. This should give you the required .002 to .004.
6. When you have determined the correct shims remove the races and inject or press grease in one side only! Keep going till the grease comes out the other side, and leave a bulge of grease on both sides. Don't be tempted to save time by greasing from both sides you will trap air in the middle of the bearing and possibly cause premature failure.
7. Lube the oil seal that goes at the base of the axle shaft with motor oil / light grease.
8. Reassemble everything, tighten the nut to 40 lb. ft., then tighten further until a hole in the shaft lines up with a slot in the nut. This should occur well before the maximum torque of 70 lb. ft. is reached.

(Interesting: note the MGB torque starts at 40, where the Midget started at 46)

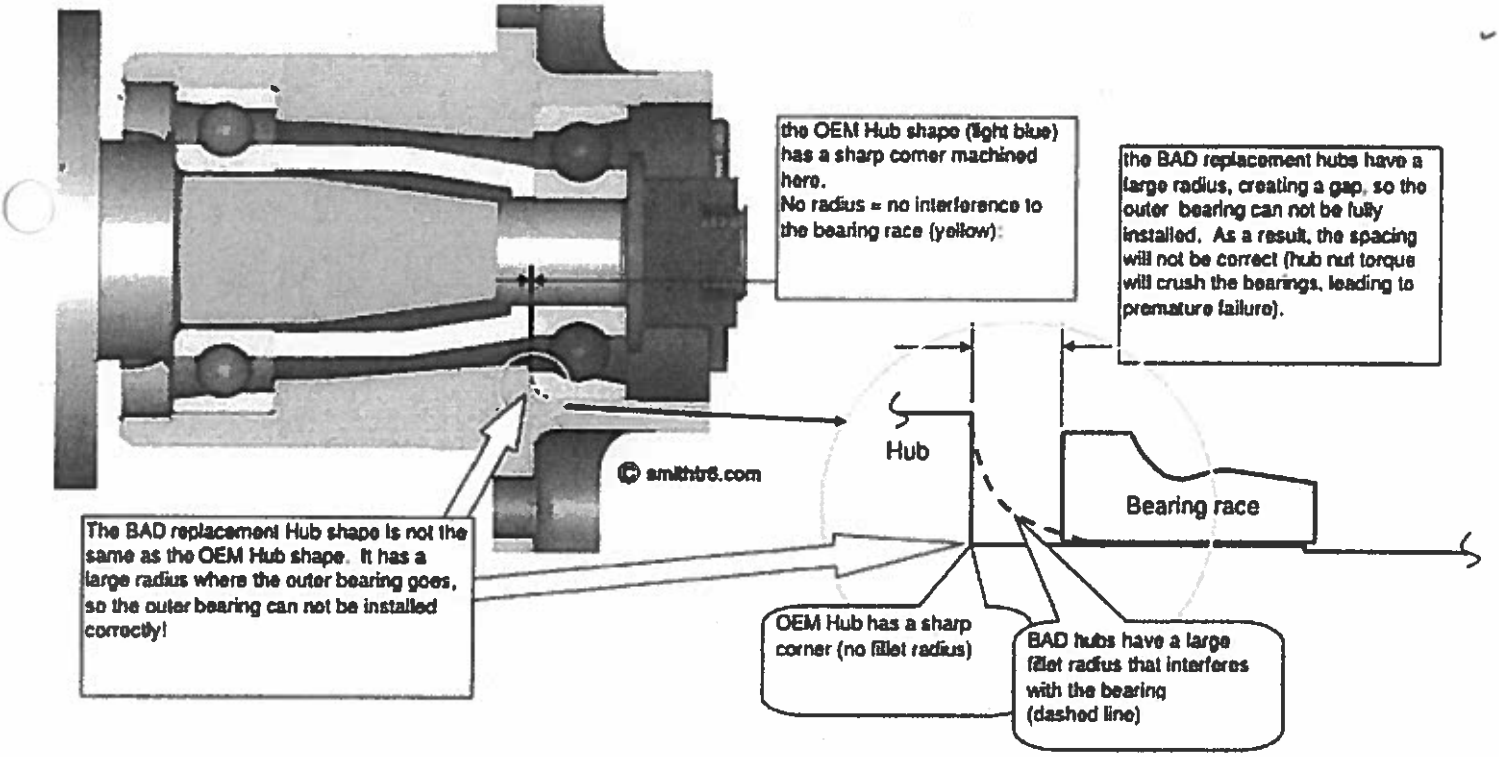
* This Huey tip Posted by Mike DeLorey, 8/26/2010, MG Experience BBS, MGB section:

"If you can't use a dial indicator, you can go by feel. If the hub spins free, and you can feel axial play but not see the movement you are there. If you can feel and see movement you have .005" or greater axial play. .005" is about where you can start to actually see movement. For any of the old timers out there that were former Army aviation and had to shim the sync elevators on a Huey or Cobra that's how we checked the axial play."

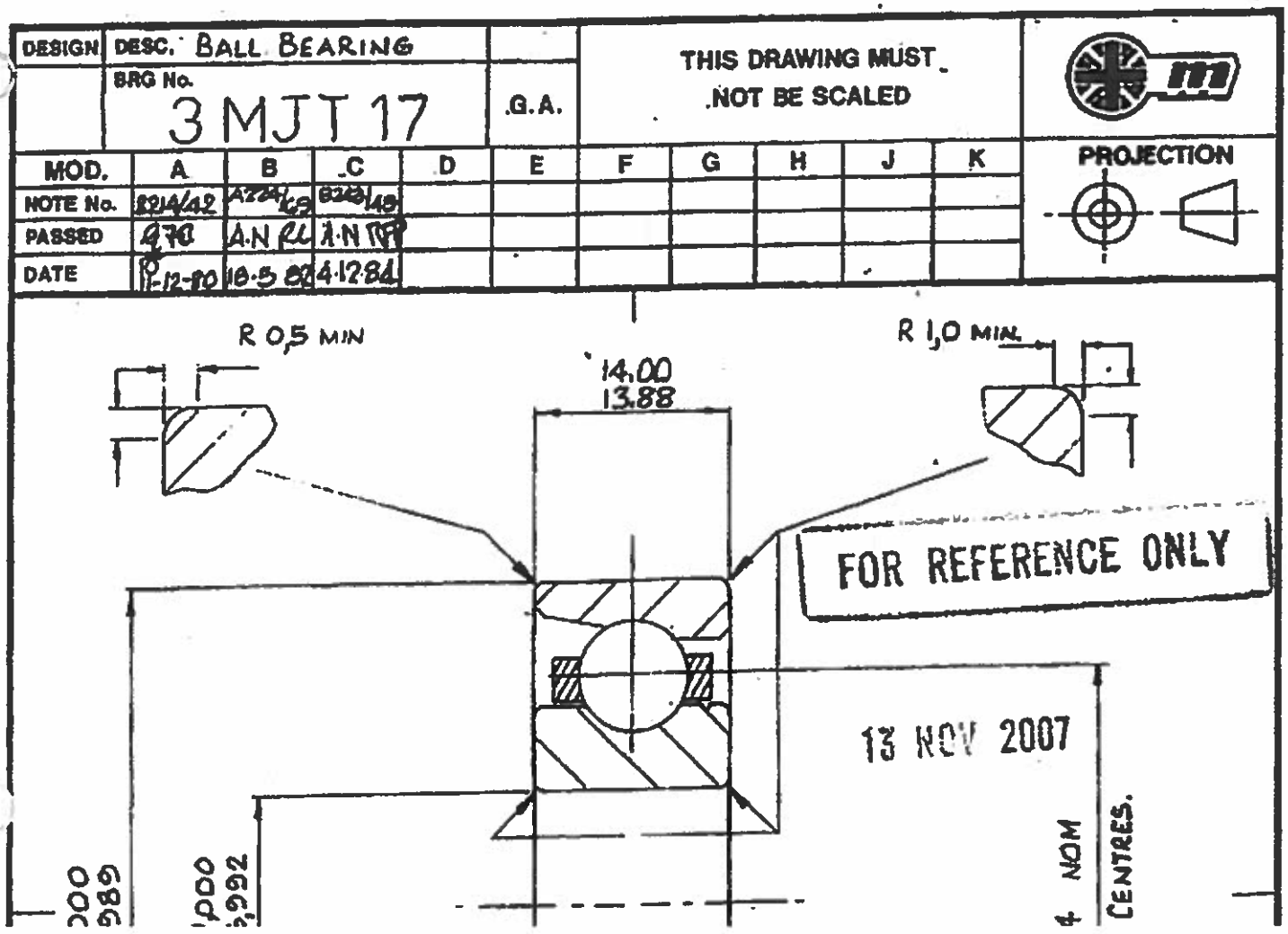
Attachment 3 - Hub Radius Issue

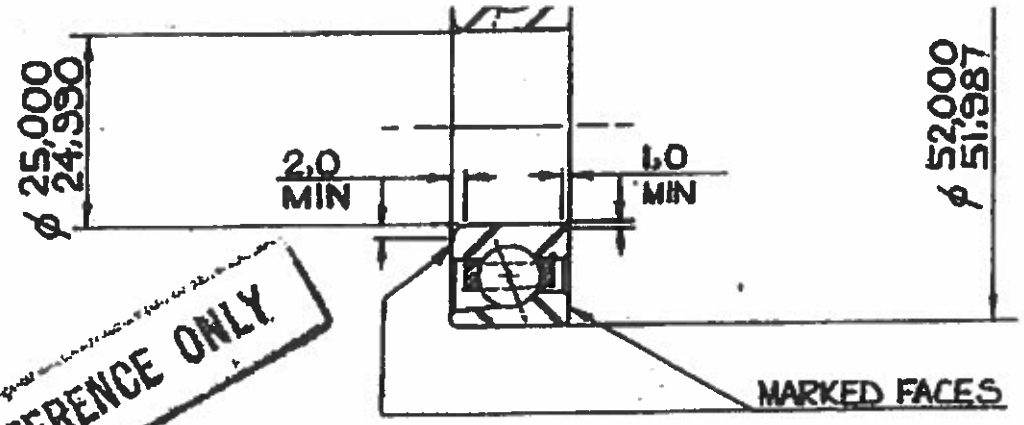
Watch out! Some replacement wire wheel hubs are machined incorrectly and should not be used.

Here is how to spot a bad one:



Original Bearing Drawings from RHP





FOR REFERENCE ONLY

CONTACT ANGLE 20°

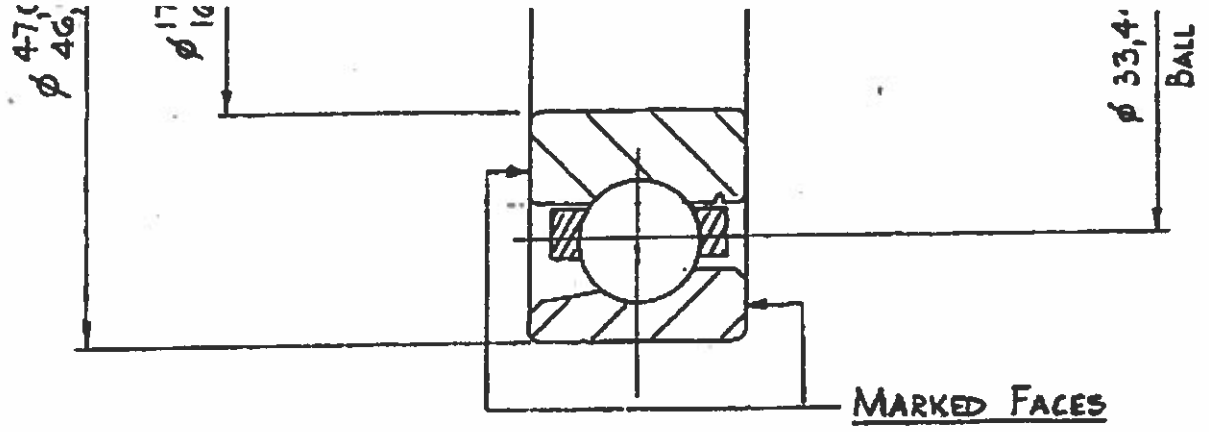
BRASS CAGE

MARKED FACE OF OUTER TO BE FLUSH TO 0.025 ABOVE UNMARKED FACE OF INNER WHEN A GAUGING LOAD OF 24.5N IS APPLIED TO MARKED FACE OF OUTER.

LUBRICATION. - PACK FULL WITH GREASE CONFORMING TO RHP SPEC 57-91/A

RADIAL INTERNAL CLEARANCE							
22/33 μm							
ISO BASIC LOAD RATINGS:- NEWTONS		A4	RHP BEARINGS LIMITED NEWARK				
DYNAMIC Cr. = 12 600N							
STATIC Cor. = 8 500N							
ORIGINAL CUSTOMER	AUSTIN MORRIS	DRN. RFP 8-12-80	DESIGN	DESC. A/C BALL BEARING			
CUST. PRINT No.	2A.4299	CKD. RFT 8-12-80		DRG No 34/LJT 25	G.A.		
OUR FILING No.		APP'D					

Admel P/2/225



11-BALLS ø7.9375 (5/16")

LUBRICATION
BEARING IS PACKED WITH GREASE CONFORMING TO RHP SPEC 57-01/A

RADIAL INTERNAL CLEARANCE

ISO BASIC LOAD RATINGS:- NEWTONS
DYNAMIC Cr. =
STATIC Cor. =

A4

RHP BEARINGS LIMITED
NEWARK

ORIGINAL CUSTOMER	AUSTIN MORRIS BL	DRN.	PJT	10/12/80	DESIGN	DESC. BALL BEARING
CUST. PRINT No.	2A 4178	CKD.	GFB	11-12-80		BRG. No. 3 MJT 17 G.A.
OUR FILING No.		APP'D				

Admal P/2/225

DESIGN	DESC. A/C BALL BEARING										THIS DRAWING MUST NOT BE SCALED	PROJECTION
	BRG No 34 /LJT25				G A.							
MOD.	A	B	C	D	E	F	G	H	J	K		
NOTE No.	8214/46	8348/49										
PASSED	RFP	AN										
DATE	11-12-80	4.12.84										

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13 NOV 2007