STAG NEWS

Magazine of the Triumph Stag Club USA
Winter 2018 | Issue 98

246 bhp Stag

Busting Lubrication Myths • Double Brake Lights • A Stag Affair

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Submissions should preferably be non-formatted MS Word documents. Articles of 1,500-2,000 words are preferable but larger submissions can be accommodated. The Editor reserves the right to make changes to any submission for layout purposes. Photographs or diagrams should be sent separately as high-definition JPG files (>4000KB) with appropriate cut-line/caption descriptions. The author should provide a short biography. Send by e-mail to the Editor ahead of the deadline dates of March 1, June 1, September 1 and December 1 for inclusion in a future issue.

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On the Cover

Neil Brown's Stag in rural Staffordshire
Photo: Neil Brown

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PLEASE CONSIDER CONTRIBUTING

Producing a magazine dedicated to a single classic car model issue after issue, as we do at Stag News, can be challenging. In order to keep providing interesting articles and stories, we need to hear from more of our membership. Thanks to those who have already stepped up to the plate and prepared a once off submission or have become regular contributors.

Please consider sending us an illustrated article about your Triumph Stags; the hunt for a suitable model, the restoration projects completed or underway, the modifications you have made, the difficulties faced, why you still love them, the outings and trips you take, the shows and events that you attend, the friends and associates with whom you share this passion.

We would like to hear from members in as many different States and Provinces (and internationally) as possible in order to keep the content regionally balanced.

Renew your membership ON-LINE at www.tscusa.org/join.asp

NEW MEMBERS
Since Fall Issue #97

David Anderson, Minneapolis, MN

Kevin Becker, Winter Park, FL

Iain Jackson, Humboldt, TN (Rejoined from 06/16)

Paul Kusber, San Carlos, CA

Ronald Marchese, Voorhees, NJ

Phillippe Marcotte, Lauderdale By The Sea, FL

Kevin McCarthy, Eagle, ID

Rory McGlade, Tottenham, ON, Canada

Alan Metcalf, Sainte Anne des Lacs, Quebec, Canada

Nick Tusa, Covington, Louisiana

Neville Wardle, Branford, CT

Sean White, Lancashire, England (Re-joined from 11/15)

Toby Wingfield, Crystal Lake, IL

Errata

In Stag News, #95 Spring 2017, at the end of the article entitled "Placing Stripes & Badges," we indicated that all Federal Stags had a black background to the front grille badge from the start of the MkI production run. It seems that Federal cars mirrored the UK models and had a grey background on Mk1 cars, turning to a black background with Mk2 cars.

DEADLINE

The deadline for the next issue of STAG NEWS is:

Mar. 1, 2018

To submit material for publication refer to details on inside front cover

From the Editor

As we begin the New Year, I'd like to extend best wishes to all our members. I'm already looking forward to the driving season starting again, hopefully sometime in mid- to late March, but our southern members will likely have a few drives and events already under their belts.

Meanwhile, with assistance from two of my Triumph neighbors, Colin Pillar and Tony Fox, I am using the down time to carry out some changes to my Stag, including swapping out the BW35 transmission and replacing it with an ex-Jaguar, four-speed ZF automatic transmission that Tony happened to have sitting in his truly amazing inventory of Stag parts. Of course, it also means replacing the drive shaft but I'm looking forward to more relaxed highway cruising and smoother gear changes.

In this issue, Neil Brown, a member of the Stag Owners Club in the UK, describes how he achieved a remarkable 246 bhp output from his Triumph Stag. It seems that the inlet manifold is the main drag on wresting more power from the Stag's V8 engine. It must be quite an exhilarating drive! Engine lubrication guru and Lotus 7 owner, Peter Marie, suggests that the best 20W-50 engine oil for one's classic car may actually be a synthetic 5W-50 oil. If you're still confused after reading the article, don't worry, I'm still working through it myself! Rounding out the issue, Michael Link recalls his first Stag sighting back in 1986. Michael is planning the drive of a lifetime this year; taking his Stag from the west coast across the continent to attend the Bronte Stag Weekend events and British Car Day® near Toronto and then stopping in Sacramento on the return journey for Triumphest. We're looking forward to bringing you an exclusive report on Michael's 6,000 mile round-trip odyssey which will take place over a two week period in September. What a great way to celebrate his Stag's 45th anniversary!

We really do appreciate the contributions from our readers (text and photographs) describing Triumph Stag-related events, travels, repairs, innovations and restorations.

Top - Ted & Eden Allison at Bronte | Centre - Chris Tank's Stag at Brits on the Lake | Bottom - Double brake lights for added safety

Founder's Corner

2018 - Happy New Year TSC USA MEMBERS

Now that we have achieved and celebrated our Silver Anniversary as the best Triumph Stag Club on this continent, the job continues to preserve and enjoy these great Triumph cars. Thank you one and all for your commitment to these great Triumph Stags which have soared in appreciation and value because of our collective efforts to bring this model in to its proper limelight in the history of the Triumph marque. Winter is very evident in my home state of Pennsylvania, as it is in many areas of the USA and Canada, so driving our Stags is not always an option until spring time.

However it is the best time to get on with those "promised projects" and have our Stags ready for spring time driving. Do contact each other for assistance on a problem, if you are a little unsure of how to remedy. Isolated pride can be a sure way to make incorrect mechanical decisions.

This Cub was founded to help preserve the Federal Specification Triumph Stag in the United States and Canada. To accomplish this goal many members have spent years of effort in assisting in these goals. Triumph Stag Club USA is a club to assist our members with their Stags and provide camaraderie while achieving these goals. For some time now I have been receiving e-mails at Stagclub@epix.net of a political and/or personal nature from some of our members. This Club is not a forum for personal matters or political opinions. If a member wishes to contact another member regarding personal or political matters they MUST use both the private e-mails of sender and receiver. If for some reason, the sender does not have the personal e-mail of the receiver, they should get it and keep their personal matters and political opinions private.

That said, I must encourage all members to interact on Stag problems, accomplishments, events, etc., through the Club. It is our club and we must ensure that our focus is on preserving and enjoying our Stags. My cellular phone and computer are always on, so don't hesitate to contact me or other members; Please just keep it appropriate for all.

Michael Coffey - Founder

Busting Motor Oil Myths
for Classic Cars

by Peter P. Marie, B.Sc.

Peter Marie has been a student of engine lubricants for almost 50 years. His interest started with solving lubrication problems on motorbikes in his youth and later issues with motor oil selection for sports cars during race track events of which he is an active participant. He contributes regularly to forums on engine lubrication and is fortunate to have many friends in the field including tribologists, chemical engineers and race oil formulators from whom to garner the latest trends and developments in engine lubricants. Peter is a member of the Lotus Car Club of Canada and can be reached at petermarie1955@gmail.com.

I'm occasionally asked, *"What's the best 20W-50 oil to run in my classic British sports car?"* My answer is the best 20W-50 is a 5W-50! And to add further shock effect, I qualify that statement with, *"But only if you can't maintain oil pressure with a 0W-40, 5W-30 or 0W-30."* It's a common myth that heavier oil automatically provides greater protection and I'll try to explain why it may not.

A mineral oil 20W-50 grade is technically obsolete and hasn't been recommended by any auto manufacturer in North America or Europe for almost thirty years. Porsche now recommends their current OEM 0W-40 oil for all their water-cooled models, going back 40 years. They have also developed their own brand, "Classic Motoroil 20W-50" for Porsche air-cooled cars of up to 2.7 liters, going back to the first Porsche 356 built in the late 1940s. However, it is not a true SAE 20W-50 and Porsche doesn't label it as such, just 20W-50 with no API or ACEA certifications. It has been independently analyzed and it is actually a GP III synthetic oil, likely a 10W-50. Why would Porsche market the oil as a *"classic mineral 20W50"* when in fact they've developed a superior, modern synthetic oil as the best oil for their older engines? It's one of those myths that old vehicles require old tech motor oils and Porsche knows it wouldn't sell very well if it was correctly labeled.

Older Multi-grade Oils

The old mineral oil grades like 20W-50 that were recommended back in the day have retained a certain cachet with owners (and mechanics) that transcends any technical merit the grade may once have had. Motor oil has improved dramatically in the past 40-50 years and continues to technically improve. In fact, many of the performance characteristics of the more advanced oils available today didn't exist ten years ago.

The early multi-grade oils of the 60s and 70s, and even 80s, were very shear prone, meaning they didn't retain their hot viscosity rating for long and after as little as 1,000 miles that 20W-50 was at best a 20W-40 if not a 20W-30. In the 70s, a 10W-50 grade was beginning to be recommended as an option but was even more shear prone and today only synthetic-base oils are used to make that grade. In many driver's handbooks of the day the 20W-50 grade was given the same high temperature protection as a straight (monograde) 40 weight oil and the 40-grade was often preferred for sustained high speed driving in the summer months.

Today's 20W-50s vs yesteryear?

Today, most are heavier because they are more shear stable and often are formulated at the heavier end of the 50-grade range. A SAE 50-grade oil must have a new kinematic viscosity between 16.30 and 21.89 centistokes (cSt) measured at 100°C. Kinematic viscosity is a very simple measure of an oil's resistance to flow or rate of flow under the force of gravity alone.

Castrol Classic XL 20W-50 has viscosity characteristics similar to oil's of yesterday and its kinematic viscosity at 100°C (KV100) is 17.3 cSt with a viscosity index (VI) of 120 (more on the significance of VI later). Most of today's 20W-50s have KV100 specs of at least 18 cSt and often at 19-21 cSt. But the kinematic viscosity (KV100) measure does not accurately represent the viscosity of oil under actual usage. An oil's viscosity, operating under pressure and stress, such as in the rod bearings under load, can vary depending on the oil's chemistry. The main culprits in this phenomenon are the polymer viscosity index improvers (VIIs) used to create multi-grade mineral oils. For example, in making a multi-grade 20W-50, one starts with lighter, lower viscosity base oils and then sufficient VIIs of the correct type are added to raise the hot kinematic viscosity at 100°C to that of a 50-grade oil. The finished oil will be formulated to be light enough to qualify with its winter rating as a 20W with a sufficiently low cold cranking simulator (CCS) viscosity, meaning that at -15°C the oil must have a viscosity less than 9,500 centipoise (cP). These long-chain polymer molecules work by reducing the rate by which an oil naturally thins out (or loses viscosity) with increasing temperature. In effect, they uncurl or expand, reducing the amount of viscosity loss.

The problem with these polymer VIIs (thickeners) is that they undergo what's known as temporary shear under stress in an operating engine, reducing their effective viscosity. But once the stress is removed, as when the oil exits a bearing, of a running engine, the polymer VII containing oil will return to its original kinematic viscosity. Back in the day when these multi-grade oils were first developed, the chemical engineers knew there was a problem because a multi-grade oil with the same KV100 spec as a straight single grade oil would generate lower oil pressure suggesting the oil was still somehow lighter. Even before the advent of multi-grade oils, it was already known that mineral oils refined from different crude oil sources could "express heavier" than expected from their KV100 specs.

Viscosity - All Manner of Confusion

Contrary to expectation, oil is compressible to a certain limited extent, depending on its chemistry. The measure of this is determined by its pressure-viscosity coefficient. To deal with the problem that the KV100 spec did not represent actual operating viscosity in an engine, the Society of Automotive Engineers (SAE) began in 1977 to develop a better hot operating temperature viscosity measurement, and by the mid-80s the High Temperature High Stress (HTHS) viscosity measure had been established. It is measured at 80°C, 100°C and 150°C in centipoise (cP) units of viscosity.

HTHSV was supposed to replace the KV100 spec but unfortunately that hasn't happened because it is an expensive test to perform. Consequently, we now have two high temperature viscosity measures, creating all manner of confusion, even amongst tribologists and oil formulators.

The HTHS viscosity measure at 150°C is the standard measure of an engine oil's high temperature viscosity. That temperature is of course higher than the nominal 100°C sump oil temp but oil in the bearings under high load will be higher than the sump oil temps

Peter's Caterham 7 with a selection of engine oils

plus other hot parts of an engine, primarily the ring belt area will be even hotter than that, so 150^{0}C was chosen. HTHSV is sometimes referred to as "bearing viscosity" since it more accurately represents the viscosity of oil at the bearings, particularly the rod bearings, of a running engine.

Even though an HTHSV measure or rating is at 150^{0}C, it is the most accurate spec to use for comparing how viscose or heavy an engine oil will be at all oil temps down to at least 0^{0}C (32^{0}F). A typical 20W-50 today will have a HTHSV of about 4.8 cP. The HTHSV of oils made back in the 60s and 70s before the measure existed were probably in the 4.4-4.7 cP range - of course that's fresh virgin oil before any viscosity losing shearing that would occur in an engine.

So where does one find the HTHSV, KV100 and other spec's for a motor oil? Unfortunately, not on the bottle of oil where it should belong, but only on the oil companies' website. Look for the Product Data Sheet (PDS) or Technical Data Sheet (TDS) or sometimes just Typical Properties data. While the KV40 and KV100 specs are always provided, the HTHSV spec is not always listed. The chart (page 6) presents sample specifications for some of today's oils.

The 50-grade oils have a wide HTHSV viscosity range from about 4.0 cP to 6.2 cP. There are 40-grade oils heavier than some 50-grades and some 20W-50s heavier than most 10W-60s. At least one 20W-50 (Brad Penn) is heavier than all 10W-60s. There is a greater HTHSV range within the 20W-50 grade than there is between a 0W-20 and a typical OTC 5W-50, such as Castrol Edge, and that's where problems can occur. A common complaint amongst 20W-50 users who may have changed oil brands of the "same viscosity" is that their oil pressure is now reading maximum all the time. Since they have incorrectly assumed that the viscosity is similar, they believe the problem must lie with the pressure relief valve (PRV), oil gauge, or sending unit when the cause is their choice of oil brand (probably with a HTHSV well over 5.0 cP).

The viscosity index (VI) is second only to HTHSV in terms of importance. The major problem with oil in an engine is that it thins out when it gets hot and thickens up when it cools. The VI is an indication to what extent the viscosity changes with temperature at typical operating temps compared to other oils of the same grade. It's a dimensionless number derived from the kinematic viscosity measured at 40^{0}C and 100^{0}C. The SAE developed it long before multi-grade oils were invented and chose a VI of 100 which was just out of reach of the best mineral oils of the day from which to rank lubricating oils.

For example, straight-40 grade oil from the 60s such as Castrol Classic XXL 40 had a VI of 95 which was considered very good at the time. So when the first multi-grade 20W-50 came to market in the late 50s, its VI of nominally 120, was considered a lubrication break-through.

Today however, if a finished, fully-formulated engine and transmission oil doesn't have a VI of at least 170, it is below average. The better synthetic oils will have VIs in the 180s with the most advanced over 200 and approaching 230. This is accomplished by using high VI synthetic base oils plus newly developed very high VI polymer viscosity index improvers (VIIs).

Oil Classification

First, we need to explain what is a mineral or conventional oil. These are base oils refined from crude oil and are categorized into three groups by the American Petroleum Institute (API):

- ***Group I*** *oils are solvent-refined, which is the simplest refining process. Motor oil sold in the 1960s and earlier was made this way.*
- ***Group II*** *oils are refined to a greater extent using a hydrogen–treating process developed in the early 1970s. This makes up the bulk of the so-called conventional motor oils sold today. The VI of these oils is up to 120.*
- ***Group III*** *oils are hydro-cracked oils refined to the greatest extent resulting in very pure oils with a VI above 120. Even though these oils are still refined from crude oil, the best of these oils have performance characteristic that can match that of more expensive GP IV synthetics for a fraction of the price. GP III based motor oils started to hit the market place in the early 1980s.*
- ***Group III+*** *Recently, a new type of base oil derived from natural gas (gas-to-liquid or GTL) falls into the GP III camp and are often referred to as GP III+ due to their exceptional properties including very high VIs and low volatility.*

Finished oils made from GP III stocks can be called "synthetic" here in North America but in Europe, and particularly in Germany, motor oils made from these base oils cannot be called synthetic. As a result, most of the motor oils advertised as 'synthetic' in Canada and the USA are made from GP III "mineral" stocks. In fact, many so called 'conventional' motor oil sold today are blends of GP II, GP III+ (almost GP III) and GP III out of necessity to meet the ever increasing performance requirements of the API, ACEA and the auto manufacturers themselves.

- ***Group IV*** *are synthetic oils of polyalphaolefins (PAOs) chemistry. These oils are made from a process called synthesizing. They have exceptionally good cold-flow properties plus very low oxidative rates at high temperatures.*
- ***Group V*** *oils are all other synthetic base oils including esters, such as diester, polyolester and complex esters. The best of these can handle extremely high temps in addition to possessing very good cold-flow properties plus having very high VIs. They are polar in nature, meaning they actually will bond to metal. They are often blended with PAOs to formulate the highest performing motor oils at a premium price.*

Anti-wear (AW) additives

All motor oils contain anti-wear additives to minimize wear during boundary lubrication conditions when an oil film may be broken to prevent metal-to-metal contact. The most common and least expensive of these is zinc dialkyldithiophosphate (ZDDP). It's called a Zinc additive because that's the first part of its name but it is primarily the phosphorus in the molecule that bonds under heat and pressure to ferrous wear-surfaces and acts as a sacrificial wear element instead of the metal itself.

How much AW is necessary for a particular engine is often discussed, particularly with regard to older engines with flat tappet push rod valve-trains. Using a higher ZDDP oil may have some merit in a newly rebuilt engine but in my experience 1,000-1,100 ppm of phosphorous is fine once an otherwise stock engine is broken-in. That said, there is no harm in using oil with a higher ZDDP level if it satisfies one's piece of mind. In the ZDDP (and other ZDP and ZP, Zn/P based anti-wear molecules) the ratio between the two elements is fixed, so you can't raise one without raising the other. In elemental analysis there is more Zn than P but it is the P that can clog a catalytic converter.

Personally, I never chose oil based on its ZDDP level but rather its viscometrics. Since I use light 0W-20 and 0W-30 oils in some of my older cars, I do in some cases use a ZDDP supplement (Red Line Break-In Additive) to raise the phosphorous level to 1,000 ppm in oils that use ZDDP as the principal AW agent. One bottle is good for 4 or 5 oil changes.

Advantages of Synthetic Oil

What are the advantages of running a high VI synthetic oil vs a conventional 20W-50

Brand	Grade	KV40 (cSt)	KV100 (cSt)	VI	HTHSV (cP)	P (ppm)	Zn (ppm)
Penzoil*	20W-50	160.0	17.5	120	4.6	1,000	1,150
Castrol GTX*	20W-50	159.0	18.1	125	4.8	1,150	1,300
Castrol GTX High Mileage*	20W-50	188.0	20.3	126	5.4	1,150	1,300
Valvoline*	20W-50	181.8	20.5	132	5.7	1,100	1,350
Shell Rotella*	15W-40	118.0	15.0	133	4.3	1,150	1,275
Kendall GT-1*	20W-50	160.0	19.4	139	4.9	1,090	1,200
Brad Penn*	20W-50	159.0	20.0	140	6.2	1,400	1,500
Porsche Classic MotorOil *(likely a SAE 10W-50)*	20W50	130.0	19.3	164	5.0	830	890
Amsoil Z-ROD	20W-50	140.0	19.3	157	5.2	1,300	1,400
Amsoil	5W-50	127.0	20.3	184	4.7	1,000	1,200
Amsoil AMO	10W-40	95.9	14.6	158	4.3	1,300	1,400
Castrol Edge	5W-50	114.0	18.4	170	4.1	1,150	1,250
Mobil Delvac 1 ESP	0W-40	87.0	15.2	186	3.9	1,100	1,250
Mobil 1	5W-30	61.7	11.0	172	3.1	750	800
Mobil 1	5W-50	108.0	17.5	180	4.4	950	1,090
Mobil 1	15W-50	130.0	17.5	160	4.5	1,100	1,260
Pennzoil Platinum	5W-50	106.0	17.6	186	4.1	760	860
Pennzoil Platinum	10W-60	164.0	23.2	171	5.5	790	900
Shell Rotella T6	5W-40	87.0	14.2	170	4.0	1,150	1,150
Red Line	5W-50	130.0	21.0	186	5.0	1,100	1,200
Red Line	10W-60	170.0	25.9	187	5.8	1,150	1,200
Red Line Powersport 4T	0W-40	76.5	15.8	221	4.0	2,100	2,125
Toyota Brand	0W-20	37.2	8.5	216	2.6	700	800

Oils marked * are mineral/mineral blend oils. The other oils are 100% synthetic, made from GP III, GP IV and/or GP V base oils

in a classic car. Firstly, as mentioned a traditional 20W-50 has a VI no higher than 120 so when you see some 20W-50 brands with a VI in the 130s and even 140 they are using some higher quality GP II base oils and/or even some GP III base oils in their formulations. So while they don't have all the advantages of full synthetics they will outperform a more traditional 20W-50.

That said, the best synthetic oils keep an engine internally cleaner, have less combustion deposits, lower volatility, less oxidation and will last 2 to 3 times longer. But the main advantage, especially with heavier oil grades is a much lower cold start performance while providing greater high temperature protection. In carbureted engines, one gets an improved cold engine performance and an improvement in the car's drivability on start-up through warm-up as a result of less power sapping oil drag and of course, all this can extend the life of an engine.

Winter Rating

The number before the W in a SAE oil grade is its winter rating. The smaller the number, the farther below freezing an oil will still be able to pump. 0W, the lowest rating, simply means that oil still has a borderline pumping ability at -40 degrees. SAE, API and ACEA rules require the lowest winter rating that a motor oil can pass be stated in the oil's grade. For example, if a synthetic 50-grade oil passes the test for a 10W it is supposed to be labeled SAE 10W-50. If it passes the test for a 5W, a SAE 5W-50 label is what's required. Some formulators do try to work around this rule for marketing purposes (think of the Porsche 20W50 example provided earlier).

Purchasers of motor oil will often mistakenly chose their oil grade based on the winter rating, rationalizing that they don't need a 5W let alone a 0W oil because they won't be starting their car at anywhere near those cold temperatures. What they don't appreciate is that the move to 5W-50, 0W-40, 0W-30 and 0W-20 synthetic grades in recent years has little to do with formulating an oil that will allow an engine to crank at -30^{0}C or -35^{0}C but rather the pursuit of an oil with a higher VI. The highest VI oils in the lighter oil grades will automatically have a 0W winter rating. For example, the most advanced race oils have a 0W rating which has nothing to do with any extreme cold temperature performance but rather is the result of selecting high VI base oils and high VI VIIs.

The car will be more pleasant to drive

How does a 20W-50 viscosity compare to a 20W-20 at typical cold start-up temperatures (0^{0}C/32^{0}F)? Using Castrol GTX 20W-50 (VI 125) as an example, it is over 3 times heavier. In fact it has about the same viscosity as a straight-40 mono-grade oil. At room temperature the straight 40-grade is about 10% lighter and that's compared to one of the "lighter" 20W-50s like GTX. As far as your engine is concerned, it's 40-grade oil in the sump at more typical start-up temps.

Now let's compare that "light" 20W-50 to a high VI synthetic with a similar high temp (HTHS) viscosity, e.g., Amsoil 5W-50 (VI 184). It is 35% lighter at room temperature, at 10^{0}C (50^{0}F) it's 45% lighter and at 0^{0}C (32^{0}F) 55% lighter. But in the parts of an engine where the oil gets very hot such as in the ring belt, Amsoil will actually be more viscous (heavier) since its rate of viscosity loss with increasing temps is lower, yielding greater high temperature protection.

If you can run a lighter 5W-50 or even a 0W-40, the advantages are even more pronounced because of the further reduced oil drag on start-up and during the warming-up period. Having the lowest oil drag possible can completely transform an engine's driving characteristics. Easier starting of course but less choke is necessary to maintain a cold idle. And since the viscosity thins out at a much lower rate on warm up, idle speed will be much less affected and you will have to reduce your hot idle speed. The engine will rev much more easily with less throttle. On balance, the car will be more pleasant to drive and that's more than worth the higher price of high VI synthetic oil in my opinion.

Using Your Oil Pressure Gauge

If you're still with me, you may think selecting the best oil for your classic car is complicated. Instead, it's rather easy since most LBCs come equipped with an oil pressure gauge (OPG). The OPG has many useful functions including being a viscosity meter. The OPG actually measures back-pressure or the oil's resistance to flow through the engine, consequently the heavier or more viscous the oil, the higher the oil pressure (OP) reading. The OP reading can therefore be a proxy for operational viscosity in a running engine. It is the bottom line that takes everything that can affect an oil's dynamic viscosity into consideration, including the condition of the engine bearings (clearances or degree of wear) and the condition of the oil itself such as shear, fuel dilution and the biggest factor, oil temperatures.

Auto manufacturers provide a recommended minimum and maximum safe OP operating range usually at some specified high rpm, once the engine is up to normal operat-

The OPG has many useful functions including being a viscosity meter

ing temperature. An OP spec on idle is often provided too but for various reasons including reduced oil flow it is not as reliable a tool to gauge operational viscosity. Even without knowing what oil grades are recommended, one can quickly determine if the viscosity of the oil in the engine falls within the recommended OP range.

The maximum recommended OP often correlates with the engine's oil pump's pressure relief valve (PRV) setting. That determines how heavy or viscous the motor oil can be to efficiently lubricate and cool the internal parts of the engine. When an engine is cold and the oil is thick and heavy, the PRV will be activated at higher revs diverting some oil back to the sump until it has thinned out sufficiently as the engine warms up to allow the PRV to remain closed at high revs, permitting the minimum required volume of oil to circulate within the engine.

Once the oil is up to its normal hot operating temperature, one should be able to access high revs with the maximum OP reading on the gauge falling well short of the maximum cold OP reading or factory PRV setting. If that's not the case and the PRV is still in relief at high revs, then the oil in the sump is too heavy for the engine.

Since we're dealing with an old engine, it is important to first make sure that the maximum factory OP setting can be achieved. With the Triumph Stag, the PRV controlled maximum OP is nominally 70 psi. If your OP isn't that high at elevated revs with a cold engine then something is amiss and assuming the oil gauge itself is operating correctly, the culprit with a Stag is usually a weak PRV spring. Borrowing an OP test gauge will help determine whether the source of the maximum cold low OP is the gauge, sending unit, PRV spring or oil pump itself. The minimum recommended OP for the Stag is 50 psi and it is a common mistake among Stag owners to conclude all is fine if that's what you have with a hot engine and not much more with a cold engine. That means the PVR is controlling the maximum OP and that is not it's purpose since oil flow is being partially diverted to the sump instead of flowing through the engine . It is the engine bearing clearances and oil viscosity that should determine the maximum hot OP and not the PRV. Typically a PVR starts to open about 15 psi before maximum system oil back pressure is reached. So with a` Stag engine if your target hot operating OP is 50-55 psi, then you're going to want a PVR controlled maximum cold OP of 65-70 psi.

Assuming the engine and oil gauge are operating correctly and one has no problem hitting 70 psi with a cold engine, the first thing to establish is what the hot OP is with the oil one currently has in the sump. Then look up the HTHSV rating of that oil brand. If you're reaching your maximum OP of 65-70 psi and it happens at only marginally raised revs of say 2,000 rpm then one now knows the oil is way too heavy and if the 20W-50 being used has a HTHSV well over 5.0 cP, that is the problem. But if a lighter 20W-50 is being used, a good candidate to try would be a 0W-40.

If 65-70 psi is reached at much higher revs of say 4,500 rpm then the oil would be just somewhat too heavy and if a 20W-50 is being used with a HTHSV in the 4.8 cP area one could consider trying one of the lighter 5W-50s such as Castrol Edge. If the OP was in the low-60s psi area one could still try that if the goal is to get the OP down closer to 50 psi. On the other hand, if the OP is already in the low 50 psi range running the same 4.8 cP 20W-50, your options are more limited, although one could try a heavier 5W-50s from Amsoil or Red Line or even a 10W-60.

The minimum recommended OP stat doesn't necessarily mean if your OP drops below that figure, such as when higher than expected oil temps occur, that increased engine wear will result, as there is usually a pretty large safety margin. Besides, high VI synthetic oils automatically provide greater high temp protection for a given OP level compared to low VI mineral oils.

In optimizing an engine oil viscosity choice, the main objective is to make sure that one doesn't use an oil that is clearly too heavy and secondly, to chose an oil that is at the lighter end of the known safe operating range at hot operating temps, plus of course, being as light as possible on start-up, even at normal ambient temperature.

Blending Oil Grades is Okay

Having established how heavy the current sump oil is and having some idea of what lighter oil you may wish to use when doing the oil change with the new oil, I suggest not filling to the maximum level on the dipstick but to the minimum level only, before firing it up and road testing. If you're just going to warm-up the engine in the garage or driveway, you can use even less oil initially to see if you're on the right track. A couple of liters is usually more than enough to cover the oil pump pick-up tube and the oil will come up to temperature faster.

When testing, you should make note of the lower OP after a minute or so of initial running time vs the old oil and of course what your new minimum OP is when the oil is fully hot. If your oil pressure is still higher than what you want, you then have room to top up incrementally with a much lighter oil until the desired OP at elevated revs is achieved. Then top up to the max level with that blend percentage. An ideal oil choice to accomplish that is the Toyota brand 0W-20 which can be acquired for a bargain price at any Toyota/Lexus dealership. There is nothing else available for the price with the same very high 216 VI that will be as effective at lowering the start-up viscosity disproportionately to that at operating temps.

On the other hand, if your OP is lower than what you want, then you have room to add something heavier. Unfortunately, heavy synthetic oils such as 10W-60 are expensive and you won't find any at your local big box auto parts store. You can get a Pennzoil BMW brand 10W-60 at any BMW dealer and the heaviest 10W-60 with the highest VI is likely Red Line.

Oil Change Interval

One final point, if you're going to use some expensive synthetic oil, the last thing you want to do is change it out prematurely. Synthetic oil lasts 2 to 3 times longer than mineral oil and will literally last for years, if you take care of it. Short trips in sub-freezing temps will shorten the life of any oil as it never gets up to normal operating temps. Classic cars rarely operate under such conditions; in fact they operate under pretty ideal conditions. It is still best not to start an engine unless you're going to bring the oil up to temperature and that can takes 10 to 15 minutes longer than the coolant takes to hit normal temps. In summer it's not critical if you occasionally don't always follow that rule, as less condensation and raw fuel gets into the oil.

You can pretty much rely just on accumulated mileage and not time, for when to change out the oil. I know old habits die hard and after 2 to 4 years you're going to want to change the oil because it's black right? Trust me, if you've only clocked 5,000-6,000 miles, the oil will still have plenty of life left in it assuming you've followed the best practices rule. If you want to know for sure about the sump oil condition and remaining life, simply take a 4-ounce sample and have it analyzed. It costs about $25 and provides all kinds of interesting data including AW additive levels, degree of kinematic viscosity oil shear, contamination levels and approximate remaining life. You only have to do this once, as you'll then know how long you can extend the oil-change interval.

Summary

I hope this article at least has you thinking a little more critically about motor oil and some of the modern options that are available for our classic cars. I'll leave you with a lubrication tenet that sums up viscosity selection very succinctly: *"As light as possible – as heavy as necessary."* **SN**

Neil's Stag along the shores of Lake Annecy in the Haute-Savoie region of France

246 bhp Stag

Fitting electronic fuel injection to the Triumph Stag engine

text & images by Neil Brown

I shall begin with a little bit of the history of how I ended up fitting EFI to the Stag engine. Somewhat surprisingly, I didn't start with a Triumph Stag. I was looking to improve the performance of my TR250, which I had fitted with a Stag engine, in the hope of getting more power than the original straight six could provide, even in a tuned state.

This Stag engine was fueled with a Holley 390 carburetor and was fitted with a set of home-built 4-into-2-into-1 exhaust manifolds, built from 38 mm tubing. This size of exhaust manifold tubing turned out to be very significant many years after they were first built.

After a few years, I was hoping for even more power and better fuel consumption, so I decided to try electronic fuel injection. The obvious source of injection equipment for a small capacity V8 in the United Kingdom was the Rover engine as fitted to the Rover Vitesse saloon car (the flagship model of the SD1 which produced 190 bhp using a fuel-injected version of Rover's 3.5L V8), and later to a variety of Range Rovers.

My first attempt used the standard Stag inlet manifold, modified to accept the Rover injectors, and a large single throttle body.

A high pressure injection fuel pump was fitted and the engine bay loom from the Rover was used along with all the required electronic bits and pieces. The engine loom only needed four wires connecting to the car and much much to my surprise the engine burst into life at the first turn of the key! It didn't get any better power output than with the Holley (165 bhp) but fuel consumption improved by about 5%.

A few years later, I felt the need for yet more power. I bought another Stag engine in need of a rebuild and the one that was fitted to the TR250 found its way into my Triumph 2500 estate car. Significantly, despite going back to the original Stromberg carburetors, the engine only lost 3 bhp when installed in the estate. This showed the Stag inlet manifold was the main restriction to power output.

I got lucky with the replacement engine; it had been previously rebuilt with high compression pistons. This engine was built to give a 10:1 compression ratio and I also fitted a pair of fast road cams. However, what was really needed to improve the performance was a separate inlet runner per cylinder, like the Rover inlet manifold.

Being a farmer, I can always find some scrap metal lying around. In my scrap metal pile I found some 10 mm plate, some 3 mm plate and a variety of sizes of stainless steel tubing left over from a refurbishment of the milking parlour. These materials were to be the basis of all three manifolds I have built so far.

After some trial and error, I ended up with 216 bhp out of the engine in the TR. I then bought my first complete Stag which inconveniently suffered a major engine failure after three months. So I used the opportunity to rebuild the engine to the same specification as the one in the TR but decided to use 34 mm primary pipes on the exhaust manifolds, as this is the size of the regular Stag tubular manifolds that can be purchased. I was seriously disappointed when the Stag could only manage 190 bhp. There were torque gains below 2000 rpm but not where I wanted it.

Not wanting to take apart a car that was working well, if not quite as quick as I wanted, I decided to start again with my second Stag. This was a ground-up rebuild

Fig. 1 - Inlet manifold tubes

that took three years to complete. The photos here were taken during the build of this third injection manifold.

Building the Manifold

A set of inlet manifold gaskets were used as a template to produce the manifold to head flanges. These were cut out of 10 mm steel plate. I had already decided to use the Rover plenum top again, as it was easier than trying to build one from scratch.

A section was cut from the 3 mm steel plate in the shape of the plenum top. Eight holes were then cut in this plate to give the best spacing available within the confines of the plenum. Previous manifolds had proved the Rover inlet trumpets were a suitable diameter for the Triumph engine, so these would again be the basis of the design of the inlet tract.

Fig. 2 - Bottom of inlet manifold

The Stag's inlet ports are square in shape and also somewhat smaller in diameter than the Rover trumpets, so the transition has to be made between the two sizes and shapes. The actual length of the inlet runners was determined by the height available under the standard bonnet. There is only about 1/8th inch clearance as the top of the plenum can be touched by simply pressing with a thumb in the middle of the bonnet.

Fig. 3 - Trial fitting the plenum base

Fig. 1 shows the batch of 8 tubes approximately 6-inches long cut, welded and beaten to a square shape at the cylinder head end. I cut a thin triangle about 4-inches long out of one side of the tube so that when the cut edges are squeezed together and the tube re-welded, the smaller end becomes the correct size for the Stag inlet port. The welds are hidden on the underside of the manifold.

The first two manifolds also used a 4-inch long taper from the diameter of the Rover trumpets to the diameter of the Stag inlet port. Using a shorter length of taper seems to reduce flow when tested on my home made flow bench.

The angle of the cut at the square end was determined by flow testing. These heads were gas flowed around the valve area but retained the standard size at the cylinder head inlet manifold face and I found I could get much better gas flow if the inlet tracts were angled downwards. I have subsequently found on my latest engine, with enlarged ports, that is currently under development that this downward angle is less important for flow, but it makes constructing the manifold simpler if it is used anyway.

Fig. 2 shows how the eight lengths of tube were welded to the 10 mm plate adaptors. In this picture I am checking that the new manifold does not reduce flow through the port. The trumpet taped to the end of the tube is to smooth the airflow. My flow bench is attached to a spare cylinder block.

Fig. 3 shows the 3 mm plate I used for the plenum base being trial fitted. The fuel rail is an eBay purchase. This was fitted with 8 brass hose tails of the correct size to fit the injector hose.

The bosses where the injector lower seals fit were simply formed by building up a hump of MIG-weld and drilling a suitable sized stepped hole through the middle. Fig. 4 shows the almost completed lower half of the manifold. The sockets for the inlet trumpets on the plenum base have slots in them. I did this so that I could experiment with different length inlet trumpets. A hose clip around the socket pulls into the slot gripping the trumpet and preventing it from moving. I initially made two sets of trumpets that could be varied in length by 10 mm each, giving a total variation in length of 20 mm.

Inlet tract length appears to be abso-

Fig. 4 - Manifold nearly completed

lutely critical on the Triumph engine. On the first manifold I developed of this type, I gained a huge amount of bottom end torque using the standard Rover trumpet lengths but lost 3 bhp at the top end of the rev range when compared to the Stag-based inlet manifold. I subsequently shortened and equalised the lengths (the Rover has odd length trumpets to account for bends in the lower inlet manifold). This shortening gained slightly more bottom end torque over the original longer trumpets, but a massive 45 bhp at the top of the rev range when using fast road cams.

The two brackets poking out from the centre pair of tubes are to locate the fuel rail which is also used to hold the injectors down onto their seals.

Fig. 5 shows the manifold from the rear. To stiffen the base of the plenum so I could get an airtight seal to the alloy top, I cut a section of 90 degree angle steel to a depth of about an inch and welded 6 nuts on the inside to take the Allen headed bolts that retain the plenum top.

This picture also shows the water return for the cooling system. The manifold adaptor plates block off the original waterways. The rear water transfer housings (MK1 Stag are thicker than MK2 Stag) are

Fig. 5 - Manifold from rear showing water connections

drilled and tapped to take three quarter inch brass plumbing fittings. I then used a piece of 30 mm stainless pipe to take the water to the front of the engine having formed a Y-connector to join the two 20mm bits of stainless coming from the water transfer housings. The 30 mm pipe also has a fitting welded to it to take the injection system's coolant temperature sender, and a flat plate to take the extra air valve that increases the engine's cold idle speed. This has to be on the hot side of the cooling system or it never closes properly.

Fig. 6 shows the injection system pretty much completed. Note the coolant return pipe running from the water transfer housings at the rear of the heads. The 'bunch of bananas' tubular exhaust manifolds fitted to this engine are a key feature of its high power output but they are sized to suit the whole engine build specification and would very effectively kill torque on a less developed engine.

Fig. 6 - Complete inlet manifold showing exhaust manifold

The Fuel System

Fuel injection systems require a much higher fuel pressure than the original pump can provide. The original Rover injection system ran at 28 psi for UK specification cars, and 36 psi for USA specification cars. The fuel pressure regulator can be replaced with an adjustable unit and this was used as a crude performance tuning device on the original air flap metering systems, first used by Rover. It worked by increasing the full throttle fuel pressure to enrich the mixture for maximum power, while retaining a more standard fuel pressure at light throttle for better fuel economy.

I used second-hand ones purchased off eBay on my first three injection systems. Generally I have been using fuel pressure in the region of 40-42 psi. To provide the necessary fuel pressure, a dedicated high pressure pump is required. The first two complete Rover injection systems I purchased came with the pump included.

Fig. 7 shows the pump and fuel filters in the spare wheel well of the first Stag I converted to EFI. The fuel pump is fed through a large filter on the suction side. In theory the fuel feed pipe from the Stag fuel tank is too small to supply this type of high pressure pump but I have not really noticed too many problems when a large pre-filter is fitted, provided the pump used is not of too high a capacity. I did not like the idea of putting high pressure fuel through the original Stag fuel pipes with their several rubber joints, so I made a dedicated high pressure pipe the same size as the original out of copper tubing. Injection systems circulate fuel back to the fuel tank so therefore need a return line and the original fuel line is fine for this purpose. Fortunately the fuel tank on the Stag is equipped with a blanked-off fuel return as the same fuel tank was used on the Lucas injected PI estate cars.

Fig. 7 - Fuel pump and filters in the spare wheel well

Full Engine Management

I built the first two injection systems using the original Rover engine control unit (ECU). Although these systems had produced the power I required, they did have their shortcomings and technology has now moved on. In addition I wanted to lose the air measuring flap that becomes restrictive over 200 bhp.

Lots of expensive aftermarket ECU's exist, but most rely on dealer set up. This might be acceptable if the specification of the engine is not going to alter. I knew I was going to be fiddling with it regularly, so a more DIY approach seemed sensible. In addition, if I could get the first one to work then I would end up doing at least two more on other engines.

The Megasquirt range of ECU's (www.msextra.com | mail@megasquirt.co.uk) seemed like a good choice as there is lots of on-line back up and a forum. I decided to buy a professionally built unit that could be plugged straight into the Rover engine loom. It is possible to have fuel-only management, like the original Rover, or to do the job better, an ignition map can be used. The trigger for the Megasquirt unit can be a toothed wheel on the crank, but it can also be triggered by the ignition from the original distributor. Since I had electronic ignition already installed, I decided to go for this option. To ensure the trigger point does not move, the vacuum advance unit is removed from the distributor, and the mechanical advance weights are welded up.

The main problem was setting up the phasing of the rotor arm within the distributor. As all the advance is done electronically, it is necessary to find a rotor arm position that can cope with timing variations from 6 degrees to 52 degrees and still be close enough to the contacts

in the distributor cap to prevent the spark jumping the wrong way.

To analyse the mixture, a wide band lambda sensor and sensor driver unit is required. I welded the sensor boss in the link pipe between the left and right hand exhaust pipes.

The Megasquirt unit came with an installed base map for a Rover V8. Nobody had a base map for a Stag but the Rover one would be sufficient to get the engine running.

It took quite a while to get the fuel map set up the first time I did it. It is possible to do the job single-handedly by driving around and data logging the runs. The run is then played back and the fuel can be adjusted on the fuel map at various rpm and load settings. In theory there is an auto-tune feature which should get the mixture somewhere near right but when I tried it, everything got significantly worse.

I think the problem here was actually the inadequate ignition coil with which I started out. The weak coil caused a misfire which the lambda sensor interpreted as a weak mixture. It then enriched the mixture further, creating a worse misfire. By the time I had figured out that the problem was the coil, I had already got the hang of manual mapping.

I reckon I probably used two tanks of fuel before I had the fuel map somewhere near right but practice makes perfect and the two subsequent cars I fitted with the same system took far less time to complete. The second one was quite easy as it was another Stag engine and I was able to get the engine up and running straight away by using the map from the first engine.

Although it is possible to set the fuel map by yourself, the ignition timing has to be set up on a rolling-road to get the best out of it. The fuel map was already good enough and it only took about half an hour to sort out the ignition timing. It is possible to sort the best timing for economy as well as full power, which is why I ended up with a massive 52 degrees of ignition advance at light throttle settings and obtained a gain of 16 bhp at peak power over the estimated figures from which I had started.

The Results

It must be stated that the final results are very dependent on the amount of effort put in to the engine build. The Stag engine is a short-stroke unit, so tends to produce its best torque at a relatively high rpm. The original Stromberg set up and inefficient exhaust manifolds do not favour high rpm and this is why big gains can be made with a change of inlet and exhaust manifolds. The standard inlet ports from the factory are dreadful and big gains can be made with careful porting work.

The readily available tubular manifolds that fit the Stag are perfectly sized for the original Stromberg set up but in my experience they are a bit small in diameter, once ported heads and fuel injection, and particularly fast road cams are added into the mix.

Fig. 9 - The engine bay after completion

It seems that a reasonable result for a UK specification car is around 180 bhp when using the regular Stag 34 mm diameter tubular exhaust manifolds. The torque curve is a lot flatter than the standard engine, with greatest increases at the bottom end of the rev range.

However, moving to 38 mm diameter exhaust manifolds with the fast road cams bumps up the top end to approximately 215 bhp but there are torque losses below 2000 rpm. I had to build my own exhaust manifolds as nothing is manufactured in this size and I built them in a 4-into-2-in-to-1 design for better torque spread.

As I mentioned earlier, the first engine I built for my first Stag was a copy of the engine in the TR but only made 190 bhp due to the 34 mm diameter manifolds I had used. I ended up refitting the standard cams and this dropped back to 180 bhp.

For my most powerful engine, in my second Stag, internet theory suggested 38mm primary pipes with 44mm secondary and 50mm exhausts. This only works with well-ported heads that can generate enough gas flow to make pipes of this size work. The basic specification of the engine was the same except for a raise from 10:1 compression to 10.5:1 and significantly better flowing heads.

Power was lifted to 246 bhp at 6650 rpm with peak torque of 220 lb.ft. at 5200 rpm. The large diameter manifolds do lose torque below 3000rpm but it is better than the standard engine from 1800 rpm upwards.

Fig. 8 is a copy of the last rolling road print out of my 2nd Stag (in blue) and the

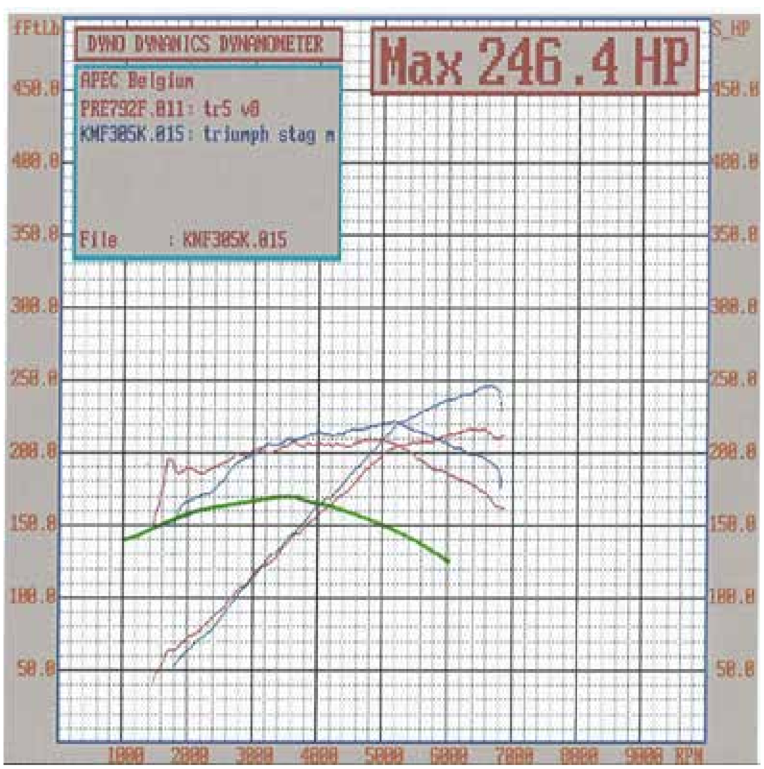

Fig. 8 - Dynamometer print out

Stag engined TR (in red). I have also added the torque curve (in green) of a standard UK specification Stag for comparison.
I am currently working on yet another engine that I will be fitting to my TR. This one will be nearer to 11:1 compression ratio and many hours (probably in the hundreds) have been spent on the flow bench and I have welded extra metal into the ports and combustion chambers to increase flow and compression ratio.

Hopefully this next engine will produce over 250 bhp, will still be perfectly road driveable and still achieve close to 30 mpg in normal driving.

On the Road

In a lot of respects, the car behaves just like a normal Stag. However, it handles better than a normal Stag due to progressive-rate road springs, slightly up-rated shock absorbers and polyurethane suspension bushes. I have found the standard Stag brakes are adequate for road use, though I have fitted Yellowstuff front brake pads, after finding the standard ones only lasted four laps on a race circuit!

I have taken my Stags on three 2,000 mile round trips to the French Alps while enjoying my other main passion of Paragliding. Most of the journey is done at a steady 80 mph on the French toll roads and my 246 bhp Stag has averaged between 28 and 29 mpg on the last two runs. In general driving, it averages between 25 and 27 mpg, with 30 mpg being seen if I can stick to the speed limits on normal roads.

The only down side to the fast road cams is that although the engine idles at 800 rpm, it delivers very little torque just off idle, so care has to be taken not to stall it when pulling away. Once above about 1200 rpm it feels completely normal at light throttle settings in normal driving conditions.

However, once the throttle is buried in the carpet it becomes a very different animal! Flooring the throttle in third at 800 rpm, it accelerates like a normal Stag up to about 2000 rpm. Due to the levels of torque increasing all the way up to 5200 rpm, the rate of acceleration keeps increasing as the revs rise, bringing a silly grin to my face every time! It will just about hit 100 mph in third gear at 7000 rpm.

On the other hand, in wet and slippery conditions there is no need to worry about breaking traction at low rpm and spinning off into the nearest ditch. This driveability is one reason I have won the 8-cylinder class in the TR Register's National Day Autosolo, using my Stag-engined TR250, for the past 3 years!

My Other Triumphs

I also have four other Triumphs. I have owned my 1968 TR250 since 1992. It had a straight-six for two years, and Stag engines since then.

Next was a 1974 2-door Toledo saloon which I have now owned for 20 years. This came with the original 1300 engine. It was fitted a 3.9 litre Rover V8 for several years but was very difficult to drive in the wet due to the low rpm torque. As a result, I fitted a Dolomite Sprint 2 litre 16-valve engine for a couple of years but I missed the sound of a V8, so fitted the Stag engine that came out of my TR.

The next purchase about 10 years ago was a 1971 Triumph 2.5 PI estate. This came with a worn-out carbureted engine which needed replacing. I removed the Stag engine from my Toledo, as it was really too heavy compared to the Rover, and this was fitted to the estate where it still resides to this day.

The Toledo then received a Rover 3.5 litre unit. The slight reduction in capacity reduces the low rpm torque to a level where the Toledo isn't so terrifying in the wet!

About eight years ago, I bought my first Stag, a 1976 model, followed by my 1971 Stag a couple of years later which is the most powerful one I have built to date.

I do all my own work on my cars with the exception of machining work. I have rebuilt engines, gearboxes and differentials, welded the rusty bodywork and resprayed the paint work.

Between working on my car collection, my day job is a dairy farmer. At least it gives me some barn space to keep my collection! **SN**

*Neil Brown is a member of the Stag Owners Club (UK). He operates a dairy farm in rural Staffordshire, in the West Midlands area of England and clearly enjoys tinkering with Stag engines! **- Ed**.*

In 1986, commuting in my 1977 Carmine Red, Triumph Spitfire to my first post-graduation job, my daily drive to work involved crossing the San Francisco – Oakland Bay Bridge. The Spitfire was such a joy to drive, I departed from home early enough every morning that I could enjoy the thirty mile drive each way at more or less freeway speeds, and not become trapped in bogged down traffic. I made this commute for just over three years, the Triumph being very reliable and economical transportation, with only one exception when the water pump died shortly after exiting the toll booth while I was crossing the bridge.

For three months of that commute, there was a marvel to behold. Suddenly one morning, over there upon my right and slowly passing me, was a beautiful light colored car. Then as it pulled away up the incline section of the bridge, I saw that it had the same rear end design as my Spitfire—only it was on what looked like a large car, at least from the perspective while inside a Spitfire.

The first time I saw this car, though I had enjoyed seeing it, I thought no further of it. Then the next day I saw it again and this time I noticed it said "Triumph" on its rear bumper. This was visible because it was in the adjacent lane to my left instead of four lanes over on my right

A Stag Affair

by Michael Link

Michael's Stag at Triumphest 2014 - Santa Maria

as it had been the day previous. Excited, that night when I got home, I looked in my Triumph books (no internet then) to see if I could figure out which model of car that was. I had never seen anything like it. I knew the Triumph roadsters, but what was this?

In one of my books there was a photo of a Stag; now I knew what it was called but not much more than that. It was difficult to see too much detail since this was still before sunrise, sodium lights were new and they made it difficult to discern colors. I have never known what color that Stag was, only some light color that was not white.

Afterwards I made certain that I arrived at the toll booth at precisely 4:45 a.m. I was rewarded by the Stag driver doing the same and for a period of three months we would drive side by side across the bridge. Suddenly one morning there was no Stag to cross the bridge with me. I never saw it again, though for a few more years while I continued to cross at the same time I always hoped it would re-emerge and we would resume the dual Triumph crossing over the bridge.

I developed a great curiosity about Stags after seeing one those mornings which continued long after that one ceased to drive across the bridge.I really needed to learn more about the Triumph Stag. The next step was to buy books about Triumphs, when I could find them, to see if they had information about the Stag. The more I read and learned, the more questions I had and the need to learn more grew, as my interest in the Stag grew deeper. This became a quest to learn about the Triumph Stag. I had to learn more and to eventually own one.

Fast-forward ten years and newly graduated again. I was now a new member of the Triumph Travelers Sports Car Club, and I happened to mention to another club member that I loved her Stag, and would equally love owning one but there didn't seem to be one for sale anywhere. I had kept my eye out as much as I could to find one, but never came across any. Her response?

She and her husband just happened to have a second Stag that he was working on, with the intention of eventually selling it. She told me it was an unfortunate color, Sienna Brown. My wife liked the Triumph Stag too, having looked carefully at theirs during Travelers Club functions. It was perfect timing to mention my desire to purchase a Stag.

I bought that Sienna Stag from a really great couple. They helped me finish the job of reassembling the engine, showing me how it is put together—they even made me dinner every time I went to their home to work on the Stag. To this day I have very warm feelings for the couple who sold the Stag to me, they showed such a rare and elevated level of kindness.

The Stag was very original throughout, including the Sienna color, the interior and the convertible top. The engine does not 'numbers match' to its Heritage Certificate, though it is from the correct number sequence for its 1973 production; I suspect it is a factory replacement engine.

While this all sounds good, there has always been a drawback to this particular Stag. Though the Saddle Tan interior is quite beautiful, it has its an unfortunate paint color—Sienna Brown, a body color I call "dog doo brown." During our stewardship of the Stag I have buffed the Sienna paint every few years and have done all I could to preserve it. Despite the long slow process of paint failure occurring, I have until recently been able to keep the paint looking fairly decent.

In 2016, I determined that the time had come to repaint the car, there was no more life left in the paint. We decided on Sapphire Blue and to say good bye to "dog doo brown," ahem, Sienna—originality will just have to suffer on this point. We considered the various shades from the blue color palate the Stag came in that year, limited to those that were paired with the Saddle Tan interior which is still looking very good. Interestingly, there is a bit of disagreement on this topic, there are variations in what is reported as originally available, with several versions of the differing information repeated.

Last January, I began the process of a full color-change repaint. I thought I would take on the project and do it myself, to learn and experience exactly what is involved while getting to know the body as well as I do the rest of the Stag. It has been an interesting and fun project so far. **SN**

Michael has now completed the color change and will be providing a step-by-step account of the body preparation and painting in a future issue(s) of Stag News ***- Ed.***

Michael's Stag almost ready for the paint booth

Reverse Light Upgrade Kit

Three Functions in One

by Terence McKillen

When Gil Keane, proprietor of Better Car Lighting, located in Bidford-on-Avon, Warwickshire, recently advised me that he has developed a compact, high power LED bulb kit to replace the standard 21 watt reversing light bulb in the Triumph Stag, I decided it would be an interesting upgrade to try out.

The new LED is a 2-pole bulb, designed by Gil and manufactured to his specification, that requires the swap-out of the standard reversing light bulb holder for a Stag stop/tail bulb holder and running an extra power source from the front of the car to the trunk. Most Stags already have an unused switch on the dash complete with warning light which controls the rear window heater on the hard top. Gil suggests extending the power wire (which is located at the top of the right hand side B-pillar) to the trunk but I found it more convenient to just run a new wire from the panel switch back to the trunk, following the same route as my radio antenna cable. This new wire is connected to the second spade connector on the twin pole bulb holder.

When you engage reverse gear, the white reversing light will work as previously, but it is much brighter, and only uses 2 watts (10% of original draw). When the panel switch is operated, the same bulb now changes to a powerful, hi-visibility red tail light (as fitted to most European cars these days), to ensure that you can be seen from behind in poor conditions. In addition, you connect the blocking diodes provided in the kit, to link the new live wires with the existing brake light live circuits (the green and purple wires). Now, when you apply the brakes, the same bulb will light up red to give you twin brake lights on each side (existing brake light plus the 'reversing' light red function), ensuring that following traffic will notice you better under all conditions. The purpose of the diode is to prevent the dash switch from turning on the brake lights as it only allows current to travel in one direction, consequently allowing the new red 'reversing' position to function as a brake light until needed to be on permanently in poor visibility through activation of the panel switch. If the red fog light is active when you select reverse gear or if your foot is on the brake pedal, the red light function will take priority (on the basis of safety over convenience) but the red light is sufficiently bright to illuminate the way for reversing. Once you take your foot off the brake pedal and/or turn off the panel switch, the white reversing light function is restored.

This new kit comes with two 380HP Compact LED bulbs which are manufactured to Better Car Lighting's specifications and are not available elsewhere, a pair of wire connectors and two blocking diodes at a cost of £49.99 (about US$65) plus air mail to USA/Canada of about US$7.20. You can pick up a pair of bi-polar reversing light bulb holders from your favorite parts supplier (Moss Motors has TR6 bulb holders - part # 544-250 at $5.65 each which also suits the Stag).

Gil also sells a complete range of LED bulbs that can transform the illumination inside and outside of any 45-50 year old classic car. I recently upgraded some of my warning light bulbs with BA5ES LED light bulbs. These are the LED equivalents for the original tiny Lucas E5 screw-in filament bulbs (often referred to as Lilliput bulbs) used in the 8-bulb warning light cluster on the Stag and other non-roadster Triumph models. These LEDs cost £4.99 each (about $7.00) but they do make a huge difference; my turn signal repeaters are now quite visible, even in strong sunlight.

The reverse light upgrade kit is a very easy job for the amateur electrician to accomplish and will take about an hour to complete, and of course, it is not necessarily specific to the Triumph Stag but can be an applied solution to any classic Triumph, after the installation of a dash or console switch.

Check out Gil's website at **www.bettercarlighting.co.uk**; or contact him at The 4Sight Lighting Co., 2 Wixford Park, Bidford-on-Avon, Warwickshire, B50 4JS, UK; or Tel: +44-(0)121-773-7000; or E-mail: enquiries@bettercarlighting.co.uk. **SN**

above: 380HP LED bulbs

left: compared to original 21w bulb

Double brake lights (red) mode

Fog light (red) mode

Reversing (white) mode

End Panel

Weld-on re-thread for front strut tube repair - from Chris Witor of Wookey Wells, Somerset (specialists in Triumph 2000, 2500 models). The repair is for use where threads have stripped on the alloy nut on the lower struts (Stag set up is similar to the 2000/2500). Cut off 16 mm from the top of the damaged thread, then fit the weld repair. It is important that the cut off is square, ideally parted or faced off on a suitable lathe. Price is £11 ($14.50) each. **www.chriswitor.com/**

Steel wool - there are some professionals who use #0000 super fine steel wool to clean car windows. As it is possible to easily scratch glass with steel wool, be sure to check the grade is 'four zero' grade. An untrained person may tend to over-scrub, apply too much pressure or not keep the work surface properly lubricated with soapy water. Before trying this method, test the steel wool on a corner of the window to make sure it doesn't leave any scratches. Using a clay bar is another way of removing the worst contaminants from windshield glass but always make sure to use a clean fold so as not to scratch the glass with any impurities picked off the glass surface and keep the surface well lubricated with soapy water.

Hood (Soft Top) Catch – TSC Member Paul Barrow of Montesano, WA brought our attention to a new product available from StagWeber in the UK. Chris Spain has designed a new and better catch for locking up the lower half of the Stag's soft top frame (Original BL Part No.: 631681). The first batch of catches are sold out but more are on order. We don't yet have a price for the StagWeber part but the original catches are still available from Rimmers at £10 ($13) each (two required). To order, the new catches go to **http://www.stagweber.co.uk**. Chris has prepared a Youtube video showing the new catch being installed to the frame at **https://www.youtube.com/watch?v=wn_2CCfptMg**.

New Classics World Website – Kelsey Media, publishers of *Triumph World* magazine and a range of other classic titles, have launched the Classics World website as the new home for all their classic car online content. The website is packed full of the latest classic car news, guides, drives and events coverage. There's also car buying advice, auction reviews and previews, nostalgia and everything you need to know about maintaining, driving and enjoying your classic car. Although focussed on British events, the site will also be of interest to North American classic car enthusiasts. Check it out at **www.classicsworld.co.uk.**

Silicone Cam Cover Gaskets – Quiller Triumph of East Sussex, UK, who provide silicone rocker and cam cover gaskets for various Triumph models, are now developing a silicone gasket for the Triumph Stag's cam covers. As well as being infinitely reusable, the malleable nature of silicone apparently solves the problem of continually seeping standard cork gaskets. Based on their prices for other Triumph models we suspect the gaskets will cost about £25 ($32) each. Contact Quiller at **info@quillertriumph.co.uk** or +44 (0)208 854 4777 or **www.quillertriumph.co.uk/Quiller/Parts**.

Trans America Challenge 2018 - the 3rd running of the Trans America Challenge by the Endurance Rally Association will run from 27 May to 17 June. The rally starts off from Charlestown, SC and finishes in Seattle, WA via Memphis, New Orleans, Wichita Falls, Aspen, Boise and stops in between. This is the rally that Phil Garrett and Kieron Brown led in their Stag for most of the way in 2015. So far there are no Triumphs among the 32 entries. For more information - **www.endurorally.com/pages/trans-america-2018**.

Bronte Stag Weekend 2018 – the annual gathering of Stag owners at Bronte, Ontario organised by Tony Fox around the Toronto Triumph Club's renowned British Car Day event will be held this year September 14-16. Further details will be available on our website or directly from Tony shortly.

Stag AWD - on a visit to the UK in November 2017 for the NEC Classic Car Show in Birmingham, Tony Fox had an opportunity to again test drive Russell Lewis' all-wheel drive Stag. This was one of two 1972 Stags that the factory released to GKN-Formula Ferguson for testing of the All-Wheel-Control system. The set-up was very similar to that used on the Jensen Interceptor FF. The Stags were fitted with a viscous coupling transfer as well as the Dunlop Maxaret anti-skid braking system. The only outwardly visible sign of the converted AWD Stag is a bonnet hump required to clear the engine which had to be raised to accommodate the front drive train. We hope to bring a more in-depth review by Tony in the Spring issue of **Stag News**.

Transmission Bell Housing - most people are unaware that the Stag's automatic transmission bell housing uses a 3/8-in. steel dowel or roll pin in the upper (12 o'clock) position and a special 5/16-in. placement bolt on the lower right side (at 26-minutes past the hour position) which has a thicker 3/8-in. dia. upper grip length. With the manual transmission, there is a special bolt (HB824 in the parts manual) that does the same thing. It also fits around the 26-minutes past position in the bell housing. There is also a dowel at the 40-minute position rather than the top position. LD Part has a replacement bolt in stock, part number HB824SP. Many cars are without these two items, having been discarded by previous owners for one reason or another. However, both are important to ensure precise fitment, especially for a perfect alignment on the clutch release bearing and carrier on the manual transmission, before torqueing up the remainder of the bolts and studs.