October 2010

North Birmingham News

NEWSLETTER

Flight of Fantasy Run

Flight of Fantasy Run, Sept. 5th 2010.

I had ridden the route on the previous Tuesday and the weather was beautiful, warm sunshine and great views over the splendid rolling Shropshire countryside.
Sunday dawned dull and cool as 21 stalwarts turned up at Tony's Diner near Bridgnorth. Bill Crew brought his well-travelled BSA/Monza outfit and joined the VMCC on the day.
Some mammoth breakfasts were consumed setting folks up for the impending journey.
Very shortly after the start the Bantam of Andrew Spencer gave up due to dirty fuel. Thanks to Chairman, Martyn Round who lent Dave Spencer a tow rope to get Bantam and son home.
About eight miles in I came upon the Bills Orchard and Danks putting on wet gear. I stopped and did the same, good plan as moments later the heavens opened.
The magnificent views that had accompanied Tuesday's run were obscured. What a disappointment! We followed the River Corve to Ludlow and then turned northwards towards Dinchope and Wenlock Edge. The weather brightened a little as we arrived at the ancient Royal Oak at Cardington, in the shadow of Caer Caradoc.
Most people were happy to get a drink and then head for a drier, warmer environment. Poor Josie Stanley was soaked. This was the nineteenth Flight of Fantasy that I have organised and sadly the first to just fizzle out, no award presented and no pictures for posterity.
The Trophy is awarded to the owner of the machine that individuals would like to take home, it need not be concours or even a recognised classic, just a bike that takes your fancy.
One person fancied Colin Lloyd's '59 Matchless G80, one Morris Trupp's quirky '61 Ariel Arrow, one Eric Greenfield's '72 Daytona, two Bill Harley's Bitsa, five Bill Orchard's lovely '27 Sunbeam mod 7.
The overall choice with six votes was Josie's characterful '29 Ariel mod. F, "Norman". I will make the presentation at clubnight. thanks to everyone who made the effort to ride.

Trevor.

Tall Stories

The longer the stroke, The greater the power.

That was what many people believed before the true nature of bore-to-stroke relationships was fully acknowledged.

Forty years ago, when I was a new member of the Vintage Club, I could guarantee that at any meeting, some old-timer would totter up to peer at my bike, and after a few minutes would shake his hoary locks and exclaim: Ah! 'There's not a motorcycle made today that'll pull like those wonderful old long-stroke engines!' They believed it, too. The myth, born before the First World War, grew in the twenties and persisted to the thirties. I'm not sure that it's dead even today. But myth it surely was, for a high stroke-to-bore ratio never gave any advantage, and surprisingly, never really caught on in the motorcycle world.

Perhaps there was – and is – confusion between peak power, torque and flywheel effect. Yet torque has nothing to do with stroke length, being entirely an indication of how efficiently the cylinder is filled at a given number of crankshaft revolutions. The characteristic attributed to good torque is, in some engines, simply the effect of a heavy pair of flywheels.

Where cars were concerned, some did indeed have very long strokes compared to the bore, but this was not the result of deliberate choice.

Rather it came about through a system that taxed cars not – as it did with motorcycles, on cubic capacity, but on the piston area, taking no account whatever of the stroke. Thus, if the maker of a four cylinder car of 70 x 71.4mm (1100cc) wanted to increase its power, it was all too tempting to lengthen the stroke to, say, 97.4mm and the capacity to 1500cc, or even to go to a stroke of 116mm and 1800cc, or even to go to a stroke of 116mm and 1800cc capacity. The car remained at 9hp for taxation purposes, and the owner paid not a penny more.

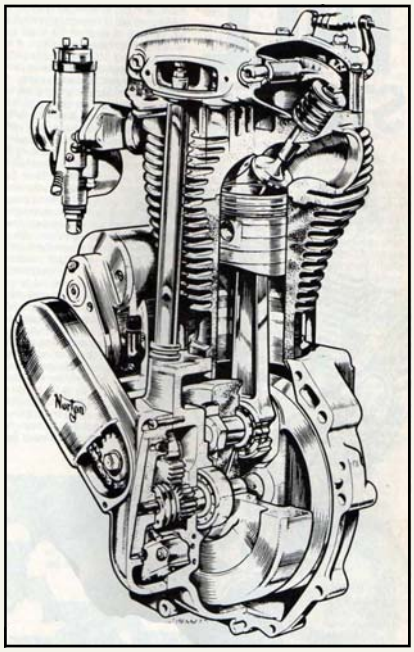
Even more ridiculous was the situation in some categories of car racing which placed restrictions on the bore, but not on the stroke. In the Voiturette class before the First World War, this led to such grotesque freaks as the V-twin Lion Peugeot with a bore of 80mm and a stroke of 280mm (2800cc). It had a stroke three-and-a-half times greater than the bore, three inlet and two exhaust valves, and an exhaust pipe passing over the driver's head! In both instances, what impressed the ignorant was that 'long-stroke' equated with power. They did not, ridiculous as it may seem to take in the fact that the swept volume was so much greater. However, no such situation ever existed where motorcycles were concerned. By far the greater majority of early motorcycles used the same dimensions as had their ancestor, the single cylinder De Dion of the1890s. So much so that regulations for early competition speak of, not a 500cc class, but 'for engines of 85 x 88mm or the same volume swept out by the piston'. The 1914 Senior TT bears this out. Of 49 single cylinder entries, not less that 40 had engines of 85 x 88mm (499cc).

There were three Ariels which had stokes shorter than the bore, a Puch of 84 x 90mm, two Premiers of 79 x 100.5mm and three Nortons of 79 x 100mm. For the record, the race was won by Cyril Pulin's 85 x 88mm Rudge. The 'long-strokes' were nowhere, two of the Nortons finishing in 46th and 51st places.

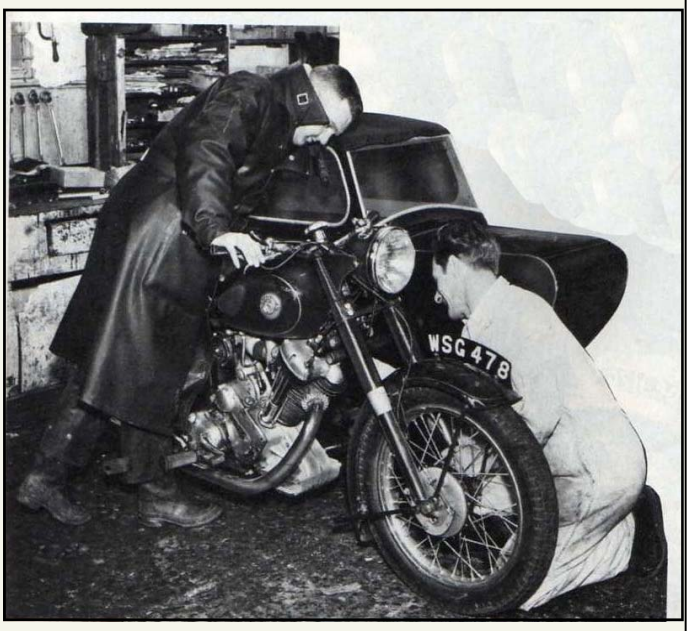
It is unlikely that the time-honoured dimensions of 85 x 88mm were chosen for any other reason than the need for a neat, compact engine unit. That they worked satisfactorily is evident from their almost universal use.

However, as early as 1904, E W Walford, a respected engineer of the day, wrote an article for the Motor Cycle that still makes interesting reading well over eighty years later. In this, he examined the possibilities of different stroke to bore ratios and came firmly down on the side of shorter strokes and larger bore. Acknowledging the theoretical disadvantage, from a viewpoint of thermal efficiency, of the short-stroke engine's increased ratio of surface area to volume in the combustion chamber, he dismissed this by pointing out that the heat – if not wasted in one way – was wasted in another. If it were not lost to the increase combustion chamber area, then it went down the exhaust pipe.

He pointed out the advantages of a short stroke – including the stiff, compact nature of such a layout, - and said with admirable simplicity: 'With the short-stroke engine at a given rpm, the piston speed is less than that of a long-stroke engine. The momentum of the piston is less, and its reversal at the end of each stroke is rendered easier.

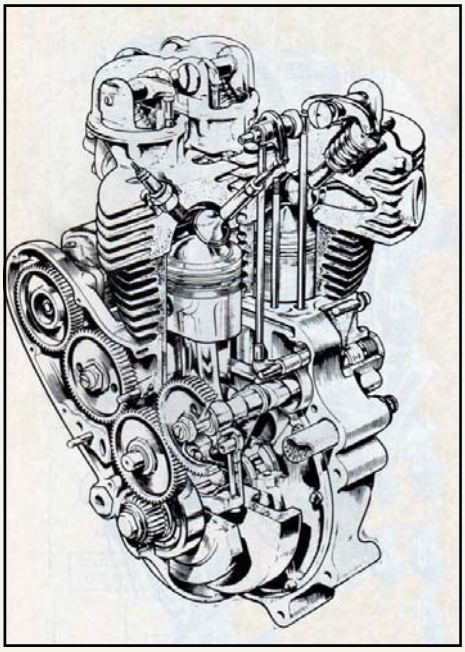


Above: an epitome of the long stroke engine, Norton's 596cc Model 19 engine persisted from 1933-1955 with bore and stroke of 82 x 113mm. And this was the "short stroke" ver-



Above: admiring the panther long stroke engine

Above: buyers of BSA's unit construction A65 twins benefitted from almost square bore and stroke dimensions of 75 x 74mm, compared to 70 x 84mm for the previous A10 650's



Above: British vertical twins often had surprisingly modern cylinder dimensions. AMC's 600cc unit, used in the Matchless G11 and AJS model 30, matched a 72mm bore with a 72.8mm stroke.

It follows from this that with a short stroke, the motor bearings are subject to smaller strains than is the case in the long-stroke engine; and that there is less vibration.'

Furthermore, he wrote: 'With a long-throw crank, there is a greater movement on the gudgeon pin bearings, and the angular thrust is greater, necessitating a longer connecting rod to give the same angular thrust as in a short-stroke engine. This in turn means a taller cylinder, already tall on account of the long stroke. The crank of the long-stroke is intrinsically heavier because of its greater diameter, but worse than that is the need for more flywheel effect. This gives the designer the choice of increasing the overall diameter – or the weight – of his flywheels, to which he has a natural objection'.

Walford concluded that 'It is to be hoped that no-one will put forward for the long-stroke engine "increased expansion of the exploded charge". If he can clearly see where the increased expansion comes in, then he should devote his attention to perpetual motion and squaring the circle".

The average motorcyclist continued in a fog. In a 1908 issue of the Motor Cycle, a reader enquired: 'A little matter has been rankling in my mind and I should like to hear other opinions about it.

It has been suggested that an engine's power is decided by the bore alone, irrespective of the stroke, because the piston speed remains nearly the same whatever the stroke may be."

Confused? Well, what he was trying to say was that bore and stroke ratios made little difference to power output, and in the context of the time – maximum rpm of 3500, compression rations of 3.5:1 and the universal use of side-by-side valves – he may well have had a point.

That confused thinking prevailed is only confirmed by Motor Cycle's columnist Ixion, writing in 1913 about the recently introduced fact that the engines has a very long stroke', he wrote, 'is perceptible in that the power developed is astounding, and the engine plugs away up hills in a way that no engine of 85 x 88mm can hope to imitate'. Note the emphasis on the 'long-stoke' rather than the 50% increase in capacity and the more that 50% increase in flywheel weight and effect. By such naive comments were the public swayed.

Manufacturers were not slow to cash in on the public's gullibility. Thus, when in 1922 Sunbeam altered the dimensions of their sports engines from 85 x 88mm to 79 x 105.5mm, they emphasised the 'long-stroke' in sales literature. Many people today believe that all Sunbeams were long-strokes, but of course the 85 x 88mm layout was continued in other models. Having a crankshaft in the range with 105.5mm stroke enabled Sunbeam to use the regular 85mm piston and thus offer a sidecar model of 85 x 105.5mm (600cc).

Similar expediency continued, especially in the thirties when money was tight. Quite a few new 350cc models were brought out, sharing their crankshaft with an existing 500cc engine, to save money and use up idle stocks. Sometimes the reverse process occurred. When their 68 x 68.5mm 249cc MOV model was an immediate success, and customers clamoured for a 350cc version, Velocette could not afford to produce an entirely new engine. Instead, using the existing top-end, they, stretched the stroke by an outrageous 40%, to make an engine of 68 x 96mm, or 349cc – a long-stroke indeed. At a 1.41: 1 stoke-to-bore ratio, it should, by the old beliefs, have been a ponderous, slow-running machine with enormous pulling power from low rpm.

In fact, it felt like any other sporting 350cc machine of the time, and never betrayed its very long stroke in the way it ran. However, it is significant that although the MOV formed the basis of quite a few successful racing bikes in the 250cc class, the MAC was never similarly used. The reason for this was it long stroke and consequent high mean piston speed.

In the very dawn of motor engineering, the celebrated Dr Frederick Lanchester used a mathematical discipline called Dimensional Analysis to examine the effects of the rapid acceleration and deceleration, or reversal of load, on the reciprocating parts of the engine at each end of the stroke. He came to the conclusion – by and large still valid today – that when the mean piston speed exceeded 4000 feet per minute, these loads became destructive. That is not to say that the engine flies to pieces automatically at this speed, but prolonged us will very likely result in failures of little ends, big ends, connecting rods and pistons. As with many complication studies; the final application of Dr Lanchester's work is extremely simple. If the stroke in millimetres is multiplied by 0.00656, a figure is obtained which, dived into 4000, will give the 'safe' rpm for that engine.

With the MOV's 68.5mm stroke, this works out at close to 9000rpm, but the MAC at 96mm reaches its safe limit at a mere 6d350rpm,. High engine speeds are not an infallible royal road to power. But it is axiomatic that if the engine's volumetric efficiency, or breathing, is as efficient at, say, 6000rpm as it is at 5000rpm, then it is making 20% more power strokes per unit time at the higher speed than at the lower. Neglecting friction losses, it will make 20% more horsepower. In as much as a short stoke-to-bore ration permits safe high engine speeds, it can only be desirable.

For racing, the use of a long stroke and small bore limited the size of the vales on an ohv engine, and to make then as large as possible they had to be set in a hemispherical cylinder head at a wide angle to one another. Not only did this tend to shroud the valves with the cylinder wall, but fresh charge tended to short circuit to the exhaust port during the overlap period. With a short-stroke engine, valves of the same size can be used, set at a flatter angle that aims towards the exhaust port. The valves, being further from the cylinder wall, are un-shrouded.

If the designer wishes to increase valve size he has room to do so, and may then decide to reduce the valve list a little, so as to give more clearance between valve and piston. This is turn gives him the opportunity of, if desired, raising the compression ratio. The use of very large valves in racing engines does bring problems of piston clearance. For a valve of, say 50mm diameter with a lift of 40% of that diameter, the valve full open will project 20mm into the cylinder.

This is a good argument for using paired valves. A single valve of 50mm diameter has an area of 1964sq mm. A pair of valves, each 982sq mm in area, will be 35mm in diameter and call for a lift of only 14mm. Furthermore, each valve will weigh no more than half the weight of the single large valve, with resulting better control even with lighter springs.

These were lessons learned over many years at the sharp end of racing.

By 1936, Joe Craig realised that the 79 x 100mm layout of the 500cc Norton racing single was restricting its breathing and shortened the stroke. It was successively shortened until reaching its final configuration of 93 x 73.5mm in an experimental engine in 1958. From the start, Honda used short-stroke engines and four valves per cylinder both for the road and for racing.

Sometimes the very nature of a layout plays its part in determining the bore and stroke. Today, one of the few flat twins on the market is the venerable BMW. But for many years the flat – or horizontally opposed – twin was popular, chiefly because of its excellent balance and the smooth way in which it delivers its power. A short stroke was virtually forced on the flat twin – a consideration that mattered a good deal whether the engine was laid fore-and-aft, as in the Douglas, or across the frame as in the BMW. Thus, even in the 1920s, the 750cc ohv Douglas had dimensions of 74.5 x 68mm, which would be considered distinctly 'over-square' even today. BMW began with a bore and stroke of 68 x 68mm and have largely stuck with 'square' dimensions ever since/

It is rather interesting to glance at the bore-to-stroke ratios of the various vertical twins that dominated the post war British market. A vertical twin is not an easy engine to layout, because it needs to be kept reasonably narrow – Edward Turner's 500cc Speed Twin of 1937 was no wider than the 500cc single it supplanted – so as to prevent the crankshaft, usually supported in only two main bearings, from flexing.

But it also needs to have room for air to reach the hot-spot between the two cylinders so as to keep distortion to a minimum. The temptation for any designer must have been to reduce the bore sizes in the interests of attaining both these parameters. If I had been asked to say 'what was the typical stroke-to-bore ratio of the average British vertical twin?', I would have said that it was a rather long stroke ratio – perhaps as much as 1.3:1. And I would have been quite wrong. Only three engines in all the years that vertical twins were made in British factories approached that figure: the Norton Dominator 650 at exactly 1.3:1 (68 x 89mm); the original Triumph twin, and Val Page's KH Ariel (both of which, at 63 x 80mm, had a stroke-bore ratio of 1.27:1).

In fact the average stroke-to-bore ratio of all the vertical twin models works out at a rather surprising 1.118:1, or virtually square. Far from designers having juggled with bores and strokes – as they so easily could have – to raise the capacity in the face of American demand for 'more cubes', they moved with an eye to maintaining a low stroke-to-bore ratio.

AMC, for example, started out with a 66 x 72.8mm 498cc twin, which was quickly increased to 592cc twin, which was quickly increased to 592cc by opening up the bore to 72mm. This lowered the ratio from 1.1:1 to virtually square. They were then able to add another 50cc by lengthening the stroke to 79.3mm, which still left the ratio at 1.1:1. This was no greater than in the original 500cc engine.

Again, the BSA A7 – as redesigned by Bert Hopwood with a reduction in stroke from 82mm – had a 1.1:1 stroke-to-bore ration. The 650cc A10, at 70 x 84mm, had a ratio of 1.1:1. When both were redesigned as the unit-construction A50 and A65, the 500's dimensions were altered from 66 x 72.6mm to 65.5 x 74mm, producing a ratio of 1.13:1. The 654cc A65 was slightly over-square at 75 x 74mm.

So, apart from an occasional instance when expediency called for a slightly longer bore-to-stroke ratio, British designers remained faithful to a ratio close to, or just under, 1.2:1. Very commendable, but in late years the vertical twins that had originally become popular for their turbine smoothness became a by-word for vicious high-frequency vibration. Whatever the cause, I don't believe that it was anything to do with stroke-to-bore ratios.

Since the early 1960s, almost every motorcycle engine designed worldwide has had a stroke shorter than the bore. And it should be noted that the short stroke engine's ability to attain high rpm doesn't always make it a screamer. Mechanically safe to 1,000rpm, it may well develop maximum power at only 8000rpm, thus providing a wide margin of safety.

There is nothing, really, that can be said in favour of long strokes. And before Panther owners puck up their pens in defence of the Models 100 and 120, let me point out that at 87 x 100mm and 600cc engine has a stroke-to-bore ratio of a mere 1.15:1. So perhaps people who attribute the panther's sterling qualities to their 'long-stroke' are failing into the same trap – of confusing the stroke with cubic capacity – in which we found Ixion stuck some 90 years ago.

More Expert Advise on DIY Paint Jobs By John Chrichlow

This article started out in response to questions raised by motorcycle owners wanting to know more about the advantages and disadvantages of the two current systems used.

WATER BASED PAINTS

Most professional re-finishers now prefer to use a 1.4mm fluid top and air cap on their spay guns when using water based paints whereas around a 1.8mm set-up was more common with solvent based paints but a conventional 'Solvent' (1.8mm fluid tip/ air cap) will do the job. Most water-based paints only require about 10 to 15 water based solvent to have then ready to spray so you may need a little more 'Neat' paint than you would a solvent based paint, having said that, a water based 'Standox' paint I used covered well with only two coats, it depends on what colour undercoat you are painting over.

Water based solvent is basically de-ionized, water with a fungicidal additive which only usually costs a few pounds a litre so it isn't worth the risk trying to cut corners and use tap water. It is usually recommended that water-based paint is filtered before use as any 'Dry' particles in the mix will not dissolve (As with solvent based), they will only break up into smaller gritty bits. A good painter will always filter his paid before use no matter what type of paint is being used.

If you can spray solvent based paints, you will have little trouble spraying water-based, the main difference is that the solvent in solvent based pairs evaporates at normal air temperature so the paint dries fairly quickly. The water 'Solvent' will not evaporate at normal air temperature, you will need air movement, similar to putting washing on the line on a still, damp day, the washing will 'Blow' dry, you will need a method of 'Blow' drying the water based paint. Blow 'Drying' guns are available quite cheaply, I have known people use a hair drier (on cold) or sometimes even the air pulled across the job by an extractor fan in a spray booth will do the trick. When using any form of flower to dry the paint always pass the air across the panel not directly at it. Basically, it you have no air-movement, water based paint will take forever to dry, that's about the only downfall when using it.

SOLVENT BASED PAINTS

The E.U. Regulations of 2007 governing the various uses of paints allows cellulose paint to be used on classic vehicles and industrial purposes. Cellulose paint has been re-categorized as 'Specialist Coatings' as it is no longer commercially available from general paint suppliers, it is only available from 'Specialist' outlets. The main problem nowadays is that due to its limited supply and the E.U. regulations the call for cellulose paint is very low compared to pre-E.U. regulation days.

Limited demand means limited manufacture, limited manufacture means higher production costs, higher production costs means a more expensive product to the consumer. My suppliers of cellulose materials have imposed on me four 12.5% and one 5% price increases in the past two years. The problem I have is that my paint formulas are based on one particular paint manufacturers' base tinters. It is not possible to cross reference a base tinter or formulation from one system to another, that would be too easy, so(!) I either pay the new prices or simply stop mixing the paint.

It all comes down to the end user, if they are prepared to pay the price. I pay the manufacturers' price and continue mixing and retailing cellulose paint. My suppliers have informed me that whilst there is a market for cellulose products and so long as they can still obtain the raw materials to make them, they will continue to manufacture them. That is, unless our fellow ministers in Brussels decide to 'Move the goalposts'.

Cellulose paint can be over coated with a two-pack clear acrylic lacquer if required (most people seem to prefer clear lacquer these days) but make sure that the cellulose paint is thoroughly dried out before applying any two-pack lacquer. For the DIY restorer I usually recommend 24 hours at 20 C (normal air temperature) t be on the safe side but professional painters can reduce this time greatly as they usually have access to a heated spray booth. Excess solvent let in the cellulose paint can cause rippling of the lacquer and any 'Tail' solvents left in the cellulose paint can lead to the lacquer 'Spider web' cracking at a later date. These drying times are not relevant when using a modern 'Polyester Base-coat' system.

Polyester base-coat paint were designed to speed up the throughput of work in body shops so when applying these paints it is recommended that you ask the supplier for a data-application sheet so that you can adhere to the manufacturers thinning ratio, thinners, flash off, drying and lacquering times to help avoid problems.

Polyester base-coat paints are very fast drying (Compared to most other types of paint) and it is recommended that they are lacquered as soon as they are dry to ensure good adhesion of the lacquer to the base -coat, this can sometimes be within 20 minutes. The manufacturers of the base-coat system I used recommended that the paint was lacquered within 4 hours maximum.

The reason for this 'Short time' re-coating is that the base-coat dries, then starts to cure. The lacquer is applied to the base-coat before it cures, giving a good bond of lacquer to base-coat, then the whole job cures off together.
If a polyester base-coat is applied and left to cure (Let's say overnight) and the next day the lacquer is applied, the job looks o.k. but the clear lacquer has not fully bonded to the (now cured) base-coat. Sometime later with a few small stone impacts to the paint job, small white-ish patches start to appear and the lacquer 'Flakes off'. If the lacquer chips off (due to bad adhesion) and you decide to give your 'Car' a jet wash, water is forced into the chips, gets under the lacquer and the lacquer comes off in sheets (I have seen lacquer peeling off even without a jet wash). This is known as 'Delamination' of the lacquer, we've all seen it on car bumpers or panels and it is usually due to too long a drying/curing time of the polyester basecoat paint before lacquering. Using the wrong type of thinner can also alter the drying/curing time.

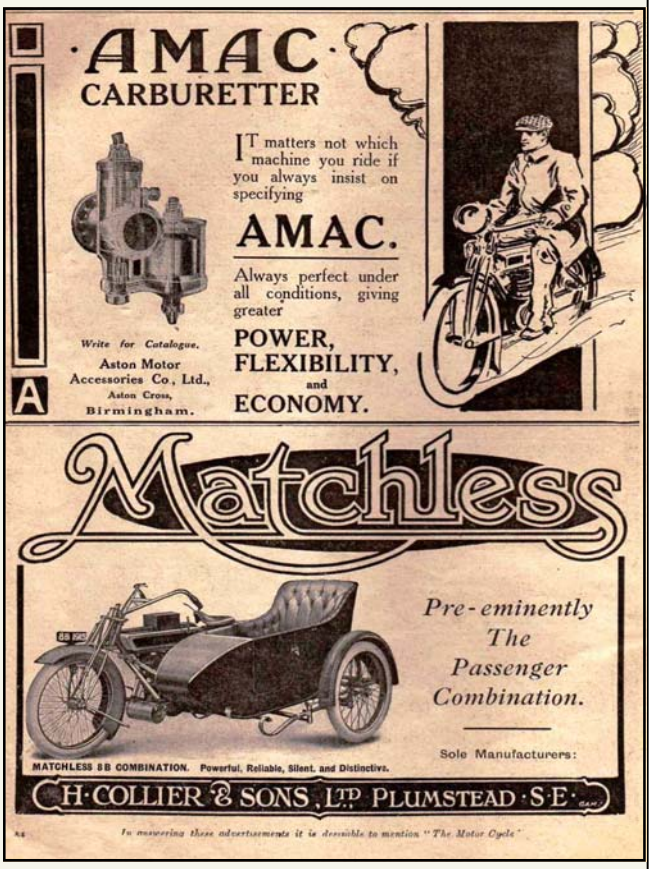
I have seen these problems caused by a multitude of other reasons which you would not believe and the painters will never admit to doing. If you have to 'Walk away' from a polyester base-coat job and it cures before you have time to apply the lacquer, all you need to do is (using a fine Scotch pad or fine; wet/dry abrasive paper) lightly flat the job to matt the paint and give a 'Key', apply another coat of paint, let it dry, then apply the lacquer. Base-coat keyed and bonded to the base-coat beneath and lacquer bonded to the base-coat, job done.

I have formulated nearly all my Classic Motorcycle colours using my own cellulose mixing scheme. I have formulated a small number of the solid colours in two-pack. I can supply cellulose solid and metallic finishes for most Triumph models from about 1936 to 1980 plus a few either way. I have formulations for many other marques available and will match a colour to a sample provided by the customer.

I can supply Polyester base-coat for most modern cars and motorcycles.

I can supply two-pack, alkyd synthetic, oil based synthetic, leather/vinyl and a load of other types of paint that you have probably never heard of that, they are for specialized applications although most of these paints are only available in fleet, British standard and RAL colours. Obviously, any E.U. Non-compliant materials are supplies on the understanding that they will only be used on jobs that fall inside the E.U. Regulation guidelines. We don't want to break the law, do we.

John Chrichlow



This article was first published in the TOMCC magazine and kindly supplied by Martyn Griffiths

Roger's Run

The Sunday dawned a bit damp but promising to be a nice day after all the rain on Saturday.
12 riders signed on for Roger's run at Noel Clarke's and by the time we all set off the sun was beginning to shine.
We had a pleasant ride through the back roads just skirting the edge of Droitwich and on to the coffee stop at the glider club just outside Pershore, unfortunately there were no gliders flying as it was very windy and low cloud.
So after having tea, coffee and toasted tea cakes we set off again towards Broadway but going around it by taking what was probably an old drovers road straight up the side of the Cotswold hills and along the top passing the Broadway tower which is the second highest place in the Cotswolds at 1024feet (or 312metres if you are modern!) built as a folly for Lady Coventry in 1799.
We continued along the top of the Cotswolds with good views over the countryside before dropping down to the GWR (Gloucestershire Warwickshire Railway) were various refreshments were taken and a look at the steam engines at work and a replica of the Iron Duke a broad gauge engine.
We had a pleasant ride home via Pershore etc but buy the time we got home it was getting cold (I am missing the summer already)

Thanks to all that signed on it makes the effort worth it !!!

Roger Greening

After the exceptional heavy rain during the 2010 Levis Cup Road Trial perhaps we should adapt our sidecars

PROVISIONAL FORTHCOMING ATTRACTIONS FOR 2010

	CLUB NIGHTS
OCTOBER 27TH	Talk by Paul Taft “The BSA years”
NOVEMBER 24TH	Talk by Phillipa Wheeler on “aircraft Archaeology”
DECEMBER	No Meeting

DATE	RUN	ORGANISER	Tel No
OCTOBER 3RD	Levis Cup Road Trial	Paul Harris	01902-842732
OCTOBER 10TH	Autumn Run	Andy Briggs	0121-544-5938
NOVEMBER 7TH	Winter Wander	Paul Harris	01902-842732