

“A BLOWN PISTON”

(or “The burdens of a Twin Cam owner”)

By David De Saxe

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I desperately needed expert advice and assistance, and none was more welcome than that of John Tofts (who owned the car for many years before it was mine), and Geoff Barron, both of whom gave up more time than I believe they really had available to come to my house and work with me to install new pistons and put



the engine back together. This is the place to express my enormous gratitude to them both – as well as to my local chum Brian - and to acknowledge the advice of Peter Wood, who supplied most of the parts - apart from the pistons themselves, which I managed to get through Zebedee’s long-established engineering shop in Calne. It was Zebedees who balanced them and then did a really good job of crack testing, machining the cylinder head, facing the valves and seats, dressing the ends of the valve stems and setting with meticulous accuracy the valve clearances once they had reassembled the head.

John had given the head and the valves, stems, guides and buckets a thorough examination before I had the machining done, and his view was that all components looked good with none needing replacement. The question that remained, therefore, was what had caused the blown piston. None of this is rocket science, though we all know the phenomenon caused the engineers at Abingdon to scratch their heads when it happened with alarming frequency with works competition cars as well as those belonging to customers. The cause can be classified in only four ways: incorrect ignition setting; wrong fuel or too lean a mixture; metallurgical failures; and incorrect engine assembly – e.g. valve settings or timing. I’m sure the chaps at Abingdon were able to eliminate the last two, so burnt out pistons must have been caused by ignition timing or fuel problems.

My engine is the later, lower compression type. Using the awful stuff that passes for petrol nowadays, plus a manganese-based lubricating and octane-raising additive (Miller's VSP) at each fill-up, I have always set the ignition at 3 degrees before TDC. This compares with the factory recommendation of 8 degrees BTDC using 101 or 99 octane petrol. I believe the retardation of 5 degrees to have been reasonable, and I certainly never experienced any pinking or running-on. If there was any reduction in performance I wouldn't have noticed it. Equally, I always set the twin SUs over-rich – though how much over-rich they need to be is a moot point. So what had I done wrong or failed to do?

On the very last page of the ignition section (section B.14) of the workshop manual there is a sinister warning: I quote the final sentence: "If the distance between the two limits exceeds 5/16 in. (8 mm.) the distributor drive gears must be renewed before a new distributor is fitted." In other words, ignore that at your peril. John lent me a suitable pointer he had made to gauge the amount of movement in the distributor drive shaft. The measurement was somewhat in excess of the tolerance given in the book, so, heeding the sinister instruction, I told John, who told Peter, who said: "There's your problem, then". I have to say that to question such a statement from a Twin Cam expert of Peter Wood's massive experience would be foolhardy in the extreme, but I confess that inwardly I was thinking that the lower compression engine would permit much more tolerance in ignition timing, and if the shaft wobbled a little bit more than it should, would that really cause too much heat at the top of the cylinder? People I asked said their distributors had quite considerable backlash and it didn't seem to matter. I kept silent, of course and Peter was able to supply new distributor drive gears (the price of which caused severe wincing). I got my machine shop to fit the gears to the distributor; then, with further gritting of teeth, I had it rebuilt by Holdens. On refitting the distributor, I rechecked the play which was now well within tolerance.

On reflection, I had been very lucky that when the piston blew, no other damage resulted. When I dismantled the engine, I found all the alloy fragments had fallen into the bottom of the sump, with just one tiny piece behind the pressure relief valve. There was nothing at all in the oil pump assembly. With everything cleaned up, the work of reassembly commenced, with new parts as appropriate. Hours were spent with a dial gauge getting the valve timing right. Anyone who has done it will probably agree it takes much trial and error with the adjustment on the cam sprockets. The worst aspect is that it's just about impossible to find a stable position to rest the stand for the dial gauge.

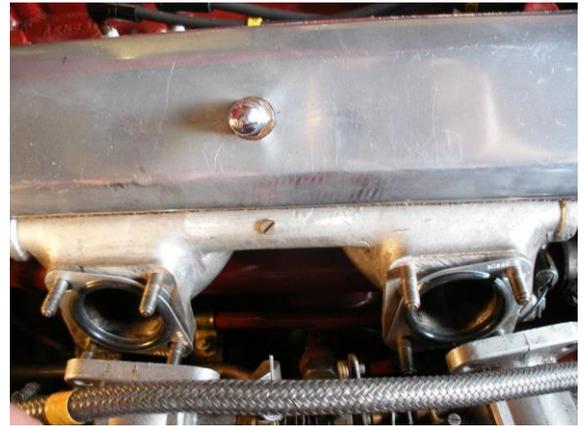
Anyway, and living through evenings of despair when I stood in the garage contemplating a partly empty engine bay and thinking I'd never get it done, it was finally all back together again. To my delight the engine fired up almost straightaway – but to my horror the oil pressure needle refused to rise. I 'phoned Peter Wood, who told me to put another gallon of oil in the sump. Obviously the pump needed full immersion to prime, for Peter's advice did the trick. Of course, I immediately released the extra gallon! Since the rebuild I've completed around 2,000 trouble-free miles – with engine revs not exceeding 2,500 for the first 500 miles and gradually increasing to 4,000 or so. You may think this is the end of the story. It isn't.

John Tofts had suggested using Thackery washers when refitting the carbs to the manifold. *Thackery-Schmackery*, I thought, because I wanted to get on with it and see if the engine fired. As I said earlier, it did, and I thought nothing further of John's advice. (I should here note that John's Twin Cam is fitted with twin Webers, which helped me to think nothing further). And then I read the Twin Cam Group's book "The First 50 Years". In particular, I read Bill Spohn's article on page 74. I then re-read it – twice. I implore you all to do likewise, if you haven't already done so and acted appropriately. I'm not saying that badly timed ignition doesn't matter, but I am saying that what Bill writes about carb floats sticking on the central post and causing a lean mixture seems far more likely to be the cause of piston failure.

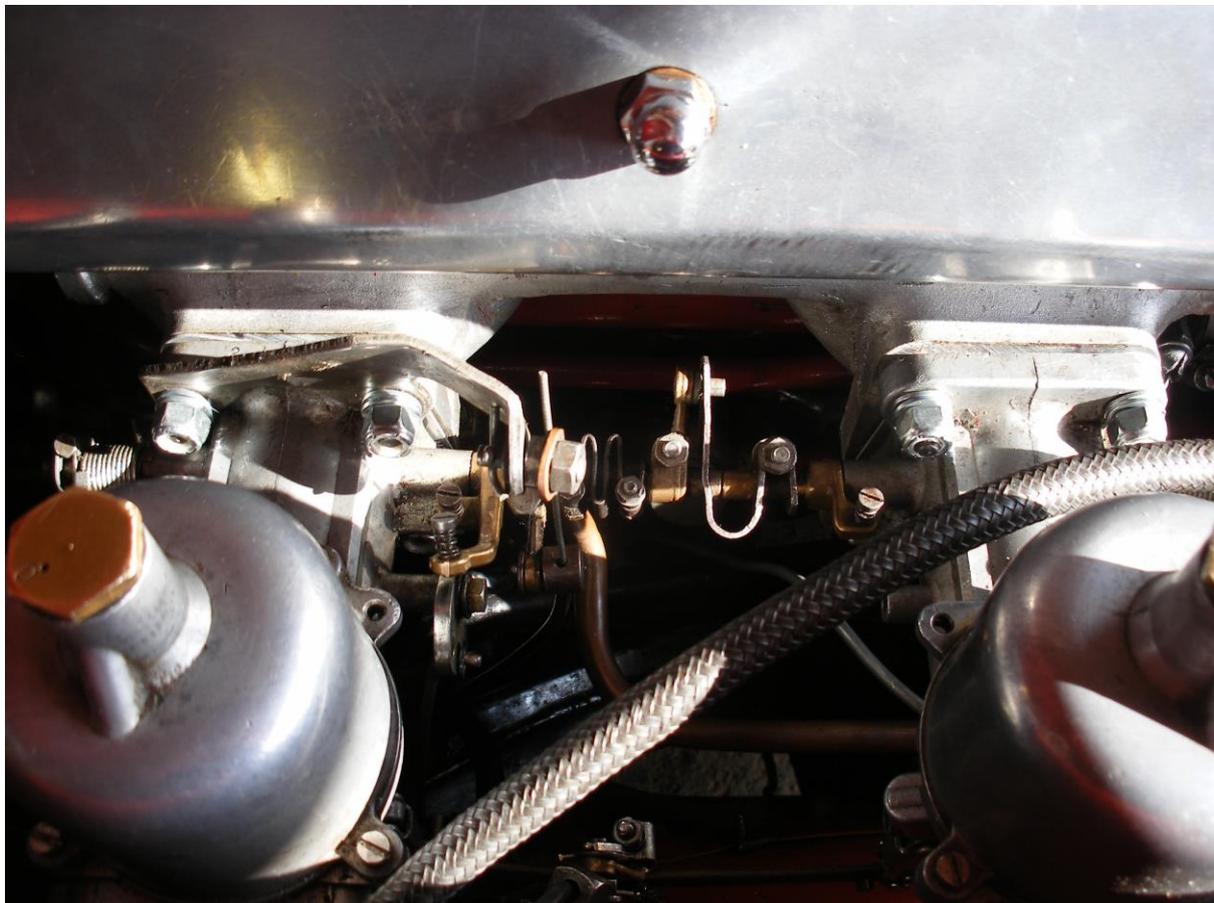
The remedy is unbelievably simple – and unbelievably cheap. For about £14+ VAT you can get the complete kit to cure the potential problem. Order the parts from Eurocarb of Reading (0118-943-1180 or www.dellorto.com). As the website suggests, Eurocarb are Dellorto (and Weber) specialists, but the carb mounting kit adapts for SUs. You can order on-line for next day delivery. You need 2 Misab 47mm. Spacers (these are thin alloy plates surrounding a lightly protruding O-ring; you'll need to elongate the fixing holes a fraction to fit the wider spacing of the manifold studs); 8 Thackery washers (these are the double wound type); and 8 nyloc nuts. (The photo shows only four nuts and washers, but you'll need eight).



When you fit them, first discard the original carb to manifold gaskets as the O-rings in the new spacers will replace these. The nuts must not be overtightened; the recommended gap between the coils on the washers should be .035 in.-.040 in. This will work well on the front carb but, because the studs on the rear one have to carry the accelerator cable bracket and the throttle return spring bracket, you can't wind the nut on far enough for the nylon insert to grip.



Longer manifold studs would solve the problem (shorter nyloc nuts seem no longer available), but I think I've managed satisfactorily by using a drop of Loctite on the three studs affected.



If all the above is old hat to you, I apologise – but for the sake of those who may still be “unconverted”, I hope you'll see my story as the work of a missionary.