

Featured Engine No. 21

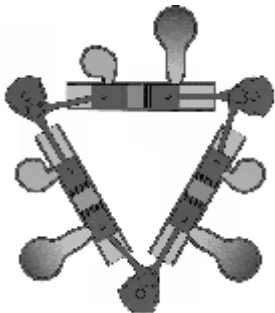
The Napier Deltic Marine Engine

By Wikipedia

The Deltic story began in 1943 when the British Admiralty set up a committee to develop a high-power, lightweight diesel engine for Motor Torpedo Boat^[1]. Hitherto in the Royal Navy, such boats had been driven by petrol engines but this fuel is highly flammable, making them vulnerable to fire, and at a disadvantage compared to the German diesel-powered E-boats.

Until this time, diesel engines had poor power-to-weight ratio and low speed. Before the war, Napier had been working on aviation diesel designs (licensed versions of the Junkers Jumo 204) and the Admiralty felt these would be a reasonable starting point for the larger design they required.

The original Napier Culverin was an opposed piston design. Instead of each cylinder having a single piston and being closed at one end with a cylinder head, the elongated cylinder contained two pistons moving in opposite directions towards the centre. This negates the need for a heavy cylinder head. This led to a rather "flat" engine, intended to be buried in the wings of large aircraft. The Admiralty required a much more powerful engine, so for the added power Napier took three of their original Culverins and "bolted them together".



The result was an inverted triangle, the cylinder banks forming the sides, and tipped by three crankshafts, one at each corner. The crankshafts were connected with phasing gears to drive one output shaft. Various models of Deltic engine could be produced with varying numbers of cylinders, though nine and eighteen cylinders were the most common, having three and six cylinders per bank respectively. In 1946, the Admiralty placed a contract with the English Electric Company, parent of Napier, to develop this engine.

One of the interesting features of this engine was the clever way the crankshaft phasing was arranged to allow for exhaust port lead & inlet port lag. These engines are called 'uniflow' designs because the flow of gas into & out of the cylinder is one way, assisted by mild supercharging to improve cylinder exhaust scavenging.

Earlier attempts at designing such an engine failed because of the difficulty in arranging the pistons to move in the correct manner, for all three cylinders in one delta. Napier solved this problem by gearing the crankshafts so that one of them rotated in the opposite direction to the other two.

In an opposed piston design with no inlet or exhaust valves, and no ability to vary the port positions, the Deltic design arranged each crankshaft

to connect two adjacent pistons operating in different cylinders in the same plane, using forked connecting rods, one an 'inlet' piston used to open and close the inlet port, and the other an 'exhaust' piston in the adjacent cylinder to open and close the exhaust port.

Crankshaft connecting-rod journals were arranged so that each cylinder's exhaust piston 'led' its inlet piston by 20 degrees of crankshaft rotation. This allowed the exhaust port to be opened well before the inlet port, and allowed the inlet port to be closed after the exhaust port, which led to both good scavenging of exhaust gas, and good volumetric efficiency for the fresh air charge. It suffered from the disadvantage that the two pistons contributed unequally to power output.

Development began in 1947 and the first Deltic unit was produced in 1950. By January 1952 six engines were available, enough for full development and endurance trials. An ex-German E-Boat, powered by three Mercedes-Benz diesel engines, was selected for these trials, since its power units were of approximately equal power to the new 18 cylinder Deltic engines. Two of the three Mercedes-Benz engines were replaced with Napier Deltics, the compactness of the Deltic being graphically illustrated: they were half the size of the original engines. The Deltic weighed one fifth of its contemporaries of equivalent power.

Proving successful, Deltic diesel engines became a common powerplant in small and fast naval craft. The Royal Navy used them first in the Dark-class fast attack craft. Subsequently they were used in a number of other smaller attack craft. The low magnetic signature lent itself to use in mine countermeasure vessels and the Deltic was selected to power the Ton-class minesweeper. The Deltic engine is still in service in the Hunt-class. These versions are de-rated to reduce engine stress.

Deltic diesels served in MTBs and PT Boats built for other navies. Particularly notable Was the Norwegian *Tjeld* or *Nasty* class, which were also sold to Germany, Greece, and the United States Navy. *Nasty*-class boats served in the Vietnam War, largely for covert operations.

While the Deltic engine was successful and very powerful for its size and weight, it was a high-strung unit, requiring much maintenance. This led to a policy of unit replacement rather than repair as the Deltics were easily removed, generally being sent back to the manufacturer for repair.

A turbo-compound variant of the Deltic was planned. This would have been achieved by inserting the turbine stage from a Rolls-Royce Nene turbojet into the centre of the delta. The engine would then act as a gas generator, driving the turbine with its exhaust gas & recycling energy that would otherwise be lost. Such an engine was hoped to produce 6,000 horsepower. However, the simpler – and ultimately more efficient – gas turbines were set to take over the world and the aging Deltic had had its day.

Calendar of Events for 2008

Nov. 8th. **Event.** Enstone Sortout. Enstone airfield, Oxfordshire. Bookings, 01367 810415

Nov 24th. **Club night** Guest Speaker:- Tony Scammells. Talk entitled "Just a little something".

Dec 7th. **Event.** Winter Crankup at Nunney Catch.

Dec 27th. **Event.** Mince Pie Crankup at the Old Down Inn. ALL DATES ARE SUBJECT TO ALTERATION.

Chairman's Report *(printed as received)*

The meeting at the Old Down Inn on September 29th saw a good turnout of members to be entertained by member Colin Baker with his Digital projector and a DVD film from Morris Car publicity dept in the early thirties showing Morris Cars touring from Cornwall to John O Groats. This film showed the spectacular scenery and architectural gems along the way. Well done Colin this film was highly entertaining and enjoyed by all. The evening finished with the usual raffle. Saturday October 11th saw about 45 members and friends attend the annual Social Evening and Skittle Match at the Royal Oak pub at Corsley near Frome. This was a new venue for us as Butler and Tanners club is still closed. This proved to be an excellent venue with tables laid out for our supper the length of the alley. The food served was very good, and I think all present enjoyed a very convivial evening. The skittles was extremely competitive with Jackie's team "The Strikers" beating Robin's team "The Tremblers" by 348 to 343. The highest score for a gent was won by Tom Shepherd, the highest lady was Primrose Pattle and the highest junior was Oliver Baker. The cup for the lowest score of the night was Mary Butler. (I nearly qualified for this award but Mary just pipped me.) The evening was rounded off with an excellent raffle which added to club funds. I would like to extend thanks to Arthur Smith for finding us this venue, and to Diane Davis for organising the food and to Carol Phillips for running the raffle and last but not least Jackie for running the skittles, and thanks to all the members who took part in making this a very successful event.

Letters received for publication

By e-mail

In reply to Gloria Carp's letter in the August newsletter, we are not in a position to put on a rally of our own for many reasons, the main being financial. It would cost a minimum of £5,000 - £6,000 to finance it. This sum of money would be at serious risk of being lost, the bad weather of this summer would have certainly wiped it out. Also in recent years things like foot and mouth and other agricultural maladies, health and safety, local council regulations are all stacked against us and make the running of rallies much harder than in years past. When we were running the type of rally that Gloria advocates we ran nine, lost money on eight of them and only made a profit on one.

By combining our annual get together (rally – crank-up – call it what you like) with another organisation, we can put on an event without any financial outlay whatsoever. This year's event at Haynes was not on a date given to us by Haynes; the committee chose it because it was Father's day & Haynes busiest day of their calendar.

The money Gloria talks about from raffles etc is used for general club expenses, paying guest speakers and raffle prizes, thus making crank ups and club nights entirely self-supporting. The membership subscriptions are more than taken up by our Public Liability insurance premium, newsletter printing and distribution.

Thanks to the sterling work of our Treasurer Jackie, the club breaks even most years and stays solvent. The modest sum of money we have in the bank for a rainy day is not sufficient to finance a rally. I hope this will answer Gloria's misinformed comments as to why we do not hold our own rally.
Brian Baker, Chairman

By post ...

The chairman's July report states that he cannot understand why only 21 out of 50 members that entered the event at Haynes Motor Museum actually attended. I feel that it is blatantly obvious why so few attended this event. When they learned that it was only open to club members & invited friends, with no other exhibits except stationary engines, no trade stands or stalls, no entertainment of any kind & no catering they voted with their feet. I know that they had access to Haynes café & museum, but from phone calls & being approached by numerous club members I am told it is not what the members want.

The Wessex Stationary Engine Club is big enough to stand on its own two feet as we did for many years under various chairmen and committee members. For the last two years we have been at the beck and call of others and it doesn't work.

I resent the implication that the committee members that did not attend the event should be voted of at the next annual general meeting, this brings into question mine and other committee members loyalty to the club. My loyalty is not to be judged by the events I attend, but by the work and help I offer to my fellow club members and the club as a whole. Are the thirty entrants that failed to attend the Haynes event going to be asked to resign?

Assuring you all that I have only the best interests of the Wessex Stationary Engine Club at heart. **E.J. Gay, Vice Chair, WSEC**

As the annual rally has been the subject of a questionnaire & the committee is now actively dealing with this issue, I feel that the subject has had a sufficient airing. I thank all correspondents & having printed all correspondence at hand, this subject is now closed. – Ed.

Berwick St. John Steam & Vintage Rally

By Eric Gay

The Nissan left Trowbridge at around 8 o'clock on Saturday 13th September, heading for Shaftsbury & we never in our wildest dreams guessed what lay before us. On the way down the roads were damp but not running in water, it was only when we got to within about 500 yards from the site entrance that our troubles began. We had to wait to be towed onto the site and late in the afternoon we had to be towed out. Now, I have always thought we who exhibit and restore old engine must be a little mad & I am sure that I can say I am one fully paid up member as we returned on Sunday thinking it would be better. How wrong can one be? If anything it was worse being again towed in to the site. The ground being compacted by the many tractors, water was now running over the mud. This was the only rally in all my years of going to shows that the engine and mill stayed in the van - I just could not get them out in the conditions (the poor old hips don't help none). But the show must go on - and it did. We had no more rain over the weekend.

The lads and lasses that got on site Friday were able to set up and run and a very good display of engines there were with yet again a good few Wessex members doing their bit.

All the ploughing took place as this was on the hill below the main site and on green sand that drained very quickly - even the ploughing engines had no trouble & the horses on the lower part of the main site did their work also and everything programmed took place. It was a credit to all of the exhibitors that worked so hard to make this year's show a success in the conditions we had to face. Two years until the next one - just pray we get a dry weekend so we can all enjoy ourselves and raise a few bob to help those less fortunate than us.

My Mate Old Deadly Part 4

By Eric Gay

This is how Old Deadly became the proud owner of a BSA A10 Gold Flash. I bet most of you that live around Somerset & Wiltshire have heard the name Pankhurst, They were dealers in motorcycles and had an old cinema in Salisbury, full of bikes & mostly a right load of rubbish! Old Deadly took a trip to Salisbury to have a looksee & met a chap outside Pankhurst's sat on his bike. He was looking to sell the BSA it did not take long for the deal to be done. His Enfield plus cash and Old Deadly was the owner of a very fine 650cc BSA.

The first thing he did was to polish the engine cases till you could see your face in them. I still have a photo in black and white of this bike and you could see a reflection in the timing case. He now had a new road bike and the Greeves, he played with the engine and made Mr Villiers engine go like the clappers, like he said to we boys "Damn thing dun't

go too bad". Well, it went very well and though he did not win races he didn't fall off or finish last.

Racing at Rookham, the gremlins struck the Greeves as he was laying about fifth. He was going well on the slight climb at the back part of the track when the gearbox locked up solid & poor Old Deadly came to a screeching halt. Back at home the box was stripped and the shaft with the siezed gear was taken to Harrings in Union Street to have the gear pressed off but although 40 tons of pressure was applied, the gear never moved at all. It hung in his garage for years & became a talking point with the lads "No oil in the box" we said. We knew it wasn't true, but it did wind Old Deadly good & tight!

Now I said before that Old Deadly could make most bikes go well as he had the knack. He still has it now, but does it to stationary engines. One of our mates Brian had a DBD34 500cc BSA Gold Star, he brought it to Old Deadly for inspection. "It vibrates summut 'orrid & its get up & go has got up and left".

Old Deadly worked every evening and all weekend on that Goldie, I know a fair bit if what he did to it but he never told us all of what he did, when asked he just said "that's for me to know and you will never know". Well, Brian came to see how Old Deadly was getting on & arrived just as hisself was bolting up the tank.

"Does it go?" "course it goes" & off went Brian coming back half an hour later with a "What have you done to my bike?" "Why?" said Old Deadly. A large grin came over Brian's face " It's never gone like that bnefre - what did you do to it?" "Oh this and that" said Deadly, "take it up the road" said Brian & Old Deadly did not have to be asked twice. When he returned it was with a broad grin "It don't go bad do it" he said. Old Deadly had added just over 15 miles an hour to Brian's BSA.

He thought that if he could do this to a Gold Star, what could he do to his A10 Gold Flash & not long after Old Deadly went for a trip to Henly in Arden, coming home with Road Rocket cylinder head, carburettor, high compression pistons and a few other bits, bought from a chap that worked for a certain Birmingham Small Arms company! I will tell you more next time.

Vintage Jumble at East Cranmore, 18th Oct

By Kim Siddorn

I got up an hour late & flew down to Cranmore as fast as my vee8 would carry me. There were hundreds of people everywhere! Well, that's how it looked as I rolled in the gate, loads of stuff to see & equally loads of people to buy it. Statistically, there were twice as many stalls as usual and 196 people through the gate to buy the stuff they had for sale.

Personally, I found some interesting stuff including a German air cooled two stroke single of unknown manufacture. Obviously dry stored for years, I look forward to getting it going.

The day was a rip-roaring success by anyone's measure.