

# ROLLS-ROYCE AND WORLD WAR II

By Frank Carroll – Oct 2022

Today, Rolls-Royce Holdings plc is a public limited company with headquarters in Kings Place London, producing civil and military aero engines, marine propulsion systems and power generation equipment. It has numerous subsidiaries around the world and altogether employs 50,000 people, including 20,000 in north America.

This 'Goliath' in aerospace, defence, energy and marine industry traces its origin right back to the partnership between The Honourable Charles Rolls and Henry (later Sir) Royce formed in 1904. Rolls-Royce today is the second largest maker of aircraft engines and also has major businesses in the marine propulsion and energy sectors.

Rolls-Royce Motors (building Rolls-Royce and Bentley motor cars) was separated from the 'aero division' in 1973 and then in 1998 Volkswagen bought the automotive arm, ultimately restricted to Bentley Motors while BMW paid 40 million pounds for Rolls-Royce Motor Cars, producing the first new Phantom VII to roll out of the southern England factory at Chichester on 1<sup>st</sup> January 2003. Today the annual production is 5,000 new Rolls-Royce motor cars and 11,000 new Bentley motor cars.

During the Second World War, Rolls-Royce completed very few motor cars, instead focusing on aero-engine production which effectively saved the British Empire and delivered the 'Allies' victory against aggressors Germany, Italy and Japan.

## Earlier history

The company was steered away from aero engines by Henry Royce after Charles Rolls died in an aeroplane mishap at Bournemouth on 12<sup>th</sup> July 1910, the first Briton to die in a powered aircraft accident. By World War I, however, the company was drawn into aero-engine production and made more than half of such engines used in that conflict. At their 1915 AGM, the company was against focusing on aero engines, but Claude Johnson as General Manager chased all sorts of war-work, while Henry Royce continued quietly working on the Eagle aero engine (12 cylinder water-cooled 60 degree vee engine of 20.32 litres, of which 4,681 were built). Later in that first world war he developed the Hawk, the Falcon and in 1918 the Condor aero engines. Johnson and Royce did not want to lose the wealth of engineering expertise for which Rolls-Royce was famous, even in 1915, and their strategy was successful.

Earlier, by 1906, Rolls-Royce had attained the reputation of producing "the best car in the world", with its famous Silver Ghost motor cars. The company then became rather competitive, aiming to win the Schneider Trophy for seaplanes, an annual race first held in 1912. By the 1920's (after the dark days of World War I) this was the premier international contest for technical development and aircraft speed. Supermarine Aviation Works Ltd joined in this competition in 1931 with a refined racing seaplane which relied on a Rolls-Royce 37 litre, V12, "R engine" that had been specifically designed to win the 1929 race, capable of delivering 1500 horsepower for short periods.

The Rolls-Royce team refined the R engine for the 1931 contest to give 2,783 horsepower and ensured the 1931 Schneider Trophy stayed in England, setting a new world airspeed record of 379 miles per hour. Only 19 "R" engines were built, but it was later developed into the 37 litre Griffon aero engine which powered later versions of the Spitfire (at speeds up to 795 kms/hour) and other planes. Rolls-Royce exploited the fame earned by this mechanical engineering excellence, using it to promote the company's products.

Only two years later, Sir Henry Royce died on 22<sup>nd</sup> April 1933 (at the age of 70 years) but he left an amazing legacy, including his design of the famous Merlin aero engine, a smaller, more versatile 27 litre V12 powerplant. By then, Rolls and Royce had inspired generations of mechanical engineers who were patriotic leaders with vision and determination – one of these was Ernest Hives, who had joined the company in 1908 as a car tester. Hard work in developing the early Eagle, Falcon, Hawk and Condor aero engines saw him rise to be General Works Manager and a Director by 1937. Respect for him by the Air Ministry led to acceptance of his enthusiasm for the construction of ‘Shadow Factories’ at new, more remote sites, to concentrate on aero engine production.

By the late 1930s, the Merlin was rapidly being improved, plainly going to be the most powerful and versatile aero engine for the coming World War II. Hives was determined to achieve maximum production from available resources so Rolls-Royce was given land and assistance to build ‘shadow factories’ at Crewe (near Manchester) and Hillington (near Glasgow, western Scotland), as well as expanding the Derby works in central England. He was keen to get ahead of the Bristol Engine Company, which had a shadow factory producing the 38 litre Hercules 14 cylinder (in two rows) radial aero engine, as they raced to gear up for imminent conflict.

## **World War II**

First run on 15 October 1933, the Merlin was refined so that its power soon rose to 1,100 horsepower and by the end of World War II, the later versions produced 2,200 horsepower. True to its reputation Rolls-Royce continued to improve the design, creating more than 50 variants through its long life until production ceased in 1956. Over 168,000 Merlin engines were built, including 55,500 by Packard in north America under licence and 30,000 (mostly for bombers) under licence by Ford of Britain at its Trafford Park factory near Manchester.

How Rolls-Royce converted cow-paddocks at Crewe and Glasgow to large factories producing complex engines in 12 months is legendary. They trained machinists (as many women as men) in 3 weeks to do what previously took 3 years to learn, establishing foundries and manufacturing almost all parts on site!

Rolls-Royce have always been prepared to share technology with other reliable manufacturers and by 6 April 1941, with Leyland Motors, they had developed a modified version of the Merlin aero engine to power military tanks and named it the Meteor. Prototypes were built by Rolls-Royce, but Leyland and later Rover built around 12,000, remaining in production till 1964, powering a range of 10 different armoured vehicles including Centurion tanks used here in Australia. Rolls-Royce upstaged the smaller Ford V8 tank engine, which was not perfected until 3 years later, just before the D-day landings.

Rover came to build the Meteor tank engine after Ernest Hives determined that Rolls-Royce could and should seize control of the Whittles’ jet aero engine project which had faltered under Rover’s management, so in January 1943, he said to Rover “You give us this jet job and I’ll give you our tank engine factory in Nottingham” – a fearless and decisive leader!

In Britain there were 27 airframe manufacturers and Rolls-Royce was one of eight aero-engine makers during World War II. By 1935 only 893 military aircraft were built, but production rose rapidly and in 1941 20,000 were built, with engines to power them, 80% of which were produced by Rolls-Royce and Bristol. Indeed, in 1940 Britain produced 71% more aircraft than Germany, and 63% more aero-engines than Germany! Rolls-Royce performed best of all these – remember that, for much of the war, British homes and factories were being bombed by the Germans!

Rolls-Royce continued to experiment and invent, taking the lead in British efforts to design and produce jet engines, so that it had experimental jet-engined aircraft flying by 1943. Their jet engines have been named after English rivers and one of those post-war jets was built under licence here in Australia at the

Commonwealth Aircraft Corporation factory, Victoria, for modified CAC Sabre jet fighters also built there. Today Rolls-Royce Holdings plc has four large factories designing, producing, and servicing jet engines for aircraft and power generation, including one in southern Berlin! It has also designed and set records with its all-electric passenger plane!

Under licence from Rolls-Royce, the American Packard Motor Company built the V-1650 Merlin (as many as 510 per month by April 1942) to supplement Britain's demand for bomber engines. By then, Bomber Command was embarking on bombing enemy targets in Europe, having survived the 'Battle of Britain'. From May 1942, night raids saw 1,000 heavily laden bombers (four engines apiece) head east to bomb European cities and German factories. Packards also powered the North American P-51A Mustang, a few of the P-40 Kittyhawk models and Canadian Hawker Hurricane fighters.

Neutral North America tried to stay out of the European conflict and the earlier offer by Rolls-Royce to have Ford Detroit produce Merlins under licence with a certain market was turned down. However, the USA had no option but to rapidly gear up and join the Allies after the ambush of its naval base at Pearl Harbour by Japanese aggressors on 7 December 1941. The USA did not just declare war on Japan and head west, but, with Canadian forces, joined the allies in effecting the D-day landings of 6 June 1944 and fighting across Europe to victory 11 months later.

I have no doubt that Rolls-Royce engineering, inspired by Royce's motto of attaining perfection, was the game-changer providing the Allies with superior air-power that saw VE day on 8 May 1945. This was not the end of World War II, which raged on in the western Pacific for another 14 weeks till Japan surrendered on 15 August 1945.

There are hundreds of inspiring stories of endurance by Rolls-Royce-powered aircraft and armoured machines, but one worth mentioning here is the way Spitfires with extra long-range fuel tanks were flown off US aircraft carriers many hours eastward to Crete to save that besieged island and turn the tide of World War II in the Mediterranean.

The Allison Engineering Company was another North American company which contributed to the success of Rolls-Royce in World War II and beyond, to this day. General Motors Company had bought Allison in 1929, enthusiastically growing its aero-engine division. The Allison V-1710 was similar to the Merlin and over 70,000 were built between 1940 and 1945, to power many types of planes, including the P-38, P-39, P-40, P-63, and P-51A (until the Merlin replaced the Allison in later Mustang models). Rolls-Royce had collaborated with Allison for many years from early in that war through till eventually acquiring the company in 1995. It has continued the long record of producing and servicing aero engines for civil and military use around the world.

I hope the reminders of what was achieved by one company, Rolls-Royce, during World War II, might remind us of what we should be capable of achieving in the future – I hope it inspires us and coming generations to aim for 'engineering excellence' which was the basis of the Rolls-Royce reputation trusted in world conflicts and still trusted today, as over 50,000 Rolls-Royce jet engines power essential aircraft.

It is one of the strongest marques in the world – the name is synonymous with 'the best'.

**By Frank Carroll**

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