

## Spitfire MkII vs. Me 109 E comparative test

*A witnesses of a comparative test made in 1940 by RAF pilots at Farnborough. This is an excerpt from the book "Fly For Your Life – The story of Robert Stanford Tuck", by Larry Forrester (Mayflower Books, Granada, Publishing Ltd, 1979 – ISBN 0 578 12787 8)*

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(...) Bob Tuck was chosen to work on a project of the highest importance. In the workshops of the Royal Aircraft Establishment at Farnborough, scientists and specialists of the Air Fighting Development Unit had stripped down and then reassembled the first Me. 109E to fall into our hands. It had been captured intact after force-landing in western France a few weeks earlier. Tuck and Wing Commander George Stainforth a brilliant pilot who had set up many air records in the thirties, were ordered to fly an exhaustive comparison test, matching the 109 against the Spitfire. To eliminate any difference in skill between the two officers, they were to change machines half-way through the trials and repeat their programme exactly.

Veteran fighter pilot Group Captain Harry Broadhurst and a large party of brass bats, backroom boys and Rolls-Royce experts were assembled to watch the test. The boffins cuddled their calculations, clicked their slide-rules and chattered excitedly.

Stainforth took the Messerschmitt first. Tuck was in his own service Spit. They got down to their first task by forming in line abreast at about 20,000 feet, wing-tip to wing-tip, flying absolutely straight and level with their throttles fixed at pre-arranged settings. Then gently they eased their sticks forward into a shallow dive, without touching their throttles, to see which fighter would draw away. This called for extremely accurate flying, for if either pilot had the slightest skid or sideslip on, he would lose some of the effect of his streamlining - the machine would present a greater resistance to the air and the speed wouldn't build as it should.

Nothing in it - German and British plane dived neck and neck. They repeated the manoeuvre with different throttle settings and obtained more or less the same result. In a flat-out, straight and level race the German proved very slightly faster. In various rolls and turns, the Spitfire was decidedly more manoeuvrable. When it came to pulling up out of a steep dive, the 109 had a most definite advantage. It could pull up much more sharply, and climb away a little faster. Then they turned to a problem when Tuck and most other combat-experienced pilots considered grave and pressing.

*"At this stage" - Tuck talking - "109's were getting away from us fairly frequently by sticking their noses right down and going into near-vertical dives. This meant that the pilot had to take what's known as negative 'G' - in other words, in this maneuver he was on the outside of the curve, like someone going over the top of a switchback at terrific speed, so gravity's effect was to yank him up sharply out of his seat and throw him against his harness. In most other dogfight manoeuvres, you understand, the pilot was on the inside of the curve which this machine was describing, so he was subject to positive 'G', which rammed him down into his seat, bent his backbone like a bow, and pressed his chin forward*

and downwards on to his chest. Positive 'G' also could make him 'black-out', because as he pulled violently out of a straight path through the air his blood tended to rush to his feet. For a few seconds, in the tightest section of pull-out from a steep dive, his brain was drained of blood and consequently his eyesight blurred and momentarily he became unconscious.

Well, we reckoned we were just as tough and fit as the Luftwaffe boys, and that we could take just as much 'G'-positive or negative - as they could. But to our dismay we'd found that our Merlin engines couldn't stand up to negative 'G', whereas the Messerschmitt Daimler-Benz seemed quite unaffected.

This is the sort of thing that would happen: you'd work up behind a 109 at height, and just as you got set to blow him out of the sky he'd spot you, slam his stick fully forward and drop like a gannet, more or less vertically. If you tried to do the same, the moment your nose went down your engine would go 'pop-brangl', there'd be a puff of dark blue smoke, and you'd lost all your power for several vital seconds.

We'd guessed the reason, of course, and the boffins who'd gone over. that captured 109 confirmed it. The Daimler-Benz engine had direct fuel injection, whereas the Merlin had a carburettor which couldn't cope with the negative 'G' imposed by this sudden transition from the horizontal to the vertical.

I'm pretty sure the German Intelligence knew this failing, and that the Messerschmitt squadrons had been briefed to adopt this power-dive technique to get away from our Spits. All we could do in this situation was roll over on to our backs and then dive after them, but that took several seconds and the Hun usually had time to get well out of range or nip into the cover of a cloud. It was pretty damned frustrating.

George Stainforth and I demonstrated this business, and firmly established the defect for the benefit of the Rolls-Royce chaps who'd have to find the solution. Within a few days they'd devised a footless carburettor for the Merlin that functioned perfectly under the most violent negative 'G', and in a matter of a few weeks it was fitted to every operational Spitfire. It shook the Messerschmitt lads when we began going straight on down after them and blasting them as they dived. They changed their tactics pretty smartly."

Dogfighting high over Farnborough, Tuck suddenly found Stainforth's 109 squarely in his sights. Staring at the now familiar black crosses, for one instant sheer instinct took charge and moved his hand to press the firing button. He checked the action just in time - not that it would have been fatal, for the Spitfire's guns, though loaded to establish full fighting weight, weren't cocked.

For the second run through the test programme, Tuck got into the Messerschmitt.

"Right away I realized one reason why the 109 could pull out of a dive more sharply than the Spit. The rudder pedals were several inches bigger than ours - in fact, the pilot sat with his legs very nearly horizontal. This, of course, considerably reduced the effects of positive 'G' in a pull-out, because with the feet high there wasn't the same tendency for the blood to drain away from the upper body. As a matter of fact, some weeks before I'd had my own pedals extended upwards for about six inches, and I'd found that I didn't black-out so easily.

The medics were very interested in this point, as they supported the suggestion that we should have higher rudder. But some technical type claimed that with

*the raised pedals there was a danger that with full left rudder on, the toe of the right foot, as it came back, would foul the petrol cocks on that side of the cockpit. That was absolute ballocks, because you never used full rudder in the air - you just couldn't get it on again at the terrific pressures on the control surfaces, and even if you had manage it, you'd probably have flick-rolled and over-stressed the whole aircraft! I had flaming arguments on this score, and in the end they let me fly with the extended pedals. Later the idea was adopted as a general principle on certain marks of the Spitfire."*

*He didn't like the 109 cockpit much. "It seemed even smaller than the Spit's, and the pilot's vision was decidedly poorer. The hood and windscreen were certainly far more robust, but they had 'a lot of thick metal strutting - heavily studded, like girders - in front and on the sides, and these obviously obscured several sections of the sky. Oddly enough, this one didn't have a rear vision mirror. The instrument panel was very confusing at first because it was festooned with scraps of paper bearing conversions - from kilometres to miles, metres to feet and so on. I had to sit and study it all for quite a while before taking-off. I was interested to note that the gunsight was a reflector job, not much different from our own."*

*Tuck's opinion, after repeating the test programme in the captured enemy machine, was that the 109E was "without doubt a most delightful little aeroplane - not as manoeuvrable as the Spit mind you, nor as nice to handle near the ground. It had a tendency to a rather vicious stall, because, you see, it was even smaller than the Spit. But certainly it was slightly faster, and altogether it had a wonderful performance. An odd thing that sticks in my memory: it had a distinct, peculiar sort of smell, a certain soundness that I have noted often since then, in every German aircraft I've got into. Like an empty beer barrel, or stele vinegar, maybe. Probably it was the type of dope or spray they used -I don't know. But it was unmistakable, alien. And not at all pleasant, not like the smell of our own kites." (...)*