

Armstrong startling

by John King

I RECEIVED A FRIGHT recently when hand starting a Tiger Moth. No injuries or anything more than a jump, but it was the first time in more than 35 years and untold hundreds of Gipsy Major starts that I can remember being put in a situation of undue risk. I took it as a personal affront that all those years of careful attention to procedure should suddenly come unstuck. Was I getting complacent?

The details of when, where and what aren't important, but I was in a farm paddock, starting a cold Tiger Moth engine for two people heading off in challenging conditions. The chocks were in place and I went through the usual starting ritual — tickle carburettor, suck in, wind backwards to vaporise the fuel in the manifold, throttle closed, set and contact. This particular Tiger had no external magneto switches, which should have made me more than usually alert.

Deep breath, swing propeller. No response from the engine. On the third pull I realised there was no click from the impulse mechanism, so it was switches off while I did something about it. The passenger produced a white pebble, not too heavy but rather decorative and well rounded by water action, which I used to tap lightly, once, underneath the impulse. A responding faint click a fraction of a second later suggested that things were better now, so I returned the pebble to its owner, fastened the cowl, said "switches off" and gave a gentle pull through while I listened closely for the proper sounds.

And the engine fired. Immediately. Right then. Fortunately I've always treated a propeller with suspicion, but I was half a step closer than usual and the unexpectedness of a rapidly rotating wooden club, inches from various parts of my anatomy, brought me instantly to full alert.

As it idled away as well-trained Gipsy Majors do, the ensuing conversation was calmer than I actually felt. It went along the lines of: "I said 'switches off'!" "Oh sorry, I thought you said 'switches on'."

Think about it. Two expressions, differing only in the ultimate consonant but meaning exactly the opposite of each other. How many people have been hurt through just such a misunderstanding?

Let's face it, hand starting an aircraft engine is probably the riskiest thing a vintage aviator can do in the course of normal flying. It may be something of a lost art, but the Armstrong start is normal for nearly all Gipsy Major engines.

I learned to fly in the mid-1960s with the NAC Flying Club at Harewood. At the time the club had Auster ZK-AXF and used RNZAF instructors, alternating their Saturdays to teach civilians to fly after spending normal working weeks in Harvard back seats at Wigram. (My first two instructors were Gerry Brown and Gavin Trethewey, and I'm pleased to note that all four of us are still active.)

Naturally enough we used RNZAF procedures and nomenclature when starting the Auster's tiring Gipsy Major. Even before I first sat in the cockpit I was given a full lunch hour of how to start this unfamiliar piece of machinery, and the lessons were ingrained into my consciousness. I firmly believe that the air force way is the best, and any attempts to reinvent the wheel only lead to increased risk.

Rule number one: the person swinging the propeller is in charge of this whole shebang. No matter how senior, the person at the controls in the cockpit obeys the starter's every word and action. And for those who have never learned or, God forbid, forgotten those lessons, the procedure is worth repeating. It doesn't need a checklist as it isn't very

complicated, but it does need care and attention.

Starter: "Brakes on, fuel on front [for Auster], switches off, throttle closed." The pilot performs the appropriate actions and repeats the commands, and the starter then does whatever is needed to introduce starting fuel into the engine intake manifold. With another "switches off, throttle closed" for luck he pulls the propeller through usually four compressions to suck raw petrol into each cylinder.

Starter: "Switches off, throttle wide." The pilot again makes sure the magneto switches are off and opens the throttle wide, whereupon Mr Armstrong pulls the propeller backwards, usually for eight blades. The theory here is that the raw fuel is vaporised back into the intake manifold in the state of rich mixture Gipsy Majors like when cold.

Starter steps back and: "Throttle closed." The pilot closes the throttle. Fully. All the way back. This is one of the most important parts of the routine, as it introduces a mindset that the throttle is closed before anything else is done. Even if everything else is fouled up, an engine can wreak only a certain amount of havoc at low idle. Just ask those who have experienced the drama of an unoccupied aeroplane running at full throttle. Their descriptions can be colourful.

Pilot: "Throttle closed."

Starter: "Throttle set." The pilot opens the throttle, often with the tip of the tongue showing in the corner of the mouth, to where experience tells him or her that the engine will start reliably and run at more or less idle speed, and replies: "Throttle set."

Now for the crucial bit. The starter says "Contact" in an authoritative tone of voice. NOT "switches on" or "she's hot" or any other expression which might seem clever at the time. "Contact" is so entirely different from "switches off (or on)" that anybody with normal pilot's eyesight can lip-read it. This is especially important when starting an engine among a group of other noisy engines, and also when the prudent modern pilot wears decent ear protection. At this point in starting an engine there is no room for possible confusion. Get it right.

The pilot holds the stick back, repeats "contact" in a loud voice and works the switches in the appropriate manner. The climax of this whole procedure comes when the starter, preferably seeing that the switches have indeed been positioned correctly, pulls the propeller gently and the whole things bursts into life.

Different people have different techniques here. Some walk away, pulling the propeller as they go, but I never trust the thing enough to turn my back on it. I check the ground around the nose for the usual cowpats, stones, thistles and small children, and when pulling the blade I take one step backwards, fixing the propeller with a stern expression.

The pull needn't even be hard, if the engine is in good condition. A Gipsy Major should start with a gentle swing, just as that one did when I wasn't expecting it.

But there is never any room for error, confusion or complacency when hand starting an aircraft engine. Get it right. Get the nomenclature right. Use the correct words. I don't know about anybody else, but my livelihood depends on my having a full set of working hands and digits, and I don't want to risk having anything broken through the use of unfamiliar terms. I'm also a devout coward when it comes to the thought of pain.

Armstrong starting needs resolute people and correct procedures. It's also very satisfying when it goes right. It beats pushing a button any day.