

# GA1313

*Posted on 02.09.2022 by Steve Forward*

**Category:** [General Aviation](#)

**Report Title** Reduced Power after Take-off

## Initial Report

I'm a (300+hrs) PPL holder and fly frequently with other pilots and passengers. On a bright breezy summer's day, myself as P1 and three non-pilot passengers flew in a PA28 180HP Archer uneventfully to [Airfield] and spent a very enjoyable time there. Late afternoon we got back in for the return flight. I'd checked the fuel, weather and my moving map was all set. All was well and we now had an 18Kt wind straight down the runway for take-off which, as a tailwind, would push us home faster.

I always use my Pooleys PA28 checklist and, taking my time, did so as we started up, did power checks and pre-take-off checks. We were then cleared to line up and take off. Being a [long] runway and entering at the [xx] hold, which is about half-length, I had checked and knew we had more than sufficient to get airborne safely. Having lined up, stopped to check the DI and my moving map were all correct, I applied full power and we began the take-off roll. A quick gauge check and I noticed the RPM was about 100 below what I expected but we were accelerating rapidly and into the brisk wind were soon airborne and commencing a right turn climb out. I then noted that our rate of climb was 400/500FPM not the usual 700FPM.

Saying to myself (passengers enjoying the view and oblivious anything was other than normal) this is not a crisis but something isn't right I duly checked mixture fully rich, flaps up, fuel pressure & oil pressure in the green, carb heat cold but cycled with RPM drop & recovery. I decided to continue the climb to 2000' then level off and make a left orbit to the north of the field as I didn't want to get too far away if I did have an engine problem. I would then take another look at the situation. I considered it to be a situation that was not an emergency because the engine was smoothly producing power and all indications were normal though a bit low on RPM. I elected not to advise ATC at this stage as was now clear of the ATZ on the Approach frequency with a Basic Service. Level, and ensuring primarily I flew the aircraft and about to commence the LH orbit, I went through all the key checks:

- Mixture rich
- Change tanks fuel pressure good – no change in RPM
- Oil pressure & Temp both nicely in the green
- Carb heat cycled with RPM drop & recovery but still low.

- Alternator online and charging
- And finally Mags on 'both' only to find that the key was set to only one Mag not both. Turned to both and the RPM instantly increased as did the rate of climb to 700FPM.

We then continued on course for a pleasant uneventful flight home. The checklist states "Magnetos – on Both, check master on" but I had somehow left the switch on one magneto not both. Back on the ground at home base I checked the switch carefully, it wasn't loose and positively clicked to each position for each mag and both so not at fault. The situation was of my making. The degraded engine performance had a degree of risk by reducing the climb rate but as we weren't flying towards high ground and were climbing I consider it in the low category, however had the selected mag failed it could very quickly have become a full blown emergency which, with a little more diligence on my part, I could have and should have avoided. Lesson learned.

## Comment

Although there are of course engine-specific tolerances for achieving maximum rpm during take-off, experiencing much-reduced rpm after applying full power is a serious issue that should immediately ring alarm bells. The reduction in power could be for any number of reasons ranging from magneto failure, FOD partially obstructing airflow, or even imminent engine failure so, if there is sufficient runway available, pilots should consider immediately aborting the take-off in such circumstances and stay on the ground. Although there was plenty of runway available in this instance, a good rule of thumb for assessing performance is to calculate the expected take-off run required for the pertaining conditions and then identify a stop point 1/3 along this distance such that if the aircraft has not achieved 2/3 of the required airspeed by this point, the take-off should be aborted. If a problem like this is encountered shortly after take-off then don't forget the option may also be available to land ahead on long enough runways. And don't be shy of speaking to ATC if you are trying to resolve an issue once airborne. Not only will it help them to make preparations in case you do need to return to the airfield, but they can also help you by advising of any other aircraft or obstacles in the area that might be a potential threat whilst you are heads-in trying to sort out the problem.

It's easy to be wise after the event about the thoroughness of checks etc but we are all human and sometimes make mistakes. The key thing is to establish why the check was missed in the first place. We don't know for sure, but could there have been distractions at that moment in time which might have caused the pilot to miss a part of the checklist and not ensure that the magneto selector was at both? If you are aware or suspect that you've been distracted, disturbed or rushed during checks, best practice is to return to the start of the appropriate section of the checklist and start again. Also, when carrying passengers, brief them about the need for a 'sterile cockpit' at important times such as pre-take-off, take-off and landing so that there are no extraneous conversations that might cause such distractions.

Finally, this report demonstrates well that both magnetos are required for maximum engine performance, the second one is not there just in case the first one fails! One of the immediate actions on experiencing low power during the take-off or climb should be to check that both magnetos are selected on.

## Key Issues

### Dirty Dozen Human Factors

The following 'Dirty Dozen' Human Factors elements were a key part of the CHIRP discussions about this report and are intended to provide food for thought when considering aspects that might be pertinent in similar circumstances.

**Pressure** – compulsion or anxiety to satisfy demands (press-on-itis to achieve the task)

**Distraction** – attention diverted from task by internal mis-prioritisation (check-lists and procedures)

**Communication** – information flow (passenger briefing about sterile cockpit requirements)

**Complacency** – disregard for risks, over-assumption of ability (positive action on encountering reduced performance during take-off)

**pressure**Pressure

**distraction**Distraction

**poor\_communication**Communication

**complacency**Complacency



