contributed by Frank Parker

Flying the Harvard

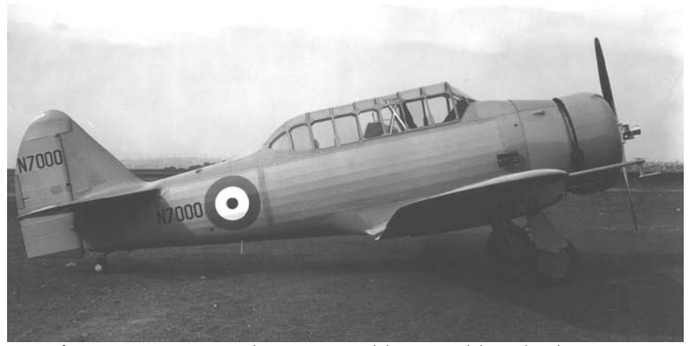
I am often asked, what is this or that aircraft like to fly? To answer the question I will attempt to share some of my experiences and thoughts. Firstly the Harvard.

MY FIRST encounter with the Harvard was on an ATC Flying Scholarship at RNZAF Base Wigram in January 1969. This was a daunting prospect for a 17 year old with just a few hours gliding and Cessna 150 time in my logbook.

I was accepted by the RNZAF on No. 170 Pilots Course when the Harvard was the Air Force's basic trainer. The Harvard is the aircraft I learnt to fly in and I'm still flying it 40 years on; little wonder it is my yardstick for all other aircraft.

I consider that my pilot training in 1970 was based on the WW II syllabus to produce a Kittyhawk, Corsair, Avenger or Spitfire pilot, or maybe, there are simply essential skills a pilot must master - there is a best way to teach these skills and that process had been well established over the preceding years.

Our basic handling training program was little different from what you would receive from a current flight school or aeroclub, except there was an early emphasis on aerobatics. We were introduced to basic aerobatic manoeuvres from Lesson 1 and had completed spin training prior to solo.



Aircraft N7000, a NA-49 (North American model 49) was delivered to the RAF in 1938. The 'Harvard' designation is derived from the Royal Air Force's allocation of University titles to training aircraft (Airspeed Oxford) and recognition of the aircraft's USA heritage.

RNZAF 'Red Checkers' Harvards circa mid 1960s.

The Harvard is a simple yet complex aircraft. Remembering its design era is the mid 1930s, the systems are simple. Main flying controls and trims are direct to the control surface via cables. Ancillary controls, throttle, propeller, carb heat, oil cooler etc. are all mechanical links. The electrical system is basic 24 volts, the gear and flaps are hydraulic. The cockpit is spartan and devoid of any comfort items, with endless hooks and corners to claim a knuckle and cavities in which to lose anything you may drop.

Ergonomics are non-existent. The gear and flap selector are co-located and operate in the same sense; indeed more than one after-landing flap retraction has resulted a collapsed undercarriage. The instrument panel is a mess with flight and engine instruments interposed in no particular order. The environment is almost hostile; noise, vibration, drafts, hot in summer, freezing in winter.

The engine is supercharged with a constant speed prop leading to complex engine handling requirements which had to be mastered from the outset.

With the above in mind it would be easy to dismiss this aircraft as a disaster, and no doubt there are a fair number who have encountered the Harvard that feel this way. For those of us who have managed to tame her however, she is a gentle grandmother with just the occasional grouch !

It was instilled into us trainee pilots that you had to control the aircraft or it would control you; indeed a mechanical horse. Training was well structured. The first two lessons (Concrete 1 and 2) were to learn start up and taxi skills. It was constant with at least three lessons per week, which maintained steady progress but little time for catch up if you got behind.

Despite its size, the Harvard is remarkably light and responsive to control inputs, and this is also the comment I receive from many familiarisation flights. Test pilots talk of control harmony, where ideally the control force gradient should be ailerons 2, elevators 4, and rudders 8 in comparative force. This reflects the average person's strength where the arm can pull or push about twice the force it can move sideways and the legs are several times stronger than the arms. The Harvard has this harmony which makes it pleasant to fly.

Basic handling is straight forward. The book could have been written on this aircraft, in fact it probably was. Turns require a dab of rudder, power changes a trim adjustment, and control forces get heavier with airspeed. It's an aircraft that talks to the pilot.

Stalling is standard, a little pre-stall buffet then a relatively gentle nose drop. But be warned, any yaw will be rewarded with a healthy wing drop.

Spinning is standard in entry and recovery, with no hidden vices. We were taught to enter spins from straight and level, and steep turns flicking over and under the turn. All this emphasis was to teach the budding pilot how to recognise a spin in a manoeuvre and how to recover from it.

The supercharged engine handling is initially complex, however once the basics are mastered it is logical and becomes straight forward. Nonetheless it is a large capacity, 1340 cu in (some 22 litres) 1930s design and requires respect and some nursing, skills necessary for the larger piston engines of the era. With a basic carburettor, there was no inverted capability which limited the manoeuvre envelope - possibly a bonus for the rookie.

The first big challenge for all pilots is achieving solo. In our training this was around the 20 hour mark and the Harvard circuit is a busy place for the trainee. If compared to a Cessna there are the added complications of undercarriage and constant speed prop which was adjusted (reduce RPM) commencing downwind, then again (increase RPM) a few seconds later when completing your landing checks – there must have been a reason…

The real test of course was landing. The Harvard weighs some 5000 lbs (two tonnes) which means there's a lot of inertia to control. This is not the time to delve into the intricacies of landing a tail wheel aircraft, suffice to say the aircraft is laterally unstable during landing and if the pilot loses control the aircraft will take over and result in a ground loop. I have managed two low speed

A Brief History of the Harvard

THE Harvard design genesis is difficult to follow. Conceived as a basic trainer for the US Army Air Corps, it first flew on 1 April 1935 as the NA-16 (North American model 16). This design was modified to the NA-26 and submitted to the USAAC for the 'Basic Combat' aircraft competition in March 1937. First production deliveries of the aircraft were 180 examples to the USAAC as the BC-1 and 400 to the RAF who with war looming in Europe, required a training aircraft. The RAF designated their aircraft as the Harvard 1. Subsequently the Harvard became the advanced trainer for the Commonwealth and US Forces, where it is known as the T-6 or Texan in the US Army Air Corp, or SNJ in the US Navy.

It was used for pilot training, weapons training and aerial gunnery from the rear cockpit. Over 11,000 were produced. Most allied pilots of WW II wrestled with the Harvard and in the USA it is acknowledged as the pilot maker of its time.

The Harvard has a combat history spanning actions from Syria/ Israel 1948, Greek civil war, Korea, Vietnam, Kenya, Algeria, Angola, Mozambique, Argentina, and Pakistan.
The last serving Harvard's were with the Apartheid South African Air Force in 1995, a service history of 57 years.

2013 is the type's 75th anniversary following the delivery of these aircraft in 1938. NZ Warbirds are planning a suitable tribute later in the year.

The mainstay of most NZ Airshows, our NZ 'Roaring Forties' Harvard Display Team in action.

ground loops in my 40+ years of flying, fortunately suffering no more than a slightly red face. A high energy ground loop is a completely different situation, generally resulting in significant damage that starts with a collapsed undercarriage, followed by a broken wing, busted prop, damaged engine etc. Landing incidents were a rare event during our training, testament to the quality of our instructors.

I have mentioned basic handling procedures were completely standard. Aerobatics were also straight-forward. Firstly we mastered the aileron roll and loop, then barrel roll. This latter manoeuvre had me baffled until a particular pre-flight brief ("it's a bloody great helix in the sky Parker") turned on the light and I could appreciate what I was trying to achieve. These basic manoeuvres were than combined into half cubans, roll off the top and with experience stall turns. We were then expected to develop an aerobatic sequence for our final handling check.

I recall instrument flying with the least enthusiasm. We were put in the rear seat with an instrument hood which resembled a tent over the cockpit. That was claustrophobic enough. Take a glance at the instrument layout and you will note there is no logic to it - the standard flight instrument panel had not been considered in 1935 when these aircraft were conceived. A limited panel compass turn required analysing the P-11 compass down by your knees, mentally calculating the number of degrees to turn, divide by 3 to make that seconds then achieving that turn on the bat and ball at rate one. We were allowed two attempts to get within 10 degrees of the required heading. Add a touch of Canterbury nor-wester turbulence and it was a recipe for disaster. I recall difficulty holding height during steep turns. My instructor took us down to 100 feet over Lake Ellesmere, had me open the hood to see our height then under the hood had me complete some steep turns. I didn't lose an inch ! His comment: "See you can bloody well do it." Problem cured.

Our navigation training was concentrated around the Canterbury Plains. I generally enjoyed this aspect of flying, although there was the occasional geographical embarrassment; "Why do you think they call that 'Red Mountain' Parker?" is one bit of positive reinforcement I recall.

Two memorable components of our training were 'Tented Camp' and 'Weapons Training'. The former was two weeks at Nelson where we lived and operated from a canvass camp on the airfield and practiced our navigation skills in unfamiliar territory. Weapons Camp was at Ohakea, an introduction to air to ground gunnery, albeit with a solitary .303 browning in the wing, plus low level and dive bombing with 12 lb practice bombs. Exhilarating stuff for an 18 year old from the provinces.

The Harvard was a great training aircraft for the 1940s and 50s. It taught the pilot essential skills for aircraft he would encounter, aerobatics for the fighter pilots, tail wheel skills for the fighters, DC-3 transports and bombers of the time, and big engine skills for the period. By the time it was retired in 1976 it had become an anachronism. The Air Force fleet was jets and turbines, tail wheels were museum artefacts, and the CT-4 Airtrainer was a better training platform for the modern pilot.

Nonetheless, I am fortunate to have encountered the Harvard as the aircraft which taught me to fly, and as with any experience it is the highlights that live in the mind. I am also fortunate to continue an association with the Harvard and though it may not compare to more exotic aircraft I have had the privilege to fly, it remains my yardstick, the aircraft I will compare all others too.

Cheers, frankly@xtra.co.nz

contributed by Bill Beard

Insurance for engines run 'on condition'

ONE OF THE main provisions of an aircraft insurance policy is that operation and maintenance of the aircraft must be conducted in full compliance with the CAA Rules. Accordingly, aviation insurers accept the use of engines beyond the manufacturer recommended TBO (time between overhauls) subject to certain manufacturer recommendations and/or CAA approved programmes.

Under the policy terms and conditions, insurance companies will pay for, repair, or make good accidental damage to the insured aircraft. BUT in the case of repairs to an on-condition engine, though different insurance companies may have different views, generally the following ground rules will be applied.

In the case of a total loss – no problem. The company will pay the agreed value including the engine, less the deductible. However, in the event of engine repairs even say following a prop strike, the normal procedure is that the Claims Adjuster will approve a bulk strip (paid for by the insurers). If any damage is found (ie. crankshaft damage or the like) the insurers may provide for replacement of damaged part(s) caused directly as a result of the accident, subject to age and AD (airworthiness directive) status. If the crankshaft is on its second or third life or has been superseded then settlement may be subject to negotiation. However, as the engine is beyond its TBO it will not be approved for "return to service" without a complete overhaul. The cost of this will be to direct account of the insured/owner as the policy does not cover wear and tear or deterioration.

The long and short of it therefore is that if your time expired engine is damaged, the insurance company will compensate the insured for accident related damage but the cost of the overhaul to enable it to return to service will not form part of the claim.

Likewise, with airframe damage, insurers will only pay for the accident damage. Additional rectification such as corrosion etc. identified during the repair process will be to the account of the insured.

To discuss this topic or any other questions relating to aviation insurance or to seek quotations, contact Bill Beard at Avsure on 0800 322 206.

Accident and Incident Reports are provided courtesy of Avsure

Type: Cessna 172B RWC
Location: Mahia **POB:** 1
Operation: Private Other **Injuries:** Nil
Date: 12 April 2013
Report: During a slow taxi, the aircraft's front wheel hit a solid piece of wood sticking approximately 15cm out of the ground causing the nose leg top bolts to be shorn off. The leg folded under the belly of the aircraft.

Type: Robinson R22 HAM
Location: West Coast **POB:** 2
Operation: Private Other **Injuries:** Nil
Date: 2 May 2013
Report: Helicopter took off on its own and came down on its side.

Type: CAW SportCruiser JBZ
Location: Whitianga **POB:** 1
Operation: Private Other **Injuries:** Nil
Date: 25 April 2013
Report: Runway grass was found to be fairly long on landing, with the pilot seeing a freshly mown strip to their left. Believing this was the centreline they adjusted their landing roll but found the mown strip was the runway edge. Due to the camber and crosswind the aircraft left the runway and struck a drain, with subsequent damage.

Type: Composite Heli KC518 ICM
Location: Waitemata Hbr **POB:** 2
Operation: Test **Injuries:** Nil
Date: 6 May 2013
Report: Helicopter suffered uncontrolled yaw, engine RPM started to overspeed, so the pilot reduced power and commenced an auto-rotation. Helicopter ditched in the Waitemata Harbour. No injuries reported.

Type: Hughes 369E HNA
Location: Eglington Valley **POB:** n/s
Operation: Not stated **Injuries:** Nil
Date: 26 May 2013
Report: Engine failure followed by autorotation, with moderate damage.

Type: Robinson R22 Beta HYR
Location: Rangiora **POB:** 1
Operation: Training Solo **Injuries:** Nil
Date: 29 May 2013
Report: Instructor exited the aircraft to allow the student to conduct a solo hover flight. Entering the hover the helicopter's nose dropped slightly, with the helicopter then moved abruptly rearwards in response. The port skid dug into the ground resulting in a dynamic roll-over.

Type: Tecnam P92 Super Echo THA
Location: Hastings **POB:** 1
Operation: Training Solo **Injuries:** Nil
Date: 7 June 2013
Report: The right landing gear leg collapsed as the aircraft was taxiing to the runway. The aircraft fell onto its right wing and stopped.

Type: Bell 206B HTA
Location: Nelson **POB:** 1
Operation: Ferry **Injuries:** Nil
Date: 7 June 2013
Report: Helicopter experienced an engine mechanical issue during a ferry flight. An autorotation was conducted, with a heavy landing causing substantial damage. The pilot was uninjured.

Type: CHR Safari IJE
Location: North Shore **POB:** 1
Operation: Private Other **Injuries:** Nil
Date: 11 June 2013
Report: Helicopter lost tail rotor authority while hovering, resulting in the aircraft rolling over. The pilot was able to vacate the wreckage without injury.

Type: Gippsland GA200C EMD
Location: Ekatahuna **POB:** 1
Operation: Agricultural **Injuries:** Nil
Date: 19 May 2013
Report: Left main landing gear collapsed shortly after beginning the takeoff roll causing the propeller and the left wing to contact the ground.

These accident reports are sourced from www.caa.govt.nz and contain information *as reported* to the CAA recently. As such, the accuracy of the information supplied cannot be guaranteed. See www.caa.govt.nz for other details which may be added as more information is received.