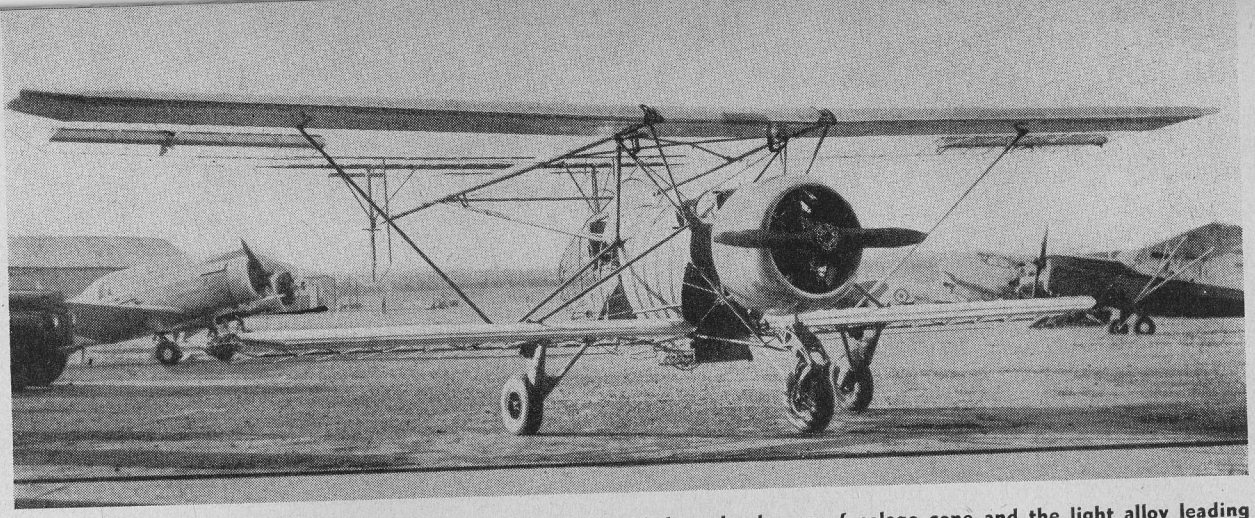


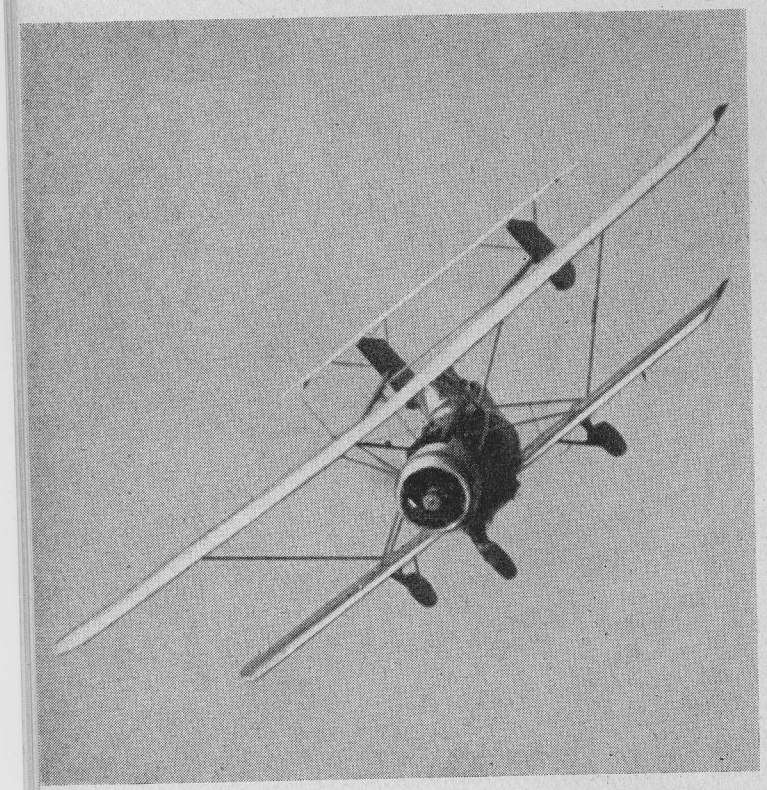
The welded mild steel tank which forms the hopper, the welded steel tube rear fuselage cone and the light alloy leading edge sections of the upper and lower mainplanes are apparent in this "before covering" view of the PL.7 Tanker.

Flying The Tanker

An unconventional but workmanlike approach to agricultural aircraft design is exemplified in the PL.7 project. Here is Keith Robey's flying report on the prototype aircraft.

ALTHOUGH little has been heard of the PL.7 Tanker project in recent months, steady progress has been made with the development of this interesting Australian built agricultural aircraft and Kingsford Smith Aviation Services anticipate that Type Approval tests will begin shortly.

The PL.7 flew for the first time on September 20, 1956. Since that time the prototype has flown approximately 45 hours and flights have been made with loads of up to 2200 lb. in the hopper. Minor modifications have included the removal of the pilot's canopy and the PL.7 is now being flown with an open cockpit. Construction details were described in AIRCRAFT in November, 1956.



This action shot supports the good manoeuvrability qualities claimed for the Tanker during its early flight tests.

It is a large single engined biplane of unequal span, unusual appearance and unconventional design. The fuselage consists of a large nacelle built around a mild steel tank, forming the hopper. The 400 HP Cheetah 10 engine is mounted in the nose of the fuselage nacelle and the pilot's cockpit in the extreme rear section. Tailplane, elevators and twin rudders are mounted on booms projecting back from the upper mainplanes and the aircraft is fitted with a fixed tricycle undercarriage which features a steerable nose wheel.

Detail design changes are planned for future production aircraft as a result of experience gained with the prototype. These include an all metal tailplane instead of the present steel tube fabric covered structure, deletion of the separate centre section on the upper mainplane, and redesign of the lower mainplane which will feature a straight through centre section with detachable outer wing panels instead of being fabricated in two separate sections as at present. The straight through centre section will permit the deletion of one of the struts which at present brace the lower mainplane and it is also planned to further clean up the design by omitting several small bracing struts from the tail boom structure.

Through the courtesy of Kingsford Smith Aviation Services and by permission of the Department of Civil Aviation, I was recently able to fly the PL.7 prototype and was much impressed by its performance and docile handling characteristics. The aircraft is a single seater and after being thoroughly briefed by Stan Burtis, chief instructor of the Kingsford Smith Flying School, who has shared the developmental flying with Peter Brown, I ventured forth on my own and spent a most interesting hour exploring the flying characteristics of this unusual aircraft.

Entry to the cockpit of the Tanker is not as difficult as appearances may indicate. Access is by way of an assist step and a cockpit door situated on the starboard side. The cockpit is very spacious and a windscreen of generous proportions gives adequate protection from the slipstream. For a prototype aircraft the cockpit finish and standard of instrumentation is particularly good and although not intended to represent, might well be quite acceptable as a production standard. Control layout is simple and convenient. Working around the cockpit from left to right, one finds the elevator trim in a most convenient location alongside the seat and working fore and aft in the natural manner. The fuel system consists of one 50 gallon tank mounted under the cockpit floor and a simple on-off cock protrudes through the floor at the side of the pilot's seat. Throttle, mixture and carburettor heat controls are found in a special quadrant on the left hand cockpit wall and a Ki Gass priming pump, together with a slow running cutout, are mounted just below the instrument panel on the extreme left hand side. Magneto switches, engine and flight instruments occupy the instrument panel in convenient locations with an electrically operated fuel gauge, generator switch, master switch and starter button located on the right hand side. The braking system is hydraulic and the brakes are toe operated, but not differential; the parking brake is controlled by a knob mounted on the right hand side of the instrument panel and is applied by pulling out the knob while the toe brakes are depressed. Hopper controls consist of a lever controlling the aperture of the chute mounted to the left of the pilot's seat and an emergency dump release on the instrument panel. In an emergency the contents of the hopper may be jettisoned in five seconds.

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Flying The Tanker

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Starting up the Tanker entails first turning on the fuel, priming with the Ki Gass pump, selecting mixture rich and with both magneto switches on and the throttle set about half an inch open, the Cheetah 10 is ready to be turned over on the electric starter. The engine starts readily and should be kept idling at approximately 1000 revs to avoid fouling plugs. Taxying is simple, the steerable nose wheel being controlled through the rudder pedals and directional control is most positive. The long nose and the big radial engine obstruct forward visibility somewhat and it is necessary to uncover the blind spot by yawing the nose. Without any load in the hopper the Tanker is inclined to pitch whilst moving over a rough surface but steps are being taken to eliminate this characteristic in the production aircraft by moving the main undercarriage three inches further aft.

The general ground handling characteristics are good; the aircraft is manoeuvrable and can be handled in a restricted space without undue difficulty. The nose wheel turns through an arc of 34 deg. giving satisfactory turning radius, the braking system is effective and the Tanker rides well on its rubber block shock absorber system.

Standing across wind before takeoff I first tried the switches at 1600 revs and after a brief full power check, ran through the drill laid down in the Pilot's Notes. As the Tanker is fitted with a fixed pitch propeller and is not equipped with flaps all that is necessary before takeoff, apart from the customary checks and precautions applicable to all types of aeroplanes, is to set the trim, place the mixture in the takeoff position, check fuel cock on, contents sufficient and carburettor heat off. Using full throttle for takeoff, the lightly loaded Tanker accelerates rapidly. There is no tendency to swing and a slight backward pressure on the control column lifted the nose wheel off the ground at approximately 30K, the Tanker was well and truly airborne at 40K and takeoff distance appeared to have been in the vicinity of 150 yards. Best angle of climb speed is 55K, but best rate of climb is 65K and at this speed the Tanker climbed away at 1200-1400 ft./min. Once clear of obstacles the mixture control should be returned to the normal "rich" position and power reduced to the recommended 2¼ lb. boost x 2300.

I first climbed to 1000 feet and levelled out to clear the Bankstown circuit and restricted area. Once clear of height restrictions I began climbing again and at 4000 feet levelled out and settled down to familiarise myself with the Tanker's general handling characteristics. Recommended high cruise power setting is -½ lb. boost x 2100 revs and economical cruise in weak mixture -1 lb. boost x 2100 revs. At high cruise power I found that the indicated airspeed appeared to be in vicinity of 95K and economical cruise approximately 10K slower. Visibility in level flight ahead and below is poor, but in all other directions good. Visibility in the turn is satisfactory and much superior to the average high wing monoplane. The controls of the Tanker are heavy but quite well balanced and accurate turns require very little rudder. Lightly loaded the Tanker is very manoeuvrable and although aerobatics are not normally permitted, the aircraft has been regularly looped and spun during the test programme that has been carried out in recent months by company and DCA pilots. Although the Cheetah could never be accused of being a particularly noisy engine, the noise level in the open cockpit is fairly high. The large windscreen deflects the slipstream in an efficient manner, however, and for an open cockpit aircraft, the pilot's working conditions are quite comfortable It is probable that in the production version of the Tanker a return will be made to an enclosed cockpit, but with a different type of canopy to that with which the prototype was originally equipped.

Exploring the slow flying characteristics, I found that the aircraft could be flown with satisfactory control down to speeds in the vicinity of 50-55K. Aileron control was adequate to carry out turns at 55K, but this appeared to be the minimum manoeuvring speed. With power off and the nose held fairly high the stall occurred at approximately 38K; there was little warning judder, but when it did occur the stall resulted in no more than a gently dropped starboard wing. With some power on the speed went back to 32K and again the stall occurred with little warning, but was just as gentle and the result the same. Aileron control became less effective as the stalling speed was approached, but on each occasion normal recovery action resulted in full control being regained with a minimum loss of height. Experimenting with some incipient spins, I found that if full rudder was applied at the point of stall the wing dropped and the nose pulled away lazily into the first turn of a spin. I did not allow the spin to develop and found

that normal corrective action resulted in full control being regained with surprisingly little loss of height.

Returning to the aerodrome I rejoined the circuit on the down wind leg. All that is necessary before beginning the approach is to check the fuel contents, ensure that the mixture is in the fully rich position and the carburettor heat off. The Tanker, with its fixed undercarriage, fixed pitch propeller and lack of flaps is a remarkably uncomplicated aeroplane for its size and drills are surprisingly simple. I personally could not get away from the feeling that there must be something else to do, or that I must have forgotten something in my check. On the base leg I throttled back and reduced speed to 65-70K and adjusted the elevator trim. Turning final I further reduced speed to 55-60K and found that the approach angle was slightly steeper, than I had anticipated. With a trickle of power the Tanker descends at quite a comfortable angle and the lack of flaps or an air brake is of no concern. The actual landing is very simple and does not call for any particularly fine adjustment or skill. If the fence is crossed at 50-55K and the aircraft held off in the normal manner the speed will wash off a little quicker than one might expect in a non flapped aircraft and the Tanker will touch down on the main wheels first, dropping forward onto the nose wheel as elevator control is lost. There is no tendency to swing.

Taking everything into consideration, the Tanker adds up to quite a satisfactory aeroplane from the pilot's point of view and its development will no doubt be watched with considerable interest.

Empty weight of the Tanker is 2700 lb. and maximum all up weight 5000 lb., permitting a disposable load of 2300 lb. which of course includes the weight of pilot and fuel. Kingsford Smith Aviation Services anticipate, however, that the empty weight of production aircraft will be considerably lower than that of the prototype with a corresponding increase in disposable load. Alternative powerplants under consideration include the Alvis Leonides and 450 HP Wasp Major. The price of the Cheetah-powered production version is expected to be in the vicinity of £13,000. END.

Wooden Aircraft CofA Restrictions

DCA has advised Australian agricultural operators that restrictions are to be applied to the issue of Certificates of Airworthiness for wooden aircraft featuring glued ply shell wing or fuselage constructions which have been modified for agricultural operators. The Department has stated that the decision to apply these restrictions is based on the fact that glued wooden ply shell aeroplanes suffer a marked non-rectifiable deterioration in strength with time which will be accelerated by the effects of contamination by agricultural preparations. Recent tests on structures of this type have revealed complete failures of glued joints tested between 5-10 years after manufacture, whilst other joints have lost 40% of their initial strength after five years and rather more than 60% after 10 years storage under favorable conditions. DCA advance as a further reason for restricting the use of wooden aeroplanes on agricultural operations the fact that it is virtually impossible to engineer proper crash protection into a wooden fuselage. The conditions issued by DCA follow:

Glued wooden aeroplanes which have already been modified will be eligible for continued certification for the time being but it is likely that this permission will be withdrawn in a few years' time.

Drawings covering the modification in such aeroplanes shall not be used to adapt other aeroplanes of the same type for agricultural purposes and such drawings are to be endorsed "Inactive for Future Production."

Any individual glued wooden aeroplane on which agricultural modification work is physically in hand, with the verbal or written approval of an Aircraft Surveyor or Aeronautical Engineer of this Department, may be completed and will be eligible for certification as in the case of existing modified aeroplanes. This special dispensation will not apply to proposed modification of any other aeroplane of the same type.

At renewal of Certificates of Airworthiness for all glued wooden agricultural aeroplanes very rigorous inspection standards will apply.

These conditions will not apply to aircraft such as DH.82 which features a solid wooden wing spar, but would curtail the operations of such types as the Wackett Trainer, Avro Anson or Miles Gemini. Some examples of these types have recently been converted for agricultural operations. END.