

Lester Mason at work in Northland, New Zealand.

Mike Feeney

During the autumn of 2011, professional photographer Tony Smith happened to sight a Super Air aircraft engaged in spreading fertilizer on a local farm near Okaihau, in Northland, New Zealand. Okaihau is inland from the well known Bay of Islands region; very popular with both NZ and overseas visitors. Being an old agricultural pilot and a friend of the pilot, Lester Mason, I thought it would be interesting to use a few of Tony's excellent images and add some explanatory notes for overseas and local New Zealander readers.

Super Air is a large operator with 14 pilots at 12 bases; including its head office and engineering division at Hamilton International Airport. The head office serves the prosperous Waikato farming region. Super Air operates mainly from Taupo north and also has a large base at Masterton in the lower portion of the northern New Zealand island. Their interesting website will explain many details about the company, www.superair.co.nz

In the photo where the aircraft is being loaded, Johnny Wintour, Lester's workmate, drives one of their two loading vehicles with the fertilizer bucket's sock positioned in the hopper opening. The New Zealand-built Fletcher FU-24-950, ZK-BHG, has had its original 400 HP, eight cylinder, Lycoming IO-720 piston engine replaced with a 550 SHP Walter turboprop. Super Air also fitted 550 SHP, P&W PT-6-11AG and 750 SHP, PT-6-34AG (de-rated to 550 SHP) turboprops to remanufactured FU-24 airframes and use many in this configuration. The engine retrofit greatly enhances performance; particularly with respect to the rate-of-climb. The gas turbines, with their slow-revving propellers, are much quieter than the original combination which, particularly in the early morning, can be heard far from the airstrip. The snarling sound of the propeller tips, which are near supersonic speed at maximum take-off rpm, can be annoying to some whilst others rather like it. In my experience, it is a "blokey" sort of thing...if you get my drift.

Super Air purchased the basic "Fuso Fighter" truck cab and chassis, then manufactured most of the loading equipment in their own workshop. This includes the large 5,000-litre fuel tank, lockers for tools and safety gear, the boom and bucket, the hydraulic line system for lifting and adjusting the bucket's angle and the rear loading cab with its duplicated controls and hydraulic ram controls.

Weighing the load is accomplished by use of a bleed line to a calibrated hydraulic gauge. The long boom is folded and stowed for safe operation on public roads. A typical payload for the Walter and PT-6 FU-24 is, depending on airstrip slope and length, about 1.1 tonne on average and 1.27 tonne at max. structural hopper load when fuel load is lighter. Loading time is about 12 seconds, depending on the product's flow characteristics. The 5,000 litres of fuel provides about 27 flight hours for the turboprop aircraft or 55 hours for those using piston engines.

The bulk fertilizer product is delivered to the airstrip by truck and tipped into a large concrete or wooden bin which is located at the higher end of the airstrip. The loader-driver eases the bucket into the heap of fertilizer and then lifts the boom up to the loading height for weighing, using the gauge in his cab. He then moves the loader onto a set position and waits for the pilot to return and park the aircraft on a pre-determined spot to enable the driver to move in over the aircraft at an angle which should preclude damage to the tailplane or wing flaps. After loading, the driver backs out and, after checking the vehicle is clear, the pilot applies full power and rolls. The team work is amazing to watch and is a rather 'slick' operation.

New Zealand's rural farm airstrips generally range in length from about 600 metres (2000 ft) if level, to perhaps 270 metres (900 ft) when very steep (a slope of up to 20%). All pilots prefer a strip to have some slope as this greatly reduces the long, laborious take-off roll that is required on a level strip. New Zealand ag aircraft routinely operate at weights which may be up to 30% greater than the type's Normal or Standard Category figure. The take-off roll on a level strip may take as long as 25 seconds which, unless the surface is smooth, places prolonged stresses and shock loads on the undercarriage and increases airframe metal fatigue.

With many of Lester's takeoffs, he becomes airborne at about 65 knots and literally "falls" off the end of the airstrip with a considerable rate of descent as he accelerates to 85-90 knots for the climb. It is crucial the airstrip has no obstacles at the end and for some distance out along the extended initial flight path. Once the take-off has begun on a steep strip, it is not usually possible to abort the roll due to the aircraft's momentum.

Should an engine problem arise, or an unexpected large tailwind gust occur, the pilot must initiate the jettison process. By NZCAA law, 80% of the load must be able to be dumped within five seconds. This type of overloaded operation is legal only if no third party risk is present at the end of the airstrip or within the initial climb-out. A house, farm building, school or public roadway (if right on the airstrip's end) could be deemed as a third party human or property risk.

The Fletcher FU-24 has a large wing area of 330 square feet and a thick aerofoil section which generates high lift at low airspeed, but also creates much drag at high angles of attack; particularly with flaps extended. The usual procedure is to retract take-off flaps as soon as airspeed permits, no matter what the height. The take-off weight may be as much as 2.7 tonnes when conditions are good.

With the thrust to weight ratio provided by the turboprop engine, the FU-24 is capable of contour flying over much steeper terrain than were the earlier piston-engined models. For example, the first Fletchers that were operated back in the early 1960s had only 225 or 240 HP and when loaded with about 0.75 tonne could scarcely climb at all until some of the load had been spread. The accident rate involving these models, in retrospect, was staggeringly high with many WWII veteran pilots losing their lives or being seriously

injured. The serious accident rate has improved greatly over the past 10 to 15 years; although it is, potentially, still a high-risk occupation should any complacency creep in or maintenance standards not be of the highest quality.

For a long time the FU-24 had only one seat in the cockpit. One sat in the middle and with no dual controls simply got in it and taught oneself how to fly it. When I did my type rating, the instructor stood on the tarmac and observed me doing some steep turns, stalls, a forced landing onto the aerodrome and a few circuits. After a chat, he signed off on the type rating form which was sent to Civil Aviation for processing.

In the FU-24-950 and -954, the pilot sits on the left and there is a seat for a passenger. It is a tight fit, but quite adequate for the loader driver or a farmer to brief the pilot on the areas he wants covered. It is illegal to carry a passenger during actual high weight, low-level flight operations. The canopy slides aft and has a rubber seal to keep the dust and rain out (if maintained to a high standard). The check-cable is on the nose gear to prevent the oleo dropping out should the scissor-links fail. With the gas-turbine engines, the propeller is further forward when compared to the piston-engined models. The fuel tanks form part of the wing's leading edge and are detachable. The hopper fill-hole is behind the cockpit and has a lid to reduce dust being sucked out.

Sortie time, including loading, take-off, transit to the spreading area, sowing time, return to the airstrip and the landing, depends on the distance and relative location of the target area with respect to the airstrip, the amount of climb and the rate per hectare. It may be as short as 2.5 minutes or as long as seven or eight minutes. About 4.5 minutes is fairly typical. The fastest I recall ever working was when sowing lime in a 240 HP, FU-24 at 1.5 tonne per acre onto an area right off the end of the strip and out to each side. With the help of my excellent loader-driver, Neville Hooper (whom I still chat with in Thames), I averaged 1.75 minutes and carted 0.85 tonne per load. The 60-ton job took just $60/1.75 = 34.3$ loads per hour $\times 0.85 = 29$ tons per hour...just over two hours to complete the job. But there was nothing clever about it really, as I was sowing at close to the dump rate of flow. Busy though for a 'kid' pilot of just 21.

That was 50 years ago and I reflect now that I had then just logged my first 1,000 hours and must have completed at least 10,000 take-offs; most of them from small farm airstrips and in overloaded Cessna 180 and FU-24 aircraft. This type of experience was to prove valuable when I began, with 3,000 hours logged, to fly in the rugged highlands of Papua New Guinea in 1964.

Mike Feeney of Hamilton, New Zealand is a retired professional pilot and a long-time aviation journalist, technical and air safety writer. Thanks to Super Air General Manager, Graeme Martin, for the use of the photographs.