

## AGRICULTURAL BOEING STEARMANS IN AUSTRALIA: NATIONAL AIRCRAFT NA-75s

By Geoff Goodall

*Only two Boeing Stearman type biplanes were imported for agricultural work in Australia. Two highly modified National NA-75 models flew only briefly in 1957 before DCA limitations on their agricultural load forced the US owners to abandon their Australian plans.*



*Crop-Care Pty Ltd National NA-75 VH-FBA giving demonstration flights at Armidale NSW in October 1957. The large US designed spreader can be seen under the belly. Photo: John Patterson collection*

The Stearman Model 75 two-seater biplane was first flown in 1934, in the same year that the Stearman Aircraft became a subsidiary of Boeing Aircraft Company. It became the basic primary trainer for US Army Air Corps and US Navy before and during WWII, going into large-scale production at Wichita, Kansas in various models to suit different training roles. Total number built varies between 8,500 and 9,800 depending on reference sources. Many were supplied to other countries, including 300 to Canada under wartime Lend-Lease, where the PT-27 was named *Kaydet*. All models were externally similar, powered by a range of 215hp to 280hp Lycoming, Continental and Jacobs radial engines:

US Army Air Corps (renamed US Army Air Force) : PT-13, PT-17, PT-18

US Navy: N2S-1 to N2S-5

Royal Canadian Air Force: PT-27 winterised, enclosed cockpits

In the early post-war years over 4,000 military disposals Boeing Stearmans were sold on the US civil market, the majority being put to work as agricultural sprayers and dusters. Many field modifications and power plant changes were carried out to improve performance and increase the payload, to give more efficient spreading. During the 1950s various aviation contractors offered Stearman modification kits, but **National Aircraft Corp, at Van Nuys Airport, California** was the first to come up with a radical high-lift redesign of the wing platform to provide a big improvement in performance and up to 1,000 pounds (equivalent to half a US ton) agricultural payload increase. Their modified aircraft was marketed as the **National Aircraft NA-75**.

The full NA-75 conversion was based on Boeing Stearman PT-17 but fitted with a much more powerful 450hp P&W R-985 *Wasp Junior* radial engine driving a Hamilton Standard constant-speed propeller. The uncowled engine was fitted on shorter engine mounts, which required the oil tank to be relocated from behind the engine firewall to a new compartment inside the fuselage. The original wooden wings were replaced by new-build NA129 upper wings and NA126 lower wings, of all metal

construction with fabric covering and end-plates on each wing tip. The new wings had ailerons in both upper and lower wings instead of the lower only and wingspan increased by 3 feet. An innovation was fitting the cockpit instrumentation to the upper wing trailing edge above and in front of the pilot to reduce the need to look down into the cockpit while low flying. The fabric side covering on the fuselage was replaced by metal panels attached with screws to allow easy removal for inspection or cleaning. Various other improvements were incorporated into the NA-75, although a planned electric starter was discarded to reduce all non-essential equipment, and the big P&W had to be swung by hand.

### **The first Stearmans in Australia**

By 1957 Australian agricultural aviation was dominated by Tiger Moths, Avro Cadets and Cessna 180s, but the first of a new generation of specialist agricultural aircraft were being imported, Fletcher Fu 24s, Edgar Percival EP-9s and DHC-2 Beavers. At Fishermans Bend, Melbourne, the Commonwealth Aircraft Corporation was developing the CA-28 Ceres heavy cropdresser.

The Department of Civil Aviation Import Permit Register records an application on 10 April 1957 by **Crop Care Inc, Sacramento California** to import four "Boeing A75" aircraft. Import Permit No.623 was issued on 23 May 1957. They were in fact National NA-75 modifications of the Boeing Stearman. Crop Care was an established operator in California, and sales agent for the NA-75. The company management saw Australia as an opportunity to expand their business, in particular to establish training schools for agricultural pilots to learn the American dusting and spraying techniques as well as sales of NA-75s.

*Aircraft* magazine's September 1957 issue reported on recent events in the Australian aerial agriculture field:

*"One of the most interesting developments has been the arrival in Australia of American aerial agricultural executive John Neace, representing the American company Crop Care. Mr. Neace has stated that his company is interested in establishing an Australian subsidiary to assist the local aerial agriculture industry by starting a training school for pilots. Crop Care hold import licences for five Stearman aircraft and three of these aircraft are expected to arrive in Australia during September."*

An Australian subsidiary company had been established, Crop Care Pty Ltd with an office in central Sydney. In a press release, the company said it was keen to enter the Australian aerial agriculture field but would not be flying commercial operations in competition with existing companies. Instead, their aim was to market the NA-75 here and establish the first aerial agriculture pilot training school in Australia. Their school would use two-seater NA-75 trainers and allow them to pass on their US experience and equipment to local operators,

On Tuesday 1 October 1957 the first two Crop Care NA-75s arrived crated at Bankstown Airport, Sydney from the Sydney wharves. They were uncrated at the hangar of Ray and Larkin aircraft engineers under the supervision of John Neace.

The following day an Australian Application for Registration form for the first NA-75 under assembly was completed by John Neace and handed in at DCA's Bankstown office. He wrote on the form "Request registration VH-CCA". However assembly of this first aircraft N63267 was completed within three days and it was rolled out of the hangar in the same blue and yellow paint scheme but its American registration had been replaced by the earlier-allocated Australian marking VH-FBA. It was a single-seat agricultural model with a 41 cubic feet capacity metal hopper installed in the former front cockpit position. VH-FBA was test flown on 3 October by American Harry North, Crop Care's chief pilot who had joined the company team in Sydney.



*The first NA-75 assembled was VH-FBA, seen at Bankstown in October 1957. The P&W radial of the second NA-75 VH-CCI can be seen behind.*

*Photo by Peter Keating*

Prior to issue of a Certificate of Registration, the Department approved this first NA-75 to make a demonstration tour to northern NSW, under its current US Certificate of Airworthiness.

Several days later, with a large swathe spreader installed beneath the hopper under the fuselage, Harry North departed Bankstown in VH-FBA heading for Tamworth, stopping in at Newcastle on the way. On takeoff from Newcastle at Broadmeadow airfield into a stiff breeze, he was airborne in about 100 feet, impressing the onlookers. On arrival at Tamworth, he was met by East West Airlines' Operations Manager John Riley and company director Mr. Pat Carter.

Harry North departed Tamworth the next morning for Armidale NSW where he carried out agricultural demonstration flying. Armidale was an important base for Airfarm Associates Pty Ltd, founded at Tamworth in 1954 by Basil Brown, formerly Operations manager for East West Airlines. Brown had just completed a major investment that year with the import of three new Fletcher Fu24s from New Zealand.

### **The East West Airlines connection**

Harry North's visit to Tamworth in VH-FBA was to show the aircraft to Airfarm Associates, but more importantly to East West Airlines. Behind the scenes over previous months, Crop Care's management in Sacramento had been in discussions with the airline. At that time East West was anxious to increase utilisation for its maintenance organisation at Tamworth, which was under-utilised by day when the airline's DC-3s and Lockheed Hudsons were away. East West Airlines' directors discussed an offer to assemble and maintain the proposed Crop Care fleet of NA-75 aircraft and an optimistic suggestion of setting up manufacture of the type at Tamworth. For the same reason, during 1957 East West Airlines assisted the construction of the prototype Millicer Air Tourer VH-FMM and negotiated sole manufacturing rights for a planned production line at Tamworth. Neither ventures were to eventuate.

At the East West Airlines Board meeting in Sydney on 26 October 1957 the following three resolutions were carried by the Directors:

1. *"That the three representatives of East-West Airlines Limited nominated for the Board of Directors of a company to be formed for the assembly and modification and manufacture of "Stearman" Agricultural aircraft and who will form half of such Board together with Messrs Charles M. Bransetter Junior, John F. Neace and Harry L. North are Messrs D.M. Shand, A.L. Carter and Captain A.J. Smith."*
2. *"That the Chairman of the Board be authorised to sign on behalf of the Company a covering letter*

*which will accompany the proposal to the Department of Civil Aviation setting out the particulars of a joint venture by East-West Airlines and Crop Care Pty Ltd."*

3. *"That Messrs D.M. Shand, A.L. Carter and A.J. Smith be authorised to proceed with the formation of the companies in connection with the joint venture with Crop Care Pty Ltd provided that a licence is obtained to import a satisfactory number of Stearman aircraft and that the Capital from the United States of America provided by Crop Care will be invested in Australia."*

However, after this positive start, the next Directors meeting a week later deferred discussion on the Crop Care project and it is never mentioned again in the company minutes. At the East West Airlines Directors meeting on 1 March 1958 it was agreed to bid for the Beechcraft agency for Australia (which was gained by de Havilland Aircraft Pty Ltd at Bankstown) after which the formation of the airline's Special Projects Division successfully pursued large-scale contracts such as extensive rain-making experiments.

Meanwhile back at Bankstown during October 1957 the second Crop Care NA-75 was being assembled, a two-seater trainer. These NA-75 trainers had the P&W R-985 radial and new-build metal wings with e-plates,

Crop Care Pty Ltd submitted an Australian Registration Application to DCA on 14 October in the name of Crop Care Pty Ltd, Sydney. The application form stated the aircraft's purpose was "pilot training and personnel transportation". The application requested a "personalised" marking to commence their own registration series and DCA obliged with VH-CCI, and approval to operate in the local Bankstown area during DCA flight performance trials to establish the loading conditions for Australian Type Certification.



*The only picture found of VH-CCI was this view of the pair in Aircraft magazine of December 1957*

Two more Crop Care NA-75s N52364 and N46568 were shown in FAA records as exported to Australia in 1957 but whether they actually arrived is not known. All contemporary reports refer to just two Stearmans at Bankstown.

### **Performance test flying at Bankstown**

During October 1957 Crop Care co-operated with Department of Civil Aviation to expedite the Australian Type Certification process, which was essential before a Certificate of Airworthiness could be issued to each NA-75 and commercial operations commence.

Earlier, DCA's Airworthiness Section had written to Crop Care Inc President Charles H. Brenstetter in Sacramento, setting out the requirements for Australian certification. The letter included the following candid advice:

*"Unfortunately, we do not have any Stearman aircraft on our Register and very little technical information on them. These facts make our requirements rather harder to meet than they would be otherwise, particularly for such a veteran aircraft type as the Stearman.*

*At this stage we do not know exactly what gross weight we would permit for agricultural operations. Before permitting any increase over the normal category weight, we would need to have a look at the design calculations and particularly to see the basic loads report of the manufacturers.*

*The attached list details the technical data which we would require before the aircraft are certificated. If, at this stage, any of this data is unprocurable, we should be informed at an early date as it would then be necessary to decide whether a concession might be granted"*

1. US Export Certificate of Airworthiness for each aircraft
  2. A list of all modifications incorporated in the aircraft
  3. Approved Flight Manual, flight limitations, operating procedures, loading restrictions
  4. Approved aircraft performance data
  5. Electrical wiring diagram and load analysis of the electric system
  6. Manufacturers manuals for flight operation, erection, maintenance and repair
  7. Aircraft parts catalogue
  8. Stress analysis showing, for all members of the primary structure, design loads, dimensions, materials, strengths and margins for safety
  9. Drawings of major assemblies, installations and major components including the modified wings, system diagrams, and a list of all assembly drawings
  10. Copies of all modifications and service bulletins for all type certificated components and propeller.
- Under existing arrangements with Pratt & Whitney, DCA receive full information on the R-985 engine."*

On 10 October 1957 Harry North must have returned to Bankstown with VH-FBA after the demonstration tour, because Crop Care principles in Sydney advised DCA they were ready to commence performance flight tests. A schedule was prepared, to begin at Bankstown within the next few days, supervised by DCA's Sydney based Regional Senior Airworthiness Engineer John Thorpe. A series of performance measuring flights were conducted, as well as other tests, such as on 14 October cockpit carbon monoxide contamination tests in VH-FBA's cockpit found minor levels at pilot head level during taxiing but none during takeoff, climb or approach. The full load air tests were conducted at a Maximum All Up Weight (MAUW) of 4612 pounds, which would allow a 1500 pounds agricultural load. It is reported that during the Bankstown flight tests at that weight, the aircraft was measured by DCA surveyors clearing a 50 feet obstacle from a 1300 feet take-off run and climbing at 625 feet per minute.

It was towards the end of these routine certification tests that the cordial relationship between Crop Care and DCA ran aground. Crop Care's pilot Harry North mentioned to DCA's John Thorpe that in the United States the NA-75 performance improvements allowed a payload up to a MAUW of 5,250 pounds and the company intended to market them in Australia at that weight. Any lesser payload made the operating costs of the big P7W radial uneconomical

### **Payload dispute**

This high operating weight came as a surprise to DCA Head Office Airworthiness Section in Melbourne. It hurriedly responded to Thorpe pointing out that a Civil Aeronautics Administration (forerunner to the FAA) specification for the standard Boeing Stearman quoted MAUW of only 3,632 pounds. John Thorpe, who became the man in the middle, replied as tactfully as he could to his Head Office masters that these were not basic Stearmans, but as had been explained throughout, were highly modified at considerable expense to enable a far better flying performance and payload. Head Office then advised him that they had located a copy of American advertising literature for the NA-75 conversion which quoted MAUW 4,612 pounds. A cable was sent to CAA in Washington DC, but the response was not particularly helpful, stating that the Stearman specification paperwork included no approval for MAUW above 3,632 pounds, however CAA field inspectors routinely granted field approvals for some Stearman aircraft with NA-75 wings for MAUW 4,612 pounds on a individual pilot basis.

DCA was in a quandary. Head Office Airworthiness Branch went back to first principles and applied a standard performance formula to come up with an Australian figure. On 17 October, John Thorpe personally phoned Crop Care's American President Charles Branstetter who was still in Sydney, to pass on Head Office's ruling that the MAUW the Department would allow for NA-75 agricultural operations had been determined as 4,240 pounds. One can imagine the disappointment at this figure, a thousand pounds lower than the payload they planned. It was a totally unexpected obstacle for Crop Care because it became clear that in the United States at that time there was little CAA close oversight of the aerial agriculture industry and certification load figures were rarely an issue – it was more just a philosophy of *"just load her up until she won't fly"*.

The company protested and asked DCA to review the maximum weight limit, supplying new supporting documents from National Aircraft Corp justifying a 4,600 pounds MAUW. Crop Care said it was prepared to accept that figure as a starting point to enable them to commence in Australia. John Thorpe amended the performance test schedule to include a series of 4,600 MAUW trials at Bankstown, during which VH-FBA needed only 1300 feet distance on take-off to clear the standard 50 feet obstacle, climbing at a rate measured by DCA as 625 ft./min. However, a more serious blow came during these additional performance trials.

On 24 October, Thorpe sent a teleprinter message to Head Office reporting that emergency dump air tests in VH-FBA at 4,612 pounds MAUW indicated a dump-time of dry fertiliser was 30 seconds. Dumping air tests with a load of 150 gallons of water representing liquid fertiliser took 25 seconds. The load-jettison industry standard was 5 seconds, to allow the pilot to dump his load in the event of engine failure or other emergency. This standard for the smaller hoppers fitted to the contemporary Tiger Moth and Avro Cadets was rarely enforced, but all agreed that 30 seconds was too slow. To add to the Department's concern, Crop Care freely admitted that when their large fertiliser spreader unit was attached to the hopper underneath the fuselage, the dump time took over 2 minutes.

John Thorpe worked closely with Crop Care over the next three weeks on various suggestions to improve the dump rate. All involved costly modifications to the hopper design and release mechanism, to which Charles Branstetter objected because each change reduced the aircraft's spreading efficiency. One problem was the design of the sloping walls of the hopper, which slowed the flow when the load was jettisoned. On 30 October John Neace wrote an emotive letter to DCA challenging the 5 second limit as unreasonable given the rapid improvements in wet and dry chemicals being applied and efficiency of spreading methods. He argued for a dispensation to allow the Stearmans to continue in Australia while the matter was reviewed:

*"All of the important developments within the aerial agricultural industry have been made by trial and error methods over a number of years. As an example, the spraying systems as we know them today, were first developed by pilot operators in an effort to increase the utility factor of their aircraft. Our spreading devices have been developed and built by these same people in the same manner. Soon the ones that worked well were copied by others.*

*If regulations such as these are to be adopted which will in effect "freeze" design, all individual development and experimentation vital for the progress of the industry will be denied."*

### **Crop Care Pulls Out**

Six weeks after their first two aircraft arrived in Sydney, Crop Care decided to abandon its Australian plans. After the relative freedom from regulation enjoyed by the extensive US aerial agricultural industry, they found the DCA standards to be unreasonable and inflexible. The company wrote that it did not reject the restrictions on weight and dump-load times, but it expected to commence operations in Australia as an on-going collaboration with DCA based on practical field experience.

They arranged to have the Stearmans at Bankstown re-packed into their wooden crates for shipping back to California. On 14 November John Neace wrote to the DCA requesting their aircraft be cancelled from the Australian Register, adding his personal appreciation for the help the company had received from the staff of the Bankstown office. VH-FBA had not yet been formally registered, and VH-CCI, added to the Civil Register 11 November was cancelled three days on the date of his letter.

As Crop Care shut down its Sydney office, John Neace was anxious for the return of the bulky certification documentation paperwork he handed over to DCA. After his requests received no response, he sent a telegram to the DCA Bankstown office bluntly demanding that it must be available for him to personally collect there by 2pm on 16 November 1957, probably indicating his departure for California that evening.

### **Keith Robey's Air Test Report**

Just prior to re-packing the two Stearmans, Crop Care invited experienced Bankstown pilot Keith Robey to fly both Stearmans for his regular *Air Test* series in *Aircraft* magazine. However DCA refused to allow him to fly the agricultural machine VH-FBA because it had not been formally issued with a Certificate of Registration.

Keith Robey's report described the single-seater VH-FBA in detail, based on a close inspection with Harry North. Keith was impressed by the construction methods of the new all-metal wings, designed to allow field repairs to damage to ribs and using screws in place of rivets. *"The cockpit is roomy and the pilot sits high in a position affording maximum visibility. With the instruments removed from the cockpit to the wing centre-section, the cockpit is bare. All but the most essential equipment has been discarded in order to reduce empty weight and simplify maintenance."*

They then took the two-seater VH-CCI for dual flying at Bankstown. *"Lightly loaded the Stearman becomes airborne in a surprisingly short distance and the initial climb at 65 Knots is very steep. Normal climb power is 30 inches at 2000 revs and, after reducing power to this setting, the rate of climb was still 1500 feet/min. I found the aircraft to be very stable and all three controls heavy, but effective.*

*Dropping down to a low level, Harry North demonstrated simulated dusting runs up and down the old abandoned airstrip at Hoxton Park. These runs are made at 80kt and American technique*

*appears to involve flying at a much lower altitude than is customary for dusting in Australia. Trying my hand at some low level runs, I found that the Stearman handled nicely..."*

After being re-packed, VH-FBA and VH-CCI were not immediately shipped back to USA but were left in storage at Bankstown. In September the following year, John Thorpe at the DCA Bankstown office received a visit from a well-known airport character James "Wac" Whiteman, then a crop-dusting pilot flying Edgar Percival EP-9s for Airspread Pty Ltd. Whiteman expressed a keen interest in purchasing the two Stearmans, but Thorpe explained their history and stressed that the NA-75s had not completed their type certification. On Thorpe's request, DCA head office sent a detailed letter to Whiteman dated 16 October 1958 advising him that the aircraft were eligible for Australian certification with an agricultural MAUW of 4240 pounds, however he would be responsible for the full type certification process before they could be operated.

Whiteman was a veteran pilot, flying in South America as early as 1930, later a mercenary during the Spanish civil war before enlisting in RAAF in 1938. He was well aware of Departmental requirements, having certified the first Australian civil Mustang VH-BVM *Rebel*, in which he broke the Australia-New Zealand record in 1953.

Whiteman decided to walk away from the Stearmans.

He was to fly Stearmans three years later when he joined Crop Culture (Overseas) Ltd in Ecuador and Jamaica, flying Stearmans and Snow aircraft, spraying banana and sugar crops. He was later based in Sudan spraying cotton before returning to Jamaica.

The two stored Stearmans at Bankstown had been shipped back to California by September 1959 when Crop Care Inc President Charles Banstetter replied from Sacramento to a DCA clerical form-letter enquiring if they intended to renew the registrations in the future. Showing admirable courtesy, he wrote simply that VH-CCI and VH-FBA had been returned to USA.

Stearmans were not to reappear in Australia until 1981 when the growing warbird movement saw the first of a large number imported from USA, where retired crop-dusters were popular private owner aircraft, restored back to two-seaters and usually painted in US wartime trainer paint schemes.

Final comment on the NA-75 story comes from Keith Robey's pilot report in *Aircraft* magazine:

*"There seems little doubt that the Stearman would have proved a very useful addition to the range of aircraft available to Australian agricultural operators and that a wealth of experience and American know-how was available to the Australian industry through the Crop Care organisation. That all this should be lost seems to leave the local industry all the poorer and reflects no credit on the authorities responsible."*

\* \* \* \* \*

**These are the four Stearman/NA-75 aircraft which Crop Care intended to send to Australia in 1957 to begin their Australian venture. Only the first two are confirmed to have actually arrived.**

Note: USCR = United States Civil Aircraft Register

**VH-FBA (VH-CCA) National NA-75 c/n 75-4319**

Built as a PT-17 Boeing Stearman for USAAC as 42-16156  
6.57 N63267 rebuilt at Van Nuys Airport, California as a National NA-75  
57 N63267 Crop Care inc, Sacramento California  
9.57 DCA allotted registration VH-FBA: Crop Care Pty Ltd, Sydney NSW  
2.10.57 Australian Registration Application: Crop Care Pty Ltd, Sydney  
3.10.57 Test-flown at Bankstown after assembly.  
10.57 Demonstration tour to Tamworth and northern NSW. Flying on current US CofA  
11.57 Dismantled and packed at Bankstown for shipping back to California.  
9.58 still stored dismantled at Bankstown  
59 N63496 Crop Care Inc, Sacramento  
64 USCR: Douglas P. Bailey, Live Oak CA  
66-72 USCRs: Sutter Butte Dusters Inc, Live Oak CA  
3.11.72 Cancelled from USCR

**VH-CCI National NA-75 c/n 75-206**

- Built as a PT-13B Boeing Stearman for USAAC as 40-1649
- 57 N63495 rebuilt at Van Nuys Airport with National NA-75 metal wings and P&W R-985, Completed as a pilot trainer with two open cockpits with dual controls.
  - 57 N63495 Crop Care Inc, Sacramento California
  - 11.11.57 Registered VH-CCI: Crop Care Pty Ltd, Sydney NSW.
  - 14.11.57 cancelled from Civil Register at owner's request
  - 11.57 dismantled at Bankstown for shipping back to California.
  - 59 N63495 Crop Care Inc, Sacramento
  - 64 USCR: Douglas P. Bailey, Live Oak CA
  - 66-70 USCR: Richard L. Cutsinger, Avondale AZ
  - 71 Cancelled from USCR
  - 31.3.98 Restored to USCR after rebuild: Fred J. Willert, San Diego California
- Current

**N46568 National NA-75 c/n 75-1844**

- Built as a PT-17 Boeing Stearman for USAAC as 41-8285
- N46568 rebuilt at Van Nuys Airport, California as National NA-75
  - 57 N46568 Crop Care Inc, Sacramento California
  - .57 Cancelled from US Civil Aircraft Register: Exported to Australia
  - .58 N5525A Crop Care Inc, Sacramento California
  - 3.60 Sold to Colombia as HK-564X, later HK-564E

**N52364 National NA-75 c/n 75-2064**

- Built as a PT-17 Boeing Stearman for USAAC as 41-8505
- N52364 rebuilt at Van Nuys Airport, California as National NA-75
  - 57 N52364 Crop Care Inc, Sacramento California
  - .57 Exported to Australia
  - .58 N5524A Crop Care Inc, Sacramento California
  - 4.60 Sold to Colombia as HK-565X, later HK-565E

Various agricultural modifications of the Boeing Stearman continued in USA well into the 1970s. One of these was American Airmotive, an established aircraft maintenance company at Miami, Florida. In 1962 they marketed a similar Stearman modification with new-build metal high-lift wings with end-plates, named *American Airmotive NA-75*. Their advertising claimed over 200 Stearmans had been fitted with their wings, and advertised that agricultural loads in excess of 2,000 pounds could be carried.





*Boeing Stearman N4742V is typical of the large numbers of military-surplus Stearmans used across USA for agricultural work. This aircraft appears to be a NA-75 conversion, but that is not confirmed. Photographed at Medford, Oregon in December 1963 by Brian R. Baker*

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