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FIRE RESEARCH - MANJIMUP SECTION

Aircraft Operations from Manjimup

Progress Report

Introduction:

Aircraft operations this season commenced on October 2nd, 1967 at Jandakot with the fitting of C.S.I.R.O. and Forests Department equipment to a Beechcraft B55 Baron aircraft on hire from Messers Civil Flying Services, and finished on January 17th, 1968.

The planning & results of the aerial controlled burning programme have been dealt with elsewhere. This report covers the activities of the aircraft and crew during this period. The performance of equipment used, and recommendations for possible future improvements together with an analysis of hours flown and their cost.

Equipment:

Aircraft:

The successful tenderer for this years contract was Messrs Civil Flying Services of Jandakot who supplied a Beechcraft B55 Baron. Briefly the B55 is a low winged conventional twin engined aircraft. Its engines are six cylinder continentals with fuel injection, and rated at 260 H.P. Its wing span is 37'10", length 27'3" and has a useful load of 2,075 pounds. Its all up weight amounts to 5,100 pounds, that is inclusive of crew, equipment, and 112 gallons of fuel, with the power settings necessary for this type of operation it has a time range of approximately five hours.

Incendiary Dropping Machine:

Was the same machine as used during last years programme. It is still owned by C.S.I.R.O. who have during 1967 made the following additions and modifications:

(a) An ejection counter which proved extremely useful when assessing the rate and percentage of "fire take" i.e. after the first four dropping runs have been given sufficient time for the spot fires to become apparent and there is evidence of 60 fires, if the counter shows an ejection of 200 capcules we know that this rate is in the vicinity of 30%. This information is then passed directly to the O.I.C. of ground operations. This addition to the machine was made following our recommendation at the conclusion of last years operations.

(b) Regardless of the machines ejection rate setting it now automatically speeds up to its maximum, immediately it is switched off at the end of a run, this is an excellent modification and helps to minimise the chances of putting the odd capsule over the edge.

(c) The emergency electric extinguisher system is now wired independently from the rest of the machine thus in the event of a power failure during the period after injection and before ejection it can be used if necessary. In addition a CO_2 soda sypton is now carried. During the whole of this years operation it was unnecessary to use either emergency system. It is now also possible to test the electric system in flight by operating a bypass valve which recirculated the water in the tank instead of flooding the machines turntable.

(d) On fitting the machine into the aircraft it was found that the curvature of the babin was such that it was impossible to operate the rheostat controls from the right hand side. After considerable thought it was decided to completely reverse this mechanism. It was found to work equally well from the left. Our actions and their necessity have since been explained to C.S.I.R.O. in detail.

Performance:

There was only one serious hold up to the controlled burning programme due to a failure of the machine.

It could not be rectified locally and was taken to Jandakot and thence to Como Radio Branch. Once in the hands of an expert the fault turned out to be trivial and was rectified in a matter of minutes. It was reinstalled, and operations continued the following day with no further failures. Altogether the machine ejected some 60,000 capsules without mishap. It has now been returned to C.S.I.R.O. in Melbourne.

Capsule Cabinet:

The cabinet was again positioned on the left hand side of the machine and presented no problems. An additional set of trays were made, which proved to be of great value, as they were re-charged each day by the Manjimup work force thus eliminating the delay often experienced when having to re-charge at the airstrip.

Radio Equipment:

Radio Branch supplied two specially modified V.H.F. units, one for installation in the aircraft and the other to be held at Manjimup in event of failure.

Inter-com System:

The noise level in the Baron is such that it is impossible to communicate from the front to the rear crew position, it was therefore necessary to install an efficient two way inter-com unit.

This was made up by A.W.A. at Jandakot and installed in the aircraft. It is now the property of the Forests Department and has been sent to Radio Branch for checking.

Performance:

Reception and transmission by the V.H.F. unit was faultless during the whole of the controlled burning programme. It was possible to raise all fixed and mobile units often when conditions were such that they were having difficulty in ground to ground communication. However the extremely hot conditions experienced after the conclusion of the controlled burning programme early in January proved too much for it, although every attempt was made to keep it cool. The aircraft was at this time being used to plot and patrol wild fires. The emergency set was installed and worked well initially but was beginning to crack up when fortunately the weather pattern changed radically.

Beacons:

Four H.F. 25 watt Teleradio's were modified and supplied as radio beacons for the controlled burning programme. They were tuned to transmit a signal on 1696 K.C. and were installed in Land Rovers.

Performance:

The performance of these sets can only be described as most dissappointing. It had been hoped that they would have had a range of at least ten miles however their effectiveness was found to be often as short as 1½ miles.

In an attempt to increase their range the aerial masts were modified by workshops branch at Manjimup, the result was encouraging as this did on occasions double their former strength.

It is understood that this matter is being taken up with O.I.C. Radio Branch in detail as the programme next season will involve much larger areas necessitating an effective signal with a range of at least 10 miles.

Ground Distance Measuring Equipment:

The marker Land Rovers were fitted with measuring equipment designed by the O.I.C. of Manjimup Workshops and constructed by his staff. Seven units were made and they have since been returned for checking and any necessary repairs.

Performance:

All units proved to be sound practical, and accurate and were of invaluable assistance to the marker crews in maintaining their flight line positions.

Activities:

The major function of the aircraft was the controlled burning programme, which as stated has been dealt with separately by O.I.C. Fire Research. However it was utilised in other fields namely Pre-inspections of C/B areas, Inspections after C/B, Leaf

miner survey and photography and wild life inspection. Inspection of Wild Fires together with plotting fresh outbreaks and general patrol. It was also utilised by working plans branch for aerial photography. An analysis of the utilisation of Flying Hours and these costs is given hereunder.

Analysis of Costs:

Total flying time for the whole programme was 225 hours and the acreage covered 432,000. The cost of Aircraft hire and availability being $15,983.00 thus giving a figure of 3.7 cents per acre. However as can be seen from the following break down of costs. The time actually spent by the aircraft on Control Burning operations represents only 58% of the total, which reduces the acreage cost to 2.2 cents per acre. However it is realised that an operation of this magnitude requires Aerial inspection both before and after the actual burn and perhaps a more realistic figure should include these activities. The combined total time spent on Pre-inspection, Actual Controlled Burning and Inspections afterwards represents 75% of the total cost or 2.7 cents per acre.

Pre-inspection C/B	7	hours	40	mins.	4%
Actual C/B	131	"	45	"	58.5%
Inspection after C/B	28	"	55	"	13%
Inspection and plotting Wild Fires	24	"	50	"	11%
Preparation and testing Equipment	9	"	10	"	4%
Leaf Miner inspection photography	2	"	40	"	1%
Photography F.D.	9	"	50	"	4%
Wild life inspection	0	"	50	"	0.5%
Ferry Mjp/Mkt/Mjp.	8	"	55	"	4%
Total	224	"	35	"	100%

Period	Aircraft Insp Prep C/B	Actual C/B	Insp.& After C/B	Insp & Patrol Wild Fires	Prep: Test Equipment, Beacons etc	Leaf Miner Insp. & Photo.	Photo F.D.	Wild Life Insp.	Ferry Jkt/Mjp/Jkt	Total
29/9/67- 14/10/67	5-50	0-40			5-30	0-50		0-50	4-00	17-40
17/10/67- 11/11/67		56-25		2-00	2-00	1-50			1-55	64-10
2/11/67- 25/11/67		21-45	8-55						2-00	32-40
26/11/67- 20/12/67	1-50	46-55		5-55	1-40				1-00	57-20
1/12/67- 17/1/68		6-00	20-00	16-55			9-50			52-45
Totals	7-50	131-45	28-55	24-50	9-10	2-40	9-50	0-50	8-55	224-35
	4%	58.5%	13%	11%	4%	1%	4%	0.5%	4%	100%

Hours flown by Individual Officers:

Forests Department:

Bradshaw	7
Broadbent	2
Campbell H.	2
Donnelly	1
Edwards	4
Evans M.	6
Grace	2
Gobby	9
Hunter	6
Keene	21
Kelers	3
Kokir	8
Mather	4
McCormick	10
Peet	66
Pegrum	6
Pears	1
Percival E.	1
Percival N.	3
Phillips-Jones	5
Pridham	1
Quain	2
Richmond	8
Robson	2
Rowell	178
Skeet	3
Smart	3
VanDidden	149
White	3
Williamson	4
Winfield H.	1

Agricultural Department:

Currie	4

Dept. of Wild Life:

Mott	2

Bush Fire Brigades:

Foreman	2
Beebe	2

Aerial Controlled Burning 'Daily Operations'

Airstrip:

The newly constructed airstrip at Manjimup was used as a base for all C/B operations this season. The convenience of being within 20 minutes driving time from D.H.Q. was a great improvement, the Shannon strip still proved useful on a number of occasions but with the power and speed of a modern aircraft such as the Baron, distance from the C/B areas was no object.

The Nannup and Busselton jobs were reached within 20 minutes and Shannon, Harvey and Collie within 30 minutes. However the Manjimup base could well do with another strip running east-west. On many occasions serious cross-wind difficulties were experienced and the trough effect of having the strip carved from timbered country often produces a rolling effect on the cross wind making both take off and landing hazardous.

Fuel and Supplies:

Were taken out each day by the crew, fuel was supplied in drums by B.P. and picked up from their Manjimup depot. This company also supplied an engine driven pumping unit for fueling the aircraft. No real difficulties were experienced.

A ground level lock up store where up to a dozen drums could be stored would be an advantage. As would in time a simple hanger for the aircraft to afford some protection to equipment and incendiary materials during delayed standby periods.

Ground Communication with C/B Area:

It is not possible to use the Aircraft V.H.F. set for ground to ground communication, a vehicle equipped with V.H.F. is therefore essential. Apart from the aircraft failures early in the programme there was only one occasion when an electrical fault prevented it from proceeding to the area when called by ground control. Generally there was a waiting period of from ½ to ¾ hour. It is realised that it is useless for the aircraft to wait over the area until all ground personnel are in position, and that it is difficult for ground control to give an estimate of when they will be in position. But it is felt that this delay was often too long and possibly resulted in spot fires at the end of some operations being lit too late in the day.

Dropping procedure:

There was no radical change in this procedure from previous years operations, the job was carried through according to the pre-arranged flight plan for each particular area. Marker crews on the whole responded well to instructions and overcame their odd difficulties with minimum delay. As pointed out in previous reports the advantage of having regular full time marker crews cannot be overstressed. With everybody knowing exactly what is going on, and fully attuned to the possibility of what can go wrong, the job runs

smoothly keeping delays and hold ups to a bare minimum.

The selection and shape of areas to be dealt with is of the utmost importance, the rounded or angled edge is still the greatest difficulty that the aircrew has to overcome, again it is realised that on many occasions it is impossible to avoid them, but from the point of view of both economy and safety the large squared area lends itself well to this type of operation.

Crew:

Consisted of a commercial pilot of many years standing and experience, employed by the company supplying the aircraft, together with a navigator and incendiary machine operator from the Manjimup fire research section relieved when possible by the Dwellingup section. It is absolutely essential that the crew operate as a closely knit team, each aware of the others responsibilities and difficulties. A high level of firm but flexible discipline must be and was maintained at all times during the programme. The importance of avoiding the use of personnel who are subject to sickness, excitement or nervousness cannot be over stressed. It is certainly no disgrace to be air-sick but it is a hopeless proposition to expect any productive effort in the air from any one who is.

The operation of the incendiary machine in the air is essentially a job for a completely experienced, air minded specialist unworried by what the aircraft and the rest of the crew are doing, but alert to any alternative instruction that may come his way, for the main part of the programme this task was ably carried out by T/A VanDidden.

Apart from isolated instances it was found either difficult or impossible to assist Divisional personnel to recognise their area's from the air although every effort was made to achieve this.

Choice of Aircraft:

Whilst the power and general efficiency of the B55 Baron is not debated, there can be little or no doubt that a low winged aircraft is not as suitable for this type of operation as is a high winged aircraft. During the actual dropping run the actual field of vision is extremely limited.

The argument that the view from a high winged plane is restricted during a steep turn just does not hold water. During the turn the navigator is generally busy with other activities and it is during the run that he must compile his information for transmission to ground control. The ideal aircraft would be high winged with the engines conventionally placed on the wing.

M.N. Powell.

TECHNICAL ASSISTANT

MNR:LH
MANJIMUP
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