

# C.E. LANE POOLE MEMORIAL TRUST

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LANE POOLE AWARD  
STUDY TOUR NOVEMBER 1985



*A REPORT TO THE TRUSTEES*

By

*G. N. HUTCHINSON*

## C.E. Lane Poole Memorial Trust

*The Lane Poole Memorial Trust was established to commemorate the work of Charles Edward Lane Poole and in particular, the connection between the former Conservator of Forests and the late Thomas Cullity.*

*Lane Poole was appointed Inspector-General of the Woods and Forests Department in Western Australia in 1916, and was responsible for establishing the legal framework on which the State's forestry operations have since been carried out.*

*That legal framework was the 1918 Forests Act. Before the Act was introduced there was no legislation to control the amount of timber cut, the place and manner of cutting, or to regenerate the forest after cutting,*

*When Thomas Cullity graduated from the University of Western Australia in 1918, Lane Poole offered him the newly created position of Utilisation Officer in the Forests Department, which he held for one year before leaving to start up Millars' new commercial kilns at Yarloop.*

*Thomas Cullity maintained an interest in forestry and timber for the rest of his life and founded Cullity Timbers in 1928 and Westralian Plywoods in 1943. From these companies WESFI was formed.*

*The Trust was initiated by WESFI Chairman, Denis Cullity and the then Conservator of Forests Bruce Beggs in 1983, and developed by a Board of Trustees representing the former Forests Department and WESFI.*

*The current Chairman of the Board is the Executive Director of the Department of Conservation and Land Management, Dr. Syd Shea.*

*The WESFI connection resulted from a belief held by Lane Poole that forestry needed to be inter-disciplinary to cater for the needs of society.*

# Contents

Objective of Travel Award.....	4
Tasmania.....	5
Victoria.....	8
Australian Capital Territory.....	12
New South Wales.....	14
System Comparisons.....	18
Future Developments for the Department of Conservation and Land Management.....	20
Summary and Recommendations.....	21
Appendix I - Tasmania Radio Communication Plan.....	22
Appendix II - Itinerary and Contacts.....	23

## Objective

The purpose of the trip was to investigate the communication system and facilities being utilized by other Forests and Fire Services in Tasmania, Victoria and New South Wales.

The visit also enabled the inspection of radio equipment manufacturing companies Philips, A.W.A. and Codan to look at their manufacturing techniques, new or proposed products and generally seek new ideas which would benefit the communication systems of the Department of Conservation and Land Management (CALM).

## Tasmania

In Hobart contact was made with communication officers from the Tasmania Fire Service (T.F.S.), Forestry Commission, National Parks and Wildlife and Police Communications. I also received information on the radio systems operated by the S.E.S. Ambulance Service, Councils, timber companies and the Hydro Commission.

The radio communication systems operated by these organisations are technically the same. This has been brought about by the development of the Tasmania Radio Communications Plan.

### **2.1 The Tasmania Radio Communications Plan**

This plan, unique in Australia, was developed to improve liaison between emergency services following the severe bushfires in 1967.

The organisations concerned operated radio communications equipment on diverse channels in the high and very high frequency (V.H.F.) bands thus making intercommunications impractical because of equipment incompatibility.

A plan was devised to reorganise the radio facilities of those organisations with a role in civil emergency activity, which would enable them to intercommunicate in any part of the State and also allow the same base and mobile equipment to be used for day to day domestic radio traffic.

A major obstacle in the development of the plan was the presence of private radio users allocated in the proposed frequency band. Close liaison followed with the then State Premier, who wrote to those users, requesting their cooperation in relinquishing their allocated frequencies in favour of the plan and offering State funds to cover all costs associated with the frequency change. Cooperation was received by all concerned.

The frequency chosen for the Tasmania Radio Communications Plan was in the V.H.F. low band 75 to 80 MHz (see Diagram Appendix I).

The allocation of frequencies within the plan was in the past limited by the available mobile technology. To fully utilise the allocated plan channels, the mobile must be capable of frequency switching from the lowest to the highest frequency channels without performance degradation. The application of frequency synthesis technology radio has enabled 5 MHz frequency range with the ability to select any of up to 100 channels.

All State Government services, Councils, public instrumentalities, private companies and pastoralists participate in the plan.

An important feature of the plan is its ability to employ domestic channels for routine domestic traffic and matters of mutual concern to municipalities with common boundaries whilst the liaison channel (76.79 MHz) is kept exclusively for high priority emergency traffic.

A copy of the plan is available at CALM Communications Branch.

## **2.2 The Tasmania Fire Service**

The Tasmania Fire Service (T.F.S.) operates a single frequency simplex radio system with links to control the remote V.H.F. base stations.

Some 17 remote V.H.F. base stations are linked into the three regional Headquarters at Launceston, Burnie and Hobart.

The T.F.S. operates the largest single radio network in Tasmania with some 1 300 pieces of radio equipment, with 10 V.H.F. channels which cover most of the State.

### **2.3 General Comments**

The Police, Ambulance, Forestry Commission, National Parks and Wildlife etc. all operate remote bases with link or landline control similar to the T.F.S.

The timber companies are the exception in Tasmania, they have Department of Communications (D.O.C.) approval to operate T.T.R.'s (Talk Through Repeaters) and use the receiver channel as a simplex channel as we do.

Because of the size of Tasmania, High Frequency (H.F.) radio is not widely used. The State Emergency Service (S.E.S.) has a small base to base station operation.

### **2.4 Key Points from Tasmania**

- The Tasmania Radio Communications Plan.
- Use of helicopter for servicing of Communications Sites.
- Pagers are operated over their V.H.F. radio system.
- T.F.S. have computerised their radio and records.
- Currently testing Auto-com telephone connected to radio system.
- Extensive use of receiver only radios. (Cost only \$120)
- Poor or no facilities or technical staff (except Police and Hydro Commission with large workshops).

## Victoria

In Victoria contact was made with the Department of Conservation, Forests and Lands (D.C.F.L.). The Country Fire Authority (C.F.A.) along with a visit to the Philips factory at Clayton.

### **3.1 Department of Conservation, Forests and Lands**

The D.C.F.L. radio system consists of a single frequency simplex V.H.F. base station system with U.H.F. or landline links to headquarters. Only 6 V.H.F. channels are currently in operation with some 1 800 radios.

A small H.F. system is operated in the north-western section of Victoria (Mildura).

Their radio workshop H.Q. is at Surrey Hills with technical support staff situated throughout the State. Recently Victoria was divided into 18 regions and they plan to have a technician plus an apprentice responsible to each region. Currently they have one engineer, a senior technical officer, 12 technicians and 10 apprentices (24 Total).

Funding the Communications Section of D.C.F.L. is a real problem, similar to ours. They also have recently evaluated communications cost and have come up with similar figures and a plan as we did after our radio review in 1983, that is "make the user pay". Reports are available at Communications Branch.



### 3.2 The Country Fire Authority

The Country Fire Authority of Victoria operates a very large radio network utilising more than 8 000 radio transceivers.

Radios operate in the V.H.F. high band (163 MHz) single frequency simplex mode and have 11 channels of which at least 6 common channels are fitted to every radio.

The reason they chose single frequency simplex operation without a repeater or talk through is, they claim, the increase in reliability. (If the repeater fails, the whole system fails and mobile to mobile communication is not possible). They also claim it is more flexible and economic because two channels are provided where as a repeater has only one channel. (Two frequencies required). I will discuss these points later under (3) comparisons.

Liaison with other authorities is provided by either the exchange of hand held radios or in the case of D.C.F.L. a radio has been fitted in each district office.

A State-wide H.F. - S.S.B. network is in place using two frequencies (2 488 and 4 525 KHz) which proved invaluable during their recent fires when Telecom telephone services locked up and were unusable for hours. All regions and zone headquarters, one transport vehicle in each area are able to use this network together with communications vans, senior officers, and district mechanical officer vehicles.

A radio pager system is overlaid on their simplex high band V.H.F. radio service.

A very large number of listening only sets (receive only) are used by C.F.A. personnel thus allowing them to monitor local V.H.F. radio traffic (cost per radio \$100).

The Communication staff totals 25 and consists of two senior staff, 20 technicians, 2 assistants and 1 full time storeman. Note: no apprentices.

All service is carried out from the well equipped workshop at the C.F.A. headquarters at Malvern.

Funds raised from levy totalled a massive \$890,000 for the 1985/86 financial year.

In the last 6 months they have purchased three micro processors at a cost of \$15,000 and have recorded such things as:

- All radio records
- Site and radio maintenance
- Funds and store ordering
- Radio licence information.

The computers purchased were the Apple MacIntosh which has word processing, graphics for circuits and can be operated from a versatile mouse unit.

Recently they have introduced a policy that all vehicles fitted with radio will have two batteries and separate electrical systems fitted.

### 3.3 Philips

The Government Area Manager, Mr Theo Papacharalambous showed me over their factory located at Clayton.

The factory is not advanced in automation and I was very surprised to find the circuit boards being component loaded by hand. The boards are then put through a solder bath, pins cut off, then cleaned. The boards are then tested by the aid of a computer.

I watched this process for about 10 minutes and all the boards tested were found to be faulty.

The factory is currently producing -

400 - 900 series radio per week

40 - 828 series radio per week

100 - 300 series C.B. radios per week.

Philips have now released a field programmer for their 900 series mobile, the Epson HX20 at a cost of \$4,500. They will also be releasing shortly a 99 channel programmable portable at an approximate cost of \$1,500.

#### **3.4 Key Points from Victoria**

- D.C.F.L. decentralised workshop compared to C.F.A. centralised system.
- D.C.F.L. funding problems compared to the C.F.A.'s \$890,000.
- The use of H.F. to back up the telephone system when lock-up occurs.
- Computer record system C.F.A.
- Large staff and facilities for communication.
- Radio pager systems and receiver only radio use.
- Separate electricity system of radios in C.F.A. vehicles.
- Philips equipment - Programmer
- 99 Channel portable.

## Australian Capital Territory

In Canberra contact was made with A.C.T. Forests, The Energy Commission and Telecom.

### 4.1 A.C.T. Forests

The A.C.T. Forests system operates on Midband V.H.F. and one channel covers all the A.C.T. The site (Mt. Tennent 1,383 m high) is then linked back to Canberra. Some 150 mobile and 20 hand helds complete their radio system.

Liaison is established with the Bush Fire Council and State Emergency Service on separate radios.

The A.C.T. Forests have no technical staff, Roger Fenwick, the Senior Fire Officer liaises with the A.C.T. Energy Commission who provide all their radio service at a cost of \$12,000 per year.

Three main towers are used for fire detection with a backup of 2 smaller towers.

All radio traffic is recorded for future reference by a lanier recorder which also logs the time of message.

#### **4.2 A.C.T. Energy Commission**

The Energy Commission also provides maintenance to other Government services in the Territory such as the P.W.D., Ambulance service etc. I visited their service facility at Canberra which has a staff of seven looking after some 1,400 pieces of radio equipment in mobile and base station operations.

#### **4.3 Telecom Tower - Black Mountain**

While in Canberra I was fortunate to arrange a tour of the Telecom Communications Tower on Black Mountain.

The tower is 195 metres high and contains three T.V. transmitters, microwave telephone equipment, connecting Melbourne to Sydney and Canberra telephone system to the Australian network. F.M. Transmitters along with Telecom pager and other Government radio systems are also housed in the tower.

#### **4.4 Key Points from the A.C.T.**

- Centralised Government service organisation.
- All radio traffic recorded for future reference.

## New South Wales

In N.S.W. contact was made with the Forestry Commission, Bush Fire Council of N.S.W. along with a visit to A.W.A. and Codan Communication Company.

### 5.1 Forestry Commission

The main workshop is located at West Pennant Hills with outposts at Tumut, Batemans Bay, Bathurst and Coffs Harbour.

Their radio system is again simplex with 5 channels, some of which are shared with councils and other Government agencies. They have requested D.O.C. to provide additional private channels.

In the Eastern District H.F. systems provide communications on three frequencies (3,196, 4,450 and 6,950 MHz) approximately 20 mobiles are operated on these frequencies.

The Forestry Commission owns 4 Cessna fixed wing aircraft and a helicopter, which are used for detection and other purposes. The radios are fitted by contractors.

The Communications staff consists of O.I.C., 8 technicians, 4 apprentices, a typist and a full time storeman (15 total). They have a similar radio fleet as CALM but they receive 30% more funds to run their operation.

1985/86 \$300,000 compared to \$207,000 CALM

They have also purchased an I.B.M. personal computer for their records and plan to use the computer for automatic testing of radio equipment.

On the way to Canberra I visited the fire control room and radio workshop at Tumut.

Their radio system also consists of a low band V.H.F. simplex mobile to mobile communication with 400 MHz links. Two low band channels cover their district and are located at Tumorrroma (1,220 m high) and Burngoogee, (fire tower at both locations).

There are three offices and 50 mobiles in the Tumut region and the maintenance is carried out by two technicians and 2 apprentices.

Liaison is achieved by separate radio in the offices where all radio messages are recorded.

Access to the radio network, for after hours operations is provided for with an interface unit placed between the telecom handset and the radio transceiver.

Lightning was the main cause of fire in the 1984/85 season with 185 recorded fires.

## **5.2 Bush Fire Council of N.S.W.**

The Bush Fire Council's communications officer showed me over one of the more progressive bush fire stations at Warringah located some 40 km north of Sydney at Terry Hills.

Warringah has over 600 volunteers in various brigades and have a large area of private and national park land to protect.

The Warringah Bush Fire Services have a high band V.H.F. system with links to tower and stations. Unfortunately the system is not uniform throughout the State. Other Councils such as Hornsby, their neighbouring council operate a low band system. Plans have been put forward to D.O.C. for allocation so they can make the system uniform.

The Warringah fire control centre was the best equipped communications centre seen during the trip.

The operations room had facilities for other councils, police, ambulance officers to bring radio equipment into the centre and operate alongside each other. Each operator has a glass cubical provided to operate from but can see and contact other sections involved.

A large disposition board indicated call signs of vehicles, type of vehicle etc.

All radio messages are recorded for fire or general day to day operations.

The Bush Fire Council of N.S.W. and Brigades have a large number of Midland programmable radios and are very happy with their reliability and performance.

### **5.3 Sydney Manufacturer Visit**

While in Sydney I visited the A.W.A. factory in Ashfield. I was impressed by the automation they use in manufacturing electronic boards used by Telecom for the phone systems.

All radio equipment supplied by A.W.A. is now being manufactured overseas.

A number of new products could be useful in the development of CALM's communication system.

I also visited Codan Communications in Chatswood where there were a number of new products on display.

Codan have just released a frequency synthesizer 99 channel H.F. Transceiver along with some data transmission equipment and a small hand held portable H.F. I will arrange demonstration of this equipment when available.



#### 5.4 Key Points from N.S.W.

- Forestry Commission funding compared to CALM (\$300,000 F.C. to \$200,000 CALM).
- Large staff and facilities.
- Computer record system.
- Warringah fire control centre.
- A.W.A. equipment - Manpack Transceiver M-200
  - Remote Control Console RC-6A
  - Base Station BS-83A
  - Mobile printer transcrip 85
- Codan equipment - Synthesised H.F. transceiver
  - Data transmission equipment
  - H.F. frequency agile antenna system
  - H.F. hand held portable.

# 6

## System Comparisons

The V.H.F. system operated on the east coast is basically single frequency simplex compared to our dual frequency repeater or talk through.

### 6.1 Advantages

#### Single Frequency Simplex

- Only one frequency required
- If the base fails, mobile to mobile can communicate but only over a short range (5 to 7km).

#### Repeater

- Mobile to mobile communications over a great distance (up to 100 km)
- All mobile hear conversation
- One receiver and transmitter required at the Repeater or base.

## 6.2 Disadvantages

- Requires two receivers and two transmitters at the base (more to go faulty).
- Mobile to mobile communications short range.
- Other mobile may not hear other mobiles.
- Require two frequencies
- Repeater fails mobile to mobile communications cease.

Note: radios currently being purchased have the facility to switch to simplex (50% of fleet).

## 6.3 Summary

Our repeater system in my opinion is more effective because of its mobile to mobile range. It is therefore used as an administrative tool as well as in fire control.

I consider single frequency simplex is utilised on the east coast because of the channel congestion not because of its advantages.

# 7

## Future Developments For CALM

- 7.1 One of the most inhibiting factors facing Communication Branch at the moment is its funding. I believe we must develop a system of payment similar to the "Plant Hire". This system makes the user pay for service and equipment and not rely on a hand out.
- 7.2 The basic radio communication systems are sound but can be refined and expanded if funds are available to continually update.
- 7.3 The recent proposal for increase in staffing Communications Branch should see the branch able to cope with near future development and maintenance.

# 8

## Summary And Recommendations

- 8.1 Organise a suitable funding system for radio communications - preferably the user pays system.
- 8.2 Computerise radio communication information and records either by purchasing our own system or by using the CALM main frame.
- 8.3 Evaluate systems attachments such as radio pagers, telephone interconnect (for V.H.F. and H.F.) and radio recording equipment.
- 8.4 Provide S.O.H.Q. with a properly manned radio communications operational centre.
- 8.5 Test the suitability of radio equipment seen at Philips, A.W.A. and Codan.
- 8.6 All officers in the eastern states expressed their interest in inspecting our radio system. It is suggested this could be arranged on a seminar inspection basis in each state every two years.

# Appendix I

Tasmania Radio Communication Plan available from  
CALM Communications Branch -  
50 Hayman Road Como.

## Appendix II

TRAVEL AWARD - G.N. HUTCHINSON  
NOVEMBER 1985

### ITINERARY AND CONTACTS

03/11/85	Left Perth	-	Arrived Hobart (11.00 a.m.)
04/11/85	Tasmania	-	Tasmania Fire Service
		-	Mark Whitney and Jim Hickman
05/11/85	Tasmania	-	Tasmania Fire Service
		-	Mark Whitney and Jim Hickman
06/11/85	Tasmania	-	National Parks & Wildlife
		-	Sam Rondo
07/11/85	Tasmania	-	Forestry Commission (Communications School) - Paul Leach
08/11/85	Tasmania	-	Forestry Commission (Police Academy) - Paul Leach
09/11/85	Travelled to Melbourne		
10/11/85	Victoria		
11/11/85	Victoria	-	Dept. of Conservation Forests & Lands - David Turner
12/11/85	Victoria	-	Dept. of Conservation Forests & Lands Radio Workshop - Bruce Bernett
13/11/85	Victoria	-	Philips Factory - Theo Papacharalambous and Geoff Simpson
14/11/85	Victoria	-	Country Fire Authority - Mike Clark and Peter Welham
15/11/85	Victoria	-	Country Fire Authority
16/11/85	Victoria		
17/11/85	Travelled Melbourne to Tumut		
18/11/85	Tumut	-	Forestry Commission - Keith Dodd
19/11/85	A.C.T.	-	A.C.T. Forests, Energy Commission - Roger Fenwick and Gordon Smith

20/11/85	A.C.T.	-	Telecom Tower - Black Mountain - Malcom Binkley
21/11/85	Travelled A.C.T. to Sydney		
22/11/85	N.S.W.		
23/11/85	N.S.W.	(Saturday)	
24/11/85	N.S.W.	(Sunday)	
25/11/85	N.S.W.	-	Forestry Commission - Mark Shenstone
26/11/85	N.S.W.	-	A.W.A. Land Mobile Communications - Ross Boyd
27/11/85	N.S.W.	-	Codan Pty Ltd - Gordon Ware and Phil Caper
28/11/85	N.S.W.	-	Bush Fire Council N.S.W. - John Marett and Keith Simpson
29/11/85	N.S.W.	-	N.L.D. Communications - Norm Beach

Returned Perth (10.00 p.m.)