

The Institution of Engineers, Australia; Sydney Division  
**Engineering Heritage Committee**

### **ORAL HISTORY PROGRAM**

**INTERVIEWEE :** Ernest Martin Bullock

**TAPE NUMBERS :**

IEA SYD JR 1

**INTERVIEWER :** Jack Rose

IEA SYD JR 2

**INTERVIEW DATE :** 12<sup>th</sup> & 15<sup>th</sup> November 1999

**NUMBER OF TAPES :** 2

**RESTRICTION ON USE :** None

### **INTERVIEW TAPE LOG**

This interview took place at Aminya Retirement Village, Baulkham Hills, NSW  
on 12<sup>th</sup> and 15<sup>th</sup> November, 1999.

This interview is part of the Oral History Project of the Engineering Heritage Committee  
of the Sydney Division the Institution of Engineers, Australia.

## Tape Log

Tape : IEA SYD JAR 1 , Side A		
COUNT	SUBJECT	NAMES & KEYWORDS
0	Ernest Martin Bullock, born 1921, Wellington, New South Wales. Father mixed farmer, mother schoolteacher. Education at Wellington Primary School, and Intermediate High School. 2 years at Dubbo High School to first matriculation	Ernest Martin Bullock Wellington Primary School Wellington Intermediate High School Dubbo High School
23	Travelled by train Wellington – Dubbo. Two older brothers (non-matriculants), younger brother to Wollaroi College, Orange. Ernie matriculated 1936, Too young for University - repeated 5 <sup>th</sup> year at Wollaroi College, matriculated 1937.	Wollaroi College, Orange
50	Entered Faculty of Engineering, Sydney University. Interest in engineering developed from working with farm machinery, and advice from uncle to concentrate on relevant subjects – to excel in mathematics. Uncle a design engineer with Railways Department.	Sydney University Railways Department
86	Graduates in 1941 as Electrical / Mechanical engineer after 4 years study. No separate Electrical Engineering degree at that time.	
98	Applied for job advertised with NSWGR - appointed to Electrical Branch as engineer, December 1941	New South Wales Government Railways NSWGR Electrical Branch
122	First assignment was a fuelling system at Ultimo Power Station. Then, design of 2 Radar Towers. After, RAAF wanted lightweight air-warning radar station (LWAW) – he designed structural & mechanical aspects. 30 day deadline to design and produce prototype (met). Very effective design. Others had designed, waveguides, electronic components etc. Principle of LWAW system - less than 1 ton total weight, in lightweight modules for ease of handling, transportation and installation.	Ultimo Power Station RAAF Radar towers Mr Woolidge LWAW Radar Station
207	LWAW at National War Memorial Museum. Supplied 15 to British in Burma and US Forces in South Pacific. Surprised at number and distribution. 50 <sup>th</sup> anniversary celebrated in 1992 – postage stamp issued. Instruction manual written, and early problems overcome. Problems with mildew and humidity. Design of further radar structures and antennas – not as succesful..	National War Memorial Museum, Canberra Burma, South Pacific
273	Radar system electronics by Gramophone Company ( <i>later to become EMI</i> ) and Amalgamated Wireless Australia (AWA). Mechanical equipment design carried out within NSWGR. Units manufactures by private companies, assembled at NSWGR Wilson St workshops annexe. Systems mainly transported by air.	Gramophone Company Amalgamated Wireless Australia Wilson St Workshops Dr David Myers "103", "104" Converters

	Dipole dimensions not as originally intended, but design proved more effective. Mechanical design for "103", "104" converters to plan by Dr David Myers - a device for aiming guns using radar information.	
357	Sought promotion to Field Engineer at Mains Depot, Leichardt. Maintained 320 miles of overhead wires (1500 volts) and 400 miles of high voltage of transmission lines (11 kV to 66kV). Ultimately in charge of the 300 staff. In 1955 – 1957, extended electrification to Lithgow (work designed and installed done by BICC under contract) - built to different standards. High voltage supplies designed by Railways	Mains Depot, Leichardt 1500 Volt traction electrification Parramatta Lithgow BICC
430	Family. Married in 1943, 3 children. Has 8 grandchildren	
443	End of Side A	



Tape : IEA SYD : JAR 1, Side B		
COUNT	SUBJECT	NAMES & KEYWORDS
0	Start of Side B	
	Academic success of family.(medicine, economics and computers). 3 engineers, solicitor among grandchildren. Stable family life, moral & spiritual values.	
55	Benefits of electrification over diesel and steam traction - limited axle loads. Use of regenerative braking on electric trains - some deficiencies.	Blue Mountains
93	Extension of electrification Hornsby to Gosford. In-house design and construction. Trained own staff to perform work. Unique design of overhead wire and catenary, due to gradients, Rate of construction significant – sought approval for extension to Newcastle – not approved until 1980 by which time the economic benefits were lost..	Hornsby – Gosford electrification Hawkesbury River to Berowra
160	Recommended further electrification in 1980 - Albury to Brisbane, and west to Orange and Gunnedah - using 25 kV AC supply Advice not accepted.	Albury Brisbane Orange Gunnedah 25kV traction
195	1974 – became Supervising Engineer, Country Electrical Services Moved to Chief Engineer, Electrical Branch, with overall responsibility. Re-visited HV traction for various benefits, using French system of electrification. Benefits of HV AC traction over 1500 volt DC traction. Effects on signalling system. Under Public Transport Commission, position renamed General Manager. 1300 km of electrified track, with 36 traction substations, and 750 km of high voltage transmission lines.. Problems of performing with shrinking budgets.	
355	Staff review of engineering positions – carried out by clerical staff – results unsatisfactory. Appeal to Commission accepted. Carried out comparison with Local Government electricity supply authority salary rates – engineers were re-graded up one grade.	
438	End of Side B	

Tape : IEA SYD : JAR 2, Side A		
COUNT	SUBJECT	NAMES & KEYWORDS
0	Start of Side A	
	Shortage of engineering staff due to lack of replacement by predecessor (problem overcome). Appointed to Chief Operations Manager in 1980, when State Rail Authority established. Unusual for engineer, but resulted from earlier operations research work on parcels handling and freight operations at Darling Harbour Goods Yard. Introduced computerised seat bookings to improve 'no-show' situation – done 'on the cheap' – applying some of his earlier engineering experience.	Chief Operations Manager State Rail Authority Darling Harbour Goods Yard
123	Chairman of Steering Committee for introducing XPT. Daily peak hour reliability review (all aspects) – allocation of responsibility for delays. Double-decker and 'red rattler' trains Engineering background an advantage	XPT train Countrylink 'red rattler'
210	Experience of high-speed travel – Europe, Japan, Germany. believes high speed not suitable for Sydney – Canberra (costs of high speed operation and maintenance) Sydney – Melbourne would be preferable, due to larger populations. High speed rail questions arose only since his retirement. Introduced computerised wagon control system. Problems of introducing change – change as threat to existing practices and staff.	High speed rail Sydney – Canberra Sydney Melbourne
305	Major contribution to NSWGR – 'to do a good job' - the pursuit of innovation and excellence. - New methods for overhead transmission line installation, for improved productivity. Before you change something, know why it was as it was, and be certain that the new method is better.	
380	Retirement after 40 years service - determined by variety of circumstances -economic benefits, and problems with political interference.	
433	End of Side A	



Tape : IEA SYD JAR 2, Side B		
COUNT	SUBJECT	NAMES & KEYWORDS
0	Start of Side B	
	Liaison with other authorities - Sydney Electrolysis Committee, Electricity Supply Association of Australia (ESAA), Standards Association Electrical Engineering Board - various standardisation activities a continuing involvement as part of his position. Urban Transit Authority liaison – installation of video passenger information systems at Central Station	Sydney Electrolysis Committee Electricity Supply Association of Australia (ESAA) Standards Association Electrical Engineering Board
72	Activities since retirement - Consultant to chair Railways of Australia committee setting standardised electrical traction voltages between states. New electrification in other states has been at 25kV. Would like to see NSW adopt 25kV traction system, due to superior economics – higher power, longer life. Retained by private consulting firm (Hyland, Joy and Wardrop) for various projects – feasibility study for light rail system in Malaysia, and study of Melbourne overhead traction supply system. No longer willing to accept the time pressures involved in consulting work.	Railways of Australia (RoA)  Hyland, Joy and Wardrop
165	Return to University for personal satisfaction to develop competency with computers. Did thesis ("Economics of Purifying Water to U.N. Standards") to qualify for Master of Engineering Science at Sydney University - Joined AWWA (Australian Water and Waster Water Association) to make contact with engineers in field. 21/2 years part-time study - oldest member of class ("old bugger") Awarded degree in 1989 Since then, he plays golf.	AWWA (Australian Water and Waster Water Association) Master of Engineering Science
274	End of Side B	