

The Institution of Engineers, Australia

Engineering Heritage Australia

National Engineering Oral History Program

INTERVIEW TAPE LOG**Interviewee:** Charles Thomas James Bubb **Tape Numbers:** IEA EHA: MP 1 to 7**Interviewer:** Dr Margaret Park **Number of Tapes:** 7, Sides A & B**Place of Interview:** ADFA (Australian Defence Force Academy) Campus, Canberra**Dates of Interview:** 17, 24 & 31 October 2003

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Log prepared using (make and model of machine): Sony Cassette-Corder TCM-15V;
Tape Conversion Rate: 30 minutes = 420 on counter, i.e. 1 minute = 14 on counter
Interview recorded on Marantz PMD420 professional portable analog recorder.

Tape: IEA EHA: MP1, Side A

Time/ Counter	Subject	Proper Names & Keywords
000-012	Provides full name, date and place of birth.	Perth, Western Australia
013-115	Details of family migration to Australia, occupations, family bakery business, working with the business, depression years, description of location of business and buildings.	Bubb Brothers British Bakery Victoria Park The Great Depression Public Service ethos Military Service - WWI
116-209	Growing up in WA, describes attending Catholic schools – primary, then secondary. Interested in reading and science, particularly popular science. Influences at school.	Sisters of Mercy - Primary Christian Bros School Spud Murphy – teacher Bill Mangini; Fred Jones
210-243	Describes courses of study from age 6 including his gift for music and learning.	Music; musical instruments
244-304	Finishes high school at 15. Options after school – too early for university; public service examinations, leaving certificate.	High School Matriculation Public Service - clerical
305-422	Discusses lead up to his studies at university including languages required and subjects of interest – looking towards the future, attended tech courses in mathematics, then enrolled at University of Western Australia, free to attend, unusual for his family/neighbourhood to attend university.	Science Fiction interests: Arthur C Clarke University
	End Side A, Tape 1	

Tape: IEA EHA: MP1, Side B		
Time/Counter	Subject	Proper Names & Keywords
000-060	Determined to attend university, importance of mother's support. Attempted vocational guidance tests prior to university. Describes interest in engineering and courses available. Entered university in 1944 during WWII. Discusses wartime issues, felt 'far away' being in WA, also wartime regulations in attending university.	University of Western Australia (UWA) Engineering studies World War II
061-112	Duration and structure of university course, course intake – first in five year course. Last year of university – 1949, describes work experience with BHP and desire to travel afar due to isolation of WA.	Engineering courses Engineering disciplines Work Experience BHP Port Kembla
113-255	Discusses preference for structural engineering. Describes influence of Prof. Blakeley, a consulting engineering and UWA academic. Top 50 per cent. Describes returning soldiers attending engineering at UWA. Women in common first year, mathematics, top students.	Structural Engineering Prof. Blakeley (UWA) Returned Soldiers Ron Firns Dr Lex Blakeley Women at university
256-290	Joining the Institution of Engineers as students. Describes status of membership.	Institution of Engineers
291-409	Discusses the importance of mathematics, also influences of teachers and differences of styles and personalities at UWA. Hopkins = calculation method, highly mathematical; Hondros = array of methods and calculations, modern for the time.	Harry Hopkins (UWA) George Hondros (UWA) Mathematics and Calculations
End Side B, Tape 1		
Tape: IEA EHA: MP2, Side A		
000-050	Influences of teachers – Hondros appealed more than Hopkins. His array of methods for use as a 'tool kit'. Leaning towards American methods/styles, but maintained a balance between English/American methods. Nickname given by Ron Firns = Charles Magnus.	George Hondros Harry Hopkins Science University Exams/Competition
051-072	Discusses life beyond university and obtaining work as an engineer. Majored in structures and hydraulics.	Engineering Disciplines: Structural, mechanical, Electrical, hydraulics
073-089	Applies for work with Tasmanian Hydro-electric commission as well as the Snowy Mountains Hydro-electric scheme.	Tasmania – Hydro Electric Snowy Mountains Scheme
090-111	Discusses the divide between design and construction. Decided to gain construction experience first. Also describes short work experience during university breaks.	Design and Construction
112-132	Accepts work for Hydro Electric Commission, Tasmania and undertook construction aspect of engineering work prior to transfer to Design Office, majority of five years in Design.	Tasmania Hydro Electric Commission Hobart Design Office
133-252	Describes a typical day in the Design Office, in structural design, power stations. Rigorous checking and signing off of drawings, equal standing. Describes talents and range of work colleagues. First contact with Hungarian refugees, early 1950s. Classified first as an Assistant Engineer.	Hobart Design Office Ted Tanner (BHP & HEC) Robert Frisch-Fay (HEC)
253-303	Commonwealth Department of Works (Comm Works) seeking engineers for New Guinea appealed to Charles, desired a change/opportunity for travel. Opportunity did arise to join Snowy Scheme, Charles declined. Flying boat from Sydney Harbour.	New Guinea Commonwealth Department of Works Comm. Works Snowy Mountains Scheme

304-422	Describes meeting other engineers, such as Principal Engineer – George Redmond. Worked directly with Tony Grakovich. Details visit to power station and a 'prediction of failure' for the stability of the excavation. Recalls other 'predictions of failure'.	New Guinea George Redmond Tony Grakovich Prediction of Failure RAAF Hangar, Darwin Cyclone Tracy
	End Side A, Tape 2	
	Tape: IEA EHA: MP2, Side B	
000-035	Continues with Cyclone Tracy and collapse of RAAF Hangar. Another hangar, used as a terminal, was built to wartime standards and not upgraded, this also failed.	RAAF Hangar, Darwin Hangar/terminal Cyclone Tracy
036-078	Career cut short due to developing a form of dermatitis called Pompholyx (soldiers called it jungle rot) and repatriated to Australia, Brisbane Hospital. Describes treatment of cortisone and its effects.	Medical treatment - cortisone Repatriation Brisbane Hospital Blue Cross Insurance
079-100	Recalls return to Comm. Works. No particular place for Charles and sought other work. Passed over opportunity in South Australia and desired to stay in Melbourne.	Comm. Works – Victoria South Australia
101-121	Found a position (promotion) at Melbourne City Council in building surveyors department. Good training, extension of checking/analysis skills from university days.	Melbourne City Council Consulting Engineers
122-183	Changes to Melbourne skyline (altering of 10 storey height limit); describes involvement with the city's first skyscraper – ICI Building, steel framed glass façade 20 storey structure. Structural engineer for architects, Harvey Brown, did calculations on CSIRO computer – CSIRAC. Charles checked the calculations manually by using the Lightfoot's method. Speaks of the benefits of experience at the Council.	Melbourne City Council ICI Building Building Height Limits Harvey Brown Computers CSIRAC (CSIRO computer) Lightfoot's Method
184-290	Discusses European standards, i.e. German 'proof engineers' and its concepts, instead of using codes. Describes benefits of work experience up to and including Melbourne City Council.	Standards and Codes Proof Engineers Structural Design Processes
291-385	Left Melbourne City Council after 18 months seeking promotion. Recalls story of George Redmond and Ted Pitt (Sydney Harbour Bridge experience) approaching Charles to return to Comm. Works.	Comm. Works Head (central) Office, Melb. George Redmond Ted Pitt
	End Side B, Tape 2, 17 October session ends	
	Tape: IEA EHA: MP3, Side A Session on 24 October 2003	
000-082	Moving to Comm. Works, Central Office Charles discusses the work experience and skills he brought with him from the Melbourne City Council in 1957 and previous work and studies. Describes Comm. Works as the public works agency of the federal government arising from the wartime Allied Works Council.	Comm. Works Head (central) Office, Melb. Allied Works Council Joint Parliamentary Public Works Committee
083-196	Impressions of Comm. Works 'Head' Office. Possible move to Canberra constantly in the background. Discusses work/social interactions with the structural section/drawing office. Permanent vs temporary employment. Freemasons vs Catholics influences within the public service. Describes the clients of Comm. Works, all territories of the Commonwealth, Government Departments, Civil Aviation, Veterans Affairs.	Structural Section, Comm. Works John Brothie Freemasons/Catholics Chief Engineers

197-244	Relationship with Comm.Works architects. Discusses working with women, such as architect Cynthia Teague.	Architects, Comm.Works Clive Wade Clive Osborne Alan O'Meara Cynthia Teague
245-332	Importance and benefits of the professional associations within the public service and other external organisations. Discusses awards, remunerations (the engineers case, c1960s).	Professional Officers Assoc. Australian Professional Engineers Assoc. Institution of Engineers
333-415	Describes role in Comm.Works from 1957 as junior engineer within the drawing office 'learning the ropes'. Formed the view that the client's interests, project management and peer collaboration were important.	Junior Engineer Comm.Works Project Management Peer Collaboration
	End side A, Tape 3	
	Tape: IEA EHA: MP3, Side B	
000-085	Discusses project management – a revolution for the Department and processes involved in the change. Teamwork within the Department. Department name changes over time. Political influences, de-engineering of the Department.	Project Management Teamwork John Wisken Tony Blunn George Warwick Smith
086-126	1960s in the Department - examinations, assessments of staff, speed reading, getting along with others, presentations.	Staff Evaluation Alan O'Meara
127-184	Six months secondment as Senior Officer to the North West Cape project, US Navy. Feelings about American culture, working in a foreign country, language differences. Made aware of security issues, 'locked waste paper bins'.	North West Cape Project WA US Navy
185-275	Describes role within the project and its purpose, work colleagues, living/living allowances in West Los Angeles, smog in Los Angeles.	North West Cape Project WA Security Clearances Al Pratt, USN Los Angeles
276-372	Discusses standard of engineering in US, use of consulting engineers – Holmes and Narver. Mentions work on Omega Tower. Attempted to bring back ideas from US experience. Worked in the Very Low Frequency Commander Pacific project design office on construction design of tall towers in remote area of Western Australia, extreme wind velocities.	Engineering in US Private Consultancies Holmes and Narver Omega Tower North West Cape Project, WA – Very Low Frequency
373-420	Discusses possibility of attending university courses at UCLA.	University of California, UCLA
	End side B, Tape 3	
	Tape: IEA EHA: MP4, Side A	
000-045	Chooses university course based on the project management system used by consultants to control design of North West Cape project - PERT (program evaluation and review technique). Called Critical Path scheduling in Australia. Describes his student project – structural design of Customs House, Melbourne.	UCLA PERT Critical Path Scheduling Ewan Fraser
046-104	Provides details of the method of critical path scheduling and its uses, including first use by US Navy on Polaris Missile project.	Critical Path Scheduling
105-138	Explains benefits of studies to his work in Australia and to Comm.Works. Hans Wolfram appointed from outside the Department. Application of 'critical path' work, including Radio Australia Project, Cox Peninsula, NT	Critical Path Scheduling Hans Wolfram Radio Australia Project, Cox Peninsula, NT

139-179	Implementing critical path scheduling training for other staff. Use of critical path for Comm. Works projects in Melbourne and Sydney – major construction of airports.	Critical Path Scheduling Staff training Tullamarine Airport Mascot Airport
180-264	Discusses adopting and adapting ideas as a characteristic of Australian engineering. Discovering new ideas and adapting these for local use. Reflects on Comm. Works role as an innovator, a research/thinking organisation, to have specialists available as required. Being 'open to new ideas'.	Australian engineering Specialists Innovation
265-405	Finishing task with North West Cape Project and staff required afterwards. Explains US tendering system and also discussions with US Navy staff on regional versus central control – pendulum swinging. Uses idea later when Chief Structural Engineer.	North West Cape Project Tenders Al Pratt Regional vs Central control Chief Structural Engineer
	End Side A, Tape 4	
	Tape: IEA EHA: MP4, Side B	
000-087	Working in Comm. Works Head Office, as engineer Class 4, structural design section. Mentions impact of assassination of US President Kennedy. Discusses design tasks facing the Department in the 1960s, including construction of the Reserve Banks and the staff involved.	Comm. Works Structural Design John F Kennedy's assassination Reserve Bank Dick Uhr
088-139	Building relationships with university engineering professors, such as Melbourne University, Monash University and University of Sydney. Discusses the concept of 'limit state design' in relation to steel design and structures and working with colleague, Norm Sneath.	Professor Len Stevens (UMelb) Professor Arthur Francis (UMelb) Limit State Design Norm Sneath
140-190	Describes departmental encouragement and training of staff, keen to provide access to courses. Professional and academic qualifications for engineers. Computer testing and applications for the department.	Staff training Engineering Qualifications Computers
191-289	Describes Comm. Works involvement in Australian Standards and Codes, specifications, tendering processes and ethics. Hiring of new engineers from universities. Technical expertise offered free and done 'behind the scenes'. Fell apart with the demise of the department.	Standards and Codes Standards Association of Australia Specifications and Tenders Ethics Best Practice
290-356	The department adopts 'limit state design' under Chief Structural Engineer, Norm Sneath. Professor Bill Melbourne at Monash University, specialist in loading aspect of design analysis and also the dynamics of wind engineering, earthquake engineering. Influences of mentors and colleagues.	Limit State Design Norm Sneath Professor Bill Melbourne (Monash) Loading Design Wind Engineering Earthquake Engineering
357-415	Describes the changes within the Department from pure engineering to public service and provides details of titles of heads of sections. At the end of 1971 was Engineer Class 5.	Public Service Classifications Engineer Class 5
	End side B, Tape 4	
	Tape: IEA EHA: MP5, Side A Session on 31 October 2003	
000-064	Career shaped by events and individuals and many changes within the Comm. Works Department. Discusses senior management appointments. Describes engineering	Comm. Works Hans Wolfram Norm Sneath

	background of Norm Sneath (Canberra Office).	Philosophy of Engineering
065-090	Describes primary objective of office of Chief Structural Engineer and support of engineers in regional offices.	Regional Offices
091-117	Discusses post graduate courses/qualifications for engineers. Becomes aware of need for advance qualifications and availability of Commonwealth scholarships.	Maritime Engineering Arthur Hicks Commonwealth Scholarships
118-182	Appointment of Alan Rehier as Director General c1968. Investigates post graduate study and scholarships.	Alan Rehier Commonwealth Scholarships
183-221	Describes the application process and course pursued in earthquake engineering. Professor Arthur Francis presented a talk on risks in structural design, in particular, in relation to earthquakes. Mentions the Adelaide event in 1954. Discusses background in earthquake engineering, work in Papua New Guinea, contact with seismologists in Bureau of Mineral Resources.	Professor Arthur Francis Earthquake Engineering Adelaide Papua New Guinea Bureau of Mineral Resources Dr David Denham (BMR) Ian Everingham (BMR) Hugh Doyle
222-260	Design of earthquake resistant structures in relation to Australian seismicity. Describes earthquake in Meckering, Western Australia.	Earthquake Engineering Australian Seismicity Meckering, WA
261-358	Investigates codes/courses available in earthquake engineering (c1968) around the world, including US, New Zealand and Europe. Pursued course (scholarship) on earthquake seismology at Imperial College, London with Professor N. N. Ambraseys. Attends conference on earthquake engineering and describes new world view including plate tectonics.	Earthquake Seismology Imperial College, London University Santiago de Chile Earthquake Engineering Conference (c1968/69) Professor N. N. Ambraseys, Imperial College Plate Tectonics Seismology
359-398	Applies for diploma course at Imperial College, London upon return from conference. Travels via United States to contact conference delegates, Bruce Bolt and others.	Imperial College, London Prof. Bruce Bolt (UC Berkeley)
	End Side A, Tape 5	
	Tape: IEA EHA: MP5, Side B	
000-068	Describes engineering seismology and related engineering disciplines. 'Basic aim is the reduction and the risk from earthquakes to human life and the works of man'. First Australian trained with a qualification in earthquake engineering. Engineering conferences in Europe.	Imperial College, London University Dr Sarma Engineering Seismology
069-139	Discusses knowledge obtained via courses and European conferences attended from 1969-1971 and benefits to the Australian Earthquake Code (1979). Provides details of others involved in the Code Committee, including David Sutton. By 1979 Charles was Chairman of Code Committee and wrote the commentary. Value of code to overseas Comm. Works commitments, e.g. embassy in Japan, High Commission, Papua New Guinea.	Australian Earthquake Code David Sutton Newcastle Earthquake Embassy Buildings
140-170	Describes practical results of the code in highrise, un-reinforced brick construction. Refers to keynote address presented at the Australian Engineering Society Conference held in Perth, Western Australia 4-5 November 1998. Published in <i>Bulletin of the New Zealand Society for Earthquake Engineering</i> , Vol. 32, No 1, March 1999.	Standards Association of Australia Australian Engineering Society Conference, 1998

171-198	Describes parallels with wind engineering and views on the relationship of structural engineering to earthquake engineering.	Wind Engineering Earthquake Engineering Structural Engineering
199-237	New perspectives and advancement of qualifications, changes in 'perspective of time'. Attended all world earthquake engineering conferences; became the Australian delegate (after Prof. Stan Shaw, aeronautical engineering at University of New South Wales). Inaugural President of Australian Earthquake Engineering Society.	Soil Mechanics Prof. A. Bishop, Imperial College International Association of Earthquake Engineering Professor Stan Shaw (UNSW) Australian Earthquake Engineering Society
238-285	Discusses the uses of earthquake engineering skills and the talents available, including the limited use of such skills/knowledge in the United States.	United States
286-354	Discusses the variations in construction standards throughout the world relating to earthquake engineering and the lack of enforcement of standards/codes.	Construction Standards Earthquakes
355-420	Provides an illustration from the United States – California school construction and application/enforcement of special code.	United States School Construction Code
End Side B, Tape 5		
Tape: IEA EHA: MP6, Side A		
000-070	Discusses changes in the Department of Comm. Works, election of Labor Government and the possibility of moving Head Office to Albury/Wodonga.	Comm. Works Head Office Labor Government Albury/Wodonga
071-122	Describes the Department's involvement in Darwin in relation to earthquake and cyclone standards. Cyclone Tracy in 1974 - failures in residential structures. Refers to the RAAF Hangar failure as predicted and mentioned previously.	Darwin Hans Wolfram Cyclone Tracy
123-161	Discusses the effects of 11 November 1975, dismissal of Whitlam including change in direction to Albury/Wodonga. Changes in government policy and impact on the Department – first non-engineering head appointed, George Warwick Smith, traditional public service administrator.	11 November 1975 Gough Whitlam George Warwick Smith
161-201	Talks about Norm Sneath's changes within Comm. Works engineering section to expand structural group and increasing level of specialisation. Specialist computer analyst appointed, Graham Belcher. Structural group continues to meet as a social group.	Norm Sneath Structural Engineering Group Graham Belcher
202-244	Positions as Principal Engineer Class 5 in Structural Engineering Section and acting as Chief Structural Engineer. Provides insights into George Warwick Smith and his initial view of the Department. Department project work.	Principal Engineer Chief Structural Engineer George Warwick Smith
245-303	Describes visiting Darwin after Cyclone Tracy – profound effect – to assess reconstruction work in reference to structural engineering and Comm. Works responsibilities. Charles offers his definition of a bureaucrat.	Cyclone Tracy Norm Sneath Reconstruction of Darwin
304-363	Hawke Government changes even greater. Describes the approach of the 'managerial' style. De-engineering, de-skilling occurred after Charles's retirement, but he was aware of the possibility of this change after a visit to the North America and the British Columbia Building Corporation (BCBC).	Hawke Government De-engineering British Columbia Building Corporation (BCBC) Tony Blunn

364-415	Describes the move of Head Office to Canberra - a reality after being forecasted for many years.	Canberra Chief Structural Engineer
	End Side A, Tape 6	
	Tape: IEA EHA: MP6, Side B	
000-039	Provides details about his special assignment in Sri Lanka (Ceylon then) and request for assistance from their government (late 1978). Lists name changes of Comm. Works Department. Presented recommendations to the Sri Lankan Prime Minister.	Canberra Sri Lanka
040-082	Describes the effects of the cyclone in Sri Lanka, the weaknesses found and the buildings destroyed. Recurrent cyclone patterns, overseas and in Australia.	Sri Lankan Cyclone 1978
083-117	Records impressions of help required from Australia, in particular, offering training instead of material support. Meetings with government officials, disaster support groups and professionals, including Chief Structural Engineer of the Sri Lankan Local Government Housing and Construction Department of Building, Dr Ms Premala Sivaprakasapillai.	Dr Ms Premala Sivaprakasapillai
118-137	Provides details of training films produced after Cyclone Tracy and presented in Sri Lanka. Details cyclone prone areas of Australia – Queensland and Western Australia.	Cyclone Tracy Training Films Queensland Western Australia
138-222	Discusses his recommendations to the Department based on his findings, as well as his recommendations to the Prime Minister in Sri Lanka. Describes visit with the Prime Minister accompanied by the High Commissioner. Lists standards and building regulations required. Describes problems with rebels/civil war. Australian aid directed towards getting the regulations and training correct.	Sri Lanka Cyclone Reconstruction Standards and Building Regulations Australian Aid
223-273	Upon returning to Canberra Charles took up position of Director of Engineering. Discusses his desire to maintain his work with earthquake engineering.	Director of Engineering
274-394	Records his experience with the competition for the new parliament house and the briefing process. Eminent group of engineers appointed to review the short-listed entries of six. Professor Len Stevens contacted the Department for assistance. Describes the engineering tasks involved and the results.	Parliament House (New) Professor Len Stevens
395-406	Appoints a Chief Structural Engineer, John Spencer from within the Department.	John Spencer
	End Side B, Tape 6	
	Tape: IEA EHA: MP7, Side A	
000-136	Discusses involvement with Black Mountain Tower in relation to the assumptions made in the design. Concerns with wind design loading, main wind record at Canberra airport. (Australian wind code highly regarded overseas.) Used knowledge of earthquake resistant design for assessment of concrete and steel tower, as well as modeling techniques and animated film depicting vibrations. Design architect, Dick Uhr, supervised [Frank Dubrovsky] on hundreds of design shapes. Describes feelings about the tower as a Canberra landmark.	Black Mountain Tower Professor Bill Melbourne, Monash University Limit State Design Australian Wind Code John Loyld Dick Uhr Frank Dubrovsky
137-150	Talks about his protégé in earthquake engineering, Kevin McCue, now in private practice, involved in the supply and activation of strong motion recorders at the Tower.	Kevin McCue

151-243	Records involvement with the Second Hobart Bridge Committee and the design, construction and funding of the Bridge. Received a congratulatory letter from Bob Hawke, describes the opening ceremony/meeting the Prime Minister.	Second Hobart Bridge Bob Hawke
244-331	Feelings about changes coming to the Department, including budget/funding cuts. Concerns about the possible loss of an engineering department. Speaks of Tony Blunn and their working relationship. Wary of growth of managerial ideas. Investigated how to reduce an engineering or building group to absolute minimum. Visit to the BCBC (British Columbia Building Corporation)	Departmental Change Budget cuts Tony Blunn British Columbia Building Corporation (BCBC) See also Tape 6, Side A (304-363)
332-410	Explains how he helped to develop individuals and their skills both as Chief Structural Engineer and later as Director of Engineering. Prepared staff for the 'last days' within the Department; discusses protégés and influences of professional colleagues.	Staff Development Dr David Denham Kevin McCue Gerhard Horoschun Fire Engineering Blast Engineering
	End Side A, Tape 7	
	Tape: IEA EHA: MP7, Side B	
000-027	Continues with discussion regarding protégés in earthquake engineering, including Gerhard Horoschun, currently an academic at ADFA (Australian Defence Force Academy). Gerhard was the last structural engineer within the Department.	Gerhard Horoschun Blast Engineering
028-085	Describes other aspects of engineering encountered as Director of Engineering, such as legionella and asbestos. Mechanical engineering specialist, Clive Broadbent, sent overseas to investigate problems/solutions. Produced test methods, test and maintenance procedures.	Legionella Cooling Towers Legionnaire's Disease Clive Broadbent Mechanical Engineering
086-100	Expresses views on the future of engineering profession. Working with Legal Liability and Professional Indemnity Standing Committee of the Council of the Institution of Engineers.	Engineering Profession Institution of Engineers Legal Liability and Professional Indemnity Standing Committee IEAust Peter Miller
101-120	Provides advice to engineers today - develop, gain and retain professional skills. Discusses principles of engineer and desire to explore the philosophy of engineering.	Engineering Profession Philosophy of Engineering
121-210	Sums up views on engineering, working within a multi-disciplinary organisation with integrity and trust. Significance of using one's ability to form professional judgements. Mourns the loss of the Department and that there is no Chief Engineer within the Commonwealth Government.	Professional Judgement Loss of Comm. Works Department Principles of Engineering
	End Side B, Tape 7	
	End of Interview	