

# **STEPHEN JAMES EMERY**

**Qualifications** *B.Eng(Hons)(Uni. NSW), MBA(Uni. WA), PhD(Rand),  
FSAICE, PrEng, MIEAust, CPEng, FAICD, FSAT, MAAPT, MAGS*

## **Specialist Engineering Consultant**

### **PERSONAL PROFILE**

- Specialist consultant with wide ranging engineering, technical and commercial expertise earned during the course of 32 years of responsibility and achievement in the fields of airport and road engineering and engineering management.
- Key areas of expertise include airports, pavements, materials, bitumen, asphalt, diagnostic engineering and research, multi-faceted and multi-disciplined projects, commercial and engineering education.

### **EXECUTIVE SUMMARY OF PROJECTS IN LAST FIVE YEARS**

#### **Bitumen and asphalt**

- a) Technical expert in PMBs and asphalt for \$35 million airport surfacing problems in Dubai, including asphalt on what will be the world's largest airport at Jebel-Ali, involving field and laboratory studies, accelerated pavement testing, auditing, airport pavement design, and development of PMBs. 2006 to 2007.
- b) Leader of a multi-disciplinary research team into bituminous surfacings and polymer modified bitumens for Australian Airports Association, including investigation of stripping, groove closure, performance issues, modified binder manufacture and specification, development of new airport binders. 2004 to 2007.
- c) Technical expert in bitumen surfacing and materials for \$0.8 million airport surfacing claim; Gingin, Western Australia. 2005 and continuing. Technical expert in bitumen surfacings and materials for \$0.65 million road surfacing claim; Mt Magnet to Sandstone, Western Australia. 2004. Technical expert in surfacings, pavements and materials for \$1.7 million construction and road performance claim in Ripon Hills, Western Australia. 2002-2007.
- d) Technical expert in bitumen surfacing and materials
- e) Technical expert in development of bitumen refining, bitumen specification and shipping specification, quality control, and transport economics. 2004 to 2006.
- f) Technical expert in analysing PMB bitumen, multigrade bitumen and asphalt production, performance and quality control on airports operating to an intense surveillance protocol. Various projects and airports in Australia. 2005 to 2007.

#### **Airports and heavy duty pavements**

- g) Specialist investigation into materials and pavements at Walvis Bay International

March 2008

Airport for A380 upgrade. Alternative designs, audit ICAO compliance, limit salt damage. 2007 and continuing.

- h) Pavement investigation into concrete pavements at Macau International Airport. Pavement investigation and analysis, overlay design, design, traffic forecasting, and masterplanning elements. 2007 and continuing.
- i) Technical expert in investigation of failure of heavy duty asphalt pavements at a container terminal in Townsville. 2006
- j) Geometric and structural design of runway for Boeing 747/A340-600 at Bloemfontein Airport, 2006. Senior team member.
- k) Runway resurfacing. Materials sourcing, design, quality control, tendering, construction supervision, quality control and establishment of onsite bitumen laboratory. 2002, 2005, 2006. Western Australia.

### **Roads and Highways**

- l) Implement complete pavement management system into major road network for Perth Metropolitan North (TNC 8). Collect road condition data. Model road maintenance and rehabilitation needs for 7 year period, and prepare Operational Road Plan with all maintenance and rehabilitation works. Budget and level cashflow. and continuing.
- m) Design and documentation for rehabilitation and re-alignment of 33 kms of rural highway N2-14, Keiskamma to Green River, South Africa. 2004 to 2006.
- n) Design and documentation for rehabilitation of 72 lane-kms of major urban freeway N12 Tom Jones to Daveyton, South Africa. 2004 to 2007.
- o) Specialist in R61 freeway pavement failure investigation for \$1 million claim in South Africa, involving advanced asphalt and materials testing in 2003-4.
- p) Freeway rehabilitation (128 lane kilometres) near Pretoria, South Africa, including design and supervision of material and pavement investigation, design of pavement rehabilitation, introducing ISO 9000 quality system, toll-road economic analysis, and construction supervision. 2000 to 2004.

### **Other**

- q) Detailed masterplan for existing Boeing 737/767 airport. Forecasting, airport layout, airside configuration, terminal layout design, landside, non-aeronautical uses, services. 2007 to 2008.
- r) Developed new unit for Latrobe/Deakin University CPEE postgraduate course on Heavy Duty and Industrial Pavements in 2007, wrote the textbook, and Unit chair for 2007 and ongoing.
- s) Leader of multi-disciplinary research team into extensive design airspace study including AS 3931 and AS 4360, analysis of accident databases, public survey of attitudes and statistical analysis. 2003-2004. Team leader. Australia.

## DETAILED EXPERIENCE

**Kubu Consultancy Pty Ltd**  
**Kubu Australia Pty Ltd**  
Director

**Pretoria**  
**Perth**  
1998 to present

### Materials, bitumen, asphalt and pavements

1. Specialist investigation into materials and pavements at Walvis Bay International Airport for A380 upgrade. Alternative designs, audit ICAO compliance, limit salt damage. 2007 and continuing.
2. Investigation into concrete pavements at Macau International Airport. Pavement investigation and analysis, overlay design, design, traffic forecasting, and masterplanning elements. 2007 and continuing.
3. Geometric and structural design of runway rehabilitation for Boeing 747 at Waterkloof Airforce Base, Pretoria, 2007 and onwards. Senior team member.
4. Geometric and structural design of runway for Boeing 747/A340-600 at Bloemfontein Airport, 2006. Senior team member.
5. Technical expert in PMBs and asphalt for airport surfacing problems in Dubai, including construction of what will be the world's largest airport at Jebel-Ali, involving field and laboratory studies, accelerated pavement testing, auditing, airport pavement design, and development of PMBs. 2006 to 2007.
6. Technical expert in analysing PMB and multigrade bitumen and asphalt production, performance and quality control on airports operating to an intense surveillance protocol. Various projects and airports in Australia. 2005 to 2007.
7. Technical expert in development of bitumen refining, bitumen specification and shipping specification, quality control, and transport economics. Commercial in confidence client. 2004 to 2006.
8. Technical expert in surfacings and materials for several major road surfacing claims in Western Australia involving field and laboratory studies and research into bitumen stripping (Bannister Road, Sandstone-Leinster), 2004-2005.
9. Leader of a multi-disciplinary research team into bituminous surfacings and polymer modified bitumens for Australian Airports Association, including investigation of stripping, groove closure, performance issues, modified binder manufacture and specification, development of new airport binders 2004 to 2007.
10. Forecasting, traffic mix and structural design of 3 rapid exit taxiways at Johannesburg International Airport, 2004.
11. Design and documentation for rehabilitation and re-alignment of 33 kms of rural highway N2-14, Keiskamma to Green River, South Africa. 2004-2006
12. Design and documentation for rehabilitation of 72 lane-kms of major urban freeway N12 Tom Jones to Daveyton, South Africa. 2004-2007.
13. Leader of multi-disciplinary international team to develop a 7-year forward works plan for all maintenance and rehabilitation works on a Long Term Road Maintenance contract (TNC 8) covering Perth Metropolitan North roads. Involved the use of pavement management systems, pavement deterioration modelling, visual assessments, budgeting, cashflow levelling, innovative surfacings, extensive surveillance data analysis. 2004 and continuing.
14. Specialist in R61 freeway pavement failure investigation for \$1 million claim in South Africa, involving advanced asphalt and materials testing in 2003-4.
15. Technical expert for \$0.3 million dispute in pavement performance in Western Australia involving prediction of pavement performance and probabilistic modelling. 2002 and 2003.

16. Technical expert in surfacings, pavements and materials for \$1.7 million construction and road performance claim in Western Australia, 2002 and continuing.
17. Geometric and structural design, construction management for runway extension and for runway surfacing at Broome International Airport, 2001, 2002, 2003, 2005, 2006.
18. Firm's leader for consortium of consultants on freeway rehabilitation (128 lane kilometres) near Pretoria, South Africa, including design and supervision of material and pavement investigation, design of pavement rehabilitation, introducing ISO 9000 quality system, toll-road economic analysis, and construction supervision. 2000 to 2004.
19. Specialist consultant for various materials problems including bitumen stiffness, alkali-silica reaction, dust control, foamed bitumen stabilisation, insitu cement stabilisation, and excessive stone water absorption. 1999-2003.

#### Technology

20. Detailed masterplan for existing Boeing 737/767 airport. Forecasting, airport layout, airside configuration, terminal layout design, landside, non-aeronautical uses, services. 2007 to 2008.
21. Forecasting for Bloemfontein Airport, 2006. Senior team member.
22. Leader of multi-disciplinary research team into design airspace study including AS 3931 and AS 4360, analysis of accident databases, public survey of attitudes and statistical analysis. 2003-2005.
23. Started soils laboratory, installed quality system, and gained NATA accreditation (14582) in 2001. Registered NATA auditor (16927) 2002 and continuing.
24. Design audit of ICAO Code 4D runway and taxiway reconstruction. Including FWD testing, materials location, pavement design using FAA and elastic layer analysis, pavement rating. Perth, Western Australia. 2002.
25. Developed the business and operational plans for various airline operations. 2000-2002.
26. Senior member of team in project to investigate improved productivity, potential for small business units and the commercialisation of the Gauteng Provincial Roads Department road maintenance activities (500 staff). Introduction of performance related specifications including skid resistance, riding quality and surfacing integrity. 2001-2003.
27. Masterplanning new Boeing 767 airport, and pavement design. Located new airport sites. Located materials, and leading research into use of local materials. Environmental planning for new airport at Broome including forecasting, risk and noise assessment. 1999-2001.
28. Major tender assessment (\$200,000,000) for Main Roads Western Australia involving complex tender assessment techniques for a new form of long term (10 year) road maintenance operating contract. Performed in accordance with ISO 9000 quality system, risk management and performance based specification including skid resistance, riding quality and surfacing integrity. 1999.
29. Surfaced road network assessment for major city, prioritisation of works requiring interface with PMS and maintenance management system. 1998.

#### Academic

30. Developed new unit for Latrobe/Deakin University CPEE postgraduate course on Heavy Duty and Industrial Pavements in 2007, wrote the textbook, and Unit chair for 2007 and ongoing.
31. Unit chair for Latrobe/Deakin University CPEE postgraduate course on Pavement Management Systems from 2005 and ongoing.
32. Unit chair for Latrobe CPEE postgraduate course on Flexible Pavement Construction for 2004-2007.
33. Lectured on airports, airline economics, forecasting and revenue management at Murdoch University, Perth in 2003-4.

34. Ran Deakin University/ Centre Pavement Engineering Education postgraduate course on pavement wearing surfaces in Perth in 2003.
35. Undertaking advanced research into airline economics and air travel forecasting at University of Western Australia, including demand and supply factors, aircraft operating costs, yield management, and tourism demand. 2002 and continuing.
36. Ran South African workshops on ultra-thin asphalt layers and frictional road surfacing courses to broaden knowledge, disseminate best practice from around the world and fit ultra-thin asphalts to the new asphalt design guide and other thin surfacings in 2002.
37. Presented lectures, tutorials, laboratory and field sessions at Department of Civil Engineering at the University of Witwatersrand. 1998-2002.
38. Developed and managed engineer level extended course on asphalt surfacings for Botswana Roads Department in 1999.
39. Serving on various committees, including Steering Committee and Chairman of the Marketing Committee for CAPSA'99, Technical Committee World of Asphalt Pavements 2000, National Council of the Society for Asphalt Technology (SAT), and the Flexible Pavements Committee of the Permanent International Association of Road Congresses (PIARC), as well as various national and specification committees for bitumen, geotextiles, natural materials.

**University of Witwatersrand**

Honorary Professor, Dept. Civil Engineering

**Johannesburg**

1998 to present (contract)

40. Created and implemented an undergraduate course in roads and development engineering covering contractual relationships between parties, contract documents, tendering procedures, construction planning and control, human resource allocation, and introduction to the design of municipal services and roads over the full life cycle (from planning through to operation and maintenance), carried out within a development context.
41. Supervise research of doctoral and masters students in the fields of chemical stabilizers in road construction, dust suppressants, skid resistance, bitumen viscosity, labour based construction of asphalt, blast furnace slags.
42. Represent University in steering an advanced commercial bitumen and road performance laboratory including pavement surveillance, riding quality, deflectometer, skid resistance, asphalt, bitumen, and seals.
43. Develop and deliver distance education materials at undergraduate level.

**Colas Southern Africa Pty Ltd**

Group Technical Director

**Johannesburg**

1994 to 1998

44. Managed the technology resource for 3 modified bitumen plants, 7 emulsion factories and 15 asphalt plants, including R&D, centralised emulsion formulations and assistance. Led a team which developed and/or re-engineered commercial production of SBR modified bitumens, SBS modified bitumens, and crumb rubber-bitumen blends.
45. Main Board of Colas Southern Africa Pty Ltd, as a Murray & Roberts appointed director. Attended subsidiary board meetings. Represented Colas on the board of Bitutek, a partly owned commercial laboratory in Durban.
46. Developed effective business strategies and technical solutions to maintain revenues and profits in a rapidly changing marketplace, including Build-Operate-Transfer and long term operating contracts. Leader in developing Murray & Roberts strategies in the roads field, in the development of Small, Medium and Micro Enterprises (SMMEs) and in black empowerment.
47. Developed South Africa's first Performance based road surfacing specification including

- skid resistance, riding quality, cracking, and pot-holing.
48. Technical Expert in investigation into organic chemical production operations in Ghana for Danish Government.
  49. Conceptualised and implemented re-engineering of Group technical function and laboratories, focused on commercial partnerships with 11 consultant engineering companies and 2 universities.
  50. Implemented and managed marketing strategy including Internet, multimedia, advertising, public relations, and publications.

**University of Stellenbosch****Stellenbosch, South Africa**

Professor, SABITA Chair of Asphalt Pavement Engineering

1993 to 1994

51. Created and implement postgraduate and undergraduate courses in roads, materials and pavement engineering.
52. Conceptualised and implemented intensive course on pavement management systems (PMS), covering integrated road management, building blocks of a PMS, pavement condition surveys, visual pavement assessment, mechanical surveillance and skid resistance, identification of needs and maintenance alternatives, deterioration modelling and project prioritisation, economic analysis and optimisation, and preparation of a multi-year programme with alternative strategies to fit varying budgets.
53. Involved in the National Public Works Programme Working Group, with strong involvement in the Technical Working Group.
54. Provided academic support to Technikons and to professional development training.
55. Mentor and advise cross-cultural postgraduate students.
56. Supervise research projects, including bitumen penetration/viscosity modelling.

**Wallace, Emery and Associates Pty Ltd****Perth and Pretoria**

Managing Director

1986 to 1992

57. Director for a specialist engineering consulting firm involved in airports, mining, and roads in Australia and South Africa.
58. Led major research team investigating performance of bitumen surfaced low traffic roads. Rewrote national design standards for rural roads including geometric design, materials, pavement design, roadside furniture, safety aspects, drainage, construction, maintenance, rehabilitation, socio-economic and environmental aspects. Personally received SABITA research award in 1991.
59. Design and documentation for airport runway upgrade, new terminal, and communications at Christmas Island. Developed wind standards for Island using innovative analysis techniques. Controlled project schedule. Involved in management of claims, financial reconciliation, and contract disputes.
60. Initiated, investigated, designed and constructed runway extension and upgrade to Boeing 767 standard at Broome.
61. Senior member on ADB project on road safety in Malawi. Responsible for road engineering, black spot rectification, and accident data and analysis.
62. Other projects involving all aspects of airport operation and development including new airport sites. Other engineering projects including design, investigation, rehabilitation, training, and pavement failure analysis.

**National Institute for Transport and Road Research, CSIR****Pretoria**

Senior Research Engineer

1981 to 1985

63. Team leader of research project to investigate interaction between moisture, materials and pavement performance. Extensive involvement with field and laboratory testing. Extensive use of statistics. PhD was based on this research.

64. Leader of moisture investigation project and pavement failure analysis in Malawi.

**Department of Transport (Aviation)**

**Australia**

Engineer

1975 to 1981

65. Engineer in National Government Department responsible for airports.

66. Assistant Airport Engineer Sydney Airport 1975-76. Assistant Engineer Rural Aerodromes NSW 1976-1977. Airport Maintenance Programme Engineer, Head Office 1978. Divisional Engineer Western Australia South 1979-81, responsible for 10 airports.

67. Led team which developed masterplan for Jandakot Airport. Technical expert in land planning appeal tribunal for aircraft noise at Jandakot Airport in Perth.

68. Projects included site control of new multi-story carpark at Sydney Airport, runway friction testing Sydney and Canberra, resurfacing of airport runways at Perth and Adelaide, new terminal at Geraldton, numerous pavement investigations.

69. Administration of national airport maintenance funds for 279 airports.

**ACADEMIC AND PROFESSIONAL CREDENTIALS**

<b>University of Witwatersrand</b> PhD (Civil Engineering)	<b>Johannesburg, South Africa</b> 1985
<b>University of Western Australia</b> MBA	<b>Perth, Australia</b> 1990
<b>University of New South Wales</b> Bachelor Civil Engineering (1st cl. Hons)	<b>Sydney, Australia</b> 1975

**Professional qualifications**

Chartered Professional Engineer (Australia) (National Professional Engineer Register) - CPEng

Professional Engineer (South Africa) - PrEng

Fellow South African Institution Civil Engineers - FSAICE

Member Institution of Engineers Australia - MIEAust

Member Association of Asphalt Paving Technologists, USA - MAAPT

Member Australian Geomechanics Society - MAGS

Fellow Society Asphalt Technologists, South Africa - FSAT

Fellow Institute Company Directors, Australia - FAICD

**Post-graduate courses**

Expert Determination (2006) 2 day course run by Institute of Arbitrators and Mediators, Australia

Expert Witness (2006) 1 day course run by Institution of Engineers, Australia

Demand analysis for airports/airlines (2004) 3 day course run by University of Westminster, London

Decision Choice modelling (2002) 3 day course run by University of Sydney.

Advanced bitumen technology (1998). 4 day course run by University of Stellenbosch

Airport Planning (1997) 5 day course run by University Texas at Austin and University of Stellenbosch

Bitumen/emulsion technology (1995) 4 day course Colas Southern Africa

**NATA – National Association Testing Authorities, Australia**

Assessor #16927

Chemical: Bitumen. Construction Materials: Soils, aggregates, asphalt.

**PUBLICATIONS**

Over 70 papers at international conferences and journals. Lead author of a bitumen industry standard book and CD-ROM on road surfacings. Senior author involved in writing road industry manuals.