



## Bernie Davis

### Senior Structural Engineer



Some 50 years of full time experience in the design, development and construction aspects of engineered structures both conventional and unusual, has provided Bernie Davis with a broad based approach to his professional service. He is specialised in the areas of swimming pools / tanks, tension structures and composite materials.

#### Technical Skills

- Conceptual and Structural Design

#### Project Experience

##### AQUATIC

Bernie has been involved in the planning and design and construction of swimming pools and aquatic centres for the past 45 years. His experience encompasses all the structural aspects of pool design including the use of composite materials and the development of specialised pool equipment.

Bernie has undertaken study tours and inspections of numerous indoor and outdoor aquatic centres in Australia, New Zealand, USA, Canada and Europe. He has written papers and lectured on aquatic centre economics, construction and the relationship of shade enclosure and pools.

The following brief selections of projects demonstrate Bernie's vast ongoing experience in aquatic projects:

- Dreamworld & WhiteWater World
- Sea Temple Resort Pool, Port Douglas
- Thuringowa Lagoon, Townsville
- Mackay Bluewater Lagoon
- Arlie Beach Lagoon
- Blackall Aquatic Centre, Queensland
- Porter Bay Aquatic Centre, Port Lincoln
- Doncaster Aquatic Centre, Victoria - Master Planning
- Sleeman Centre, Brisbane - Pool reconfiguration and Water Slide
- North Sydney Olympic Pool - Air supported membrane roof
- Kilsyth Pool Complex, Victoria - Enclosure and Pool Redevelopment
- Mirage Gold Coast Resort - Swimming Pool and Lagoon
- St Cuthbert's School, New Zealand - Enclosure of existing pool
- Civic Pool, Canberra ACT - Enclosure
- Moveable Bulkhead Design, Canberra ACT and Warringah New South Wales Swimming Pool
- Wave Machine and Ozone System, New Plymouth New Zealand
- Wave Machine and Ozone System, New Plymouth New Zealand

Reports for the redevelopment of existing pools at:

- Southport, Sandgate, Darwin, Chermiside

Studies and / or preliminary designs for major indoor/outdoor aquatic

#### LOCATION

Brisbane Creek Street

#### YEARS OF EXPERIENCE

50

#### QUALIFICATIONS

Bachelor of Engineering, Honours, University of Queensland, 1959

Bachelor of Science, University of Queensland, 1965

#### MEMBERSHIPS

Member, Institution of Engineers, Australia

Member, College of Structural Engineers, Australia

Registered Professional Engineer in Queensland, and NPER3

Member, Composites Institute of Australia

#### SPECIALISATIONS

Swimming Pools / Tanks

Tension Structures (Cable, Fabric, Net)

Composite Materials (Fibreglass / Plastics)

centres at:

- Invercargill and Hastings, New Zealand and at Gibraltar, Japan
- Sydney Olympics 2000 Aquatic Centre, Sydney Moveable Floor and Bulkhead
- Green Island Resort, lagoon / pool
- Prefabricated 25m pool for Oodnadatta and other remote sites South Australia
- Consultant to 25 commercial pools in conventional and unconventional construction systems in Queensland and New South Wales
- New 50m public pool, Raymond Terrace, New South Wales
- Airlie Beach, major lagoon development study and detailing

### **SMALL STRUCTURES**

- Development of design and detailing methods for concrete reinforced and post-tensioned slab on ground for residential and similar small scale buildings
- Responsible for Geotechnical Laboratory and Foundation investigations, reports and footing designs for over 20,000 single level and two storey buildings
- Design of bracing, tie down, framing, steel and timber beams, retaining walls of all types and masonry for several thousand houses
- Investigation into cause of cracking to concrete slab-on-ground, brickwork and internal partitions. Recommendation of rectification programs

### **TENSION STRUCTURES**

Bernie is an active promoter of contemporary structural materials and concepts, being keenly attuned to contemporary architecture having lectured for 20 years at the University Of Queensland School Of Architecture and prepared numerous technical papers. A major area of concentration focuses on tension membrane, cable net and air-supported structures. Bernie has been involved in the design of more than 500 tension structures most of which have been built in Australia and New Zealand. These include permanent, retractable and temporary structures, as listed below:

- Marina Mirage Refurbishment
- Mirage Gold Coast Resort, Fabric sails over Marina Mirage – original works
- Royal Pines Resort, Gold Coast Tension Membrane roofs to tennis courts and recreation areas \$2 million
- Wollongong Driving Range Net Structures (30m high)
- Parramatta Driving Range Net Structures (30m high)
- Currumbin Bird Sanctuary, Gold Coast 3,000m<sup>2</sup> of Cable Net
- Aviaries
- Sunhill Garden Centre, Auckland, New Zealand Tension membrane roof
- Warana 1988, Brisbane Festival canopies with specialised lighting
- Queen St Mall, Brisbane Tension membranes
- Bank of Western Samoa, Tension membrane roof and shade structures
- Maroochydore Shopping Centre, Membrane roof structure
- Wollongong Mall, New South Wales, Mall shade structures
- Mayfair Shopping Centre, Hobart Tension Membrane
- Waterfront Shade and Market Structures, Kuching, Malaysia
- Port Beach Restaurant, Freemantle Western Australia
- Entry Structure for Paramount Hotel, Singapore
- Exhibition Building for Auckland Harbour Board at Fukuoka, Japan
- Hippodrome, Noumea
- Chairman, Standards Committee on Fabric Test Methods
- Grandstand McKean Park, Napier, New Zealand

- Tourist projects, Malaysia, Indonesia, Singapore, New Zealand
- Concept design Expo 88, Brisbane
- Public aquatic centre, Port Lincoln
- Air supported public pool enclosures, North Sydney, Canberra, Lilydale
- Melanesian Hotel, Papua New Guinea
- University lecture hall, Cairns, Freeform cable net roof
- Suspended concrete grid roof for resort, New South Wales
- Large cable supported sculptures, Brisbane
- Prototype screen systems for car parks, New York
- Numerous Golf Range net enclosures, Australia and New Zealand
- Large scale net and shade roof systems for ponds, fish farms, refused dumps, tailings claws and car bond storage

### **TOWERS & MASTS**

- Upgrade of 45m tower by Kevlar Guy Cables to accommodate extra loads, Bald Knob, Queensland
- 45m Masts, Kempsey, Weipa and Thursday Island
- 60m Tower, Mt Coot-tha, Brisbane
- National Transmission Agency 14 MF Masts, Northern Territory and Western Australia, Inspection and refurbishment
- 63m Mast, Grafton New South Wales
- 27m Tower, Wulcha New South Wales
- 32 Lattice Towers and Columns, Skyrail Cableway Cairns
- 120m Mast, St. Helena Island Queensland
- 40m Tower, 4BU, Bundaberg Queensland
- 30m Mast, Yarrabah Cairns Queensland
- 42m Mast, RAAF Base Weipa Queensland
- 60m Mast, Mt Stuart Townsville Queensland
- 135m Tower, Jakarta Indonesia
- Queensland Railways, Towers for Microwave System, Gladstone to Brisbane
- Steel Towers for Rail Project in Indonesia
- 70m High Braced Tower at Burns Peak, Port Moresby
- New South Wales State Rail Authority, Tower structures Albury to Canberra
- Fiji Television Services, Design of towers
- Fiji Electricity Authority, Design of microwave steel towers
- QTQ9, Brisbane, Television tower – Concept Design
- 60m Mast at Oman
- Guyed Mast at St Helena Island
- Radio 2AD, Armidale 48m Mast
- Station 2CA, Canberra Radio Mast
- Design of Fibreglass Supporting Beams for Standby Batteries
- Investigation of existing guyed masts through New South Wales and Queensland

### **FIBREGLASS**

Bernie Davis is one of the few Australian consultants who specialise in fibreglass design. He has been involved in the design, documentation and inspection of projects in fibreglass and composite materials for the past 25 years.

Bernie's experience in the choice of materials and reinforcements, integration of the design of a variety of materials as well as the ability to provide direct and comparative costing estimates, separate his capabilities from the rest.

- Sydney Olympics 2000 Aquatic Centre, Fibreglass moving floor and bulkhead design
- McArthur River Mine, Queensland, Fibreglass chemical tanks

Electro-Winning Cells:

- Andacollo Copper Mine, Chile
- Copper Refinery, Myanmar
- Nifty Copper Mine, Western Australia
- Girilambone, New South Wales
- Mt Cuthbert Mine

Large scale refining tanks/settlers:

- Nifty Copper Mine, Western Australia
- Girilambone, New South Wales
- Olympic Dam Copper and Uranium Mine, Optimisation Projects 1 and 2, South Australia
- Cawse Nickel, Western Australia \$1 million
- Investigation of very large Duct Jointing Systems for major North Queensland fertilizer project
- Road Transport Storage Tanks
- Fibreglass Panels Centrepoint Tower, Sydney
- Testing of new fibreglass products in association with Queensland University of Technology
- FRP Shelf Storage System for Standby Batteries
- Developmental design of high composite ladders for electric power industry
- FRP settler tanks, flumes and roofs for sewerage treatment plants Brisbane, Logan, Tasmania, Sunshine Coast
- Fibreglass swimming pool construction systems
- Large cooling fan stacks for power stations
- Specialised FRP Formwork Systems
- Ventilation duct/consols for high corrosive process plant
- FRP formwork for power station spiral volute pump feed
- High vacuum storage sphere, Cairns
- Development of fibreglass / resin / aggregate composites for chemical plant applications

#### **WATER STORAGE**

- Murgon, QLD – 15m Ø × 7.2m
- Croydon, QLD – 18m Ø × 5.8m (1.8m)
- Kilcoy, QLD – 20m Ø × 6m (1.8m)
- Haigslea, QLD – 20m Ø × 8m
- Hope Vale, QLD – 2 No. Tanks @ 20m × 6.8m
- McLeod Lane, QLD – 24m Ø × 8.4m (3.5ml)
- Chesterfield, QLD – 26m Ø × 6m (3ml)
- Highfields, QLD – 26m Ø × 6m (3ml)
- Thursday Island 0- 25m × 25m × 7.5m (4ml)
- Ripley, QLD – 54m Ø × 7m (16ml)
- Helensvale ,QLD – 48m Ø × 11.5m (20ml)
- Cover Hill, QLD – 62m Ø × 10m (30ml)
- Springfield, QLD – 60m Ø × 11m (30ml)
- Gladstone, QLD – 80m Ø × 10.5m (50ml)

#### **ROAD BRIDGES**

- Boomi River, NSW – 3 × 11m
- Gnoura Gnoura Creek, NSW – 3 × 11m
- Camp Creek, NSW – 3 × 11m
- Spring Creek Rd, Clifton QLD – 1 × 12m
- Kyeamba Rd, Wagga Wagga NSW – 1 × 25m
- Canal Creek, QLD – 2 × 12m
- Tevern Rd, Bridges, NSW – 2 No. @ 5 × 12m
- Fairy Mead Rd, QLD – 2 × 9m

## **SEWER/WATER TREATMENT**

- Tenex Jobs:
  - o Bega, VIC
  - o Victor Harbour
- Karalee, QLD – 6m Ø × 7m
- Moranbah, QLD

## **FOOT BRIDGES**

- Nerang River, QLD – Steel Truss
  - o 1 × 25m
  - o 1 × 30m
- Broadbeach, QLD – 1 × 33m concrete

## **OTHER PROJECTS**

- SWB Silos/Conveyors/Ship Loaders -Brisbane, Gladstone and Darling Downs
- Prestressed Concrete Reservoirs, Redcliffe, Gladstone and land Councils
- Rail Bulk Unloading Facilities - Brisbane; and Gladstone
- Large Water Storage Tanks, Barrier Reef Islands and North Queensland
- Sole responsibility for major civil and structural works at State Wheat Board Terminal, Brisbane
- Mt. Coot-tha Lamella Dome
- Review of prestressed bridges and reservoirs
- Public art works, Brisbane, Sydney and Canberra
- System design and development of space frame roof projects
- Wharf and jetty projects