

RUSSELL SMITH

Contact Details:	Email: russell.smith@quantise.com.au Mobile: 04 8808 8174
Years of Experience:	32
Qualifications:	B.E. (Mech.), University of Newcastle (1986) Fitter and Turner (1983)
Professional Affiliations:	Chartered Professional Engineer (CPEng) Member of Engineers Australia (MIEAust) National Professional Engineer Register (NPER) Registered Professional Engineer of Queensland (RPEQ)
Fields of Competence:	<ul style="list-style-type: none"> • Mechanical Testing, Strain Gauging, Analysis • Mechanical/Structural Design and Design Audits • Manufacturing and Testing Procedures • Troubleshooting and Problem Solving • Hydraulic System Analysis

EMPLOYMENT SUMMARY

Feb 2014 - Present	Managing Director (founder), Quantise Consulting Engineers Pty Ltd.
Jun 2011 - Feb 2014	General Manager - Machinery, Director, BMT WBM Pty Ltd.
Aug 2000 - Jan 2014	Director, BMT WBM Pty Ltd
Jun 2003 - Mar 2006	Chairman, Director, WBM Pty Ltd
Jan 1994 - Jun 2011	Newcastle Business Unit Manager (Machinery), WBM Pty Ltd
Feb 1992 - Jan 1994	Plant Engineer, Webster Manufacturing Limited, Elizabeth SA.
Sep 1988 - Feb 1994	Senior Engineer, WBM Pty Ltd, Brisbane Qld.
Jan 1986 - Sep 1988	Design Engineer, BHP Rod & Bar Products Division, Newcastle NSW
Jan 1979 - Jan 1986	Trainee Engineer, BHP Rod & Bar Products Division, Newcastle NSW

PROFESSIONAL EXPERIENCE

QUANTISE

Quantise Consulting Engineers was founded in February 2014. Quantise provides engineering test & measurement, analysis, design, and expert witness services to manufacturers and industry in and around Newcastle NSW.

BMT WBM PTY LTD

BMT WBM is a specialist consultancy focusing on the application of leading edge technology in the fields of engineering and environment.

Test & Measurement

- Testing of 2000+ hydraulic fitting components to establish the fatigue performance characteristics and improve longwall hydraulic safety.
- Strain gauge testing of drill rigs, draglines, excavators, rope shovels, stockpile machinery, haul trucks, and other mining and heavy industry equipment to establish operating stress ranges and undertake fatigue life assessments.
- Static strain measurements (200+ channels) to verify stress analysis results on passenger rail vehicles.
- Measurement of coupler load distribution along 1.5km long coal freight trains to help understand fatigue damage distribution.
- Measurement of loads in dragline roller slew bearings to assist with life prediction and scheduling of bearing replacement.
- Verification of pressure vessel design by strain measurement during hydrostatic testing.
- Measurement of torque in rotating shafts using telemetry, including conveyors, mining vent fans, dragline swing, and dragline propel drives.
- Testing of underground roof support structures using a 5000 tonne capacity forging press.
- Using torque measurement to characterize load sharing problems between primary and secondary conveyor drives.
- Fatigue cycle counting on mobile machinery structures using laser survey equipment and long term data logging.
- Foundation concrete strength testing.
- Measurement of in-service stresses and loads in longwall roof supports.
- Investigation of pressure transients in longwall roof support hydraulic systems.

Design and Analysis

- Design of modifications for off-road haul truck water tanks to eliminate premature fatigue failures.
- Design of 200 tonne tension and compression test rig for rail vehicles (passenger and freight).
- Design of shafts for large mine ventilation fans.
- Development of long term data logging installations.
- Design of structural repairs for fatigue failures in off-road haul truck structures and mobile bulk materials handling equipment.
- Design of quick filling station for off-road haul truck water tankers
- Moveable access platform design for shiploaders.
- Design modifications to address fatigue problems in dragline masts.

- Design of shafting for process machinery.
- Modifications to longwall roof support structures to correct premature failures.
- Designed and specified specialised unit handling machinery for metal refineries.
- Designed and specified components for aluminium melting furnaces.
- Designed basic electronic equipment for specific testing applications.
- Designed machinery and components for hypersonic wind tunnels for the American National Space Plane (NASP) Project.

Failure Investigations

- Investigation of structural cracking, bearing failures, hydraulic cylinder failures, and gearbox failures in mining machinery (underground and surface).
- Identification of problems in hydraulic cylinders used in underground mining equipment and off-road coal haul trucks, and recommendation for rectification.
- Examination of open gearing failures in draglines and power shovels.
- Investigation of shaft failures in high speed rotating machinery.
- Assessment of performance deficiencies in fluid couplings.
- Component failures in various process machines.
- Investigation of cracking in portal reclaimer structure, shovel car body and crawler frames, dragline tri-structure and dragline fairlead support structures.

Design Audits

- Rail freight vehicle bogies.
- Vibrating screens for mineral processing.
- Dragline structures.
- Underground roof support structures.
- Safety audits on rail mounted mobile materials handling vehicles.
- Underground lifting equipment.

Specifications, Works Supervision and QA

- Specification of high strength alloy steel forgings for bucket wheel excavator shafts and centrifugal ventilation fans.
- Supervision of structural repairs and non-destructive testing of large mobile bulk materials handling equipment.
- Specification of hydraulic leg cylinders for underground roof supports.
- Quality assurance surveillance for longwall mining machinery
- Prepared, evaluated and supervised NDT procedures for large high strength alloy steel forgings.
- Superintendent of repair contract for Brisbane wharf side container crane, contract value \$750,000.
- Conducted quality assurance programs on components being manufactured in Japan and USA.

Longwall Roof Support Hydraulic System Audits

Developed software to assess longwall hydraulic systems. The software inputs include delivery and return hose details, pump and accumulator details, and the roof support hydraulic cylinder details to calculate critical productivity and roof security performance. All parameters can be modified to assess the impact of changing component details or operating strategies. Over 70 hydraulic system studies were completed, with more than 10 including calibration by pressure and flow measurement at the longwall.

Webster Manufacturing Limited produced fractional horsepower electric motors, primarily for domestic appliance applications (dishwashers, washing machines, pool pumps etc.).

- Managed and supervised tool room operations.
- Designed tooling, jigs, fixtures and specialised machinery for the mass production of motor components.
- Programmed and set-up a 16 tool CNC machining centre for production work
- Designed, detailed, and installed an automatic part catcher for a Mazak Quick turn 15N CNC Lathe.
- Identified zero position error problems with an automatic winding machine, designed, detailed and installed a zero position detent device.
- Trouble shooting of pressure die casting problems both with die design and casting practice.
- Arranged and assessed quotations from equipment suppliers for production and materials handling equipment.

Design Engineer

- Prepared specifications, evaluated tenders, and supervised the design and construction of various components of plant and equipment.
- Rectified maintenance problems in various plant departments.
- Construction inspector for steelmaking furnace replacement contract - total furnace weight 1000 tonnes, cost \$70M.
- Responsible for the design and drawing of mechanical and structural components.
- Analysed structural designs using computerised stiffness matrix methods.
- Analysed failures of various plant and equipment.
- Designed and tested experimental equipment to evaluate various plant problems.
- Calculated and analysed thermal movements of large (3m diameter) high temperature gas pipe work and designed support systems.
- Programmed computers for use by personnel in administrative and design disciplines.
- Completed location selection studies, warehouse capacity and layout studies for the Sydney Mini Mill.

Trainee Engineer

A number of separate positions were held under this title. These included:

Service Shops Draftsman 1985 - 1986

- Responsible for design, supply and installation of items including storage and loading facilities, structures and accesses.
- Designed tools and dies for the mass production of various components by upset forging.

- Designed machinery for spraying a uniform ceramic coating onto blast furnace stave cooling pipes.
- Designed various tools and attachments for the machine shop and forging shop machinery.

Construction Inspector for No. 3 Blast Furnace Rebuild (\$40M) 1984 – 1985:

- Responsible for detection of construction errors and subsequent elimination by site modification.
- Wrote and supervised site contracts to correct design and/or fabrication errors.
- Co-ordinated construction work with normal plant operation to avoid loss in production and construction delays.

Engineering Assistant 1983 - 1984:

- Responsible for small maintenance, repair, and design jobs.
- Planned routine maintenance shutdowns and organised manpower in various plant departments.
- Routine testing and supervision of equipment in various plant departments.

Apprentice Fitter & Turner 1979 — 1983:

- Basic training in fitting and turning, gas and arc welding, gas cutting, and general fabrication.
- Basic training in fluid and power transmission including experience in fitting and overhauling hydraulic components, and designing, installing and maintaining hydraulic systems.
- Trained in the operation of many common metal working machines. Operated the following machines during high volume production runs of various components and tools:
 - horizontal milling machine
 - broaching machine - turret lathe
 - shaper
 - power band saw (horizontal & vertical)
 - radial drill
 - surface grinding machines

RESEARCH PUBLICATIONS

Longwall Hydraulics Staple Loc Staple Fatigue Assessment, ACARP Project C19011, 01/08/2012.

Review of Regenerative Technologies to Increase Longwall Advance Speeds, ACARP Project C12022, 15/11/2004.