Jim Benson

Qualifications

- BEng (Civil), University of Canterbury, New Zealand (1988)
- Chartered Engineer UK (1994)

Professional memberships and affiliations

- Fellow, the Institution of Civil Engineers (2006) - Member (1994), ICE Reviewer (2005 onwards)
- Fellow, Chartered Institution of Water and Environmental Management (2010) - Member (1997)
- Registered Professional Engineer, Hong Kong - Civil (2006)
- Registered Professional Engineer, Singapore (PE 4266) - Civil (2007)
- Member, Hong Kong Institution of Engineers (2003), Reviewer (2013 onwards)
- Member, the Association of Project Managers (2006)
- Member, Institute of Materials, Minerals and Mining (2008)
- Member, Institute of Quarrying, Hong Kong (2009)
- Tunnelling Society member - British, Singaporean, Hong Kong, and Australasian;
- Geological Society member - Hong Kong and Malaysian

Expertise

- Multidiscipline engineering, Tunnelling, Underground works, Resident Engineer, Project Management, Claims, Expert Witness
- Asian Business Strategy, Planning, Management and Development
- 11 years' experience in Contract Management
- 12 years' experience in Risk Management
- 22 years' experience in Tunnelling Risk Management

Summary of competencies

Tunnelling and Underground Planning, Design, Construction, Project Management, Owner's Engineer, Claims, Dispute Resolution, and Expert Witness, Specialist optioneering and co-ordination of multi-discipline engineering projects. Management, design and construction of tunnels, railways, stations, structures, sewage treatment, water treatment, reservoirs, pipelines, pumping, cement works, maritime works, drainage, bridges and highways.

Specific design and planning experience of TBMs, tunnels, stations, shafts, caverns, cut and cover, pipe-jacking, and related structures in soft and hard ground. Detailed design of structures including, steel, concrete, water retaining structures, foundations, piles, frames, and bridges. Familiar with associated engineering codes, software and capabilities.

In Hong Kong, Jim was the Design Director, Contract Manager and Risk Manager on **901-Admiralty Station** responsible for the tunnelling and cavern Engineer's Design for the new South Island Line and Shatin to Central Link. Jim was also the **Independent Checking Engineer** and Risk Management Advisor for the Hong Kong MTR **WIL 703, 705, XRL 810A&B, 803A&D, 823A&B, 826, 824, SIL 902, KTE 1002** and DSD **Lai Chi Kok** and **Stonecutters Island Tunnel -** DC/2009/18. Jim was the designated 'Designer' and led the successful Tender (based on an alternative tunnel design) and subsequent Detailed Designs for the Design and Construction of the ***Kowloon Southern Link (KDB200 - West Kowloon to Tsim Sha Tsui East)*** - Link200 JV and the ***CLP - Castle Peak Cable.*** Jim was also the Tunnel Design Manager for Risk Management of 3.5km of rock and soft ground tunnels and stations forming part of the ***Shatin to Central Link (SDC100 – Tai Wai to Diamond Hill Section)***; and carried out the detailed design of the reinforced concrete tunnel lining for the ***Route 8 (Previously Route 9) Nam Wan Tunnel at Tsing Yi*** in granite. Jim has been involved in the design and construction of **14No. Metro tunnelling projects**, and **13No. Stations** in 4No. Countries.

PROJECT EXPERIENCE

July 2014 to present – Managing Director – Benson Consultancy (HK) Limited

PROJECT | Liantang / Heung Yuen Wai Boundary Control Point – Site Formation and Infrastructure works – Contract 2
Client: Dragages Hong Kong Limited
Role: Temporary Works Designer – Consultancy Agreement CV/2012/08-CA021
Key achievements: Prepared calculations, Technical Reports and Drawings for temporary works designs and drawings for TBM Segment and Cooling Plant slabs and Workshop rafts, Cable draw pits, Batching Plant and Silo slabs. Conveyor and Tower crane foundations, and tunnel portal steelwork doors. The 'hands on' design solutions addressed the Contractors risks.

PROJECT | Puyo Hydro Electric Power project - 30MW – Philippines
Client: FirstGen / Jacobs
Role: Owner's Engineer
Key achievements: Providing specialist tunnelling and geotechnical design for the 6.5km tunnel including inputs to the Geotechnical Investigations, GBR (Geotechnical Baseline Report) strategy for the successful tender design. Advised FGEN on risk management and contract strategy. Jacobs (SKM's) works included 35 man years of services.

May 2012 to June 2014 – Group Manager Tunnelling – Jacobs/SKM
Role: Responsible for developing and delivering SKM's Global tunnelling business, including Tunnelling Strategic Plan, Business Plan and Community of Practice for 120No. staff, before Jacobs acquired SKM. Prepared companywide Risk Management procedures for Geotechnical and Tunnelling business.

PROJECT | Shatin to Central Link, Contract 1103 – Hong Kong
Client: GB Foundations and Construction
Role: Specialist Designer
Key achievements: PLAXIS-2D analysis and design of 6mm steel lining to Water Supply Services (WSD) tunnel within 6m clearance of MTR-SCL tunnels constructed using drill and blast techniques.

PROJECT | Li Yu Tang Gas Main Tunnel – Chengdu, Sichuan, China
Client: Chevron
Role: Specialist Tunnelling Advisor
Key achievements: Assessed existing conditions, risks and construction to flooded gas main tunnel under 10 bar hydrostatic pressure. Recommended ingenious risk adverse construction alternative involving tremie concrete, pumped foam concrete and sequential grouting regime.

PROJECT | Northern Line Extension – Nine Elms Station - UK
Client: Banham Group
Role: Expert witness
Key achievements: Expert advice with respect to the planning, design and construction of Nine Elms Station. Critiqued the Consultants design documents and audit trail. Reference was made to London Underground Limited Design Requirements, Standards, Codes of Practice, Risk Management techniques and Guidance documents. Various constraints and construction methods were investigated including top down, bottom up for the station; as well as Earth Pressure Balance TBMs and mining in London Clay for the platform tunnels. The advice enabled the client to 'win' and settle out of court, and achieve their financial and operational objectives.

PROJECT | Tun Razak Stock Exchange – Kuala Lumpur - Malaysia
Client: 1MDB
Role: Tunnelling Advisor
Key achievements: Engineering review and advice associated with transport circulation and utility tunnels. Developed 3D scheme design alternatives that included Mined Tunnels, TBMs, Horizontal Pipe piles, and elevated viaduct construction options. Ground conditions consisted of KL Limestone adjacent to Kenny Hill formation. Existing constraints included Cochrane KVMRT station, Variable Density TBMs (blow out prevented by thixotropic gels), SMART tunnels, and the 12No. lanes of Jalun Tun Razaq/MEX-KG/SMART.

PROJECT | T213 – Thomson Line – Caldecott Station & Cripple Siding Tunnels - Singapore
Client: Leighton Asia Ltd
Role: Tunnel Design Manager
Key Achievements: Responsible for the detailed tender design including NATM sequential excavation that involved managing risks via, 2 stage colloidal silicate grouting, canopy tubes, triple concurrent headings, sequential excavation, lattice girders and fibre reinforced shotcrete – all modelled using PLAXIS. The Station Box utilised Secant Bored Piles and the seepage analysed was verified using SEEP-W. The ground conditions consisted of highly fractured Bukit Timah granite with a variable G3 rockhead.

PROJECT | T208 & T216 - Thomson Line – Springleaf & Stevens Stations & Tunnels - Singapore
Client: Leighton Asia Ltd
Role: Tunnel Design Manager
Key Achievements: Responsible for tunnelling advice that assisted Leighton Asia Ltd to win T208 – Springleaf Station and tunnels. Led the PLAXIS soil structure analysis the design of tunnel linings, secant bored piles, soil- underpasses, TBM retrieval shafts, specialist grouting techniques. Bukit Timah granite with overlying completely decomposed granite and Kallang formation. Construction included TBM, cut and cover, and Horizontal Pipe piling.

PROJECT | F3 to M2 - Pennant Hills to Thornleigh Road tunnel – Sydney, Australia, D&C - tender design – (2013)
Client: Global-Link-JV (Ghella-Acciona)
Role: Peer Reviewer
Key Achievements: Peer Review of construction, tunnelling and cavern options. Optioneering advice related to alignments, TBMs, Road Header, Canopy tubes, bolting patterns with bolts up to 12m in length, Ground treatment, Groundwater drawdown, settlement, spaceproofing and lining designs in Hawkesbury sandstone, Ashfield shales, residual soils and fill.

PROJECT | F3 to M2 - Pennant Hills to Thornleigh Road tunnel Engineering and Environmental scheme design - (2012)
Client: Transurban
Role: Tunnel Designer – Scheme Design
Key Achievements: Specialist tunnelling and risk management advice to Transurban with respect to constructability, crown profile and lining designs based on Road header and Canopy tube construction in Hawkesbury sandstone and Ashfield shales.

PROJECT | Auckland City Rail Link – New Zealand
Client: Auckland Transport and New Zealand Transport Agency
Role: Tunnelling advisor
Key Achievements: Specialist technical and risk management advice, cost comparison and presentation to Auckland Mayor, Councillors, NZTA, AT and other stakeholders for 1No. Cut and cover station at Aotea square, 2No. Station cavern platform stations at Karangahape Rd and Newton Rd, connected via twin bore 6.5m I.D. Earth Pressure Balance TBM tunnels. Geology included East Coast Bays formation, Parnell Grit, alluvium and volcanics. The Reference Class Forecasting (RCF) techniques compared project costs in Hong Kong, Singapore, UK, and Shanghai to reduce budgeting bias, quantify unknowns and reduce cost estimating uncertainties. Advised potential high level strategic, planning, design, procurement and construction risks as well as possible mitigation measures. NZD 2.86bn construction estimate - 2012.

PROJECT | New Zealand – Waitemata Harbour Tunnel
Client: Auckland Transport and New Zealand Transport Agency
Role: Tunnelling advisor
Key Achievements: Prepared cost estimate, risk management and technical advice for the twin bore, 15.5m excavated diameter TBM tunnels. 2.7km twin bored tunnels plus 0.8km of cut and cover road and rail tunnels. Estimate used for budgeting purposes. Geology included alluvium, volcanics and East Coast Bays formation. NZD 1.5bn construction estimate - 2012.

PROJECT | New Zealand - Wellington - Mount Victoria Tunnel Duplication
Client: New Zealand Transport Agency
Role: Tunnelling advisor
Key Achievements: Specialist advice to NZ Transport Agency regarding the proposed dual tunnels. Technical interrogation and optioneering (value engineering) to reduce risks, costs and shorten the construction programme. The proposed tunnel includes two

lanes of traffic and a dedicated cycle/pedestrian walkway. Geology consists of Greywacke, siltstone and sandstone. NZD 170m construction estimate.

Snowy Mountains Engineering Corporation (SMEC), Asia Limited, January 2008 - May 2012
Role: Regional Manager - SMEC International - North Asia (Hong Kong, Macau, China, Mongolia, Taiwan, South Korea, North Korea, and Japan)

Key Achievements: Built business from 5No. Staff in Hong Kong in 2008 and developed AUD 10m/yr. revenue business with 70 staff, in North Asia by 2011. Responsible for all operations, commercial, risk management and technical aspects including staff from 18No. different nationalities in Hong Kong, Mongolia and China. Staff included Technical Directors, Engineers, Country Managers, Office Managers, Accountants, translators, administrative and technical staff.

Role: Managing Director – SMEC Asia Ltd
Key Achievements: Developed HKD 30m/yr revenue business in Hong Kong. Responsible for all operations, commercial and risk management aspects; including growing business in tunnelling, geotechnical, structural, environmental, E&M and transport planning sectors.

- Managing Director, SMEC Asia Ltd (Hong Kong and Macau)
- Executive Director – SMEC Mongolia LLC (Founding Director)
- Director – SMEC Beijing Ltd
- Director – SMEC Consulting Pte Ltd (Singapore)
- Chairman – Engineering Consultants Contracting Ltd
- Project Director – SMEC International

PROJECT | DSD Stonecutter's Island Effluent Tunnels and Disinfection Facilities DC/2009/18. (2011 to 2012)
Client: Chun Wo – CEC - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: The works expand the treatment capacity of the existing Stonecutters Island Sewage Treatment Works from 1.7 to 2.44 million cubic metres per day. Construction includes a drill and blast tunnel, primary and secondary support, chambers, E&M, Building Services and dechlorination plant. The main shaft was constructed from diaphragm walls. The works are associated with the Harbour Area Treatment Scheme Stage 2A upgrading works. Prepared successful the successful tender and advised risk management requirements for Chun Wo – CEC. Construction value USD 88m.

PROJECT | MTR C1002 Kwun Tong Line Extension, Yau Ma Tei to Whampoa Tunnels, Hong Kong (USD110M) (2011 to 2012)
Client: Chun Wo – Hip Hing - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible to Chun Wo – Hip Hing JV for checking the temporary works associated with Whampoa Station and overrun tunnel. Advised on risk management.

PROJECT | MTR C823A Express Rail Link – Tai Kong Po to Tse Uk Tsuen Tunnels, Hong Kong (USD194M) (2011 to 2012)
Client: Maeda – China State - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking the shafts and tunnels at Kam Tin. Hitachi 9.22m Earth Pressure Balance TBM and advising on risk management. There are 2No. 1.2km tunnels at one end of the project and 2No. 800m long tunnels at the other end which interface with the 823B contract.

PROJECT | MTR C823B Express Rail Link – Shek Kong Stabling Sidings & Emergency Rescue Sidings, Hong Kong (USD415M) (2011 to 2012)
Client: Maeda – China State - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking and advising on risk management for the Shek Kong Stabling Sidings & Emergency Rescue Sidings Tunnels. Construction involved diaphragm walls, excavation and lateral support, large culverts and drainage diversions.

PROJECT | Zamyn Uud Regional Logistics Centre, Mongolia/China (USD50M) (2012 to 2012)
Client: ADB Bank / Government of Mongolia
Role: Project Manager and Engineer's Design
Successful Bid Manager and Project Director for a USD 50m Rail/Road Logistics Centre at the Mongolia/China borders. The scheme involves the assessment of issues associated with the transfer of goods and passengers, and construction involves Roads, bridges, railways and cargo handling facilities. The ADB assisted MRA (Mongolian Railway Authority) with funding.

PROJECT | 1500km Railway – Mongolia – Technical Advisor (USD6BN) (2011 to 2012)
Client: MTZ (Government of Mongolia)
Role: Engineer's Design
Successful Bid Manager and Project Director responsible for bidding, winning, and advising on risk management for the 1500km FEED (Front End Engineering Design – Technical Advisor) to the Mongolian Government – MTZ. The railway passes through the extreme climate of the south Gobi desert between Dalanzadgad and Choibalsan including a major interface at Sainshand with the Trans-Siberian railway. Developed strategy for developing a further 3000km of railways.

PROJECT | Ukhaa Khudag – Gashuun Sukhait Rail Project – Mongolia (2009 to 2012)
Client: Leighton Mongolia LLC
Role: Bid Manager/Project Director/Project Manager (Design and Build)
Responsible for the design management and delivery of 225km of continuously welded rail with temperature range of -40°C to 45°C. Responsible for all project management, specifications (procure and construct), and 600No. drawings translated into Mongolian. 28.2mtpa coal Operational requirements and Train simulations generated the final design.

PROJECT | MTR C810A and B Express Rail Link – West Kowloon Terminus Station – South, Hong Kong (2011 to 2012)
Client: Laing-O'Rourke-Hsin Chong Paul Y - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for the checking and advising on risk management for C810B (USD 427m) including slopes, bulk excavation, dewatering, lateral support, reinforced concrete structural works and barging facility.
Client: Leighton-Gammon - JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking C810A (USD1.1B) (2011 to 2012) the Leighton-Gammon - JV on 810A for slope construction. Using a semi-bottom-up top-down approach, over 1.7 million cubic metres of earth were excavated and 600,000 cubic metres of concrete poured and 150,000 tonnes of steel reinforcement fixed in the construction of the 28 metre-deep below-ground rail terminus building. The 11 hectare station has 15No. Platforms and is expected to handle the transit of 99k/pax/day.

PROJECT | MTR – C902 – South Island Line – Nam Fung to Admiralty Tunnels – Hong Kong (2010)
Client: Nishimatsu
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking and advising on risk management for all temporary works designs. Soft ground portal used canopy tubes and steel sets, and the main tunnel was drill and blast.

Client: Sembawang – Hsin Chong/Kumagai Gumi - JV
Role: Tender Design (Design and Build)
Key Achievements: Responsible of all permanent and temporary works design optimization, alternatives, tunnel lining designs. The ground conditions consist of tuff and granite, along with geological features including the Wanchai Gap and Magazine Gap faults.

PROJECT | MTR – C824 - Express Rail Link – Guangzhou to Hong Kong (2010 to 2012)
Client: Kier-Kaden-OSSA- JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for the design checking and risk management advise on the Ngau Tam Mei to Tai Kong Po Tunnels. The Construction consists of a 2.6km long single bore, double track tunnel, and a 400m long bifurcation cavern, stub tunnels, a 90m deep ventilation shaft, and a 40m deep emergency access shaft. The drill and blast construction encountered geology comprising tuff with fault zones and water ingress. The tunnels cross below, and within, 22m of an existing WSD 3.4m diameter water tunnel.

PROJECT | MTR – C826 - Express Rail Link – Guangzhou to Hong Kong (2010 to 2012)
Client: CRCC – Hsin Chong Ltd
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking all temporary works. The ground conditions consist of completely decomposed granite with overlying alluvial soils and marine clay. The northernmost section on the route runs between Mai Po shaft in the New Territories and Huanggang in mainland China. The project is 3.3km long with slightly more than 40% of the 8.7m I.D. twin tubes in the New Territories. A Herrenknecht Mixshield (slurry) TBM was used for the main tunnel drives with ground freezing for the cross passages.

PROJECT | MTR - C821 – Express Rail Link – Shek Yam to Mei Lai Road Tunnels – Hong Kong (2010)
Client: Vinci – Chun Wo – CRGL - JV
Role: Tender Design (Design and Build)
Key Achievements: Responsible for the tender design of all permanent and temporary works including design optimization and alternatives. The ground conditions consist of granite with geological features including the Lead Mine Pass and Tolo Channel faults.

PROJECT | MTR - C803A and 803D - Express Rail Link – Terminus Station – Hong Kong (2010 to 2012)
Client: Bachy Soletanche Ltd
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible to for checking all temporary works including diaphragm walls. The ground conditions consist of completely decomposed granite with overlying alluvial soils and marine clay. There was also poorly compacted reclamation with sand (1994-1996). The station has 15 platforms.

PROJECT | MTR - C705 West Island Line – Kennedy Town Station and Tunnels – Hong Kong (2009 to 2012)
Client: Gammon Construction Ltd
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking all temporary works. The ground conditions include Tuff, Grade III granite, and completely decomposed granite. The cut and cover Station box is unique in so far as it located in a valley feature that required a 3-D seepage analysis to justify the temporary and permanent works design. Soft ground tunnelling techniques, and 2 bar grouting under a tree wall. The Blasting Assessment Report (BAR) required approval from a specialist All Reservoir Panel Engineer (ARPE).

Client: Penta Ocean – Hsin Chong JV
Role: Tender Design (Design and Build)
Key Achievements: Design Director responsible for the tender design of all temporary works, design optimization of permanent works, risk management advice, Blasting Assessment Report (BAR) and the tender submission. Soft ground tunnel and ground treatment under tree wall. Slopes and reservoir were assessed and protected. The top down and bottom up cut and cover options were optimized relative to an existing in-situ bored pile wall supporting a major housing development.

PROJECT | MTR - C703 West Island Line – Sheung Wan tunnels – Hong Kong (2009 to 2012)
Client: Dragages-Bachy-Maeda JV
Role: Independent Checking Engineer (Design and Build)
Key Achievements: Responsible for checking all temporary works and advising on risk management. The ground conditions include Grade III granite, and completely decomposed granite, and passed through a number of existing physical obstructions including SGI and R.C segmental linings, piles, steel sets before breaking through an existing diaphragm wall into Sheung Wan Station crossover box. Construction involved ground freezing using brine, extensive grouting, drill and blast with numerous nearby sensitive receivers and a specialist Bessac TBM that excavated and removed existing tunnel linings.

Client: Leighton-CRCC JV
Role: Tender Design –Target Cost
Key Achievements: Design Director responsible for brainstorming options and tender design of all temporary works, the design optimization of the permanent works, and tender submission. Options included a TBM that dismantled the existing linings, a TBM that excavated the existing linings. Ground treatment, in the form of grouting and ground freezing. The shafts were constructed from diaphragm walls, secant piles, bored piles, pipe piles and sheet piles.

PROJECT | MTR - C901 South Island Line (East) - Admiralty Station and Shatin Central Line enabling works – Hong Kong (2009 to 2012)
Client: MTRCL/Arup
Role: Engineer's Scheme Design
Key Achievements: Design Director for arguably Hong Kong's most complex and high risk Cavern station. The new South Island Line and Shatin to Central Lines are constructed in close proximity to Admiralty Station. The main cavern is formed with minimal cover due to low rock head and the close proximity of the existing Admiralty Station, and operating railways for the Tsuen Wan and Island Line. Responsible as a specialist sub-consultant for the Geotechnical interpretation, draft Blasting Assessment Report (BAR) assessment of potential damage to existing infrastructure, as well as the specialist Cavern design and Risk Management advice, tunnel design analysis using UDEC, and interfaces with TBMs, and underpinning the Island Line tunnels. Involved in value engineering and interrogating options. The main cavern span design options ranged from 12 to 24m. Construction estimate HKD 2.4bn.

PROJECT | International Finance Centre – Office Tower - 25 Floors - 3,000 sqm/floor (Chuangs Towers) – Ulaanbaatar. (2011 to 2012)
Client: Chuangs
Role: Engineer's Detailed Design
Key Achievements: Project Director for the electrical and mechanical design and preliminary steel frame and foundation design that recommended piles due to seismic conditions. The design catered for the Ulaanbaatar district steam heating and hot water supplies.

PROJECT | Edelweiss Hotel – 27 Floors – 3,000 sqm/floor. (2011 to 2012) ***Project Director***
Client: Chuangs
Role: Engineer's Detailed Design
Key Achievements: Project Director for detailed design of the steel structure and E&M including district steam heating and hot water supplies. Recommended piled foundations due to slender shape and seismic conditions.

PROJECT | MTRC C1106 Shatin to Central Link Detailed Design for Hung Hom Station and Associated Tunnels. (2010 to 2011)
Client: MTRCL/Atkins
Role: Detailed condition surveying
Key Achievements: Project Director for the condition survey to Hung Hom Railway Terminus Station. Particular attention focused on Risk Management and concrete elements that may be affected by future ground movement from the construction works and steelwork elements prior to A&A works being undertaken.

PROJECT | Contract Nos DC/2007/23 and 24, Harbour Area Treatment scheme Stage 2A Construction of Sewage Conveyance System - (Dec 2008 to March 2009)
Client: Paul Y McConnell Dowell
Role: Tender Design (Design and Build)
Key Achievements: Design Director responsible for the permanent and temporary works design, and risk management advice. The HATS Stage 2A Sewage Conveyance System (SCS) collects and conveys pre-treated sewage from eight existing Preliminary Treatment Works (PTW) located along the northern and south-western shoreline of Hong Kong Island, to the Stonecutters Island Sewage Treatment Works (SCISTW) for treatment before final disposal into the western harbour via an existing submarine outfall. Design included 20km of tunnels (3 to 5m in diameter) designed with an extensive grouting regime (OPC and microfine) and drill and blast. Scheme includes 15No. Shafts and adits for production and/or drainage purposes. The shaft depths and diameters ranged from 120m to 160m, and 10 to 14m respectively.

PROJECT | DSD Lai Chi Kok Drainage Tunnel – Hong Kong (2008 to 2012)
Client: Leighton Asia Ltd
Role: Independent Checking Engineer (ICE)
Key Achievements: Design and Construct contract. Responsible to Leighton Asia Ltd for the checking of all temporary and permanent works for tunnels and drop shafts, including site inspections. The 4.9m I.D. tunnel passes through granite and soft ground, in close proximity to highway over bridges and other major infrastructure. Herrenknecht Slurry TBM with cutter changes up to 3.45 bar.

PROJECT | LTA-MRT-C916 - Downtown Line–Stage 2 - Beauty World Station and Tunnels - Singapore (Tender Design - 2008)
Client: McConnell Dowell (Singapore) Ltd
Role: Design and Construct - Tender Design
Key Achievements: Project Director, responsible for the successful tender design of Beauty World (Civil Defence) Station and 1.1km of tunnels, including all temporary and permanent works, and Risk Management advice. Value engineering generated unique temporary works (Station box - secant piles/pipe piles) solution to win the tender. The ground conditions comprise competent and decomposed Bukit Timah granite, and overlying soft Kallang Marine Clay. The Station and entrances were optimized spatially to allow for E&M, Ventilation, Civil and Structural requirements; as well as interfaces with a proposed overhead URA building and large existing surface water drainage channel. The tunnels were excavated with a 6.35m OD Herrenknecht slurry (mixshield) TBM.

PROJECT | LTA-MRT-C915-Downtown Line Stage 2 – Tunnels from Beauty World to Hillview – Singapore (2008)
Client: McConnell Dowell (Singapore) Ltd
Role: Design and Construct - Tender Design
Key Achievements: Project Director responsible to McConnell-Dowell for tender design of 2.3km tunnels, cross passages, and the Hillview/station box option. The ground comprised competent and decomposed Bukit Timah granite. Slurry TBM recommended.

PROJECT | Contract No. DC/2007/18 Yung Shue Wan and Sok Kwu Wan Village Sewerage, Stage 1 Works. ELS for Laying the Proposed Sewers through the Main Street (2008 to 2010)
Client: Kaden Construction Ltd
Role: Contractor's Temporary Works Designer
Key Achievements: Design Director responsible for the ELS design to construct sewers along the main street of Yung She Wan. Challenges included limited construction access and the close proximity of the existing village houses found on shallow foundations. The head room limitation was less than 3m and the vibration limit was 5mm/s due to nearby sensitive village houses. For these reasons we devised a two-staged sheetpiling method to successfully resolve issues. HKD 116m.

PROJECT | Detailed Design and Advisory Consultancy Services for Construction of Highway Tunnel across Rohtang Pass near Manali, India (2008)
Client: Government of India / Border Roads Organization
Role: Proof Checking Engineer
Key Achievements: Responsible for the detailed tunnel design checks including temporary and permanent support to the tunnels and portals. The Rohtang Pass Tunnel Project is located in the Himachal Pradesh in India. This is an 8.8km single tube bi-directional road tunnel that passes through the high Himalayan ranges 51 km from the nearest city Manali and at an altitude of 3978m with 3000m cover. Construction involved extensive grouting. The 3km depth generates rock burst issues. At the time of construction, this was the highest altitude road tunnel in the world.

Project Director, Contract Manager and Risk Advisor on the following: - 2008 to 2012

- MTR – 820 Tunnels – Environmental advice to Dragages. Const. - value USD 473m.
- MTR – Lai Chi Kok Station - Cheung Sha Wan – Pedestrian Subway – Kaden (ICE)
- MTR – Tsing Yi Station Commercial Works - Maeda – Temporary Platform (ICE)
- MTR – Tsueng Kwan O South Station – Maeda – Temporary works design
- MTR – Tung Chung Station – Kaden – Temporary Works
- Tak Shing, Goudie - Redevelopment of 369 to 371 Hennessy Road, Wan Chai
- EMSD – CE542007 – Assessment of Fuel Price Estimates – Development Plan 2009-2013
- DSD – Tsuen Wan Drainage Tunnel – Maeda – Structural and Soil Nail analysis
- CLP – Kai Tak Cable Tunnel – Maeda - Tender Design – (Ranked No.1)
- Laiban Dam – 30 MW HEP and 1,900 MLD water supply serving Luzon/Manila (Dam, Tunnels, Pipelines, Infrastructure – Tender Design- Leighton) - Philippines
- Barclays Bank – ICBC Tower – Floor slab checking
- HKIA – Baggage Reclaim – Temporary Steel Platform (ICE)
- Alliance – Shenzhen Quarry – Owner's Engineer, rehabilitation, new access road, drainage
- Alliance - Shek O Quarry – Owner's Engineer, rehabilitation, Car park, Access Road, Slope works, Submerged basin
- Alliance-KWP - Lam Tei and Anderson Road Quarries – Owner's Engineer, Slope assessments

Mott Connell Ltd. (Hong Kong & Singapore) 2003 to 2008 - Associate / Principal Engineer

PROJECT | KCRC Kowloon Southern Link, KDB200 - Austin Station and Tunnels, Hong Kong (2004 to 2008)
Client: Link200-JV (Leighton, Balfour Beatty (Gammon), Kumagai Gumi, John Holland
Role: Designated 'Designer' for Detailed Design – Design and Build (Lump-sum)
Key Achievements: Project Manager / Design Manager / Tunnel Designer and designated MMJV 'Designer' for the successful KDB200 Tender design, detailed design, risk management and construction supervision for the Link200 joint venture on the KCRC Kowloon Southern Link. A 3.8km underground, double tracked electrified domestic passenger railway connecting east Tsim Sha Tsui and Nam Cheong Stations. The tunnels run level at the new Austin Station and existing ETST island platform Stations, and are stacked along Canton Road. Responsible for the tunnel design, risk management advice and co-ordination of the alignment (min. radius 225m), permanent way, settlement analysis and impact assessment (Boscardin & Cording), segmental tunnel lining design, space proofing options, cross passages, sumps and trackside safety issues as the tunnels pass through marine fill, completely decomposed granite and grade G3 granite, with as little as 3m clearance between tunnels, buildings, foundations and the existing MTRCL Tsuen Wan Line tunnels below Salisbury Road. During Construction reassessed the effects to buildings and utilities due to increased volume loss. 8m OD Herrenknecht slurry TBM. Prepared the significant design prolongation claim. Also prepared station/ tunnel/shaft construction claims and justifications for additional time and money for the Contractor. Supported the specialist claims advisors, by classifying and defining the 'cause and effect' arguments to achieve a successful settlement. The MTRCL then took over KCRC towards the end of the project. Construction value HKD ~2BN.

PROJECT | Gambas to Novena/May School Cable Tunnel - Singapore (2007)
Client: Singapore Power
Role: Feasibility Study, Scheme Design and Procurement and Risk Management Advisor
Key Achievements: Project Manager for the study of an 18km cable tunnel supplying 10No. 400kV circuits. This required a ~6.2m ID tunnel. The ground conditions included Bukit Timah granite, Jurong Formation and Old Alluvium. Managed the option study, optimisation and preliminary design of E&M, Ventilation, Civil and Structural elements. Developed TBM and construction logistics, contract strategies, programmes and costs estimates. Presented procurement and Contract options and risk management solutions to Singapore Power Board recommending Engineer's Design for greater control of the management, operations, maintenance and design requirements. SGD 690m.

PROJECT | Beacon Hill Tunnel –Hong Kong (2007)
Client: TownGas
Role: Feasibility Study and Scheme Design
Inspected the Beacon Hill Tunnel and recommended lining design as the Specialist Tunnelling Advisor including modifications to the Japanese Arches and Portal Structures. Advised on maintenance requirements including relining, drainage and structural integrity.

PROJECT | HKU Centennial Campus, Hong Kong (2006)
Client: Gammon Construction
Role: Tender Design (Design and Build)
Key Achievements: Carried out an independent review of the tender submission in order to ensure it attained a maximum tender assessment score. Tender was successful. The scheme consists of twin drill and blast tunnels for reservoir storage (salt and freshwater). Approximately 500m in length and 10m in diameter.

PROJECT | DSD Hong Kong West Drainage Tunnel (2006)
Client: Impregilo/China State
Role: Tender Design (Design and Build)
Key Achievements: Design Manager to Impregilo/China State for Pre-qualification. A 10.5km long 6.25-7.25m ID tunnel with 35 intake structures and a sea outfall. The scope required a reference design including hydraulics, civil engineering, architecture, landscaping, contract documentation and site supervision. The ground conditions were predominantly grade G3 Granodiorite and Tuff with overlying decomposed strata. The alignment passed in close proximity to existing infrastructure. Construction estimate of HKD 2BN.

PROJECT | Ocean Park – Funicular Tunnel and Site Formation, Hong Kong (2006)
Client: Gammon Construction
Role: Tender Design (Design and Build)
Key Achievements: Design Manager for the Gammon tender submission. A 1.2km long ~10-15m I.D. Funicular tunnel with a 10% gradient. The ground conditions are predominantly Tuff. Construction is from 2007 -2010 with an estimate of HKD 1BN.

PROJECT | CLP Castle Peak Cable Tunnel, Hong Kong (Design & Build) (2005 to 2006)
Client: Dragages (Hong Kong) Ltd
Role: Design and Build – Detailed Design
Key Achievements: Project Manager / Tunnelling Design Manager / Bid Manager for the successful Dragages tender design (based on an alternative). A 4.5m ID tunnel, 4.5km in length, connecting the existing Castle Peak Power Station with Tuen Mun, housing 8No. 132KV circuits. Responsible for the detailed design, risk management advice and co-ordination with Dragages included managing the tunnelling, geotechnical, mechanical and electrical design during construction. Specific input to alignment design, 'drained' and 'undrained' segmental tunnel lining details, durability report and co-ordination of the spaceproofing requirements. Maximum overburden of 260m (cover). The ground conditions are predominantly grade G3 Granite and Tuff along with overlying decomposed strata. 5.25m OD Double shield hard rock Herrenknecht TBM. Construction value HKD 0.38 BN.

PROJECT | DSD Tsuen Wan Drainage Tunnel, Hong Kong (Design & Build) (2005)
Client: Drainage Services Department Ltd
Role: Scheme Design
Key Achievements: Bid Manager for the successful scheme design Tender. A 5km long 6m ID tunnel, with three vortex intakes and a sea outfall. The scope required a reference design including hydraulics, civil engineering, architecture, landscaping, contract documentation and site supervision. The ground conditions were predominantly grade G3 Granodiorite and Tuff with overlying decomposed strata. The alignment passes in close proximity to existing KCRC Westrail and WSD water tunnels. Construction estimate HKD 2BN.

PROJECT | Mitcham to Frankston Freeway (EastLink), Melbourne, Australia (2004)
Client: Theiss – John Holland JV
Role: Detailed Design (Design and Build)
Key Achievements: Assistant Project Manager, Tunnel Design Manager, and Risk Advisor for the initial detailed design, strategic planning, budgeting, programming, allocation of resources and fees for tunnelling, roads, bridges and utility diversions. A 3km tunnel in sandstone/siltstone. The tunnel was excavated through sedimentary Silurian Melbourne formation with intrusive dykes, using Roader Header and canopy tubes under the Mullum mullum creek. Responsible for the co-ordination of tunnelling design requirements with the construction and design tasks. Construction value AUD ~2BN.

PROJECT | Hobson's Bay Main Sewer Relocation, Melbourne, Australia (2004)
Client: Melbourne Water
Role: Project Manager and Scheme Design (Alliance)
Key Achievements: Seconded to Melbourne Water as Project Manager to work with John Holland (Contractor) and GHD (Designer). A 3m diameter siphon with ground conditions of soft sandstone, gravels, sands, silts and clay ~35m below the river Yarra. Prepared the Cost reimbursable tender documents based on AS2124, chaired Risk Management workshops, managed the fast track D&C program. TBM tunnel and Diaphragm walls for shafts. Project shelved by Port of Melbourne Corporation. Construction AUD ~80M.

PROJECT | CLP Chi Ma Wan Cable Tunnel, Hong Kong (2004)
Client: Dragages (Hong Kong) Ltd
Role: Detailed Design (Design and Build)
Key Achievements: Tunnelling Design Manager responsible for the segmental lining design and horizontal directional drill (HDD) for 3No. 132KV circuits. Dragages constructed the 3.2km long, 4m internal diameter tunnel using a Robbins hard rock TBM. Tunnel alignment passes approximately 300m under a reservoir and the 0.8m HDD passes beneath a marine estuary at Pui O. Ground conditions consisted of Grade 3 granite. Construction value HKD 700m (including Kwai Ching, Tsz Wan Shan and Tuen Mun cable tunnels).

PROJECT | KCRC Shatin to Central Link, SDC100 - Hong Kong (2003 to 2004)
Client: Kowloon Canton Railway Corporation (KCRC)
Role: Scheme Design
Key Achievements: Tunnel Design Manager, Construction and Risk Management Advisor for the SDC100 section of the Shatin to Central Link. The SDC100 section comprised 3.5km of rock and soft ground tunnels, shafts, a deep mined station, and an Automatic People Mover. Extensive optioneering was carried out before developing the scheme that involved the use of TBM, drill and blast, NATM, Pipe pile and Cut and Cover construction methods as well as ground treatment. Responsible for management of all tunnel and geotechnical aspects for below ground design deliverables including the blasting assessment and analysis of a close proximity WSD water tunnel (~8m) in rock using Phase2, DIPS, UNWEDGE, and SEEP-W, close proximity MTRCL Kwun Tong Line tunnels (~4.5m) using FLAC-3D, and TBM launch shafts and Station box using FREW. This included input to the Geotechnical Basis of Design, Ground movement prediction, Instrumentation and Structural Options reports. Prepared Working Papers on TBM Methods, Tsz Wan Shan Station NATM construction in CDG (including risk assessment), WSD tunnel survey and construction interface, MTRCL Railway Protection Interface, and Explosive Magazine Site proposals. Supervised deliverables for tunnels and Automatic People Mover including reports, specifications and drawings for Construction, Tunnelling, Cut and Cover, Durability, Environmental Description, Fill Management, Existing Buildings and Structural Assessment and Trackside Safety. Construction value HKD ~35bn in 2003 became HKD 80bn in 2010.

Charles Haswell and Partners Limited - 1992 to 2003, Haswell (Singapore)
2002 to 2003 - Specialist Tunnelling and Risk Management Advisor –Project and Office Manager
Responsible for all of Haswell's Singapore operations and project management in Singapore.

PROJECT | Link Sewers to the Deep Tunnel Sewerage Scheme, Singapore (2000 – 2003)
Client: Singaporean Consultants - KTP, CKM, CHP, PWD, CDM, Fong Consult
Role: Specialist Tunnelling and Risk Management Advisor
Key Achievements: Specialist sub-consultant advice included site investigation, pipejacking, vortex drop shaft and hydraulic design, specifications, settlement, instrumentation and monitoring, construction methods, machine selection, risk assessments, tender evaluation to a number of local Consultants engaged by the Public Utilities Board. Specifically Tuas-5, Link-U-Upper Thomson, Link-H-Lentor, Link-S&T-Novena, Link-R, Link-D2. The maximum length of pipejack was ~1km. The combined length of sewers is 50 km with internal diameters ranging from 0.25m to 3 m, shafts up to 35m deep, and ground conditions including Gombak Norite, Bukit Timah Granite, Jurong Formation (Mudstone and Sandstone), Old Alluvium (Lightly cemented Sandstone), and Kallang Formation (very soft Marine Clay). The Upper Thomson – Link 'U' Sewer used a Herrenknecht Dual-Mode (alternating Slurry & EPM) TBM for the 3km at I.D.2.4m and 4 bar pressure (max.). Prepared alternative designs and extensive optioneering. Construction cost ~ SGD 200m.

PROJECT | Tanah Merah Link Sewer, Singapore
Client: Ed Zublin
Role: Tender Design (Design and Build)
Key Achievements: Design of 44No. temporary shafts using caissons, cast in-situ, segments, secant piles and NATM on the Tanah Merah Link Sewer project. Advised on Risk Management.
PROJECT | Kranji Flow Equalisation Basin, Singapore
Client: Ed Zublin
Role: Tender Design (Design and Build)
Key Achievements: Tender design of temporary and permanent works to a Flow Equalisation Basin, including compliance with water retaining codes. Advised on Risk Management.

PROJECT | NEWater Project, Singapore
Client: PUB/KTP Consultants
Role: Specialist advice
Key Achievements: Prepared the NEWater pipeline Specification in line with Singaporean regulations and international codes of practice.

PROJECT | Kallang Expressway Contract 421, Singapore (Design & Build)
Client: Woh Hup
Role: Tender Design (Design and Build)
Key Achievements: Design of the underground tunnels on the Kallang Expressway Contract 421. A 3-lane dual carriageway cut and cover tunnel in Marine Clay and Old Alluvium. The permanent and temporary works design included reinforced concrete piles, diaphragm walls (40m deep), sheet piles, and water retaining reinforced concrete box.

PROJECT | Route 9 Nam Wan Tunnel, Hong Kong
Client: Gammon Construction/Arup
Role: Detailed design (Design and Build)
Key Achievements: Prepared the successful Tender stage detailed design as sub-consultant to Arup. Designed the reinforced concrete tunnel lining for main tunnel and cross passages in rock for the Route 8 (Previously Route 9) Nam Wan Tunnels from Tsing Yi to Cheung Sha Wan in Hong Kong. HKD 1.2BN.

PROJECT | Channel Tunnel Rail Link Contract 361, London, UK (Design & Build)
Client: Murphy Group
Role: Detailed designer (Design and Build)
Key Achievements: Detailed designer for the cofferdams and temporary works to the specialist crossings RLX 105 and 103 on the Channel Tunnel Rail Link Contract 361. 10m deep excavation with sheet piles, steel walings, and concrete base slab.

Cement Industry, Haswell (UK), 1999 to 2000 - Project and Contract Manager
PROJECT | Padeswood Cement Works, Wales, UK
Client: Castle Cement
Role: Detailed Designer (Engineer's Design)
Key Achievements: Responsible for the Project and Contract Management of all Civil Engineering aspects including Client liaison, Planning, Civil design and Cost Control of the £620k fees. Reassessed Civil design brief and expanded scope of services to £1.2m fees. Process Plant design and supply by F.L. Smidth. Overall project costs estimated at £45M.

PROJECT | Buxton Lime Industries Cement Works, Derbyshire, UK (Design & Build)
Client: Thyssen-Krupp Polysius
Role: Tender assistance and design
Key Achievements: Project Manager responsible for Client liaison, Civil Contractor Selection, preliminary civil designs and quantities. Designed post tensioned silos from first principles and checked to DIN standards. Construction estimated at £120M.

Haswell (Scotland), 1998 to 1999 - Resident Engineer
PROJECT | Clinker Cooler Works, Dunbar, Scotland, UK
Client: Blue Circle Cement
Role: Engineer's Representative – Civil works (Design and Build) – Responsible for Design Contract and Risk Management
Key Achievements: Planned and co-ordinated all subcontractors works during the shutdown period using Powerproject software to ensure all works were undertaken safely and expediently. Supervised the civil subcontractor Tilbury Douglas Construction. Resolved unforeseen physical difficulties, design proposals and construction methodology in order to progress the works as quickly as possible. Assessed and evaluated all Civil/Structural/Geotechnical variations, claims and extensions of time to achieve a successful settlement. Model Form 'A' Conditions of Contract.

Haswell (Trinidad), 1997 to 1998 - Design Co-ordinate & Sub-Consultant Manager – Water Treatment
PROJECT | South Water Supply Project, Trinidad, West Indies (Design & Build)
Client: Trinidad and Tobago Water Services (TTWS)
Role: Design Co-ordinator – Responsible for Design Contract and Risk Management
Key Achievements: Co-ordinated the South Water Supply Project team operating within Trinidad and Tobago Water Services Ltd (TTWS) and the Water and Sewerage Authority (WASA). Value $TT 643M (approx. £63m). The project required upgrading an existing 270 Mld Water Treatment Plant to provide a new 70 Mld stream. Other works involved providing an additional 11 Mld to be treated by

modifying eight existing Water Treatment Plants served by borehole water wells. The plants required refurbishment, upgrading and/or replacement. Sixteen new borehole water wells were drilled or refurbished. An existing 20km transmission main was provides with a new 900mm diameter dual steel pipeline. Further works included 70 km of new transmission and distribution pipelines with diameters varying (100 - 300mm). Design Co-ordination involved extensive information gathering and liaison with the Client (WASA) and other bodies to finalise the design requirements. Field investigations were undertaken to finalise the scope of works. Local Consultants were engaged and managed to produce tender documents. Planning Permission required liaison with a wide range of engineering disciplines in order to ensure the objectives were co-ordinated. Haswell and the local consultants jointly produced the D&C tender documents. The Conditions of Contract were based on modifying the IChemE Red Book and FIDIC.

Haswell (London & Birmingham), 1996 to 1997 - Project Manager – Sewage and Water Treatment

PROJECT | Hampton Ozonation WRW, London, UK (Design & Build)
Client: Miller Construction
Role: Bid Manager
Key Achievements: Responsible for preparing and presenting the civil design to Thames Water Utilities. Nominated as Design Co-ordinator. Scheme awarded to in-house Designers – Taylor Woodrow. Construction value ~£20M.

PROJECT | Ladybower and Ashopton Viaducts and associated Pipebridge Refurbishment, Midlands (UK)
Client: Severn Trent Water Ltd.
Role: Project Manager
Key Achievements: Responsible for the detailed design, drawings, contract documents, sub-consultant management, and co-ordination of design team. A Severn Trent Water Millennium Project located in the Derbyshire Peak District. Construction value ~£7M.

PROJECT | Wombourne Sewage Treatment Works, Wolverhampton, UK
Client: Severn Trent Water Ltd.
Role: Project Manager
Key Achievements: Managed the site investigation, structural survey, feasibility study and design works for Severn Trent Water. The hydraulic modelling included the provision of a new humus tank as well as renewing bacteria bed media to conform with consent requirements. Construction value ~£700K.

PROJECT | Barby Service Reservoir refurbishment, Midlands, UK
Client: Severn Trent Water Ltd
Role: Project Manager
Key Achievements: Prepared the Feasibility Study, and recommended a new 15 mega-litre reservoir due to operational and demand requirements for Severn Trent Water. Permanent chlorination and new pipework were also provided along with internal remedial works. Construction value ~£1.5M.

PROJECT | Ilkestone Croft Yard Reservoir refurbishment
Client: Severn Trent Water Ltd
Role: Project Manager
Key Achievements: Managed the detailed design which involved reviewing internal lining alternatives and cost estimates. A Severn Trent Water project valued at £90K.

PROJECT | Gas Main Bridge Crossing, Barry, Wales
Client: TransCo. Ltd
Role: Project Manager
Key Achievements: Managed the design of the bridge that spanned twin Railtrack lines and required maintenance access to the 300mm diameter pipelines. A British Gas Transco project value at £50K.

PROJECT | Armitage Sewage Treatment Works, Midlands, UK
Client: Severn Trent Water Ltd
Role: Project Manager

Key Achievements: Responsible for the design of all civil renewal works. The feasibility study revealed hydraulic and pumping constraints that were optimised during the detailed design. A Severn Trent Water project valued at £880K.

Haswell (London- UK), 1995 to 1996 - Project Manager & Senior Engineer – Tunnelling and Structures

PROJECT | CrossRail redevelopment at Liverpool Street Station, London, UK
Client: Transport for London (London Underground Ltd and British Rail)
Role: Tunnel and Cavern Designer and Risk Management Advisor
Key Achievements: Sub-consultant to W.A. Fairhurst. Detailed structural and geometrical NATM design of underground caverns, ventilation shafts, escalator shafts, station tunnels, running tunnels. Checked design from first principles for caverns (dome shaped circulation concourses). Resolved the cut and cover design where the tunnels interfaced with the Station box. Designed the escalator shafts in S.G.I. where NATM was not feasible in the Woolwich and Reading gravel beds. Rescheduled the overall programme using Power Project to achieve the optimum construction sequence in London Clay, Lambeth Group, Thanet Sands and Chalk.

PROJECT | Northern Line tunnels, London Bridge, UK
Client: City of London
Role: Specialist Tunnelling and Risk Management Advisor
Key Achievements: Advised the City of London during reconstruction of the Northern Line tunnels beneath London Bridge for the Jubilee Line Extension. Particular attention was given to the close proximity of the River Thames and London Bridge when reviewing tunnelling construction methodology on site. Arranged to issue an injunction order as the Contractor refused to comply with man lock specification requirements.

PROJECT | Clacton Foul Water Sewer Relief project, Essex, UK
Client: AMEC
Role: Tender Design (Design and Build)
Key Achievements: Prepared the successful tender design and drawings. This included segmental reinforced concrete shaft and tunnel linings and modifications to the existing sea outfall chamber. Construction value £26M.

PROJECT | Railtrack Southern, UK
Client: Railtrack
Role: Tender Design – Consultancy services
Key Achievements: Prepared Tender designs for the Railtrack Southern and North East Zones inspection and maintenance management of railway under and over bridges, retaining walls, embankments, and structures. PICOW and PTS qualified.

PROJECT | Drainage Tunnel, Malta
Client: Gruppo Dipenta Construzioni
Role: Tender Design (Design and Build)
Key Achievements: Prepared the tender stage drainage tunnel lining design in Pwales, Malta for Gruppo Dipenta Construzioni. The proposed lining considered earthquake loadings and in soft ground utilised steel fibre reinforced shotcrete. Value £10M.

PROJECT | Storm Relief Tunnel, Hastings, Sussex, UK
Client: Southern Water Ltd
Role: Tunnelling and Risk Management Advisor
Key Achievements: Developed cost and programme estimates based on construction options for a 6.5m ID storm relief tunnel. Construction value ~£20M.

PROJECT | Heathrow Express Tunnels, London, UK
Client: London Underground Limited
Role: Specialist Tunnelling and Risk Management Advisor
Key Achievements: Advised London Underground Limited on site with respect to the stability of their Piccadilly Line running tunnels and station during the construction of the Heathrow Express tunnels after the well documented NATM collapse. NEC form of contract.

PROJECT | East London Line, London, UK
Client: London Underground Ltd; **Role:** Feasibility Study
Key Achievements: Feasibility design of escape tunnels and flood gates at Rotherhithe and Wapping Stations on the East London Line for London Underground Limited.

Grafham Carbons Limited, West Midlands – UK (1993 to 1995)
Client: Grafham Carbons Ltd (Severn Trent Water and Anglian Water – JV)
Role: Engineer's Representative (Seconded from Haswell) – Responsible for Contract Management
PROJECT | Tipton - Granular Activated Carbon Regeneration Plant – West Midlands, UK (Design & Build)
Key Achievements: Engineer's Representative responsible for the Contract Management, civil, mechanical and electrical construction, commissioning, performance tests and final account. The scheme included a kiln, acid bath, water retaining structures, extensive pumping, pipework, gas and chemical treatment, and full operational control by SCADA. Vibro-compaction piles and pad footings provided support to the 20m high main building. Additional delegated powers include supervising and approving design checks. The programme, delays and extensions of time were analysed using the "Time Slice" approach on the Powerproject software package. Responsible for Civil, Mechanical and Electrical Inspectors as well as the Plant Manager during construction, commissioning and the performance tests. IChemE (lump sum) Contract. Tender value £8.25 million. Further advice during the maintenance period, included a lining investigation report. Attended Board meetings and advised on progress, commercial, safety and technical aspects. Critically evaluated all the Geotechnical, Civil, and Structural variations, extensions of time and claims to achieve a final project cost of £8.55M.

Charles Haswell and Partners Ltd, London – UK, 1992 to 1993 - Graduate Engineer – Tunnelling and Structures
Responsible for training all London Operations Staff in the effective use of their Quality Assurance procedures before successful certification.

PROJECT | Northern Line Tunnels, London, UK
Client: London Underground Ltd
Role: Tunnel Designer
Key Achievements: Design Engineer responsible for the detailed design of permanent and temporary works including tunnels, shafts, openings and track support system integral within specialist Tunnel Shield for the Northern Line tunnel lining replacement project. Two existing 150m lengths of SGI running tunnel linings were replaced with a larger stainless steel lining (with a 400 year design life) due to naturally occurring sulphuric acid in London Clay. The running tunnels were relined during night-time possessions to maintain normal tube-train commuting during operational hours. Construction options (GRP, SGI, RFC, SS) were interrogated during the design process. Settlement was estimated based on O'Reilly and New. Responsible for preparing detailed designs, Specifications, Bills of Quantities, cost estimates and Construction programme options. Construction value £7M.

PROJECT | Jubilee Line, London, UK
Client: London Underground Ltd
Role: Tunnel Designer and Risk Management
Key Achievements: Responsible to London Underground Limited for structural advice requested during the Waterloo International escalator tunnel construction that interfaced with the Jubilee Line. Advice related to risk management and the resolution of over stressed temporary supports under load from compensation grouting. Construction value £5M.

PROJECT | Black Country Sewerage and Drainage Project, West Midlands, UK
Client: Miller Construction
Role: Detailed Designer (Design and Build)
Key Achievements: Detailed design of tunnel intersections, manhole shafts, base slabs and reinforced concrete chambers for the Black Country sewerage and drainage project. Construction value £1M.

PROJECT | Hinstock STW, UK
Client: Severn Trent Water Ltd
Role: Structural Designer
Key Achievements: Designed all structures including tanks, flow chambers and buildings for the Hinstock STW. Construction value £8M.

Robert West and Partners, London – UK, 1989 to 1992 - Graduate Engineer – Structures, Bridges, Highways and Maritime

PROJECT | River Seven, Yorkshire, UK
Client: North York Moors National Park
Role: Structural Designer
Key Achievements: Detailed design of a footbridge spanning 21m across the River Seven in the North Yorkshire Moors. Arched steel beams with stainless steel pins and teak decking and hand railing. Prepared the Contract Documents and supervised drawing production. Modelled the 3-pin arch snap-through failure mechanism using the LUSAS-FEA software package. Construction value £55K.

PROJECT | Gallion's Reach Docks, London, UK
Client: London Dockland Development Corporation
Role: Design Engineer
Key Achievements: Preliminary design of lock gates at Gallion's Reach on the river Thames. Detailed structural and preponderance design check of lock gates at the King George V Docks on the Thames.

PROJECT | Kingston upon Hull Docks, Humberside, UK
Client: London Dockland Development Corporation
Role: Design Engineer
Key Achievements: Preliminary design of lock gates at Kingston upon Hull. Detailed structural and preponderance design check of lock gates.

PROJECT | Replacement Coastal Defence Scheme, Littlehampton, UK
Client: Littlehampton Council
Role: Design Engineer
Key Achievements: Detailed design and preparation of tender documents and drawings for a replacement coastal defence scheme in Sussex. Research work involved Hydrographic surveying to obtain sea bed levels and tidal currents for the Bathometric computer model. Physically modelled at Hydraulics Research in Wallingford, UK. Construction value ~£2M.

PROJECT | Timber Framed Jetty, Greenhithe, UK
Client: Port of London Authority
Role: Maritime and Structural Designer
Key Achievements: Structural survey, structural check and redesign of a timber framed jetty on the river Thames.

PROJECT | Trident Submarine Channel and Beacon Structures, Barrow-in Furness, UK
Client: Ministry Of Defence
Role: Maritime and Structural Designer
Key Achievements: Design of leading light and beacon structures, piled foundations and navigation channel for Trident submarines.

PROJECT | Bridges, Highways, Drainage and Retaining Walls, UK
Client: Leeds City Council
Role: Road and Drainage Designer
Key Achievements: Design of highways, retaining wall, and drainage design for 2km of dual carriageway at Pudsey, Leeds. The highway alignments, slope stability and drainage networks were all verified using the MROAD-3, SLOPE and CADS-DRAINAGE software packages. Value £5M.

- Highway alignment, roundabout and priority junction design using the MROAD-3, ARCADY and PICADY software packages.
- Analysed various masonry arch bridges in North Yorkshire as part of the Department of Transport's 40 tonne load assessment.
- Prepared all Contract Documents, for a bridge replacement project in Bridport, Dorset. Value £200K.
- Designed reinforced concrete elements for a pumping station in Darenth, Kent. Construction value £70K.

Robert West and Partners, London – UK, 1990-1992 - Resident Engineer

PROJECT | King George V dock Bascule Bridge and Lock gates – London Docklands

Client: London Dockland Development Corporation Ltd

Role: Resident Engineer

Key Achievements: Supervised the final civil works, Mechanical and Electrical commissioning of the Bascule Bridge and Lock gates. Taylor Woodrow was Contractor. Construction value £2M. In addition, prepared the Specification and supervised all aspects of the final civil works during the three months construction period. The London Docklands Development Corporation was the client, and the Geoffrey Osborne Builders were the Civil Contractor. Construction value £150K.

Lake Coleridge Power Station, Canterbury, New Zealand, 1987 - Undergraduate Engineer, summer placement

Client: Ministry of Works

Role: Construction Labourer

Key Achievements: Internal repairs to the Lake Coleridge Hydroelectric Power Station intake tunnel. Construction labouring, shuttering and fixing reinforcement to penstock foundations and bridge abutments that supported pre-stressed concrete beams.

Bay of Plenty Harbour Board, New Zealand - 1986 – Summer Placement

Client: Bay of Plenty Harbour Board

Role: Undergraduate Engineer

Key Achievements: Site Supervision of mooring dolphin construction and pile driving on a major wharf extension at the Port of Tauranga. Hydrographic surveying and preparation of structural designs and drawings for the Harbourmaster's building extension.

Key Courses Attended

- Strategic Leadership – Melbourne Business School (2010)
- Leadership – Ashridge, UK (2005)
- Cantonese and Mandarin for Executives (2010)
- Project Management – (1998)
- CDM: Planning Supervisor Role – (1997)
- Confined Space: UK (1992-2000), Singapore (2000-2003) and Hong Kong (2003 -2016)
- Lusas – Finite Element Structural Analysis – (1993)
- Powerproject Planning – (1994)
- Soft Ground Tunnelling; Imperial College, London, UK – (1993)
- Hydraulic Design, UK – (1991)
- Railtrack PTS and PICOW, UK (1994)
- HKSTA Certified Confined Spaces Worker Section 4(1) of the HKFIU (2010)

Software Package Knowledge

PROJECT MANAGEMENT: Primavera, Power Project, Microsoft Project, Excel, Word
STRUCTURAL: S-Frame & S-Steel, Sand, NLStress, LUSAS – FEA, Images 3-D, CADS, STRAND7, SAP2000.
TUNNELLING & GEOTECHNICAL: FLAC, PHASE2, FREW, SEEP-W-3D, UNWEDGE, DIPS, PLAXIS-2D/3D, UDEC.
Haswell in-house tunnelling and soil-structure interaction software: TUNGEN, CONCOL, CONTUN packages that interface with Sand & NLStress. Slope, CADS-Retain, CADS-Piled Wall.
HYDRAULICS, DRAINAGE, HIGHWAYS: CHAT, Loop, CADS-Drainage, M-Road3, ARCADY, PICADY

Languages

English – reading, writing and speaking – Excellent
Cantonese, Mandarin, Japanese, Spanish – Minimal

Papers Presented

Benson J.F. (2003) *'Design Considerations for Small Diameter Tunnels in Singapore'* – Proceedings of Underground Singapore, "Updating the Engineering Geology of Singapore" 27th -29th November 2003, NTU, Singapore.

Wightman, N.R. & Benson J.F. (2014). *"Impact of changing geological conditions for foundation design and construction in Tung Chung New Town Area".* Proceedings of HKIE 34th Geotechnical Division Annual Seminar, 30 May 2014, pp135-141.

Benson, J.F., Wightman, N.R. and Mackay, A.D. (2014). "*Cost comparisons for metro tunnelling projects in 4No. major world cities*". Proceedings of World Tunnel Congress - WTC2014 & 40th ITA-AITES General Assembly, at Iguassu Falls, Brazil, 9-15 May 2014.

Referee/s

Justin Taylor
Risk Manager
Leighton Asia – Hong Kong
+852-9359-3088

Tom Barrett
Construction Manager
Mass Transit Corporation Limited – Hong Kong
+852-9100-6113