



John Christopher Bird

Chief Engineer

Profile

Chris is a Chartered Mechanical Engineer and a Fellow of the Institute of Mechanical Engineers with over twenty five years experience in the specification, design and operation of large mechanical plant. With a PhD in the design of tunnelling equipment using the finite element method. He has worked on the design, commissioning and operation of many TBMs including the Channel Tunnel. In addition he also specialises in mechanical handling systems for both conveying and lifting. He also specialises in the design and qualification of cranes and lifting equipment for use in a nuclear environment. Drawing upon this experience he has undertaken the role of expert witness in both litigation and insurance matters on lifting, mechanical failure of plant in general and more specifically construction equipment.

Key Experience

- Design of Tunnel Boring Machines
- Mechanical handling systems
- Mechanical design for movable structures, bridges, shiplifts and Ro Ro
- Third party checks of mechanical systems
- Hydraulic systems
- Commissioning of mechanical plant
- Design and seismic validation of cranes and other lifting equipment for use in a nuclear environment
- Use of the finite element method for engineering design
- Expert witness

Profession

Mechanical Engineering

Joined Atkins

January 2009

Nationality

British

Qualifications

BSc (Hons) Mechanical Engineering
 MEng Stress Vibration and Design
 PhD Tunnelling Shield Design,
 FIMechE, CEng

Professional Associations

Chartered Engineer, Fellow of the Institute of Mechanical Engineers.
 Registered as an expert witness with the Law Society

Experience with Atkins

Job Title: Chief Engineer

June 2010 – Present

Seconded to ITER Project, Cadarache, France. Atkins are 25% stakeholder in Engage who have been awarded the contract to be the Architect Engineer for the design of the all the buildings and associated services. Chris is the lead engineer for the specification of all of the handling equipment within the buildings, which includes

- 7 number industrial cranes from 2 to 750t
- 11 Nuclear, high integrity, remote controlled cranes from 5 to 60t
- 46 Port Cell Doors, shielding and confinement to the Tokamak
- 100 shielding and confinement doors
- 6 passenger lifts and 2 number 12t goods lifts

January 2009 – May 2010

- Continuation of the design of the back-up systems for both a 9 and 10 metre Tunnel Boring Machine
- Design validation of Cranes for working serving submarines at Her Majesty Naval Base Clyde
- Reviewing of cranes for the offshore industry
- Design of Road and Pedestrian Bridges for the Crossrail Project (Canary Wharf)
- Clients representative for the Media City Footbridge (Salford Quays)
- Review of Electrical Control System & Safety Integrity Level (SIL) assessment for Roll On Roll Off Facility
- Third Part check of River Suir Bridge Gantry

1989 to December 2008 - Technical and Quality Director

1987 to 1989 - Senior Design Engineer and Quality Assurance Manager

Movable Structures:

- Technical Advisor to the Highways Agency for Moveable Bridges
- Design of Ship Lifts
- Design of mechanical, electrical, hydraulic and structures for the Torbay footbridge and impounding lock gate
- Modifications to pedestrian swing bridge, The Deep, Hull
- Third party check of swing bridge
- Design of mechanical elements for Roll-On Roll-Off bridge
- Review of existing Roll-On Roll-Off systems for compliance with BS 6349 part 8 and recent changes in EC directives

General Engineering:

- Design of cargo crane jib, coal grabbing crane jib and general lifting equipment involving seismic verification
- Design/Verification of fairground equipment
- Design and evaluation of mechanical handling system
- Design of Conveyor Systems
- Design of Crane bridge for 280t Steelworks crane
- Design of structural steelwork
- Dynamic assessment of structures and machines
- Design of welding manipulator

Tunnelling Related Projects:

- Design of Channel Tunnel Boring Machine. Responsible for works testing and commissioning of the Channel Tunnel Boring Machine. Employed as a member of the Robbins Markham JV site commissioning team and retained as site mechanical engineer
- Seconded to Storebaelt Project Denmark (1992 - 1995). Responsible for co-ordination of the safety and risk analysis on behalf of the client. The project value was 600 Million Sterling for the construction of two 8.75 metre diameter, 8 kilometre rail tunnels. In addition from January 1994 responsible for the Tunnel Boring Machine and Technical Management
- Retained by Lesotho Highlands Development Agency as the TBM advisor for Mohale-Katse Tunnel
- Design audit of Storebaelt tunnelling machines
- Review of suitability of hardrock TBMs, Hong Kong
- Retained on behalf of Hong Kong Government as an expert witness with respect to suitability of TBMs
- Audit of the refurbishment of the shield roadheader
- Retained by Thames Water to redesign upgrades to Lovat TBM
- Audit of Lovat TBM for use on Port Headland Iron Ore Tunnel (Australia)
- Review of failure to Sealing System of TBM main bearing St Clair Tunnel (Canada)
- Review of main bearing and sealing problems for Brighton and Hove Stormwater Project on behalf of Southwest Water
- Design and commissioning of two shields, 6 foot and 8 foot diameter, for use in drill and blast tunnel including provision for segment handling and conveyor systems for mucking out
- Flood Alleviation Scheme Polperro: Roadheader failure
- Design of back-up equipment for Tunnel Boring Machine on behalf of Kawasaki Heavy Industries, for use on the Channel Tunnel Rail Link
- Technical assessment of TBMs for insurance claim purposes
- TBM assistance to Scottish & Southern Power on the Glendoe hydro electric scheme
- Technical advisor to Downer Engineering (Singapore)
- Design of TBM back-up equipment for Metro system

Nuclear Related Projects:

- Life assessment of 80 tonne cantilever crane for nuclear refuelling
- Design and Seismic validation of Shield door for BNFL
- Seismic validation of 7 EOT cranes for BNFL
- Seismic validation of 10t and 45t dockside cranes for Devonport Dockyard

- Independent Technical Assessment of Hydraulically operated load follower device for servicing the reactor fitted to a submarine
- Independent Pier Review of ship lift at Devonshire Docks, Barrow-in-Furness to be reclassified for ASTUTE class submarines
- Seismic analysis for Gas Circulator Crane at Dungeness Power Station
- Design and seismic validation of lifting bogie for reactor head torque tightening machine
- ITA of Flask lifting rig for Sizewell 'B'
- Design of 4t lifting attachment for BNFL Crane
- Naval mooring boom bearing assessment
- Validation of SLD Cranes for servicing Nuclear submarines
- Handling equipment for explosives in an experimental environment

Involvement in Litigation and Arbitration:

- Registered as an expert witness with the Law Society
- Evaluation of Belt Conveyor Systems
- Evaluation of Conveyor System in a paint plant
- Failure of Rock Crushing Plant
- Performance of tunnelling equipment
- Fatigue failure of crane beams
- Fatigue assessment of escalator bracket
- Assessment of side loading fork lift truck
- Evaluation of a conveyor system for articulated lorries through an x-ray system
- Investigation of sling failure whilst lifting a canal boat

Experience with Dowty (Hucknall) Ltd (1985-1987)

Job Title: Senior Design Engineer

- Design and testing of mining supports for use on longwall faces and in the roadway.

Experience with Markham and Company Limited, Chesterfield (1983-1985)

- Design and commissioning of mining roadway supports and tunnelling equipment. Design and development of pneumatic conveying equipment and systems. Design of minewinder brakes and headgear pulleys.

Experience with Sheffield University (1980-1983)

Job Title: Research Student

- Subject: An investigation into the design of tunnelling shield.

A design method was developed for tunnelling shields which involved quantifying the loads which are then applied to a series of numerical models, by way of an example a case study was undertaken. The work was validated by both experimental techniques and finite element models which were generated using the PAFEC finite element package.

GEC Power Engineering (1978)

Job Title: Technical Assistant

- Mechanical Design of a dual focus laser anemometer.

Training:

- CCNSG Contractor Passport: Trainow Safety Training
- The Construction Regulations 1996: Safety Training Ltd
- Integration of Health & Safety Legislation: CITB
- Lectured on Appropriate Risk Assessment Technique for Major Civil Engineer project: Capitia Training
- CDM Regulations - A Practical Guide: Capitia Training
- CDM Regulations 2007 by Joyce Legal
- Trained auditor for BS EN ISO 9000:2000 Quality Management Systems
- Private study of British (and other International) Standards, published data required for the project being undertaken

Publications:

- Selection of TBMs for the Channel Tunnel and Storebaelt Tunnel. Chalk Tunnels Engineering Geology Symposium, 2 - 4 September 1995 University of Brighton
- Time to Belt Up: Review of the role of conveyors in tunnelling. Tunnels and Tunnelling, September 1998 issue
- The operation and maintenance of bridge access gantries and runways. Second Edition (2007). Institute of Structural Engineers. Member of reviewing committee and contributor