

PERSONAL DETAILS

Nationality	British
Profession	Chartered Civil engineer
Specialisation	Cement and concrete technology
Position in Firm	Director
Year of Birth	1955
Years with Firm	6

LEGAL CASE EXPERTISE

Over 40 years of industry experience in the field of concrete construction technology, inspection, testing, maintenance and repair. A chartered civil engineer recognised at the highest level by the Engineering Institutions and founder-director of Robery Forensic Engineering Limited. Formerly with contractor Taylor Woodrow, Stangers and consulting engineers Maunsell/AECOM & Halcrow/CH2M.

Accredited expert in failure investigation & forensic engineering, serving as an expert witness on concrete and construction issues, experienced in Technology and Construction Court, Arbitration, Mediation, Adjudication & Public Inquiry. Nearly 90 publications/presentations in the field of concrete performance. Fields of expertise include:

- appearance of structures and visual assessment
 - basement concrete construction and waterproofing
 - brickwork, stonework, masonry, cast stone and mortar
 - car park specification, construction and maintenance
 - coatings for the protection and repair of concrete
 - concrete compliance, specification and quality to EN206/BS8500
 - concrete placing, bleed and shrinkage cracking
 - diaphragm wall construction
 - disaster investigations, including fire, bomb and water damage
 - external concrete pavement and hardstanding
 - freeze/thaw resistance
 - general forensic examination of construction failures
 - industrial warehouse flooring, screeds and toppings
 - liquid-retaining structures, water stops and leak sealing
 - no-fines and other concrete housing
 - paints, coatings and membranes for concrete
 - performance of air entraining and workability admixtures
 - piled concrete floor construction
 - PQ concrete and requirements for air entrainment
 - repair products and systems, including sprayed concrete/mortar
 - slip-resistance of concrete flooring
 - steel, carbon and synthetic fibre-reinforcement
 - test methods for concrete and data interpretation
 - tramways and light rail in concrete surrounds
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APPEARANCES AS AN EXPERT IN COURT/ADR

1. 2021 – Mediation (virtual) – failure of pile-supported concrete warehouse floor
 2. 2021 – Court of Session (virtual) – condition of a car park and waterproofing systems
 3. 2020 – Mediation (virtual) – quality of concrete delivered to a warehouse floor
 4. 2019 – International Arbitration, London – quality of works for a water supply project
 5. 2019 – Adjudication meeting – standard of construction for a concrete-framed building
 6. 2018 – TCC, London – slip resistance of concrete floors in a sports stadium.
 7. 2017 – Mediation, London – construction of pile-supported warehouse floors and hardstandings.
 8. 2017 – Arbitration, London – causes of concrete spalling to tramway arrises.
 9. 2016 – Mediation, Reading – strength of concrete supplied for a basement project.
 10. 2016 – Mediation, Birmingham – construction of waterproof basements to a new resort development.
 11. 2016 – International Arbitration, Oman – standard of concrete enabling works to a new airport.
 12. 2016 – International Arbitration, Oman – standard of concrete building works to a new airport terminal.
 13. 2016 – Adjudication, Edinburgh – construction of a new-build warehouse facility, using steel-fibre reinforced floors and external hardstandings.
 14. 2015 – Mediation, London – design and construction of concrete warehouse floors at dock levellers.
 15. 2015 – Mediation, Dublin – specification and performance of concrete for wind turbine bases.
 16. 2015 – International Arbitration, London – defects in coatings applied to concrete tanks in a sewage treatment plant in Qatar.
 17. 2013 – TCC, Birmingham – appearance and standard of traditional stonework construction in the Cotswolds.
 18. 2012 – Mediation, London – construction of steel fibre reinforced concrete industrial ground floor slabs.
 19. 2012 – International Arbitration, Dubai – defective construction works in 23 reinforced concrete car park basements.
 20. 2011 – International Arbitration, London – quality of concrete construction (diaphragm walls, floor slabs, screeds and cracking) in a basement car park in Moscow.
 21. 2010 – Mediation, London – construction of deep man-access chambers.
 22. 2010 – International Arbitration, Geneva – standard of concrete construction for a new multi-functional development in Moscow.
 23. 2009 – Mediation, Dublin – design and construction defects in a reinforced concrete domestic property.
 24. 2007 – Mediation, London – use of roller-compacted concrete for an industrial ground floor.
 25. 2007 – Mediation, London – appearance of cast stone concrete blocks.
 26. 2007 – Adjudication, London – floor construction in a sports stadium and remedial works.
 27. 2006 – Mediation, London – concrete build issues in a new national sports stadium, including large pour foundations, slipformed concrete and the regularity of suspended floor slabs.
 28. 2003 – Public Inquiry, Northampton – defence to appeal against the Council’s refusal to demolish a concrete lift testing tower.
 29. 2003 – Mediation, London – use of marine aggregates in a reinforced concrete car park.
 30. 1999 – Mediation, London – NDT assessment of an eleven-storey hotel and repair options.
 31. 1997 - OR Court, London – causes of collapse to a ceiling sub-frame assembly.
 32. 1997 - OR Court, London - cause of spalling of concrete ground floor slabs in a cold store.
 33. 1997 – Arbitration, London - surface finish of concrete linings and paint to a road tunnel.
 34. 1983 – Arbitration, Barnstable - relating to defective concrete repair works to a coastal pier.
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EDUCATION AND PROFESSIONAL STATUS

BSc (Hons), Civil Engineering, The University of Leeds (1977)
PhD, Concrete Technology, The University of Leeds (1981)
Chartered Engineer, (1987)
Fellow, Royal Academy of Engineering (2012)
Fellow, Institution of Civil Engineers (2011)
Fellow, The Concrete Society (2011)
Fellow, Institute of Concrete Technology (2017)
Member, American Concrete Institute (1988)
Member, UK Register of Expert Witnesses
Member, Institute of Asset Management
Member, RILEM

FORMAL EMPLOYMENT RECORD

2015 – present **Founder-director, Robery Forensic Engineering Ltd**
2015 – present **Visiting Professor, University of Birmingham (part time)**
2004 – 2015 **Technology Fellow, CH2M HILL (formerly Halcrow Group Limited)**
2003 – 2009 **Director, the Concrete Society, President 2006-2008**
2000 – 2002 **Director, QSRMC, ICE Representative**
1999 – 2002 **Director, Remco Systems Ltd**
1995 – 2004 **Director, AECOM (formerly Guy Maunsell & Partners)**
1990 – 1995 **Technical Director, Harry Stanger Limited**
1982 – 1990 **Senior Engineer, Taylor Woodrow Construction**

CONSTRUCTION SECTOR APPOINTMENTS

2015 – present **ICE Publishing, Editorial Panel, Forensic Engineering Journal**
Appointed to the Editorial Panel responsible for acceptance/rejection decisions on papers submitted for peer review, commenting on recent issues of the journal, recommending subjects for technical papers and providing general advice to the Chair of the Panel.

2015 – present **Robery Forensic Engineering Limited, Director**
Director and founder of a bespoke consultancy practice offering expert advice on troubleshooting construction defects and investigations of failures in service, including maintenance and remediation, and as required producing evidence in resolution of legal disputes.

2015 – present **University of Birmingham, Visiting Professor**
Royal Academy of Engineering Visiting Professor in Forensic Engineering: Member (former Chair) of the Industrial Advisory Board; Teaching to 2nd, 3rd & 4th year MEng and MSc modules on concrete durability, specification, deterioration and maintenance and legal cases.

2011 – 2014 **CIRIA, Committee Chair**
Project CON195 on the design of containment systems for the prevention of water pollution from industrial incidents, upgrading Reports 163 & 164 on bund containment, and leading to new guidance in CIRIA Report C736.

- 2000 – present **Institution of Structural Engineers, Task Group Member**
Project to update the design recommendations for multi-storey and underground car parks, contributing to sections on coating systems, durability design and repair of concrete exposed to de-icing salts in car parks the 2002 (3rd), 2011 (4th) & 2021 (5th) editions.
- 2010 – 2018 **Institution of Civil Engineers, Structures Expert Panel**
Member and deputy chair of ICE’s Standing Panel on building structures, responsible for advice on structures policy advice.
- 2001 – present **The Concrete Society, Midlands Committee member**
Appointed as director of the Society, member of the Technical Executive Committee and then as President (2006-2008), responsible for the operation of the technical and support functions. Continuing as a committee member of the Midlands Region and a former chair.
- 2000 – 2018 **Institution of Civil Engineers, joint Chair, National Steering Committee**
Following the Pipers Row car park collapse, preparing recommendations for the inspection, maintenance and management of car park structures, 1st and 2nd editions.
- 1999 – 2002 **QSRMC, ICE Representative**
Appointed as ICE representative and board director for the Quality Scheme for Ready Mixed Concrete, involving oversight of the introduction of updated procedures following introduction of EN 206-1 and BS 8500 for concrete production, replacing BS 5328.
- 1998 – 2000 **DETR, Thaumasite Expert Group**
Following discovery of the softening of concrete bridge foundations due to the thaumasite form of sulfate attack, appointed to the Expert Group to develop recommendations for inspection, testing and repair of structures affected by this reaction.
- 1995 – present **University of Leeds, Visiting Lecturer**
Visiting lecturer on the MSc civil engineering course on “Deterioration, maintenance and repair of concrete structures” and ACT module assessor. Former Visiting Professor (2000 to 2018). Member and former chair of the School of Civil Engineering Industrial Advisory Committee.
- 1990 – 1992 **Steel Construction Industry Forum, Broadgate Phase 8**
Appointed to the Fire Engineering Group to record the lessons learned from the construction-stage fire in the Broadgate Phase 8 development, by Liverpool Street Station, leading to the production of the Steel Construction Institute report “Investigation of Broadgate Phase 8 Fire”.
- 1989 – present **British Standards Institution, Committee Chair**
Current chair of B/517/8, mirror committee to CEN TC104/SC8 on concrete repair and protection, responsible for EN 1504. Also served on BSI committees for concrete protection and repair, sprayed concrete, geopolymer concrete and epoxy-powder-coated reinforcement.

CURRENT/RECENT MAJOR EXPERT WITNESS CASES

- 2020 – present **UK: Finishes to hospital flooring**
 Investigation of the mismatch between specified structural finishes and final finished floor level in a hospital environment, including review of contract packages and design coordination & site visit.
 Solicitors: Simmons & Simmons

- 2019 – present **UK: Deterioration in stone flooring**
 Investigation into the causes of cracking and rocking in a limestone tiled floor to a shopping complex that has been repaired and re-repaired and continues to deteriorate. Work includes planning of investigation works to establish the cause(s) of the deterioration before action
 Solicitors: Eversheds Sutherland LLP

- 2019 – present **UK: Cracking and curling to concrete warehouse floor**
 Investigation of cracking and hole formation in a reinforced concrete overslab laid on an existing uneven reinforced concrete warehouse floor and settlement of external hardstanding. Advising on methods for remediating the deterioration.
 Solicitors: Squire Patton Boggs (UK) LLP

- 2019 – present **UK: Blistering failure to car park deck membrane**
 Investigation into the failure of a car park waterproofing system applied to the roof of a multi-storey car park, that exhibited blistering and detachment in large sheets and where repairs have also failed. Instructed to review the technical investigations carried out and provide a reasoned expert report into the possible causes.
 Solicitors: DAC Beachcroft LLP

- 2018 – present **UK: Regularity in suspended concrete floors**
 Dispute concerning the standard of build to warehouse suspended mezzanine floors, comprising steel framing with composite concrete and steel decking, that exhibits mid-span sagging deflection. Includes an assessment of specification requirements against design and installation procedures and recommendations for remedial works.
 Solicitors: Taylor Wessing LLP

- 2017 – present **UK: Cracking and settlement in pile-supported warehouse floor**
 Dispute concerning the floor failure in a grain feed warehouse, where part of the slab cracked and sank, and in other areas the floor has deflected between the supporting piles.
 Solicitors: Carson McDowell LLP

- 2017 – present **Oman: Design and construction of Airport**
 Investigation of the design and construction standards used to build a new airport terminal. Work included site visits and inspections of new build reinforced concrete structures and repair works to those structures, and then opining on appropriate standards of construction and presenting evidence.
 Solicitors: White & Case LLP

- 2017 – present **Finland: Performance of air entrained concrete**
Dispute concerning variable strengths of insitu ready-mixed air entrained concrete supplied to a hospital project, involving site inspections, test analysis and expert reporting.
Solicitors: Avance/HPP Solicitors
- 2017 – present **UK: Erosion of brick mortar**
Investigation of erosion in mortar used for domestic housing, including analysis of the types of cement used, mix designation and strength class to current standards.
Solicitors: Dentons LLP

RFEL RECENT MAJOR PROJECTS/LEGAL CASES

- 2020 - 2021 **UK: Condition of concrete car park**
Dispute over the construction standard used to build the upper car park levels to a shopping complex, with waterproofing at roof level. Dispute was heard in the Court of Session, with expert evidence provided.
Solicitors: Pinsent Masons LLP
- 2021 **UK: Concrete pop-outs in warehouse floor**
Dispute over the causes of surface pop-outs in a power-trowelled warehouse floor and methods of repair, concluding in Mediation.
Solicitors: TLT LLP
- 2017 – 2020 **UK: Cracking and paint failure to retained façade**
Dispute between residents of a façade retention development of GII-listed masonry façade, built in the 1850s. Following completion, cracking was found in the original stucco, along with peeling of the new paint system and failure of a car park membrane. Concluded following Mediation.
Solicitors: Fenchurch Law LLP
- 2019 **UK: Assessment and repair of spalling to concrete tunnel surface**
Investigation into the causes of deterioration to an underground concrete vehicle track bed, supporting rubber-tyred people movers.
Recommendations made for strengthening the surface.
Client: Heathrow Airports Limited
- 2018 – 2019 **UK: Assessment of risk from HAC bridge beams**
Following discovery of bridges with precast prestressed beams made using high alumina cement (HAC) concrete, commission was to review the state of knowledge on HAC concrete beams, built over 50 years ago.
Client: Network Rail
- 2018 – 2019 **Oman: Deterioration to water supply assets**
Investigation to premature deterioration of reinforced concrete structures to a new water supply network of water-retaining tanks and ancillary structures, including site investigations to log the defects.
Solicitors: White & Case LLP
- 2018 – 2019 **UK: Accuracy and tolerances in student accommodation**
Review of survey and documentation relating to the construction of a new reinforced concrete framed building where floors and walls were alleged not to meet tolerances of the NSCS and BS 5606.
Solicitor: Womble Bond Dickinson (UK) LLP

- 2018 **Ireland: Cracking to walls of waste receiving bunker**
Inspection of concrete walls to a new waste-to-energy plant that exhibited cracking and leakage in what was designed as water-retaining concrete construction. Report identified the causes as shrinkage cracking and gave recommendations on methods for repair.
Client: Sedgwick
- 2018 **UK: Failure of car park deck coating system**
Investigation into the causes of failure in a proprietary coating system applied to a multi-storey car storage facility, that caused blistering over joints between prestressed concrete planks supported on steel framing.
Client: Cemplas
- 2017 – 2019 **UK: Leakage into hospital basement**
Investigation of the causes of leakage into a service tunnel and review of waterproofing measures.
Solicitors: Bigger & Strahan LLP
- 2017 – 2019 **UK: corrosion-induced spalling to car park**
Extensive corrosion of reinforcement in an insitu concrete car park, built in the 1980s, including establishing the causes and extent of the problem, finding appropriate methods for repair and establishing responsibility for the defects.
Solicitors: Shepherd and Wedderburn LLP
- 2017 – 2018 **UK: Slip resistance of power-floated concrete surface**
Dispute concerning slipperiness of power-floated concrete used in a sports stadium following foot trafficking and spillages. Evidence presented to the TCC, London.
Solicitors: RPC LLP
- 2017 – 2018 **UK: Warehouse floor discolouration**
Investigation of discolouration in one bay of steel-fibre reinforced concrete that appeared darker and “damp” compared with adjacent bays.
Client: New Look
- 2017 **Central America: Thermal cracking in bridge segments**
Advice to insurers on the causes and extent of thermal cracking in insitu-cast post-tensioned box section bridge components and review the justification to demolish.
Client: Evakin Consulting
- 2017 **UK: Cracking in new-build concrete roads**
Troubleshooting the causes of occasional severe carriageway cracking on a new concrete road project, where concrete was laid using a paving machine and then textured and cured.
Client: AWPR JV
- 2016 – 2020 **UK: Deterioration of external façade**
Investigation of rain penetration through the façade rain screen and into a retail development, causing saturation of screed. Cracking in an insulated grc shell was identified as causative of leakage and recommendations made to renovate the painted façade.
Solicitors: Eversheds Sutherland LLP

- 2016 – 2019
UK: Deterioration and gross settlement in warehouse floor
Investigation as to the condition of industrial warehouse floors supported on stabilised ground, exhibiting extreme settlement across parts of the floor. Settlement has resulted in cracking and racking moving out of plumb.
Solicitors: Shoosmiths
- 2016 – 2018
UK: Attack of dense concrete blockwork
Investigation of the causes of collapse of walls in wastewater treatment tanks, including a review of construction methods, testing, interpretation of the results and damage prediction.
Solicitors: DLA Piper LLP
- 2016 – 2018
UK: Cracking defects in guided busway
Site visits and document review to establish the causes of grouped cracking defects in a new guided busway, laid by concrete paving machine. Also, to develop recommended remedial work to rectify cracking and erosion of the concrete.
Client: TfGM
- 2016 – 2017
UK: Lifting of foamed concrete cable trenches
Narrow trench technology was used to install new fibre optic cables, backfilled with a foamed mortar. In some areas the mortar was lifting as if residual expansion was occurring.
Client: McNicholas
- 2016 – 2017
UK: Blistering of Hospital Vinyl Flooring
Investigation into the cause of blistering and loss of adhesion of welded sheet vinyl flooring, and local crushing of the underlying screed. Issue was associated with residual construction moisture in the screeds that attacked the sheet vinyl adhesive.
Solicitors: Trowers & Hamblins LLP
- 2016 – 2017
UK: Defects in concrete floors and hardstandings
Dispute concerning differential settlement in pile-supported industrial ground warehouse floors and hardstandings and the cracking and movement of mezzanine floors and methods of repair.
Solicitors: Shoosmiths
- 2016 – 2017
UK: Failure of waterproofing membrane
Dispute about the causes of splitting and leakage to a car park waterproofing system applied to prestressed hollow concrete planks supported on a steel frame.
Solicitors: DAC Beachcroft LLP
- 2016
UK: Use of Insulation without separation layers
Research, testing and reporting on the risks arising from using aluminium-faced insulation material beneath an insitu concrete floor.
Client: Bell Building Projects Ltd
- 2016
UK: Basement leakage and “floating” concrete
Site visit to investigate the cause of water ingress to a new basement where the concrete was alleged to be lifting. Investigations showed the cause of the leakage to be defective waterproofing installation.
Client: Liverpool Victoria Insurance

- 2015 – 2018
Oman: Construction of drainage culverts
Investigation of the construction standards used to build drainage culverts and other structures beneath a new airport runway and taxiway complex. Work involved site visits and inspections and presentation of evidence in an arbitration in Oman
Solicitors: White & Case LLP
- 2015 – 2018
UK: Bund design and construction training
Providing training courses to clients on containment system design and maintenance, following publication of lessons learned from the Buncefield Incident in 2005.
Client: various, including Environment Agency
- 2015 – 2018
UK: Deterioration of concrete hardstandings
Investigation into surface scaling of an external concrete hardstanding in Scotland, built using structural synthetic fibre reinforcement.
Solicitors: CMS-Cameron McKenna LLP
- 2015 – 2017
UK: Causes of concrete pop-outs
Site visits and investigations of the causes of pop-outs in finished concrete surfaces caused by calcined dolomite inclusions in new concrete safety barriers. Research identified the causes and significance of the pop-outs.
Client: Costain
- 2015 – 2017
UK: Delayed concrete delivery
Investigation of the causes of severe honeycombing to concrete walls to a swimming pool at a domestic property, where delays in the discharge led to significant quantities of water being added to offset the stiffening concrete.
Client: Mr Naderi
- 2015 – 2017
UK: Failure of waterproofing systems
Advice on basement waterproofing failures during construction at a major hotel complex. Work entailed reviewing construction specification and correspondence, inspecting the issues and identifying the principal causes.
Solicitors: CMS-Cameron McKenna LLP
- 2015 – 2017
Oman: Build quality of reinforced concrete construction
Investigation of the standards of construction for a new airport terminal and enabling works, including drains and culverts. Work includes attending site to inspect the quality, reviewing the construction records and NCRs and advising on the methods of reinstating the works.
Solicitors: White & Case LLP
- 2015 – 2016
UK: Ready-mixed concrete supply
Dispute about the quality of ready-mixed concrete supplied to a bridge construction project in Scotland.
Solicitors: Thorntons LLP
- 2015 – 2016
Ireland: Cracking of wind turbine bases
Investigation to Irish Law into allegations that low strength concrete was causative of cracking to concrete turbine bases, including review of over 200 core strength test measurements and analysis.
Solicitors: Tughans LLP

2015 – 2017	<p>UK: Surface blemishes to precast concrete panels Advice on the causes, extent and significance of surface blemishes or pop-outs to precast concrete wall and ceiling panels, caused by aggregates being contaminated with small quantities of potentially expansive treated material intended for the steelmaking industry. Solicitors: Taylor Wessing LLP</p>
2015	<p>UK: Damage to water conveyance pipes Investigation into allegations that deterioration of asbestos cement water pressure pipes was causative of pipe bursts in the network. Solicitors: Internal Water Company Legal Dept.</p>
2014 – 2015	<p>Qatar: Performance of linings to treatment works Investigation into the preparation and application of liquid-applied protective coating systems to the tanks of a new sewage treatment works in Qatar. Solicitors: Bond Dickinson LLP & Mayer Brown International LLP</p>
2014 – 2015	<p>UK: Pile supported warehouse floor Investigation into the causes of settlement or heave beneath a pile-supported steel-fibre reinforced concrete industrial ground floor. Scope includes a review of the specification for the concrete used in the piles and slabs and the tolerances expected. Solicitor: Browne Jacobson LLP</p>
2014 – 2017	<p>UK: Defects in warehouse floor Investigation into the causes of cracking and curling around dock levellers in a ground-supported steel fabric-reinforced concrete industrial ground floor. Solicitor: Mills & Reeve LLP</p>
2013 – 2016	<p>UK: Airfield runway construction using PQ concrete Investigation into the causes of low strength concrete in external concrete paving. Solicitor: Thrings Solicitors LLP</p>

PREVIOUS APPOINTMENTS AND EXPERIENCE

2004-2015	<p>HALCROW GROUP LTD/CH2M HILL Technology Director, Europe Transportation Responsible for technology and innovation across Transportation BU.</p>
2013 – 2015	Various: Durability Assessment Specialist
2012 – 2015	Lead Technologist, Europe Transportation
2011 – 2015	Asset Management Team Leader, Midlands
2011 – 2015	Halcrow Group Limited, Regional Director
2004 – 2011	Area Resource Director, Midlands
2008 – 2010	
2008 - 2015	<p>Queens University Belfast, Visiting Professor</p>
2003-2011	<p>The Concrete Society - Head Office Held positions on the Technical Executive Committee and chair of the Regional and Clubs Association; appointed for two consecutive terms as President of the Concrete Society (2006-2008).</p>
1995-2004	<p>MAUNSELL GROUP/AECOM/FABERMAUNSELL UK: Birmingham Office, business unit director</p>
1997-2004	

Director for Engineering Services in the South Region of the Transportation Division, responsible for the £2.5m pa turnover business. Board Director of Maunsell Europe (1997-2000). Board Director of JV company, Remco Systems Ltd developing cathodic protection control and monitoring systems (1997-2002).

1990-1995
1990-1995

HARRY STANGER/TBV STANGER

UK: Various Investigations, project manager

Head of Engineering Services at Harry Stanger, responsible for the Investigations and Components Testing at the Elstree Head Office.

1981-1990
1988-1990

TAYLOR WOODROW GROUP/TAYWOOD ENGINEERING

UK: Technical Service Group, senior engineer

Investigating a wide range of concrete construction problems including, strength performance, screeds, concrete toppings/granolithic, cast stone, GRC, GRP and ground-bearing floor slabs

1974-1981
1977-1981

THE UNIVERSITY OF LEEDS

Civil Engineering Department, PhD research

Postgraduate research in the field of concrete technology under the supervision of Professor Adam Neville and Dr Peter Wainwright, thesis "Use of Domestic Incinerator Ash as an Aggregate in Concrete".

1974-1977

Civil Engineering Department, BSc

Honours degree course in civil engineering.

PROJECT EXPERIENCE (1981-2015)

2009 – 2010

UK: Defects in concrete sewerage system

Investigation into alleged defects in a foul sewer system.

Solicitors: DJM Law LLP

2009 – 2011

Ireland: Advice on concrete workmanship issues

Investigation into the quality of concrete poured to construct wind turbine bases at a wind farm.

Solicitors: HBJ Gateley Wareing LLP

2009 – 2010

UK: Advice on cracking in a ground-bearing floor slab

Initial inspection and assessment of a concrete industrial ground floor slab built to TR34.

Solicitors: Browne Jacobson LLP

2009 – 2010

Ireland: Investigation of basement leakage

Investigation into water leakage into the basements of 17 newly constructed dwellings, built using a precast panel construction system.

Solicitor: Matheson Ormsby Prentice LLP

2009

UK: Coating system to concrete floor, single joint expert

Investigation into causes of premature failure of a concrete floor paint in a steel treatment works, following a fire and water damage.

Solicitors: Edwin Coe/Lane & Co LLP

2008-2012

UK: A184 White Mare Pool interchange, project director

Design of impressed current cathodic protection system and patch repairs to bridge piers on Area 14 MAC.

Client: A-One

2008 - 2010	Ireland: Failure of waterproofing works Investigation into the causes of water penetration through basement retaining walls to a coastal domestic property. Solicitor: Matheson Ormsby Prentice LLP
2008	Qatar: Failure Investigation of collapsed roof Investigation of the causes of failure to a warehouse roof above a steel melt shop. Client: Cunningham Lindsay Loss Adjusters
2007 - 2010	UK: Performance of concrete bund walls Investigation of the causes of contamination of ground and groundwater and the performance of concrete bund walls. Solicitor: Bond Pearce LLP
2007-2010	UK: Coating Protection of Rail Assets, project director Revise and update Client specifications to current standards for the use of protective treatments for rail infrastructure. Client: Network Rail
2007 – 2010	UK: Investigation of No-fines Concrete Housing Advice on the life expectancy of 1960s multi-storey housing blocks built using no fines concrete. Solicitor: Dickinson Dees LLP
2007-2009	UK: Severe Cracking to Ground Floor Slabs Investigation of severe cracking in an unbonded concrete overslab for a warehouse. Solicitor: Taylor Wessing LLP
2007	UK: Investigation of the quality of Cast Stone Units Advice in a dispute regarding the specification and supply of cast stone units for an office complex. Solicitor: Hugh James LLP
2006 – 2012	UK: Cracking to ground floor slab Advice on the cause of severe cracking in the floor of a conventional warehouse floor, designed and built to TR34. Solicitor: Slade Legal LLP
2006-2008	UK: Cracking to Ground Floor Slabs Investigation of the cause of significant cracking and break-up to newly laid concrete floor in free and defined movement areas in a warehouse. Solicitor: SLS LLP
2006-2007	UK: Cracking to Ground Floor Slabs, technical specialist Investigation of the cause of significant cracking to a new concrete floor to TR34 incorporating steel-fibre reinforcement. Client: Chalcroft Construction Ltd
2006	UK: Advice on Cement Burn claim Single joint expert instruction relating to supply of concrete to a project that caused alkali burns to an operative. Solicitors: Awdry, Bailey & Douglas LLP

- 2005-2008 **UK: Investigation of Stadium Construction Defects**
Advice about placing of self-compacting concrete, adequacy of slipforming works, flatness and level of suspended floors, concrete durability & fire resistance & remedial works specifications for a national stadium.
Solicitor: Nabarro LLP
- 2005-2006 **UK: Road Asset Management Plan, expert advisor**
Preparing an asset management plan that encompassed bridge, pavement and other highway assets.
Client: City of Edinburgh Council
- 2005 **UK: Failure Investigation of Floor Topping, technical specialist**
Cracking of a topping to an existing industrial ground floor.
Client: UK Maintenance Services (UK) Ltd
- 2004-2008 **UK: Failure Investigation of Ground Floor Slabs**
Investigation and advice on ground-bearing slabs, both internal floors and external hardstanding.
Solicitor: Olswang LLP
- 2004-2008 **UK: Failure Investigation of Ground Floor Slab**
Appointment to advise on the cause of cracking and break-up of an industrial ground floor, built using steel fibre reinforced concrete to TR34.
Solicitor: Shoosmiths LLP
- 2004 - 2005 **UK: Adequacy of Asbestos Survey**
Advice on the structural aspects of building construction as related to the risk of residual asbestos following pre-demolition strip-out.
Solicitor: S J Berwin LLP
- 2004-2006 **UK: Investigation of blast effects, project director**
Assessment of structures exposed to blast containment effects, including structural capacity and extent of defects.
Client: AWE
- 2002-2004 **UK: BCV Asset Inspections, project director**
Asset inspections to record the location and general condition on the Bakerloo, Central and Victoria Lines, for both above and below ground assets.
Client: MetroNet BCV
- 2002-2004 **Greece: Rion - AntiRion Crossing, technical specialist**
Undertook a durability assessment of the concrete specification for the new bridge to ensure durable construction in the harsh marine environment.
Client: Greek State General Secretariat of Public Works
- 1999-2001 **UK: Bridge Strike Detection System, project director**
Led the negotiation with the client to deliver experimental bridge strike detection systems on two bridges on the Central and East London lines.
Client: London Underground Ltd
- 1998-2004 **UK: Superagency Area Commissions, project director**
Supply chain relationships with MA & MAC operators to deliver bridge assessment and repair services to Trunk Road Areas 5, 9, 12 and 13.
Client: Mouchel and AmeyMouchel

- 1998-2002 **Singapore: Durability specifications, specialist advisor**
Provided durability assessment reports and technical advice for D&B contractor client, relating to new-build concrete structures.
Client: Nishimatsu Corporation Joint Venture
- 1997-1999 **Hong Kong: Durability specifications, specialist advisor**
Durability assessment reports and technical advice for new-build bridges and other structures forming the Kowloon-Canton Railway (KCR) extension.
Client: KCR Corporation / various
- 1997 **Hong Kong: Kap Shui Mun Bridge, Specialist advice**
Invited to assist with the troubleshooting of construction problems on the Kap Shui Mun bridge, designed by Maunsell.
Client: MCAL
- 1997-1998 **Hong Kong: Specialist Advice**
Durability audit for the Route 10 highways contract; maintenance strategy for the concrete catchwaters; and drafting the "*Model Specification for Protective Coatings for Concrete*" for the Hong Kong Government.
Client: Various
- 1997-1999 **Hong Kong: Durability assessments, specialist advisor**
Technical support on tender submissions in Hong Kong including the Tsing Ma Control area, inspection of the Cross-Harbour tunnel and inspection of bridges and tunnels in Guangzhou.
Client: KCB / MCAL
- 1997-2003 **UK: Client Representative - A19 DBFO, project director**
Provided technical advice on the effect of electrochemical chloride extraction systems on the A19 Tees Viaduct bridge structures.
Client: Highways Agency
- 1997-2002 **UK: Highways Agency Strategy Support, project director**
Responsible for pricing, technical overview and client liaison on the following HA strategic projects won by Maunsell in relation to bridge performance.
Client: Highways Agency
- 1997-2002 **UK: Area 12 MA Commission Support, project director**
Technical support on the risk and reliability strategy for the Midland Links viaducts.
Client: Atkins/Highways Agency
- 1995-2004 **Australia: Durability specifications for tunnels, expert**
Durability assessment review of materials suitability and specification, for two new-build concrete structures.
Client: BRC
- 1995-1999 **Denmark: Durability specification, specialist advisor**
Provided tender stage durability assessment proposals to meet Client specifications for the Copenhagen Metro.
Client: Comet Construction Group

- 1993-1995 **UK: Broadgate Phase 8 Fire, project manager**
Planned managed and supervised investigations into the effects of a severe fire during construction of Phase 8 of the Broadgate complex.
Client: Stanhope Properties / Bovis-Schal
- 1991-1994 **UK: Swan Theatre Car Park, expert**
Legal dispute concerning the design and specification of a car park, the grade of concrete and omission of waterproof membranes to the decks and ramps.
Solicitor: Wycombe District Council Legal Dept
- 1993-1994 **UK: Bomb Damage - James Capel House, project manager**
Following terrorist explosions in the City of London, negotiated, priced and managed the testing and investigation works to verify the extent of damage.
Client: Various insurance firms
- 1994 **UK: Minster Court Fire Investigations, project manager**
Planned managed and supervised investigations into the effects of a severe fire during construction of Minster Court, London.
Client: Arup
- 1993 **UK: Ceiling Subframe Assembly Collapse, expert**
Investigated the cause of a sub-frame ceiling grid collapse.
Client: Robbins Loss Adjusters
- 1989 **Hong Kong: CED Lecture, Technical Specialist**
Presentations to the Civil Engineering Department (CED) in 1989, on investigation, maintenance, repair and protection of bridges & tunnels.
Client: CED, Hong Kong
- 1987-1990 **Malaysia: Hospital Refurbishment, technical specialist**
Technically responsible for investigation work on a hospital in Johor Bahru, to assess the extent of carbonation and reinforcement corrosion.
Client: Johor Ministry of Public Works
- 1986-1988 **Singapore: MRT Construction, technical specialist**
Appointed to assist the Mass Rapid Transit Corporation to evaluate the aggressiveness of bacterially-active soils and chloride-containing groundwater towards precast concrete lining segments for bored tunnels.
Client: Mass Rapid Transit Corporation
- 1986-1988 **Hong Kong: Low Cost Housing, technical specialist**
Advising HK Housing Authority (HKHA) on durability issues, including prevention of chloride-induced reinforcement corrosion in housing blocks.
Client: HKHA
- 1982-1985 **UK: Expert Witness on Repair System Failure, engineer**
Responsible for the planning of test programmes in support of Arbitration proceedings concerning bleed-related defects in concrete repair works.
Solicitor: NDDC Legal Department
- 1982-1984 **Various Overseas: Failure Investigations, senior engineer**
Technical research in support of several major overseas litigation contracts involving assessment of the strength and durability of reinforced concrete structures, including City Centre Tower, Perth, Das Island Telford Gardens
Client: Various solicitors

Publications & Presentations (89)

1. Robery, PC, "Best Practice in the Management and Protection of Concrete Assets", *Proc ICE Forensic Engineering*, V174, n1, Feb 2021, pp10-14 (<https://doi.org/10.1680/jfoen.20.00023>)
2. Robery, PC (joint author), "Potential use of small-diameter concrete cores for in situ compressive strength assessment", *Magazine of Concrete Research*, 2019 <https://doi.org/10.1680/jmacr.19.00053>
3. Robery, PC, "Best Practice in the Management and Protection of Concrete Assets", presented at UKIERI Concrete Congress, Jalandhar, India, 5-8 March 2019
4. Robery, PC, et al, "Recognising severe environments", Ch 2, *Concrete in Extreme Environments*, Ed Bull, JW & Xiangming, Z, Whittles Publishing, 2018
5. Robery, PC, "Concrete Specification, Construction and Problem Avoidance", presented at 2018 Neville Symposium on Advances in Concrete Technology, Leeds, 18 July 2018
6. Robery, PC & Segers, PM, "Effective corrosion management of reinforced concrete assets", *Proc Corrosion & Prevention 2017*, 12-15 November 2017, ICC Sydney, Australia
7. Robery, PC, Kaewunruen, S & Li, D, "Early-age responses of railway prestressed concrete sleepers to creep and shrinkage", 2nd International RILEM/COST Conference on Early Age Cracking and Serviceability in Cement-based Materials and Structures - EAC2 12-14 September 2017, ULB-VUB, Brussels, Belgium
8. Robery, PC, "The Ability of Concrete to Resist Hostile Environments", *Proc. 45th Institute of Concrete Technology Convention / Symposium 6th April 2017*, Queens Hotel, Leeds
9. Robery, PC, "The Durability of Concrete Car Parks", presented at Institution of Structural Engineers (Midlands)/Concrete Society seminar, 28 February 2017
10. Robery, PC, "Alkali-activated cementitious material and concrete – Specification", presented at Special Seminar on geopolymer concrete, King Mongkut's University of Technology Thonburi, Bangkok, Thailand, 18th February 2017
11. Robery PC, "Using the power of low carbon binders to drive enhanced durability", *Proc 12th Annual Concrete Conference, Cha-Am, Thailand, 15-17 February 2017*
12. Robery PC, "Preserving the life of infrastructure through effective monitoring and intervention", *Proc 2nd R.N.Raikar Intl Conf on Advances in Science and Technology of Concrete*, Mumbai, India, 18-19 December 2015.
13. Robery PC (joint author), "Sustainable life extension of M1 Motorway half joints using impressed current cathodic protection", *Proc. 16th European Bridge Conference*, Edinburgh, 23-25 June 2015
14. Robery PC (joint author), "Containment for petroleum products – lessons learnt from Buncefield, UK", *Proc ICE Civil Engineering*, Volume 167, Issue 4, 1 November 2014, pages 167 –175
15. Robery PC, Keynote Paper: "Role of asset management in monitoring durability changes to minimise safety risks to Infrastructure", *Proc. 3rd international Conference of Service Life Design for Infrastructure*, Zhuhai, China, 15-17 October, 2014
16. Robery PC (joint author), "Interpreting field data for adhesion strength of bonded overlays", *Proc Structural Faults and Repair 2014*, Imperial College, London, 8-10 July 2014
17. Robery PC (joint author), "Building information modelling and its effect on off-site construction in UK civil engineering", *ICE Proceedings of Management, Procurement and Law*, V167, Issue MP3, June 2014
18. Robery PC (joint author), "Site pull-off adhesion testing and EN1504", *Concrete*, Oct & Dec 2013
19. Robery PC (joint author), "Implementing an Offsite Construction Strategy: A UK Contracting Organisation Case Study", *ARCOM Conference*, 3 October 2013
20. Robery PC (joint author), "Analyzing the need for offsite construction and standardization in the UK water and environmental management sectors", *International Conference on Sustainable Built Environment for Now and the Future*, Hanoi, Vietnam, 26-27 March 2013
21. Robery PC (joint author), "Microbial degradation of synthetic fibre-reinforced marine concrete", *Journal of International Biodeterioration & Biodegradation*, Feb 2013, <http://dx.doi.org/10.1016/j.jibiod.2013.02.015>
22. Robery PC (joint author), "Microscopic examination of a new mechanism for accelerated degradation of synthetic fibre reinforced marine concrete", *Construction and Building Materials*, vol. 41, 2013
23. Robery PC (joint author) "Briefing: Microscopic study into biodeterioration of joint sealant", *Proc ICE Construction Materials*, 2013
24. Robery PC (joint author), "Microscopic study into biodeterioration of marine concrete", *International Biodeterioration & Biodegradation*, vol. 79, 2013
25. Robery PC (joint author), "Realising offsite construction and standardisation within a leading UK infrastructure consultancy", *Proc AEC Conference*, 17 August 2012
26. Robery PC, "Carrying out inspection work and planned maintenance – UK Practice", *Proc 2nd IQPC Bridges Conference*, Riyadh, Kingdom of Saudi Arabia, 19-20 March 2012
27. Robery PC (joint author), "Offsite Innovation in UK infrastructure: The role of the approvals process in Box-Jacking projects", *Proc ARCOM Conference*, 5 September 2011
28. Robery PC, "European Standards for Concrete Repair", Chapter 11, *Concrete Repair*, ed M Grantham, Taylor & Francis, 2011.
29. Robery PC, "Effective management of concrete assets - Concrete durability: achievement and enhancement", *Proc 5th IABMAS Conference*, Philadelphia, USA, 11 – 15 July 2010

30. Robery PC (joint author), "Can Nanotechnology Address Today's Civil Engineering Challenges?", Proc 5th IABMAS Conference, Philadelphia, USA, 11 – 15 July 2010
31. Robery PC, "In situ monitoring and assessment of concrete structures", presented at Queens University Belfast Science Bridge workshop, 18-19 June 2010, Belfast
32. Robery PC (joint author), "Can Nanotechnology Address Today's Civil Engineering Challenges?", Proc SEI 2010 Structures Congress, 13-15 May 2010, Orlando, Florida, USA
33. Robery PC, "Chapter 16, Repair and Rehabilitation of Concrete", ICE Manual of Construction Materials, Vol 2, Thomas Telford, London, 2009
34. Robery PC (joint author): "Nanotechnology – fact or fiction for practising Engineers", presented at the Nanocem Open meeting April 28, 2009, University of Leeds
35. Robery PC (joint author): "European Standards for the repair and protection of concrete", Proc SEI 2009 Structures Congress, 30 April 30- 2 May 2009, Austin, Texas, USA
36. Robery PC: "Keynote Paper: Effective Management of Concrete Assets", Proc Intl. Conf, Concrete: Construction's Sustainable Option, Dundee, Scotland, 8-10 July 2008
37. Robery PC (joint author): "Nanotechnology in repair, maintenance and asset management of bridges and structures", Proc Structural Faults and Repair 2008, Edinburgh, 10-12 June 2008
38. Robery PC: "Managing bridges and other highway assets: looking at the impact of whole of government accounts", IAM Assets, April 2007
39. Robery PC: "Keynote Paper: Non-destructive testing (including tests for structural strength)", Proc 8th Int'l Conference on Concrete in Hot and Aggressive Environments, Kingdom of Bahrain, 27 – 29 November 2006
40. Robery PC: "Examining the practical aspects of asset valuation", Proc Conf, Managing the Highway Network - Implementing and Evaluating Asset Management and Traffic Management, ICE, London 11 October 2006
41. Robery PC (joint author): "Multi-storey car parks – have we parked the issue of effective maintenance?", *Concrete Engineering International*, Autumn 2006
42. Robery PC: "Keynote paper: Enhanced Concrete performance: learning lessons from the past", Proc Concrete Communication Conference, UCL, London, 5-6 September 2006
43. Robery PC (joint author): "European Standards for the Repair and Protection of Concrete", Proc Concrete Solutions – 2nd International Conference on Concrete Repair, St-Malo, Brittany, 27-29 June 2006
44. Robery PC: "Applying whole life principles to deteriorating concrete assets", Keynote Paper, Proc Concrete Solutions – 2nd International Conference on Concrete Repair, St-Malo, Brittany, 27-29 June 2006
45. Robery PC (joint author): "Design, construction and maintenance of car parks - bridging the gap between bridge and building technology", Proc Structural Faults and Repair '06, Edinburgh, 13-15 June 2006
46. Robery PC (joint author): "European standards for concrete repair - Update on progress", Proc Structural Faults and Repair '06, Edinburgh, 13-15 June 2006
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48. Robery PC (joint author): "Managing North London's River Flood Defences: Part 1 Focus on Asset Management; Part 2: Focus on Asset Engineering", *Concrete*, April/May 2006
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50. Robery PC (joint author): "Impressing the current in Birmingham", *Concrete*, No 4, Vol 38, pp 35 -36, April 2004
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56. Robery PC (joint author): "The Role of Ongoing Structural Assessment in Reducing Infrastructure Risk", Proc IABSE Conf on Risk and Reliability of structures, Malta, 2001
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62. Robery PC (joint author): "Performance of concrete strengthened with carbon fibre fabric", Proc Structural Faults and Repair '97, Edinburgh, July 1997
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68. Robery PC: "European Standards for structural and non-structural repair of concrete", *Concrete Repair Bulletin*, ICRI, May/June 1996
69. Robery PC (joint author): "Material for the Repair and Protection of Concrete", Proc Structural Faults '95, July 1995
70. Robery PC (joint author): "Methods of Investigation using combined NDT Techniques", Proc Structural Faults '95, July 1995
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82. Robery PC (joint author): "Corrosion Protection to Buried Structures", Proc. Singapore Mass Rapid Transit Conference '87, 6-9 Apr 1987, reprinted in *Construction and Building Materials*, Vol 1, n 2, 1987
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85. Robery PC (joint author): "Diagnosis and Repair of Marine Structures: Towards a Unified Approach", Proc. Marine Concrete '86, London, 22 Sept 1986
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