

ALUN THOMAS

Dr Thomas has a broad experience of many types of tunnelling methods from immersed tubes to segmental linings, from closed face TBMs to hand excavation under compressed air. He has a specialism in sprayed concrete lined (SCL/NATM) tunnels and numerical modelling, using a range of programs (FLAC, FLAC3D, Plaxis 2D & 3D, UDEC, 3DEC & STAAD). He has been involved in promoting the use of permanent sprayed concrete, fibre reinforcement and spray-applied waterproof membranes. Over the last 25 years he has been involved in many of the recent major UK tunnelling projects such as the Jubilee Line Extension, Heathrow Express, Terminal 5 and Crossrail, as well as working on design and construction of tunnels internationally. Notably he has worked in Denmark, Russia, USA, Iceland, Hungary, Singapore, India, Norway and Hong Kong.



Dr Thomas has given lectures at the British Tunnelling Society course, Leeds University, the Budapest Technical University and the Danish Technical University. A regular contributor to magazines and conferences with more than 70 publications, he has written articles on subjects ranging from sustainability to user-friendly contracts. A second edition of his book, "Sprayed concrete lined tunnels" has just been published, in addition to the Chinese and Turkish versions of the first edition. Dr Thomas was Vice Animateur of the ITA's Working Group 12 on Sprayed Concrete and was chairman of ITAtech's activity group for Fibre Reinforced Concrete Precast Segments.

CONTACT INFORMATION

Dr Alun Thomas

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NATIONALITY

British / Irish

EDUCATION

2000-2004

PhD University of Southampton, United Kingdom

1991-1994

BA Cambridge University, United Kingdom

AWARDS & QUALIFICATIONS

2008 ICE Telford Premium Prize for "Evaluation of a novel method of SCL tunnelling" by B. D. Jones, A. H. Thomas, Y. S. Hsu, & M. Hilar.

Member of the Institution of Civil Engineers & Chartered Engineer (UK)
Engineers Australia National Engineering Register

LANGUAGE SKILLS

English (mother tongue), German, Bosnian, Danish, French, Hungarian



PROJECTS

2019 onwards

Founder and Managing Director, All2plan Consulting ApS

Reference design for a 10 km road tunnel in Bosnia-Herzegovina (2023)

Support to REDR for their Structural Design, Assessments course for Ukraine (2023)

Carbon management (2022) A study for a metro company into how clients can manage carbon during design and construction phases and how to reform procurement to encourage lower carbon solutions. Global best practice was gathered and analysed for this study.

Expert advice on SCL design and numerical modelling for 29 km railway tunnels (2022) this advice was for a design check. There were parallel tunnels in rock for freight and High Speed trains.

Expert to the court (2022) for a claim dispute case involving a TBM tunnel.

Research Associate, Cambridge University Engineering Dept (2021-22) Back analysis of fibre optic monitoring data from the construction of an SCL junction at Crossrail for the Centre for Smart Infrastructure and Construction (CSIC). This includes sophisticated numerical modelling of the tunnels using the FLAC3D software.

Head of Design for contractor joint venture (May – December 2020) managing the tender design of a 1.7 billion euro road project including 4 tunnels & a 600 m long suspension bridge in Norway. The role encompassed all aspects of the design from detailed technical issues and the climate budget to contractual and organizational aspects. All of this was delivered successfully despite the fact that most of the design and construction teams had to work remotely.

Carbon footprint calculations for utility tunnels A joint research project with the Danish Technical Uni and HOFOR into the methodology and tools for carbon footprint calculations for water tunnels.

Soft ground tunnelling course (via Ingeoexpert) - a 6 week long, online comprehensive course for engineers who are new to tunnelling in soft ground or who wish to refresh their knowledge. This popular course has been run several times since it was launched with very positive feedback from attendees.

SCL Masterclasses – several training workshops on sprayed concrete linings for IC-Elea & ITA Slovenija.

Expert advice on constructability for a twin bore (TBM driven) road tunnel in UK (January – June 2020). Working as a part of a team of experts, this involved the review of the design team's solutions and writing several reports to assess the robustness of the solutions and to provide briefing notes to support the planning approval team.

Design checking for a small SCL tunnelling project in rock in Sydney, Australia.

Expert advice on durability of sprayed concrete linings and rock bolt grout in rock with high levels of contamination.

Expert advice on fire design for a major road tunnel project in rock in Australia.

Expert advice on fire life safety design for 10 km road tunnel in Bosnia-Herzegovina.

Carbon footprint calculation for an innovative drainage mesh for tunnels and underground works.



Specifications for a long rail tunnel in Slovenia.

2017-2018

Tunnelling Director, EMEA-CIS, Minova & Global Product Manager for Powders (from 2018), Minova

2014- ongoing

External lecturer (part-time), Danish Technical University, Copenhagen

2012-2017

Head of Department, Tunnels

Ramboll Denmark, Denmark

Responsibility for the operations, strategy, financial performance and business development of the department.

2016-2017

Halic-Unkapani immersed tube tunnel

Gama-Nuroi-GLF JV, Turkey

Tender design for this unique submerged tunnel in an incredibly challenging environment.

2015-2016

Fehmarnbelt Fixed Link

Femern A/S, Denmark

Cost estimate for TBM option and advice on bored tunnel design for the 18 km road and rail tunnel in soft ground; member of the internal Steering committee for the project.

2015-2016

Parallel Thimble Shoal Tunnel

AECOM, United States

The Chesapeake Bay Bridge and Tunnel ("CBBT") is a 20-mile-long vehicular toll crossing, carrying US Route 13, the main north-south highway on Virginia's Eastern Shore. The Parallel Thimble Shoal Tunnel Project contains the construction of a second two-lane tunnel beneath the Thimble Shoal navigation channel. The tender design for AWVC JV covered both a TBM and immersed tube tunnel options and included numerical modelling of the approach structures in very soft marine deposits.

2015

Vejle Fjord crossing

Vejdirektorat, Denmark

Expert advice on a tunnelled solution for this railway connection in Denmark in soft ground.

2014-2017

Shatin to Central Link (SCL) Provision of Independent Geotechnical Expert Advice for the Immersed Tube Tunnel (IMT) works

Pypun Engineering Consultant Ltd., Denmark

The Shatin to Central Link (SCL) is a 17 kilometres long railway project running from north to south Hong Kong running through several districts and linking a number of existing railway lines. The centrepiece is conducted under contract SCL 1121 and contains the 1.7km immersed tube tunnel (IMT) crossing the Victoria harbour, located in soft marine deposits and decomposed granite. Ramboll Denmark undertakes the role to be the Independent Geotechnical Expert Advice (the 'expert Reviewer') for the Immersed tube tunnel (IMT) Works for the North South Line Cross Harbour Tunnel.



2014

George Massey Tunnel Replacement Bridge Project

MMM Group Limited, Canada

The existing George Massey Tunnel is to be replaced by a new bridge with a total length of 2.8km of which 1300m is a cable stayed bridge. Ramboll acts as the Owners engineer through a subconsultancy agreement with MMM-Group. Inter alia Ramboll has provided a study on the decommissioning and removal of the existing immersed tube road tunnel.

2014-2015

Skt. Annæ Plads – Outline design

Schønherr A/S, Denmark, Denmark

Advice on microtunnelling for a climate resilience project in the historic heart of Copenhagen. The new arrangement of sewers will prevent flooding during sudden storms.

2014

Ringsted-Fehmern North Phase 4

Banedanmark, Denmark

Ringsted-Fehmern North Phase 4 - review of contract documents and specifications for this high speed rail link.

2012-2016

Copenhagen Metro extension to Nordhavnen

Metroselskabet, Denmark

Project Owner & Tunnel design expert

Preparation of outline design and tender documents for the extension of the Cityringen metro to the new Nordhavn development, including 1.8 km of twin tube bored tunnel, 1 shaft and 2 stations in soft ground and limestone. Support during tendering and now during the construction phase.

2014-2015

TBM tunnel Design Review

Confidential client

Expert reviewer reviewing segmental lining design and assessing damages to the 10 m diameter tunnel for a high speed railway in very challenging ground. A series of numerical models were made to simulate the effects of over-excavation on the weak, highly stressed rock mass. Expert witness in the arbitration hearings.

2014

M1 to M2 Corridor, Sydney

InfraSol Group Pty Ltd, Australia

Writing tunnel specifications for a 8 km long twin tube road tunnel with 3 lanes in each tunnel.

2013-2014

Doha Green Line DVE

PSH JV, Qatar

The Doha Green Line Underground is an integral part of the Qatar Rail Development Program. Ramboll undertakes the role of the Design Verification Engineer for the Green Line. The Green Line comprises 6 stations, 2 switchboxes, escape shafts and 18.7 km of connecting twin tunnels and follows Al Rayyan Road connecting Education City with the Heart of Doha. Within Ramboll's scope I was responsible for checking the steel fibre reinforced segmental lining, openings and the mined (SCL) cross-passages. Various numerical models were used for all these structures, including the modelling of post crack behaviour of fibre reinforced concrete.

2013

Jernbane Regelverket
Jernbane Verket, Norway
Tunnel design expert

Updating the Norwegian Railways technical rulebook for tunnel design, in particular to include TBMs.

2013-2014

Pipelines along Damhusåen
Hvidovre Forsyning A/S, Denmark

The Damhusledning – Hvidovre project is a 4.3 km sewer project. Section 1 consists of:

- 1700 meters of tunnel with a DN 2400 mm concrete pipe
- 400 meters of tunnel with a DN 2000 mm concrete pipe
- 1200 meters of cut and cover sewer with diameters of 300-1200 mm
- 8 target or starting pits depth up to 12 meters

Review of the risks in the tender design. Expert advice to troubleshoot problems with air loss and uncontrolled water ingress into the open shield which is being driven under compressed air. A study of alternative construction methods was undertaken and a TBM procured to continue the project.

2012-2013 & 2016

Trento Linea Azzurra
Autonomous Province of Trento, Italy

Competition to design a new commuter railway from Rovereto to Tione: providing expert advice on tunnel design and construction

2012-2013 & 2016

Øresund Metro
København Kommune / Malmø Stad, Denmark

Project Owner for cost estimate for a new metro link between the two cities, considering both an Immersed Tube Tunnel, a bored tunnel and a combined Immersed Tube Tunnel and bridge. Updated in 2016 to consider a tunnel cross section with 2 metro-tracks side by side.

2012-2013

Fonvizinskaya, Moscow Metro
Mosmetrostroy, Russian Federation
Tunnel design expert

Design of 100 m of SCL access tunnel, 200m ventilation tunnel; design check of PCC segmental lining for running tunnel on the metro line; expert advice on tunnelling & numerical modelling.

2012

Bergen Light Rail
Bybanen, Norway

Establishing the design team for the rock tunnels for this project in Bergen.

2012

Dibba Khor Fakkan road tunnel
CHSS, United Arab Emirates

500 m long twin bore SCL road tunnel in rock: technical advice to the client's engineer.

2012

Crossrail C121 SCL Expert Advice
Mott MacDonald, United Kingdom

Providing expert advice on sprayed concrete tunnel lining design



1994-2012

Mott MacDonald, various roles & locations

2011-2012

Singapore MTR C903 Bugis station

BACHY, Singapore

Design review of steel frame box tunnels with a 3D numerical model at this metro station.

2010-2011

Bangalore Metro UG2 & Majestic Station Projects

BMRL, India

Expert advice on SCL tunnelling in soft ground and highly weathered rock; review of slope stability and seepage inflow modelling; design of instrumentation and monitoring plan.

2010-2012

Bataapati Radioactive Waste Repository

Mecsekerc, Hungary

Project director for the detailed design of the waste storage caverns, access tunnels, sumps and equipment chambers for the low/intermediate level nuclear waste repository at Bataapati. Additional specialist studies included a set of plate-jacking tests, back-analysis of monitoring data using 2D and 3D numerical models and site support during construction of the storage chambers.

2010-2011

West Island Line Extension

MTRC, Hong Kong

Expert advice on tunnelling for the overrun tunnels at the Kennedy Town metro station; numerical modelling for the tender design and then detailed design for University and Sai Yung Pun station caverns using UDEC and FLAC; design reviewer.

2010-2012

Chennai Metro UA004

LnT-SUCG JV, India

Detailed design of tapered segmental lining, cross-passage openings and settlement analysis for 3 km section of metro from Nehru Park to Pachaiappa College.

2009

British Tunnelling Society (BTS)

BTS, United Kingdom

Member of editorial panel for updating the BTS Specification.

2009-2012

Matra Pumped Storage Project

RWE, Hungary

Responsible for the civil engineering aspects of this pre-feasibility study for a 600 MW hydroelectric scheme, as part of a broader project which also involved the preliminary environmental planning application. This included the dams, tunnels, pressure shafts and underground powerhouse.

2008

Sao Paulo

-, Brazil

Expert advice to the investigating team of the collapse at the platform tunnel at Pinheiros Station, Line 4.



2008

Transfer Baggage Tunnel to T5

BAA, United Kingdom

Design check for diaphragm wall boxes and TBM tunnel drives where they pass existing infrastructure, including impact assessments on existing live LU metro tunnels and settlement analysis.

2008-2012

Victoria Station Upgrade

TWBN JV, United Kingdom

Expert advice on SCL tunnelling and numerical modelling for the expansion of the existing LU metro station at various stages of the design; highly sophisticated 3D numerical modelling of new and existing tunnels in gravels and clay including jet-grouting and canopy tubes; specifications; design of shaft PAL 12a and escalator shaft PAL 10a ; review of excavation sequences.

2008

Horgos - Pozega

PORR, Serbia

Expert advice on tunnelling for due diligence of motorway.

2008

Thameswater Ring Main

Thameswater, United Kingdom

Expert advice on SCL tunnelling, shaft design and detailed design of an SCL tunnel in soft ground at Hampton, as part of the extension of the water supply system.

2007-2008

Delhi Metro

DMRC, India

Detailed design for sections of the new metro Line 2 and the Airport Metro Express Link, both SCL tunnels and segmentally lined tunnels in soft ground, including numerical models; settlement analysis and instrumentation plans for Airport Metro Express Link.

2007-2012

Mott MacDonald Internal Training Course on Tunnelling

Mott MacDonald, United Kingdom

Initiated and organised this course and presented most of the four half-day sessions. The topics covered were design concepts and methodology and SCL tunnel design and construction. The course has been repeated at Budapest Technical University and Danish Technical University later.

2006-2012

Bataapati Radioactive Waste Repository

Mecsekerc, Hungary

Review engineer for the review of ongoing excavation and geotechnical investigation for the low/intermediate level nuclear waste repository at Bataapati; writing specifications; numerical modelling of tunnels using UDEC, FLAC, FLAC3D and Phases2; back-analysis of monitoring data.

2006-2012

BASF MS345 Sprayed Membrane

BASF, United Kingdom

Updating the product review of MS345 sprayed membrane, including numerical modelling of composite lining behaviour and back-analysis of laboratory tests.



2006-2012

Miscellaneous Projects

Various Clients, India, Ireland, Hungary, United Arab Emirates, United Kingdom

Specialist advice on sprayed concrete linings (design and specifications). Bid manager/assisting in tenders for a variety of projects, including the 18 km Veligonda water transfer tunnel in India, the 10 km Belfast Sewers Project, Shepherd's Bush LUL station development, Dubai Metro, BKV framework contract (Hungary) and Cork Northern Ring Road, Ireland.

2006-2008

Budapest Metro Line 4, Hungary

BAMCO, Hungary

Expert advice to BAMCO JV on SCL tunnelling, settlement analysis and face stability of the TBM underpassing the Danube river.

2006

Smart Tunnel

GAMUDA, Malaysia

Assistance in detailed design of the segmental lining and internal works for this unique combined floodwater/road tunnel, constructed in karstic limestone in Kuala Lumpur.

2006

Marmaray Crossing

TAISEI, Turkey

Assisting in the preparation of specifications for the SCL and bored tunnels for this railway; project manager for the advice to Taisei-Gama-Nuroi JV.

2005-2007

Budapest Metro Line 4

Fomterv, Hungary

Project manager for assisting in design development of stations (notably Fovam and Sz Gellert); specialist advice on sprayed concrete linings; detailed design of a shallow, combined ventilation and running tunnel in stiff clay for Bocskai station near live tram lines for Swietelsky Obayashi JV.

2005-2006

Long Tunnels Study

BP, United Kingdom

Project manager for a study into the feasibility of driving tunnels greater than 50 km in length. This study involved researching the state-of-the-art and exploring new technologies to meet the challenges posed by very long tunnels. Input was gathered and coordinated from experts in the field of segmental linings, TBMs, ventilation and transport logistics.

2004-2005

Karahnjukur Iceland

Landsvirjkun, Iceland

11 months (July 2004 to May 2005) as a site engineer as part of a team supervising construction of 60 km of tunnels in hard rock for a hydroelectric powerstation. Excavation was by both drill and blast and open face TBM. The contract value for the tunnelling works is £180 m. Main duties included instructing rock support, geological mapping, monitoring progress for payment purposes and development of a tunnel supervision database, using MS Access.



2004-2012

Crossrail Project (MDC Stage)

CLRL, United Kingdom

Crossrail cost £15 bn and the central section comprises 42 km of tunnels. Managing numerical modelling of SCL tunnels for three stations, Liverpool St, Farringdon and Whitechapel, all located in soft ground comprising gravels, clays and sands. Expert advice on SCL tunnelling and shafts and numerical modelling, including calibration of the geotechnical model and validation of the modelling process. Very sophisticated, nonlinear modelling in both 2D and 3D was used at the heart of the design of this mega-project. Co-author of the project standard for numerical modelling. During the Hybrid Bill stage, I was responsible for design and planning of new stations, in close proximity to varied existing surface and subsurface structures, coordinating the work of multi-disciplinary teams. The project involves preparation of outline designs for submission to Parliament for planning permission. Specific roles include:

- Bond St Station & Liverpool St Station (LIS) – Design engineer
- Specialist input on sprayed concrete tunnel linings

The station design included connections to existing LU stations and assessment of the impact on adjacent tunnels and buildings as well as the power cable tunnel at LIS.

2004-2008

Sprayable Waterproofing Membrane Evaluation

BASF, Switzerland

Project manager for a product evaluation of Masterseal 345, a spray-on membrane for use in tunnels, including development of generic specification and examination of test methods. This study was subsequently updated in 2006-8.

2004-2005

Customer Care Representative for Tunnels Division

Mott Macdonald Group, Hungary

Customer Care Representative for Tunnels Division

2004

Abbotscliffe Rail Tunnel

Network Rail, United Kingdom

Concept design for remedial works to an old brick-lined tunnel in chalk and special measures for controlling severe water ingress.

2003-2004

Heathrow Terminal 5 Project

BAA, United Kingdom

Construction value £2.7 bn. Shift engineer supervising the construction of the SCL shafts and tunnel for the StormWater Outfall Tunnel; specialist advice on sprayed concrete and design checking for SCL works for the Heathrow Terminal 5 project.

2003-2012

Miscellaneous Projects

Various Clients, Ireland, United Kingdom

Providing specialist advice on various road tunnel projects, including Dublin Port road tunnel and A3 Hindhead SCL road tunnel, UK (the later continued in 2008), Singapore power cable tunnel (shaft and SCL launch chamber design), Sofia Metro Line 2 tender & Sydney Metro Line One tender.



2002

Mission Valley East LRT

SD MTS, United States

Construction value \$12 m for SCL tunnel. Designer's representative on site for SCL tunnel in San Diego, California, USA (for five months), responsible for assisting in the day-to-day construction management of the tunnel and providing advice on all design matters. Management of detailed design for the SCL tunnel which is part of an extension to the light rail system. The numerical modelling included simulation of seismic effects. This project has won several awards including the UK Tunnel Industry Award for Excellence in Design 2004 and ASCE (San Diego Section) 2004 award for Outstanding Civil Engineering Project.

2002-2004

Design Checking (various projects)

Various Clients, United Kingdom

Independent design checking of sprayed concrete lined tunnels for Channel Tunnel Rail Link Contract 250 and Brixton Mobility Impaired Person lift shaft at the LU station.

1998-2002

Royal Commission for 1851 Exhibition, Industrial Fellowship

Mott Macdonald Group - PhD Research, United Kingdom

PhD research into the numerical modelling of sprayed concrete tunnel linings at University of Southampton, building on the existing research of a recent EC-funded research project and Heathrow Express back-analysis. Contribution to the British Tunnelling Society Lining Design Guide.

1997-1998

Heathrow Terminal 5

BAA, United Kingdom

(Construction value £2.7 bn) 12 months' working for the tunnels team on concept design including cost estimates, 3D computer aided design and feasibility studies for Storm Water Outfall Tunnel, Airside Road Tunnel and extensions of the Heathrow Express and LU Piccadilly Line railway tunnels. The project included pipejacking for utilities under the A3044 road.

1997-1998

Detailed design for Afon Mwldan flood alleviation scheme

-, United Kingdom

A 3.6 m span SCL tunnel in weak rock to convey water and avoid flooding.

1996-1997

Heathrow Express

BAA, United Kingdom

Design of sprayed concrete linings (SCL) for tunnels and junctions, as well as construction monitoring of on-going SCL work. The overall project cost £440 m.

1996

Feasibility Study for Horsea Deep Diving Facility

Mott MacDonald, United Kingdom

A deep shaft in soft rock to be filled with water for diving training.

1996-1998

Tender Designs

Mott Macdonald Group, Israel, United Kingdom, Hong Kong

For rock tunnels including: road tunnels in Carmel, Israel and Ramsgate, UK and a metro extension at Quarry Bay, Hong Kong.



1995-1996

Jubilee Line Extension, Contract 105

AOKI-SOLETANCHE JV, United Kingdom

Construction value £100 m. Seconded to Aoki as a site engineer for 12 months, supervising tunnel enlargements at Bermondsey Station, by hand excavation under compressed air, using cast iron segments and tunnel construction with an earth pressure balance (EPBM) tunnelling machine.

1994-1995

Heathrow Express Recovery Team

BAA, United Kingdom

Construction value £450 m. CTA station redesign, mainly shafts and tunnel junctions. Detailed design of linings (precast concrete and cast iron) and steelwork for openings in tunnels.

1994-1995

London Underground Seepage Study

LUL, United Kingdom

Investigating methods for reducing water ingress in existing LU tunnels of different types.

1994

Piccadilly Line Extension to Terminal 5 at Heathrow Airport

BAA, United Kingdom

Feasibility study for the LU metro link to the planned new terminal.



PUBLICATIONS

2022

Glass fibre reinforced polymer (GFRP) permanent rock bolts

ITA-AITES World Tunnel Congress, WTC2022 and 47th General Assembly Bella Center, Copenhagen 2022

Authors: A.H. Thomas

Sustainability – the future is now

Tunnels & Tunnelling International August 2022, p 42

Authors: A.H. Thomas

2021

Design methods for Fibre reinforced concrete

13th international tunnelling and underground structures conference, ITA Slovenija

Authors: A.H. Thomas

The role of innovation in sustainability

Sustex 2021 conference presentation

Thomas, A. H. (2021) **Spraying for success** – Rules of thumb: sprayed concrete, Tunnels & Tunnelling International August 2021 p 24-27

2020

Dauerhafte Spritzbeton Innenschalen – eine internationale Betrachtung

Permanent Sprayed Concrete Linings – an international update, Spritzbeton Tagung 2020, Alpbach

Authors: W. Aldrian, A.H. Thomas & K-G. Hoiter

The design of the Crossrail tunnels in UK

Geomechanics and Tunnelling 14, No. 4, pp. 340–346. <https://doi.org/10.1002/geot.202100014>

Authors: A.H. Thomas

Developments in fibre reinforced concrete in tunnelling

Geomechanics and Tunnelling 14, No. 4, pp. 333–339. <https://doi.org/10.1002/geot.202100018>

Authors: A.H. Thomas & E.S. Bernard

Thomas, A. H. (2020) "Achieving sustainability in tunnelling through innovation", IS-Cambridge, 10th International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground.

Permanent Sprayed Concrete Linings

ITA report no. 24, ISBN 978-2-9701242-6-9, 2020

Authors: ITA WG12 & ITAtech (W. Aldrian, A.H. Thomas & K-G. Holter)

Fibre reinforced sprayed concrete for ground support

Tunnelling and Underground Space Technology, Volume 99, May 2020, 103302

Authors: E.S. Bernard & A.H. Thomas

2019

Glass fibre reinforced polymer (GFRP): the low carbon option for permanent rockbolts

Proceedings of the Institution of Civil Engineers – Geotechnical Engineering, <https://doi.org/10.1680/jgeen.19.00174>

Authors: A.H. Thomas

2019

Achieving sustainability in underground construction through innovation.

Proceedings of the Institution of Civil Engineers – Civil Engineering, <https://doi.org/10.1680/jcien.19.00018>

Authors: A.H. Thomas

2019

Sprayed concrete lined tunnels

CRC Press, Boca Raton, USA, ISBN: 9780367209759 - <https://www.crcpress.com>

Authors: A. H. Thomas

2019

Glass fibre reinforced plastic (GFRP) permanent rockbolts

WTC2019, World Tunnelling Congress, Naples, 2019.

Authors: A.H. Thomas

2018

Glass fibre reinforced plastic (GFRP) permanent rockbolts

Fjellsprengningsdagen 2019

Authors: A.H. Thomas

2018

Ultra-fast rapid hardening sprayed concrete

Sprayed Concrete Symposium 2018, Trondheim

Authors: P. Mills, S. Tadolini & A.H.Thomas

2018

The design philosophy for permanent sprayed concrete linings

Sprayed Concrete Symposium 2018, Trondheim

Authors: A.H.Thomas & R. Dimmock

2018

GFRP rockbolts: Design & application

Reinforcement, Sealing and Bolting of the Rock Mass and Engineering Construction, Minova / VSB Technical University seminar, Ostrava

Authors: A.H.Thomas

2018

The design philosophy for permanent sprayed concrete linings

Reinforcement, Sealing and Bolting of the Rock Mass and Engineering Construction, Minova / VSB Technical University seminar, Ostrava

Authors: A.H.Thomas

2017

Life-cycle assessments of rock bolts

Tunnelling Journal, June/July, p 47-49.

Authors: J.Kodymova, A.H.Thomas & M.Will

2017

The design philosophy for permanent sprayed concrete linings

Proceedings of the World Tunnel Congress 2017 – Bergen, Norway.

Authors: A.H.Thomas & R.H.Dimmock

2015

The design of the Fehmarnbelt Tunnel

Proceedings of the World Tunnel Congress 2015 –Dubrovnik, Croatia.

Authors: A.H.Thomas, S. Kalmar Pedersen & L. Lundberg



2015

ITAttech GUIDELINE FOR FIBRE REINFORCED CONCRETE PRECAST SEGMENTS

Proceedings of the World Tunnel Congress 2015 –Dubrovnik, Croatia.

Authors: A.H.Thomas, C. Eberle & S. Psomas

2014

Design methods for fibre reinforced concrete

Proceedings of the World Tunnel Congress 2014 – Tunnels for a better Life. Foz do Iguagu, Brazil.

Authors: A.H.Thomas

2014

Design methods for fibre reinforced concrete

Tunnelling Journal, June/July pp 44 - 48

Authors: A.H. Thomas

2013

Fehmarnbelt Fixed Link Tunnel

12th Australian Tunnelling Conference

Authors: A.H.Thomas

2013

Trigger happy: thoughts on monitoring SCL tunnels

A.H.Thomas, Tunnelling Journal Dec 2013/Jan 2014 pp 31 - 34

2013

Sustainability and the tunnelling industry

P. Duarte, M. Cooke & A.H.Thomas, Tunneltalk Dec 2013, tunneltalk.com

2012

SUSTAINABILITY AND TUNNELS

P. DUARTE, A.H. THOMAS & M. COOKE, 2012 Under City Colloquium, Dubrovnik, pp 54 -55

2012

NEW DEVELOPMENTS IN SCL TUNNELLING

A.H. THOMAS & A. PICKETT, 2012 Under City Colloquium, Dubrovnik, pp 58 - 59

2012

USER-FRIENDLY CONSTRUCTION CONTRACTS

A.H. THOMAS & A. PICKETT, 2012 Under City Colloquium, Dubrovnik, pp 150 – 151

2012

Where are we now with sprayed concrete lining in tunnels?

A.H. THOMAS & A. PICKETT, 2012 Tunnelling Journal, April/May pp 30 - 39

2012

Composite Shell Linings

A.H. THOMAS & A. PICKETT, 2012 Spritzbeton Tagung pp 1 - 17

2011

TUNNELLING IN ROCK WITH TUNNEL BORING MACHINES (TBM)

THOMAS, A.H., ITA SEE 2011, Dubrovnik, pp 136-137.

2011

A DETAILED DESIGN OF BÁTAAAPÁTI NATIONAL RADIOACTIVE WASTE REPOSITORY

BENO, B., VARO, A. & THOMAS, A.H., ITA SEE 2011, Dubrovnik, pp 190-191.



2011

UDEC MODELING IN GRANITIC ROCKS

VARO, A., KOVÁCS, A. & THOMAS, A.H., 2nd International FLAC/DEM Symposium, 14-16 February 2011, Melbourne, Australia, pp 153 – 160.

2011

GEOTECHNICAL REPORTS IN UNDERGROUND CONSTRUCTION

KANDI, E.J., THOMAS, A.H., FORGO, L. & HERSVIK, D., ITA SEE 2011, Dubrovnik, pp 6-7.

2011

ADVANCED NUMERICAL MODELING IN TUNNEL DESIGN – THE EXAMPLE OF A MAJOR PROJECT IN THE UK

GOIT, C.S., KOVÁCS, A. & THOMAS, A.H., 2nd International FLAC/DEM Symposium, 14-16 February 2011, Melbourne, Australia, pp 117 – 126.

2011

THE DESIGN OF COMPOSITE SPRAYED LININGS

THOMAS, A H & PICKETT, A P, Modern use of wet mix sprayed concrete for underground support, Tromso, Norway, pp 402-413.

2010

ADVANCES IN SPRAYED CONCRETE TUNNELLING

THOMAS, A.H., Tunnelling Journal, Apr/May 2010 pp 40 – 44.

2010

NEW CHALLENGES IN NUMERICAL MODELLING

A.H. THOMAS, Underground Construction Prague, pp 721 – 725.

2009

ADVANCED NUMERICAL MODELLING IN TUNNEL DESIGN – THE EXAMPLE OF A MAJOR PROJECT IN THE UK

A. H. Thomas, E. Kandi, Á. Czeglédi, & M. Wolf-Győri, ITA World Tunnelling Congress, Budapest, pp 119-120.

2009

TUNNELLING ON AN EPIC SCALE. THE KÁRAHNJÚKAR HYDROELECTRIC PROJECT

T. Nyíregyházi, A. H. Thomas, & J. Kroyer, ITA World Tunnelling Congress, Budapest, pp 370-371.

2009

NUMERICAL ANALYSIS OF SHALLOW SCL TUNNEL

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