

Grenfell Tower – fire safety investigation:
The fire protection measures in place on the night of the fire, and conclusions as to:
the extent to which they failed to control the spread of fire and smoke;
the extent to which they contributed to the speed at which the fire spread.

Phase 1 Report – Appendix A

**Experience, qualifications, appointments, speciality of the Expert and of those who
have assisted in the preparation of the report**

REPORT OF

Dr Barbara Lane FREng FRSE CEng

Fire Safety Engineering

24th October 2018

Specialist Field	:	Fire Safety Engineering
Assisted by	:	Dr Susan Deeny, Dr Peter Woodburn, Dr Graeme Flint, Mr Tom Parker, Ms Danielle Antonellis, Mr Alfie Chapman
On behalf of	:	Grenfell Tower Inquiry
On instructions of	:	Cathy Kennedy, Solicitor, Grenfell Tower Inquiry
Subject Matter	:	To examine the circumstances surrounding the fire at Grenfell Tower on 14 th June 2017
Inspection Date(s)	:	6 th October, 1 st November, 7-9 th November 2017

Dr Barbara Lane
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London W1T 4BQ

REPORT OF
SPECIALIST FIELD
ON BEHALF OF:

DR BARBARA LANE
FIRE SAFETY ENGINEERING
GRENFELL TOWER INQUIRY

Appendix A– Experience, qualifications, appointments, speciality of the Expert and of those who have assisted in the preparation of the report

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Curriculum Vitae of Dr Barbara Lane

Curriculum vitae of : Dr Barbara Lane FEng CEng
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

DR BARBARA LANE

FEng, FRSE CEng, PhD, BA BAI (Hons), MIFE

Director of Ove Arup + Partners Ltd, London and Arup Fellow

Chartered Fire Safety Engineer 2002

Fellow of the Royal Academy of Engineering 2016

Fellow of the Royal Society of Edinburgh 2018

Introduction

Dr Barbara Lane, is a Director of Ove Arup & Partners Ltd.

Based in London, she has considerable experience in the development and delivery of fire safety designs, coupled with particular expertise in construction stage compliance, construction stage fire risk assessments, as well as the operational requirements for a safe building handover and occupation.

Barbara has twenty-one years' experience working on design and construction projects in the Regulatory environment and has considerable experience as a result regarding the statutory requirements and functional objectives. This includes the occupation stage requirements, as well as the design and construction stage requirements.

Barbara has led negotiations with approving authorities, insurers, and other key stakeholders, for a variety of complex buildings, including high rise residential, commercial, stadia, conference centres, stations, airports, leisure parks and art centres, around the world.

She has specific construction dispute resolution experience, providing expert advice regarding the behaviour of construction materials and construction systems in fire, as well as Regulatory compliance requirements.

Barbara has a particular interest in applied research for improving standards and skills in the construction industry. She holds the Silver Medal from the Royal Academy of Engineering 2008, for outstanding personal contribution with a commercial benefit to British engineering. She was made a Fellow of the Royal Academy of Engineering in 2016 for services to fire safety engineering. She was recently made a Fellow of the Royal Society of Edinburgh.

Current Arup roles:

Director of Ove Arup & Partners Ltd. - global fire safety engineering technical Leader for 228 fire engineers, 83 of whom are based in the UK.

Member of the UK Middle East India and Africa Board for Arup - which has overall responsibility for business operations and performance and the success and well-being of 4,700 staff across six countries and 20 offices.

Group leader –the Technology Group – a £25M operational business in the UK region – Staff numbers 236. This is a group of highly specialist practitioners in the fields of fire safety engineering, acoustics, lighting, virtual, visualisation, building performance, smart buildings; my role is to lead the business, create new technologies, and directly apply these new technologies into the wider Arup business.

Fellow of Arup for fire safety engineering. Arup Fellow is a life-long, honorary title awarded to exceptional individuals in the firm considered role models with world-class vision and initiative. They are individuals that people can turn to for their unique perception and experience.

Professional Associations, Education:

Fellow of the Royal Society of Edinburgh, induction 14th May 2018.

Fellow of the Royal Academy of Engineering 2016. Awarded for leadership in crystallising fire safety engineering as a profession by immersing it in the field of building design and construction, and driving competence, education, regulation and stakeholder relationships.

Silver Medal Royal Academy of Engineering 2008, for outstanding personal contribution with a commercial benefit to British engineering. Based on structural fire analysis and design work.

Visiting Professor, University of Edinburgh, from 2008 - 2017

Chartered Engineer with the Institution of Fire Engineers, C Eng MIFE, 2002 Member of the Institute of Fire Engineers, MIFE, 2001

Member, Society of Fire Protection Engineers, 2000

Barbara joined Ove Arup & Partners in 1997.

PhD, Multi-storey steel frame buildings in fire, University of Edinburgh, 1997

BA BAI (Hons) 2.1, Civil Engineering, Trinity College Dublin, 1992

Some specific project examples are listed here:

High Rise Residential buildings/developments – fire safety design work

Canary Wharf – multiple high-rise buildings on the site. Project Director responsible for developing fire strategies that demonstrate compliance with the UK Building Regulations and Canary Wharf's own framework which has additional fire safety requirements.

The Shard, London. Project Director responsible for on-site compliance works regarding the approved fire strategy.

Elisabeth House. Fire Project Director for this mixed-use, high rise development, including commercial, residential and retail accommodation.

High rise buildings UK and International

Transforming Tate Modern, UK. Project Director for the fire safety strategy for this unique building designed by Herzog + De Meuron, addressing life safety, property protection, business continuity and art collection protection and security.

The Pinnacle, London. Project director for the advanced structural fire analysis and design of this 63 storey tower rising 288m from street level.

Leadenhall St Tower, London. Project Director for the structural fire analysis of this 50 storey development proposed for the City in London, for British Land.

Heron Tower, London. Project Director for the structural fire analysis of this 50 storey development proposed for the City in London; also evacuation analysis for specific catastrophic events.

Shoreditch Development, London. Project Director for the rail fire safety at a right of light development, creating new fire safety issues at a major transport interchange in London.

Lime St Commercial development, London. Project Director for the structural fire safety strategy and assessment for two office towers in central London.

Kings Place Development, London. Project Director responsible for the structural fire analysis and design of this new office headquarters, in London

CCTV building, Beijing. Project Director for Structural fire analysis and strategy development and presentation, for this Rem Koolhaas structure in Beijing

Plantation Place South, London. Project Director responsible for the structural fire analysis this multi-storey composite steel frame structure in fire conditions which removed the fire protection from 67% of the steel beams. The work was carried out for British Land.

Pennsylvania Station Redevelopment, New York, New York. Project Engineer responsible for the development of a detailed fire strategy to facilitate the conversion of a Listed Post Office building to accommodate a new railway station. Her work

included detailed egress and smoke modelling, structural fire protection calculations, and extensive negotiations with the authorities having jurisdiction, including Amtrak.

British Museum World Conservation and Exhibitions Centre, Montague Place, London. Part of the fire team that dealt with this unique space, and addressed key fire engineering challenges such as the risk of water damage from suppression systems to invaluable contents, the constraints imposed by the existing estate, an HGV lift passing through all basements and flexible exhibition space, and enabling a unique architectural vision for the glazed facades.

On Site Construction Compliance – Active and Passive Systems

Construction Stage experience: Gateway Birmingham New Street Station Project, UK (part-time on site). Project Director for the fire team dealing with the construction stage ongoing fire risk assessment of all works on this £600M redevelopment. This full time on site role was as competent advisor to the principal contractor (Mace) such that they fulfil their duties under CDM and RRO, in this shared premises. Barbara were responsible for a dynamic full time risk assessment process to identify hazards and to reduce the risk of those hazards causing harm to as low as is reasonably practicable; and to determine what fire safety measures and management policies are necessary to ensure the safety of people in this shared premises, should a fire occur.

Due to the complex nature of the works and the large number of persons it impacts, it included full time stakeholder liaison including West Midlands Fire and Rescue Authority, Network Rail, and others. Technical aspects of the role include analysis and inspection of the performance of construction materials, and construction processes; systems installation auditing, fire alarm cause and effect testing and defining alterations; on site construction inspection; on site enforcement of the fire safety measures; ongoing review of the sub-contractor's fire risk assessments underpinning their works; occupancy analysis and safety solutions for the 140,000 members of the public on the "site" daily including platform and public areas; plus, reviewing firefighting access and facilities and creating amended approaches as required.

Construction Stage experience: Dublin Airport Terminal 2 (full time on site). Project Director for the fire engineering works. This involved the development of a fire safety strategy that addresses life safety, business continuity and property protection; plus, integration with commercial and security requirements, unique to Terminal 2. Barbara led the negotiations with all key stakeholders in that regard – fire brigade, operator, insurers, end users in retail areas – to ensure the final design and management strategy proposed met their multiple requirements. Barbara was then based fulltime on site leading the programming of works and inspections, in order to achieve a compliant building project handover. She led the team of M+E and fire engineers responsible for the testing and certification of the integrated fire alarm system, supporting the complex phased evacuation regime forming the basis of the fire strategy.

In addition, Barbara and her team were responsible for the dynamic fire risk assessment

works and corresponding fire safety measures to enable the construction works to continue in parallel with the works for ORAT (operational readiness and airport transfer).

The Shard (part time on site) - Responsible for on-site compliance works regarding the approved fire strategy including fire alarm testing, detailed passive fire safety systems inspections; preparation of defects lists prior to handover, seeking out compliance matters for handover.

Schiphol Airport, Amsterdam - Lounge 2 and OneX Projects

Barbara was the Project Director for a site based team of engineers undertaking fire risk assessment work for the Schiphol client Organisation Terminal Real Estate. Focused on reducing risk from fire during a programme of extensive reconstruction, building modification and fire safety system renewal within the extended range of terminal buildings, with works taking place simultaneously in different areas with different main contractors for each area.

Other project types

Expert Witness appointments – multiple since 2009

Cladding analysis in fire – multiple since 2011

Fire risk assessments: buildings in use - multiple

Current research topics include fire safe facades, timber performance in fire, informal settlements and fire safety management.

Committee Membership

SFPE Standard S.01 Committee on Calculating Fire Exposures -- Traveling Fires, 2017
Member of the SFPE Standard S.01 Committee on Calculating Fire Exposures to Structures, 2016

Editorial board, Journal of Fire Protection Engineering, SFPE, USA,
2012 IFE Technical Standards Advisory Group, 2007

SFPE Standards Making Committee on Calculating Fire Exposures to Structure, 2004

ASCE/SEI Standards Committee on Structural Design for Fire Conditions, 2002

Task group to FSH14 (BS9999 Construction fire safety)

2002 AISC, Fire Safety Engineering Committee, 2001

onwards AISC, Temperature Effects Task Committee,
2001

SFPE Task Group on Fire Exposures to Structural Elements, 2000

Chairman - SFPE/ASCE structures in fire conference, Professional Development Week,
Baltimore, September 2003

Institute of Structural Engineers, Fire Safety Committee, 2003 onwards

Member of the Peer Review College for the EPSRC since 1998

Selected Publications/key note presentations

Fire sector summit 2017 Construction Industry Standards – The Future from a Fire Safety Perspective

New Fellows Presentation Royal Academy of Engineering, October 2016
Timber in Fire: keynote presentation 22 April, The Fire Lecture 2015, The Worshipful Company of Fire Fighters, London, 2015
Opening address and panel, Opportunities for Women - Your Career in STEM, Aldersgate, London, 10th October 2014 (O4W)
Fire Safety Design in practice: 40 years of Fire Safety Engineering @ Edinburgh: A special symposium, Surgeons' Hall Edinburgh, 15th and 16th of May 2014
Structural Failure and the Twin Towers: New Developments and Challenges in Fire Safety: Engineers Ireland, Dublin, 26 March 2014.
The BCSEA and Tata Steel Fire Engineering Seminars June 2013, London, Getting value from fire engineering for Architects and Engineers
The role of the fire engineer, Annual Professorial lecture Edinburgh University, March 2013 Panel member (with presentation) for inspiring and innovative technical women at the British Science Festival, WES, 10th September, 2009
The Society of Fire Protection Engineers (SFPE) October 12-17, 2008, Charlotte, North Carolina; Keynote speaker – B Lane: Structures and fire: The role of the practising fire professional
IFE Graduate lecture 2008: Fire Engineering in the Built Environment
Interflam 2007 11th International Conference on Fire Science and Engineering: Multi-Storey
Deeny, S., Lane, B., Hadden, R., Lawrence, A. (2018) " Fire Safety Design in Modern Timber Buildings ", The Structural Engineer, Page 48- 53
NFPA: International approaches to structural fire resistance, 2008: Chapter for the revised version of the Fire Protection Handbook, outlining design methods for structures in fire
Fire Analysis for High-Rise Buildings; Barbara Lane, P Williams, B Hume, A Heise, G Rein, W Jahn, J Torero NIST: Presentations from Sept. 13-15, 2005, Technical Conference on the Federal Building and Fire Safety Investigation of the World Trade Center (WTC): Comments on Structural Fire Response and Collapse Analysis, Lane 2005
Reducing the risk and mitigating the damaging effects of fire in tall buildings, B Lane, S Lamont, NCE conference, 2005.
Tall buildings in fire - the use of structural fire engineering solutions, Plenary Session on the World Trade Center collapse, Interflam Fire science and engineering conference, July 2004 Lane, B Thermal and structural analysis methods and tools - gaps in knowledge and priority area for research from a practice perspective, Invited White Paper at NIST Research and Development Roadmap for Fire Safety Design and Retrofit of Structures workshop Baltimore October 2003
Chairman - SFPE/ASCE structures in fire conference, Professional Development Week, Baltimore, September 2003.
Lane, B, Protecting high risk structures – a new approach based on structural fire engineering, Industrial Fire Journal, June 2003
Lane, B, Robust design of structures in fire - a new approach, Invited Conference paper 1st annual congress on Infrastructure Security for the Built Environment, ASCE annual conference, Washington 2002.
Lane, B, Limitations of fire resistance design methods, Invited Conference paper Fire Protection strategies for the 21st Century, SFPE professional development week, Baltimore 2002

Lane B, Lamont S, Robust design of tall buildings in fire - addressing approving authority and insurance issues, CIB-CTBUH International conference on tall buildings, Malaysia 2003.

A1 Curriculum Vitae of Dr Susan Deeny

Curriculum vitae of : Dr Susan Deeny
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Susan Deeny (CEng PhD MEng MIFireE) Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

Chartered Engineer with the Institution of Fire Engineers, CEng MIFE, 2017
PhD, the implications of compartment fire non-uniformity for the membrane action of reinforced concrete slabs, University of Edinburgh 2010
MEng, Civil Engineering, First Class Honours, University of Edinburgh 2005

Past and present positions

Senior Fire Safety Engineer, Ove Arup & Partners Ltd (2014 – present)
Fire Safety Engineer, Ove Arup & Partners Ltd (2011 – 2014)
Fire Safety Engineer, Buro Happold (2010 – 2011)
Graduate Civil Engineer, Buro Happold (2005 - 2006)

Principal professional specialisms

I have 8 years' experience as a practicing Fire Safety Engineer; my principal specialism is the design of structures for fire. My experience includes performance based design of steel structures, specifying performance specification for structural fire resistance and advising on fire protection methods for various forms of construction which. Within this specialism I also co-supervise PhD research at the University of Edinburgh on the performance of concrete and timber structures in fire.

Relevant experience

My experience also includes development and delivery of fire strategies, undertaking performance-based fire engineering assessments, providing fire risk assessment for operational fire safety, undertaking site inspection of building fire safety provisions.

I also have experience in providing 3rd party technical reviews of fire safety designs, specifications and analyses. Also 3rd party compliance reviews against UK and international fire safety codes.

I have also conducted post fire incident analysis of structural performance for a multi-storey steel and composite frame structure.

Memberships of professional organisations

Member, Institution of Fire Engineers since (2017- 2018).
Associate Member, Institution of Fire Engineers (2010 – 2017).

Curriculum vitae of : Dr Susan Deeny
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Published books and editorial roles

Technical Report No. 68 Assessment, Design and Repair of Fire-damaged Concrete Structures.

Awards

Recipient of the Women's Engineering Society (WES) Karen Burt Award for best new female Chartered Engineer in October 2018.

Now in its 20th year, it recognises the candidate's excellence and potential in the practice of engineering, highlights the importance of Chartered status, and offers recognition to contributions made by the candidate to the promotion of the engineering profession.

Research publications

Deeny, S., Lane, B., Hadden, R., Lawrence, A. (2018) " Fire Safety Design in Modern Timber Buildings ", The Structural Engineer, Page 48- 53

Bartlett, A., Hadden, R., Hildago, J., Santamaria, S., Wiesner, F., Bisby, L., Deeny, S., Lane, B. (2017) "Auto-extinction of engineered timber: Application to compartment fires with exposed timber" Fire Safety Journal, vol 91

Hadden, R., Bartlett, A., Hildago, J., Santamaria, S., Wiesner, F., Bisby, L., Deeny, S., Lane, B. (2017) "Effects of exposed cross laminated timber on compartment fire" dynamics Fire Safety Journal, vol 91

Rickard, I., Bisby, L., Deeny, S., Maluk, C., (2016) "Predictive testing for heat induced spalling of concrete tunnels – The influence of mechanical loading" Conference: 9th International Conference on Structures in Fire (SiF 2016) Princeton, USA

Kotsovinos, P., Law, A., Deeny, S., Butterworth, N., (2014) "Structural Fire Response of Tall Buildings with Inclined and Bi-Linear Perimeter Columns" Conference: 8th International Conference on Structures in Fire (SiF 2016) Shanghai, China

Deeny, S. and Stratford, T. (2010). Stability of RC structures under non-uniform thermal exposure. Conference: 6th International Conference on Structures in Fire (SiF 2010), East Lansing, USA

Deeny, S., Stratford, T., Dhakal, R., Moss, P. and Buchanan, A. (2009). Spalling of concrete: Implications for structural performance in fire. Applications of structural fire engineering Prague, Czech Technical University in Prague.

Welch, S., Jowsey, A., Deeny, S., Morgan, R. and Torero, J. L. (2007). "BRE large compartment fire tests - Characterising post flashover fires for model validation." Fire Safety Journal 42(8): 548-567

Deeny, S., Abecassis-Empis, C., Stratford, T. and Torero, J. L. (2007). The Dalmarnock Fire Tests on a Cast In-situ Concrete Structure. fib International workshop: "Fire Design of Concrete Structures - From Materials Modelling to Structural Performance", Coimbra, Portugal, Universidade de Coimbra.

Research work and academic engagement

PhD supervisor for:

Ieuan Rickard – *A novel cost effective and simple predictive test for design and optimisation of fire safe concrete tunnel linings*

Alastair Bartlett – *Novel Fire Testing methods in support of Tall Timber Construction*

Felix Wiesner – *Structural behaviour of cross-laminated timber compression elements in non-standard fires*

A2 Curriculum Vitae of Dr Peter Woodburn

Curriculum vitae of : Dr Peter Woodburn
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Dr Peter Woodburn, MA, PhD, CEng, MIMechE Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

Chartered Engineer with the Institution of Mechanical Engineers, CEng MIMechE, 2006
PhD, CFD simulation of fire-generated flows in tunnels and corridors, Cambridge University, 1995

BA, Engineering, Cambridge University, 1989 (MA 1992)

Past and present positions

Associate Director, Ove Arup and Partners Ltd, 2015 to present

Associate Director/Technology Fellow, Halcrow/CH2M Hill, 2005 to 2015

Senior Engineer, Atkins, 1998 to 2005

Research Associate, Imperial College 1996 to 1998

Research Associate, University of Edinburgh, 1995 to 1996

Graduate Engineer, Ove Arup and Partners Ltd, 1989 to 1990

Principal professional specialisms

I have more than 20 years' experience as a practicing engineer, principally in the field of fire safety in tunnels and underground structures, and technical analysis of fluid flow including smoke dynamics. This has included design and construction of tunnels and underground stations on projects around the world. I have also undertaken many projects applying engineering analysis to a wide range of problems for infrastructure, industry, civil engineering and buildings, including post incident analysis. I also have experience of fire safety design of nuclear facilities.

Relevant experience

My relevant experience in post-incident analysis includes research into the trench effect as occurred in the King's Cross Station fire as a Research Associate at the University of Edinburgh from 1995 to 1996.

Over the period 2002-2004 I undertook a post-incident analysis of conditions within the Mont Blanc Tunnel during the fire of 1999, working for the French tunnels agency CETU.

I undertook a post-incident analysis of one of the largest leaks of oil from a pipeline in the North Sea in 2000.

I have undertaken design and analysis of smoke control systems for more than 20 years.

Memberships of professional organisations

Member, Institution of Mechanical Engineers since 2006.

Curriculum vitae of : Dr Peter Woodburn
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Relevant research publications

D.M.Deaves, S. Gilham, B.H.Mitchell, P.J.Woodburn and A.M.Shepherd, 'Modelling of catastrophic flashing releases', Journal of Hazardous Materials, Vol 88, number 1, pp 1-32, 2001.

Gilham, S., Deaves, D.M., and Woodburn, P.J. 'Mitigation of dense gas releases within buildings: Validation of CFD Modelling', Journal of Hazardous Materials, Vol 71, 2000.

Gilham, S., and Woodburn, P.J. 'Improved Validation of Source Term Modelling', HSE Contract Research Report CRR220, HSE Books, 1999.

Woodburn, P.J. & Drysdale, D.D. "Fires in inclined trenches: The dependence of the critical angle on the trench and burner geometry" Fire Safety Journal, vol 31 pp 143-164, 1998.

Woodburn, P.J. & Drysdale, D.D. "Fires in inclined trenches: time-varying features of the attached plume" Fire Safety Journal (short communication), Vol 31, pp, 165-172, 1998.

Woodburn, P.J. & Drysdale, D.D. "Fires in inclined trenches: the effects of trench and burner geometry on the critical angle" IAFSS International Symposium, Melbourne, Australia, 1997.

Woodburn, P.J. & Britter, R.E. "CFD Simulations of a tunnel fire - Part I" Fire Safety Journal, Vol 26, p 35-62, 1996.

Woodburn, P.J. & Britter, R.E. "CFD Simulations of a tunnel fire - Part II" Fire Safety Journal, Vol 26, p 63-90, 1996.

Woodburn, P.J. & Britter, R.E. "The sensitivity of CFD simulations of fires in tunnels" IAFSS European conference, Zurich, Switzerland, 1995.

Woodburn, P.J. "Computational Fluid Dynamics simulation of fire-generated flows in tunnels and corridors" PhD thesis, Department of Engineering, University of Cambridge, UK, 1995.

A3 Curriculum Vitae of Dr Graeme Flint

Curriculum vitae of : Dr Graeme Flint CEng
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Dr Graeme Flint, PhD, MEng, CEng, MIFireE Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

Chartered Engineer with the Institution of Fire Engineers, CEng MIFE, 2013
PhD, Fire induced collapse of tall buildings, University of Edinburgh, 2005
MEng (Hons) 2.1, Civil and Structural Engineering, University of Edinburgh, 2002

Past and present positions

Senior Fire Engineer, Ove Arup and Partners Ltd, 2010 to present
Fire Engineer, Ove Arup and Partners Ltd, 2006 to 2010

Principal professional specialisms

I have 12 years' experience as a practicing Fire Safety Engineer; my principal specialism is computational modelling and design of structures for fire. My experience includes performance based design of steel and composite structures, developing performance specifications for structural fire resistance and advising on fire protection methods for various forms of construction.

Relevant experience

My experience also includes development and delivery of fire strategies, undertaking performance-based fire engineering assessments, undertaking fire risk assessment work, undertaking site inspection work, inspecting fire safety systems, and providing third party design reviews.

I have been responsible for fire safety design on a wide range of high rise buildings across the UK and around the world, including: Qatar National Museum (Doha), The Shard (London), Transforming Tate Modern (London), Quartermile Q9 (Edinburgh). In my time at Arup I have also assisted with 3 other expert witness projects including post incident analysis of the collapse of a multi-storey steel and concrete composite frame structure following fire.

Memberships of professional organisations

Member, Institution of Fire Engineers since 2006.

Relevant Research publications

G. Flint, "Fire Induced Collapse of Tall buildings", PhD Thesis, University of Edinburgh, December 2005

Curriculum vitae of : Dr Graeme Flint CEng
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

S. Lamont, B. Lane, G.R. Flint, A.S. Usmani, "Behaviour of structures in fire and real design – a case study", Journal of Fire Protection Engineering, Feb 06; vol. 16: pp. 5 - 35.
G. Flint, A.S. Usmani, S. Lamont, J. Torero, B. Lane, "Effect of Fire on Composite Long Span Truss Floor Systems", Journal of Constructional Steel Research, Volume 62, Issue 4, April 2006, Pages 303-315

Graeme Flint, Asif Usmani, Susan Lamont Barbara Lane, and Jose Torero, "Structural Response of Tall Buildings to Multiple Floor Fires", ASCE Journal of Structural Engineering 133 (12), pp. 1719-1732, December 2007

G. Flint, B. Lane, "Take to the Floor", Fire Prevention and Fire Engineers Journal, July 2007

G. Flint, S. Lamont, B. Lane, H. Sarrazin, L. Lim, D. Rini, C. Roben, "Recent lessons learned in Structural Fire Engineering for composite Steel Structures", Fire Technology, Volume 49(3), pp 767-792, July 2013

Conference Papers

A. Temple, G. Walker, G. Flint, Y. Panev, P. Kotsovinos, "Verification of 2D heat transfer models developed in LS-DYNA for structural fire engineering applications", The International Conference of Applications of Structural Fire Engineering (ASFE 2017), September 2017

P. Kotsovinos, G. Flint, G. Walker, B. Lane, "Qualitative assessment of the fire hazards beneath bridges", 14th International Conference and Exhibition on Fire Science and Engineering (Interflam), July 2016

P. Kotsovinos, G. Flint, G. Walker, B. Lane, "Assessing the fires on the deck of cable stayed bridges", Ninth International Conference on Structures in Fire, June 2016

G. Flint, B. Lane, "Long Span Composite Beams Subjected to Fire – Effects of Fire on Lateral Stability", Application of Structural Fire Engineering, Prague, February 2009

A. Heise, G. Flint, B. Lane, "Effect of fire on tall buildings: Case study", 3rd International Conference on Steel and Composite Structures 2007, ICSCS07, July 2007, pp705-712

G. Flint, A.S. Usmani, S. Lamont, B. Lane, J.L. Torero, "Fire induced collapse of tall buildings", 4th International Structures in Fire Workshop, SiF 2006, May 2006, pp415-526

S. Lamont, B. Lane, A.I. Jowsey, A.S. Usmani, J.L. Torero, "Innovative Structural Engineering for Tall Buildings in Fire", JCSWS and IABSE Workshop on Robustness of Structures, November 2005

A.S. Usmani, G.R. Flint, A.I. Jowsey, S. Lamont, B. Lane, J.L. Torero, "Modelling of the Collapse of Large Multi-storey Steel Framed Structures in Fire", The 4th International Conference on Advances in Steel Structures, 2, 991-998, 13-15 June, 2005

B. Lane, S. Lamont, A.S. Usmani, J.L. Torero, G.R. Flint, A.I. Jowsey, "Robust Design of Tall Buildings in Fire – The Use of Analysis for Structural Fire Engineering Solutions", Interflam 2004, July 2004

G.R. Flint, A.S. Usmani, "Investigation into the Impact of Fire on the Twin Towers", The 3rd International Structures in Fire Workshop, SiF 2004, May 2004

A4 Curriculum Vitae of Joseph Wade

Curriculum vitae of	: Joseph Wade
Specialist field	: Commissioning of building services systems including life safety systems
On behalf of	: Grenfell Tower Inquiry

Joseph Wade (CEng IEI, AMIMechE) Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

Chartered Engineer with the Institution of Engineers Ireland, CEng IEI,
Associate Member of the Institute of Mechanical Engineers
BEng, Mechanical Engineering, University of Portsmouth 1994
HND, Mechanical and Manufacture Engineering

Past and present positions

Airport Systems Specialist, Ove Arup & Partners Ltd (2016 – present)
Fire Safety Engineer, Ove Arup & Partners Ltd (2012 – 2015)
Resident Engineer, Ove Arup & Partners Ltd (2006 –2012)
Resident Engineer, RN Murphy (2005 - 2006)
Commissioning Manager, Bovis (2003-2005)
Regional Manager, Commetch, (2002-2003)
Commissioning Manager, Commtech, (1999-2002)
Project Engineer, Techniques Airconditioning Singapore, (1998-1999)
Commissioning Engineer, CMD Asia, (1996-1997)
Commissioning Engineer Commtech, (1995-1996)
Director, Independent Commissioning and Engineering, (2005 – present)

Principal professional specialisms

I am an experienced Chartered Engineer currently working in the aviation sector with extensive knowledge of project delivery, testing, commissioning, integration, validation and handover. I have gained my experience in projects ranging from small commissions through to fast track mega projects

Projects that I have been involved in range from office blocks to mixed use residential and retail, electronic manufacturing to bio-pharmaceutical, however the last 10 years have been spent predominantly in the transportation sector.

I understand the nature of life safety, business critical and general systems and the due diligence that has to be applied throughout, to ensure the successful integration of these systems to each other and into existing operational systems.

Curriculum vitae of	: Joseph Wade
Specialist field	: Commissioning of building services systems including life safety systems
On behalf of	: Grenfell Tower Inquiry

Relevant experience

The Shard, London – I was the client's representative during the integration of the Shangri-La hotel's life safety systems into the Landlords life safety systems. My role was to witness the hotels systems as a standalone item and advise the client that the systems were ready to be integrated onto the landlords system, followed by fire alarm integrated systems testing of the integrated systems. This included operation of stair pressurisation systems with motorised fire smoke dampers (MSFD's) operating as relief paths and MSFD's operating to provide compartment lines.

Centennial Tower, Singapore – I was the lead Heating Ventilation and Air-conditioning (HVAC) commissioning engineer on this project that included commissioning of 35 storey stair pressurisation systems, smoke control systems and demonstrating compliance to the Authority having Jurisdiction.

LSE Student Accommodation, Holborn – I was the lead HVAC commissioning engineer on this project that included commissioning of stair pressurisation systems, smoke control systems and demonstrating compliance to the Authority having Jurisdiction.

New Doha International Airport, Qatar – I was part of a Fire Engineering team acting on the client's behalf of a brand new airport that included the main terminal building and all the support buildings associated with it. The team were tasked with checking both the passive and dynamic life safety systems. The passive systems comprised of compartmentation, fire stopping, fire door / damper / shutter installation and emergency egress routes. The dynamic tests included sprinkler systems, hose reel systems, FM 200 systems including room integrity testing, standalone testing of the fire alarm system and the third party equipment followed by full system integration testing proving the operation of VHTMS, access control and MVAC to name a few. We also prepared the contractors for demonstration to the local authorities, including reviewing the support documentation.

Birmingham New Street Railway Station – I was the Senior Engineer on site who was responsible for ensuring that the contractors complied with the fire regulations and the fire risk assessments that were carried out due to the construction site being a shared premise with the Station and the Pallasades Shopping Centre. The station falls under the Fire Precautions Sub-Surface railway regulations which severely restrict the use of combustible materials within the sub-surface environment. I was also responsible for preparing and carrying out the test regime to validate the operation of the life safety systems.

Terminal 2, Dublin Airport Resident Engineer – I was the Senior RE on the Terminal 2, Dublin Airport project. The project involves the addition of a new terminal and pier at the airport with associated enabling works and has a projected cost of €600m. My role expanded to include a Construction Management role, liaising between the contractors

Curriculum vitae of	: Joseph Wade
Specialist field	: Commissioning of building services systems including life safety systems
On behalf of	: Grenfell Tower Inquiry

and the design team. I took on the responsibility of the commissioning for the life safety systems and the full integrated system testing. Systems include MV & LV electrical distribution, HVAC, Passenger Boarding Bridges, BMS, lighting controls, VHTMS, communications and specialist systems. Due to the nature of these packages, the interfaces with other packages are numerous and complex, presenting several challenges to be overcome.

Credit Suisse First Boston Bank Canary Wharf – I was the Project Manager for Commissioning Management of a nine-storey office block, incorporating two dealers trading floors for all building services. Coordinating, directing and overseeing of the certification / validation of building service's equipment. The complexity of the electrical back up system due to the connection to standby generators, two external feeds from the electrical supply company and the adjacent buildings, required full integration testing of electrical and life safety systems in the new building

Memberships of professional organisations

Member, Institution of Engineers Ireland (2010- 2018).

Associate Member, Institution of Mechanical Engineers (1994 – 2017).

A5 Curriculum Vitae of Tom Parker

Curriculum vitae of : Mr Tom Parker
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Tom Parker (MEng) Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

MEng, Structural and Fire Safety Engineering, University of Edinburgh, 2014

Past and present positions

Fire Safety Engineer, Ove Arup & Partners Ltd (2014 – present)

Principal professional specialisms

I have 4 years' experience as a practicing Fire Safety Engineer. My masters research topic at the University of Edinburgh was on the structural fire performance of recycled concrete aggregate concrete.

Relevant experience

My experience includes development and delivery of fire strategies, reviewing technical fire stopping details for compliance with relevant guidance, site inspection of fire stopping systems, and providing third party design reviews.

Memberships of professional organisations

Associate member, Institution of Fire Engineers – since 2016.

A6 Curriculum Vitae of Danielle Antonellis

Curriculum vitae of : Mrs Danielle Antonellis
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Danielle Antonellis (MEng) Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

MEng, Fire Protection Engineering, Worcester Polytechnic Institute, 2013
BSc(Eng), Civil Engineering, Worcester Polytechnic Institute, 2012

Past and present positions

Fire Engineer, Ove Arup and Partners Ltd, 2015 to present
Graduate Fire Engineer, Ove Arup and Partners Ltd, 2014 to 2015
Fire Engineer, Tyco Fire Protection Products. 2012 to 2014

Principal professional specialisms

I have 6 years' experience as a practicing Fire Engineer. My principal specialism is fire suppression design. My experience includes design of water based fire protection systems and special hazard suppression systems for buildings with various hazards. In my previous role, I managed a full-scale fire test program for residential sprinklers.

Relevant experience

My experience also includes development and delivery of fire strategies, undertaking fire risk assessment work, undertaking site inspection work, inspecting fire safety systems, and design of fire protection systems.

Memberships of professional organisations

Member, National Fire Protection Association since 2015.
Member, The Institution of Engineering and Technology since 2013.

A7 Curriculum Vitae of Alfie Chapman

Curriculum vitae of : Mr Alfie Chapman
Specialist field : Fire Safety Engineering
On behalf of : Grenfell Tower Inquiry

Alfie Chapman (MEng) Curriculum Vitae

Assistant to Dr Barbara Lane

Qualifications, training, accreditation

MEng (Hons), Structural and Fire Safety Engineering, University of Edinburgh, 2016

Past and present positions

Fire Safety Engineer, Ove Arup & Partners Ltd (2016 – present)

Principal professional specialisms

I have 2 years' experience as a practicing Fire Safety Engineer. My masters research topic at the University of Edinburgh was on the structural fire performance of laminated bamboo structural members.

Relevant experience

My experience includes development and delivery of fire strategies, undertaking fire risk assessment work and site inspection work, inspecting fire safety systems, and providing third party design reviews.

Memberships of professional organisations

Associate Member, Institution of Fire Engineers – since 2016.

Conference Papers

A. Bartlett, A. Chapman, C. Roberts, F. Weisner, R. Hadden, L. Bisby “Thermal and flexural behaviour of laminated bamboo exposed to severe radiant heating”, World Conference on Timber Engineering (WCTE 2018), August 2018