



Appendix G – References for Appendices A
to F
Smoke Ventilation of Common Access
Areas of Flats and Maisonettes

The authors of this report are employed by BRE. The work reported herein was carried out under a Contract placed by the ODPM. Any views expressed are not necessarily those of the ODPM.

Appendix G – References for Appendices A to F

- ASHRAE (1999). *Handbook (HVAC Applications) - Chapter 51: Fire and Smoke Management*.
- Australian Building Codes Board (2004). *The Building Code of Australia 2004*.
- British Standards Institution (1971). *British Standard Code of Practice CP3: Chapter IV (Precautions against fire): Part I (Flats and maisonettes) 1*.
- British Standards Institution (1990). *Fire Precautions in the Design, Construction and use of Buildings - Part 1 (Code of practice for residential buildings)*. BS 5588-1.
- British Standards Institution (1998). *Fire Precautions in the Design, Construction and use of Buildings - Part 4 (Code of practice for smoke control using pressure differentials)*. BS 5588-4.
- Building Industry Authority (New Zealand) (2001). *New Zealand Building Code - Fire Safety Clauses*.
- Butcher, E.G. (1973). 'The control of smoke on escape routes in buildings'. *Fire Surveyor*, April 1973, pp. 32-38.
- Butcher, E.G. & Parnell, A.C. (1979). *Smoke Control in Fire Safety Design*. E. & F.N. Spon Ltd.
- Butcher, E.G. & Parnell, A.C. (1997). 'Smoke control systems – the provision of replacement air'. *Fire Safety Engineering*, vol. 4, no. 3, pp. 12-13.
- Butcher, E.G. & Parnell, A.C. (1998). 'Smoke ventilation of fire-fighting lobbies'. *Fire Safety Engineering*, vol. 5, no. 2, pp. 27-28.
- CEN (2000). *Smoke and Heat Control Systems - Part 6: Pressure Differential Systems - kits*. Draft EN 12101-6.
- Cao, L. & Guo, Y. (2003). 'Large eddy simulation of smoke movement in a shaft'. *Int. J. Engineering Performance-based Fire Codes*, vol. 5, no. 4, pp. 152-157.
- Chung, K.C. (1999). 'Evaluation of smoke exhaustion performance of a vestibule within tall buildings in Taiwan'. *Int. J. Engineering Performance-based Fire Codes*, vol. 1, no. 2, pp. 71-80.
- CIBSE (2003). *Guide E – Fire Engineering*.
- Clark, J.A. & Buckley, P.E. (1995). 'The evolution of pressurized stairwells'. *ASHRAE Transactions*, vol. 101, part 1, pp. 1001-1005.

Cox, G. (1995) Compartment fire modelling. In *Combustion Fundamentals of Fire*, ed. G Cox, Academic Press, pp.329–404.

Cox, G., Kumar, S. & Markatos, N.C. (1986). 'Some field model validation studies'. *Fire Safety Science – Proceedings of the First International Symposium*, Hemisphere Publishing, pp. 159 -171.

DeCicco, P.R. (1973). 'Smoke and fire control in high-rise office buildings – Part I: Full-scale test for establishing standards'. In *Proc. Symp. on Experience and Applications on Smoke and Fire Control, ASHRAE Annual Meeting, Louisville, USA, ASHRAE*, pp. 9-15.

Delichatsios, M.A. & Liu, X. (2001). 'Temperatures and heat fluxes in corridors owing to room fires'. *Proc. Interflam 2001*, pp. 1323-1330.

DETR (2000). *The Building Regulations – Approved Document B – Fire Safety* (2000 Edition).

Ferreira, P.E. (2002). 'Use of multizone modeling for high-rise smoke control system design'. *ASHRAE Transactions*, vol. 108, part 2, pp. 837-846.

Fire Code Reform Centre (Australia) (1998). *Reliability of Stair Pressurisation & Zone Smoke Control Systems*. FCRC Technical Report 98-05.

Ghosh, B.K. (1990). *Smoke Movement in a Multi-storey Block of Flats*. BRE Client Report 43/90.

Ghosh, B.K. (1993). 'Some effects of crosswind on ventilators'. *J. Wind Engineering and Industrial Aerodynamics*, vol. 45, pp. 247-270.

Gosman A.D. & Lockwood F.C.(1973). 'Incorporation of a flux model for radiation into a finite difference procedure for furnace calculations'. *Proceedings of the 14th Symposium (International) on Combustion*, The Combustion Institute, pp. 661-671.

Gross, D. (1990). 'Estimating air leakage through doors for smoke control'. *Fire Technology*, February 1990, pp. 75-81.

Hadjisophocleous, G., Zhuman, F. & Lougheed, G. (2002). 'Computational and experimental study of smoke flow in the stair shaft of a 10-story tower'. *ASHRAE Transactions*, vol. 108, part 1, pp. 724-730.

Harrison, R. and Miles, S. (2002). *Smoke Shafts Protecting Fire-fighting Shafts: Their Performance and Design*. BRE Project Report No. 79204.

He, Y. (1999). 'Effect of pressurisation and smoke management systems on fire growth and smoke movement in a multi-storey building'. *Int. J. Engineering Performance-based Fire Codes*, vol. 1, no. 3, pp. 148-155.

Heselden, A.J.M. (1985). *Smoke Flow into Staircases - the Effect of Openings to the Outside*. BRE Note 46/85.

Hobson, P.J. & Stewart, L.J. (1972). *Pressurisation of Escape Routes in Buildings*. FRS Fire Research Note 958.

Horton, G. (1999). 'Risks to fire-fighters'. *Fire Safety Engineering*, vol. 6, no. 6, pp. 30-31.

Horton, G. (2004). 'Ventilation of access corridors – are the 'standard' requirements adequate?'. *Fire Safety Engineering*, March 2004, pp. 12-14.

International Code Council (2002). *2003 International Building Code*.

Janse, E.W. et al. (1998). 'Evacuation from smoke filled corridors'. *Proc. 1st Int. Symp. Human Behaviour in Fire*, 31 Aug-2 Sep 1998, Univ. Ulster, UK., pp. 639-648.

Jin T. (1978). 'Visibility through fire smoke'. *Journal of Fire and Flammability*, vol. 9, pp. 135-155.

Jin, T (2000). 'Visibility and human behaviour in smoke'. In *SFPE Handbook of Fire Protection Engineering*, Section 2, Chapter 4, pp. 2-42 - 2-53. NFPA, USA.

John, R. & Seeger, P.G. (1977). 'Anforderung an Brandluftungsanlagen bei innenliegenden Sicherheitstreppenräumen' (Requirements for Fire Venting Systems for Internal Safety Staircases).

Kandola, B.S. (1986). 'The effects of simulated fire pressure and outside wind on the internal pressure distribution in a five-storey model building'. *Fire Safety J.*, vol. 10, pp. 211-227.

Klote, J.H. (1988). 'An overview of smoke control technology'. *ASHRAE Transactions*, vol. 94, part 1, pp. 1211-1222.

Klote, J.H. (1990). 'Fire experiments of zoned smoke control at the Plaza Hotel in Washington DC'. *NIST IR 90-4253*, National Institute of Standards and Technology.

Klote, J.H. (1993). 'Design of smoke control systems for areas of refuge'. *ASHRAE Transactions*, vol. 99, part 2, pp. 793-807.

Klote, J.H. (1995). 'An overview of smoke control research'. *ASHRAE Transactions*, vol. 101, part 1, pp. 979-990.

Klote, J.H. (1998). 'North American approach to smoke management'. *Proc. Seminar on Fire Safety -Smoke Control: Standards and Practice*, 23 March 1998, Inst. Mech. Eng. HQ, London.

Klote, J.H. & Milke, J.A. (2002). *Principles of Smoke Management*. ASHRAE.

Klote, J.H. & Tamura, G. (1996). 'Elevator piston effect and the smoke problem'. *Fire Safety Journal*, vol. 11, pp. 227-233.

- Kujime, M. et. al. (1999). 'Hand calculation method for air supply rates in vestibule pressurization smoke control system'. *Int. J. Engineering Performance-based Fire Codes*, vol. 1, no. 1, pp. 27-40.
- Kujime, M., Matsushita, T. & Tanaka, T. (2003). 'Influence of doorway opening conditions on vestibule pressurization smoke control in office buildings'. *Proc. 7th Int. Symp. Fire Safety Science*, Worcester, MA, USA, June 2002, IAFSS, pp. 741-752.
- Lattimer, B.Y. et. al. (1994). 'Transport and oxidation of compartment fire exhaust gases in an adjacent corridor'. *J. Fire Protection Engineering*, vol. 6, no. 4, pp. 163-181.
- Lougheed, G.D. et. al. (1999). 'Smoke movement in egress routes in a high rise building'. *3rd Int Conf*, pp. 27-38.
- Lougheed, G.D., McCartney, C. & Taber, B.C. (2000). 'Smoke movement for sprinklered fires'. *ASHRAE Transactions*, vol. 106, part 1, pp. 605-619.
- Magnussen B.F. & Hjertager B.H. (1976). 'On mathematical modelling of turbulent combustion with special emphasis on soot formation and combustion'. *Proceedings of the 16th Symposium (International) on Combustion*, The Combustion Institute, pp. 719 - 729.
- Mawhinney, J.R. & Tamura, G.T. (1994). 'Effect of automatic sprinkler protection on smoke control systems'. *ASHRAE Transactions*, vol. 100, part 1, pp. 494-513.
- Malhotra, H.L. (1967). *Movement of Smoke on Escape Routes Part 3: Effect of Permanent Openings in External Walls*. FRS Fire Research Note 653.
- Marchant, E.W. (1984). 'Effect of wind on smoke movement and smoke control systems'. *Fire Safety J*, vol. 7, pp. 55-63.
- Marchant, R. (1992). 'Sandwich pressurization systems for smoke control'. *ASHRAE Journal*, vol. 34, no. 11, pp. 20-26.
- Markatos, N.C., Malin, M.R. & Cox, G. (1982). 'Mathematical modelling of buoyancy induced smoke flow in enclosures'. *International Journal Heat Mass Transfer*, vol. 25, pp. 63-75 (and letter on above: vol. 25, pp. 1777-1778, 1982).
- Marshall, N.R. (1985). *Powered Smoke Dispersal in Internal Common Access Corridors*. BRE Note 125/85.
- McGuire, J.H. (1967). 'Control of smoke in building fires'. *Fire Technology*, vol. 3, no. 4, pp. 281-290.
- McGuire, J.H. & Tamura, G.T. (1979). 'The National Building Code smoke control measures'. *Engineering Digest*, vol. 25, no. 9, pp. 35-38.
- Miles, S.D., Kumar, S. & Cox, G. (2000). Comparisons of 'blind predictions' of a CFD model with experimental data. *Fire Safety Science – Proceedings of the Sixth International Symposium*, IAFSS, pp. 543-554.

- Miles, S. (2001). 'The predictive capability of CFD for fully developed fires'. *Fire and Explosion Hazards - Proceedings Third International Seminar*, Windermere, UK, pp. 229-240.
- Miles, S. & Harrison, R. (2002). 'Smoke ventilation of firefighting shafts'. *Fire Safety, Technology and Management*, vol. 7, no. 2, pp. 29-34.
- Miles, S. (2003). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD2410) – Minutes of the First Meeting of the Steering Group. BRE Project Report No. 213161.
- Miles, S. (2004a). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD 2410) - Final Report on the Review of Smoke Ventilation Practice. BRE Project Report No. 213169.
- Miles, S. (2004b). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD 2410) - Minutes of the Second Meeting of the Steering Group. BRE Project Report No. 213171.
- Miles, S. (2004c). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD 2410) - Interim Report on the CFD Modelling and Analytical Study. BRE Project Report No. 213173.
- Miles, S (2004d). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD 2410) - Progress Report on Physical Modelling, CFD Modelling and Analytical Study. BRE Project Report No. 213174.
- Miles, S. (2004e). Smoke Ventilation of Common Access Areas of Flats and Maisonettes and their Relationship to the Provision of Compartmentation and Means of Escape Procedures (BD 2410) - Minutes of the Third Meeting of the Steering Group. BRE Project Report No. 213177.
- Morgan, H.P. (1997). 'The effects of natural ventilation on lobbied escape stairs'. *The Journal of the Fire Service College*, vol. 1, no. 3, pp. 35-46.
- Morgan, H.P., Heselden, A.J.M. & Marshall, N.R. (1981). *Smoke Control in Internal Common Access Corridors*. BRE Note 94/81.
- Morgan, H.P., Marshall, N.R. & Williams, C. (1987). *Smoke Dispersal Validation*. BRE Client Report 7/87.
- Narayanan, P. (1993). *Smoke Control in Multi-storey Buildings*. Branz Study Report No, 50.
- National Research Council Canada (1995). *National Building Code of Canada 1995*.

NBFU (1939). 'Smoke Hazards of air-conditioning systems'. *NFPA Quarterly*, vol. 33, no. 2, pp. 113-122.

National Fire Protection Association (2000a). *Life Safety Code Handbook 2000 Ed.*

National Fire Protection Association (2000b). *Recommended Practice for Smoke-Control Systems*. NFPA 92A 2000 Ed.

ODPM. Smoke ventilation of fire-fighting shafts. DETR Safety and Health Business Plan. CD Reference No. CI136/8/194. Project cc 1834.

Platt, S. (1974). 'The concept of smoke dispersal for means of escape'. *Fire*, March 1974, p. 524.

Poreh, M. & Trebukov, S. (2000). 'Wind effects on smoke motion in buildings'. *Fire Safety J.*, vol. 35, pp. 257-273.

Poreh, M. & Trebukov, S. (2003). 'Stairway to safety'. *Fire Engineers J. & Fire Prevention*, April 2003, pp. 32-34.

Poreh, M., Trebukov, S. & Gurevitz, T (2003). 'Mitigation of wind effects on the performance of pressurization systems in high-rise buildings'. *Proc. 7th Int. Symp. Fire Safety Science*, Worcester, MA, USA, June 2002, IAFSS, pp. 753-762.

Proulx, G. (2001). 'Highrise evacuation: a questionable concept'. *Proc. 2nd Int. Symp. Human Behaviour in Fire*, March 2001, Boston, USA., Interscience, pp. 221-230.

Rasbash, D.J. (1967). 'Smoke and toxic products produced at fires'. *Transactions and Journal of Plastics Institute*, Jan 1967, pp. 55-61.

Rimen, J.D. (2000). *The use of positive pressure ventilation in firefighting operations*. Home Office Fire Experimental Unit Research, Report Number 81.

Saathoff, P.J. et. al. (2002). 'The influence of a rooftop structure on the dispersion of exhaust from a rooftop stack'. *ASHRAE Transactions*, vol. 108, part 2, pp. 1029-1038.

Shields, T.J. & Silcock, G.W.H. (1987). *Buildings and Fire*. Longman Group.

Standards Australia & Standards New Zealand (AS/NZS) (1998). *The use of ventilation and airconditioning in buildings, Part 1: Fire and smoke control in multi-compartment buildings*. AS/NZS 1668.1:1998.

Tamura, G.T. (1969). 'Computer analysis of smoke movement in tall buildings'. *ASHRAE Transactions*, vol. 75, part 2.

Tamura, G.T. (1970). 'Analysis of smoke shafts for control of smoke movement in buildings'. *ASHRAE Transactions*, vol. 76, part 2, pp. 290-297.

Tamura, G.T. (1978). 'Exterior wall venting for smoke control in tall office buildings'. *ASHRAE Journal*, vol. 20, no. 8, pp. 43-48.

- Tamura, G.T. (1980). 'The performance of a vestibule pressurization system for the protection of escape routes of a 17-story hotel'. *ASHRAE Transactions*, vol. 86, Part 1, pp. 593-603.
- Tamura, G.T. (1982). 'A smoke control system for high-rise office buildings'. *ASHRAE Journal*, vol. 24, no. 5, pp. 29-32.
- Tamura, G.T. (1983). 'Review of the DBR/NRC studies on control of smoke from a fire in high buildings'. *ASHRAE Transactions*, vol. 89, part 1B, pp. 341-361.
- Tamura, G.T. (1990). 'Fire tower test of stair pressurization systems with mechanical venting of the fire floor'. *ASHRAE Transactions*, vol. 96, part 2, pp. 384-392.
- Tamura, G.T. (1992). 'Determination of critical air velocities to prevent smoke backflow at a stair door opening on the fire floor'. *J. Applied Fire Science*, vol. 2, part 1, pp. 5-21.
- Tamura, G.T. (1994). 'Fire tower tests on vestibule pressurization for protection of stairshafts'. *ASHRAE Transactions*, vol. 100, part 1, pp. 981-989.
- Tamura, G.T. (1994). *Smoke Movement and Control in High-rise Buildings*. NFPA.
- Tamura, G.T. & Klote J.H. (1987). 'Experimental fire tower studies on mechanical pressurization to control smoke movement caused by fire pressures'. *Proc. 2nd Int. Symp. Fire Safety Science*, pp. 761-769.
- Tamura, G.T. & Shaw C.Y. (1973). 'Basis for the design of smoke shafts'. *Fire Technology*, vol.9, no. 3, pp. 209-222.
- Tamura, G.T. & MacDonald, R.A. (1993). 'Comparative performances of mechanical smoke exhaust system, zoned smoke control, and pressurized building method of smoke control'. *ASHRAE Transactions*, vol. 99, part 1, pp.488-495.
- Tamura, G.T. & Wilson, A.G. (1970). 'Natural venting to control smoke movement in buildings via vertical shafts'. *ASHRAE Transactions*, vol. 76, part 2, pp.279-289.
- Truelove J.S. (1976). *Mixed grey gas model for flame radiation*. UK Atomic Energy Authority Report AERE HL 76/3448.
- Wang, Y. & Gao, F. (2004). 'Tests of stairwell pressurization systems for smoke control in a high-rise building'. *ASHRAE Transactions*, vol. 110, part 1, pp. 185-193.
- Webb, W.A. (1995). 'Development of smoke management systems'. *ASHRAE Journal*, vol. 37, no. 8, pp.36-40.
- Williams, C. et. al. (2004). Effectiveness of sprinklers in residential premises. BRE Project Report No. 204505.
- Yang, K.H., et. al. (1997). 'Design analysis of a high rise building using pressurization for smoke management'. *Refrigeration Science and Technology*, Part 3, No. 2, pp. 578-583.

Yuill, G.K. & Haddad, K.H. (1994a). 'Effect of opening stairwell doors on the performance of a stairshaft pressurization system'. *ASHRAE Transactions*, vol. 100, part 1, pp.990-999.

Yuill, G.K. & Haddad, K.H. (1994b). 'Sensitivity of a stairwell pressurization system to the air tightness of building components'. *ASHRAE Transactions*, vol. 100, part 2, pp.869-877.

Zhao, L. (1998). *Reliability of Stair Pressurisation and Zone Smoke Control Systems*. Fire Code Reform Centre (Australia) Technical Report 98-05.