

**A BIBLIOGRAPHY ON EVACUATION FROM BUILDING FIRES: EDUCATION,
BEHAVIOR, AND SIMULATION TECHNIQUES***
(Work in Progress)

Erica D. Kuligowski
University of Colorado at Boulder
National Institute of Standards and Technology
and
Dennis S. Mileti
University of Colorado at Boulder
and
START Center

January 2007

* This research was supported by the United States Department of Homeland Security through the National Consortium for the Study of Terrorism and Responses to Terrorism (START), grant number N00140510629, under Working Group 3. The authors would like to acknowledge the National Institute of Standards and Technology (NIST) for providing information for this project and the following people whose work made creating this bibliography possible: John L. Bryan, Professor Emeritus, University of Maryland, College Park; R. L. Paulsen, previously with NIST; Steve Gwynne, Hughes Associates, Inc.; and Guylene Proulx, NRC Canada.

Fires in Buildings Bibliography:

Section 1: Fire Education and Training

1. Bickman, L., Herz, E., Edelman, P., & Rivers, D. (1979). *An Evaluation of Planning and Training for Fire Safety in Health Care Facilities -- Phase Two* (Rep. No. NBS-GCR-79-179). Washington, DC: National Bureau of Standards.
2. Bryan, J. L. (1977). *Smoke as a Determinant of Human Behavior in Fire Situations (Project People)* (Rep. No. NBS-GCR-77-94). Washington, DC: National Bureau of Standards.
3. Bryan, J. L. (1986). Fire Research in Human Behaviour. In *Proceedings of the International Meeting of Fire Research and Test Centers. Lectures* (pp. 73-94). Quincy, MA: National Fire Protection Association.
4. Bryan, J. L. & DiNenno, P. J. (1978). *An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at St. Joseph's Hospital, Philadelphia, PA on August 10, 1977* (Rep. No. NBS-GCR-78-140). Washington, DC: National Bureau of Standards.
5. Chubb, M. (1993). Human Factors Lessons for Public Fire Educators: Lessons from Major Fires. In *National Fire Protection Association, Education Section*.
6. Edelman, P., Herz, E., & Bickman, L. (1980). A Model of Behaviour in Fires Applied to a Nursing Home Fire. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 181-203). New York: John Wiley & Sons.
7. Fahy, R. F. & Proulx, G. (1997). Human Behavior in the World Trade Center Evacuation. In Y. Hasemi (Ed.), *Fire Safety Science -- Proceedings of the Fifth International Symposium* (pp. 713-724). Boston, MA: International Association for Fire Safety Science.
8. Herz, E., Edelman, P., & Bickman, L. (1978). *The Impact of Fire Emergency Training on Knowledge of Appropriate Behavior in Fires* (Rep. No. NBS-GCR-78-137). Washington, DC: National Bureau of Standards.
9. Holmes, G. A. & Jones, R. T. (1996). Fire Evacuation Skills: Cognitive-Behavioral Versus Computer-Mediated Instruction. *Fire Technology*, 32, 50-64.
10. Iacobell, F. P. & Schodowski, L. (1980). Fire Reaction Training that Really Works. *Hospitals*, 54, 64-66.
11. Jones, R. T. & Randall, J. (1994). Rehearsal-Plus: Coping with Fire Emergencies and Reducing Fire-Related Fears. *Fire Technology*, 30, 432-444.
12. Kafry, D. (1980). Playing with Matches: Children and Fire. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 47-61). New York: John Wiley & Sons.

13. Keating, J. P. & Loftus, E. F. (1977). Vocal Alarm Systems for High-Rise Buildings -- A Case Study. *Mass Emergencies*, 2, 25-34.
14. Keating, J. P. & Loftus, E. (1981). The Logic of Fire Escape. *Psychology Today*, 15, 14-19.
15. Loader, K. (1978). Behaviour of People in Fires. *Fire Prevention*, No. 127, 26-29.
16. McDaniel, M. A., Bickman, L., & Edelman, P. (1977). *A Survey of Fire Preparedness in a Midwestern City* (Rep. No. NBS-GCR-78-136). Washington, DC: National Bureau of Standards.
17. Ottoson, J. (1975). Three Residential Fires -- The Human Factor. *Fire Journal*, 69, 5-9.
18. Peterson, C. E. (1979). 25 Die in "Boarding House" Fire. *Fire Journal*, 73, 30-33.
19. Pezoldt, V. J. & Van Cott, H. P. (1978). *Arousal from Sleep by Emergency Alarms: Implications from the Scientific Literature* (Rep. No. NBSIR-78-1484 (HEW)). Washington, DC: National Bureau of Standards.
20. Proulx, G. (1997). Misconceptions about Human Behavior in Fire Emergencies. *Canadian Consulting Engineer*, March, 36-38.
21. Proulx, G. (1999). Occupant Response to Fire Alarm Signals. *National Fire Alarm Code Handbook - NFPA 72*, 403-412.
22. Proulx, G. (2000). Strategies for Ensuring Appropriate Occupant Response to Fire Alarm Signals. *Construction Technology Update*, 43, 1-6.
23. Proulx, G. (2001). Highrise evacuation: a questionable concept. In *Proceedings of the 2nd International Symposium on Human Behavior in Fire* (pp. 221-230). London, UK: Interscience Communications.
24. Proulx, G. (2002). Movement of People: The Evacuation Timing. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-341-3-366). Bethesda, MD: Society of Fire Protection Engineers.
25. Proulx, G. (2003). Playing with Fire: Understanding human behavior in burning buildings. *ASHRAE Journal*, 45, 33-35.
26. Proulx, G., Reid, I. M. A., & Cavan, N. R. (2004). *Human Behavior Study, Cook County Administration Building Fire, October 17, 2003 - Chicago, IL* (Rep. No. Research Report No. 181). Ottawa, Ontario: National Research Council of Canada.
27. Proulx, G. & Yung, D. (1997). Evacuation Procedures for Occupants with Disabilities in Highrise Buildings. In National Building Research Institute (Ed.), *Proceedings of the 3rd International Symposium, Applications of Performance Concept in Buildings*.

28. Ramey-Smith, A. M. & Fechter, J. V. (1978). *Group Homes for the Developmentally Disabled: Case Histories of Demographics, Household Activities, and Room Use* (Rep. No. NBSIR 79-1727). Washington, DC: National Bureau of Standards.
29. Strother, R. R. & Buchbinder, L. B. (1980). Communications Strategies for Fire Loss Reduction. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 315-321). New York: John Wiley & Sons.
30. Tong, D. & Canter, D. (1985). The Decision to Evacuate: A Study of the Motivations which Contribute to Evacuation in the Event of a Fire. *Fire Safety Journal*, 9, 257-265.
31. Whittington, C. & Wilson, J. R. (1980). Fat Fires: A Domestic Hazard. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 97-115). New York: John Wiley & Sons.
32. Wood, P. G. (1972). *The Behaviour of People in Fires* (Rep. No. Fire Research Note No. 953). England: Loughborough University of Technology.

Section 2: Occupant Evacuation Behavioral Models

1. Averill, J. D., Mileti, D. S., Peacock, R. D., Kuligowski, E. D., Groner, N. E., Proulx, G. et al. (2005). *Occupant Behavior, Egress, and Emergency Communications* (Rep. No. NIST NCSTAR 1-7). Gaithersburg, MD: National Institute of Standards and Technology.
2. Brennan, P. (1995). Smoke Gets in your Eyes: The Effect of Cue Perception on Behavior in Smoke. In *ASIAFLAM '95. 1st Proceedings for the International Conference on Fire Science and Engineering* (pp. 187-197). London, UK: Interscience Communications.
3. Bryan, J. L. (1977). *Smoke as a Determinant of Human Behavior in Fire Situations (Project People)* (Rep. No. NBS-GCR-77-94). Washington, DC: National Bureau of Standards.
4. Bryan, J. L. (1986). Fire Research in Human Behaviour. In *Proceedings of the International Meeting of Fire Research and Test Centers. Lectures* (pp. 73-94). Quincy, MA: National Fire Protection Association.
5. Bryan, J. L. (2002). Behavioral Response to Fire and Smoke. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-315-3-340). Bethesda, MD: Society of Fire Protection Engineers.
6. Canter, D. (1980). *Fires and Human Behaviour*. London: John Wiley & Sons.
7. Canter, D., Breaux, J., & Sime, J. D. (1980). Domestic, Multiple-Occupancy, and Hospital Fires. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 117-136). London: John Wiley & Sons.
8. Edelman, P., Herz, E., & Bickman, L. (1980). A Model of Behaviour in Fires Applied to a Nursing Home Fire. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 181-203). New York: John Wiley & Sons.
9. Groner, N. E. (1996). Important "People" Problems in Hazard Analyses can be Modeled by Using a Cognitive Systems Approach. In *Proceedings of the Fire Risk and Hazard Assessment Symposium. Research and Practice: Bridging the Gap* (pp. 422-429). Berkeley, CA: California University.
10. Proulx, G. (1993). A Stress Model for People Facing a Fire. *Journal of Environmental Psychology*, 13, 137-147.
11. Proulx, G. (2002). Movement of People: The Evacuation Timing. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-341-3-366). Bethesda, MD: Society of Fire Protection Engineers.

12. Tong, D. & Canter, D. (1985). The Decision to Evacuate: A Study of the Motivations which Contribute to Evacuation in the Event of a Fire. *Fire Safety Journal*, 9, 257-265.
13. Yoshimura, H. (2000). Human Behavior. In *4th Proceedings of the Asia-Oceania Symposium on Fire Science and Technology* (pp. 137-141). Tokyo, Japan: Osaka University.

Section 3: Occupant Emergency Information/Warnings

1. Human Behavior in Fires (1979). *Fire Chief Magazine*, 23, 56-57.
2. Averill, J. D., Mileti, D. S., Peacock, R. D., Kuligowski, E. D., Groner, N. E., Proulx, G. et al. (2005). *Occupant Behavior, Egress, and Emergency Communications* (Rep. No. NIST NCSTAR 1-7). Gaithersburg, MD: National Institute of Standards and Technology.
3. Berry, C. H. (1978). Will Your Smoke Detector Wake You? *Fire Journal*, 72, 105-108.
4. Bickman, J., Edelman, P., & McDaniel, M. A. (1977). *Model of Human Behavior in a Fire Emergency* (Rep. No. NBS GCR 78-120). National Bureau of Standards (U.S.).
5. Breaux, J., Canter, D., & Sime, J. D. (1976). Psychological Aspects of Behaviour of People in Fire Situations. In *International Fire Protection Seminar, 5th* (pp. 39-50). Karlsruhe, West Germany.
6. Brennan, P. (1995). Smoke Gets in your Eyes: The Effect of Cue Perception on Behavior in Smoke. In *ASIAFLAM '95. 1st Proceedings for the International Conference on Fire Science and Engineering* (pp. 187-197). London, UK: Interscience Communications.
7. Brennan, P. (1996). Impact of Social Interaction on Time to Begin Evacuation in Office Building Fires: Implications for Modelling Behaviour. In C. A. Franks & S. Grayson (Eds.), *Interflam '96. International Interflam Conference, 7th Proceedings* (pp. 701-710). London, England: Interscience Communications.
8. Bruck, D. (2001). The Who, What, Where, and Why of Waking to Fire Alarms: A review. *Fire Safety Journal*, 36, 623-639.
9. Bruck, D. & Horasan, M. (1995). Non-arousal and Non-action for Normal Sleepers in Response to a Smoke Detector Alarm. *Fire Safety Journal*, 25, 125-139.
10. Bryan, J. L. (1957). *A Study of the Survivors' Reports on the Panic in the Fire at the Arundel Park Hall in Brooklyn, Maryland on January 29, 1956* College Park, MD: University of Maryland.
11. Bryan, J. L. (1971). *Human Behavior Factors and the Fire Occurrence* College Park, MD: University of Maryland.
12. Bryan, J. L. (1975). Human Behavior in the Fire Situation. *Journal of Fire and Flammability*, 6, 17-27.
13. Bryan, J. L. (1977). *Smoke as a Determinant of Human Behavior in Fire Situations (Project People)* (Rep. No. NBS-GCR-77-94). Washington, DC: National Bureau of Standards.

14. Bryan, J. L. (1982). Human Behavior in the MGM Grand Hotel Fire. *Fire Journal*, 76, 37-48.
15. Bryan, J. L. (1983). Human Behavior in the Westchase Hilton Hotel Fire. *Fire Journal*, 77, 78-85.
16. Bryan, J. L. (1986). Fire Research in Human Behaviour. In *Proceedings of the International Meeting of Fire Research and Test Centers. Lectures* (pp. 73-94). Quincy, MA: National Fire Protection Association.
17. Bryan, J. L. (2002). Behavioral Response to Fire and Smoke. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-315-3-340). Bethesda, MD: Society of Fire Protection Engineers.
18. Bryan, J. L. & DiNenno, P. J. (1979). *An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the Georgian Towers on January 9, 1979* (Rep. No. NBS-GCR-79-187). Washington, DC: National Bureau of Standards.
19. Bryan, J. L. & DiNenno, P. J. (1980). *An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at the University Nursing Home on April 13, 1979* (Rep. No. NBS-GCR-80-191). Washington, DC: National Bureau of Standards.
20. Bryan, J. L. & DiNenno, P. J. (1980). *An Examination and Analysis of the Human Behavior in the Fire Incident at the National Institute of Health Clinical Center on April 21, 1979* (Rep. No. NBS-GCR-80-192). Washington, DC: National Bureau of Standards.
21. Bryan, J. L., Milke, J. A., & DiNenno, P. J. (1980). *An Examination and Analysis of the Dynamics of the Human Behavior in the Fire Incident at Thurston Hall on April 19, 1979* (Rep. No. NBS-GCR-80-193). Washington, DC: National Bureau of Standards.
22. Canter, D. (1980). Fires and Human Behaviour: Emerging Issues. In *Second International Seminar on Human Behavior in Fire Emergencies, Proceedings of Seminar* Washington, DC: National Bureau of Standards.
23. Canter, D. (1980). *Fires and Human Behaviour*. London: John Wiley & Sons.
24. Canter, D., Breaux, J., & Sime, J. D. (1980). Domestic, Multiple-Occupancy, and Hospital Fires. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 117-136). London: John Wiley & Sons.
25. Canter, D., Donald, I., & Chalk, J. (1992). Pedestrian Behaviour During Emergencies Underground: The Psychology of Crowd Control under Life Threatening Circumstances. In *First International Conference. Safety in Road and Rail*

Tunnels (pp. 135-150). Basel, Switzerland: University of Dundee and Independent Technical Conferences Ltd.

26. Chandessais, C. (1980). Panic-Flight-Evacuation. In *Second International Seminar on Human Behavior in Fire Emergencies, Proceedings of the Seminar* Washington, DC: National Bureau of Standards.
27. Collins, B. L. & Pierman, B. C. (1979). *Evaluation of Safety Symbols* (Rep. No. NBSIR 79-1760). Washington, DC: National Bureau of Standards.
28. Edelman, P., Herz, E., & Bickman, L. (1980). A Model of Behaviour in Fires Applied to a Nursing Home Fire. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 181-203). New York: John Wiley & Sons.
29. Fahy, R. F. & Proulx, G. (1997). Human Behavior in the World Trade Center Evacuation. In Y. Hasemi (Ed.), *Fire Safety Science -- Proceedings of the Fifth International Symposium* (pp. 713-724). Boston, MA: International Association for Fire Safety Science.
30. Fahy, R. F. & Proulx, G. (2002). A Comparison of the 1993 and 2001 Evacuations of the World Trade Center. In *Proceedings for the Fire Risk and Hazard Assessment Research Application Symposium. Research and Practice: Bridging the Gap.* (pp. 111-117). Baltimore, MD: Fire Research Foundation.
31. Green, C. H. (1980). Risk: Beliefs and Attitudes. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 277-291). New York: John Wiley & Sons.
32. Gwynne, S., Galea, E. R., Owen, M., & Lawrence, P. (1999). *Escape as a Social Response* Report Published by the Society of Fire Protection Engineers.
33. Horiuchi, S., Murozaki, Y., & Hokugo, A. (1986). A Case Study of Fire and Evacuation in a Multi-Purpose Office Building, Osaka, Japan. In *Fire Safety Science -- Proceedings of the First International Symposium* (pp. 523-532). Washington, DC: Hemisphere Publishing Corp.
34. Innes, J. M. (1975). Human Behavior under Stress. *Fire*, 67, 601-603.
35. Jin, T. (1997). Studies on Human Behavior and Tenability. In *Fire Safety Science - Proceedings of the Fifth International Symposium* (pp. 3-21).
36. Jones, B. K. & Hewitt, J. A. (1986). Leadership and Group Formation in High-Rise Building Evacuations. In C. E. Grant & P. J. Pagni (Eds.), *Fire Safety Science -- Proceedings of the 1st International Conference* Washington, DC: Hemisphere Publishing Corporation.
37. Juillet, E. (1993). Evacuating People with Disabilities. *Fire Engineering*, 126, 100-103.

38. Keating, J. P. & Loftus, E. F. (1977). Vocal Alarm Systems for High-Rise Buildings -- A Case Study. *Mass Emergencies*, 2, 25-34.
39. Keating, J. P. & Loftus, E. (1981). The Logic of Fire Escape. *Psychology Today*, 15, 14-19.
40. Killian, R. M., Quick, R., & Stockwell, F. (1956). *A Study of Response to the Houston, Texas, Fireworks Explosion* Washington, DC: National Academy of Science.
41. Kimura, M. & Sime, J. D. (1989). Exit Choice Behavior During the Evacuation of Two Lecture Theatres. In *Fire Safety Science -- Proceedings of the Second International Symposium* (pp. 541-550). Washington, DC: Hemisphere Publishing Corp.
42. Kobayashi, M. & Horiuchi, S. (1980). Analysis of Occupant Behavior in an Office Building Under Fire. In *Second International Seminar on Human Behavior in Fire Emergencies, Proceedings of Seminar* (pp. 187-201). Washington, DC: National Bureau of Standards.
43. Latane, B. & Darley, J. M. (1968). Group Inhibition of Bystander Intervention in Emergencies. *Journal of Personality and Social Psychology*, 13, 215-221.
44. Lathrop, J. K. (1976). Two Fires Demonstrate Evacuation Problems in High-Rise Buildings. *Fire Journal*, 70, 65-70.
45. Lerup, L., Cronrath, D., & Liu, J. K. C. (1977). *Human Behavior in Institutional Fires and Its Design Implications* (Rep. No. NBS-GCR-77-93). Washington, DC: National Bureau of Standards.
46. Levin, B. M. E. (1980). *Fire and Life Safety for the Handicapped* (Rep. No. NBS Special Publication 585). Washington, DC: U.S. Government Printing Office.
47. Lo, S. M., Lam, K. C., Yuen, K. K., & Fang, Z. (2000). Pre-Evacuation Behavioral Study for the People in High-Rise Residential Buildings Under Fire Situations. *International Journal on Architectural Science*, 1, 143-152.
48. Loftus, E. F. (1979). Words That Could Save Your Life. *Psychology Today*, 13, 102-137.
49. Loftus, E. F. & Keating, J. P. (1974). The Psychology of Emergency Communications. In *Proceedings of the Public Buildings Service International Conference on Firesafety in High-Rise Buildings* Washington, DC: General Services Administration, Public Buildings Service.
50. Nober, E. H., Pierce, H., Well, A. D., Johnson, C. C., & Clifton, C. (1981). Waking Effectiveness of Household Smoke and Fire Detection Devices. *Fire Journal*, 75, 86-91.

51. Pauls, J. L. (1977). *Management and Movement of Building Occupants in Emergencies* (Rep. No. NRCC 16845). Ottawa, Canada: National Research Council of Canada.
52. Paulsen, R. L. (1981). *Human Behavior and Fire Emergencies: An Annotated Bibliography* (Rep. No. NBSIR 81-2438). National Bureau of Standards, (U.S.).
53. Paulsen, R. L. (1984). Human Behavior and Fires: An Introduction. *Fire Technology*, 20, 15.
54. Pezoldt, V. J. & Van Cott, H. P. (1978). *Arousal from Sleep by Emergency Alarms: Implications from the Scientific Literature* (Rep. No. NBSIR-78-1484 (HEW)). Washington, DC: National Bureau of Standards.
55. Phillips, A. W. (1978). The Effects of Smoke on Human Behavior -- A Review of the Literature. *Fire Journal*, 72, 69-123 (segmented).
56. Pierman, B. C. & Lerner, N. D. (1980). Testing Symbols for Fire Situations. *Fire Command*, 47, 12-13.
57. Proulx, G. (1993). A Stress Model for People Facing a Fire. *Journal of Environmental Psychology*, 13, 137-147.
58. Proulx, G. (1995). Evacuation Time and Movement in Apartment Buildings. *Fire Safety Journal*, 24, 229-246.
59. Proulx, G. (1996). Lessons Learned on Occupants' Movement Times and Behaviour During Evacuation Drills. In C. A. Franks & S. Grayson (Eds.), *Interflam '96. International Interflam Conference, 7th Proceedings* (pp. 1007-1011). London, England: Interscience Communications.
60. Proulx, G. (1997). Misconceptions about human behavior in fire emergencies. *Canadian Consulting Engineer*, March, 36-38.
61. Proulx, G. (1998). The Impact of Voice Communication Messages During a Residential Highrise Fire. In Fire SERT Centre (Ed.), *Human Behavior in Fire Proceedings of the First International Symposium* (pp. 265-274). Ulster, Northern Ireland: University of Ulster.
62. Proulx, G. (1999). Occupant Response During a Residential Highrise Fire. *Fire and Materials*, 23, 317-323.
63. Proulx, G. (1999). Occupant response to fire alarm signals. *National Fire Alarm Code Handbook - NFPA 72*, 403-412.
64. Proulx, G. (1999). Occupant Response to Fire and Smoke. In *National Fire Alarm Code Handbook* (Third ed., pp. 403-412). Quincy, MA: National Fire Protection Association.

65. Proulx, G. (2000). Strategies for Ensuring Appropriate Occupant Response to Fire Alarm Signals. *Construction Technology Update*, 43, 1-6.
66. Proulx, G. (2001). Highrise evacuation: a questionable concept. In *Proceedings of the 2nd International Symposium on Human Behavior in Fire* (pp. 221-230). London, UK: Interscience Communications.
67. Proulx, G. (2002). Movement of People: The Evacuation Timing. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-341-3-366). Bethesda, MD: Society of Fire Protection Engineers.
68. Proulx, G. (2002). Understanding human behaviour in stressful situations. In *Workshop to Identify Innovative Research Needs to Foster Improved Fire Safety in the United States* (pp. 1-5). Washington, DC: National Academy of Sciences.
69. Proulx, G. & Fahy, R. F. (1997). The Time Delay to Start Evacuation: Review of Fire Case Studies. In Y. Hasemi (Ed.), *Proceedings of the Fifth International Symposium on Fire Safety Science* Melbourne, Australia: International Association for Fire Safety Science.
70. Proulx, G. & Pineau, J. (1996). Differences in the Evacuation Behaviour of Office and Apartment Building Occupants. In *Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting* (pp. 825-829). Canada: Fire Protection Services HRDC and Fipreca.
71. Proulx, G., Reid, I. M. A., & Cavan, N. R. (2004). *Human Behavior Study, Cook County Administration Building Fire, October 17, 2003 - Chicago, IL* (Rep. No. Research Report No. 181). Ottawa, Ontario: National Research Council of Canada.
72. Proulx, G. & Sime, J. D. (1991). To Prevent Panic in an Underground Emergency: Why Not Tell People the Truth? In *Fire Safety Science -- Proceedings of the Third International Symposium* (pp. 843-852). New York: Elsevier Applied Science.
73. Proulx, G. & Yung, D. (1997). Evacuation Procedures for Occupants with Disabilities in Highrise Buildings. In National Building Research Institute (Ed.), *Proceedings of the 3rd International Symposium, Applications of Performance Concept in Buildings*.
74. Quarantelli, E. L. (1979). Panic Behavior in Fire Situations: Findings and a Model from the English Language Research Literature. In *Fire Research and Safety. 4th Joint Panel Meeting* (pp. 405-428). Tokyo, Japan: U.S./Japan Government Cooperative Program on Natural Resources (UJNR).
75. Ramachandran, G. (1990). Human Behavior in Fires -- A Review of Research in the United Kingdom. *Fire Technology*, 26, 149-155.
76. Ramachandran, G. (1991). Informative Fire Warning Systems. *Fire Technology*, 27, 66-81.

77. Scanlon, J. (1979). Human Behavior in a Fatal Apartment Fire -- Research Problems and Findings. *Fire Journal*, 73, 76-123 (segmented).
78. SFPE (2003). *SFPE Engineering Guide to Human Behavior in Fire*. Bethesda, MD: Society of Fire Protection Engineers.
79. Shavit, G. (1978). Evacuation: Testing the Effect of Voice-Message Formats. *ASHRAE Journal*, 38-41.
80. Sime, J. D. (1980). The Concept of Panic. In D.Canter (Ed.), *Fires and Human Behaviour* (First ed., pp. 63-81). London: John Wiley and Sons.
81. Sime, J. D. (1983). Affiliative Behaviour During Escape to Building Exits. *Journal of Environmental Psychology*, 3, 21-41.
82. Sime, J. D. (1985). The Outcome of Escape Behaviour in the Summerland Fire: Panic or Affiliation. In *Proceedings of the International Conference on Building Use and Safety Technology* National Institute of Building Sciences.
83. Sime, J. D. (1986). Perceived Time Available: The Margin of Safety in Fires. In *Fire Safety Science -- Proceedings of the First International Symposium* (pp. 561-570). Washington, DC: Hemisphere Publishing Corp.
84. Tong, D. & Canter, D. (1985). The Decision to Evacuate: A Study of the Motivations which Contribute to Evacuation in the Event of a Fire. *Fire Safety Journal*, 9, 257-265.
85. Wood, P. G. (1972). *Fire Research Note 953* Borehamwood, UK: Building Research Establishment.
86. Wood, P. G. (1972). *The Behaviour of People in Fires* (Rep. No. Fire Research Note No. 953). England: Loughborough University of Technology.
87. Wood, P. G. (1980). A Survey of Behaviour in Fires. In D.Canter (Ed.), *Fires and Human Behaviour* (pp. 83-95). New York: John Wiley & Sons.
88. Yoshimura, H. (2000). Human Behavior. In *4th Proceedings of the Asia-Oceania Symposium on Fire Science and Technology* (pp. 137-141). Tokyo, Japan: Osaka University.
89. Zachary, W. B., Crossman, E. R. F. W., Quan, E. C., & Condon, E. D. (1976). *Household Fire Hazard and Defense Capability: A Survey Study of San Francisco High-Rise Residential Occupancies* (Rep. No. UCB FRG 76-14). Berkeley, CA: University of California.

Section 4: Building Evacuation Computer Models

1. ASERI (Advance Simulation of Evacuation of Real Individuals) A model to simulate evacuation and egress movement based on individual behavioural response (2004). <http://www.ist-net.de> [On-line].
2. NFPA 101 Life Safety Code. (2006). 101-65-101-66. Quincy, MA, National Fire Protection Association.
3. PAXPORT and PEDROUTE brochures (2004). <http://www.halcrow.com> [On-line].
4. Pedestrian Planning for the Olympic Park Railway Station, Sydney - Transport planning for the Olympic Games (2004). <http://www.arup.com/insite/feature.cfm?featureid=38> [On-line].
5. SIMWALK 16 User's Guide (2006). Savannah Simulations [On-line]. Available: http://www.savannah-simulations.ch/simwalk/SIMWALK_16_USERGUIDE.pdf
6. *Summerland Fire Commission Report* (1974).
7. TraffGO product information - PedGo. (2005). Pamphlet
8. AEA Technology (2002). *A Technical Summary of the AEA EGRESS Code* Warrington, UK: AEA Technology.
9. Ahrens, M. (2001). *Selections from the U.S. Fire Problem Overview Report Leading Causes and Other Patterns and Trends* Quincy, MA: National Fire Protection Association.
10. Ando, K., Ota, H., & Oki, T. (1988). Forecasting the flow of people. *Railway Research Review*, 45, 8-14.
11. Averill, J. D., Mileti, D. S., Peacock, R. D., Kuligowski, E. D., Groner, N. E., Proulx, G. et al. (2005). *Occupant Behavior, Egress, and Emergency Communications* (Rep. No. NIST NCSTAR 1-7). Gaithersburg, MD: National Institute of Standards and Technology.
12. Barton, J. and Leather, J. (1995). Paxport -- Passenger and Crowd Simulation. *Passenger Terminal '95*, 71-77.
13. Bensilum, M. & Purser, D. A. (2002). Gridflow: an object-oriented building evacuation model combining pre-movement and movement behaviours for performance-based design. In *7th International Symposium on Fire Safety Science* Worcester, MA: Worcester Polytechnic Institute.
14. Boyce, K., Fraser-Mitchell, J., & Shields, J. (1998). Survey Analysis and Modelling of Office Evacuation Using the CRISP Model. In T. J. Shields (Ed.), *Human*

Behaviour in Fire -- Proceedings of the 1st International Symposium (pp. 691-702).

15. Boyce, K. E., Shields, T. J., & Silcock, G. W. H. (1999). Toward the Characterization of Building Occupancies for Fire Safety Engineering: Capability of Disabled People Moving Horizontally and On and Incline. *Fire Technology*, 35, 51-67.
16. Brennan, P. (1999). Modelling Cue Recognition and Pre-Evacuation Response. In *6th International Symposium, International Association for Fire Safety Science* (pp. 1029-1040). Boston, MA.
17. Bryan, J. L. (2002). Behavioral Response to Fire and Smoke. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-315-3-340). Bethesda, MD: Society of Fire Protection Engineers.
18. Buckmann, L. T. & Leather, J. (1994). Modelling Station Congestion the PEDROUTE Way. *Traffic Engineering and Control*, 35, 373-377.
19. Cappuccio, J. (2000). Pathfinder: A Computer-Based Timed Egress Simulation. *Fire Protection Engineering*, 8, 11-12.
20. Clifford, P. & du Sautoy, C. Pedestrian and Passenger Activity Modeling. Vineyard House, 22 Brook Green, Hammersmith, London, Halcrow Fox.
21. Davis Associates, L. (2003). Managing Large Events and Perturbations at Stations. Passenger Flow Modeling Technical Review RS021/R.03.
22. Deal, S. (1995). *Technical Reference Guide for FPETool Version 3.2* (Rep. No. NISTIR 5486-1). National Institute of Standards and Technology.
23. Donegan, H. A., Pollock, A. J., & Taylor, I. R. (1994). Egress Complexity of a Building. In *Fire Safety Science -- Proceedings of the 4th International Symposium* (pp. 601-612).
24. Donegan, H. A. & Taylor, I. R. (1998). How Complex is the Egress Capability of your Design? In T. J. Shields (Ed.), *Human Behavior in Fire, Proceedings of the First International Symposium* (pp. 601-610).
25. Fahy, R. F. (1994). EXIT89 -- An Evacuation Model for High-rise Buildings -- Model Description and Example Applications. In *Fire Safety Science -- Proceedings of the 4th International Symposium* (pp. 657-668).
26. Fahy, R. F. (1996). EXIT89 -- High-rise Evacuation Model -- Recent Enhancements and Example Applications. In *Interflam '96, International Interflam Conference -- 7th Proceedings* (pp. 1001-1005). Cambridge, England.

27. Fahy, R. F. (1999). *Development of an Evacuation Model for High-Rise Buildings, Volume 1 of 2*. DPhil by published works School of the Built Environment, Faculty of Engineering of the University of Ulster.
28. Fahy, R. F. (1999). *User's Manual, EXIT89 v 1.01, An Evacuation Model for High-Rise Buildings* Quincy, Ma: National Fire Protection Association.
29. Fahy, R. F. (2001). Verifying the Predictive Capability of EXIT89. In *2nd International Symposium on Human Behaviour in Fire* (pp. 53-63).
30. Fahy, R. F. (2003). Calculation Methods for Egress Prediction. In *Fire Protection Handbook* (19th ed.), Quincy, MA: National Fire Protection Association.
31. Fahy, R. F. & Proulx, G. (2001). Toward Creating a Database on Delay Times to Start Evacuation and Walking Speeds for Use in Evacuation Modeling. In *2nd International Symposium on Human Behaviour in Fire* (pp. 175-183). London, UK: Interscience communications.
32. Francis, R. L. & Saunders, P. B. (1979). *EVACNET: Prototype Network Optimization Models for Building Evacuation* (Rep. No. NBSIR 79-1593). National Bureau of Standards, (U.S.).
33. Fraser-Mitchell, J. (2001). Simulated Evacuations of an Airport Terminal Building, Using the CRISP Model. In *2nd International Symposium in Human Behavior in Fire* (pp. 89-100). Boston, MA.
34. Fraser-Mitchell, J. (2003). 'CRISP' Fire Risk Assessment by Simulation. Presentation given at the University of Greenwich.
35. Fruin, J. J. (1987). *Pedestrian Planning and Design*. (Revised Edition ed.) Mobile, AL: Elevator World, Inc.
36. Grosshandler, W., Bryner, N., Madrzykowski, D., & Kuntz, K. (2005). *Report of the Technical Investigation of The Station Nightclub Fire* (Rep. No. NIST NCSTAR 2: Vol. 1). Gaithersburg, MD: National Institute of Standards and Technology.
37. Gwynne, S., Galea, E. R., Lawrence, P., & Filippidis, L. (1998). A Systematic Comparison of Model Predictions Produced by the buildingEXODUS Evacuation Model and the Tsukuba Pavilion Evacuation Data. *Applied Fire Science*, 7, 235-266.
38. Gwynne, S., Galea, E. R., Owen, M., & Lawrence, P. (1998). *Validation of the buildingEXODUS Evacuation Model* (Rep. No. 98/IM/29). London: University of Greenwich.
39. Gwynne, S., Galea, E. R., Owen, M., Lawrence, P., & Filippidis, L. (1998). A Comparison of Predictions from the buildingEXODUS Evacuation Model with Experimental Data. In J. Shields (Ed.), (pp. 711-721). University of Ulster.

40. Gwynne, S., Galea, E. R., Lawrence, P. J., Owen, M., & Filippidis, L. (1999). A Review of the Methodologies used in the Computer Simulation of Evacuation from the Built Environment. *Building and Environment*, 34, 741-749.
41. Gwynne, S., Galea, E. R., Owen, M., & Lawrence, P. (1999). *Escape as a Social Response* Report Published by the Society of Fire Protection Engineers.
42. Gwynne, S., Galea, E. R., Owen, M., Lawrence, P., & Filippidis, L. (1999). Review of Modelling Methodologies used in the Simulation of Evacuation. *Journal of Building and the Environment*, 34, 741-749.
43. Hamacher, H. W. & Tjandra, S. A. (2000). Mathematical Modelling of Evacuation Problems: A State of the Art. In S. D. Schreckenberg and Sharma (Ed.), *Proceedings of Pedestrian and Evacuation Dynamics* Duisburg, Germany: Springer-Verlag.
44. Harrington, S. S. (1996). *TIMTEX: A Hydraulic Flow Model for Emergency Egress*. MSci Department of Fire Protection Engineering, University of Maryland.
45. Heskestad, A. W. & Meland, O. J. (1998). Determination of Evacuation Times as a Function of Occupant and Building Characteristics and Performance of Evacuation Measures. In *Human Behaviour in Fire -- Proceedings of the 1st International Symposium* (pp. 673-680).
46. Hoffman, N. A. & Henson, D. A. (1997). Simulating Emergency Evacuation in Stations. In *APTA Rapid Transit Conference* Washington, DC: American Public Transit Association.
47. Hoffman, N. A. & Henson, D. A. (1997). Simulating Transient Evacuation and Pedestrian Movement in Stations. In *3rd International Conference on Mass Transit Management* Kuala Lumpur, Malaysia.
48. Hoffman, N. A. & Henson, D. A. (1998). Analysis of the Evacuation of a Crush Loaded Train in a Tunnel. In *3rd International Conference on Safety in Road and Rail Tunnels* Nice, France.
49. IES. (2000). Simulex Technical Reference; Evacuation Modeling Software. Integrated Environmental Solutions, Inc.
50. IES. (2001). Simulex User Manual; Evacuation Modeling Software. Integrated Environmental Solutions, Inc.
51. Kagarlis, M. A. (2004). Movement of an autonomous entity through an environment. WO 2004/023347 A2. Patent
52. Kendik, E. (1995). Methods of Design for Means of Egress: Towards a Quantitative Comparison of National Code Requirements. In *Fire Safety Science -- Proceedings of the 1st International Symposium* (pp. 497-511).

53. Ketchell, N., Cole, S. S., & Webber, D. M. (1994). The EGRESS Code for Human Movement and Behaviour in Emergency Evacuation. In R.A.Smith & J. F. Dickie (Eds.), *Engineering for Crowd Safety* (pp. 361-370). London: Elsevier.
54. Ketchell, N., Bamford, G. J., & Kandola, B. (1995). Evacuation Modelling: A New Approach. In *ASIAFLAM '95, Proceedings of the 1st International Conference on Fire Science and Engineering* (pp. 499-505).
55. Kisko, T. M., Francis, R. L., & Nobel, C. R. (1998). *EVACNET4 User's Guide, Version 10/29/98* University of Florida.
56. Klupfel, H. & Meyer-Konig, T. (2003). Characteristics of the PedGo Software for Crowd Movement and Egress Simulation. In *2nd International Conference in Pedestrian and Evacuation Dynamics (PED)* (pp. 331-340). London, U.K.: University of Greenwich.
57. Kuligowski, E. D. (2003). *The Evaluation of a Performance-Based Design Process for a Hotel Building: The Comparison of Two Egress Models; Chapter 2* University of Maryland, College Park, in fulfillment of the requirements for the degree of M.S..
58. Kuligowski, E. D. and Gwynne, S. M. V. (2005). What a User Should Know When Selecting an Evacuation Model. *Fire Protection Engineering*, 30-40.
59. Kuligowski, E. D. & Milke, J. A. (2004). A Performance-based Design of a Hotel Building using Two Egress Models: A comparison of the results. In *3rd International Symposium on Human Behavior in Fire* (pp. 399-410). London, UK: Interscience Communications Limited.
60. Kuligowski, E. D. & Peacock, R. D. (2005). *Review of Building Evacuation Models* (Rep. No. NIST TN 1471).
61. Legion International, L. (2003). <http://www.legion.biz/system/research.cfm>.
<http://www.legion.biz/system/research.cfm> [On-line].
62. Levin, B. M. (1988). *EXITT: A Simulation Model of Occupant Decisions and Actions in Residential Fires* (Rep. No. NBSIR 88-3753). National Institute of Standards and Technology.
63. Levin, B. M. (1988). EXITT - A Simulation Model of Occupant Decisions and Actions in Residential Fires. In *Fire Safety Science - Proceedings of the Second International Symposium* (pp. 561-570).
64. Li, J. & Chow, W. K. (2000). Numerical Studies on Evacuation Pattern in a Lecture Hall. *Journal of Applied Fire Science*, 10, 265-276.
65. Lo, S. M. & Fang, Z. (2000). A Spatial-Grid Evacuation Model for Buildings. *Journal of Fire Sciences*, 18, 376-394.

66. Lo, S. M., Fang, Z., & Zhi, G. S. (2004). An Evacuation Model: the SGEM package. *Fire Safety Journal*, 169-190.
67. Lord, J., Meacham, B., Moore, A., Fahy, R. F., & Proulx, G. (2005). *Guide for Evaluating the Predictive Capabilities of Computer Egress Models* (Rep. No. NIST GCR 07-886). Gaithersburg, MD: National Institute of Standards and Technology.
68. MacDonald, M. (2003). STEPS Simulation of Transient Evacuation and Pedestrian Movements User Manual. Unpublished Work
69. Meyer-Konig, T., Klupfel, H., & Schreckenber, M. (2001). A microscopic model for simulating mustering and evacuation process onboard passenger ships. In *Proceedings of the International Emergency Management Society Conference* (.).
70. Milke, J. A. & Caro, A. C. (1997). Survey of Occupant Load Factors in Contemporary Office Buildings. *Journal of Fire Protection Engineering*, 8, 169-182.
71. Nelson, H. E. (1982). Emergency Evacuation Flow Models. In *U.S./Japan Government Cooperative Program on Natural Resources, Fire Research and Safety, Fire Research and Safety, 6th Joint Panel Meeting of the UJNR* (pp. 282-354). Japan: Building Research Institute.
72. Nelson, H. E. & Mowrer, F. W. (2002). Emergency Movement. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-367-3-380). Bethesda, MD: Society of Fire Protection Engineers.
73. Okazaki, S. & Matsushita, S. (2004). A Study of Simulation Model for Pedestrian Movement with Evacuation and Queuing. <http://www.anc-d.fukui-u.ac.jp/~sat/ECS93.pdf> [On-line].
74. Olenick, S. M. & Carpenter, D. J. (2003). Updated International Survey of Computer Models for Fire and Smoke. *Journal of Fire Protection Engineering*, 13, 87-110.
75. Ozel, F. (1985). A Stochastic Computer Simulation of the Behavior of People in Fires: An Environmental Cognitive Approach. In *Proceedings of the International Conference on Building Use and Safety Technology*.
76. Ozel, F. (1991). Simulation of Processes in Buildings as a Factor in the Object Representation of Built Environments. In *Proceedings of Building Simulation '91* (pp. 250-256).
77. Ozel, F. (1993). Computer Simulation of Behavior in Spaces. In R.W.Marans & D. Stokols (Eds.), *Environmental Simulation: Research and Policy Issues* (pp. 191-204). New York: Plenum Press.
78. Pan, X., Han, C. S., Dauber, K., & Law, K. H. (2006). A Multi-agent Based Framework for the Simulation of Human and Social Behaviors during Emergency

Evacuations. Stanford University [On-line]. Available:
<http://eil.stanford.edu/egress/publications/AI&Society.pdf>

79. Pan, X., Han, C. S., Law, K. H., & Latombe, J.-C. (2006). A Computational Framework to Simulate Human and Social Behaviors for Egress Analysis. Stanford University [On-line]. Available:
http://eil.stanford.edu/egress/publications/ICCCB_paper.pdf
80. Parke, J., Gwynne, S., Galea, E. R., & Lawrence, P. (2003). Validating the building EXODUS Evacuation Model using Data from an Unannounced Trial Evacuation. In (pp. 295-306). University of Greenwich, UK: CMS Press.
81. Paulsen, R. L. (1981). *Human Behavior and Fire Emergencies: An Annotated Bibliography* (Rep. No. NBSIR 81-2438). National Bureau of Standards, (U.S.).
82. Poon, L. S. (1994). EvacSim: A Simulation Model of Occupants with Behavioural Attributes in Emergency Evacuation of High-Rise Buildings. In *Fire Safety Science -- Proceedings of the 4th International Symposium* (pp. 681-692).
83. Predtechenskii, V. M. & Milinskii, A. I. (1978). *Planning for Foot Traffic in Buildings*. New Delhi: Amerind Publishing Co. Pvt. Ltd.
84. Proulx, G. (2002). Movement of People: The Evacuation Timing. In P.J.DiNenno & W. D. Walton (Eds.), *The SFPE Handbook of Fire Protection Engineering* (Third ed., pp. 3-341-3-366). Bethesda, MD: Society of Fire Protection Engineers.
85. Reisser-Weston, E. (1996). Simulating Human Behaviour in Emergency Situations. In *RINA, International Conference of Escape, Fire, and Rescue*.
86. Santos, G. & Aguirre, B. E. (2005). Critical Review of Emergency Evacuation Simulation Models. In R. D. Peacock & E. D. Kuligowski (Eds.), *Workshop on Building Occupant Movement During Fire Emergencies* (pp. 27-52). Gaithersburg, MD: National Institute of Standards and Technology.
87. Schneider, V. (2001). Application of the Individual-Based Evacuation Model ASERI in Designing Safety Concepts. In *2nd International Symposium on Human Behavior in Fire* (pp. 41-51). Boston, MA.
88. Schneider, V. & Konnecke, R. (2001). Simulating Evacuation Processes with ASERI. In *Tagungsband International Conference on Pedestrian Evacuation Dynamics (PED)* Duisburg.
89. Sharp, G., Gwynne, S., & Galea, E. R. (2003). *The Effects of Ship Motion on the Evacuation Process, Subsection 3.1, Critical review on model of evacuation analysis* (Rep. No. RESEARCH PROJECT 490). Report for the MCA by the Fire Safety Engineering Group, University of Greenwich.

90. Shen, T.-S. (2003). Building Planning Evaluation for Emergency Evacuation. *Journal of Applied Fire Science*, 12, 1-22.
91. Shen, T.-S. (2005). A Building Evacuation Simulation Model. *Building and Environment*, 40, 671-680.
92. Shen, T.-S. (2006). Building Egress Analysis. *Journal of Fire Sciences*, 24, 7-25.
93. Shestopal, V. O. & Grubits, S. J. (1994). Evacuation Model for Merging Traffic Flows in Multi-Room and Multi-Story Buildings. In *Fire Safety Science -- Proceedings of the 4th International Symposium* (pp. 625-632).
94. Sime, J. D. (1985). The Outcome of Escape Behaviour in the Summerland Fire: Panic or Affiliation. In *Proceedings of the International Conference on Building Use and Safety Technology* National Institute of Building Sciences.
95. Smith, R. A. & Dickie, J. F. e. (1993). *Engineering for Crowd Safety*. London, UK: Elsevier.
96. Stahl, F. I. (1979). *Final Report on the 'BFIRES/VERSION 1' Computer Simulation of Emergency Egress Behavior During Fires: Calibration and Analysis* (Rep. No. NBSIR 79-1713). National Bureau of Standards, (U.S.).
97. Stahl, F. I. (1980). *BFIRES/Version 2: Documentation of Program Modifications* (Rep. No. NBSIR 80-1982). National Bureau of Standards, (U.S.).
98. Stahl, F. I. (1982). BFIRES-II: A Behavior Based Computer Simulation of Emergency Egress During Fires. *Fire Technology*, 18, 49-65.
99. Stiefel, S. W., Bukowski, R. W., Hall, J. R., & Clarke, F. B. (1990). *Fire Risk Assessment Method: Case Study 3, Concealed Combustibles in Hotels* (Rep. No. NISTIR 90-4245). Gaithersburg, MD: National Institute of Standards and Technology.
100. Still, G. K. (1993). New Computer System Can Predict Human Behavioural Response During Building Fires. *Fire*, 85, 40-42.
101. Still, G. K. (2004). VEgAS (Virtual Egress and Analysis System). <http://www.crowddynamics.com> [On-line]. Available: <http://www.crowddynamics.com>
102. Takahashi, K., Tanaka, T., & Kose, S. (1988). An Evacuation Model for Use in Fire Safety Designing of Buildings. In *Fire Safety Science -- Proceedings of the 2nd International Symposium* (pp. 551-560).
103. Thompson, P. A. & Marchant, E. W. (1994). Simulex; Developing New Computer Modelling Techniques for Evaluation. In *Fire Safety Science -- Proceedings of the 4th International Symposium* (pp. 613-624).

104. Thompson, P. A. (1995). *Developing New Techniques for Modelling Crowd Movement*. PhD Department of Building and Environmental Engineering, University of Edinburgh, Scotland.
105. Thompson, P. A. & Marchant, E. W. (1995). A Computer Model for the Evacuation of Large Building Populations. *Fire Safety Journal*, 24, 131-148.
106. Thompson, P. A. & Marchant, E. W. (1995). Testing and Application of the Computer Model 'SIMULEX'. *Fire Safety Journal*, 24, 149-166.
107. Thompson, P. A., Wu, J., & Marchant, E. W. (1996). Modelling Evacuation in Multi-storey Buildings with Simulex. *Fire Engineering*, 56, 7-11.
108. Transport Strategies Limited (2004). A Guide to Transport Demand Forecast Models: PEDROUTE & PAXPORT. <http://www.tsl.dircon.co.uk/dempedroute.htm> [Online].
109. Wall, J. M. & Waterson, N. P. Predicting Evacuation Times -- A Comparison of the STEPS Simulation Approach with NFPA 130. *Fire Command Studies*, (in press).
110. Watts, J. M. (1987). Computer Models for Evacuation Analysis. *Fire Safety Journal*, 12, 237-245.
111. Weckman, H., Lehtimaki, S., Oy, S., & Mannikko, S. (1998). Evacuation of a Theatre: Exercise vs. Calculations. In T. J. Shields (Ed.), *1st International Symposium on Human Behaviour in Fire* (pp. 479-488). Belfast, UK: University of Ulster, Fire Safety Engineering Research and Technology Centre.
112. Williams, A. (2005). Go with the Flow. *The Architect's Journal*.