

CIVIL, CONSTRUCTION, AND ENVIRONMENTAL ENGINEERING

OREGON STATE UNIVERSITY

College of Engineering

BELL, Chris A.

Professor and Associate Dean of Engineering

BIRTH DATE

June 26, 1951

DEGREES

B.Sc., Civil Engineering, University of Nottingham, England, 1972

Ph.D., Civil Engineering, University of Nottingham, England, 1978

ACADEMIC POSITIONS

Senior Research Assistant, Civil Engineering, Nottingham University, England, 1973-1977

Lecturer in Civil Engineering, Heriot-Watt University, Edinburgh, Scotland, 1977-1981

Assistant Professor (Visiting) of Civil Engineering, Oregon State University, 1981-1983

Assistant Professor of Civil Engineering, Oregon State University, 1983-1986

Associate Professor of Civil Engineering, Oregon State University, 1986-1993

SERC Visiting Fellow, University of Nottingham, England, 1/15/88-8/15/88

Director of Transportation Research Institute, Oregon State University, 1990-1997

Professor of Civil Engineering, Oregon State University, 1993-present

Associate Dean of Engineering and Director of Engineering Research Office, Oregon State University, 1997-present

NON-ACADEMIC POSITIONS

Graduate Engineer, Bedford Borough Council, England, 1972-1973

Consulting, 1978-

Dunfermline District Council, Scotland

Condor Scotland, Ltd., Scotland

Forth Ports Authority, Scotland

Weir Construction, Scotland

Seattle Engineering International

Century West

Port of Portland

Wilsey and Ham

CRC Corporation

Benton County

Morse Brothers

Pavement Consultants, Inc.

Globetrotters International

National Research Council

United Nations Development Program

Scott Wilson Kirkpatrick Pavement Engineering, Nottingham, England

Shell Development Company

Savage Industries, Inc.

American Association for the Advancement of Science

Auburn University

FIELDS OF SPECIALIZATION

Commercial Vehicle Issues
Sustainable Transportation
Pavement Materials, Design, Evaluation, and Modeling

PROFESSIONAL ACTIVITIES

Registration

Professional Engineer, State of Oregon (OR. 12,143)

Professional Societies

Association of Asphalt Paving Technologists, Active Member
Transportation Research Board, Associate
American Society of Civil Engineers, Member
American Society for Engineering Education
National Society of Professional Engineers

Committees, Commissions and Boards

European Pavement Study Group (Member, 1977-1983)
Oregon Department of Transportation
 Weigh-in-Motion Technical Advisory Committee, Member, 1983-
 Coordinating Committee for Research, Member, 1992-
Triaxial Institute, 1983-
Association of Asphalt Paving Technologists
 Paper Solicitations Committee, 1984-1986
 Nominations Committee, 1987
Transportation Research Board
 Member, Committee on Flexible Pavements (A2B03), 1985-1995
 Member, Committee on Characteristics of Bituminous Materials (A2D01), 1985-1996
PTRC (Planning and Transport Research and Computation)
 Overseas Member, Committee on Highway Appraisal and Design, 1985-1992
ASCE
 Student Affairs Committee, Oregon Section, 1988-
 Student Chapter Advisor, 1988-
 Committee on Student Services, National, 1990-1994; Chair, 1992-1993
 Committee for Scholarships, Grants, and Bequests, Chair 1994-1998
International Society for Asphalt Pavements, Member, 1991-
Oregon State University
 Faculty Senate, 1990-1995
 Student Activities Committee, 1990-1995
Federal Highway Administration
 Judge, Excellence in Highway Design Awards, 1998
State of Oregon
 Legislative Task Force on Road User Fees, 2001-present

Honors

Austin Paul Engineering Faculty Award for Excelling in Student-Teacher Relations, 1993
College of Engineering Alumni Achievement Award, 1995

PUBLICATIONS

Books and Book Chapters

- S.U. Randhawa, S.G. Miller, C.A. Bell, and P.E. Montagne, "A Study of Commercial Vehicle Safety Alliance's Out of Service Criteria," *Accident Analysis and Prevention*, Vol. 30, No. 1, Elsevier Sciences Ltd., Great Britain, 1998, pp. 61-67.

Technical Journals

- P. Puangchit, R.G. Hicks, J.E. Wilson, and Chris A. Bell, "Development of Rational Pay Adjustment Factors for Asphalt Concrete," *Transportation Research Record 911*, Transportation Research Board, 1983, pp. 70-79.
- Ok-Kee Kim, Chris A. Bell, and R.G. Hicks, "Effect of Mix Conditioning on Properties of Asphaltic Mixtures," *Transportation Research Record 968*, Transportation Research Board, 1984, pp. 86-92.
- R.F. Bibbens, Chris A. Bell, and R.G. Hicks, "Effect of Season of the Year on Pavement Response," *Transportation Research Record 993*, Transportation Research Board, 1984, pp. 1-11.
- J.R. Montalvo, Chris A. Bell, and J.E. Wilson, "Comparison of Diametral and Triaxial Repeated Load Testing Techniques for Untreated Soils," *Transportation Research Record 998*, Transportation Research Board, 1984, pp. 6-13.
- Chris A. Bell, J.E. Wilson, and R.G. Hicks, "Effect of Percent Compaction on Asphalt Mixture Life," Placement and Compaction of Asphalt Mixtures, *ASTM STP 829*, American Society for Testing Materials, Philadelphia, 1984, pp. 107-130.
- Chris A. Bell and James E. Wilson, "Proliferation of Asphalt Cement Specifications in the State of Oregon," *Transportation Research Record 1034*, Transportation Research Board, January 1985, pp. 8-19.
- Ok-Kee Kim, Chris A. Bell, and R.G. Hicks, "Effect of Moisture on Asphalt Pavement Life," Water Damage of Asphalt Pavements: Its Effect and Prevention," *ASTM STP, 899*, American Society for Testing and Materials, Philadelphia, 1985, pp. 55-76.
- Ok-Kee Kim, Chris A. Bell, James E. Wilson, and Glenn Boyle, "Development of Laboratory Oxidative Aging Procedures for Asphalt Cements and Asphalt Mixtures," *Transportation Research Record 1115*, Transportation Research Board, January 1987, pp. 101-112.
- Chris A. Bell and Milan Krukar, "Selected Results from the First Three Years of the Oregon Automatic Vehicle Monitoring Demonstration Project," *Transportation Research Record 1123*, Transportation Research Board, January 1987, pp. 99-111.
- Guillermo Thenoux, Chris A. Bell, James E. Wilson, Doug Eakin, and Mike Schroeder, "Experiences with the Corbett-Swarbrick Procedure for Separation of Asphalt into Four Generic Fractions," *Transportation Research Record 1171*, Transportation Research Board, January 1988, pp. 66-70.
- G. Thenoux, Chris A. Bell, and J.E. Wilson, "Evaluation of Physical and Fractional Properties of Asphalt and Their Interrelationship," *Transportation Research Record 1171*, Transportation Research Board, January 1988, pp. 82-97.
- O.K. Kim and Chris A. Bell, "Measurement and Analysis of Truck Tire Pressures in Oregon," *Transportation Research Record 1207*, Transportation Research Board, January 1988, pp. 100-110.
- O.K. Kim, Chris A. Bell, J.E. Wilson, and G. Boyle, "Study on Mix Design Criteria for Controlling the Effect of Increased Tire Pressure on Asphalt Pavements," *Transportation Research Record 1171*, Transportation Research Board, January 1988, pp. 149-159.
- Ok-Kee Kim, Chris A. Bell, and James E. Wilson, "Effect of Increased Truck Tire Pressure on Asphalt Concrete Pavements," *ASCE Transportation Journal*, July 1989, Vol. 115, No. 4, pp. 329-350.

- H. Zhou, R.G. Hicks, and Chris A. Bell, "BOUSDEF: A Backcalculation Program for Determining Moduli of a Pavement Structure," *Transportation Research Record 1260*, Transportation Research Board, January 1990, pp. 166-179.
- C.A. Bell, Y. Ab-Wahab, and M.E. Cristi, "Investigation of Laboratory Aging Procedures for Asphalt-Aggregate Mixtures," *Transportation Research Record 1323*, Transportation Research Board, January 1991, pp. 32-46.
- D. Sosnovske, Y. Ab-Wahab, and C.A. Bell, "The Role of Asphalt and Aggregate in the Aging of Bituminous Mixtures," *Transportation Research Record 1386*, Transportation Research Board, January 1993.
- Y. Ab-Wahab, D. Sosnovske, C.A. Bell, and P. Ryus, "Evaluation of Asphalt-Aggregate Mixture Aging by Dynamic Mechanical Analysis," *Transportation Research Record 1386*, Transportation Research Board, January 1993.
- C.A. Bell, M.J. Fellin, and A.J. Wieder, "Field Validation of Aging Procedures for Asphalt-Aggregate Mixtures," *Journal of Association of Asphalt Paving Technologists*, Volume 63, 1994, pp. 45-80.
- J.E. Kliever, C.A. Bell, and D.A. Sosnovske, "Investigation of the Relationship Between Field Performance and Laboratory Aging Properties of Asphalt Mixtures," *Engineering Properties of Asphalt Mixtures and the Relationship of Performance, ASTM Special Publication 1265*, 1995.
- G. Thenoux, W. Allen, and C.A. Bell, "Study of an Aircraft Accident Related to Asphalt Runway Skid Resistance," *Transportation Research Record 1536*, Transportation Research Board, January 1996, pp. 59-63.
- C.A. Bell, S.U. Randhawa, and Z.K. Xu, "Impact of High Pressure Tires and Single-Tired Axles in Oregon," *Transportation Research Record 1540*, Transportation Research Board, 1996.
- Randal Thomas and Chris A. Bell, "Oregon Green Light Weigh Station Preclearance Program," *ITS Quarterly*, November 2000.

Conference Proceedings

- S.F. Brown and Chris A. Bell, "The Validity of Design Procedures for the Permanent Deformation of Asphalt Pavements," *Proceedings*, Fourth International Conference on the Structural Design of Asphalt Pavements, Ann Arbor, August, 1977, pp. 467-482.
- S.F. Brown and Chris A. Bell, "The Prediction of Permanent Deformation in Flexible Pavements," *Proceedings*, Association of Asphalt Pavement Technologists, Vol. 48, 1979, pp. 438-476.
- Chris A. Bell, "Use of the Shell Bitumen Test Data Chart in Evaluation of Asphalt Data," *Proceedings*, Association of Asphalt Paving Technologists, Vol. 52, 1983, pp. 1-31.
- Chris A. Bell and Logan Campbell, "Flexible Pavement Analysis and Evaluation with Microcomputers," *Proceedings*, Second National Conference on Microcomputers in Civil Engineering, Orlando, FL, October 1984, pp. 114-118.
- Chris A. Bell, "A Comparison of Civil Engineering Education in the USA and Great Britain," *Proceedings*, Conference on Challenges to Civil Engineering Educators and Practitioners - Where Should We Be Going?, American Society of Civil Engineers, Columbus, OH, April 1985, pp. 337-344.
- G. Thenoux, G. Lees, and Chris A. Bell, "Laboratory Investigation of the Fraass Brittle Test," *Proceedings*, Association of Asphalt Paving Technologists, Vol. 54, February 1985.
- Chris A. Bell, R.G. Hicks, and D. Irvine, "Pavement Design of Gantry Crane Lanes for the Port of Portland," *Proceedings*, 1986 Intermodal Freight Terminal Design Conference, Transportation Research Board, New Orleans, March 3-5, 1986.
- Chris A. Bell and Alaeddin E. Mohseni, "Processing and Presentation of Traffic Data from Oregon's Automatic Vehicle Monitoring System," *Proceedings*, First Canadian Conference on Computer

- Applications in Civil Engineering/Microcomputers, McMaster University, Hamilton, Ontario, May 20-23, 1986, Volume 2, pp. 266-282.
- S.F. Brown, K.E. Cooper, J.N. Preston, and Chris A. Bell, "Development of a New Procedure for Bituminous Mix Design," *Proceedings*, 4th Eurobitume Symposium, Madrid, October 1989, Volume 1, pp. 499-504.
- H. Zhou, R.G. Hicks, and C.A. Bell, "Development of a Backcalculation Program and its Verification," *Proceedings*, Third International Conference on Bearing Capacity of Roads and Airfields, Trondheim, Norway, July 1990, Vol. 1, pp. 391-400.
- C.A. Bell, Y. Ab-Wahab, and M.E. Cristi, "Laboratory Aging of Asphalt-Aggregate Mixtures," *Proceedings*, ASCE Materials Congress on Serviceability and Durability of Construction Materials, Denver, August 1990, Volume 1, pp. 254-262.
- C.A. Bell, "Relationship Between Laboratory Aging Tests and Field Performance of Asphalt Concrete Mixtures," *Proceedings*, ASCE Materials Congress on Serviceability and Durability of Construction Materials, Denver, August 1990, Volume 2, pp. 745-754.
- C.A. Bell, Y. Ab-Wahab, J.E. Kliwer, D. Sosnovske, and A. Wieder, "Aging of Asphalt-Aggregate Mixtures," *Proceedings*, Seventh International Conference on the Structural Design of Asphalt Pavements, Vol. 2, Nottingham, U.K., August 16-20, 1992, pp. 1-15.
- J.P. Mahoney and C.A. Bell, "Pavement Design and Materials, Past, Present and Future," Moderators Report, *Proceedings*, Seventh International Conference on the Structural Design of Asphalt Pavements, Nottingham, U.K., August 16-20, 1992, Vol. 5, pp. 105-157.
- Ian L. Jamieson and Chris A. Bell, "SHRP Binder Rheology Tests and Simulated Aging," European Workshop on the Rheology of Bituminous Binders: Where Are We Now?, Brussels, April 1995.
- Chris A. Bell and Julie E. Kliwer, "Evaluating Aging of Asphalt Mixtures," *Proceedings*, Transportation Congress, ASCE National Convention, San Diego, October 1995, pp. 664-675.
- Chris a. Bell, "Evaluating Aging of Asphalt Mixtures," *Proceedings*, Workshop on Performance Related Test Procedures, Eurobitume, Dublin, November 1997.

Research Reports

- S.F. Brown, Chris A. Bell, and B.V. Brodrick, "Permanent Deformation of Flexible Pavements," Final report to the European Research Office, United States Army, March 1977.
- Chris A. Bell and C.D. Whiteoak, "Recycling of Asphalt Pavements," Report presented to Lothian Regional Council, December 1980.
- P. Puangchit, R.G. Hicks, J.E. Wilson, and Chris A. Bell, "Impact of Variations in Material Properties on Asphalt Pavement Life," Final Report on Development of Rational Pay Adjustment Factors, to Oregon Department of Transportation and U.S. Department of Transportation Federal Highway Administration, *FHWA-OR-82-3*, May 1982.
- J.A. Lary, J.P. Mahoney, Chris A. Bell, and R.G. Hicks, "Seasonal Environmental Effect on the Strength of Pavement Structures," Final Report to U.S. Forest Service Region 6, by the University of Washington, May 1983.
- J.R. Montalvo, Chris A. Bell, J.E. Wilson, and J.T. Schofield, "Application of Resilient Modulus Test Equipment and Procedures for Subgrade Soils, - Part 1: Materials Testing," Final Report to Oregon Department of Transportation and U.S. Department of Transportation Federal Highway Administration, *FHWA-OR-84-3*, January 1984.
- J.R. Montalvo, Chris A. Bell, J.E. Wilson, and J.T. Schofield, "Application of Resilient Modulus Test Equipment and Procedures for Subgrade Soils, - Part 2: Application of Results in Pavement Analyses and Designs," Final Report to Oregon Department of Transportation and U.S. Department of Transportation Federal Highway Administration, *FHWA-OR-84-4*, January 1984.

- Alaeddin Mohseni and Chris A. Bell, "Processing of Data from Oregon's Automatic Vehicle Monitoring System," Final Report to Oregon Department of Transportation, Economic Services Unit, Transportation Research Report 85-15, July 1985.
- Ronald L. Terrel and Chris A. Bell, "Effects of Permit and Illegal Overloads on Pavements," Synthesis of Highway Practice, 131, National Research Council, National Cooperative Highway Research Program, Transportation Research Board, Washington, DC, September 1987.
- Ok-Kee Kim, Chris A. Bell, José Montalvo and R.G. Hicks, "Effect of Moisture and Aging on Asphalt Pavement Life, Part 1 - Effect of Moisture," Final Report to Oregon Department of Transportation and U.S. Department of Transportation Federal Highway Administration, *FHWA-OR-RD-86-01-1*, January 1986.
- Ok-Kee Kim, Chris A. Bell, James E. Wilson, and Glenn Boyle, "Effect of Moisture and Aging on Asphalt Pavement Life, Part 2 - Effect of Aging," Final Report to Oregon Department of Transportation and U.S. Department of Transportation Federal Highway Administration, *FHWA-OR-RD-86-01-2*, January 1986.
- Guillermo Thenoux, Chris A. Bell, D. Eakin, and M. Schroeder, "Evaluation of Asphalt Properties and Their Relation to Pavement Performance," Interim Report to Oregon Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, *FHWA-OR-RD-86-02*, January 1986.
- Chris A. Bell, Loyd Henion, Guillermo Thenoux, and James Washburn, "Field Testing of Automatic Vehicle Identification Systems," Final Report to Oregon Department of Transportation, August 1987.
- Guillermo Thenoux, Chris A. Bell, J.E. Wilson, D. Eakin, and M. Schroeder, "Evaluation of Asphalt Properties and Their Relation to Pavement Performance, Part 1 - Evaluation of Laboratory Data," Final Report to Oregon Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, *FHWA-OR-RD-88-02-1*, May 1988.
- Chris A. Bell, Julie E. Kliever, Brian Kramer, and Guillermo Thenoux, "Evaluation of Asphalt Properties and Their Relation to Pavement Performance, Part 2 - A Microcomputer Inventory for Routine Asphalt Data," Final Report to Oregon Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, *FHWA-OR-RD-88-02-2*, May 1988.
- Ok-Kee Kim, Chris A. Bell, and James E. Wilson, "Procedures for Controlling the Effect of Increased Tire Pressures on Asphalt Pavement Damage," Final Report to Oregon Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, *FHWA-OR-RD-88-01*, June 1988.
- Chris A. Bell, Yunus Ab-Wahab, W. Scott Davis, and George Burgess, "Evaluation of the Coordination of Weigh-in-Motion Data," Final Report to Oregon Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, June 1988.
- Chris A. Bell, "Evaluation of Pavement Damage Caused by Single-Tired Axles," Prepared for Oregon Department of Transportation, Permits and Weighmasters Section, June 1989.
- Chris A. Bell, "Aging of Asphalt Aggregate Systems," Prepared for the Strategic Highway Research Program, National Research Council, *SR-OSU-A-003A-89-2*, September 1989.
- Chris A. Bell and S.F. Brown, "Development of a New Procedure for Bituminous Mix Design," Prepared for the Science and Engineering Research Council, London, England, September 1989.
- Susan Adams and Chris A. Bell, "Adjustments to Weigh-in-Motion Data," Prepared for Oregon Department of Transportation, Planning Section, October 1989.
- Chris A. Bell, J. Washburn and M. Mahoney, "Field Testing of Automatic Vehicle Identification Equipment, Phase 2," Final Report to Oregon Department of Transportation, June 1990.
- C.A. Bell, "Aging of Asphalt-Aggregate Systems," *SR-OSU-A003A-89-2*, Summary Report to the Strategic Highway Research Program, National Research Council, Washington, DC, November 1989.

- C.A. Bell, Y. Ab-Wahab, M.E. Cristi, and D. Sosnovske, "Selection of Laboratory Aging Procedures for Asphalt-Aggregate Mixtures," TM-OSU-A003A-92-22, Final Summary Report to the Strategic Highway Research Program, National Research Council, Washington, DC, April 1991.
- C.A. Bell and D. Sosnovske, "Validation of A002A Hypothesis for Aging," *TM-OSU-A003A-92-14*, Final Summary Report to the Strategic Highway Research Program, National Research Council, Washington, DC, November 1992.
- C.A. Bell, A. Wieder, and M. Fellin, "Laboratory Aging of Asphalt-Aggregate Mixtures: Field Validation," TM-OSU-A003A-92-17, Final Report to the Strategic Highway Research Program, National Research Council, Washington, DC, November 1992.
- C.A. Bell, Y. AbWahab, M.E. Cristi, and D. Sosnovske, "Final Report on Selection of Laboratory Aging Procedures for Asphalt-Aggregate Mixtures," *TM-OSU-A003A-92-22*, Final Report to the Strategic Highway Research Program, National Research Council, Washington, DC, November 1992.
- C.A. Bell and S. Randhawa, "Truck Tire Issues: Evaluation of Impacts of High Pressure Tires and Single-Tired Axles in Oregon," Final Report for Oregon Department of Transportation, Development Branch, Future Technology Research Section, November 1992.
- C.A. Bell, S.U. Randhawa, P. Ryus, and Z. Xu, "Development of an Integrated System for Evaluation of Oregon's Truck Data, Phase 1 - Database Development and Preliminary Evaluation of Data," Final Report to TransNow, August 1993.
- C.A. Bell, S.U. Randhawa, P. Ryus, and Z. Xu, "Development of an Integrated System for Evaluation of Oregon's Truck Data, Phase 2 - Evaluation of Data," Final Report to TransNow, August 1994.
- C.A. Bell, "Overlay Design for Unstable Asphalt Mixes," Final Report to Oregon Dept. of Transportation, Transportation Research Institute Report 94-13, August 1994.
- D.D. Zaworski, C.A. Bell, K.M. Hunter-Zaworski, and M. Sacmeci, "ITS Applications to High Speed Rail Grade Crossing Safety," Final Report for TransNow, Transportation Research Institute Report 95-16, September 1995.
- C.A. Bell, et al., "Synthesis of Practice – Out of Service Criteria for Commercial Vehicles, Part A – Vehicle Criteria," Prepared for the Commercial Vehicle Safety Alliance and the Federal Highway Administration, Office of Motor Carriers, Transportation Research Institute Report 96-4, September 1996.
- C.A. Bell, et al., "Synthesis of Practice – Out of Service Criteria for Commercial Vehicles, Part B – Hazardous Materials Criteria," Prepared for the Commercial Vehicle Safety Alliance and the Federal Highway Administration, Office of Motor Carriers, Transportation Research Institute Report 96-5, September 1996.
- S.G. Miller, P.E. Montagne, S.U. Randhawa, and C.A. Bell, "Evaluation of Accident Data in Relation to Vehicle Criteria," Prepared for the Commercial Vehicle Safety Alliance and the Federal Highway Administration, Office of Motor Carriers, Transportation Research Institute Report 96-6, September 1996.
- P.E. Montagne, C.A. Bell and S.U. Randhawa, "Out-of-Service Criteria for Commercial Vehicles – Evaluation of Incident Data in Relation to Hazardous Materials Criteria," Prepared for the Commercial Vehicle Safety Alliance and the Federal Highway Administration, Office of Motor Carriers, Transportation Research Institute Report 96-7, September 1996.
- C.A. Bell, S.U. Randhawa, S.G. Miller, and P.E. Montagne, "A Review of Out-of-Service Criteria for Commercial Vehicles – Final Report," Final Report to the Commercial Vehicle Safety Alliance and the Federal Highway Administration, Office of Motor Carriers, Transportation Research Institute Report 96-9, September 1996.

- C.A. Bell, S.U. Randhawa, S.G. Miller, and P.E. Montagne, "A Review of Out-of-Service Criteria for Commercial Vehicles – Final Report," Federal Highway Administration, Office of Motor Carriers, *FHWA-MC-96-035*, September 1996.
- C.A. Bell, J.R. Lundy, S.G. Miller, P.E. Montagne, S.U. Randhawa, P.J. Ryus, and Z.K. Xu, "Synthesis of Practice for Out of Service Criteria for Commercial Vehicles, Part A – Vehicle Criteria," Federal Highway Administration, Office of Motor Carriers, *FHWA-MC-96-036*, September 1996.
- C.A. Bell, J.R. Lundy, P.E. Montagne, S.U. Randhawa, P.J. Ryus, and Z.K. Xu, "Synthesis of Practice for Out of Service Criteria for Commercial Vehicles, Part B – Hazardous Materials Criteria," Federal Highway Administration, Office of Motor Carriers, *FHWA-MC-96-037*, September 1996.
- S.G. Miller, P.E. Montagne, S.U. Randhawa, and C.A. Bell, "Out of Service Criteria for Commercial Vehicles: Evaluation of Accident Data in Relation to Vehicle Criteria," Final Report to Federal Highway Administration, Office of Motor Carriers, *FHWA-MC-96-038*, September 1996.
- P.E. Montagne, C.A. Bell, and S.U. Randhawa, "Out of Service Criteria for Commercial Vehicles: Evaluation of Incident Data in Relation to Hazardous Materials Criteria," Final Report to Federal Highway Administration, Office of Motor Carriers, *FHWA-MC-039*, September 1996.
- C.A. Bell and P.E. Montagne, "The Oregon Green Light Project, CVO Evaluation: Final Reports," Final Report to Oregon Department of Transportation and the Federal Highway Administration, Office of Motor Carriers, OSU Transportation Research Institute Reports *12-21*, April 2001.

Miscellaneous Reports and Papers

- Chris A. Bell, "The Prediction of Permanent Deformation of Flexible Pavements," Ph.D. thesis, Nottingham University, September 1978.
- Chris A. Bell, "A Comparison of Civil Engineering and Highway Engineering Education and Technology in the U.S.A. and Great Britain," Report to the Carnegie Trust for the Universities of Scotland, October 1983.
- Chris A. Bell and R.G. Hicks, "Evaluation of South Baker-Durkee Project," Report to Oregon Department of Transportation, Highway Division, January 1984.
- R.G. Hicks and Chris A. Bell, "Evaluation of Oregon State Highway Division Asphalt Mix Design Procedure," Report to Oregon Department of Transportation, Highway Division, December 1984.
- H.I. Al-Abdulwahhab, R.G. Hicks, Chris A. Bell, and R.L. Terrel, "State-of-the-Art -- Permanent Deformation of Bituminous Mixtures," *Transportation Research Report 85-12*, April 1985.

CONFERENCE PRESENTATIONS, ATTENDANCE, AND INVITED LECTURES

Conference Presentations

- "The Prediction of Permanent Deformation in Flexible Pavements," Annual Meeting of Association of Asphalt Paving Technologists, Denver, CO, February 1979.
- "Use of the Shell Bitumen Test Data Chart in Evaluation of Asphalt Data," Annual Asphalt Research Meeting, Laramie, WY, July 1982.
- "Use of the Shell Bitumen Test Data Chart in Evaluation of Asphalt Data," Annual Meeting of Association of Asphalt Paving Technologists, Atlanta, GA, February 1983.
- "Effect of Percent Compaction on Asphalt Mixture Life," ASTM Symposium on Compaction of Asphalt Mixtures, Phoenix, AZ, November 1983.
- "Effect of Season of the Year on Pavement Response," Transportation Research Board Annual Meeting, Washington, DC, January 1984.

- “Comparison of Diametral and Triaxial Repeated Load Testing Techniques for Untreated Soils,” Transportation Research Board Annual Meeting, Washington, DC, January 1984.
- “Flexible Pavement Analysis and Evaluation with Microcomputers,” Second National Conference on Microcomputers in Civil Engineering, Orlando, FL, October 1984.
- “Proliferation of Asphalt Cement Specifications in the State of Oregon,” Transportation Research Board Annual Meeting, Washington, DC, January 1985.
- “Laboratory Investigation of the Fraass Brittle Test,” Annual Meeting of Association of Asphalt Paving Technologists, San Antonio, TX, February 1985.
- “Design Applications of Weigh-in-Motion – Oregon’s Experience,” (with Loyd Henion), Second National Conference on Weigh-in-Motion Technology and Applications, Atlanta, GA, May 1985.
- “Effect of Increased Tire Pressures on Asphalt Pavements,” Northwest Roads and Streets Conference, Corvallis, OR, February 6, 1986.
- “Pavement Design of Gantry Crane Lanes for the Port of Portland,” 1986 Intermodal Freight Terminal Design Conference, New Orleans, LA, March 3, 1986.
- “Processing and Presentation of Traffic Data from Oregon's Automatic Vehicle Monitoring System,” First Canadian Conference on Computer Applications in Civil Engineering/Microcomputers, McMaster University, May 21, 1986.
- “Some Results from the Oregon Weigh-in-Motion/Automatic Vehicle Identification Demonstration Project,” Transportation Research Forum Annual Meeting, Seattle, WA, September 21-24, 1986.
- “Selected Results from the First Three Years of the Oregon Automatic Vehicle Monitoring Demonstration Project,” Transportation Research Board Annual Meeting, Washington, DC, January 1987.
- “Evaluation of Asphalt Physical and Fractional Properties and Their Interrelationship,” Transportation Research Board Annual Meeting, Washington, DC, January 1988.
- “Laboratory Aging of Asphalt Aggregate Mixtures,” Petersen Asphalt Research Conference, Laramie, July 16-18, 1990.
- “Laboratory Aging of Asphalt-Aggregate Mixtures,” ASCE Materials Congress, Denver, August 13-14, 1990.
- “Relationship between Laboratory Aging Tests and Field Performance of Asphalt Concrete Mixtures,” ASCE Materials Congress, Denver, August 13-14, 1990.
- “Investigation of Laboratory Aging Procedures for Asphalt-Aggregate Mixtures,” Transportation Research Board Annual Meeting, Washington, DC, January 1991.
- “Status of SHRP A-003A Work on Development of Laboratory Aging Procedures for Asphalt-Aggregate Mixtures,” Petersen Asphalt Research Conference, Laramie, WY, July 15-17, 1991.
- “Relating Asphalt and Aggregate Properties and Their Laboratory Aging to Field Performance of Mixtures,” Transportation Research Board, January 1994.
- “Evaluating Aging of Asphalt Mixtures,” Transportation Congress, ASCE National Convention, San Diego, October 1995.

Invited Presentations

- Invited Speaker, “Permanent Deformation of Asphalt Pavements,” A Seminar at Waterways Experiment Station, Vicksburg, MS, March, 1979.
- Invited Speaker, “Development of Rational Pay Factors for Asphalt Pavements,” Ninth Annual Asphalt Paving Seminar, University of Utah, Salt Lake City, March 1984.
- Invited Speaker, “Pavement Management,” Oregon Association of County Engineers and Surveyors, Spring Conference, Newport, June 1984.
- Invited Speaker, “Improved Pavement Design Methods,” (with R.G. Hicks), American Society of Civil Engineers, Oregon Section, Portland, OR, March 28, 1985.

- Invited Speaker, "Highways – New Developments in the U.S.," PTRC Summer Meeting, Brighton, England, July 14-18, 1986.
- Invited Speaker, "Procedures for Controlling the Effects of Increased Tire Pressures on Asphalt Pavement Damage," 20th Pacific Coast Conference on Asphalt Specifications, Berkeley, CA, May 12-13, 1987.
- Invited Speaker, "Overview of the Strategic Highway Research Program," to the Chilean Asphalt Institute, Santiago, Chile, September 21, 1989.
- Invited Speaker, "Education, Its Role in Assuring Quality in Asphalt Pavements," to the Oregon Asphalt Paving Association Annual Meeting, December 1991.
- Invited Speaker, "Pavement Design and Analysis for Improved Performance," Shell Seminar, Houston, TX, March 4, 1993.
- Invited Speaker, "Improved Characterization of Asphalt Binders and Mixtures," Advanced Science and Technology Institute Executives Conference, Corvallis, OR, May 1993.
- Invited Speaker, "Truck Research at Oregon State University," Society of Automotive Engineers, Oregon Section, January 28, 1994.
- Invited Speaker, "Impacts of Vehicles on Pavements," 1996 Size & Weight Symposium, Oregon DOT, Eugene, OR, March 5, 1996.

Conference Participation

- Invited Participant, "Strategic Highway Research Program," National Workshop, Dallas-Fort Worth, September 18-20, 1985.
- Attendee, 53rd Annual Meeting of the Association of Asphalt Paving Technologists, Scottsdale, AZ, April 1984.
- Attendee, Transportation Research Board, January 1986.
- Participant, "Heavy Vehicle Electronic License Plate System (HELP)," Executive Committee Meeting, Las Vegas, NV, December 16, 1986; Austin, TX, March 23, 1987; Sacramento, CA, September 21-22, 1987; Portland, OR, December 15, 1987; Albuquerque, NM, September 30, 1988.
- Co-Moderator, Workshop on Materials, Sixth International Conference on the Structural Design of Asphalt Pavements, Ann Arbor, MI, July 13-17, 1987.
- Participant, Transportation Research Board, January 1989; January 1990; January 1992; January 1995.
- Participant, ASCE Workshop for Student Chapter Leaders, Las Vegas, NV, February 9-10, 1989.
- Participant, Petersen Asphalt Conference, Laramie, WY, July 1990; July 1991.
- Attendee, 60th Annual Meeting of the Association of Asphalt Paving Technologists, Seattle, February 1991; 64th Annual Meeting, Portland, March 1995.
- Participant, ASCE 1995 Civil Engineering Education Conference, Denver, June 1995.

SHORT COURSES AND WORKSHOPS

- "Road Surface Management for Local Governments," for Oregon Technology Transfer Center:
La Grande, OR, November 17, 1985
Roseburg, OR, February 11, 1986
Bend, OR, February 13, 1986
- "Use of Microcomputers in Transportation," for Oregon Technology Transfer Center:
Corvallis, OR, April 17, 1986
Roseburg, OR, May 1, 1986
La Grande, OR, May 15, 1986
- "Microcomputer Analysis of Traffic Safety Information," for Oregon Traffic Safety Commission:
Corvallis, OR, May 5-6, 1987

- “Site Impact Traffic Evaluation,” coordinated for Federal Highway Administration:
Corvallis, OR, July 27-29, 1987
- “Bituminous Pavements: Materials, Design, and Evaluation”
University of Nottingham, England, April 11-15, 1988
University of Nottingham, England, March 26-30, 1990
University of Nottingham, England, April 6-10, 1992
University of Nottingham, England, April 11-15, 1994
- “Flexible Pavement Engineering”
University of Strathclyde, Scotland, May 12-13, 1988
- “Asphalt Concrete Mix Design,” Lecturer, Oregon State University, March 5-9, 1990
- “Field Control of Asphalt Concrete Mixes,” Presenter and Session Moderator, for Oregon Department of Transportation, Portland, OR, December 4,5,6, 1990
- Professional Engineering Review – Highway Engineering, Annually since 1989

RESEARCH

Prior Research

- “Application of Resilient Modulus Test Equipment and Procedures for Subgrade Soils,” Oregon Department of Transportation, 7/1/82 to 6/30/83 (\$15,200).
- “Effect of Moisture and Aging on Asphalt Pavement Life,” (with R.G. Hicks), Oregon Department of Transportation, 12/1/82 to 12/31/85 (\$50,031).
- “Evaluation of Asphalt Properties and Their Relation to Pavement Performance,” Oregon Department of Transportation, 12/19/83 to 6/30/86 (\$44,903).
- “Computer Software for Evaluating Data from Oregon’s Automatic Vehicle Monitoring Network,” Oregon Department of Transportation, 7/1/84 to 8/30/85 (\$5051).
- “Procedures to Control The Effects of Increased Tire Pressures on Asphalt Pavement Life,” Oregon Department of Transportation, 8/23/85 to 8/22/86 (\$15,500).
- “Evaluation of the Coordination of Weigh-In-Motion Data,” Federal Highway Administration, 3/31/86 to 3/31/88 (\$20,700).
- “Field Testing of Automatic Vehicle Identification Equipment,” Oregon Department of Transportation, 10/1/86 to 12/31/87 (\$67,650).
- “Asphalt Mix Design Procedures and Applications to Pavement Design, Combining UK and US Experience,” Science and Engineering Research Council, UK, 1/15/88 to 8/15/88 (\$17,500).
- “Evaluation of Pavement Damage Caused by Single-Tired Axles,” Oregon Department of Transportation, 10/6/88 to 7/31/89 (\$5,000).
- “Field Testing of Automatic Vehicle Identification Equipment, Phase 2,” Oregon Department of Transportation, 3/1/88 to 6/30/90 (\$55,830).
- “Aging of Asphalt Aggregate Systems,” Strategic Highway Research Program, 2/1/89 to 12/31/92 (\$749,058).
- “Truck Tire Issues Study,” Oregon Department of Transportation, 12/31/91 to 12/31/92 (\$20,000).
- “Development of an Integrated System for Evaluation of Oregon’s Truck Data, Phase 1,” University Transportation Center Program, USDOT, 11/1/92 to 8/31/93 (\$29,998).
- “Overlay Design for Unstable Asphalt Mixes,” Oregon Department of Transportation, 1/18/93 to 6/30/94 (\$64,998).
- “Development of an Integrated System for Evaluation of Oregon’s Truck Data, Phase 2,” University Transportation Program, USDOT, 11/1/93 to 8/31/94 (\$35,000).
- “A Review of Out-of-Service Criteria,” Federal Highway Administration, USDOT, 2/23/94 to 9/30/96 (\$192,235).

- “Evaluation of Triple Trailer Truck Operation,” Oregon Department of Transportation, 7/1/94 to 3/31/95 (\$13,536).
- “IVHS Solutions for High Speed Rail Crossings and Low Volume Roads,” TransNow, University Transportation Program, USDOT, and Oregon Department of Transportation, 12/1/94 to 8/31/95 (\$34,100).
- “Low Volume Grade Crossings for the Oregon High Speed Rail Corridor,” Oregon Department of Transportation, 12/1/94 to 6/30/96 (\$55,000).
- “Independent Evaluation of the Oregon Green Light CVO Project, Phase I” ODOT and FHWA, 9/1/95 to 4/30/2000 (\$900,000).
- “Smart Parking Lot with Just-in-Time Bus Service,” National Academy of Sciences, Transportation Research Board – Idea Project, 8/1998-7/2001
- “OSU Advanced Institute,” TransNow, University Transportation Program, USDOT, 9/01-8/02 (\$18,000)
- “OSU Advanced Institute,” TransNow, University Transportation Program, USDOT, 1991 to 2005 (\$356,788).