Dennis Attwood

HUMAN FACTORS ENGINEERING SPECIALIST

CAREER SUMMARY

Over 40 years' experience as a specialist in Human Factors and Applied Ergonomics, Driver Behavior Research and University Teaching. He has demonstrated success over the past 30 years in developing, implementing and leading Human Factors and Ergonomics programs on behalf of several major integrated oil firms including Imperial Oil, ExxonMobil Corporation, Chevron, Marathon Petroleum, ConocoPhillips, Petro-Canada (Sun Oil) and British Columbia Hydro. Dennis is author of over 180 publications in Human Factors & Ergonomics and author or co-author of four textbooks on Applying Human Factors to offices and process operations.

KEY SKILLS

- Analysis and design of process central control rooms;
- Applying Human Factors Engineering to the planning, design and implementation of capital and base (local) projects;
- Human Factors evaluations of process plants;
- Developing and implementing grassroots HF programs in Process Plants;
- Developing Human Factors Engineering Design Guidelines for integrated oil companies
- Developing HF Guidelines for Operations Procedures
- Identifying key HF issues for sites managing the operations & maintenance of product transmission pipelines;
- Providing in-class and on-line HF training to project staff and designers, plant operators and managers.
- PHA Facilitator

EDUCATION

Ph.D Industrial Engineering, (Ohio State University)
MSc, Industrial Engineering, (University of Miami)
BSc Electrical Engineering, (University of Waterloo)

CAREER

2012 – 2016: Human Factors Applications and PMO Global Solutions
Human Factors Engineering Specialist

- PHA Facilitator various Canadian Integrated Oil Companies
- Project Lead, 3-year program in Human Factors issues in Pipeline Damage
- Co-author, Canadian Standards Association Human Factors Standards for Pipelines
- Author, Outcomy Corp, computer-based training in Human Factors Engineering

2003 – 2012: Aon Risk Engineering/ Hazard Risk Associates, LLC
Principal and Human Factors Engineering Specialist

- Developed Musculoskeletal Disorder (MSD) guidance on:
  - Barrel handling for major chemical company
  - Drilling and service rig activities
  - Valve use in process plants
- Warehouse material handling activities
- Developed Human Factors design standards for major integrated oil companies
- Completed process control room assessments for several major plants internationally
- Developed Human Factors Guidance for PHA publication by the API
- Provided Human Factors Training to engineering and project personnel of several major oil refineries
- Provided HFE Assistance to four major process plant construction projects for US Gulf Coast, Mexico-LNG Importing, Qatar – LNG Production and exporting, off-shore Gulf of Mexico, Nigeria – Gas plant, off-shore Angola and the Canadian Oil Sands
- Provided HF advice to Pipelines Research Council International (PRCI) on control room assessments
- Provided Human Factors/ Ergonomics advice to Law firms and participated in depositions during litigation proceedings
- Developed a process to rank the musculoskeletal risk of operating critical manual valves.
- Co-authored two text books

2002 – 2003 (Retired) Imperial Oil Ltd.
Human Factors Engineering Specialist

- Developed model for the implementation of HF in grass roots plants and successfully implemented the model in Imperial Oil Resources Limited

1992-2002 ExxonMobil Biomedical Sciences, INC.
Human Factors Group

- Responsible for the development and implementation of a Human Factors Engineering/ Ergonomics consulting Group within ExxonMobil worldwide
- Developed marketing plans that demonstrated the use of Human Factors/Ergonomics in the different businesses of each ExxonMobil affiliate
- Original Member, Corporate Human Factors Steering and Coordination Group
- Participated in the development of Human Factors/Ergonomic programs for ExxonMobil affiliates
- Conducted assessments of chemical plants, refineries, marketing terminals, laboratories and offices,
- Conducted specialized Human Factors evaluations of process control systems in Refineries, Chemical plants and gas plants
- Developed a Human Factors in Project Design Process for ExxonMobil Chemicals
- Field-tested commercial, computer-based behavioural systems as fitness-for-duty devices
- Developed the HF component of a corporate risk analysis system (HAZOP) that is proposed as an industry (API) standard
- Developed training and workshop programs for office and site Ergonomics and Shift work
- Published a series of publications relating to Human Factors issues in Office Relocation

1982– 1992 Imperial Oil Ltd.

Design Manager (1991-1992)

- Responsible for the design of the tenant 'fit-up' portion ($60M) of Imperial's new corporate head office building
- Developed design principles for the new building
- Initiated the design process for each of the major functional areas
- Worked with employee groups to develop Ergonomics principles for each area
- Influenced architectural decisions in base-building and specialized floors
- Developed and led the process for engaging the interior design consultant
- Clarified the roles and responsibilities for the position and developed the classification package for HR

Manager, Corporate Facilities Group (1987-1991)

- Responsible for leading a group of eight to design and manage major building construction, space planning , and staff relocation and maintenance projects in Imperial's Toronto office buildings
- Developed and rolled-out an Ergonomics Awareness package to Imperial's office staff
- Developed a training module on Ergonomics for ExxonMobil's HR Systems Division
- Provided consulting services to Imperial and ExxonMobil in the area of office ergonomics
- Managed the largest staff relocation project ever conducted by Imperial following its merger with Texaco Canada. The project involved one million square feet of space and the relocation of 3300 employees with a project team of 40 Imperial and contract staff and a budget of $12M
- Successfully introduced new technology among traditional, non-technical project staff
- Developed and implemented, as a member of the management team of the Administrative Services Division, a performance measurement training program and introduced a performance-based compensation system for consideration.

Ergonomics Coordinator, Administrative Services Division (1984-1986)

- Responsible for developing an Ergonomics program for Imperial's office buildings and staff and for introducing Ergonomics into Imperial's plant and terminals
- Developed Imperial's Office Ergonomics Guidelines
- Developed and conducted 5-day technical training programs in Ergonomics
- Provided applied Ergonomics consulting services, on an as-required basis, to office workers at major office sites across Canada. Major problem areas included workstation design, lighting, seating and repetitive strain
- Provided consulting services in Ergonomics and Space Planning to facilities design teams involved with the specification of new buildings
- On loan to the Minister of Transport, Province of Saskatchewan to help develop an implementation program for daytime running-lights for road vehicles

1982-1985 Esso Chemical Canada

Safety and Loss Prevention Associate

- Managed the Corporate program of Occupational Health and Safety and coordinated the corporate program with those developed within Esso's two chemical plants
- Developed an improved method of tracking safety statistics
- Developed an automated distribution system for Material Safety Data Sheets
- Founding Member of "SAFE", an industry organization for the exchange of safety statistics and programs
- Using expertise on vehicle driving behaviour, developed in a former position, increased the road safety awareness of ECC's fleet drivers.

- While on load to the Minister of Transportation of the Government of Alberta, develop the "Lights on for Life" program for the Province

1973-1981 Transport Canada
Head of Road Safety Unit

- Responsible for planning and conducting driver behaviour research in support of Canada's Motor Vehicle Safety Standards
- Conducted live, closed-course research leading to the Federal Daytime Running-lights legislation that came into effect in Canada in December, 1989
- Developed the concept for a driving interlock for impaired drivers using a vehicle-based, computer system. Only now, 20 years later, is this research being revisited
- Advanced scientific knowledge on the effects of alcohol, licit and illicit drugs and fatigue on driving behaviour
- Conducted observational and simulator studies in various design areas including vehicle lighting, vehicle handling and active and passive restraint systems

1968 – 1972 Ministry of National Defence
Defence Scientist

- Responsible for the HF evaluation and design of military systems and equipment
- Developed analytical tools for the Human Factors evaluation of military vehicles
- Conducted evaluation trials on naval vessels and submersibles
- Experiments with aids to low-level navigation
- Evaluated the search and rescue capabilities of Transport Canada hovercraft and ships
- Designed and evaluated the navigation bridges of both Coast Guard and Naval vessels

TEACHING EXPERIENCE

1987 – 1991 Association of Professional Engineers of Ontario

- Set the annual provincial examination on Ergonomics Design of Workstations

1986 Humber College

- Developed a module on "Advanced Workstation Design"

1981- 1982 Queens's University

- Course instructor, Psychology 345, Skilled Performance, Department of Psychology

1981 University of Toronto

- Course Director, IND, 423S, Human Performance, Department of Industrial Engineering

1980 Seneca College of Apple Arts and Technology

- Course Director, Business Supervision

1978 – 1979 Durham College of Applied Science and Technology

- Course Director, Management Courses on first-line supervision and human relations

1974 – 1978 York University

- Course Director, Psychology 252E, Introduction to Experimental Psychology, Department of Psychology

BOOKS AUTHORED/CO-AUTHORED

1. *"The Office Relocation Sourcebook: A Guide to Managing Staff Throughout the Move*". John Wiley and Sons, Publishers, New York, October 1996.
2. *"Human Factors Methods for Improving Performance in the Process Industries".* Centre for Chemical Process Safety (CCPS). John Wiley and Sons Inc. publishers), New York, NY, ISBN-13 978-0-470-11754-5.
3. *"Ergonomic Solutions for the Process Industries".* Elsevier-Butterworth Publishers, December, 2003
4. *"A Practical Approach to Hazard Identification for Operations and Maintenance Workers".* Centre for Chemical Process Safety (CCPS), John Wiley and Sons, New York, 2009

SELECTED PUBLICATIONS

1) HARRON, L., and ATTWOOD, D.A. (2014) "Reducing human error using a human factors life cycle approach." Paper IPC2014-33260, Presented at the 10th International Pipelines Conference, Calgary. AB, September 29 to October 3rd.

2) ATTWOOD, D., (2014) "Vehicle-Based Driver Interlocks: After 50 Years of Research, can we now Design an On-Board, Real-Time System to Detect Abnormal Driving Behavior?," SAE Technical Paper 2014-01-0275, 2014, doi:10.4271/2014- 01-0275. Copyright © 2014 SAE

3) ATTWOOD, D.A. and MOLEDINA, M. (2013) "The use of small modular nuclear reactors for Canadian Oil Sands applications: A proposal and way forward." Proceedings, Canadian Nuclear Society, Toronto, ON., June 2013.

4) ATTWOOD, D.A. and TYS, A.T. (2013) "A method for ranking the musculoskeletal risk of operating valves in process industries." Proceedings of the Society of Petroleum Engineers, SPE-165690-MS, Pittsburgh, PA, August 2013

5) CHAVEZ, V., WRIGHT, S., AL-MARZOOKI, M., ATTWOOD, D.A., and YU-NAN LUI, (2007) "Technical Challenges during the Engineering Phases of the QatarGas II Large LNG Trains." LNG 15 Conference, Barcelona Spain.

6) ATTWOOD, D.A. (2005) Ergonomic Solutions for the Aging worker in the Process Industries. ASSE Professional Development Conference and Exposition, New Orleans, June 2005

7) API (2005) "Human Factors in New Facility Design Tool" American Petroleum Institute, Human Factors Task Force, Regulatory Analysis and Scientific Affairs Department. Significant portions of this document (page 4 onward) were prepared by Dennis A. Attwood under contract to ExxonMobil

8) API (2004) Tool for incorporating Human Factors during Process Hazard Analysis (PHA) reviews of plant designs. API PHA-1, Standard by American Petroleum Institute, 03/01/2004. Prepared for API by Dennis A. Attwood under contract to ExxonMobil

9) ATTWOOD, D.A. NICOLICH, M. J., PRITCHARD, K., SMOLAR T. J. AND SWENSEN, E. E. Valve Wheel Rim Force Capabilities of Process Operators. Journal of Loss Prevention in the Process Industries (Elsevier), Vol. 15/3, May/2002, PP 233-239

10) ATTWOOD, D.A., Comparison of Discomfort Experienced at CADD, Word Processing and Traditional Drafting Workstations. J. Ind. Ergonomics, 1989, 4, 39-50.

11) ATTWOOD, D.A., Ergonomics in Industry: How to get your foot in the door (and keep it there) S.S. Asfour (Ed) Trends in Ergonomics/Human Factors IV. Elsevier, 1987.

12) ATTWOOD, D.A., The Potential of Daytime Running Lights as a Vehicle Collision Countermeasure. SAE Report No. 810190, Feb. 1981.

13) ATTWOOD, D.A., and WILLIAMS, R.D., A Canadian Survey of Automobile Tire Pressures, Tire Failures and Tire Maintenance Practices. SAE Report No. 810068, Feb. 1981

14) ATTWOOD, D.A., WILLIAMS, R.D., and MADILL, H.D., The effects of Moderate concentrations of blood Alcohol on closed-course driving performance. J. Studies on Alc., 1980, 41(1), 623,-634

15) ATTWOOD, D.A., The effects of headlight glare on vehicle detection at dusk and dawn. Human Factors, 1979, 21(1), 35-45.

16) . ATTWOOD, D.A., Effects of moderate levels of blood alcohol on responses to information from simulated automobile rear-signal systems. Acc. Anal. and Prevention, 1978, 10(1), 11-20.

17) EATOCK, B.C., DEMMERY, W.W., WILLIAMS, R.D., and ATTWOOD, D.A, Portable interactive data acquisition and analysis system for driver behaviour research. Transportation Research Record No. 672, 1978, pp.44-49.

18) ATTWOOD, D.A., and WIENER, E.L., Automated Instruction for Vigilance Training. Journal of Applied Psychology, 1969, 53(3), 218-223.

19) WIENER, E.L., and ATTWOOD, D.A., Training for Vigilance: Combined Cueing and Knowledge of Results. Journal of Applied Psychology, 1968, 52(6), 474-479.