

## Mark A. Heidebrecht, MSE, ACSM, CHFP Board Certified - American College of Sports Medicine Board Certified - Ergonomist / Human Factors Professional

Mr. Heidebrecht's experience in ergonomics, biomechanics and human factors spans nearly 20 years of consulting, product development and litigation support. His consulting work has involved functional capacity, physical demands, physiological assessments, ergonomic risk assessments, ergonomic job analysis, return-to-work programs, and development of ergonomic analysis software. He also has extensive experience in litigation support as an expert in product liability, personal injury, premise liability, and warnings/labels involving a wide range of issues. Mr. Heidebrecht has been accepted in Municipal, State and Federal courts throughout the US.

### Education

- Post-Graduate, University of Kansas, Exercise Physiology, 1998
- Post-Graduate, Mid-America Nazarene University, 1999
- MSE, University of Kansas, Biomechanics and Work Physiology, 1994
- BSE, University of Kansas, Exercise Science, 1992
- Special Studies, Wichita State University, 1990

### Ergonomics

- Ergonomic & Human Factors Certification
- Musculoskeletal Disorders (MSD)
- Repetitive Strain Injuries (RSI)
- Ergonomic Team Training and Mentoring
- Manufacturing Processes (Lean & Six Sigma)
- Hand/Arm Vibration Exposure (HAVS)
- Whole Body Vibration Exposure (WBV)
- Environmental Exposure (Heat & Cold)
- Ergonomic Effects of Vision & Lighting
- Quantification of Ergonomic Risks
- Low Back Injuries
- Carpal Tunnel (CTS)
- Physical Demands & Abilities
- Manual Material Handling
- Effects of Aging
- Task Analysis
- Workplace Accommodations
- Anthropometrics

### Human Factors

- Systems Analysis (Industrial, Medical, Transportation)
- Information Processing & Communications
- Human Error (Commission & Omission)
- Safety Critical Systems (Law Enforcement, Medicine)
- Job and Tem Design & Communications
- Consumer Products (Instructions, Labels & Warnings)
- Human Perception & Interpretation
- Decision Making Processes
- Instructions, Labels & Warnings
- Mental Workload (Fatigue & Error)
- Situation Awareness
- Instruction, Training & Education

### Biomechanics

- Forensic Biomechanics
- Acute & Traumatic Injury Mechanics
- Shoulder, Back, Knee, Hip Injuries
- Slip, Trip & Fall Mechanics
- Balance & Stability
- Hearing Loss
- Anthropometrics
- Osteoarthritis
- Kinetics, Kinematic Analysis
- Closed Head Injuries

### Exercise Physiology

- Fatigue and Performance
- Environmental Exposure (Heath & Cold)
- Energy Delivery & Utilization
- Physical Demands & Abilities
- Thermoregulation & Dehydration
- Physical Performances & Testing
- Muscular Strength & Endurance
- Injury Prevention

### **Athletic & Sports Related Injuries**

- Athletic Training Protocols, Policies & Procedures
- Overuse & Acute Injury Mechanics
- Concussions, Closed Head Injury
- Sports Equip. Related Injuries
- Injury Prevention
- Medical Mgmt. Processes

### **Professional Organizations and Awards**

- Human Factors and Ergonomics Society
- Cognitive Engineering & Decision Making Technical Group
- Forensics Professional Technical Group
- Safety Technical Group
- Industrial Ergonomics Technical Group
- Product Design Technical Group
- Association of Canadian Ergonomists Member (In Process)
- International Society of Biomechanics
- 3D Analysis of Human Movement Interest Group
- International Shoulder Interest Group
- Footwear Biomechanics Interest Group
- American Society of Biomechanics
- University of Kansas Alumni
- Society of Automotive Engineers International (SAE)
- American College of Sports Medicine
- National Strength Conditioning Association
- Outstanding Citizen Award Douglas County Life Saving Efforts

### **National & International Professional Presentations**

- Current Trends in the Epidemiology of Musculoskeletal Disorders, Lucien Brouha: Work Physiology Symposium, September 2009
- Ergonomic Risk Analysis, National Caterpillar Dealer Environmental Health and Safety Conference, May 2009
- Essential Components of Corporate Ergonomic Process, Dairy Farmers of America (DFA), April 2009
- Design & Implementation of the Ergonomic Process for the Customer Service Division of the U.S Postal Service, Lucien Brouha: Work Physiology Symposium, University of Connecticut Biodynamics Laboratory for the Ergonomic Technology Center, September 2008
- Ergonomics: Practical Solutions for Industry, Ergo-Online, LLC, August 2008
- Advanced Ergonomics: Using the Right Evaluation Tools, American Meat Institute (AMI) Foundation, April 2008
- Ergonomics: It Doesn't Have to Be Perfect, Just Has to Be Better, Dairy Farmers of America, April 2007
- Advanced Ergonomics: Using the Right Evaluation Tools, American Meat Institute (AMI) Foundation, April 2007
- Board of Certification in Professional Ergonomics (BCPE) Prep-Course, Ergo-Online, LLC., 2001, 2002, 2004, 2005, 2006, 2007, 2008
- Ergonomic Assessments: How to Know What Type to Request, Kansas 55th Annual Safety & Health Conference, October 2005
- Ergonomic Assessments: How to Know What Type You Need, Dairy Farmers of America, April 2005
- Bringing Out The Engineer In The Rehabilitation Professional, WorkHab Provider Network Australian and New Zealand National Conferences, August 2002
- Technology, Function & Using WorkHab In Industry, WorkHab Provider Network Australian and New Zealand National Conferences, August 2002

- Ergonomic Assessment of the Whole Body, California Association of Rehabilitation Providers (CARP), September 2002
- Ergonomic Assessment of the Upper Body, California Association of Rehabilitation Providers (CARP), September 2002
- New Technologies to Quantify Motion: A Boeing Case Study, Applied Ergonomics Conference, March 2002
- New Ergonomic Tools for Old Problems, 17th Annual National OSHA VPPPA Conference, September 2001
- Ergonomic Panel Discussion, Kansas City Plant Operations Show, May 23, 2001
- Tools to Quantify and Validate Functional Motion In Ergonomics and Rehabilitation, The 24th Annual Carroll Hungate Postgraduate Seminar on Occupational and Environmental Health, February 24, 2001
- Tools to Quantify and Validate Functional Motion In Ergonomics and Rehabilitation, Safety & Health Council of Western Missouri & Kansas, February 12, 2001
- OSHA's Proposed Ergonomic Standard/Cost Effective Ergonomics, Missouri College & University Personnel Association, Regional Conference, September 2000
- Thinking Outside the Box: Simple, Cost-Effective, and Time-Efficient Ergonomic Processes, 16th Annual National OSHA VPPPA Conference, August 30, 2000
- Panel on Musculoskeletal Disorders and the Workplace, National Academy of Sciences, July 2000
- OSHA Proposed Ergonomic Standard National Hearing, Federal Occupational Safety & Health Administration Hearing, April 2000
- Integrating Physical Demand Analysis and Job Matching Techniques, Work Injury Management Conference, May 1998
- Integrating Physical Demand Analysis & Job Matching Techniques, Work Injury Management National Conference, May 1998
- The Body at Work, Levi Strauss & Co, June 1998
- Post-Offer and Pre-Placement Screening, ErgoNet, May 1997
- Personal Attributes Associated with Cumulative Trauma Disorders, ErgoNet, September 1996
- Vantage Point Health and Productivity Software, Advantage Health Systems, Inc., 1995-1999
- Worksite Analysis Master Training, Advantage Health Systems, Inc., 1995-1998
- Kinetic Analysis of Lifting and Lowering Utilizing Chaffin's Biomechanical Model, American College of Sports Medicine National Conference, June 1995
- Kinetic Analysis of Lifting and Lowering Utilizing Chaffin's Biomechanical Model, American College of Sports Medicine Regional Conference, November 1994
- Biomechanical Analysis of Lifting and Lowering, Eighth Annual graduate Research Seminar in Biomechanics, November 1993
- Research Activities
- Validity and Reliability of the MotionWatch WristCorder Post-Graduate, 1999.
- Literature Review of Personal Attributes and Cumulative Trauma Disorders. Post Graduate, 1997.
- Kinetic Analysis of Lifting and Lowering Utilizing Chaffin's Static Biomechanical Model. Masters Thesis, University of Kansas, 1994.
- Tissue Response to Muscular Strains. Graduate Research, University of Kansas, 1993.
- Force Plate Foot Strike Analysis. Graduate Research, University of Kansas, 1993.
- The Stretch Shortening Cycle. Graduate Research, University of Kansas, 1992.
- Transcutaneous Electrical Nerve Stimulation, TENS. Undergraduate Research, University of Kansas, 1992.

### **Continuing Education**

- Society of Automotive Engineers (SAE): Injuries, Biomechanics & Federal Regulation, 2009
- Lucien Brouha: Work Physiology Symposium, University of Connecticut Biodynamics Laboratory for the Ergonomic Technology, September 2008
- American Meat Institute Worker Safety Health & Human Resources Conference (AMI)

- 2007, Denver, CO
- SEAK 15th National Expert Witness Conference, 2006
- 3-D Power Performance, 2005, Emporia State University, KS
- What You Need To Know: Workplace Ergonomics, 2005, San Francisco, CA
- Ergonomics for Small Business, 2003, Albany, NY
- WorkHab FCE System: Australian Annual Providers Meeting, 2002, Coogee Bay, Australia
- WorkHab FCE System: New Zealand Annual Providers Meeting, 2002, Christ Church, New Zealand
- 2002 Worker Compensation Seminar, 2002, Kansas City, MO
- Occupational Injury Prevention Rehabilitation Society: Ergonomic Analysis of the Workplace, 2001, Chicago, IL
- Institute of Industrial Engineers 3rd Annual Applied Ergonomics Conference, 2000, Los Angeles, CA
- The Proposed Washington State Ergonomics Rule, 2000, Tukwila, WA
- Occupational Injury Prevention Rehabilitation Society: Ergonomic Analysis of the Workplace, 2000, Seattle, WA
- Human Factors & Ergonomic Society, 1999, Annual Conference
- University of California Berkeley: Synthesizing Office Workstation Ergonomics, 1998, Berkeley, CA
- Work Injury Management: Innovative Partnerships with Industry, 1998, New Orleans, LA
- Augmented Soft Tissue Mobilization (ASTM) to the Upper Extremity & Shoulder Girdle, 1998, Lenexa, KS
- How to Write Users Manuals: A Technical-Writing Workshop, 1998, Kansas City, MO
- Maple Woods Community College: OSHA Record Keeping, 1998, Kansas City, MO
- Quantitative Sensorimotor Testing, 1998, Lenexa, KS
- Work Injury Management: Innovative Partnerships with Industry, 1998, New Orleans, LA
- Augmented Soft Tissue Mobilization (ASTM) to the Upper Extremity & Shoulder Girdle, 1998, Lenexa, KS
- Maple Woods Community College: OSHA Record Keeping, 1998, Kansas City, MO
- How to Write Users Manuals: A Technical-Writing Workshop, 1998, Kansas City, MO
- Quantitative Sensorimotor Testing, 1998, Lenexa, KS
- Work Injury Management National Conference: Management for the Millennium, 1997, Kansas City, MO & San Diego, CA
- Work Injury Management: Ergonomic Analysis of the Workplace I & II, 1998, Las Vegas, NV
- University of Cincinnati: Ergonomics of Hand-Arm & Whole Body Vibration (NIOSH 596), 1997, Cincinnati, OH
- Work Injury Management: Ergonomic Analysis of the Workplace, 1997, Seattle, WA
- University of Michigan: Occupational Ergonomics, 1997, Ann Arbor, Michigan
- American College of Sports Medicine: Health Fitness Instructor Workshop, 1997, Creighton University
- American College of Sports Medicine Annual & Regional Conferences, 1994, 1995, 1996
- Seventh Annual Graduate Research Annual Conference Seminar in Biomechanics, 1993, Texas Women's University
- Eight Annual Graduate Research Annual Conference Seminar in Biomechanics, 1994, University of Kansas
- Saunders Group Workshop: Reducing Injuries in the Workplace, 1994, Kansas City, MO

## **Publications**

- Heidebrecht, M. & Bradbury S. (2004). The Direction of Ergonomics, RehabPro, 12 (2).
- Heidebrecht, M. & Bradbury S. (2004). The Use of Heart Rate: Tools to Assess Ergonomic Risk and Intervention, RehabPro 12 (1).

- Heidebrecht, M. & Bradbury S. (2003). The NIOSH Work Practice Guide: Tools to Assess Ergonomic Risk and Intervention, RehabPro,11 (4).
- Heidebrecht, M. & Bradbury S. (2003). Back Compressive Force Estimation: Tools to Assess Ergonomic Risk and Intervention, RehabPro,11 (3).
- Heidebrecht, M. & Bradbury S. (2003). The Strain Index: Tools to Assess Ergonomic Risk and Intervention, RehabPro, 11 (2).
- Heidebrecht, M. & Bradbury S. (2003). Upper Limb Assessment: Tools to Assess Ergonomic Risk and Intervention, RehabPro11 (1).
- Musculoskeletal Disorders and the Workplace, (2001). The National Academies, National Academies Press, Listed as Contributor to Report.

## **Certifications**

- Board of Certification of Professional Ergonomists, Certified Human Factors Professional, NO.1532 (Peer Reviewed), 2008 – Present
- Board of Certification of Professional Ergonomists, Certified Ergonomic Associate, NO.32, 1999 - 2008
- American College of Sports Medicine, Certified Health Fitness Instructor, No.9992, 1997 - Present

## **Professional Work Experience**

- Humatec, Senior Consultant
  - Provide ergonomic and human factors forensic analysis services.
  - Provide Human biomechanical forensic analysis services.
  - Provide work physiology forensic analysis services.
  - Conduct ergonomic risk analysis.
  - Train and mentor ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Implemented and evaluated effectiveness of ergonomic resolutions.
  - Develop and present customized ergonomic training material for industry.
- ErgoMethods, Owner
  - Train and mentor ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Implemented and evaluated effectiveness of ergonomic resolutions.
  - Develop and present customized ergonomic training material for industry.
  - Integrate ergonomic processes in lean manufacturing environments
  - Quantify ergonomic risk and perform root-cause-analysis.
  - Marketing, business management and product development.
  - Developed and manage an international ergonomic provider network servicing four large insurance companies.
  - Document essential functions and physical demands associated with job tasks.
  - Develop post-offer testing and return-to-work protocols.
  - Perform and interpret functional capacity evaluations for return-to-work.
  - Quantify physiological demands associated with job tasks.
- Ergo-Online, Managing Partner
  - Develop a preparatory seminar for individuals who are pursuing certification by the BCPE. Emphasis has been placed on core competencies needed by professional ergonomists rather than on teaching test questions.
  - Conduct preparatory seminar for individuals who are pursuing certification by the BCPE.
  - Develop preparatory online modules for individuals who are pursuing certification by the BCPE. Emphasis has been placed on knowledge bases rather than on teaching test questions.

- Develop and conduct seminars in advanced ergonomic assessment techniques.
- Develop and conduct seminars for plant ergonomic training and continuing education.
- Developed online training modules for governmental RFP in 2001.
- Washington Ergonomics, VP Training
  - Train and mentor ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Develop and present customized ergonomic training material for industry.
  - Provide training for ergonomic job analysis software.
  - Marketing and product development.
  - Implemented and evaluated effectiveness of ergonomic resolutions.
  - Develop and present customized ergonomic training material for industry.
  - Document essential functions and physical demands associated with job tasks.
  - Develop post-offer testing and return-to-work protocols.
- Ergonomic Technologies Corporation – ETC, Senior Consultant
  - Developed and implemented the Ergonomic Risk Reduction Process for the United States Postal Service's Customer Service division of the United States Postal Service. When fully implemented it will affect over 750 thousand employees.
  - Implemented the Ergonomic Risk Reduction Process for the United States Postal Service Mail Processing Centers.
  - Developed ergonomic training material for the United States Postal Service Customer Service division.
  - Trained and mentored ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Participated in union and management negotiations at the national and local level.
  - Implemented and evaluated effectiveness of ergonomic resolutions.
  - Quantify ergonomic risk and perform root-cause-analysis.
  - Document essential functions and physical demands associated with job tasks.
- MotionWatch, Director of Biomechanics & Ergonomic Services
  - Development and validation of an upper extremity motion analysis device which measured flexion, extension, supination and pronation of the wrist and forearm for ergonomic analysis and rehabilitation applications.
  - Conducted validation studies with Wichita State University which were presented at the San Diego Human Factors and Ergonomic Society National Conference in 2000.
  - Trained engineers at Boeing in the use of motion analysis technology and conducted ergonomic and six sigma studies with Boeing which were presented at the Baltimore, MD Applied Ergonomics Conference in 2001.
  - PC and Palm based software development and usability testing for motion analysis electronics.
  - Development of PC and Palm based risk analysis logic and software.
  - Provided training and education to engineers, therapists and physicians.
  - Interfaced with electrical engineers in new product development.
- Advantage Health Systems, Director of Seminars, Regional Coordinator for Levi Strauss
  - Trained and mentored ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Regional Ergonomic Coordinator for Levi Strauss's ergonomic teams.
  - Developed PC based risk analysis, occupational health and physical demand logic and software.
  - Developed and organized national conferences and seminars. Responsibilities included site and speaker selection and the development of conference and seminar content.
  - Train and mentor ergonomic teams in the identification and resolution of ergonomic risk factors.
  - Implemented and evaluated effectiveness of ergonomic resolutions.

- Develop and present customized ergonomic training material for industry.
  - Integrate ergonomic processes in lean manufacturing environments
  - Quantify ergonomic risk and perform root-cause-analysis.
  - Document essential functions and physical demands associated with job tasks.
  - Develop post-offer testing and return-to-work protocols.
  - Quantify physiological demands associated with job tasks.
- Lawrence Memorial Hospital, Occupational Health & Ergonomic Specialist
    - Performed ergonomic risk analysis.
    - Provided job accommodations and ergonomic resolutions for industry.
    - Developed and performed ergonomic and safety training.
    - Designed functional rehabilitation programs for injured workers
    - Developed and presented customized ergonomic training material for industry.
    - Document essential functions and physical demands associated with job tasks.
    - Developed post-offer testing and return-to-work protocols.
    - Perform and interpret functional capacity evaluations for return-to-work.
    - Conducted physiological assessments such as stress tests.