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Research to Practice to Research (RtPtR): A Roadmap for Occupational Ergonomics and Safety Practitioners and Researchers

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Authors Notes: Professor Sang D. Choi, Ph.D., CPE, CSP is Full Professor and Graduate Program Director in the Department of Occupational & Environmental Safety & Health at the University of Wisconsin – Whitewater. Professor Choi is also the Director of the Center for Occupational Safety and Ergonomics Research and the Program Coordinator for the Occupational Ergonomics Program. His academic experience comprises teaching graduate and undergraduate courses in occupational ergonomics, construction accident prevention, analysis and design in safety, system safety analysis, & research methods. Professor Choi's main research interests are construction ergonomics and safety, fall prevention and protection, aging workforce, work-related musculoskeletal disorders, work system analysis, and prevention through design (PTD). Dr. Choi is the Editor for the ASSE' Journal of Safety Health & Environmental Research. He is also a strong proponent of efforts to integrate research into the OESH practice and is dedicated to bridge the gap between academia and the OESH profession - Research to Practice to Research (RtPtR).

Mr. James G. Borchardt, CPE, CSP, CRIS has 46 years of Safety, Health and Ergonomic experience in the industrial and construction insurance industry. For the first 24 years of his career, he held various technical and managerial positions with Liberty Mutual Insurance and a Kemper Insurance subsidiary in the Midwest and on West Coast. Since 1993, he has been Home Office Technical Advisor of Construction and Industrial Risk Control Services for a national insurance company. Since 2000, he has represented the American Insurance Services Group (AISG/ISO/Verisk) to the ANSI A10 Construction Standards Committee. He has been the Principal and Managing Consultant of Construction Ergonomics LLC since 2013. He is also a contributor to ASSE/ANSI Z590-3-2011Prevention through Design - Guidelines for Addressing Occupational Hazards and Risks in Design and Redesign Processes and ANSI A10-2 Technical Report Prevention through Design for Construction and Demolition Safety and Health. He is recognized nationally and internationally as a Board Certified Safety Professional (CSP #4314), Board Certified Professional Ergonomist (CPE #510), Certified Product Safety Manager (#447). The International Risk Management Institute (IRMI) designated him a Certified Construction and Insurance Specialist (CRIS) in 2011.

Abstract: This presentation demonstrates the essential role of transferring occupational ergonomics and safety knowledge and interventions into highly effective prevention practices for improving the worker well-being and operational excellence in the workplace. The authors offer a snapshot and compelling evidence of ways to translate academic research into workplace practices (RtP), narrowing the gap between academic research and practical solutions to workplace safety and ergonomic challenges. As an extension of the research to practice, the authors introduce a Practice to Research (PtR) model by encouraging industry practitioners to communicate real-world exposures to academia. The presentation provides examples of simple and effective prevention practices such Manually Handling Materials, Tools and Equipment (GP-MH-MTE). Furthermore, to meet the challenges of today's changing workforce (e.g., aging, physical conditioning and obesity), the authors introduce a novel approach called Ergonomic Action Level and B Factor to help contractors preplan ergonomic controls into construction processes.

Keywords: RtPtR, Research to Practice to Research, Occupational Ergonomics and Safety

RtPtR Model/Process

In the 1990s, National Institute for Occupational Safety and Health (NIOSH) encouraged research resources to include "real world" applications and developed the research to practice model in the 2000s. According to NIOSH (2015) *"Research to Practice"* is an approach to collaborations with partners and stakeholders on the use, adoption, and adaptation of knowledge, interventions, and technologies in order to reduce and eliminate injuries, illness, and fatalities in the workplace. It is emphasized to work with partners to develop effective products, translate research findings into practice, target dissemination efforts, and evaluate and demonstrate the effectiveness of these efforts in improving worker health and safety (NIOSH, 2015).

In 2008, the academic researcher Professor Choi and the S&H practitioner Mr. Borchardt first met at the Construction Safety Conference in Rosemont, IL. The academic researcher Professor Choi has worked to create a synergy between academic research protocols and classroom teaching methods with university students and S&H practitioners. The two authors have collaborated to advocate the *"bridging the gap between academia and safety, health & ergonomic practitioners"* in an effort to make NIOSH's goal of "Research to Practice" (RtP) a reality through peer-reviewed papers and professional development conferences (e.g., HFES, ASSE, IEA, CSC, NSC, DoD/Navy). Furthermore, the authors have broadened the RtP concept to a practice to research (PtR) model by encouraging practitioners to communicate "real world" S&H exposures to academia for future research. The authors have been discussing how S&H research and resources could be made more useful to practitioners. For example, NIOSH's research to practice initiative has resulted in "practitioner friendly" manual material handling resources, such as Simple Solutions-Ergonomics for Construction Workers (NIOSH Publication 2007- 122) and Ergonomic Guidelines for Manual Material Handling (NIOSH Publication 2007-131). However, the application of NIOSH's LE with its various components seemed neither widely used nor understood by S&H practitioners. The goal became finding ways to translate academic research projects, using the NIOSH lifting equation, into S&H good practices that practitioners could apply on worksites (Borchardt and Choi, 2012; Choi, Borchardt, and Proksch, 2012, etc.).

Application has always been the goal of safety and health (S&H) researchers/practitioners. The authors have been advocating the importance of understanding of different perspectives and generate ideas for improving the process of research to practice to research, while recognizing successful pathways and its barriers in moving promising occupational ergonomic and safety concepts from research to practice and in moving important problems from practice to research. In 2013, the authors were invited to present at the 100[th] National Safety Council's Research to Practice Track, entitled "RtPtR: A roadmap for safety and health practitioners and academics" (Choi & Borchardt, 2013). In 2016, the authors co-presented RtPtR topics "Ergonomics in Construction and Prevention through Design" at the U.S. Navy's Annual Joint Safety and Environmental Professional Development Symposium (Choi & Borchardt, 2016). Figure 1 depicts the concept of *Research to Practice to Research (RtPtR)* model and continuous improvement process; translating the safety, health & ergonomic (SH&E) knowledge/research findings into the best/good practices (RtP) while completing the loop where practitioners feedback to researchers (PtR).

Figure 1. Research to Practice to Research - RtPtR Model Diagram.

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