

# How Human Factors Complements Engineering at Exponent: Principles and Case Studies

**Dr. Chason J. Coelho**  
Senior Managing Scientist  
Exponent

**Abstract:** Literature suggests that human behaviors contribute to the majority of accidents. For this reason and others, Human Factors is a growing scientific field that addresses how people interact with equipment, products, environments, work controls, other people, and more. Its scope includes, but is not limited to: (a) instructions, warnings, and labels; (b) software and hardware; (c) physical, technological, and cultural variables; and (d) interpersonal communication. In this presentation, I discuss how expertise in Human Factors can be readily applied to various phases of the product lifecycle to help improve product usability and safety. I also explain how Human Factors analyses can be applied to support occupational safety performance and discuss how expertise in Human Factors can complement engineering expertise in a variety of civil litigation cases. Informed by decades of failure analysis and proactive usability and safety experience, the talk includes relatable first principles presented alongside examples and specific case studies in an enlightening, useful, and engaging discussion.

**Bio:** Dr. Chason J. Coelho is a cognitive neuroscientist whose research focuses on human motor control. Dr. Coelho applies a uniquely interdisciplinary expertise in cognitive and physical behavior to issues such as human error prevention, decision making, human reliability, safety in design, human-machine interfacing, warnings and labels, and ergonomics. He addresses these and other facets of human performance in operations, maintenance, and emergency contexts. Dr. Coelho also provides expert analysis and testimony in cases involving premises liability, personal injury, and product liability, among others. He is a Certified Safety Professional, a Certified Fire Investigator, and a volunteer firefighter/EMT. Prior to joining Exponent, Dr. Coelho started his applied professional career as a human factors design engineer supporting the International Space Station Program at NASA Johnson Space Center.