

## Human Factors and Ergonomics Capabilities & Expertise

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### What is Human Factors and Ergonomics?

Human factors and ergonomics is a unique scientific discipline that systematically applies the knowledge of human abilities and limitations to the design of systems with the goal of optimizing the interaction between people and other system elements to enhance safety, performance, and satisfaction. In simpler terms, human factors and ergonomics focuses on designing the world to better accommodate people.

### Capabilities

One of Benchmark's strengths is in our ability to blend technology and psychology. We apply our understanding of human capabilities and limitations to our work, so we can offer solutions that are more acceptable, less costly and require less training and support. Our philosophy is to learn about the target audience to anticipate how new technology will be used and to carefully design the technology to create a safe and ideal user experience.

Our human factors and ergonomics work spans a broad range from safety and physical ergonomics, to user analyses and functional requirements specifications, and to interactions and systems design. Our core skills include knowledge of user testing methods, cognitive psychology and human factors design principles; research techniques such as user modeling, interviewing, and observation; and technical skills such as workstation design, prototyping and graphical user interface (GUI) development.

### Experiences

Benchmark's human factors and ergonomics experience can be divided into five categories:

- Safety
- User Interface Design & Usability
- Physical Ergonomics
- Research

- Training

### *Safety*

Benchmark has experience in several safety areas including accident analysis and evaluation, hazard analysis and risk assessment, safety information development, and litigation support.

In developing safety information, Benchmark uses a comprehensive process to systematically identify, analyze and communicate information about hazards. Such a process allows for the design and development of new safety information or to audit previously developed safety information to minimize wasted time and money, create consistency across product lines, and potentially deal more effectively with future legal issues. Our experiences include making use of codes, regulations, standards, accident data, technical literature, subject matter experts, and potential product users to design warnings, instructions, manuals, safety symbols, and product packaging.

### *User Interface Design & Usability*

Benchmark has experience designing user interfaces and conducting usability evaluations for a wide variety of products in several domains. Our approach is to form a detailed understanding of the target user, anticipate how the product will affect that person, and explore ways to simplify any gaps between the product's offering and the problem the user is trying to solve. Because we understand the strengths and limitations of both the user and the technology, we can explore ways to improve the interaction between them.

Our work has included prototype designs, out-of-the-box experiences (OoBE), expert heuristic reviews, usability testing, and final design specifications. Our design and usability skills have been applied to traditional PC-based software, web-based applications, handheld devices (e.g., two-way digital radios), ultra-mobile PCs, cellular telephones, and medical devices.

### *Physical Ergonomics*

Benchmark has accomplished a variety of tasks involving the design of workstations based upon task analyses and anthropometric requirements and data. Additionally, our staff has applied existing standards (e.g., MIL-STD 1472F, HFDS 2003) to systems of varying complexity. Biomechanical evaluations of handheld systems, ergonomic evaluations of work processes and assessments of cumulative trauma disorders have also been performed.

### *Research*

Benchmark has extensive experience in designing and developing experiments, field studies and surveys, collecting and analyzing data, and generating reports and/or peer-reviewed publications. Topics include warnings, hazard

communication, risk perception, hazard analysis, decision making, wildland fire safety, team training and performance, textual format, drug and nutrition labeling, display design, usability, the Internet, older adults, data collection methods, and distance-learning. Moreover, Benchmark staff has published more than 60 peer-reviewed publications, proceedings, and book chapters on these topics.

### *Training*

Benchmark's training experiences can be divided into three areas: safety information design, development, & evaluation; applied human factors and ergonomics; and wildland fire safety.

Benchmark has experience educating companies and employees about the importance of safety information (i.e., warnings, labels, signs, instructions, manuals, etc.), how to evaluate a company's existing safety information, and providing them with the skills necessary to design and develop safety information independent of outside help. Topics covered include: warnings and product liability; cutting-edge research findings; determining when warnings might be necessary; methods to determine warning content and location; and conformance with regulations and standards.

Benchmark has experience designing training programs that educate company decision makers and employees about the need for good human factors, including providing them with the skills necessary to implement this knowledge. Training topics include: making use of human factors principles when designing products; minimizing the negative impact of human error on complex systems; and user-centered design.

Dr. Braun has been a regular instructor and lecturer for the wildland fire community since 1994. Currently he serves on the faculty of S-520 Advanced Incident Management where he teaches courses on team development and team performance and serves as an informal evaluator of incident management teams completing this course. He is also a regular instructor for Fire Management Leadership (FML), a course for agency administrators, where he teaches a course on fire fighter and public safety. In addition, Dr. Braun has lectured at small district or unit meetings within the US Forest Service and the Bureau of Land Management. These lectures were given as part of orientations, formal trainings (e.g., S-404 Fire Safety Officer) and as part of management leadership conferences. Over the years, he has addressed new employees, firefighters, researchers, management teams and Washington Office staff.

### **About Benchmark Research & Safety, Inc.**

Benchmark Research & Safety, Inc. is a human factors and ergonomics consulting firm that specializes in usability, user-centered design, product safety, warnings, expert witnessing, research (design, ethnographic, perceptual) and training. Incorporated in 2000, Benchmark Research & Safety, Inc. is one of the

few multi-capability firms in the Northwest - headquartered in Moscow, Idaho with branch offices in Boise and Rigby, Idaho; Portland, Oregon; Spokane, Washington; and Grand Junction, Colorado.

**Curt C. Braun, Ph.D.** is the president, CEO, and founder of Benchmark. Dr. Braun has worked in the field of human factors and ergonomics for more than 15 years. Dr. Braun has brought psychological and human factors principles to a variety of industries including aviation, software development, public administration and research, and wildland fire management. In each field, Dr. Braun has worked to identify and shape the psychological and system design factors that promote human performance. Dr. Braun was a professor of psychology at the University of Idaho between 1994 and 2007 where he has taught courses in the design of complex systems, research methods, statistics, and ergonomics. He maintains his connections at the University of Idaho as an affiliate professor of psychology. Dr. Braun holds a Ph.D. in Applied Experimental and Human Factors Psychology from the University of Central Florida.

**Eric F. Shaver, Ph.D.** is a senior consultant with Benchmark Research & Safety, Inc., where he specializes in human factors and ergonomics, usability, safety, applied decision making, and research design & analysis. Dr. Shaver's work has emphasized achieving a good fit between people and technology to facilitate their safety, performance, and satisfaction. Dr. Shaver has extensive experience in performing expert reviews and user testing for consumer technology; developing and evaluating safety information; and designing, administering, and analyzing experiments and surveys for laboratory and field setting research projects. Dr. Shaver is an affiliate assistant professor of psychology at the University of Idaho. Dr. Shaver holds a Ph.D. in Ergonomics Psychology from North Carolina State University.

### Contact Us for Your Next Project

Whether you are planning your next project or looking for assistance with an existing project, we can help. Benchmark's unique combination of perspectives contributes to a human factors and ergonomics solution that you can apply with confidence. Contact us at 877-641-4468 or [info@benchmarkrs.com](mailto:info@benchmarkrs.com).