

Our Human Factors Engineers apply deep knowledge of human behavior, capabilities and limitations to system design to enhance human performance and safety.



BMT is committed to the cost-effective design of equipment, systems, and the workplace environment to minimize human error and optimize human efficiency and safety. The BMT HFE consulting team has extensive experience with the design and evaluation of transportation systems, military and commercial ships, offshore structures, manufacturing facilities, and power generation plants. Specific services that we provide include, but are not limited to, the following:



- **System Design** - Working as an integral part of engineering teams, we integrate human performance and safety considerations into design through drawing review, specification development, analyses such as task and link, HFE specification development and HFE training.
- **Behavioral Research** – We plan and conduct research into human behavior with respect to operation, maintenance, and passenger use associated with operations and the implementation of new technology.
- **HFE Design Standards & Guidance** – We develop HFE, human computer interface (HCI), and human machine interface (HMI) standards that can be used to guide the design of tasks, workflow, equipment, facilities, and systems. We also help interpret HFE design standards to clients' specific needs.
- **Human-Machine Interface Design** – We employ user-centered design processes as we develop Human-Machine Interface (HMI) and Human-Computer Interface (HCI) design specifications that represent both visual and functional design.
- **Human Factors Test & Evaluation (T&E)** – We use techniques such as expert evaluation, observation, questionnaires and interviews, human error analysis, and human performance measurement to perform test and evaluation during all phases of development from conceptual design through operational evaluation and post deployment.
- **Human Error and Injury Risk Analysis** – We apply methodologies like human error failure modes and effects analysis to understand the human error risk associated with equipment, systems, and tasks. We can also apply a BMT developed methodology, Human Engineering and Ergonomic Risk Analysis Process (HEERAP), to identify, analyze, and help mitigate design induced risks of human injury.

Human Factors Engineering Experience

Project Experience

BMT Group has strong and diverse capabilities and experiences in Human Factors Engineering (HFE). We bring to each project a passion for excellence, a commitment to the client's needs, and professional integrity.

- **Human Factors consulting for light rail** – BMT is providing HFE consulting as part of their system safety support of projects to design and implement mechanical gap fillers (MGF) and automatic platform gates (APG) on light rail systems operated by MTR in Hong Kong. This includes HFE assessments of equipment design, HFE studies to assess the impact of technology on passenger behavior, and human error risk analysis.
- **Human injury risk reduction** - BMT developed a methodology called the human engineering and ergonomics risk analysis process (HEERAP) that provides a step-by-step process for human factors and system safety personnel involved in system acquisition to identify, analyze, and categorize human injury risk associated with the existing or emerging system design. The HEERAP provides guidance on developing human injury risk mitigation strategies.
- **HFE program support** – BMT is providing programmatic and technical support to the U.S. Coast Guard acquisition programs. This includes contractor oversight of all ship design efforts; coordinating HFE efforts with those across other elements of HSI (training, manpower and personnel); reviewing and commenting on contractor-prepared HSI products; developing HFE requirements for specification documents and other acquisition documents; and conducting HFE assessments during acceptance and builders trials or prototype testing events.
- **HFE system assessment** – BMT, as part of on-going services to clients, has performed a number of comprehensive HFE design evaluations, including full ships and HCIs. This has included using 3-D CAD models to review complete designs before construction, leading to the identification of over 800 HFE issues and the development of redesign recommendations. BMT personnel are also planning and performing HFE evaluations of a variety of different systems for the U.S. Marine Corps.
- **Standards development** – BMT recently revised *ASTM F1166 Standard Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities*, which is an international standard that provides HFE design criteria for ships, offshore facilities, and marine systems. BMT is currently revising *ASTM F1337 Standard Practice for Human Systems Integration (HSI) Program Requirements for Ships and Marine Systems, Equipment, and Facilities*, which provides guidance on implementing an HSI program; and the *ABS Guidance Notes for the Ergonomic Design of Navigation Bridges*, which provides general ergonomic guidance, specific bridge guidance, and a process for identifying ergonomic requirements for individual vessels.



Larry Avery
Principal Human Factors Analyst
+1 919.713.0383 (office)
+1 919.522.5661 (mobile)
lavery@dandp.com

Christopher Parker
Senior Human Factors Engineer
+1 703.920.7070 ext. 288 (office)
+1 202.277.8444 (mobile)
cparker@dandp.com

Alex Ruttenberg
HFE, Safety & Health Group Manager
+1 703.920.7070 ext. 291 (office)
+1 703.380.4996 (mobile)
aruttenberg@dandp.com