



Introduction to the Human Factors and Ergonomics Society (HFES) and the field of Human Factors and Ergonomics (HF/E)

Technological advancement has the power to improve quality of life, national security, accessibility to public and private services, and productivity. To be effective, safe, and practical, human factors and ergonomics (HF/E) is needed to better understand the relationship between technology, humans, and the environment. For over 50 years, the U.S. federal government has funded scientists and engineers to explore and develop. Originally stemming from urgent needs to improve the performance of humans using complex systems such as aircraft during World War II, the field of **human factors and ergonomics (HF/E)** works to develop safe, effective, and practical human use of technology, particularly in challenging settings. HF/E does this by developing scientific approaches for understanding this complex interface, also known as “human-systems integration.” Today, HF/E is applied to fields as diverse as transportation, architecture, environmental design, consumer products, electronics/computers, energy systems, medical devices, manufacturing, office automation, organizational design and management, aging, farming, healthcare, sports and recreation, oil field operations, mining, forensics, and education.

With increasing reliance by federal agencies and the private sector on technology-aided decision-making, HF/E is vital to effectively achieving our national objectives. Federal research for HF/E is embedded in agency missions, most prominently at the Department of Defense, the Federal Aviation Administration, the Department of Labor, the National Aeronautics and Space Administration, and the Food and Drug Administration. But the field also contributes to advancing fundamental scientific understanding of the interface between human decision-making, engineering, design, technology, and the world around us through research funded by the National Science Foundation and the National Institutes of Health. The reach of HF/E is profound, touching nearly all aspects of human life from the health care sector, to the ways we travel, to the hand-held devices we use every day.

The Human Factors and Ergonomics Society (HFES) is a multidisciplinary professional association with 4,500 individual members worldwide, including psychologists and other scientists, engineers, and designers, all with a common interest in creating safe and effective products, equipment, and systems that maximize and are adapted to human capabilities.

P.O. Box 1369, Santa Monica, CA 90403-1369, USA
310/394-1811 • Fax 310/394-2410
Email: info@hfes.org Web site: <http://www.hfes.org>

March 10, 2017

Human Factors and Ergonomics Success Stories

The examples below are provided by members of the Human Factors and Ergonomics Society (HFES), and demonstrate significant improvements due to the application of our science to the design of products and systems.

1. Federal Aviation Administration human factors research personnel participated in the evaluation of a proposed program of standardized training for pilots flying Mitsubishi MU-2 turbo-prop airplanes. Implementation of this program subsequently **reduced the accident rate by 80%**.¹
2. The County of Monterey in California launched a new ergonomics program that has saved an average of \$16.56 in workers' compensation and lost work time costs for every \$1 invested over a 3-year period, **leading to more than \$8.3 million dollars of savings** in projected claims costs.²
3. Based on human factors expertise and research, the National Highway Traffic Safety Administration, U.S. Department of Transportation, developed and evaluated the center high-mounted brake light. This rear light, now required on all autos and light trucks, **reduces rear-end crash injury and deaths by an average of 7% per year**.³
4. Based on human factors expertise and research, the Federal Highway Administration, U.S. Department of Transportation, found that implementing high-intensity activated crosswalks **reduced total crashes by 29% and pedestrian-vehicle crashes by 69%**. Also showing positive effects for pedestrian and bicycle safety were the implementation of shared-lane markings for bicycles and transverse markings for crosswalks.⁴
5. Based on the science of human factors and ergonomics, Honeywell developed and implemented a company-wide ergonomics program that **led to \$2 million in both direct and indirect cost savings**, including zero repetitive-strain, musculoskeletal injuries and a **24% improvement in worker productivity**.⁵
6. At the George Wahlen VA Medical Center, human factors engineers reduced central-line blood stream infections, which have a 20% mortality rate, by creating a kit based on human factors design principles. This resulted in a **reduction in incidents from 0.9/month to zero/month**.⁶

¹ Federal Aviation Administration:

http://www.faa.gov/aircraft/air_cert/design_approvals/small_airplanes/cos/mu2_foia/media/MU-2%20Final%20Dec%2030%202005%20with%20errata.pdf

² County of Monterey in California:

<http://www.co.monterey.ca.us/personnel/safetyandergo/ergonomics/pdf/2009%20HFES%2021st%20century%20eprint%20article%20with%20permission.pdf>

³ Kahane, C.J., and Hertz, E. (1998). The long-term effectiveness of center high mounted stop lamps in passenger cars and light trucks. NHTSA Technical Report Number DOT HS 808 696.

⁴ Fitzpatrick, K., Chrysler, S. T., Van Houten, R., Hunter, W.W., and Turner, S. (2011). Publication No. FHWA-HRT-11-039.

⁵ Budnick and Osborne, (2012, Feb) Evolution of an Ergonomics Process Success Story, in *The Ergonomics Report™*.

⁶ Drews, F., Adherence engineering to increase protocol adherence. *Ergonomics in Design*, manuscript submitted for publication.