

Simulating Humans: Ergonomic Analysis in Digital Environments

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The design of workplaces and products continues to migrate from paper to the computer, where analyses accuracy, visualization and collaboration utilities allow designs to be realized much faster and better than ever before. As the pace of this development accelerates with the increased capabilities of the software design tools, less time is spent on physical prototyping, allowing for shortened time to market for new products. Ergonomists, who in the past used the physical prototypes to perform human factors analyses, are now challenged to move the analysis into the virtual domain, using new tools and methods. Usability, maintainability, physical ergonomic assessments, psychological perception, and procedural training comprise some of the human factors issues that might benefit from analysis prior to the first physical incarnation of the design. While this represents a challenge for the ergonomists, it provides an opportunity to affect change in the designs much earlier than was typically possible in the past, and to take advantage of the dramatically reduced cost of design alterations in the early design phases. Commercial pressures that leverage the cost benefits offered by complete “in tube” design are driving a rapid development of the available computer technologies. Human simulation technology is no exception. Contemporary human modeling software is assimilating a variety of human modeling knowledge, including population anthropometry descriptions and physical capability models. Companies are deploying these human modeling products to allow their ergonomists and designers to efficiently populate digital representations of products and workplaces with virtual human figures, and ask meaningful questions regarding the likely performance of actual people in those environments. Identification of ergonomic design problems early in the design phase allows time-consuming and expensive re-working of the manufacturing process of design to be avoided.

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