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Delmia SAFEWORK®Pro™ : Human Modeling

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DELMIA SAFEWORK® Pro™ - HUMAN MODELING

THE NEED

In the demanding global marketplace, ensuring that human fit, form and function are comprehensively addressed is becoming an increasingly important aspect of design. Manufacturers and designers strive to develop products that conform to all relevant Health and Safety standards and are "user-friendly" while still maximizing the productivity of their own workforce. Digital human modeling technology can assist a designer to determine the performance of people in the context of a workplace or a product before it exists and throughout its entire lifecycle.

THE TECHNOLOGY

SAFEWORK'S accurate manikin has the highest number of Anthropometric Variables (104), Segments (99) and Degrees of Freedom (149). It also has fully articulated spine & hand models as well as joints with coupled range of motion. Moreover, it's unique Multivariate Algorithm for anthropometry allows the user to create accurate virtual humans from almost anywhere around the world. Finally, SAFEWORK'S unique Boundary Mannequin Approach is essential for a better accommodation of targeted population. Other powerful SAFEWORK® features include: Postural Analysis, Ergonomic Analysis, Force and Comfort Assessment, Task Module, Clothing Module, Animation Module, Collision Detection, Vision, Library concept, direct and inverse kinematics and more.

HUMAN ACTIVITY ANALYSIS

SAFEWORK® Pro™ has been designed to evaluate all elements of human performance, from static posture analysis through to complex task activities. SAFEWORK® Pro™ possesses a range of tools and methods that specifically analyze how a manikin will interact with objects in the virtual environment. The NIOSH 81/91 and SNOOK&CIRIELLO equations measure the effects of lifting/lowering, pushing/pulling and carrying to fully optimize task performance. After inputting an initial and final task posture, a designer can determine a number of task variables such as Action Limit, Recommended Weight Limit, and Maximum Lifting/Lowering Weight.

VISION ANALYSIS

The SAFEWORK® Pro™ Vision Module, derived from the NASA 3000 Guidelines, contains an accurate vision behavior model to imitate the realistic movement of the human vision so that "what the manikin sees, the operator sees..." Four types of vision simulation are provided: binocular, ambinoocular, monocular left and monocular right (stereoscopic viewing with advanced depth perception, is available in the Virtual Reality Module). Visual characteristics are displayed as peripheral cones, central cones, blind spot cones and central spot cones that permit the user to gain an insight into the manikin's view.

POSTURAL ANALYSIS

The SAFEWORK® Pro™ Postural Analysis Module permits users to quantitatively and qualitatively analyze all aspects of manikin posture. Whole body and localized postures can be examined, scored and iterated to determine operator comfort and performance in accordance with any established comfort database. User-friendly dialogue panels provide posture information for all segments of the manikin, and color-coding techniques allow for quick identification of problem areas and positioning of the manikin in an optimized posture.

VIRTUAL REALITY

The use of a Virtual Reality environment in ergonomics can evaluate a design through virtual mock-ups, which is much less costly than traditional mock-ups. These VR simulations have industrial applications either in the design (for example, a car dashboard) or in the manufacturing processes (to evaluate safety, operability or maintainability of a production line). All applications share the need for an articulated virtual manikin controlled by a set of motion capture devices placed on a human subject. These applications allow a "virtual immersion" where the goal is to recreate the "look and feel" of a complete environment with accuracy.

THE BENEFITS

- Earlier introduction of human factors into the design process
- Improve accommodation of target population
- Reduce the number of physical prototypes
- Reduce design timeframe and associated costs
- Accelerate time to market - Improve employee satisfaction
- Improve overall product quality
- Increase productivity

STATUS

The sales information on SAFEWORK® such as pricing, appropriate products and services, etc. is available through SAFEWORK Web site. SAFEWORK® 's detailed human models can be generated and used in Delmia's manufacturing simulation programs. Likewise, integrated product design solution, CATIA V5 R6, will allow users to combine the superior human modeling capabilities of SAFEWORK® with the CATIA product design tools to provide total design lifecycle human modeling.

BARRIERS

It is difficult to estimate quantitative benefit of SAFEWORK application in actual construction projects due to the characteristics of safety. While SAFEWORK has been applied to many manufacturing processes, there is not an actual application case in construction area. The development of detailed methodology of application in construction operations should be followed.

POINTS OF CONTACT

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REFERENCES

Delmia Web Site <http://www.delmia.com>

SAFEWORK Web site <http://www.safework.com>

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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PUBLISHER

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