Process Detailing & Validation

HUMAN™

Total Design
Lifecycle
Human
Modeling

DELMIA

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Total Design Lifecycle Human Modeling

DELMIA Human™ is a powerful human modeling tool used to create, validate, and simulate advanced user-defined digital human manikins, "workers" in the DELMIA DPM environment for human interaction and worker process analysis early in manufacturing process.

The Human Solutions Advantage

By integrating the Human Solutions into its digital manufacturing environment, DELMIA ensures that Human Factors become an intuitive component in the manufacturing design process.

- ***Introduces Human Factors into the product lifecycle earlier***
- ***Ensures conformance to relevant health and safety standards***
- ***Accelerates time-to-market***
- ***Reduces design timeframe and associated costs***
- ***Improves employee satisfaction***
- ***Optimizes workplaces and work cell design***
- ***Increases productivity***

DELMIA's Best in Class Human Solutions

Manufacturing organizations around the world continue to design and develop machines, vehicles, and products that are capable of performing better, faster, and longer. An increasingly important design consideration is to ensure that these technological innovations are being designed from the perspective of the people who actually build, maintain, and operate them. From a factory worker to an aircraft pilot—today's manufacturers must consider these Human Factors (HF) early in the product life cycle.

Human Factors: *Maximizes human comfort, safety, and performance and analyze manikin interaction in the virtual environment.*

DELMIA's Human Solutions, fully integrated into the DELMIA Digital Process for Manufacture (DPM) solutions, provides such organizations with a suite of human simulation and HF tools specifically geared towards understanding and optimizing the relationship between humans and the products they manufacture, install, operate and maintain.

To ensure competitiveness in the global marketplace, manufacturing organizations are becoming increasingly aware of the value in designing manufacturing facilities specifically geared to the skills and limitations of the local workforce. Ensuring that employees are used to their maximum potential—in a safe, ergonomically efficient environment—can be determined by combining DELMIA's extensive Human Solutions portfolio with an organization's human factors 'know-how'.

People are Important

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 in determining the performance of people in the context of a workplace or a product before it exists and throughout its entire lifecycle.

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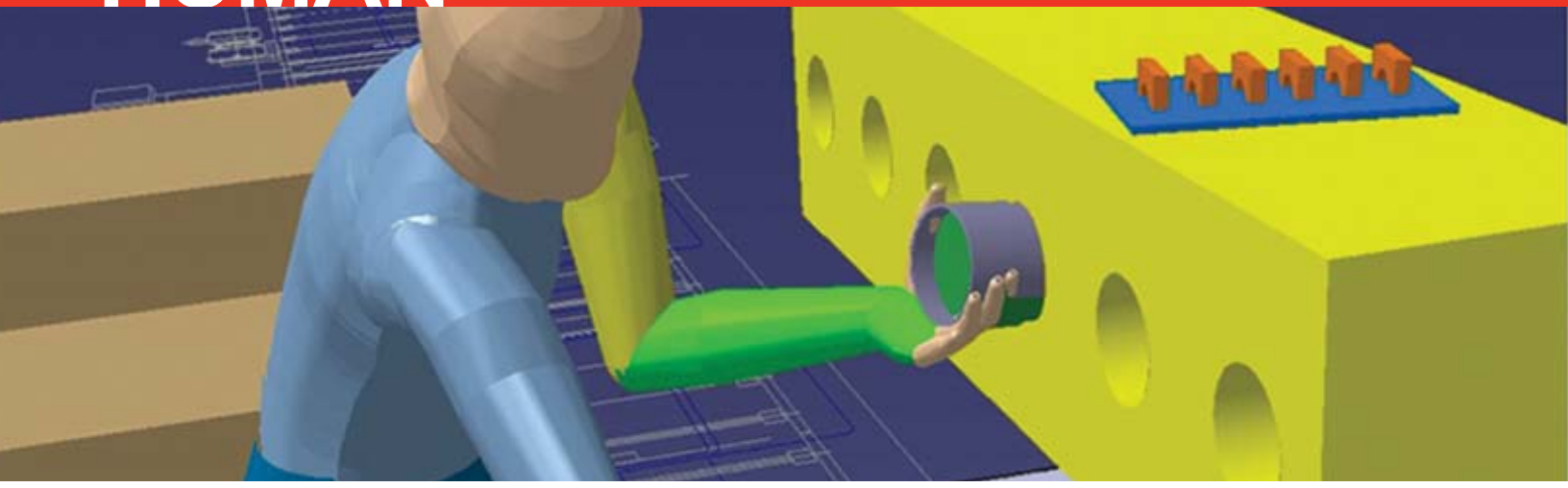


Total Design Lifecycle Human Modeling

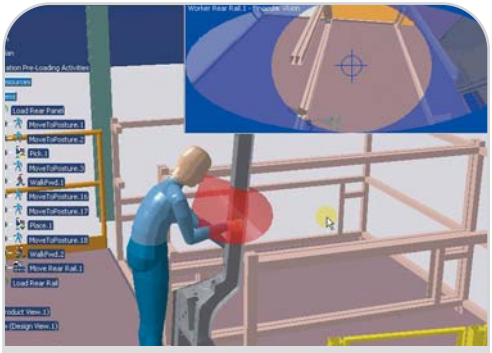
Creating and developing products based on the capabilities and limitations of people is not a new concept. Human Factors (HF) Engineering has proven that every stage of a product lifecycle has a common component—people. People who manufacture, people who install, people who operate, people who maintain.

Plan, Define and Validate

The DELMIA Human solutions are fully integrated into the DELMIA DPM solutions. This seamless integration provides an intuitive component in the design process, truly supporting the concept of user-centered design. In recognition of the varying requirements of an organization, DELMIA has specifically designed and packaged the Human Solutions to ensure that the appropriate amount of technology is placed on each user's desktop.

Human Builder

Human Builder permits the intuitive creation and manipulation of accurate standard digital human for initial worker-product interaction analysis. Human Builder offers a user-friendly interface and ensures that first level Human Factors studies can be undertaken by non-Human Factors specialists. Simple pull-down menus are used to create male and female standard manikins (Name, Gender, 5th, 50th, 95th percentile). The sophisticated manikin structure consists of 99 independent links, segments and ellipses. In addition, the manikin possesses fully articulated hand, spine, shoulder, and neck models to accurately reproduce natural movement, which includes seven default Inverse Kinematics for manikin motion. The DELMIA Human Manikin is interactively positioned using the compass, or by selecting objects to be reached. Direct kinematics manipulators can be employed to accurately "fine tune" manikin posture by manipulating individual segments in each degree of freedom.



See what they see: *Visual characteristics are displayed as cones that permit the user to gain an insight into the worker's view of the operation or task.*

Manikin vision assessment permits a designer to understand what an operator or maintainer would "see" in a task environment. A separate vision window displays the vision field from the manikin perspective to assess visual disability or limitations.

Solutions for Human Factors Specialists

The complete DELMIA Human Solution offers Human Factors Specialists, Maintenance Engineers, Manufacturing and Assembly Engineers from the aerospace, automotive, plant design, heavy engineering, shipbuilding and electrical goods industries advanced ergonomic analysis tools to:

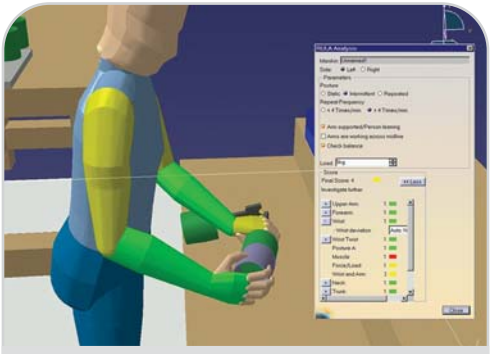
- ***Reduce the cost of Human Factors analysis by reducing physical prototypes***
- ***Evaluate entire target population during accommodation analysis***
- ***Utilize a comprehensive set of task analysis tools***
- ***Conform to civilian and military Human Factors Standards***
- ***Address maintainability issues early in the product lifecycle***
- ***Create and manipulate advanced, user-defined digital human manikins***

Human Task Simulation

DELMIA Human Task Simulation is a powerful human modeling tool used to create, validate, and simulate activities for "workers" using the DPM planning and simulation infrastructure. Workers perform these activities within the PPR environment where they may walk to a specific location, move from one target posture to another, following the trajectory or path of an object and pick and place parts in the work area.

Users can also establish part relations to constrain specific segments of the worker to parts or tools in its environment. Position constraints are also stored from selected segments to selected 3D objects in the environment. Those constraints are subsequently solved to update the posture the next time the activity is modified.

Human Solutions can be combined with DELMIA's DPM Assembly to analyze the relationship between workers and other entities within the simulation. They can be simulated and validated using the powerful process simulation capabilities within DPM, allowing the user to test multiple alternatives for the work humans must accomplish in a specific manufacturing, maintainability and assembly environment.



Quick, intuitive analysis of arm position: *Rapid Upper Limb Assessment (RULA) is used for intuitive analysis of upper limb posture*

Human Activity Analysis

Human Activity Analysis allows the user to maximize human comfort, safety, and performance through a wide range of advanced ergonomics analysis tools that comprehensively evaluate all elements of a humans interactions with a workcell. DELMIA's advanced human activity tools specifically analyze how a worker will interact with objects in the virtual environment. Users can accurately predict human performance, ensuring conformance to factory standards and maximizing performance. DELMIA Human Activity Analysis includes a wide range of ergonomics tools for analyzing worker performance such as:

- ***Analyzes lifting, lowering, and carrying tasks using the NIOSH 81 and 91 equations***
- ***Evaluates push and pull tasks using the SNOOK and CIRIELLO equations***
- ***RULA for arm position*** *assessment* ***, with the ability to customize RULA specifications***

Easily Create & Validate your Workforce

A user-friendly interface ensures that 'first level' human factors studies can be undertaken by non-human factors specialists.

- ***Manikin generation***
- ***Gender specification***
- ***Percentile specification***
- ***Manikin manipulation technique***
- ***Reach envelope specification***
- ***Advanced vision simulation***
- ***Pick, Place and Walk Activity Analysis***

Human Posture Analysis

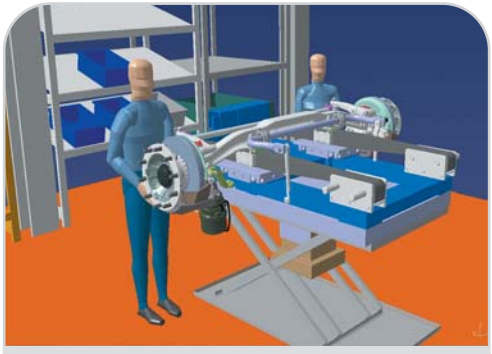
Human Posture Analysis permits the user to quantitatively and qualitatively analyze all aspects of worker's posture. Whole body and localized postures can be examined, scored and iterated to determine worker comfort and performance when interacting with the product in accordance with published comfort databases.

User-friendly dialogue panels provide postural information for all segments of the manikin and color coding techniques ensure that problem areas can be quickly identified and iterated to optimize posture. Human Posture Analysis allows users to create their own specific comfort and strength library for the needs of each individual application.

- *Provides lock/unlock Degrees Of Freedom*
- *Displays, defines and manipulates joint limits in terms of comfort, strength and precision*
- *Scores postures according to the preferred motion zones*
- *Finds best posture automatically*
- *Supports published comfort databases for postural analysis*
- *User defined comfort and posture databases*

Human Measurements Editor

Human Measurements Editor allows the creation of advanced, user-defined manikins via a suite of advanced anthropometry tools. Manikins can then be used to assess the suitability of a product or process against its intended target audience.



Seamless Integration: *Add Human Factors into the DELMIA DPM environment for dynamic simulation and analysis of human-product-process interactions.*

Upon user input of appropriate critical design variables, a multi-normal statistical algorithm automatically adjusts all other anthropometry variables to create manikins that exist within the target population. This unique "boundary" manikin technique ensures that designers accommodate their entire target population using a minimum number of manikins. The intuitive Graphical User Interface permits designers to analyze the functional relationships between anthropometry variables. In addition, the user can define task-related critical values for detailed investigation while Human Measurements Editor determines the values for remaining variables.

Variables for a "Global" Human

DELMIA Human Solutions address a global target audience by providing a number of individual anthropometry databases. Designers can analyze for target audiences in America, Europe and Asia, and adjust all other anthropometry variables to create manikins that exist within the target population.

- ***Users can customize all manikin anthropometric variables for user-specific human modeling***
- ***104 anthropometric variables (dimensions)***
- ***Supports annotations on anthropometric variables***
- ***Manages anthropometry library directly from a dedicated toolbar***
- ***Creation of user-specific anthropometry databases***
- ***Permits the creation of geography-specific anthropometry databases***

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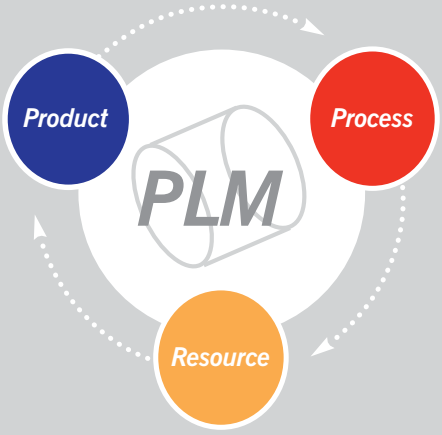

Human & the PPR Hub for Manufacturing

The Product-Process-Resource data collaboration system, called the PPR Hub for Manufacturing, is a unique data model that provides the storage and management of all product, process, and resource information required throughout the product lifecycle. The PPR model is at the heart of Dassault Systemes' Product Lifecycle Management solutions, ensuring the integration between CATIA, ENOVIA, SMARTEAM and DELMIA. CATIA provides the product solution; DELMIA provides the process and resource solution; and ENOVIA & SMARTEAM provide the lifecycle applications and decision support tools.

DELMIA's entire digital manufacturing portfolio offers complete integration with the PPR data system which allows companies to share their best practices and ensure everyone has access to the right information, at the right time

The DELMIA Digital Manufacturing Solutions

DELMIA's portfolio of digital manufacturing solutions are categorized in three distinct domain suites, based on how the impact the flow of the manufacturing process. Each domain employs a set of tools that steps through the entire manufacturing process from concept to implementation.

Process Planning

Provides a comprehensive process and resource planning support environment. The resulting process diagrams can provide a clear overview of the sequences and links between processes and resources early in product design conception.

- *Layout Planning*
- *Time Measurement*
- *Process & Resource Planning*
- *Product Evaluation*
- *Cost Analysis*

Process Detailing & Validation

Employs the structure and diagrams of the Process Planning solutions into the application specific disciplines of manufacturing. Verify process methodologies with actual product geometry and define processes to a greater level of detail within a 3D environment.

- *Manufacturing and Maintenance*
- *Weld Point Allocations*
- *Assembly Sequences*
- *Factory/Cell Layouts*
- *Machining Operations*
- *Workforce Performance and Interactivity*

Resource Modeling & Simulation

Provides a comprehensive process and resource planning support environment. The resulting process diagrams can provide a clear overview of the sequences and links between processes and resources early in product design conception.

- *Factory Flow Simulations*
- *Robotic Workcell Setup and OLP*
- *NC Machining*
- *Virtual Reality Scenarios*
- *Ergonomic Analysis*

TECMES

MAIS INFORMAÇÕES:
Para obter mais informações sobre DELMIA e outros produtos e soluções PLM, acesse: www.tecmes.com.br
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