BETA
SIMULATION SOLUTIONS

physics on screen

Human Body Models alive

ANSA
PRE PROCESSOR

Innovative, efficient, and effective ANSA tools for Human Body Models

ANSA's Crash & Safety pre-processing tools are bolstered by revolutionary capabilities for the handling of Human Body Models (HBM). HBMs are articulated interactively to instantly achieve multiple postures, while HBM variant types can be built with ANSA-morphing based technology, to meet the needs for safety simulation of models with different Body Mass Indices (BMIs). Moreover, custom bicycle model variants can be configured to address bicyclist's safety vulnerability.

Articulation & Positioning

ANSA's revolutionary HBM Articulation tool allows for precise, real-time positioning and articulation during pre-processing for all currently available HBMs, by employing the robust ANSA's morphing and Multibody Dynamics technologies. Additional advantages of the tool include:

- Compatibility with all currently available HMBs variants.
- Instant positioning inside ANSA, even for highly detailed HBMs.
- Straightforward, intuitive user interface design.
- User-centered approach in positioning methods, with direct numerical values input for precise positioning, or interactive joint articulation.
- Biofidelic positioning, driven by continuously developed metadata files that are available by BETA, upon request.

Model variants

ANSA can generate HBM variants, with its under incessant development state-of-the-art tool, which addresses the need for expanding the current range of HBMs, by adjusting their BMI and anthropometry. The tool combines ANSA's morphing and meshing capabilities with a user-friendly interface to effortlessly create new variants.
Realistic, smoothly meshed variants are produced, having proportionally modified subcutaneous fat deposits and internal organ structures.

No prior knowledge of any complex morphing and meshing techniques is required for obtaining optimal results, deeming the tool particularly user friendly and straightforward.

Bicycle configurator

ANSA's Bicycle Configurator taps into HBMs' full potential for providing Vulnerable Road User (VRU) safety. Weighting heavily on the latest accident studies to pinpoint all injury factors during accidents, a user interface has been designed that accommodates the near real-time variation of a reference city bike meshed model. Some of the tool's features for optimal results, are:

- User-friendly interface and self-explanatory layout, featuring a 2D-bike illustration for parameters visualization.
- Direct adjustment of bicycle dimensions to the size of an established HBM variant type, or tailor-made bicycle model set up.
- ANSA's robust and state-of-the-art morphing techniques for high quality meshed models.
- Modification of a wide range of city bike configurations, in terms of stack and reach distance, seat height, and crank's degrees of rotation.

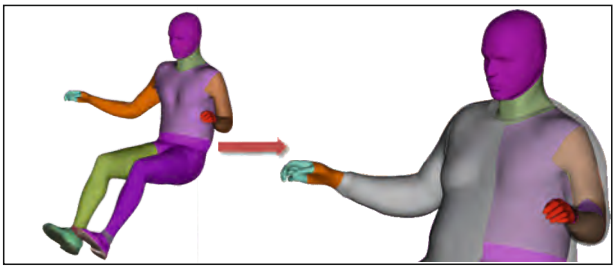
A reference city bike model file is available by BETA, upon request.

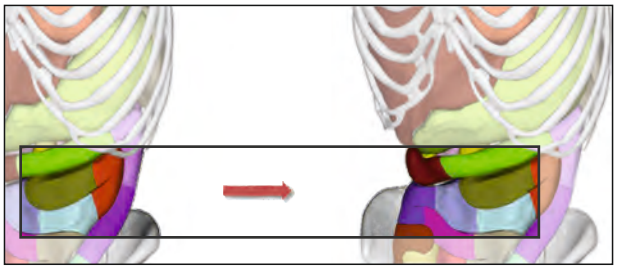
Features

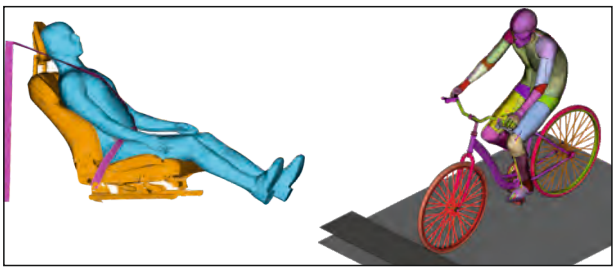
- Heavily research-based tools
- HBM articulation & positioning
- Parametrized bicycle configurator
- HBM variants generation
- Intuitive user-friendly interface
- User-centered positioning methods
- Advanced morphing techniques
- Integrated Multibody Dynamics solver

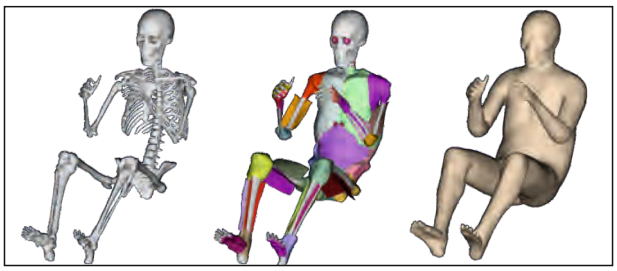
Benefits

- Skip pre-simulation with instant HBM articulation
- Accurate, biofidelic HBM positioning
- Occupant and Pedestrian posture definition
- VRU safety for pedestrians and cyclists
- Effortless, parametrized bicycle geometry modification
- HBM diversification with BMI and athropometry adjustment









META
POST PROCESSOR

Detailed Safety studies with META tools for Human Body Models

META's complete range of 2D and 3D post-processing capabilities, its unrivalled ease of extracting and automatically creating result reports, and advanced special calculation capabilities, power the Human Body Models (HBM) Post and Occupant Injury Criteria tools. Both tools support all LS-DYNA, PAM-CRASH and RADIOSS file formats, and can be run interactively or in batch mode, to reduce result extraction time to a minimum.

Reports generation

META's HBM Post tool effortlessly generates well structured, detailed reports in pptx or pdf format for complete HBM or for separate body model regions. All these reports provide crucial information about injury risks, and are embellished with a plethora of visual and quantitative results including:

- Full body or body region animations of HBM kinematics.
- Strain contour plots and high-quality depictions of skeletal or internal organ deformation.
- Element erosion identification of bony structures and ligaments.
- Advanced and customized injury criteria calculations for each HBM type.

Reliable injury prediction

META's HBM tools continuously undergo development to be on par with the latest research findings. Acknowledging Industry's needs, particular care is taken to keep up with the latest on the calculation of Brain Injury, the Ribcage fracture probability, and various organ failure criteria.

Brain injury calculation

The HBM Post tool calculates the brain Cumulative Strain Damage Measure. Brain Major Principal Strains can also be reported by identifying varying percentile values of the corresponding brain tissue elements.

Ribcage fracture probability calculation

The Ribcage fracture probability can be calculated for each individual rib and for multiple ages by applying user-determined, age dependent calculation parameters or user-defined statistical distributions.

Organ failure prediction

The Strain Energy Density Criterion is calculated for soft tissue abdominal organs, providing a complete overview of potential injuries.

Occupant Injury Criteria

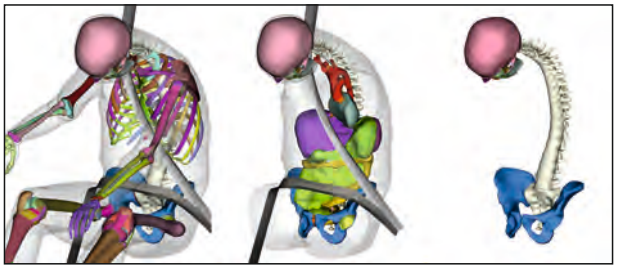
META's Occupant Injury Criteria tool extracts time history results for HBMs with unparalleled ease. The tool computes all standardized ATD injury criteria for HBMs, while allows results comparisson for multiple occupants of both types, HBMs and ATDs, simultaneously in each run.

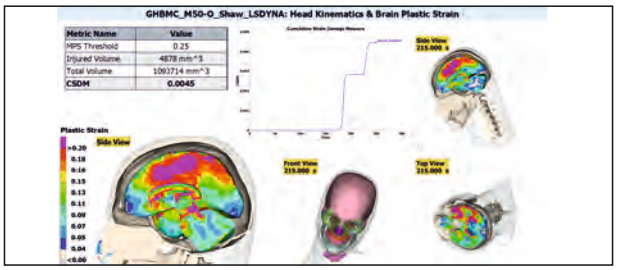
Features

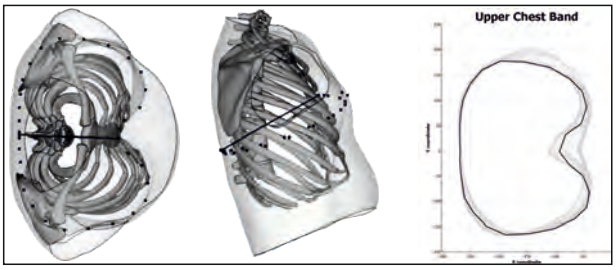
- Brain injury calculation (CSDM, HIC)
- Ribcage fracture probability calculation
- Internal organ injury prediction (SED Criterion)
- High-quality, eye-catching infographics
- Ready-to-use presentation templates
- Support of LS-DYNA, PAM-CRASH and RADIOSS file formats

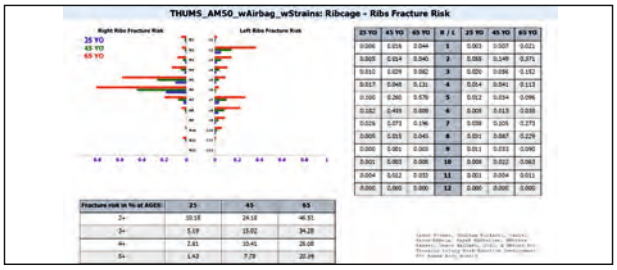
Benefits

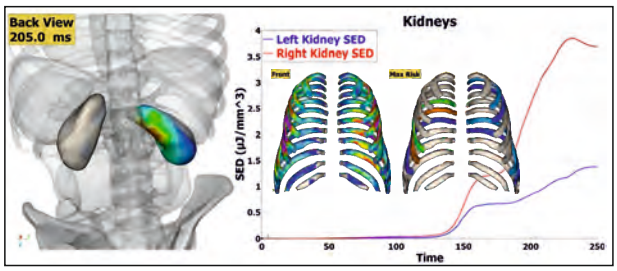
- Injury prediction based on the latest knowledge in the field
- Effortless, automated result extraction, in interactive and in batch modes
- Fast and informative report creation, dramatically reducing post-processing time
- Supported Human Body Models and ATDs comparison

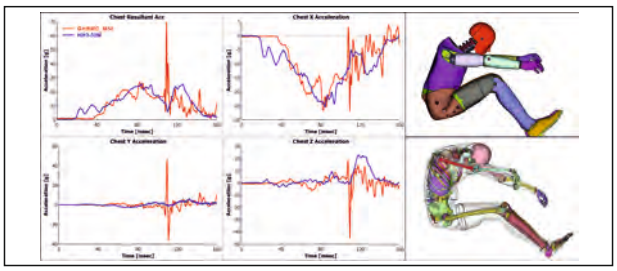












BETA
SIMULATION SOLUTIONS

physics on screen

www.beta-cae.com