

Platinum Express Spare Parts Program

In response to worldwide customer feedback, Humanetics has recently introduced a new Platinum Spare Parts Program in an effort to enhance immediate component availability for ATD end-users on select high demand ATD spare parts.

Over the past few years, Humanetics has consistently reduced delivery times on the most frequently requested spare parts. However, the Platinum Express Program takes it to the “next plateau”, offering a new level of service for the most utilized spare parts that can ship from our North American manufacturing facilities by the end of the next business day. Currently, customers can select express shipment options to guarantee specific delivery based on their unique level of urgency and worldwide location.

To support the customer’s spare parts delivery expectations, Humanetics has increased its manufacturing capacity, improved demand forecasting and increased inventory levels for frequently used spare parts. These efforts have played a significant role in building sufficient stock levels to support our customers worldwide.

The focus of the new Platinum Express Spare Parts Program is to service our global customers who have emergency or urgent needs with an immediate turnaround for minimal quantities of spare parts. The Program offers 24-hour business day shipments from Humanetics’

North American manufacturing facilities for approximately 350 listed spare parts. These parts can be ordered worldwide but may take longer to reach customers worldwide, depending on selected delivery options and availability. The list of components can be found on www.humaneticsatd.com and has been generated from a 3 year historical analysis of sales from both regulated and future regulation test dummies. With market shifts and newly released Harmonized dummies, the program’s component mix is subject to change.

To be able to serve the immediate needs for all global customers, it is recommended that orders are limited to a few pieces of the same component. Customers must contact their regional sales offices for immediate delivery arrangements of this newly created Platinum Spare Parts Program.

“We are excited that we can further support our customer’s needs for highly urgent components by offering this new program.”, said Michael Jarouche, Vice President for Global Sales and Marketing. “Customers have continually requested quicker turnarounds and emergency part availability, and we are glad we can now offer them a solution.”

BIORID
CERTIFICATION
ELDERLY ATD

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New

GEN-X BIORID CERTIFICATION

To reduce the severity and frequency of injuries caused by rearward displacement of the head (whiplash), the first phase of Global Technical Regulation No. 7: Head Restraints (GTR No.7) was implemented in 2008. Part of the second phase of the Rule's development is to evaluate the use of the BioRID rear impact dummy and to establish the injury criteria. This final development of Phase II by the informal working group is wrapping up and expected to be complete in 2016.

In evaluating the BioRID II dummy, efforts have been made to improve its repeatability and reproducibility by creating new certification tests; these include buttocks and jacket impact tests as well as a sled test with head and backrest (Gen-X). These new certification tests were deemed necessary to identify critical elements for the dummy's reproducibility. Spine bumper materials have also changed and new manufacturing controls have been



put into place to improve their reproducibility as well.

All three new tests are conducted using the existing mini-sled. For the jacket and buttocks, impact mounting fixtures are now available; the parts are impacted by a pendulum. Criteria related to compression, sled acceleration and pendulum force have been established. The Gen-X test also uses the existing mini-sled but sled seatback and headrest are added to introduce deformations in the spine, which are realistic for seat tests.

The new tests will better identify stiffness changes to the silicone jacket and vinyl foam pelvis to give a more precise evaluation of the spinal bumper performance. The hardware and tests are currently being evaluated in test labs and will be presented for adoption in the next vote for the Phase II amendment to GTR No. 7. New certification kits will be made available for purchase to perform all of the Gen-X certification tests in the near future.

Mark Brown

ELDERLY ATD :: First Generation ::



Are there special considerations for the elderly population of automotive drivers when it comes to safety? Are injuries sustained by young victims in automobile accidents comparable to those sustained by those of advanced age? These questions are often raised by the auto safety industry with the objective to maximize occupant safety despite of the differences in ages and sizes.

Humanetics has embarked on a project to realize an ATD design to reflect the anthropometry of an elderly 70 year old

small female driver by using research conducted by the International Center for Automotive Medicine (ICAM) and the University of Michigan Transportation Research Institute (UMTRI). Utilizing an external shape provided by UMTRI, some hardware cues from the small female WorldSID coupled with a newly designed organ system concept, the Elderly Dummy will allow more precise measurements of internal injuries sustained in automotive accidents for this specific demographics.

A body of research has shown that Elderly victims are more likely to sustain internal injuries during certain crash scenarios. To construct an ATD that can take more exacting internal measurements, a new thorax and abdomen design is necessary. This design involves the creation of organ sacs that contain movable and compliant organs that can react to the stresses placed upon them during high speed impacts. Load cells, pressure sensors, and accelerometers are used to take

measurements. Once organs such as the spleen, intestines, and liver are placed within the organ sac, a simulated fat layer is affixed over the entire torso to better mimic the stratified body flesh. A flexible spine, movable rib cage and floating shoulders provide the supporting structure of the ATD. A neoprene jacket similar to the WorldSID jacket provides the outer covering for the torso.

The first Alpha prototype will be ready for matched pair Post Mortem Human Subject (PMHS) testing with The Ohio State University in the first half of 2016.

Mark Brown

elderly

Harmonized H305 Euro NCAP V1.0 FE Model



The harmonized Hybrid III 5th Euro NCAP compliant FE dummy model is currently under development. It is required that the harmonized SAE jacket for the Hybrid III 5th dummy is used during regulatory testing by Euro NCAP. Additional Euro NCAP requirements include passing of both the lower and higher speed thorax pendulum certifications.

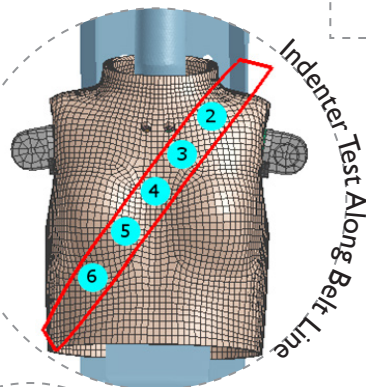
The main focus of this model development has been placed on the accuracy of the thorax performance. Global certification validation of the model is currently inefficient due to lack of representation of real-world loading scenarios. A new set of tests are conducted to reflect more realistic loadings to the thorax from the restraint signals to improve the thorax overall performance.

An example of such loading case is the aggressive pretension performance of the dummy thorax. To improve the correlations of the chest during a relatively smaller magnitude of chest deflection at a faster impact rate, tests were conducted in collaboration with Ford Motor Company with the thorax fixed at the spine-box. The thorax component setup mimics the vehicle or sled setup with the exception of the fixed belt at the buckle-end. The illustrations of the fixed thorax setup for the pretension only loading are shown below.

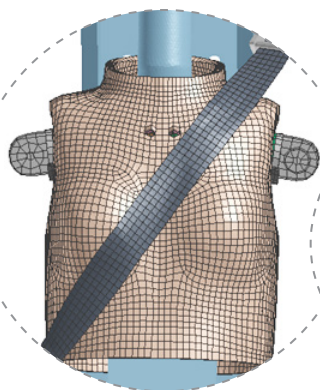
In addition, a set of data was obtained to validate the harmonized Hybrid III 5th model by using the indenter to evaluate localized chest deformation along the belt routing line. The thorax was segmented in a total of five regions, with the impactor loading the chest along the typical belt routing line as shown. Real-world data from the NHTSA crash database was used to obtain a displacement profile that simulates real-world chest deflection characteristics.

The updated Hybrid III 5th FE model is expected to perform significantly better than predecessor with the current development efforts and is expected to be available in the first quarter of 2016.

Chirag Shah



Pretension Tests



THOR-05F 5th Small Female ATD



Humanetics has recently come to an agreement with National Highway Traffic Safety Administration (NHTSA) to expand the THOR (Test device for Human Occupant Restraint) dummy-line and develop a small 5th percentile female dummy based upon the THOR-M ATD design. The THOR advanced frontal 50th percentile male ATD (THOR-50M) has improved biofidelity, measurement, and injury prediction capabilities compared with older dummies, and these improvements are expected to carry over to the THOR 5th female (THOR-05F) design.

According to studies, belted females have a higher overall risk of injury and death than belted males, including neck and abdominal injuries and thoracic and spinal fractures. Other correlations have been identified between smaller stature females and a higher risk of lower extremity injuries. These safety concerns have prompted the need to develop an advanced small female frontal impact ATD with the design improvements and instrumentation capabilities that are incorporated into the THOR-50M.

The awarded contract from NHTSA provides for building and testing three prototype THOR-05F ATDs in 2016.

The 2015 Crash Meeting sponsored by Humanetics were successfully held in Detroit MI, Heidelberg Germany and Nagoya Japan. Guests from all around the globe actively participated in the collaborative discussions and gaining insight into the industry. The meetings also provide both a professional and social format for industry peers to meet and discuss in-person some of the current challenges facing the vehicle safety industry as well as critical updates from Humanetics. Humanetics is looking forward to be hosting the 2016 Crash Meetings at our local regions with an additional one in Shanghai China.

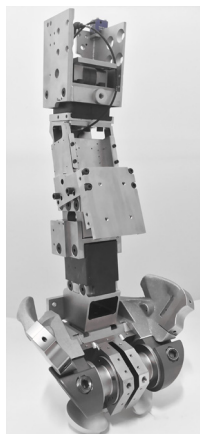
CRASH MEETING
By Humanetics

iTHOR

Integrated THOR

Worldwide, Humanetics has successfully integrated more than 200 dummies to date. While operating dummy integration and certification labs, engineers from across the globe work vigorously on the latest integration designs and compliances for newly released dummies such as the THOR.

For the past year and a half, integration of the THOR has been the main focus for the Engineering group in North America and Europe.



By coordinating and working closely between multiple disciplines, the first integrated THOR (iTHOR) project was finally realized with the successful installation of a 144-channel DTI digital DAS system.

Naturally, in order to implement the in-dummy DAS solution, some of the existing mechanical elements of the THOR had to be modified. Each

alteration to the dummy had to be carefully examined to ensure that the integrity of the dummy is not compromised in any way by the integrated design.

Internal cavities had to be created by streamlining some of the body components within the dummy and in some cases, it was proven to have resulted in the overall enhancement of the dummy. For example, the original bulky 9-accel right-angled bracket in the head assembly was replaced by a simplified version: a mounting block that can utilize 3-axis accelerometers or additional 3-axis Angular Rate Sensors (ARS, 6 channels total) at the Center of Gravity (CG). In addition, a small hub is integrated to convert analog signals from single-channeled sensors to digital format while preserving the mechanical properties of the original THOR design.

Very minor changes had to be made to the upper spine-box assembly by implementing a new mounting block designed to accommodate the new, DTI tri-axial accelerometer at T1.

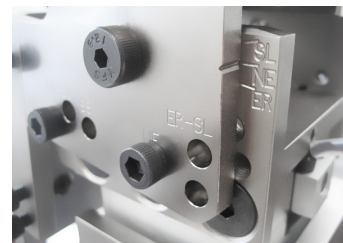
The lower spine was redesigned with two main objectives in mind: 1) free up space for on-board DAS components and 2) reduce the handling effort of the lumbar posture adjustment. Those intentions were met while retaining the complete functionality of the

original spine-box; interfaces and the positioning of the adjacent components remained unchanged. To ensure the CG of the iTHOR conforms to the original THOR, the new CG location was verified using CAD analysis.

The design of the abdomen mounting bracket/plate was greatly simplified and remained in the same mounting position within the upper abdomen. The pitch-angle positioning assembly in the lumbar spine was completely redesigned with a new 3-screw (left/right) positioning mechanism (476-3691); the locations of the screw holes on the spine box are easily accessible and can be aligned accordingly to allow pivot relative to the lumbar with ease. In addition, the pitch positions that determine the four prescribed postures (erect, neutral, slouched and super slouched at -9°, 0°, 9°, and 18° respectively) are etched on both sides of the spine so they are clearly visible for the user. This design approach frees up a considerable amount of space inside the lower spine-box for the placement of the DTI hubs and housings for single-channel sensors. Additionally, interfaces are now created in the lower spine and pelvis to house 3-axis digital accelerometers and ARS.

Along with the changes within the spine assembly, the upper and lower neck load cell cover plates are also modified to integrate the DTI digital modules and new connectors. The upper and lower neck load cells are daisy chained, with one wire handling 12 channels running to the recorder. The connectors are of rugged miniature 4-pin designs built by Comtronic. The load cells are calibrated analogically, then recalibrated digitally to ensure conformance to existing standards.

Similarly, the load cell plates in the thorax, ASIS, femur and tibia can also allow for installation of in-sensor digital modules. By utilizing this digital technology, the wire count and umbilical cables are reduced significantly. For instance, to output data from 48 channels through the legs to the recorder in the spine box, only four 3mm cables are needed.



Lastly, minimal alterations to the femur, knee and tibia flesh were implemented to accommodate the in-dummy cable routing and the changes made on the load cell cover plates. Existing channels for IR-TRACCs, potentiometers, tilt sensors, ARS and accelerometers are accounted for to preserve the measuring capability of the original THOR.

Two iTHOR prototypes have been completed thus far and will go into production early 2016.

Mike Salloum
Bernard Been

Users
Meeting

THOR Users Meeting

Humanetics Innovative Solutions is now hosting THOR-M User Meetings in NA, Japan and Europe. The purpose of this meeting is to provide an open forum to share information, discuss performance concerns and possible recommendations for the dummy updates experienced by the stakeholders during the initial testing phase of the THOR-M ATD. Attendees have the option to either join in person or via WebEx. Please contact your local representatives for more information if you are interested, we look forward to your participation.



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