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2025 ISTA Forum USA

Tuesday, March 25, 2025 8:30am - 10:00am

TransPack - Session 1

Beachside Ballroom

Chad Atzemis
Author

Adoption of PCR Plastics in Packaging Applications – From markets to material validation

With sustainability being a top priority for brand owners and packaging suppliers alike, the desire to incorporate more PCR plastics in packaging applications continues to grow. Various geographies and market segments are approaching this differently, however driving circularity into the packaging market is still a valid goal. To do so, one must ensure that the PCR materials have been validated to meet performance expectations.

This presentation will begin with a look at the market for PCR plastics with a focus on growth areas, market dynamics, and potential obstacles to more widespread adoption. In addition, a validation and quality control process based on various testing methodologies will be introduced to ensure that users can better understand their material supplies and how it may affect their end-use packaging.

Advances in Multi-Axis Transportation Vibration

Amin Joodaky
Michigan State University

Recent research in package dynamics highlights the importance of considering multi-axis vibrations-such as pitch and roll-alongside vertical vibrations for more realistic transportation simulations. There is growing interest in understanding how these additional axes impact package stability and performance. Building on the founding of the Distribution Consortium in collaboration with ISTA, Eli Lilly, and other partners, and following the installation of a 3-degree-of-freedom shaker table, Dr. Joodaky from the MSU School of Packaging has explored these dynamics. In this presentation, they will share recent findings that may support ongoing advancements in the packaging dynamics field.

How 'Virtual Models' Can Complement Physical Testing

Prabu Gokulanandam
Dassault Systemes

Dassault Systemes (DS) will discuss how the shift to more sustainable packaging materials is driving the need for more packaging testing. With the use of new materials testing is critical, while cost/margin pressure and time to scale is important for manufacturers to drive efficiency from design to production.

By using modeling and simulation (MODSIM), manufacturers can develop virtual models to predict how your packaging design will behave in the physical world. Building an accurate virtual model is the key and DS will show how to use the data from physical testing to validate a proper virtual model that can be reused to benefit future packaging designs. This complementary 'virtual + real' approach can qualify packaging designs before they go

through physical tests. This increases confidence levels in packaging designs and reduces overall time and cost.

For example, if a designer is undertaking a 'lightweighting' initiative to reduce the amount of material in the package, to help reduce cost and drive sustainability, they can use simulation to determine the optimal amount of material thickness using virtual MODSIM that will maintain package integrity under the conditions of manufacturing, logistics, retail and consumer usage. In this way, fewer designs (with higher confidence) move to the important phase of physical testing.

Attend this session and you will learn more about:
- How real data to used to construct virtual models
- Understanding how a virtual test works with packaging designs
- Applying virtual testing to accelerate the physical qualification of packaging
- How simulation can be used regardless of which CAD you work with
- Real examples

Tuesday, March 25, 2025 10:30am - 12:00pm

TransPack - Session 2

Beachside Ballroom

Development of Transportation Studies for Demonstrating Drug Product Robustness and Meeting Regulatory Requirements

Carson Dickey
Modality Solutions LLC

Hrithik Basu
Modality Solutions

Biopharmaceutical products are susceptible to damage from supply chain hazards such as shock/drops, vibration, pressure, and temperature. Regulatory agencies worldwide require the demonstration of drug product robustness to distribution hazards for the commercialization of biologics. Many biopharmaceutical products have been approved for commercialization through worst-case and concurrent hazard transportation studies. These studies are designed to demonstrate that the drug product, in its worst-case packaging presentation, is not damaged by concurrent supply chain hazards. These studies are typically supply-chain specific to ensure the exposures (number of drops, pressure levels, vibration profiles, temperature exposures) meet or exceed the exposures that will be encountered in the real world. However, the development of a standard global test plan reduces the need for custom studies for each product and their supply chain. A standard global test plan may be particularly useful for large biotech companies that distribute many products with complex and varied supply chains.

This presentation will discuss the benefits of concurrent hazard transportation studies and strategies that can be used to develop a global test plan. The active transport times for all movements in multiple supply chains were calculated and used as the basis for determining the appropriate test duration and intensity for each distribution hazard (shock, vibration, pressure, and temperature) in the global test plan. Statistical analysis was used to analyze supply chain data and develop the global test plan to ensure it covers most global biopharmaceutical supply chains, excluding major outliers. Strategies to reduce testing time when supply chains contain long forms of transit (i.e. ocean and rail) and the use of accelerated vs non-accelerated vibration profiles will also be discussed.

Double Stacking Pallets and the Impact of Humidity to Compression Strength

Matilda Wilson

Merck & Co.

This session will focus on the creation and rationale behind compensating factors (F values) and how to utilize the knowledge for appropriate business use, as well as impact of those altered compression weights to testing results on corrugated materials. Additionally, special attention will be given to how the factor of humidity impacts the calculated compensating factors and what real-world situations should be considered when determining the variables for the calculation. The discussion will be centered around the risk, benefit, and strategy of utilizing custom compression calculations to fit individual business needs as well as presenting actual testing data from ISTA 3E testing using altered F values.

Eliminate lithium-ion battery distributuion incidents via monitoring and sustainable packaging solutions

Kevin McIntosh
Safe Load Testing Technologies/W5 Engineering

The lithium-ion battery sector is considered relevant, because of the incidents identified in the distribution cycle, highlighting the importance of the distribution risks on lithium-ion batteries, especially shocks, impacts, as well as high temperatures among others. The current packaging systems are not always designed to ensure the protection of the product throughout its distribution cycle. Therefore, there is a need to generate a customized test protocol, based on ISTA standards, which reproduces the risks of distribution, and validates the whole packaging system + battery, as a necessary and complementary tool to the existing regulations for the validation of batteries. Therefore, in collaboration with the company NEXT ELECTRIC MOTORS, which designs electric motorcycles manufactured in China and finally assembled in Spain, a case study based in a sustainable packaging design was developed. The objective of this case study is to design a sustainable packaging system for lithium-ion batteries that guarantees the protection of the battery throughout the distribution cycle, using a customized test protocol, based on ISTA standards. In this case study, the following tasks have been performed: • Monitoring NEXT ELECTRIC MOTORS distribution route; monitoring the actual transit of the batteries from their supplier in CHINA to SPAIN, using the innrecord device. • Design and development of the sustainable packaging system, technically and environmentally. • Validation of the new packaging development following the tests of the new protocol according to the monitoring data and ISTA standards. • Comparison of the results of the validation of the new packaging development vs current packaging. • Design of the packaging system for the target battery. As a result of the case study, the following indicators have been estimated: • Technical Kpi, based on the test customized protocol results and logistic efficiency. • Environmental Kpi, based on the recyclability, packaging reduction and % of recycling rate materials of the different packaging systems. RESULTS: • Validation of the technical efficiency of new sustainable packaging for lithium batteries through ad – hoc test protocol based on ISTA standards. • Reduction of the quantity of different materials, in order to develop a mono-material packaging system, which facilitates collection and recycling operations. • Packaging optimization to increase logistic efficiency. • Technical and environmental indicators (Kpi´s) development, associated with the target packaging. • Packaging design with materials that are more recyclable than existing packaging

Tuesday, March 25, 2025 12:00pm - 1:30pm

Lunch

Seaside Ballroom

Tuesday, March 25, 2025 1:30pm - 3:00pm

TransPack - Session 3

Beachside Ballroom

New Developments in Sustainability and Updates from the ISTA Sustainability Committee

William Green
IBM Corporation

New Developments in Sustainability Regulations and Update from the ISTA Sustainability Committee
Supply chain sustainability continues to be a focus of global regulatory frameworks, aiming to mitigate environmental impacts and promote responsible corporate practices. An example of such regulation is the European Union Deforestation Regulation (EUDR), which targets the risks of deforestation within global supply chains.

The EUDR is designed to address deforestation by regulating the import of commodities associated with forest degradation, such as paperboard, corrugated fiberboard, rubber, wooden pallets, and crates. In order for Companies to import these commodities into the EU, they are required to ensure that the materials are deforestation-free, with burdensome due diligence processes for supply chain transparency reporting required by the EU.

Bill will also introduce and give an update from the ISTA Sustainability Committee, whose goal is to support our members in navigating sustainability challenges. One priority is helping members understand their leadership role in sustainability and how they can contribute to broader environmental goals in their respective organizations.

Packaging Engineering as a driver for growth

Damon Lucenta
Pregis

Packaging Engineering plays a crucial role as a driver for growth across industries, particularly in the areas of consumer goods, and e-commerce. By optimizing materials, packaging design, enhancing sustainability, and ensuring functionality, packaging engineers contribute directly to a company's bottom line, customer satisfaction, and market competitiveness. This presentation will focus on critical areas and identify trends that will help development and commercial teams how to manage successful projects.

Quantifying Acceleration (Vibration) Levels with PIT's Versus AGV's

Jason Marlin
Eli Lilly

Historically product is moved within a manufacturing facility with Forklifts and/or PIT (Powered Industrial Trucks). These forms of equipment lend themselves to the potential for high acceleration events due to the limitations of the driver response. A quantitative vibration assessment is performed to allow for comparison of vibration (PSD's) across multiple methods of internal product movement.

Tuesday, March 25, 2025 3:30pm - 5:00pm

TransPack - Session 4

Beachside Ballroom

Revisiting PSD in Field for Vibration Testing

Changfeng Ge
RIT - Packaging Science Program

Real-world vehicle vibrations often mix non-stationary random and non-random and shocks. Power Spectral Density (PSD) generated by vibration tester is generally a Gaussian random and stationary vibration. The field generated combined PSD doesn't tell you how long the vibration occurs at this PSD level. In this presentation, field vibration data was segmented in time domain based on trigger sequence, shock- and vibration-intensive sections. Data analysis, including PSD, was conducted for each of the sections, enabling visualization of the stationary nature of the PSD

changes over different segments. Based on the analysis, a representative composite for laboratory vibration testing, using the present equipment and standard, was proposed to mirror the field collected data.

Testing protocols based on ISTA, as a key tool, to develop a sustainable packaging system.

Patricia Navarro
ITENE

The development of testing protocols based on ISTA, as a key tool, to develop a sustainable packaging system for the companies, to improve their alignment with environmental requirements, ensuring product protection throughout the distribution cycle.
The technical validation of packaging systems, through of transport simulation test protocols, has become an essential phase in the development of sustainable packaging systems. As a consequence of environmental legislation, companies have to reduce, implement easily recyclable materials, with recycling percentage and finally significant changes in packaging design that may affect product protection. For this reason, the development of ad – hoc test protocols based on ISTA standard, becomes a necessity, to ensure the efficiency of the new packaging systems.
As a case study, a company in the bathroom sector was selected. This company as a consequence of the acquisition of different international plants, needed to standardize the packaging system for shower trays, taking into account the requirements of product protection, risks of different types of distribution, customer requirements and of course environmental requirements, among others.
Therefore, the objective was the selection, development and validation of a sustainable packaging system at a technical and environmental level, carried out with packaging eco-design based on distribution risks, through the development of a customized test protocol.
Finally, the selected sustainable packaging system was validated through the development of ad-hoc test protocol, based on ISTA protocols, which was applied to the selected packaging, obtaining positive results, which allowed the company to continue with the process of packaging system optimization, in order to increase its alignment with environmental legislation.

As a result of the case study, the following indicators have been estimated:
• Technical Kpi, based on the results of the test protocols applied on the current packaging systems of the different plants compared to the new standardized sustainable solutions.
• Environmental Kpi, based on the recyclability, packaging reduction and % of recycling rate materials of the different packaging systems.
With these final indicators, the selection of the most appropriate sustainable packaging has been covered.

RESULTS:
• Validation of the technical and environmental efficiency of new sustainable packaging solutions for shower trays.
• Development ad – hoc test protocols based on ISTA standard, considering the complexity of the company distribution cycle.
• Development of technical and environmental indicators (Kpi´s), associated with the target packaging to facilitate the selection of the most suitable packaging.