



The Center for Packaging and Unit Load Design

CPULD News

Quarterly Newsletter



Pallet Lab's Open House

The open house held on April 17, 2018 was a great success. There were over 50 people in attendance including representatives from 6 different industry partners. The catered event was held to showcase all of the laboratory's improvements completed through a seven year Lean Transformation process. Students gave presentations regarding the changes they helped implement.

A big thank you, Grupo Phoenix!

Our industry partner, Grupo Phoenix helped the lab's Lean Transformation take place through their financial support!

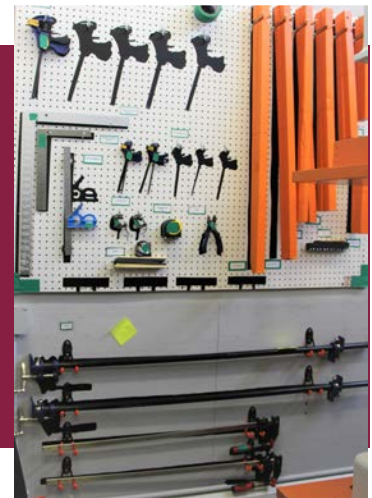
New Website is coming

We are working with a website design team to update the Center's online presence. Our new site will feature pages showcasing our people, research projects, our state-of-the-art testing and research laboratories, as well as listing and explaining all of the tests we can perform. There will also be a searchable database of industry articles, called SLICK available to our members.



We Prioritized Safety & Organization

Our student interns and lab technicians worked hard to create pegboards throughout the pallet testing and research laboratory using a shadow-picture organization system. All tools and safety equipment now have specific storage places and are much easier to find and use than before. First aid kits and fire extinguishers are clearly labeled and there are safety areas designated around each of the machines. The storage, woodshop and office areas around the lab were cleaned and organized as well.



Student Mountain Lake Retreat, by Dr. John Bouldin

The Center for Packaging and Unit Load Design (CPULD) recently welcomed this year's group of interns, and kicked off the year-long program with a three-day retreat at the Mountain Lake resort. Every year, the CPULD selects several candidates for participation in the internship, which includes hands-on work experience in the testing laboratory learning test methods, standards, and equipment use, and a two-semester course sequence designed to enhance the students' professionalism and preparation for a career in the packaging industry. This year's interns are Madison Reynolds, Dianjin Xu, Jack Lumley, and Logan Tallman. New to the program this year is a dedicated Lean Team, focusing on process improvements in the working of the lab. This year's team members are Jack Cook and Jhonny Fuentes.

This year's internship began with a team-building exercise at the Puzzlr - Blacksburg Puzzle and Escape Rooms, and transitioned to other team enhancing exercises at Mountain Lake. During the course of the internship, students gain useful experience in what test procedures actually mean and how they are applied in the real world of packaging. During the summer component of the internship, students work 40-hour work weeks in the lab conducting actual research and testing projects for corporate clients from around the world. Just before the beginning of the fall semester, each intern will have earned the professional designation of Certified Packaging Laboratory Professional (CPLP) from the International Safe Transit Association, one of the standard-authoring entities and a leader in the field of packaging and distribution.

Graduate students also participate in the life of CPULD, performing valuable management of lab projects and personnel. This year's grad student cohort includes Alina Mejias, Dorina Bugledits, Steven Morrisette, Chandler Quesenberry, and Nicholas Navarro.



Left to right: Front row: Steven Morrisette, Dianjin Xu. Back row: Madison Reynolds, Nicolas Navarro, Dr. Laszlo Horvath, Jack Cook, Dorina Bugledits, Jack Lumley, Logan Tallman, Chandler Quesenberry, Jhonny Fuentes

Welcome to Our New Graduate Students!

Steven Morrisette:

Steven will evaluate how the size of packages impact load bridging on block class pallets. His research will help the pallet industry reduce the weight of pallets and increase their sustainability.

He believes that the load carrying capacity of most pallets is very likely to be significantly higher than what is determined through current testing methods. The effects of package size and distribution on load bridging are not included in most current tests, and pallets are overdesigned when these factors aren't taken into account. The stress distribution effect will be quantified and accounted for in design of new pallets. Steven believes that this will help reduce wasted resources, hence increasing sustainability factors and reducing production costs. Research funded by The Pallet Foundation of the NWPCA.



Chandler Quesenberry:

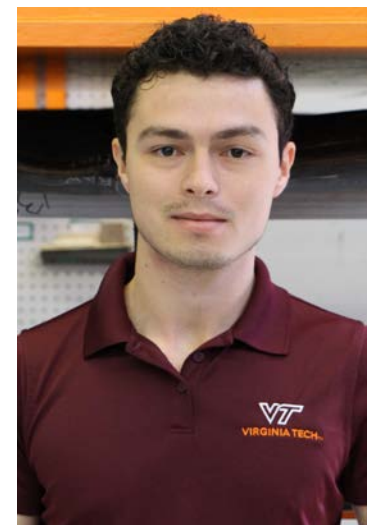
Chandler will investigate the effect of pallet stiffness on the strength of corrugated boxes. His research will help us increase safety and optimize the cost of unit loads.

Historical research indicates that the stiffness of a pallet has a significant effect on the stress distribution across the top of the pallet which, in turn, influences the strength of various packaging materials such as pails, bottles, and drums. However, the effect of pallet stiffness on the strength of corrugated boxes was only investigated under symmetric box loading conditions. Chandler's research will focus on quantifying the effect that pallet stiffness has on the strength of asymmetrically loaded corrugated boxes. Research funded by the Industrial Affiliate Membership of Center for Packaging and Unit Load Design.

Nicolas Navarro:

Nicolas's research will focus on the deployment of smart sensors for distribution packaging. His research will help us create continuous supply chain visibility.

Internet of Things (IoT) has started to become a widely used technology in many aspects of our life from smart refrigerators to aerospace sensors. In the distribution packaging sector, obtaining data on the shock, vibration, and environmental conditions that packages experience throughout the supply chain will enable us to create safer and more sustainable packaging solutions. Nicolas's research will focus on reviewing the available technologies for the distribution packaging sector and identifying opportunities for further research. Research funded by Center for Packaging and Unit Load Design.



~ Research Highlights ~

Investigation of New and Recovered Wood Shipping Platforms in the United States

By Nathan Gerber

This study was performed in order to acquire key market information and information on raw material usage for the wood pallet and container industry in 2016.

Due to the volume of new and recovered wood used by the pallet industry, the tracking of historical wood usage and pallet production is important to gauge the current state of the industry.

This study provides the wood pallet and container industry with current information regarding trends in new and used wood pallet production, wood volumes, heat treatment, and byproduct production. This survey was sent to over 2,500 companies which either manufacture or wholesale wooden pallets and containers.

Historical trends in the wood pallet market were also analyzed using the results of previous pallet surveys from 1991 - 2016. Historical trends were analyzed using previous results from both Virginia Tech and the US Forest Service research studies.

Companies in the industry can learn from this data and the historical trends studied and adopt new business strategies that take advantage of the current developments in the industry.

As a whole, the wooden pallet and container industry has shown growth. The industry produced an estimated 508 million new wood pallets in 2016, which is a 22% increase since 2011. Approximately 35% of these were 48" x 40" pallets, which continues to be the dominant standardized pallet size.

Approximately 39% of new wood pallets were custom sizes which is a significant decrease from the 60% share found in 2011. This shows that pallet sizes are becoming increasingly standardized across the industry.



Stringer class pallets remained the dominant pallet class with a 76% share of the market while block pallets and skids only accounted for 21% and 3% of the market, respectively. Approximately 38% of new wood pallets were heat treated.

Furthermore, an estimated 341 million pallets were recovered and sold as recycled/ repaired/ remanufactured pallets in 2016. The most common size of the recycled or remanufactured pallets was 48" x 40", accounting for 69% of the recycled market. Ninety-one percent of recycled or remanufactured pallets were stringer class pallets while block class pallets made up the remaining 9%.

Wood byproduct usage has changed since 2011. The conversion of broken pallets and wood waste to landscape mulch (37.5%) and animal bedding (4.2%) has declined with a proportional increase in other uses (28.3%). Biofuel conversion has remained steady at 30%.

Research funded by The Pallet Foundation of the NWPCA and by the U.S. Forest Service.



~ Research Highlights ~

Investigation of the Disposal and Recovery of Wood Pallets and Wood Packaging in the United States

By Zachary Shiner

This study was performed in order to acquire market information on the disposal and recovery of wood pallets and wood packaging in 2016.

Each year a large number of wooden pallets are manufactured, recycled, and disposed of during the transportation of goods throughout the United States.

The production of these pallets consumes a significant amount of wood, and a large number of pallets end up in landfills at the end of their useful life cycle. However, many of these pallets can be recovered through repair, broken apart into components, ground into mulch, fuel, and animal bedding, or used by landfills in their day to day operations.

The purpose of this research was to investigate the total number of pallets and crates reaching landfills in the United States as well as to gain a better understanding of the overall waste stream.

This was done by surveying all licensed Municipal Solid Waste (MSW) and Construction & Demolition (C&D) landfills in the continental United States. A questionnaire was sent to these landfills, and this entire study was intended to build upon previous Virginia Tech landfill surveys which were conducted in 1995 and 1998.

Overall, it was found the average MSW facility in the United States received 185,077 tons of waste and the average C&D facility received 74,911 tons. This results in a total national estimate of 253 million tons of MSW and 76.9 million tons of C&D waste.

Many pallets end up landfilled, but even they can be recovered if they are kept separate from other types of waste and diverted to a wood waste recovery area (as 90% of pallets are built from wood).



In fact, approximately 89.5 million pallets were landfilled, but 52 million of these landfilled pallets ended up being recovered, repurposed, or reused.

Pallets have this high rate of recovery as the market for recycled pallets has grown significantly over the past few decades. The number of recovered, repaired, or remanufactured wooden pallets has increased 160% from 1995 to 2016. Approximately 75% of wooden pallets are now recycled at the end of their useful life.

Landfills that recover wooden pallets indicate a wide variety of uses: giving them away to residents, using them “as-is” for operations, grinding them into mulch to be sold or given away, used as material for composting or for use within the facility as road base or daily cover.

Keeping pallets out of landfills helps to reduce the demand for virgin pallet lumber and to preserve landfill space while also generating economic activity.

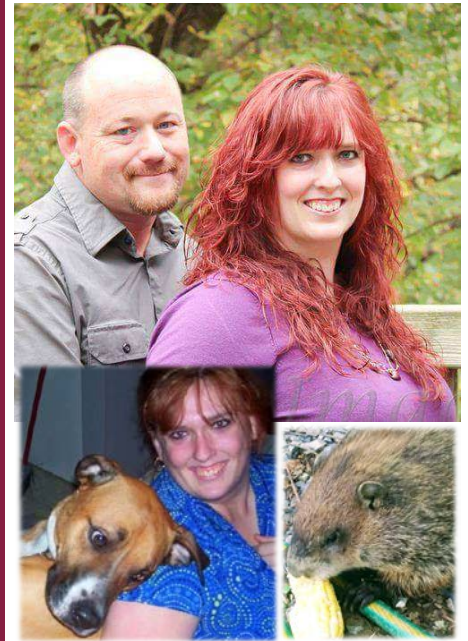
Research funded by The Pallet Foundation of the NWPCA and by the U.S. Forest Service.



Personnel Spotlight:

J. Kate Bridgeman joined the Center in the fall of 2017, filling the position of Dr. Horvath's Administrative Assistant. She's been working on organizing our short courses, developing marketing tools, maintaining databases, and helping to create the Center's new website. She's kept busy photographing our lab's interns, equipment, and testing services, maintaining Dr. Horvath's calendar, and helping to spread the word about the Center. Kate has her B.S from Radford University and came to us with over 10 years of accounting and office management experience.

Kate has lived in Christiansburg, VA since childhood and has been with her husband, Jason, for 10 years. They live in a big, old, country farmhouse with their best friend, Ana, four dogs, four cats, and a semi-tamed groundhog named Chester. Kate spends her free time reading, writing, doing artwork / crafts, and befriending the local wildlife.



Pallet Design Short Course
 August 21-23, 2018

Pallet design is an integral part of the material handling system. Wood pallet suppliers, sales professionals, professionals responsible for pallet purchases, packaging engineers and pallet specifiers will all benefit from an understanding of how to design pallets that will last longer and perform better.

This intensive three-day short course will teach techniques that pallet designers can use to save money when designing pallets by considering the interactions between all of the components of the material handling system. The course will use a state-of-the-art pallet design software called "Pallet Design System" (PDS) to better demonstrate the steps that go into the pallet design process. You will also be taken on a tour of a working, state of the art, pallet testing laboratory!

Wood Pallet Design and Performance Short Course

August 21-23, 2018



THE CENTER FOR PACKAGING AND UNIT LOAD DESIGN

Unit Load Design and Performance Short Course
 September 25-27, 2018

Unit Load Design is a revolutionary, systems design approach that significantly reduces the cost of distributing products to consumers by understanding how pallets, packaged products, and handling equipment, mechanically interact. Unit Load Design is a new and valuable service that pallet, packaging, and handling equipment suppliers can offer their customers.

This intensive three-day short course will teach techniques that pallet and packaging designers can use to save money on corrugated board and plastic packaging materials when designing pallets and packages by considering the interactions between all of the components of unit loads. The course will use a state-of-the-art unit load design software called "Best Load" to better demonstrate the steps of unit load design process. You will also be taken on a tour of a working, state of the art, packaging and pallet testing laboratory!

Unit Load Design and Performance Short Course

Sept. 25th-27th, 2018



THE CENTER FOR PACKAGING AND UNIT LOAD DESIGN
 Virginia Tech

2018 Calendar of Upcoming Center Events:

August 20th: University Fall Courses Begin

August 21st-23rd: Pallet Design and Performance Short Course

September 3rd: Labor Day Holiday

September 11th: Annual Member Meeting Welcome Dinner

September 12th: Annual Membership Meeting

September 12th: Pallet Lab Open House to Showcase Renovations

September 25th-27th: Unit Load Design and Performance Short Course

October 19th-21st: Fall Break for Students

November 17th-25th: Thanksgiving Holiday Break

December 5th: University Courses End

Contact Our Team:

Membership with the Center
 New research projects
 Quotes for new testing projects
 Distribution Packaging Projects
 Unit load Design Projects

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