<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>8:00 a.m. – 8:30 a.m.</td>
<td>Check-in/Continental Breakfast</td>
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</table>
| 8:30 a.m. – 10:00 a.m. (90 mins) | **Eliminating Load Failures in the Supply Chain**  
  *Kyle Dunno, PhD*  
  Director of Transport Packaging, Atlantic Packaging Corp |
| 10:00 a.m. – 10:15 a.m. | Break                                                                |
| 10:15 a.m. – 11:45 p.m. (90 mins) | **Currency Exchange: The Value of Relationships in Business & Beyond**  
  *Phillip Ashley Rix*  
  President & CEO, Phillip Ashley Chocolates |
| 11:45 a.m. – 1:00 p.m. | Lunch  
  Meet Our Sponsors                                                  |
| 1:00 p.m. – 2:30 p.m. (90 mins) | **The Future of Sales: How Automation and Artificial Intelligence are Changing the Role of Sales**  
  *Fionna Faulk*  
  Chief Training Officer, The American Sales Training Company |
| 2:30 p.m. – 2:45 p.m. | Break                                                                |
| 2:45 p.m. – 3:45 p.m. (60 mins) | **Packaging R&D Projects @ CBU: A Progress Report**  
  *Pong Malasri*  
  Dean of Engineering & Healthcare Packaging Consortium Director  
  *Jade Houseworth, Georgina Johns, Yuliana Sanchez-Luna, and Scott Pala*  
  BS in Engineering Management (Packaging Concentration) Major  
  Christian Brothers University |

Campus Map: [http://www.cbu.edu/assets/2091/cbumap2017.pdf](http://www.cbu.edu/assets/2091/cbumap2017.pdf)
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(http://www.cbu.edu)

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**Registered Participants**

1. Alturaif, Riyadh  
   Christian Brothers University
2. Aguilar, Eduardo  
   Christian Brothers University
3. Blair, Amber  
   Christian Brothers University
4. Bonner, April  
   Smith & Nephew
5. Choudhary, Divya  
   Christian Brothers University
6. Davenport, Jazzmyn  
   Christian Brothers University
7. Dover, Ian  
   Christian Brothers University
8. Dunno, Kyle  
   Atlantic Packaging
9. Faulk, Fionna  
   The American Sales Training Company
10. Gadomski, Dick  
    Christian Brothers University
11. Garcia, Luis  
    MicroPort Orthopedics
12. Gilman, Jay  
    FedEx
13. Gomez, Daniel  
    Christian Brothers University
14. Graff, Kyla  
    Sweetbio
15. Housewright, Jade  
    Christian Brothers University
16. Jimenez, Conrado  
    Christian Brothers University
17. Johns, Georgina  
    Christian Brothers University
18. Jones, Deon  
    Olympus
19. Jordan, Brianna  
    Christian Brothers University
20. Liu, Henry  
    Christian Brothers University
21. Luna, Yuliana  
    Christian Brothers University
22. Malasri, Siripong  
    Christian Brothers University
23. Moats, Bob  
    Christian Brothers University
24. Moritz, Brad  
    Thaddeus Medical Systems
25. Mueller, Paige  
    FedEx
26. Nobes, Geoff  
    Evergreen Packaging
27. Ostrowski, Michael  
    Smith & Nephew
28. Pala, Scott  
    Christian Brothers University
29. Payne, Christopher  
    Christian Brothers University
30. Pham, Rachel  
    Christian Brothers University
31. Phaneuf, Robert  
    MicroPort Orthopedics
32. Pourhashemi, Ali  
    Christian Brothers University
33. Ray, Asit  
    Christian Brothers University
34. Ritchie, Scott  
    FedEx
35. Rix, Phillip Ashley  
    Phillip Ashley Chocolates
36. Rodriguez, Luis  
    Christian Brothers University
37. Rutledge, Larry  
    Christian Brothers University
38. Sanchez, Yuritza  
    Christian Brothers University
39. Snow, Kevesha  
    Christian Brothers University
40. Stevens, Ryne  
    Smith & Nephew
41. Swwaffer, Marea  
    FedEx
42. Ventura, John  
    Christian Brothers University
43. Wah, Lisa  
    Christian Brothers University
44. Wellford, Brandon  
    Memphis Bioworks

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Memphis Bioworks, MicroPort Orthopedics, Olympus Surgical Technologies America, Smith & Nephew, SweetBio, 
Thaddeus Medical Systems, The Pallet Factory, Wright Medical
Eliminating Load Failures in the Supply Chain

Kyle Dunno

Abstract: Defining the environment, selecting the proper stretch parameters, and conducting the proper laboratory analysis can generate successful field shipments. The presentation will provide a review of these areas and define what packaging engineers need to know in order to prevent load failures in the supply chain. Case studies highlighting these areas will be used to demonstrate why these areas are critical.

Keywords: Field shipments; Load failures; Supply Chain

Presenter:

Kyle Dunno – Dr. Kyle Dunno, Director of Transport Packaging, Atlantic Packaging, earned his B.S., M.S. in Packaging Science and Ph.D. in Food Technology from Clemson University. He has been involved with ISTA, ASTM, IFT, and NIPHLE. Dr. Dunno is an ISTA Certified Packaging Lab Professional (Professional Level) and currently serves as Co-Editor-in-Chief of the International Journal of Advanced Packaging Technology.

---

1 Atlantic Packaging Corp, 12201 Steele Creek Road, Charlotte, NC 28273, kyled@atlanticpkg.com
Currency Exchange:
The Value of Relationships in Business & Beyond

*Phillip Ashley Rix*¹

**Presenter:**

*Chef Phillip Ashley Rix* – Award-winning designer chocolatier and chef, Phillip Ashley is the President and CEO of Phillip Ashley Chocolates. He has developed an international following for his luxury chocolates. High profile clients and events, A-list celebrities and major corporations select the brand for gifts.

Phillip Ashley is considered the preeminent chef of luxury chocolate. He is listed as one of the Best Chocolatiers and Confectioners in America by TasteTV. FORBES Magazine hailed him as the “Real Life Willy Wonka” and his brand has been selected as a Top Pick by Vogue Magazine. A self taught chocolatier, Phillip Ashley has been a featured executive chef at the esteemed James Beard House in New York City and the official chocolatier of the 58th GRAMMY® Celebration and 69th Primetime Emmy® Governors Ball. Phillip Ashley Chocolates are available worldwide via its online store and are sold by national luxury retailers: Neiman Marcus and Horchow.

¹ 798 South Cooper Street, Memphis TN 38104. [phillip@phillipashley.com](mailto:phillip@phillipashley.com)
The Future of Sales: How Automation and Artificial Intelligence are Changing the Role of Sales

Fionna Faulk

Abstract: For years, businesses have relied upon old sales techniques to identify, obtain, and retain, new clients. These old sales techniques and methodologies have, typically, been around for decades – most, prior to the invention of the internet. As buyer knowledge and access to information increases, the competitive landscape widens, and as automation is brought more heavily to market, we are witnessing the inevitable disruption of the sales industry. This talk covers what that disruption looks like, how companies can take advantage of automation to grow their business, and how the sales function will reshape in the future, with the help of artificial intelligence and automation.

Today’s sales process involves many manual-driven steps: cold calling by phone, cold calling via email, outreach via social media, qualifying potential prospects, following up with prospects, demonstrating your product or service, making (closing) the sale, following up and providing great service once a sale has been made, and many, many, more. Much – if not all – of these components are already being automated. While, presently, there is much fear behind the automation of the sales process, due to these newfound methods, there should also be cause for celebration. As ingenuity and innovation in the sales space continue to grow, many of these methods can be used to one’s advantage, especially in business to business sales.

In this talk, we will cover some of the main methods in which sales has traditionally been carried out (manually), we will discuss some of the now automated parts of the sales process, as well as the effects they have on the overall results of business efforts, and we will discuss what the future of the sales process looks like with increased improvements and applications from automation, artificial intelligence, and machine learning.

Keywords: Sales; Automation; Artificial Intelligence

Presenter:

Fionna Faulk – Fionna Faulk is Chief Training Officer of the American Sales Training Company.

---

1 Chief Training Officer, The American Sales Training Company, fionna@americansalestraining.com
Packaging R&D Projects @ CBU: A Progress Report

Siripong Malasri, Jade Housewirth, Georgina Johns, Yuliana Sanchez-Luna, and Scott Pala

Abstract: The following on-going work will be reported:

- Corrugated Box Corner Design – In this project, a 3-Angle box corner design will be discussed.
- Box Corner Stiffener Compression Strength – The effect of temperature and humidity on box corner stiffener will be reported.
- Vibration Study of Continuous-Bubble Wrap – The purpose of this study is to determine the effectiveness of continuous-bubble wrap in absorbing vibration.

Keywords: Corrugated Box; Box Corner Strength; Effects of Humidity & Temperature; Continuous-Bubble Wrap; Vibration Study

Presenter:

Siripong Malasri – Dr. Malasri is dean of engineering. He also runs the Healthcare Packaging Consortium and oversees an ISTA certified packaging test lab at CBU. He is a registered Professional Engineer in the State of Tennessee and an ISTA Certified Packaging Lab Professional (Professional Level). He is also Editor-in-Chief for the International Journal of Advanced Packaging Technology

Co-Authors:

Jade Housewirth, Georgina Johns, Yuliana Sanchez-Luna, and Scott Pala – Jade, Georgina, Yuliana, and Scott are BS in Engineering Management (Packaging Concentration) majors at CBU. They work on the projects in this presentation for their PKG 490 Packaging Projects course. All are ISTA Certified Packaging Lab Technicians.
Defining the Distribution Channel to Eliminate Unit Load Failure
• Independently Owned for 70 years
• Top 20 N.C. Private Company
• Hybrid Structure - Manufacturing, Distribution and Technical Service
• Core Competencies - Paper Converting, Critical Applications Packaging & Automation
• $510 Million In Sales
• $30 Million in Packaging Equipment Sales
• 1,000+ Employees
• Nationwide Technical Support & Service
• 17 U.S. Locations & 4 International Locations
Agenda

Why?
Stretch Film 101
Stretch Film Application 101
Atlantic Packaging Approach
Shipping and Transport Hazards
Case Study Examples:
  Product Protection
  Developing Secure Loads for Transport
Why?

Unsaleables

In 2014 unsaleables cost CPG Manufacturers an estimated $7.7B. 50% of this is a result of damage in the supply chain.
Why?

We are Packaging Nerds!

We care way to much about stretch film
Bring science to commodity viewed products
Stretch Film 101

It is called Stretch Film, not Shrink Wrap.
Congratulations!
You did it!
Inherent in the name
  Yes...
  You must stretch the film

All films are created equal
  False...
  Must understand mechanical properties

Machine is set for 250% stretch
  Well...
    Slippage
    Wear
  Need to calculate the on-pallet percentage
Stretch Film Application
Well Beyond Choosing a Ratio

Primary Stretch
Executed in the Carriage by Geared Rollers

Secondary Stretch
Executed Between Carriage and Load by Tension
Primary Stretch

Yield & Stiffness

[Diagram showing load containment and stretch percentage with specific data points and changes.]
Secondary Stretch
Compressive Force
Atlantic Packaging Approach

1. Audit
Define the Distribution Channel
Understand current packaging system
Develop Distribution Map
Atlantic Packaging Approach

1. Audit

2. Analyze
   
   Understand shipping hazards
   Develop proposed packaging system
   Establish desired conditions based on field data
Atlantic Packaging Approach

1. Audit

2. Analyze

3. Optimize and Validate
   Implement packaging system and optimize performance
   Modify equipment as needed
   Validate solution with Industry Standards
Atlantic Packaging Approach

1. Audit
2. Analyze
3. Optimize
4. Monitor
   Implement Strategy
   Maintain Standards
Shipping and Transport Hazards

Most Common:
- Shock
- Vibration
- Compression

Often Forgotten:
- Environmental
- Import/Export
- Distribution Network
Shipping and Transport Hazards

Collecting the data:
- Field data recorders and video
- Onsite review
- Expert testimony

Quantify the data:
- Develop vibration profiles
- Determine severity and probability of occurrence
- Observe handling and stacking conditions
- Include environmental conditions

Replicate the data:
- Develop tests to reproduce the hazards
- Perform in laboratory environment
Case Study

Over Usage

Product: Bottled Water
Current Film: 20” x 71 gauge

Challenge

• Machine degradation
• Poor maintenance practices
• Additional revolutions to compensate on containment

Solution

• Optimize equipment
• Implement high performance film
• Decreased cost
• Increased containment

### EXISTING CONDITIONS

<table>
<thead>
<tr>
<th>Machine</th>
<th>Product</th>
<th>Load Size (LxWxH)</th>
<th>Revolutions</th>
<th>Ounces</th>
<th>Stretch %</th>
<th>FTL* TOP</th>
<th>FTL* MID</th>
<th>FTL* BOT</th>
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<tbody>
<tr>
<td>1 Line 1 Serial #0400-5584</td>
<td>3L 6pk</td>
<td>47x41x51</td>
<td>9</td>
<td>7.05</td>
<td>155%</td>
<td>8</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>2 Line 2 Serial #0400-5585</td>
<td>3L 6pk</td>
<td>47x41x51</td>
<td>11</td>
<td>20.7</td>
<td>6%</td>
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<tr>
<td>3 Line 5 Serial #0409-3595</td>
<td>1L 15pk</td>
<td>49x41x48</td>
<td>15</td>
<td>8</td>
<td>156%</td>
<td>9</td>
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<td>5</td>
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<tr>
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<td>.5L 24pk</td>
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<td>41x46x54</td>
<td>18</td>
<td>8.98</td>
<td>164%</td>
<td>6</td>
<td>8</td>
<td>9</td>
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</tbody>
</table>

### PROPOSED CONDITIONS

<table>
<thead>
<tr>
<th>Machine</th>
<th>Load Size (LxWxH)</th>
<th>Current Revolutions</th>
<th>Current Stretch %</th>
<th>Current Ounces</th>
<th>Proposed Revolutions</th>
<th>Proposed Stretch</th>
<th>Proposed Ounces</th>
<th>Proposed Cost/Load</th>
<th>Savings %</th>
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<tbody>
<tr>
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<td>47x41x51</td>
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<td>155%</td>
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<tr>
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<td>11</td>
<td>6%</td>
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<td>12</td>
<td>250%</td>
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<td>79%</td>
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<td>18</td>
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<td>9</td>
<td>12</td>
<td>250%</td>
<td>3.2</td>
<td>52%</td>
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</table>

**AVERAGE** 12.01oz

**PROPOSED** 3.22oz

**Cost REDUCTION** 64%
## Case Study
### Over Usage

**Product:** Bottled Water  
**Current Film:** 20” x 71 gauge

### Discovery

Multiple scenarios to reproduce containment values

<table>
<thead>
<tr>
<th>Cut &amp; Weigh (oz.)</th>
<th>Revs</th>
<th>On-Pallet Stretch %</th>
<th>Compression (lbs.)</th>
<th>ASTM (lbs.)</th>
<th>Lantech (lbs.)</th>
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<td>102.9</td>
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<td>206</td>
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<td>9.3</td>
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<td>4.15</td>
<td>15</td>
<td>239</td>
<td>95.9</td>
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<td>8.4</td>
</tr>
<tr>
<td>4.06</td>
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<td>247</td>
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<td>25.0</td>
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<td>3.90</td>
<td>15</td>
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<td>3.29</td>
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<td>14</td>
<td>308</td>
<td>100.6</td>
<td>24.9</td>
<td>10.0</td>
</tr>
</tbody>
</table>
Case Study
Product Protection

Product: Empty Soap Bottles
Current Film: 20” x 49 gauge

Challenge
• Adding revolutions after failures in the field
• Load cell calibration
• Film was damaging corner bottles

Solution
• Profile film compression force using ESTL load cells
• Correlate load cell data with lab data on bottle deflection (4daN)
• Create wrap pattern to stay below force limit
• Monitor application to ensure standards are maintained

Current State
Max Force 10 daN

Optimized State
Max Force 3.2 daN
Case Study
Load Stability

Product: POP Display
Current Film: 20” x 50 gauge

Challenge
• Loads unstable
• Racking during delivery to DC
• Stretch wrap containment force too high causing damage to loads

Define the Environment
• Must cube out trailer
• Bottom pallet is unstable
• Need to stabilize base unit

Solution
• Optimized stretch wrap application
• Included cross-brace to prevent racking
• Reduced load shift from 9” to <1”
Analyze
Film, Machine and Process Analysis to establish current condition.

Test
Test Unit Load Integrity utilizing simulated real-world transit conditions. Set the correct standard.

Optimize
Process, Materials and Standards. Enable current systems to wrap products to correct standards.

Monitor
Use real-time data to ensure that every load is wrapped to the correct standard.

KEYS TO SUCCESS
CURRENCY EXCHANGE
The Value of Relationships in Business & Beyond
“Logic will get you from A to B. Imagination will take you everywhere.” Albert Einstein
Introduction

“Real Life Willy Wonka”
- Forbes Magazine
In business, especially entrepreneurship, relationships are more precious than gold.
Culture eats strategy for breakfast.
THE INTERNET OF THINGS (IoT)
The Internet of things is the network of physical devices, vehicles, home appliances, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to connect and exchange data.
Consumers are employing data-driven decision making principles in their purchasing.
The greatest business strategy cannot compete with WHO YOU ARE.
People want to buy INTO you before they buy FROM you.
“Imperfection is beauty, madness is genius and it’s better to be absolutely ridiculous than absolutely boring.” — Marilyn Monroe
Product Driven
Any questions?
Contact

@phillipashleyus

@phillipashleyus

(901) 258-7274

phillip@phillipashley.com

www.phillipashleychocolates.com
The future of sales: How automation and artificial intelligence (A.I.) are changing the role of sales

by Fionna Faulk

https://youtu.be/Y9FOyoS3Fag
Why Do I Care?

How automation and artificial intelligence (A.I.) are changing the role of sales

I care because:

• Career in Sales
• International Sales Trainer
• Future Economic Growth and Jobs
Why Should You Care?
How automation and artificial intelligence (A.I.) are changing the role of sales

What do you need from your sales team??

• Qualified Leads
• Qualify Prospects
• MORE SALES!
Traditional Sales Process
B2B Timeline

1st

Hire a sales professional to “hunt” for new business

2nd

Purchase a list or use publicly available information to manually identify prospects

3rd

Have sales professional manually call or produce in-person visits to each prospect to engage in sales cycle

4th

Manually follow up with all prospects, until one accepts a meeting or buys your product

5th

Qualify, demonstrate, and close each account (sale)
Did you know...

**75% of B2B Buyers**
“New Forrester data shows that nearly 75% of B2B buyers prefer to buy online when purchasing products for work.”

**25% of B2B Companies**
“...Yet just 25% of B2B companies actively sell online.”
B2B Sales Still Pushing *(vs. Pull Marketing)*

Why this is important in the evolution of the sales process

**PUSH**
- Meet as many prospects as you can
- Majority of prospects are not likely a fit
- Eventually you identify potential prospects from the large number of people that are viable

**PULL**
- Marketing and brand-focused
- Use smart and innovative technologies to attract desired audience
- Nurture desired audience to a greater degree of brand loyalty.
Did you know...

1 Million U.S. B2B Sales People will LOSE their Jobs by 2020
“1 million U.S. B2B salespeople will lose their jobs to self-service ecommerce by 2020...”

20% of the B2B Sales Force
“... accounting for 20% of the B2B sales force.”
Sales 2017 and Beyond

More Efficiency

1st

Fewer Sales People

2nd

Automation of outbound lead generation

3rd

Direct alignment between the sales process and marketing message

4th

Automation of sales person follow-up attempts

5th

AI and machine learning now being used to qualify prospects; while humans demonstrate, close and manage account
Customer Success:
Why Is It So Important to Be Proactive?
What is Customer Success?
And, why should you care?

Customer Success: "An Emerging Role in Business" (Wikipedia)

Customer Success is the function at a company responsible for managing the relationship between a vendor and its customers.

The goal of customer success is to make the customer as successful as possible, which in turn, improves customer lifetime value for the vendor.
Customer Success
Why it’s important to get on the bandwagon

Identify additional revenue streams with current clients

Increase repeat business

Create brand loyalty in an ever-increasing competitive marketplace

Increase overall lifetime value of client relationship

Generate more revenue and higher profits for your company, long-term
Social Media
More ways to reach your clients...

A recent study conducted by Content Marketing Institute and Marketing Profs found that, of over 1,500 B2B marketers surveyed “more than 50% of respondents noted they will increase their content marketing spend in the next 12 months.”

Social Media is finally beginning to pay off!
Mobility
Reach your prospects where they are today, and where they will be tomorrow!

30% “of total ad spend in the first half of 2015” went to mobile; this has increased nearly every year – and A.I. is improving the ROI.
Artificial Intelligence Projections

Why A.I. and automation will only get better...

In 2015, the Artificial Intelligence industry had an estimated value of $525 MILLION.

With a CAGR of 17.2%, the AI industry is poised to be worth $14.2 billion by 2023.

$14.2 BILLION
Artificially Intelligent Sales Assistant

Conversica eliminates the hard work of contacting, engaging, nurturing and qualifying leads

- Engages leads and prospects at the most opportune moment
- Tailors and tweaks responses to prospects to get the best results
- Qualifies leads prior to human sales person hand-off

www.conversica.com  https://youtu.be/ITdJXusVW0E
Automation based on big data and machine learning

**Personalized. Data-driven. Trigger-based. Cold outreach.**

- Trigger event timing
- 100+ Data Points for automated personalization
- Automated follow-up and higher positive response rate
Thank You!

How automation and artificial intelligence (A.I.) are changing the role of sales

by Fionna Faulk

https://youtu.be/Y9FOyoS3Fag
Packaging R&D Projects @ CBU: A Progress Report

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Christian Brothers University
Projects

• Corrugated Box Corner Design

• Box Corner Stiffener Compression Strength

• Vibration Study of Continuous-Bubble Wrap
Corrugated Box Corner Design

Regular Slotted Container (RSC)
Box Compression Strength

A typical, regular slotted container (RSC), carries about 1/3 of load on its four side walls and about 2/3 of load on its four vertical corners.

Thus, improving a box corner would increase box compression strength.
One-Corner Test Setup

Conventional One-Angle Corner Design

Proposed Three-Angle Corner Design
<table>
<thead>
<tr>
<th>Pair</th>
<th>Maximum Compression Load (lb)</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One-Angle Corner</td>
<td>Three-Angle Corner</td>
</tr>
<tr>
<td>1</td>
<td>229</td>
<td>278</td>
</tr>
<tr>
<td>2</td>
<td>193</td>
<td>221</td>
</tr>
</tbody>
</table>

Average = 18
Four-Corner Test Setup

Conventional One-Angle Corner Design

Proposed Three-Angle Corner Design
<table>
<thead>
<tr>
<th>Pair</th>
<th>Box Size WxLxH</th>
<th>Maximum Compression Load (lb)</th>
<th>% Increase</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>One-Angle Corner</td>
<td>Three-Angle Corner</td>
</tr>
<tr>
<td>1</td>
<td>12”x9”x7”</td>
<td>535</td>
<td>706</td>
</tr>
<tr>
<td>2</td>
<td>12”x12”x12”</td>
<td>539</td>
<td>988</td>
</tr>
<tr>
<td>3</td>
<td>16”x12”x12”</td>
<td>278</td>
<td>564</td>
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<tr>
<td>4</td>
<td>24”x18”x18”</td>
<td>428</td>
<td>663</td>
</tr>
<tr>
<td>5</td>
<td>20”x20”x24”</td>
<td>424</td>
<td>581</td>
</tr>
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</table>
Failure
Discussion & Conclusion

- This preliminary study showed that by pushing each corner inward to form the three-angle corner configuration the box strength increased significantly without increasing in materials.
- Top and bottom flaps were omitted in this study to simplify specimen preparation. Designing these flaps would be a challenge.
- The purpose of this preliminary study was to test the concept of using a three-angle corner configuration to strengthen box compression strength.
Box Corner Stiffener Compression Strength

About 30” long column stiffeners were cut into 6” long pieces
Specimens were conditioned at different combinations of temperature and humidity for at least 20 hours. They were then compressed.
<table>
<thead>
<tr>
<th>Date</th>
<th>Ambient Temp (F)</th>
<th>Ambient RH (%)</th>
<th>Chamber Temp (F)</th>
<th>Chamber RH (%)</th>
<th>Pmax (lb)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Avg</th>
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</thead>
<tbody>
<tr>
<td>10/25/17</td>
<td>66.6</td>
<td>37</td>
<td>73</td>
<td>36.1</td>
<td>1705</td>
<td>1809</td>
<td>1811</td>
<td>1760</td>
<td>1827</td>
<td>1782</td>
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<td>10/24/17</td>
<td>69.3</td>
<td>43</td>
<td>73</td>
<td>50</td>
<td>1550</td>
<td>1510</td>
<td>1590</td>
<td>1520</td>
<td>1527</td>
<td>1539</td>
<td></td>
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<tr>
<td>10/26/17</td>
<td>66.7</td>
<td>38</td>
<td>73</td>
<td>70</td>
<td>1450</td>
<td>1431</td>
<td>1462</td>
<td>1485</td>
<td>1462</td>
<td>1458</td>
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<tr>
<td>10/27/17</td>
<td>68.5</td>
<td>40</td>
<td>73</td>
<td>90</td>
<td>840</td>
<td>866</td>
<td>892</td>
<td>864</td>
<td>829</td>
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</tbody>
</table>

Effect of RH (@ 73F)

\[ y = -15.804x + 2381.9 \]

\[ R^2 = 0.8981 \]
Effect of Temperature (@ 50% RH)

y = -2.0706x + 1710.1
R² = 0.9746

<table>
<thead>
<tr>
<th>Date</th>
<th>Ambient Temp (F)</th>
<th>Ambient RH (%)</th>
<th>Chamber Temp (F)</th>
<th>Chamber RH (%)</th>
<th>Pmax (lb) 1</th>
<th>Pmax (lb) 2</th>
<th>Pmax (lb) 3</th>
<th>Pmax (lb) 4</th>
<th>Pmax (lb) 5</th>
<th>Pmax (lb) Avg</th>
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<td>73</td>
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<td>1590</td>
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<td>10/29/17</td>
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<td>1396</td>
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</tbody>
</table>
Discussion & Conclusion

• At the standard test environment (73F, 50%RH), the four corner stiffeners can carry a total of $= 4 \times 1,539 \text{ lb} = 6,156 \text{ lb}$. Please note that this is based on the 6-in stiffener length. The actual stiffener length is about 30 inches. Thus, the actual capacity would be less.

• Under 73F, the stiffener strength reduces about 16 lb per 1% increase in RH.

• Under 50% RH, the stiffener strength reduces about 2 lb per 1F increase in temperature.
Vibration Study of Continuous-Bubble Wrap
Previous Study

The inflated continuous bubble wraps used in this study reduced the impact acceleration by 10% to 40% while the traditional individual wraps reduced less than 10%.
- Empty Tote
- 9.5-lb Weight Added (shown on graph as 10-lb)
- 19-lb Weight Added (shown on graph as 20-lb)

- ISTA 3A Over the Road Trailer (30 mins)
- ASTM 4169 Truck Level 1 (30 mins)
ISTA 3A Over the Road Trailer (30 mins)
ISTA 3A Over the Road Trailer (30 mins)
ISTA 3A Over the Road Trailer (30 mins)
ASTM 4169 Truck Level 1 (30 mins)

![Graph showing two lines: one for No Wrap - 0 lbs and one for Wrap - 0 lbs. The graph plots frequency (Hz) against (G^2/Hz). The x-axis ranges from 1.00E-01 to 1.00E+03, and the y-axis ranges from 1.00E-09 to 1.00E+00.](image)
ASTM 4169 Truck Level 1 (30 mins)
Discussion & Conclusion

- At low range frequencies (1 - 10 Hz), the bubble wrap made no difference.

- At medium range frequencies (10 - less than 100 Hz), the bubble wrap made the situation worse.

- At high range frequencies (100 - 300 Hz), the bubble wrap did help in reducing the impact.
Update on New Lab Building

Option A
Dick Gadomski/Pong Original Plan – Packaging, Surface Water Institute, and Additive Manufacturing

$4.0 million project cost
*excludes new equipment

- 23,000 New SF
- 16,000 SF Benilde Remains
- 39,000 SF total
- Open August 2019

Option B
Upgrades building quality of Option A – Packaging, Surface Water Institute, and Additive Manufacturing

$5.3 million project cost
*excludes new equipment

- 23,000 New SF
- 16,000 SF Benilde Remains
- 39,000 SF total
- Open August 2019

Option C
Addition to Benilde to meet all School of Engineering needs

$8.0 million project cost
*excludes new equipment

- 35,000 New SF
- 16,000 SF Benilde Remains
- 51,000 SF total
- Open January 2020

Option D
New Gadomski School of Engineering building – meets all School of Engineering needs

$11.4 million project cost
*includes $1 million equipment cost

- 51,000 New SF
- Demolish Benilde
- 51,000 SF total
- Open January 2020