Webinar: Optimizing Packaging's Impact in the Supply Chain

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Supply Chain Management Series (SCMS) Series

Optimizing Packaging's Impact in the Supply Chain

Sept 1-2, 2015 | Georgia Tech Global Learning Center

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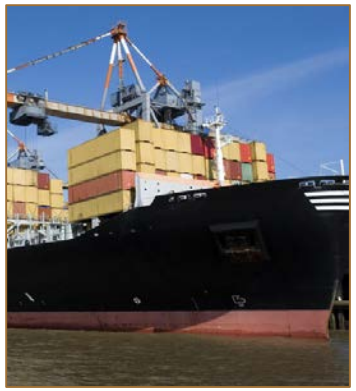

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This is to certify that

George P. Burdell

has successfully completed the Georgia Tech

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and is therefore awarded this professional *Certificate of Program Completion* on

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Webinar Agenda

- Introduction
- Course Content
- Questions/Discussion
- Case Studies / Applications

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Introduction

Packaging for the Supply Chain Professional

Supply Chain Professionals need to understand packaging's important impacts on the supply chain

Transportation Packaging for Supply Chain

Identify Opportunities for Improvement

Apply to Your Own Situations

Introduction
Packaging for the Supply Chain Professional

- **Sustainability meets cost reduction**
  - Cost savings is the business driver
- **Go where the money is**
  - The largest breakthroughs are in logistics
  - Leverage packaging design for system cost reduction
- **Damage, Logistics Costs, Customer Experience**
  - Three major motivators

Introduction
Packaging for the Supply Chain Professional

- **Workshop format**
  - Examples, pictures, case studies, references
- **Flexibility to discuss questions and applications**
- **Small group discussions**
- **Pre-seminar prep work, real-life situations**
- **Expectations - what to get out of this seminar?**

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Packaging's Impact on the Supply Chain

DAY 1 AGENDA

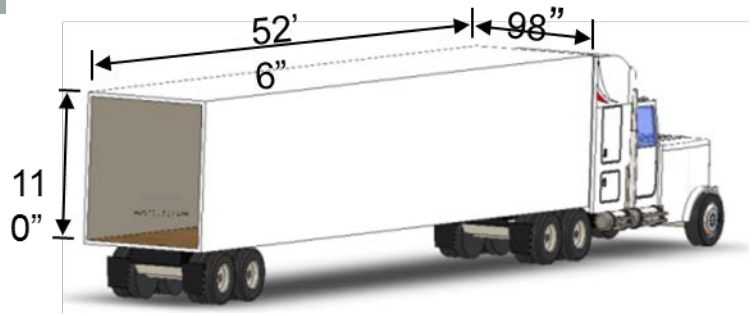
- Introduction
- Transport Packaging Basics
  - The Package Unit
  - Design, Material, Performance
  - Transportation & Distribution
  - Total Costs
- Where Things Go Wrong
- Case Studies / Applications
  - Examples and Exercise

DAY 2 AGENDA

- Damage
  - Hazards in Transportation
  - Defining the Environment
- Cost Reduction
  - Strategies for Optimization
- Sustainability
- Case Studies / Applications

Transport Packaging Basics

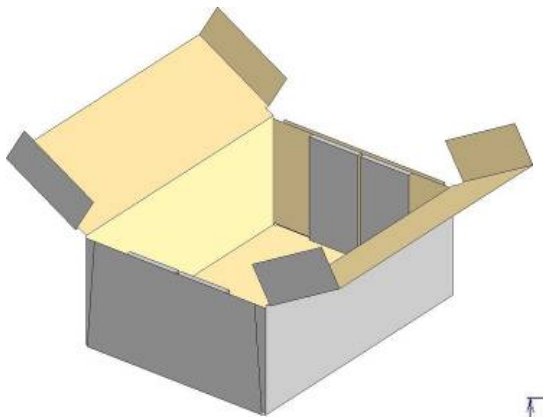
The Package Unit

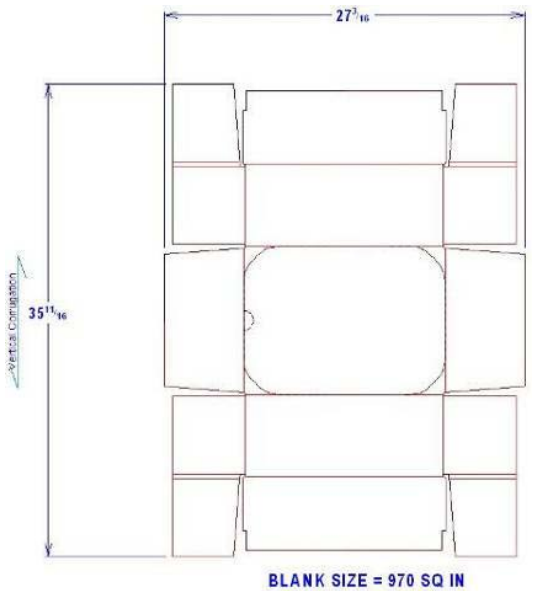


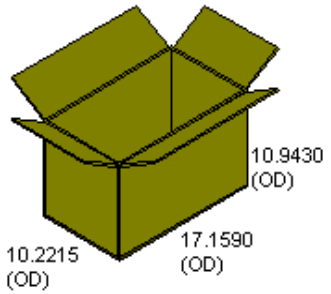
Pics Youtube.com tstotopix.me

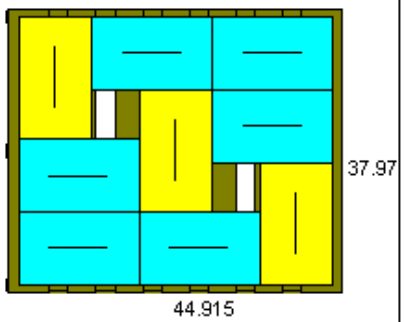
Transport Packaging Basics

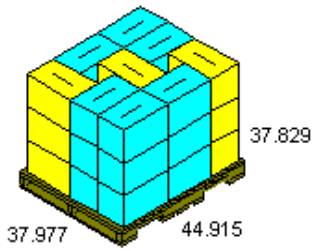
Design, Material, Performance











RSC (FEFCO 0201) 17.1590x10.2215x10.9430

	Shipper (ID)	Shipper (OD)	Unit Load (Incl. Pal)
Ln:	16.6250 in	17.1590 in	44.915 in
Wd:	9.6875 in	10.2215 in	37.977 in
Ht:	9.8750 in	10.9430 in	37.829 in
Grs:		51.000 lb	1442.000 lb
Cube:	0.9204 ft3	1.1107 ft3	37.3412 ft3
		Height Vert	
Shipper:			27
Area Efficiency:		0.00 %	82.21 %
Cubic Efficiency:		0.00 %	67.48 %
Cases per layer:			9
Layers/load:			3
Pattern:			Diagonal
RSC Area:		8.05 ft2	217 ft2
Board:	200-MULLEN 33-26M-26-26M-33-C/B		

Notes: Stretch wrap units to pallet; Column stack only

Transport Packaging Basics

Packaging Test Labs, Facilities

Transport Packaging Basics
Packaging Testing

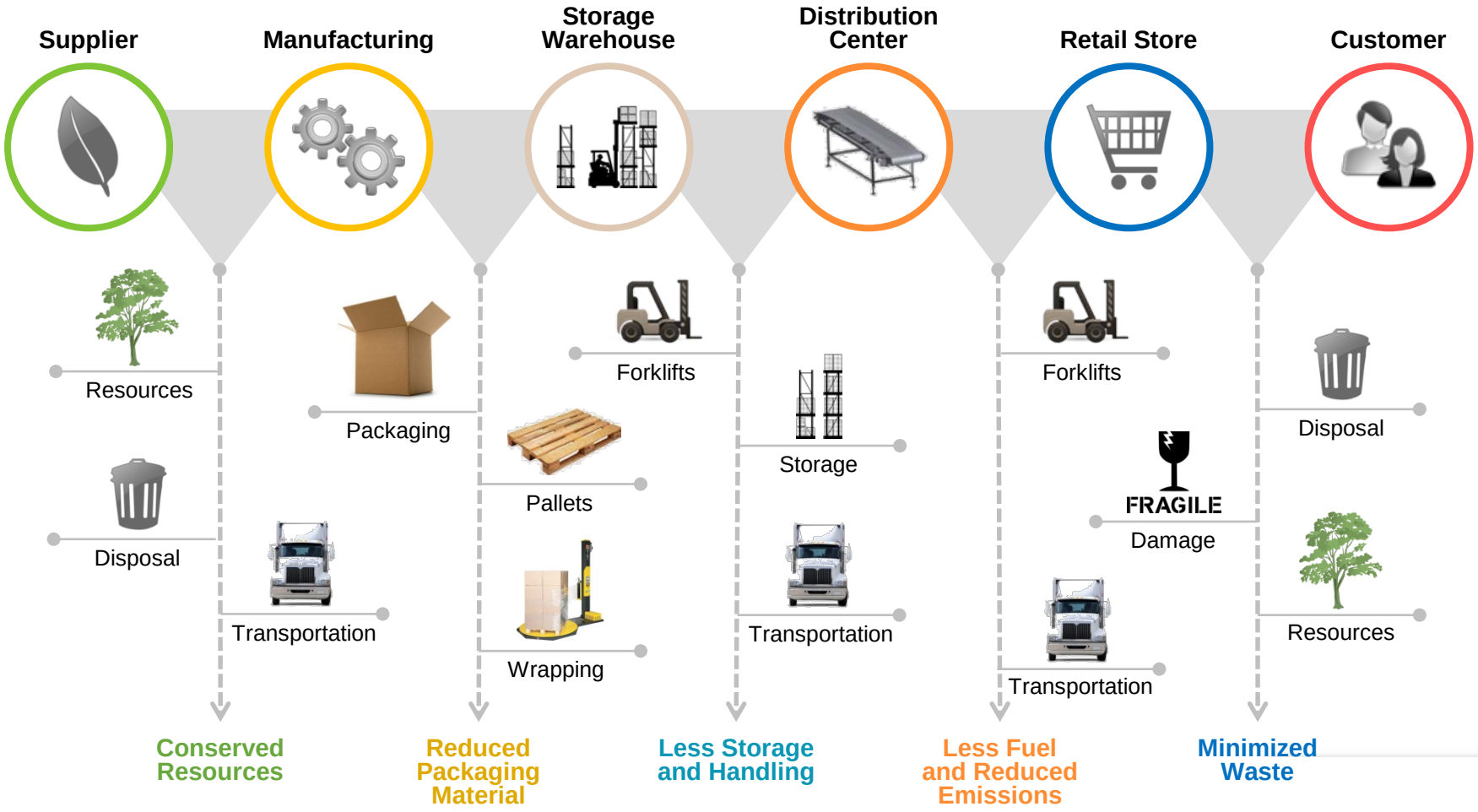
- **Real life shipments**
  - Problem with “let’s try it”?
  - Singular event, was it a smooth or rough journey?
- **Advantages of Laboratory Testing**
  - Save time – a lot of information in short time
  - Save money – less than fuel, driver and equipment costs
  - Know what the packaging/product has been subjected to
  - Testing replicates a harsh environment: controlled, predictable
  - Identify and isolate what causes problems

Transport Packaging Basics

Transportation & Distribution

Impact of Packaging on the Supply Chain

Holist View of Packaging



Transport Packaging Basics

The Seven Major Hazards

- Manual Handling
- Mechanical Handling
- Warehouse Stacking (Static)
- Vehicle Compression (Dynamic)
- Vehicle Vibration
- Horizontal Impact
- Environmental conditions

Seven Major Distribution Hazards

Environment		Event and Hazard	Damage Observation	Simulation Tests	What to Do/Action
	Rough Handling	Shock, drop, tip-over, side and top impact	Crushed corners, punctures, concealed damage	Shock and drop testing	Cushioning, handling features, right amount of materials
	Warehouse Stacking	Vertical compression from stacking, horizontal for clamp handling, static loads over time	Crushed cases, toppled stacks, creased sides, bulging rows on pallets	Top to bottom compression, side clamp handling	Racking height limits, increased materials strength and safety factors
	In-Transit Stacking	Dynamic vertical compression for TL & LTL due to shock input	Crushed cases, toppled stacks, creased sides, bulging cases	Compression testing (safety factors), Cubic ft. average load (density)	Anticipate mixed loads & stacking, increased safety factors
	Vehicle Vibration	Vibration resonance, amplification through stacks due to vibration input	Abrasion, fatigue, (wine glass shattering due to sound resonance)	Vibration resonance, random vibration/shake, real-life ship tests	Air ride vans, load restraints (damage free bars, airbags), unitize load, harden products
	Loose Load Vibration	Transient shock, stack amplification, tumbling or falling load	Drop, abrasion, excessive compression	Repetitive shock, (burst tests),	Air ride vans, load restraints (DFB damage free bars), harden products
	Horizontal Impact	Lateral compression, rail car switching and humping	Shifted loads, crushed cases, blocked doors, tip overs	Horizontal impact, (sled test)	Load blocking & bracing, cushion cars/hydro-cushion, avoid humping
	Environmental Conditions	Condensation in container, trapped heat in trailer, altitude in airplane, rain and snow, ambient humidity	Warped board, exploded edges, discoloration, frozen & brittle products, corrosion and rusting	Temperature, humidity cycling, atmospheric pressure, high & Low	Specialized transport (Reefer), insulated materials, corrosion prevention materials

PRODUCT + PACKAGE = ENVIRONMENT

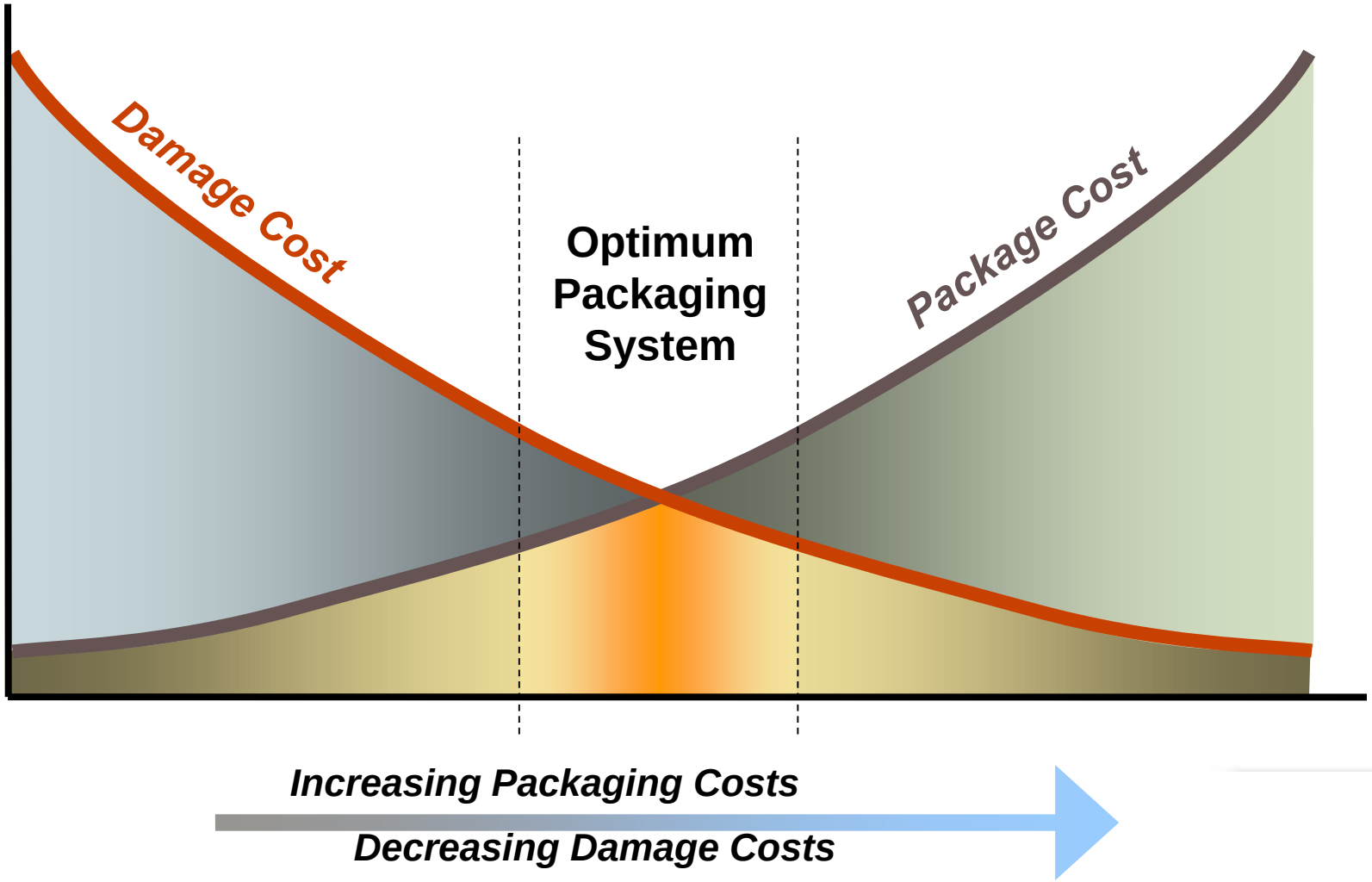
The environment encompasses . . .

- Mode of distribution: truck, rail, air, ocean, etc.
- Handling methods: push/pull, fork, clamp, pallet jack
- Storage/warehousing: stack height, racking
- Conditions: temperature, humidity
- Palletization: over/underhang, double stack, floorloading
- Many other variables

Product + package < environment….Damage

Product + package > environment….Over Packaged

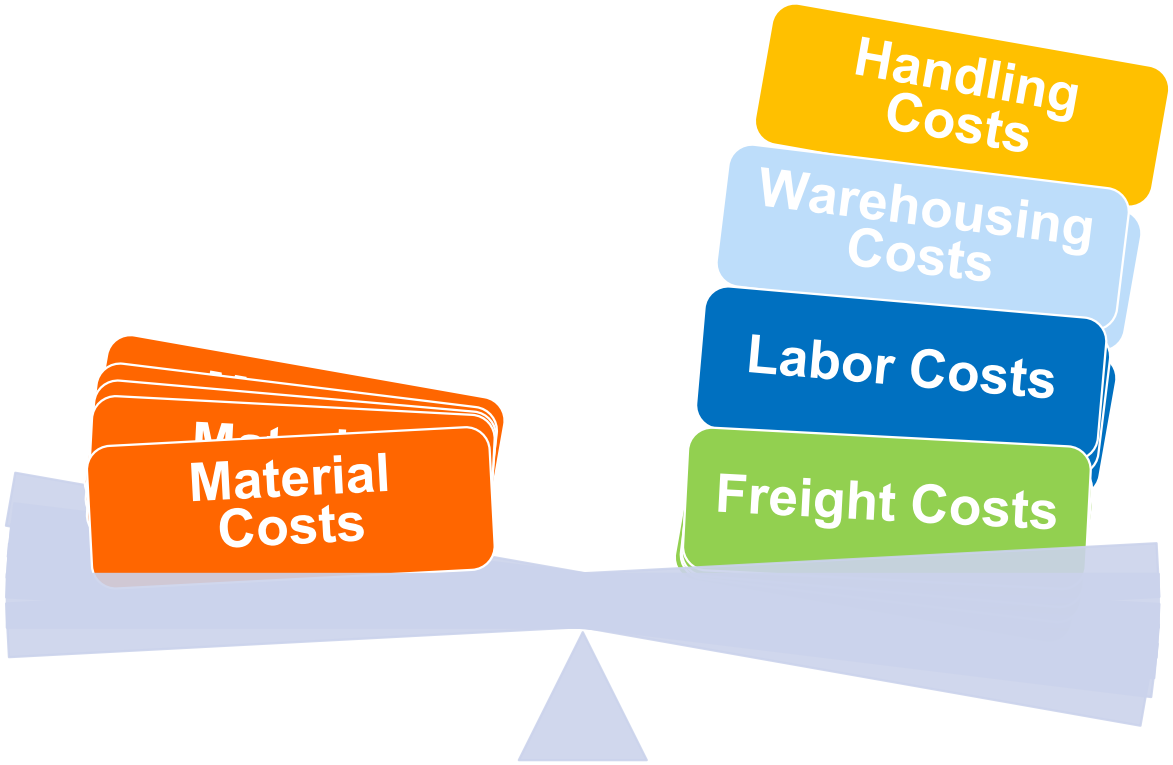
Packaging Performance



Real Cost of Damage

- **Price of product**
  - Cost of raw materials, manufacturing, logistics
- **What else?**
  - Markdowns, discounted products, slow product turnover
  - Rework: in field service, travel costs, expedited shipping costs
  - Return shipment costs, disposal cost of damaged unit
  - Interruptions: delayed installations, missed deadlines, project planning
  - Sustainability, waste
  - Customer satisfaction: value of dissatisfied/lost customer

Transport Packaging Basics



The Truth About Sustainability

MYTH

- It's a bad thing
- It's for tree huggers
- Costs more money
- Must be "green"
  - Compostable
  - Biodegradable
  - Recycled

REALITY

- Makes business sense
- Provides long-term benefits
  - Financial benefits
  - Environmental benefits

Sustainability with $avings

Sustainability

Environmental Impact of Packaging

Natural Resource Consumption

Greenhouse Gas Emission

Sustainability

Minimize Environmental Impact of Packaging

- **Material Consumption (Fiber):**
  - Reduce or Eliminate Materials
  - Substitute Packaging Materials

- **Greenhouse Gases (Diesel, Energy):**
  - Reduce Weight
  - Increase Shipping Densities

Practical Steps

- **Two areas of focus for packaging improvement opportunities**

Packaging Materials

Packaging Volume

Practical Steps to Minimize Environmental Impact

Reduce Material

- Reduced expenses
- Less material in waste stream
- Fewer disposal challenges
- Reduced weight
- Cube utilization

Examples

- Right-weighting packaging materials
- Shared load packaging strategies
- Minimize internal packaging
- Proper amounts of cushioning

Practical Steps to Minimize Environmental Impact

Reduce Volume

- Decreased freight costs
- Decreased small parcel ship costs
- Increased throughput
- Storage, warehouse savings
- Handling, labor savings




Examples

- Eliminate headspace and voids
- Minimize case dimensions
- Pallet unit load optimization
- Primary packaging size

Sustainability

- **Sources for Sustainability Calculations:**
  - www.climatecrisis.net/takeaction/carboncalculator/howitwascalculated.html
  - www.worldshipping.org/pdf/WSC_fuel_statement_final.pdf
  - www.replanttrees.org/biz%20calc/BusForm.htm
  - www.papercalculator.org
  - http://www.design-compass.org/
  - http://www.epa.gov/sustainability/
  - national renewable energy lab - http://www.nrel.gov/

Sustainability

Assumptions (from website sources):

- CO_2 per combusted gallon of diesel = 22.2 lbs/gal
- 3052 Tons of Diesel consumed for 14 Day Trip Ocean Vessel
- Max Load of 3,875 Containers (40’) per Ship
- Diesel weighs approx. 7 lbs/gal
- Average mpg Diesel for Truck and Trailers = 7.5 mpg
- 101lbs of corrugated material equivalent to 1 tree

Case Study: Meat Products

Objective

- Reduce Packaging Damage During Transit
- Decrease Supply Chain Costs

Case Study: Meat Products

Solution

- Solve for Damage
- Optimize for Cubic Densities and Transit Efficiencies
- Utilize Shared-Load Concepts
- Improve Stacking Performance

Case Study: Meat Products

Solution

ORIGINAL CASE

16 x 11 x 5.25
90 cases per pallet

REDESIGNED CASE

Quantity Difference:
54 cases

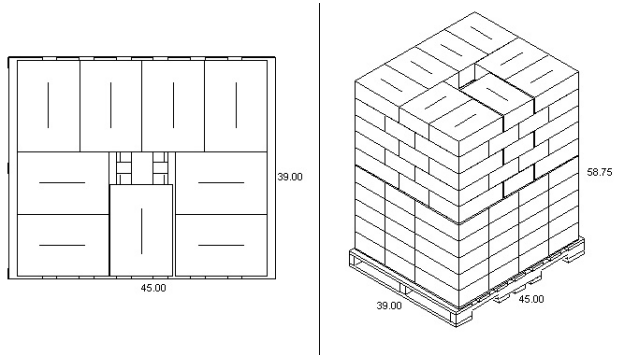
Increase: 60%

15.125 x 9.5 x 4.875
144 cases per pallet

Case Study: Meat Products

Solution

ORIGINAL CASE



REDESIGNED CASE

60% More Cases per Pallet

Case Study: Meat Products

Results: For Each Million Units

BUSINESS RESULTS	
Material Savings	**$125,000**
Labor Savings	**$5,000**
Warehouse Savings	**$86,000**
Pallet Savings	**$19,000**

SUSTAINABILITY RESULTS	
C-Flute Reduction	**3,165,305 ft^2**
Pallet Reduction	**4,400**

BOTTOM LINE:

$235,000
Costs Saved

164 Tons
Fiber Reduced

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Questions and Discussion for the Course

- **Potential Questions**
  - Retail vs. CPG vs. Industrial?
  - What preparation is required? Expectations from participants?
  - What about e-Commerce?

- **Inputs from Participants**
  - Tailored content and applications

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- **Case Studies / Applications**

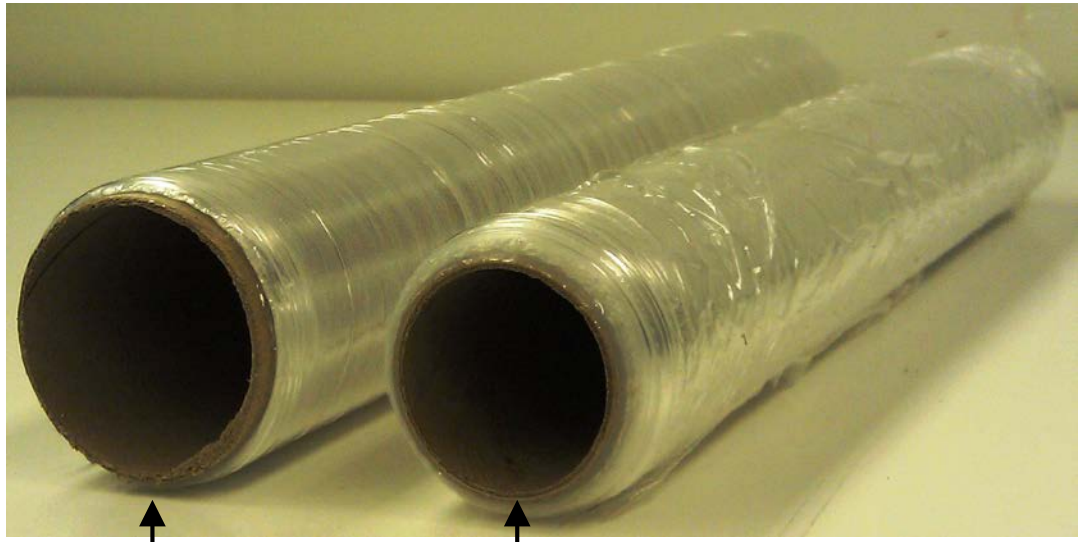
Case Study: Clear Plastic Wrap

Objective

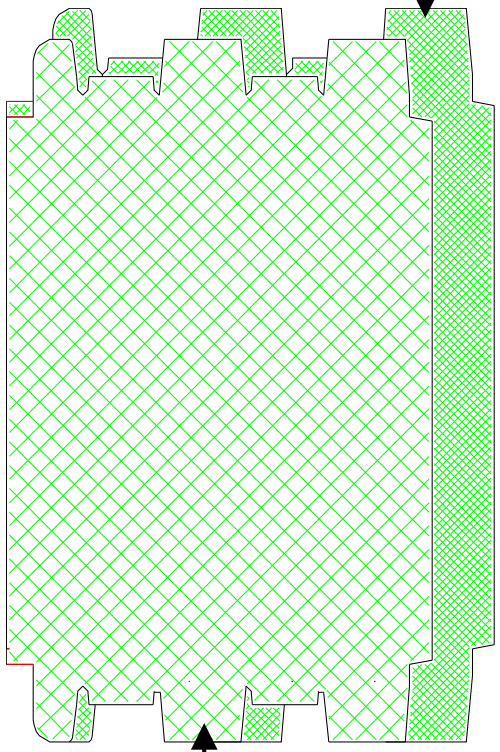
Optimize Product Dimensions to Reduce Material Consumption

Case Study: Clear Plastic Wrap

Solution



ORIGINAL: 1.625” REDESIGNED: 1.25”

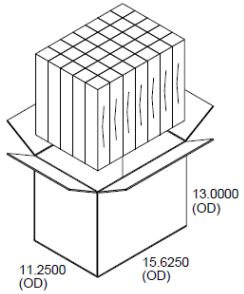


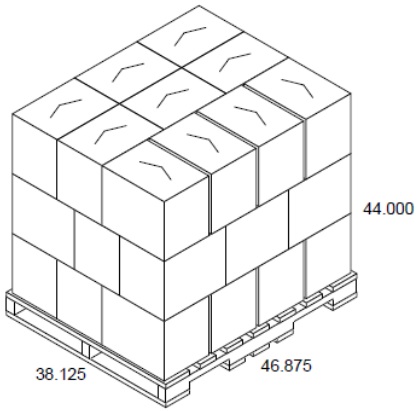
- Space Saving Carton Reduction ~ 16%
- Core Size Reduction ~ 23%
- Corrugated Case Reduction ~ 18%
- New Unit Load Configurations ~ 30%

Case Study: Clear Plastic Wrap

Solution

ORIGINAL CASE





REDESIGNED CASE

30% More Cartons per Pallet

18% Corrugated Reduction

Case Study: Clear Plastic Wrap

Results: For Each Million Units

BUSINESS RESULTS	
Material Savings	**$300,000**
Freight Savings	**$75,000**
Labor, Warehouse, & Handling Savings	**$40,000**

SUSTAINABILITY RESULTS	
Paper Reduction	**2,559,524 ft^2**
Pallet Reduction	**2,200**

BOTTOM LINE:

$415,000
Costs Saved

33 Tons
Fiber Reduced

1,400 Tons
CO_2 Eliminated

Case Study: Medical Device

Objective

- Decrease Transit Damage
- Identify Improvement Opportunities

Case Study: Medical Device

Solution

Tray Re-Design with Paired Products

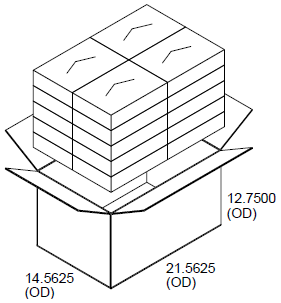
ORIGINAL VS. RE-DESIGNED TRAY		
	Original	Re-designed
Length	11.15	9.41
Width	7.625	7.44
Height	2.625	2.625
Cube	223	184
Reduction		**18%**

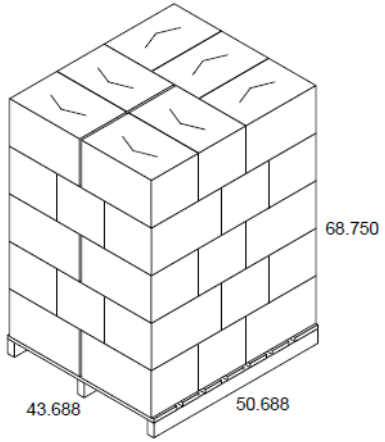
RE-DESIGNED TRAY

Case Study: Medical Device

Solution

OLD CONFIGURATION (700)





NEW CONFIGURATION (800)

14% More Units per Pallet

9% Corrugated Reduction

Case Study: Medical Device

Results: For Each Million Units

BUSINESS RESULTS	
Material Savings	**$86,000**
Freight Savings	**$14,000**
Labor, Warehouse, & Handling Savings	**$8,000**
Sterilization Savings	**14%**

SUSTAINABILITY RESULTS	
Paper Reduction	**66,000 ft^2**
Pallets Eliminated	**420**
Tray Material Savings	**18%**
Lid Material Savings	**15%**

BOTTOM LINE:

$108,000
Costs Saved

6 Tons
Fiber Reduced

270 Tons
CO_2 Eliminated

Conclusion

- **An ROI challenge for participants:**
  - Bring a packaging challenge to be solved
  - Take home new idea that can be applied to your situation

Conclusion

- **What questions do you have about your system: what do you need to learn or know?**
- **Where is the money in your packaging or supply chain system?**
- **How are you going to approach packaging cost reductions and sustainability improvements?**

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For more information, please contact

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Questions?

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