Essentials of Transport Packaging

An output from Sustainable Packaging Coalition’s Member-led Working Group
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INTRODUCTION TO TRANSPORT PACKAGING
Tertiary or Transport Package is –

A shipping unit that provides containment and protection to goods during handling, storage, and transportation. The term includes all industrial packaging and the shipping containers for consumer products.

Source: IoPP
Primary Packaging:
The packaging which contains the product. Provides protection and containment, but is not necessarily suitable for transport.

Secondary Packaging:
The packaging which contains one or more primary packages. It aids in containment, handling, unitization and damage prevention.

Tertiary Packaging:
The packaging which is used to group secondary packaging together to aid handling, unitization, transportation and damage prevention to products.

*Depending on scenario, containment box may be considered secondary or tertiary package.
Primary Packaging: The packaging which contains the product. Provides protection and containment, but is not necessarily suitable for transport.

Secondary Packaging: The packaging which contains one or more primary packages. It aids in containment, handling, unitization and damage prevention.

Tertiary Packaging: The packaging which is used to group secondary packaging together to aid handling, unitization, transportation and damage prevention to products.
Defining Sustainability for Packaging

- Is beneficial, safe & healthy for individuals and communities throughout its life cycle;
- Meets market criteria for both performance and cost;
- Is sourced, manufactured, transported, and recycled using renewable energy;
- Is effectively recovered and utilized in biological and/or industrial closed loop cycles.
- Is physically designed to optimize materials and energy;
- Optimizes the use of renewable or recycled source materials;
- Is manufactured using clean production technologies and best practices;
- Is made from materials healthy in all probable end of life scenarios;
TRANSPORT PACKAGING EXAMPLES
Transport Packaging Format

Pallets, Skids – Flat unit load support

- Size, material, and specifications based on intended use and performance requirements
- Rackable and non-rackable
- Nestable and non-nestable
- 2-way and 4-way entry
Transport Packaging Format

Slip Sheets – Flat unit load support

- Material varies by intended use
- Single vs. double lip based on loading requirements

Kraft

Corrugated
Transport Packaging Format

Containers – Used for the conveyance of consumer goods

• Material varies by use
  – Shipping Boxes
  – Shipping tubes
  – Reusable Plastic & Metal Containers
  – Stackable
  – Nestable
  – Foldable

- Plastic Stackable
- Expanded Polymer
- Liquid Transport
- Corrugated Stackable
- Collapsible Containers
- Shipping Boxes & Tubes
Transport Packaging Format

More Containers – Used for the conveyance of consumer goods

- Multi-wall Bags, Sacks & Bulk Bags
  - Commercial & Industrial use
  - Machine filled
  - Hand set-up

- Wooden and metal crates
  - Stackable, nestable

- Drums and Barrels

- Specialty packaging
Transport Packaging Format

Trays – shallow platforms used in the conveyance of light loads

• Material varies by use (food-safe, non-porous, etc.)
  – Stackable and non-stackable
• Designed for liquid containment (deeper) or simple conveyance (shallower)
• Typically used in manufacturing lines for conveyance of work-in-process
Transport Packaging Format

Exterior Protection – packaging used to protect the tertiary packaging loads during distribution and transport

- Edge Protection
- Load Stabilization
- Protective Covers

Stretch Wrap
Metal Strapping
Dunnage
Reusable Cover
Edging
Plastic Strapping
Transport Packaging Format

Interior Protection – packaging used to protect package contents from damage or breakage during distribution and transport

- Cushioning
- Void Fill
- Blocking & Bracing
- Surface Protection
VALUE OF TRANSPORT PACKAGING
Value of Transport Packaging

**Activities**
- Efficient movement of product
- Efficient storage of product
- Labels, tracking, graphics
- Protection

**Benefits**
- Reducing fuel and transportation costs
- Ease of retrieval, storage, material handling
- Product identification and communication
- Security, tamper evidence, damage minimization
Packaging Synergies

• Packaging at different levels can work together to bring products safely to market

• Interactions can facilitate primary and secondary packaging reduction
  – Load sharing reduces requirements on individual components
  – Increased unit load stability
  – Group handling reduces damage opportunities

• Synergies facilitate system wide optimization

Example - floor ready display
BUSINESS MODELS
Business Models

**Closed Pool**
- Reduced Asset Losses among business partners
- May not be standardized for use out of closed pool
- Requires larger capital outlay, self-maintenance of pool

**Managed Pool**
- Focus on asset turns, re-use and repair
- Some standard design for use within region
- Owner maintains asset quality
- Potential for Nationwide pricing

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Brewer  
Bottler  
Manufacturer  
Retailer  
Asset Provider
Business Models

One Way
• Focus on recovery and cost effectiveness
• Often designed for specific dimensions
• Potential re-sale by network of recyclers
• Possible Regional pricing

Exchange
• Focus on asset balancing
• Reduces cube space during reverse logistics
PACKAGING IN MUNICIPAL SOLID WASTE
Packaging in U.S. Solid Waste

250 Million Tons Generated

Key Facts

- Containers & Packaging are 30% of North America’s Municipal Solid Waste
- 56% of these valuable resources are wasted in landfills.
- The remaining 44% are recycled; often downcycled into less valuable products.

Source: US EPA, 2010
Over 1/3 of U.S. Greenhouse Gas Emissions are attributable to Producing & Transporting Goods

Source: US EPA, 2009

*Includes use and provision of goods. Approximately 95% of the impacts are associated with the product

Source: US EPA, 2009
SUSTAINABILITY CONSIDERATIONS
Definition of Packaging Sustainability

Sustainable packaging optimizes the sustainability of the combined product and package system

- Is beneficial, safe & healthy for individuals and communities throughout its life cycle;
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- Meets market criteria for both performance and cost;
- Optimizes the use of renewable or recycled source materials;
- Is sourced, manufactured, transported, and recycled using renewable energy;
- Is manufactured using clean production technologies and best
- Is effectively recovered and utilized in biological and/or industrial closed loop cycles.
- Is made from materials healthy in all probable end of life scenarios;

Source: SPC, 2007
Important Sustainability Considerations

• Damage Reduction:
  – As “light weighting” removes material, Transport Packaging increasingly needs to facilitate damage reduction

• Cost / Material Value
  – What cost is market willing to pay?
  – Will package be recoverable for reuse, recycling, or composting?

• Dimensions
  – Loaded footprint, loaded trailer cube, return cube
  – Nestable or collapsible
Important Sustainability Considerations

• **Weight**
  – Lower weight saves fuel but can sacrifice strength

• **Strength**
  – Racking safety, payload capacity

• **Ease of Handling**
  – Manual or equipment focus
  – Load / unload / clean time

• **Conveyance of Information**
  – May accept labels, identify regulation compliance, or track units
Important Sustainability Considerations

• Material Health
  – Is the package safe and healthy for individuals and communities throughout its life cycle?
  – Is it beneficial/restorative to the natural environment?
  – What chemicals/materials are used to meet fire or invasive species codes?

• Reusability
  – Is it able to be re-used in its current form multiple times in the supply chain?
Important Sustainability Considerations

• Recyclability
  – Can it be effectively recovered and utilized in biological and/or industrial closed loop cycles?
  – Recyclable – in theory or practice?

• Recycled Content
  – Does it optimizes the use of renewable or recycled source materials?

• Material Weight / Strength
  – Lower weight saves fuel but can sacrifice strength and ability to repair the asset
Important Sustainability Considerations

• Repairability
  – Easy to repair and reclaim individual components?

• Ease of Sourcing
  – How rare and far away does the material come from?
Important Sustainability Considerations

• Quantifying and Communicating Environmental Benefits
• Use widely accepted, third party verified standards and certifications (eg. ISO 14040)
• Life Cycle Assessment (LCA)
• Consider waste, energy, GHG emissions.
SUPPLY CHAIN OPTIMIZATION & COLLABORATION
Supply Chain Links

“Brand owners and retailers may have direct control over as little as 5 percent of the environmental impacts of packaging and only indirect control over the other 95 percent.” – SPC, Packaging Digest 3/1/10

The product is only as sustainable as the weakest link in the system
Collaboration for Packaging Value

Benefits of Collaboration

• Best Practices Sharing
• Solve Challenges outside of vacuum
• Solutions can be expanded & transferred to other businesses or industries
• Interaction with other companies help businesses develop their technology

Collaboration Considerations

• Performance requirements
• Regulatory compliance requirements
• Technical/operational factors
• Aesthetic considerations
• Material availability
• Cost