



## *Utilizing Reusable Packaging in the Whirlpool Supply Chain*

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# Background Information

- Education
  - Michigan State University
    - 2000: Packaging
    - 2008: MBA
- Professional
  - Toyota '99-'08
    - Export Packaging Development
    - External/Internal Logistics
    - Vehicle Design
    - Packaging Digital Assembly
    - Assembly Engineering
    - Contributed Savings = \$50M
  - Whirlpool
    - Material Flow Improvement (Tier 1 to Plant Assembly Line)
    - Implementation of Returnable Packaging



# Agenda

- Whirlpool Background Information
- Reusable Packaging Types
- Reusable Packaging Event Cycle



# Whirlpool Background

- North American Production
  - Refrigeration, Cooking, Dish, Laundry, Countertop
- North American Sites
  - US=8, Mexico=3
- Returnable Packaging Percentage
  - ~30%



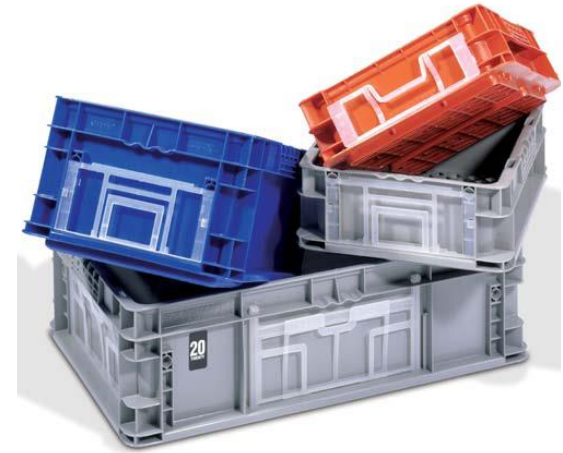
# The Truth Behind Reusable Packaging

- Why?
  - Earth Friendly
  - Lower Total Cost
  - Improved Quality
  - Increase Logistics Cube
  - Safety
  - Automation
  - Standardization
  - Flexibility
- Why Not?
  - Initial Investment
  - Loss/Attrition
  - Replacement
  - ‘Sharing’
  - Return Logistics
  - Cleaning
  - Weight
  - Proper Use
  - Calculation



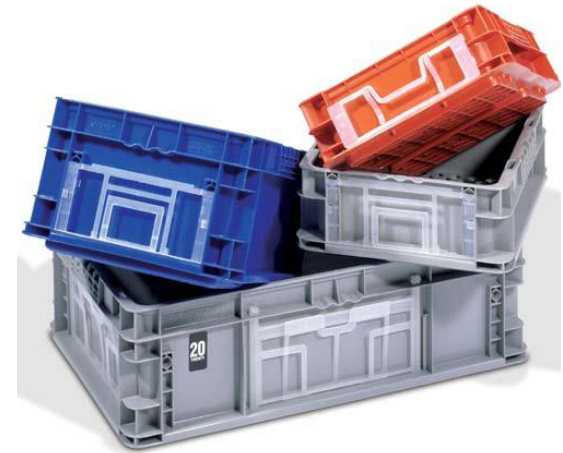
# Common Types

- Hand Held Totes
- Knock Down
- Bail n Bin
- Bulk Bins
- Steel Racks
- Overseas



# Common Types – Hand Held Totes

- Hand Held Totes
  - Multiple Sizes
  - Modular
  - Cube Efficient
  - Ergonomics
  - Cleanable



# Common Types – Knockdown Totes

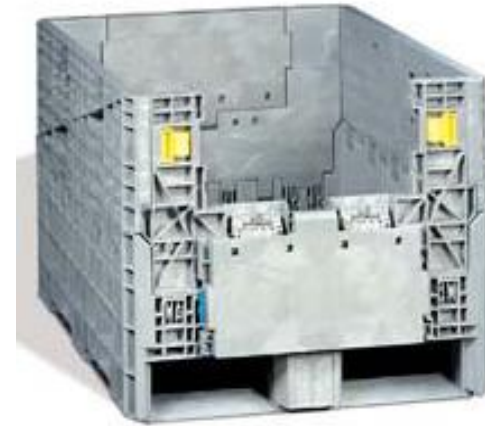
- Knockdown Totes
  - Multiple Sizes
  - Modular
  - Condensed
  - Ergonomic





# Common Types – Bulk Bin

- Bulk Bins
  - Collapsible
  - Modular
  - Ergonomic
  - Durable



# Common Types – Steel Racks

- Steel Racks
  - Engineered
  - Ergonomic
  - Durable



# Additional Items

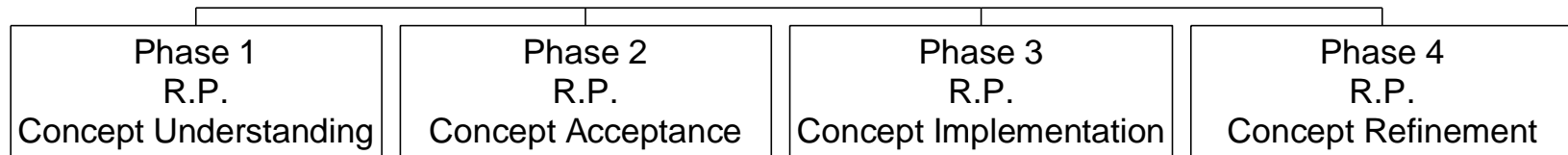
- Kanban Holders
- Labels
- Kennedy Placard
- Tote Labels
- Hot Stamps



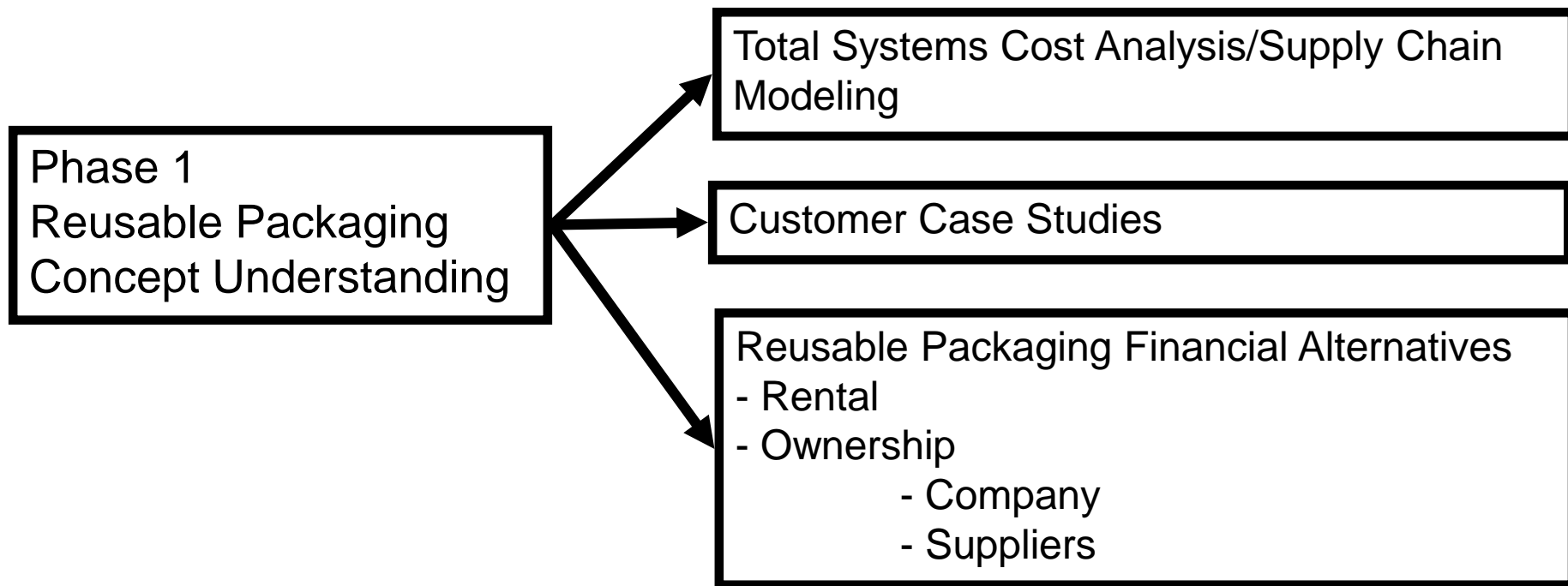
# Reusable Packaging Event Cycle



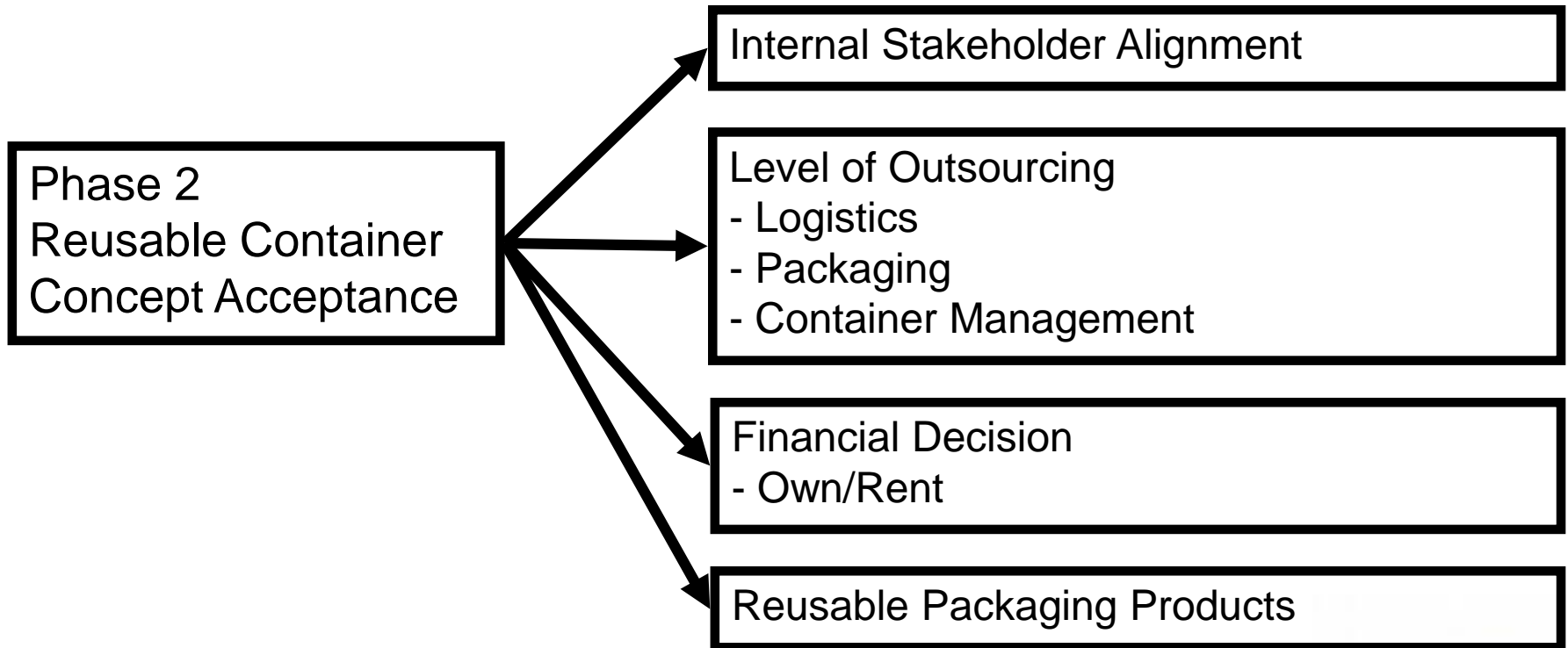
# The reusable packaging event cycle occurs in several phases



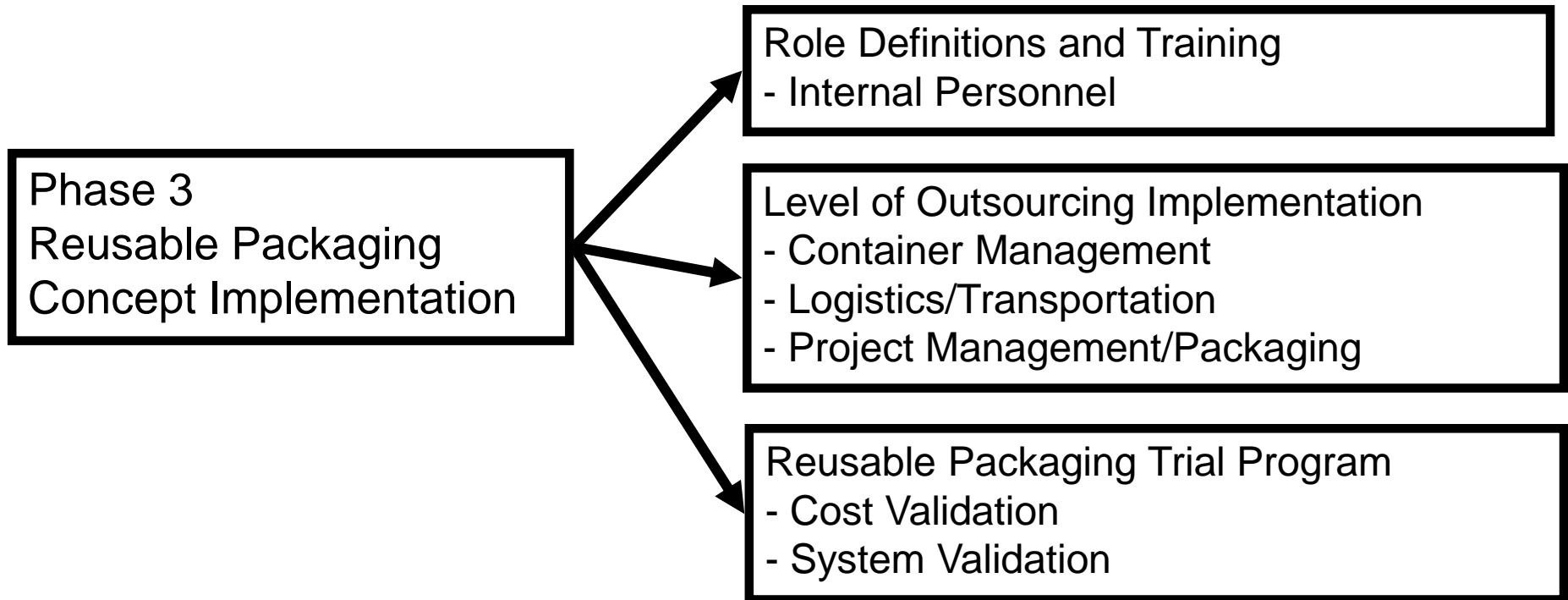
# Concept Understanding



# Concept Acceptance



# Concept Implementation

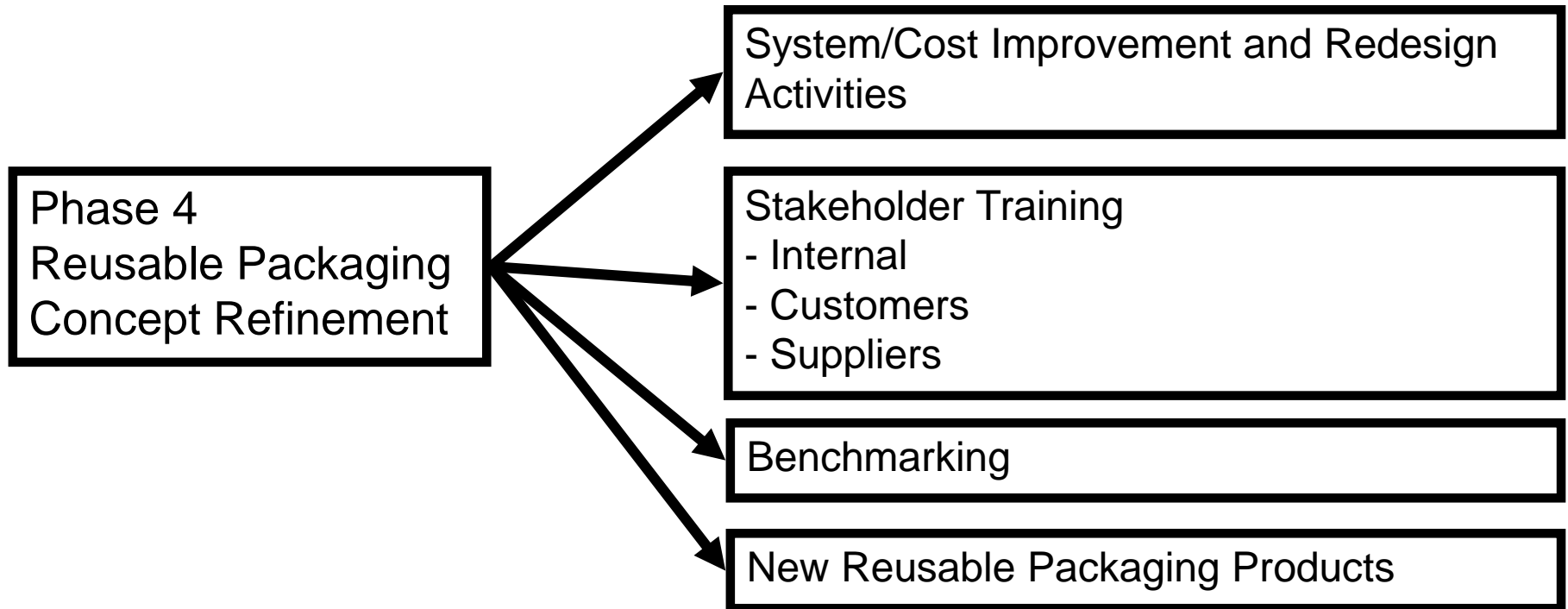


Whirlpool is at this stage in its reusable development





# Concept Refinement



Toyota is at this stage in its reusable development



# Whirlpool – What stage is Whirlpool at in the Event Cycle?

- Implementation
- However:
  - Long journey to gain acceptance = Must overcome silo organization
  - Understand current situation was challenging
  - Each plant has own philosophy
    - Returnable Corrugate Pooling
    - Buy returnables when/if budget is approved
    - Just happy to receive parts



# Cost Justification Calculation Process

- External Transportation
- Pc Price, Total Investment
- Internal Conveyance and Handling
- Safety
- Quality



# Low Change from Current Method

## Scenario: Full Flap boxes with Tape vs Straight Wall Tote Judge

|   |   |
|---|---|
| 1. Supplier prepare shipment (note: no need to tape)  | ○ |
| 2. External Logistics pick up freight   | ○ |
| 3. Customer unload, delivery to line  | ○ |
| 4. No need to cut open boxes  | - |
| 5. Customer pick up empty boxes from production line  | ○ |
| 6. Customer stage returns<br>(Staging returns takes the place of recycling, bailing, etc)                   | ○ |
| 7. External Logistics returns empties to Supplier   | + |
| 8. Supplier unload other Supplier pkg to receive empties<br>(Supplier already unloads empty expendable pkg) | ○ |

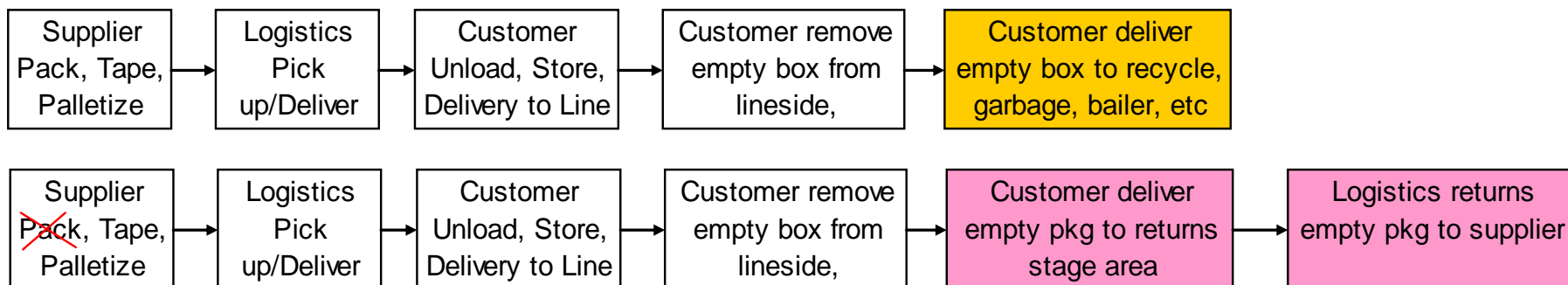
### Judge Criteria

+ = Additional work caused by Returnable

- = Removal of work caused by Returnable

○ = No difference to current method/movement

### Packaging, Activity Flow



# Transportation Calculation

- Assumptions

- Expendable = 60% Cube Utilization
- Returnable = 100% Cube Utilization
- \$1.65/Mile cost (one way)
- \$1.40/Mile Cost (round trip)
  - Guaranteed Round Trip often reduces rate

|       | Miles | Cost/Mile | Part/Day | Parts/Truck | Cost/Truck | Cost/Pc | Trucks/Day | Cost/day |
|-------|-------|-----------|----------|-------------|------------|---------|------------|----------|
| 1 Way | 500   | \$ 1.65   | 5000     | 600         | \$ 825     | \$ 1.38 | 8          | \$ 6,875 |
| 2 Way | 1000  | \$ 1.40   | 5000     | 1000        | \$ 1,400   | \$ 1.40 | 5          | \$ 7,000 |



# Packaging Cost Save Example

## Assumptions:

1. 10 pcs per box
2. 10 boxes per pallet
3. 15 system days
4. Daily Volume = 1000
5. Project Life = 4 yrs
6. 250 working days/yr

## • Expendable

- \$.85/Box, \$6/Pallet
- Cost/Pc = \$.145
- Cost/Yr = \$36K
- Cost/Project = \$145K

## • Returnable

- \$7/Box, \$70/Lid, Skid
- Cost/Pc = \$.021
- Cost/Yr = \$5K
- Cost/Project = \$21K



# Total Cost Calculation: Log + Pkg

|                  | Logistics Cost | Packaging Cost | Total   |
|------------------|----------------|----------------|---------|
| 1 Way/Expendable | \$ 1.38        | \$ 0.15        | \$ 1.52 |
| 2 Way/Returnable | \$ 1.40        | \$ 0.02        | \$ 1.42 |

Save/Pc → \$.10

Save/Yr → \$25K

Save/Project → \$100K

 Only 1 part number!



## Internal Returnable Flow?

- Returnable Packaging Supports
  - Improve safety, Labor = not cutting boxes
  - Dolly delivery, small lots, high frequency
- Calculation Process
  - Before and After Time, Manpower
  - Storage Space
    - Recycle Bin, Lineside, Warehouse, Stackability
- Challenge
  - Batch processing makes justification difficult





# Safety/Quality

- No cutting (Team Member/Part)
- Expendable Dunnage vs Returnable
- Note:
  - Maintenance is required to keep pkg clean, functional, safe and in the right place



## How is Whirlpool going to Implement?

- Selected standard packaging
  - Totes, Bulk Bins, Steel Rack Footprint
- Creating Whirlpack
  - Online database to hold packaging data
  - Available to all locations, suppliers and fabricators
  - Project management and packaging approval process tool
- Utilizing '2PP' to purchase packaging



## What's a 2PP?

- Second Party Packaging
- Purchase returnable packaging, lease to WHR over 4 years
- At end of lease?
  - WHR Re-lease for reduced cost
  - Other companies lease for reduced cost



# How Much Packaging is Necessary?

- Delivery Frequency (Internal/External)
- System Days
  - In-house
  - Supplier
  - Logistics
  - Other
- Daily Volume
- Inventory Requirements
- Things to consider:
  - How lean is your system? -> Cost/Space
  - Striving for lower investment can support a returnable process



# What Parts Need Returnables?

## Evaluate:

1. Quality Requirements
2. Safety
3. Presentation Requirements, Automation
4. Frequency of Pick up from Supplier
5. Distance from Supplier
6. Total Cost

Note: Higher frequency = Easier to justify  
Small Parts = Challenging to justify



# How to Decide Best Pack Size

- Space Lineside
  - Flow Rack
  - Footprint Storage Space
- Presentation Requirements
- Storage Space
- Delivery Frequency from Stores to Line
- Daily Volume
- Selected Standards



# How to Decide Best Pack Size

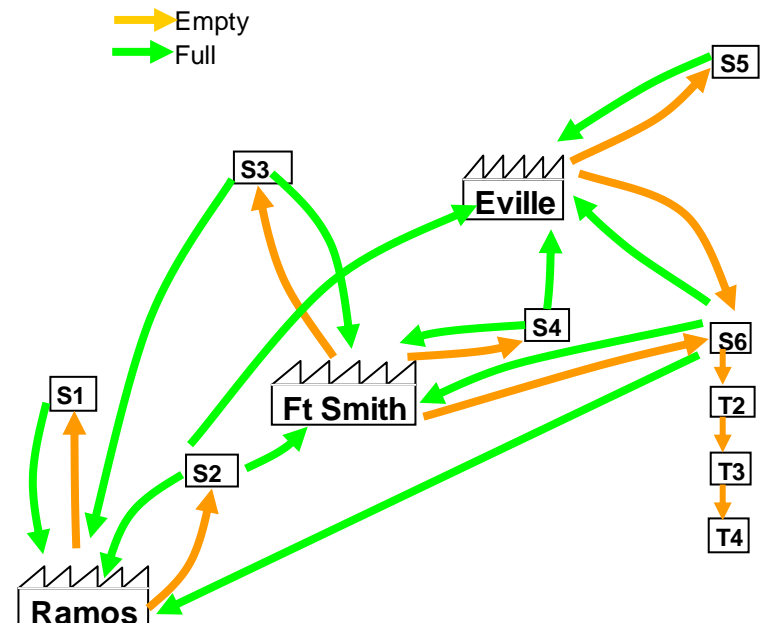
- Toyota:
  - Smallest Box, Highest Lot without exceeding max weight and quality
  - BUT, high volume large parts might come in large rack to support total system cost



# To Pool or Not to Pool

- What is it?
  - Sharing of common packaging among different locations vs dedicating packaging to specific part
  - Options:
    1. Intra plant/division/location
    2. Intra company (if multiple locations)
    3. With other customers via 3<sup>rd</sup> party

## Multiple Location Example





# To Pool or Not to Pool

- Pro
  - Volume Fluctuation
  - Ease of Return
  - Easier for Supplier to use
  - Less Space
- Con
  - Challenging to problem solve
    - Miss Ships, 'sharing'
  - Need for Discipline



# Packaging Tracking

- Methods
  - Bar Codes
  - RFID
  - Aggregate
- Note:
  - Is this necessary?
  - What is goal of tracking?
  - What is cost?



# What's Next for Returnable Pkg?

- Increased standardization
- Improved designs
- Technology
  - Design, Tracking, Calculations
- Communication



# Summary

- Key Points

- Data Gathering
- Long term vision required
- All stakeholders must be involved with clear responsibilities
- Implementations methods are not all the same
- Maintenance
- Improvement

