

# Fundamentals of Packaging

By Tom Owuor

A presentation to Ovop Malawi

February 11, 2013



What is packaging ?

# Packaging Made Simple



- For international trade/ exports local solutions are not going to work,
- Similarly in local market best packaging technology options may not work

# Key Concerns..Packaged Products

- Product Safety
- Specific Product-packaging requirements
- Consumer Acceptance
- Retailer Requirements
- Product Presentation
- Logistical Concerns
- Packaging Cost
- Other Criteria

# Packaging principles

- Containment
- Compatibility
- Retention
- Restraint
- Separation
- Cushioning
- Clearance
- Support
- Maintain
- Prevent abrasion
- Weight distribution
- Shock prevention
- Visibility
- Closure
- Instructions

# Design criteria

- Objectives
- Understanding functions
- Product & market research- what is available & required ?

# Examples of design objective

- **Introduce a new product into the market**
- **Improve packaging to reduce damage and loss**
- **Maintain share by responding to competitors' initiatives**
- **Increase sales by providing a convenience feature**
- **Reduce costs by changing package or process**
- **Response to environmental concerns**

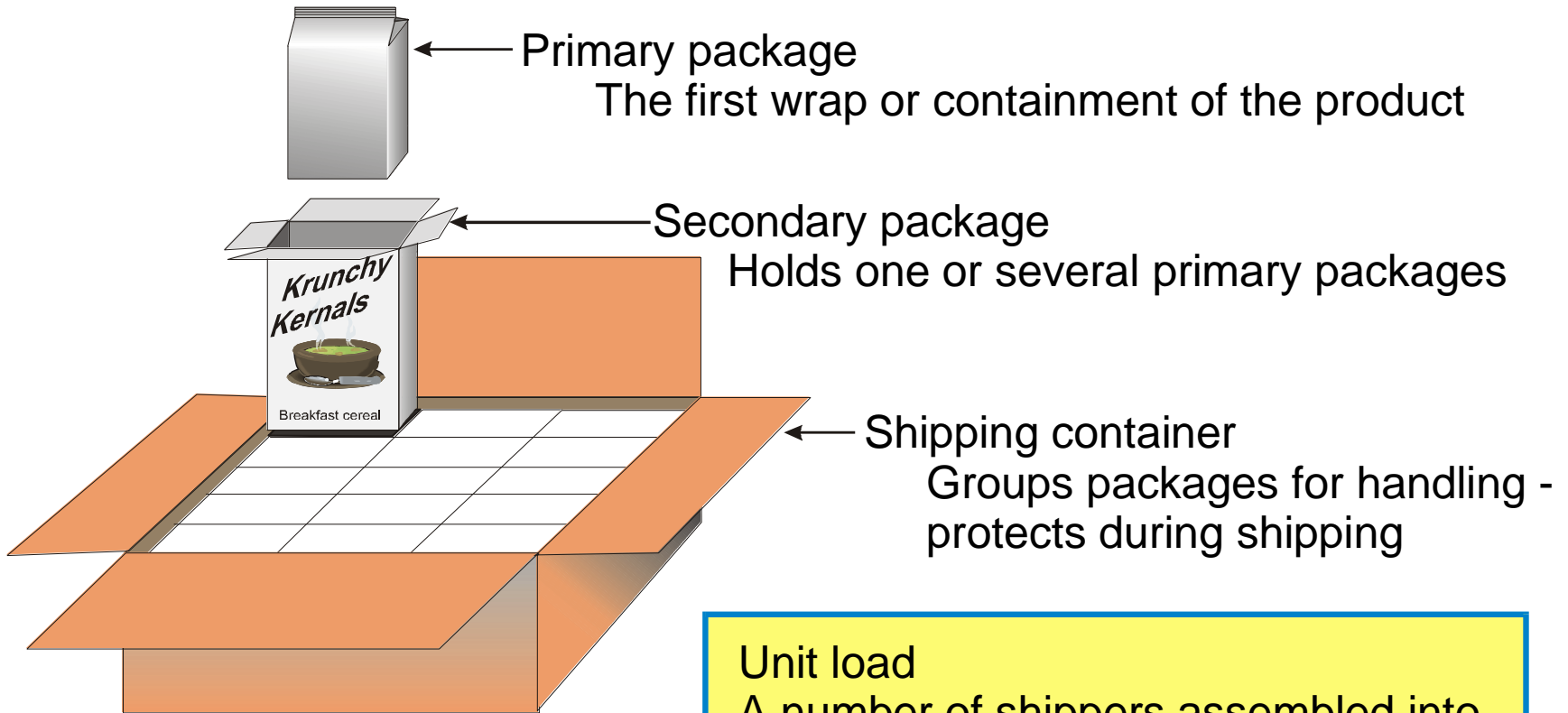
# Examples of design objective



**Maintain share by responding to competitors' initiatives**



# Packaging System Levels



## Unit load

A number of shippers assembled into a single unit for mass handling

# Unit Loads Can Be Shrink-wrapped



# Packaging a system

**Product , Packaging , Distribution**

- **Within three environments**

**Physical , Atmospheric , Human**

- **In each performs three functions**

**Protection , Utility , Communication**

# Some of the Basics of Packaging

# Basics of Packaging Materials

# Packaging Materials

- Paper
- Paperboard
- Corrugated board
- Plastics
- Metals
- Textiles
- Wood
- Inks



# Difference between paper and board?

- Carton board differs from paper because of the grammage of the materials. When paper exceeds a certain basis mass (grammage) it is more correctly termed board.
- The dividing line is 220g/m<sup>2</sup> and 300μm and the term 'board' is taken to include paperboard, boxboard and cardboard.
- In general usage '**carton**' implies '**folding boxboard carton**'.
  - This is expressed in **micrometres** (microns), where one micrometre (μm) = 0,001mm.
  - It is now common practice when specifying paperboard to specify both mass and caliper, due to the varying board densities from different board manufacturers.



# Metals in Packaging

Metals employed for packaging are iron in the form of steel, tin, chromium and aluminium.

Most are used in a combined or **alloyed** state with another metal to enhance strength, ductility or corrosion resistance.





These primary metals are mainly used for food packaging in the following forms:

- Blackplate - uncoated steel
- Tinplated steel - tinfoil
- Electrocoated chrome coated steel -- ECCS or tinfree steel
- Aluminium alloy slugs and sheet
- Aluminium foil.

These materials share the following desirable properties:

- maximum strength for mass
- resistance to working
- low toxicity
- superior barrier properties to gases, moisture, light
- functional at extremes of temperature
- provide suitable surfaces for external decoration or internal coating with protective organic materials
- convertible at high line speeds

# Glass types

- Glass containers can be produced in three basic types of material:
- **Soda/alkaline glass** ('flint' = clear glass): general trade use.
- **Neutral glass** (borosilicate glass): preferred for some pharmaceutical products where pH control is critical.
- **Surface treated glass** : for pharmaceutical products where pH maintenance is less critical.



# Properties of glass containers: Advantages

- Chemical inertness
- Totally impermeable to gases
- Clarity
- Rigid
- Resistance to internal pressure
- Hygienic
- Heat resistant
- Low cost



# Properties of glass containers:      Disadvantages

- Fragile
- Heavy mass (density 2,25 to 2,5g/cm<sup>3</sup>)
- Limited colour availability
- High temperature melting process impacts on energy conservation and the environment



# Plastics Materials

# Plastic abbreviations

Plastics commonly used in packaging are:

<b>Name</b>	<b>Abbreviated name</b>
Low density polyethylene	<b>LDPE</b>
High Density polyethylene	<b>HDPE</b>
Linear low density polyethylene	<b>LLDPE</b>
Polypropylene	<b>PP</b>
Polystyrene	<b>PS</b>
Polyamide	<b>PA</b> (nylon)
Polyester (or polyethylene terephthalate)	<b>PET</b>
Polyvinyl chloride	<b>PVC</b>

These are known by the group name of the 'polyolefins'



Polyethylene  
Terephthalate

PETE



Polypropylene

PP



High Density  
Polyethylene

HDPE



Polystyrene

PS



PVC

V



All other  
resins and  
multi-materials

OTHER



Low Density  
Polyethylene

LDPE



# Rigid Plastic Packaging

The challenge is to offer plastic bottles that provide a better barrier to oxygen and carbon dioxide, in order to increase the limited shelf life of carbonated beverages packaged this way.

Multilayer bottles and bottle coatings are possible ways of achieving this improved performance.



Pet Bottle for Soft drinks

# Flexible Packaging

Flexible packaging includes all packaging made from converted films or sheets, typically of paper and plastics, as opposed to packaging that uses thicker, usually more rigid materials.

The applications for flexible packaging have increased tremendously thanks to new plastics materials, offered alone or in combination, using lamination, extrusion coating or, increasingly, co-extrusion techniques.



Vertical FFS bag of PA/PE film, for ground almonds



Vertical FFS bag of BOPP film, for fresh salad



# Packaging

## Pure and Simple

# Benefits of Packaging

# Packaging Informs

# Packaging Informs

- Usability – convenience, simple steps
- Carries vital information on ingredients
- Keeps hazardous products away from children
- Nutritional Information – fit, healthy
- Ethical consumerism – ingredients, environment, processes, recyclable
- Safe handling and use
- Tracing manufacturing information – global preferences

# Packaging Preserves

# Packaging Preserves

- While consumers want convenience they also want freshness
- Enables distribution across vast geographic areas –
  - Local - broad geographic spread
  - International – opening up trade and industries
- Opened up markets for tastes – worldly wise
- Ensures food safety
- Convenience
  - Shelf stable products in convenient formats
  - Easy prep
- Minimises food spoilage and wastage
  - Losses for preparation of fresh produce = 10-20% vs. losses for processed produce = 0.1-1% (*Kooijman*)
  - With benefits of packaging, refrigeration and transport the losses between grower and consumers are as little as 2% in the developed world and without those facilities as much as 44% in the developing world (*Wessling*)



# Packaging Protects

# Protection.....?



# Packaging Protects

- Product
  - From factory to consumer in perfect condition
- Public
  - Tamper Evidence
  - Pilfer Proof
  - Anti-counterfeit technologies
  - Hygiene
  - Sterilised packs – hospitals, pharmaceuticals
  - Child resistant closures
  - Protect from hazardous materials losses to environment

Packaging is **KEY**  
Element of the Brand  
Experience



**DIRENE PACKAGING**

&  
Business Advisory Services

Consulting for the International Trade - Local (P) Systems, Switzerland

# Packaging is part of the brand experience

Recognisable

Delivers the brand's promise

Engages the consumer

Memorable consumption experience

Maintain consumer confidence

Medium for product revival

Ability to customise

Sensory Branding

Packaging is the first point of visual and tactile contact



# Compete For Share of the Eye

