Workshop: Procurement of Packaging for Exports
Guyana, April 19-23, 2010

Packaging Equipment;
Specifications & Purchasing

Executing/Host Partner:

Supporting Partners:

Supported with funding from:
The choices to be made

<table>
<thead>
<tr>
<th>The nature of the packaging machinery industry</th>
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<tbody>
<tr>
<td>Package design, machinability and productivity</td>
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<tr>
<td>Intermittent motion and continuous motion designs</td>
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<tr>
<td>Levels of automation and machine speed</td>
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<tr>
<td>Adjustability or change parts?</td>
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</table>
Package Machinability

The typical package design focus is on containment, protection and marketing considerations.

Frequently overlooked is the fact that:

Machines are used to bring package and product together.

So package must be readily handled and transported through packaging machinery.

Good package design makes for efficient production.
Package Design and Machinability

Packages with lower centers of gravity handle better

Stiffer, more rigid packages handle better

Common pack dimensions on multi-sized lines can reduce change-over times

Accelerations acting on a package’s inertial and structural properties can seriously alter its handling characteristics
Control implies knowing a package component’s exact position at every moment of time.

Machine parts usually are built to close tolerances.

All machine components should be under positive control.

Ideally, the package also should be positively controlled within the machine.

Packages moving on a conveyor are not under control.
The Package and the Production Line

Machine sub-systems carrying the package must be integrated with the subsystems that carry the product.

In production, the package becomes part of the machine.

The machine must not damage or alter the package.

Comparing product, package and machine, the machine is the most perfected element.
Intermittent Motion Machines

- packages stop to accomplish an operation
- simple and generally easy changeover
- limited production speed (under 100 cpm)
Continuous Motion Machines

- Package speed can be constant throughout the line
- Capable of high production rates (over 2,000 cpm)
- Requires more change parts
Filler Infeed Screw and Starwheel
Block Diagram showing Line Functions

unscrambler → filler → capper

cartoner ← labeler
Note Input/Output Activities

unscrambler
- empty bottles
- empty bins

filler
- product
- cartons

labeller
- closures
- empty boxes
- empty drums

capper
- empty boxes
- adhesive labels

cartoner
- filled products
- empty boxes
Levels of Automation

<table>
<thead>
<tr>
<th>Manual with machine assist?</th>
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<tbody>
<tr>
<td>Operator tended machine?</td>
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<tr>
<td>Fully automated production?</td>
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Level of automation is a function of labour cost as well as of available technology.

Higher automation levels require:
- tighter material tolerances
- more highly qualified technical staff
Higher Speed is Only Good if Needed!

Be very specific in estimating required output

The difference between 80 cpm and 100 cpm may require a completely different machine configuration

Twice as fast is usually more than twice as expensive

10 containers per minute = 600 containers per hour = 1,200,000 containers per year
Available Production Time

- **Working time**
  (Time workforce is paid for an uninterrupted period)

<table>
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<tr>
<th>Incidental time: breaks, setup, start-up and run-out, change-overs, maintenance</th>
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<tr>
<td>Available production time</td>
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</table>
  (Time the line could operate under fully loaded conditions) |

- **Non-equipment-related downtime**
- **Equipment-related downtime**
- **Overall running time**
- **Actual productive running time**
# How Fast Does it Go?

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Design speed</td>
<td>The cycle rate of the machine as designed, running empty</td>
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<tr>
<td>Capacity</td>
<td>Upper sustainable limit producing quality packages</td>
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<tr>
<td>Running speed</td>
<td>Instantaneous operating rate</td>
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<tr>
<td>Output</td>
<td>Quantity of quality packages produced in a given time</td>
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Assigning Machine Speeds in a Line

- Traditional lines use the filler as a benchmark.
- Machines before & after the filler run progressively faster.
- Current trend is to dynamic controls where each machine speed is continuously variable.
Adjustments or Change Parts?

If running only a few defined package sizes:
- Specify machine with change parts

Where there are many package and product variations:
- Specify a fully adjustable machine
Machinery Information Sources

- Trade shows
  InterPack, Pack Expo, etc., and regional shows
- Trade literature; buyer’s guides
- Trade Associations
- Trade professionals
  other packagers
  machinery consultants