

Homework – Product Analysis

Product analysis:

- The aim of the product analysis is to discover the demands made on paper/board quality
 - *This includes "everything": Demands during further converting operations, End user demands (strength, visual aspects etc.), Recyclability etc.*
- Target is to find out the measurable properties of a product that are critical for the usability of the product

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Target: States the critical functional properties of the final product

- At first these properties have qualitative expression such as “good runnability at printing press” for newsprint paper
-> what actually does “good” here mean for an engineer in charge of paper production – and facing concretional decisions?
- Qualitative properties require interpretation using measurable properties - “a number”.
- In the case of *newsprint runnability* this functional, measurable property could be one or several of:

*Tensile strength of newspaper and/or Elastic modulus, Tear strength,
Fracture toughness and/or Elongation at break.*

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In the case of newsprint an other qualitative requirement could be that printed images do not disturb the visual quality on the opposite side of the page i.e. there is no *print-through*.

Quantitative interpretation for this demand could be:

Opacity of newspaper and/or *Light scattering coefficient*
and/or *Porosity*.

Example - Simplified Newsprint Paper **Product Analysis**

Requirement for the functional behaviour of newsprint paper	Corresponding <i>measurable property (of newsprint paper)</i>
Good runnability at printing press (no paper web breaks) <ul style="list-style-type: none">• Good general strength level• Paper must withstand tear origination from flaws (e.g. holes)	<ul style="list-style-type: none">• Tensile strength and/or Elastic modulus• Tear strength and/or Fracture toughness and/or Elongation at break
Printed images do not disturb the visual quality on the opposite side of the page i.e. there is no <i>print-through</i>	<ul style="list-style-type: none">• Opacity and Light-scattering and/or• Porosity (measured as air permeability)

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The relationship between the (qualitative) functional properties and the measurable properties is not always clear!

- Even in best case, the measurable properties predict the end product behavior only partially
 - *E.g: Requirement - High printed image quality -> This is a visual, subjective demand -> There is no single exact measurement for this -> Measured quantities like Smoothness, Gloss, Brightness, Formation are rough indicative values at best...*
- The proper selection of suitable and relevant (critical) measurable properties for certain paper or board grade requires experienced professionals

Homework – Make a Product analysis for one of the four options:

1. Paper cup (disposable, for e.g. coffee cup)
2. Liquid packaging board (for milk – fridge temperature)
3. Folding boxboard for high quality chocolate package

Make a Report 1-1.5 A4 in length – not longer!

The main result should be a table similar to slide 4

- **Notice the different types of requirements:**
 - **Inside, outside, strength, endurance etc.**
 - **Specify the structure you select:**
base board structure + barrier layer(s)
- **Start from Wikipedia + KnowPap (know.aalto.fi)**
- **More related literature mentioned in MyCourses**
 - **Articles by Ebeling and Paulapuro**
 - **No literature references needed in this report**
- **Return the report to MC by Wednesday 16.3.**
 - **Affects 5% to the total course grade**

Questions?

Contact Eero (eero.hiltunen@aalto.fi)