

Simple test setups for assessment of performance outdoors

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Introduction

- Many bio-based materials in service are being reported to have poor surface performance
- The majority of complains concern appearance. [Aesthetics](#)
- The *aesthetic experience* is often experienced as a pleasurable and desirable experience

subjective difficult to evaluate

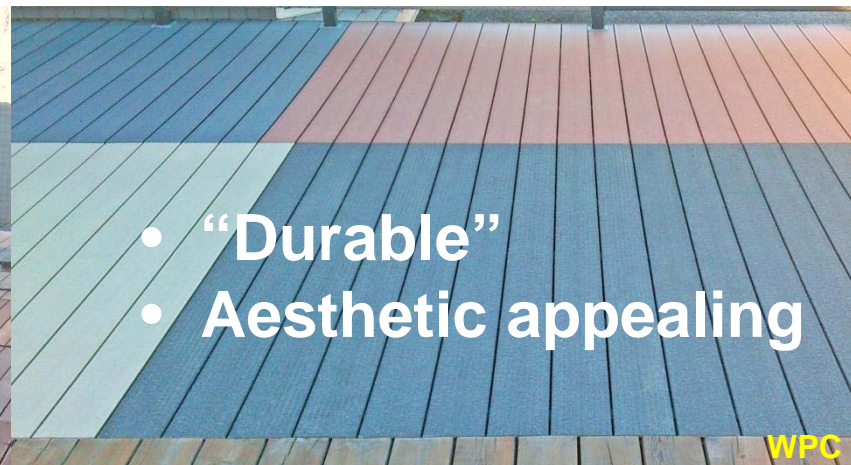
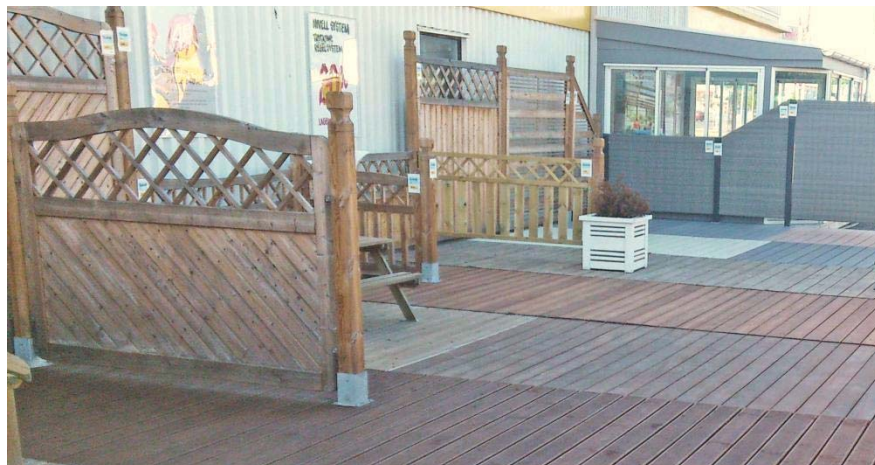
“Highly influences consumers preference”

- Rapid screening methods are desirable to facilitate product development and/or market introduction



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Examples of “high quality” bio-based products







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➤ Compromised aesthetic performance



➤ Aging with style?



Rapid screening methods

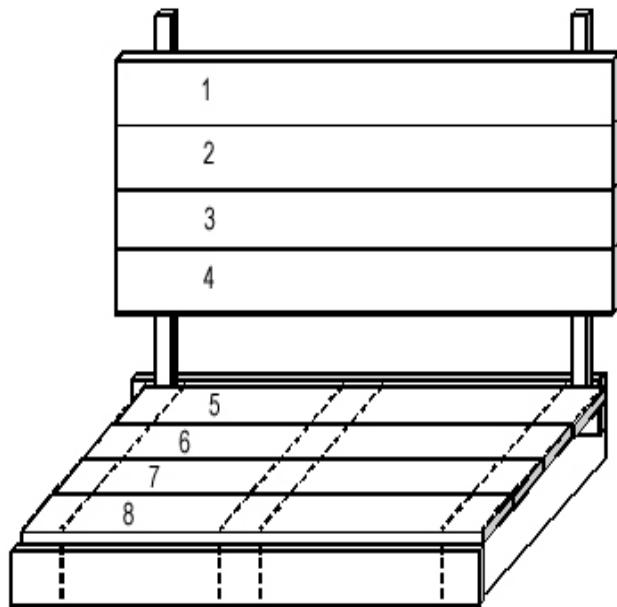
- Decking-cladding rig
- Bridges



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Decking-cladding rig

(Lonza Wood Protection - Arch Chemicals)



- **Decking** = 4 horizontal samples (20x95x700 mm)
- **Cladding** = 4 vertical samples (20x95x700 mm)
- **Rig** = preservative treated wood



- Easy to handle
- Allow for quick screening and/or comparisons between products
- Good for accessing surface properties (colour change, disfigurement, ...)
- Other parameters can also be accessed (moisture, corrosion, rot, etc...)

Borås, SWEDEN - exposure from September →

Untreated pine 19 days outdoors



Borås, SWEDEN - exposure from September →

Untreated pine sapwood 50 days outdoors



Borås, SWEDEN - exposure from September →

Pine treated with **boron-containing commercial product** 50 days outdoors



Borås, SWEDEN - exposure from September →

Pine treated with **commercial silica-based product** 50 days outdoors



Borås, SWEDEN - exposure from September →

Pine impregnated with **micronized copper** 50 days outdoors



Borås, SWEDEN - exposure from September →

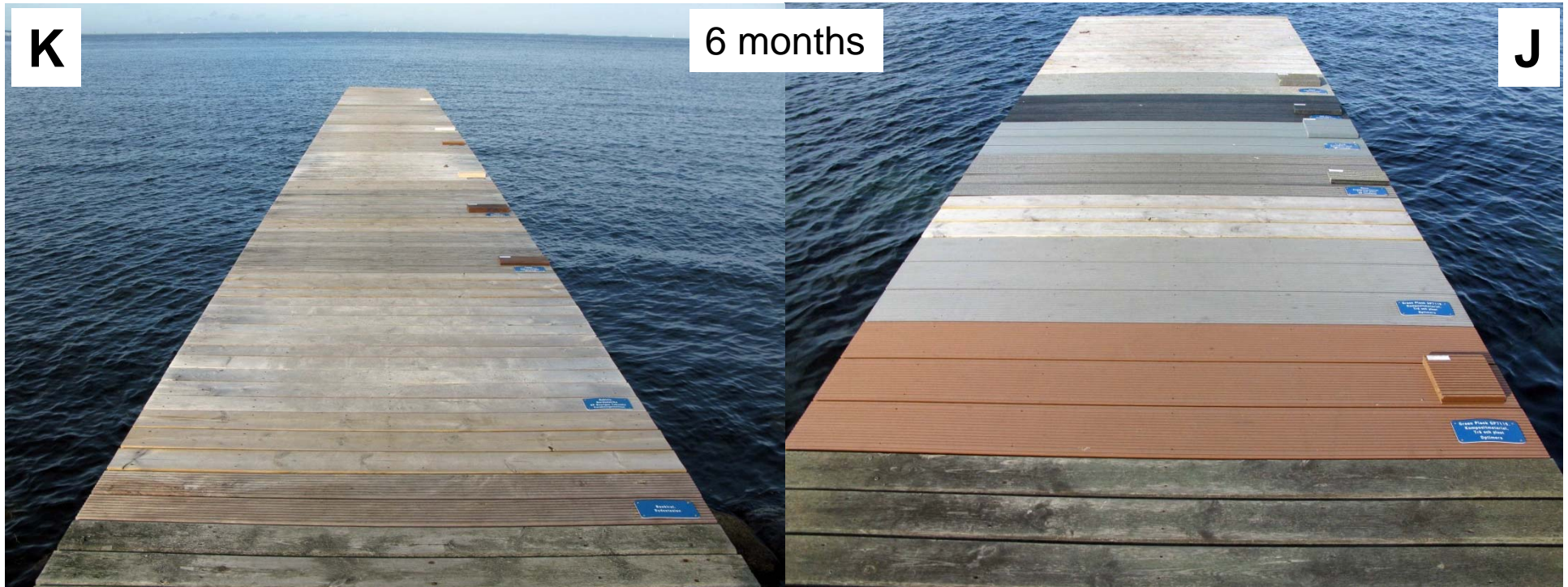


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Bridges at the coastal area of Öresund, south of central Malmö, Sweden



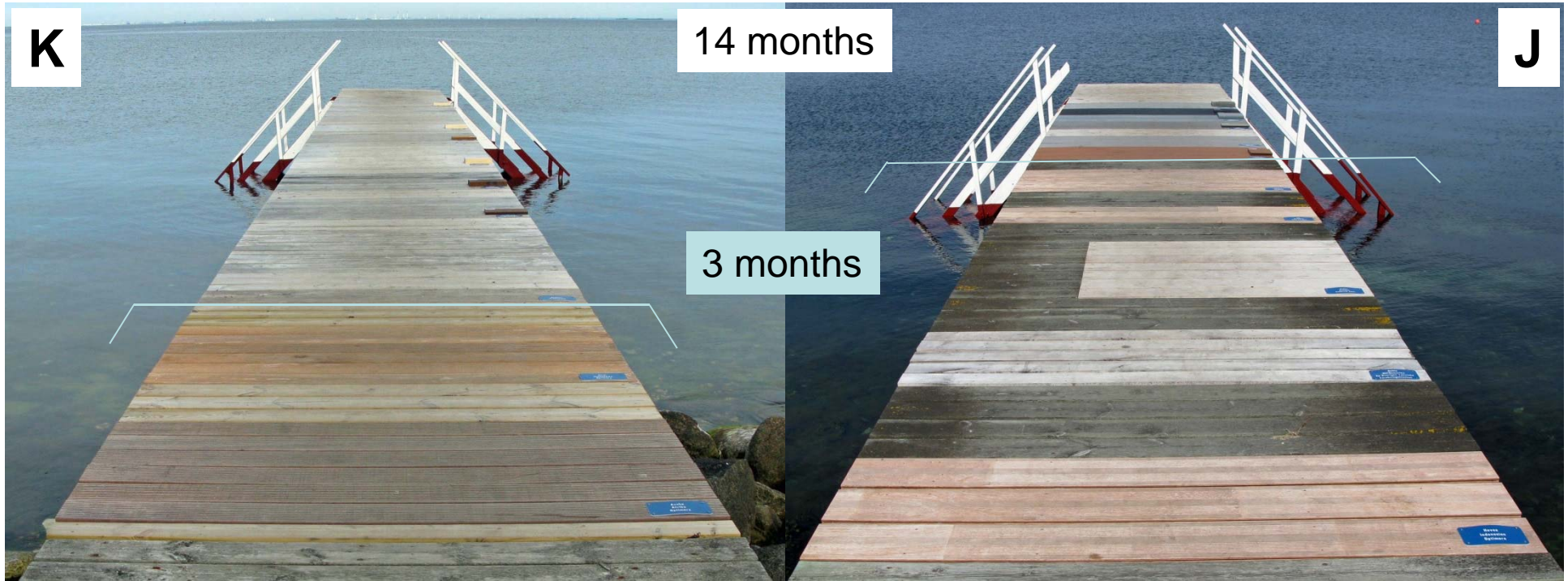




- Initiated by Malmö's City Office and SP to gather information on material **performance** with respect to appearance, durability and function **of materials for use in the city environment**.
- 25 different materials/treatments



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- Wood plastic composites and recycled plastics composites are the most stable materials so far.
- Preservative-treated, modified, special grade and tropical woods have also performed well despite some colour changes (surface disfigurement).
- Thermowood® and bankirai show the least surface disfigurement due to fungal growth. So far none of the materials show any signs of rot.

INTERVIEWS

22 interviews: 10 for Bridge K and 12 for Bridge J

1. Which material is the most pleasant to walk on?

Bridge K - Furfurylated

Bridge J - *Hevea/Cedar*

2. Which material is most unpleasant to walk on?

Bridge K - pres. treated (Ref.)

Bridge J – Rustik (PC)

3. Which material is nicest to look at?

Bridge K – Furfurylated/*Kirai*

Bridge J - *Hevea/Cedar*

4. Which material is the most boring to look at?

Bridge K - pres. treated (Ref.)

Bridge J – TX planc (PC)

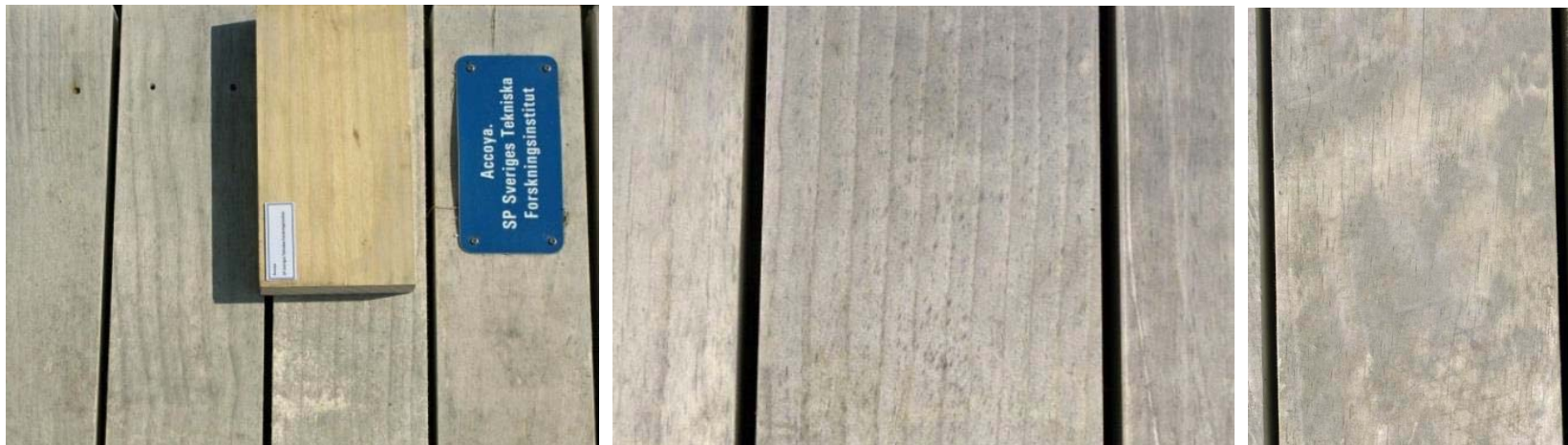


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Furfurylated



Acetylated



Kirai/Bankirai



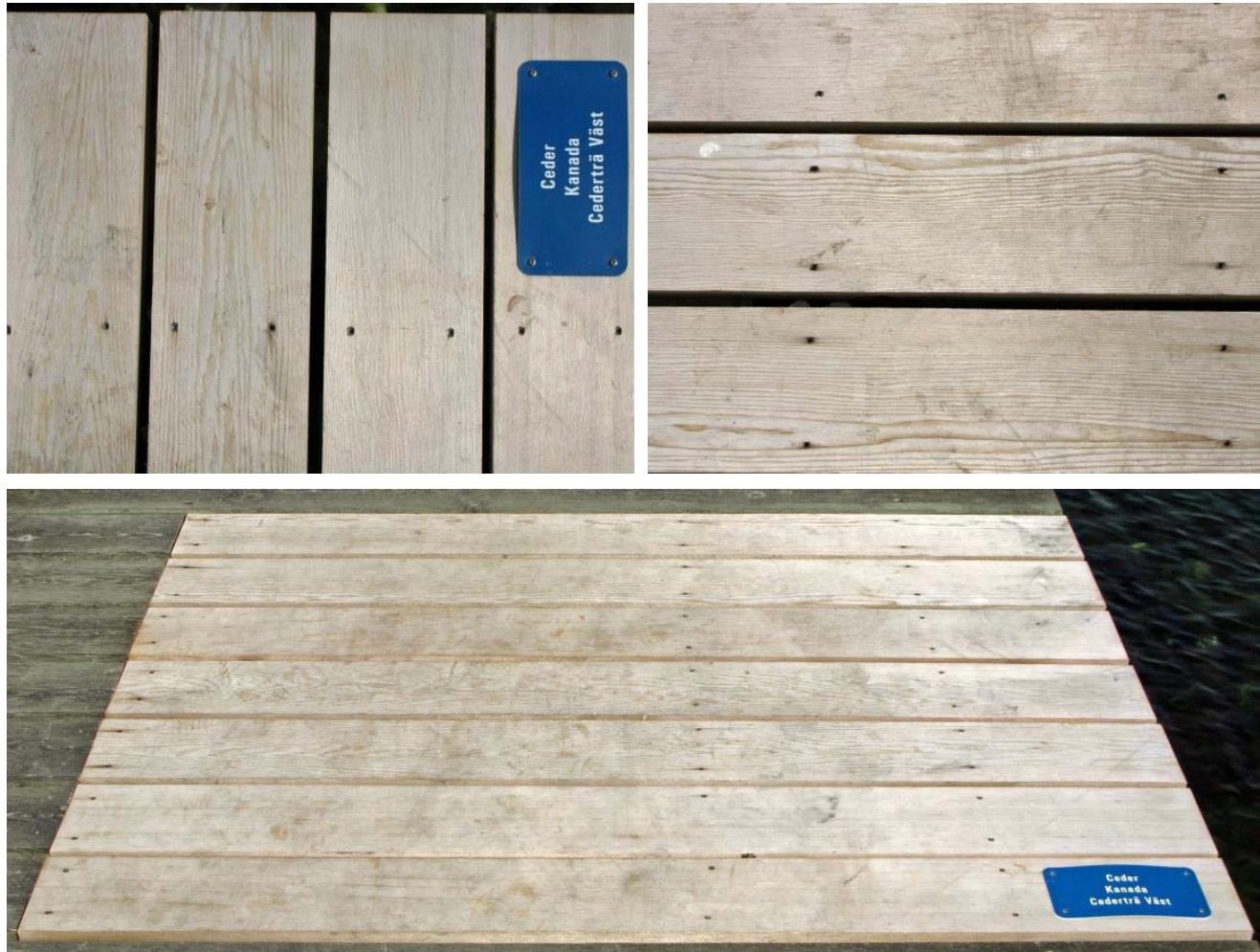
Ipê



Rubber wood (*Hevea brasiliensis*)



Western Red Cedar



INTERVIEWS

5. Does any of the materials feel warm?

Bridge K - none

Bridge J - 3 ps., 3plastic composites

6. Does any of the materials feel scratchy or sharp?

Bridge K - 1 ps., *Robinia*

Bridge J - 2 ps., 2plastic composites

7. Which material would you prefer to have on your deck at home?

Bridge K – Furfur./acetyl.

Bridge J - Ipê/Cedar (newly installed)



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Final remarks

- Outdoors exposure using **decking-cladding rigs** and **bridges** can be used for rapid assessment of surface properties
- Can be used to facilitate market introduction and product development
- Can also be used to assess consumer preference

THANK YOU!



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