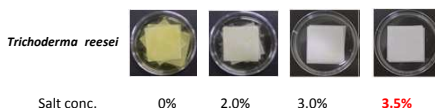




Introduction

Saltwater was successfully applied as a first-aid to preserve tsunami- or flood-damaged paper

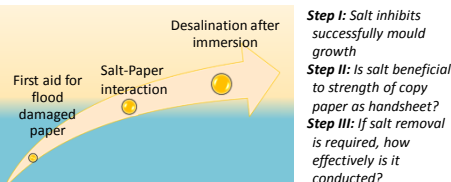
☹️ No mould grew on copy paper immersed in seawater of 3.5% or greater



☹️ Elution of dye inks was prevented



Concept

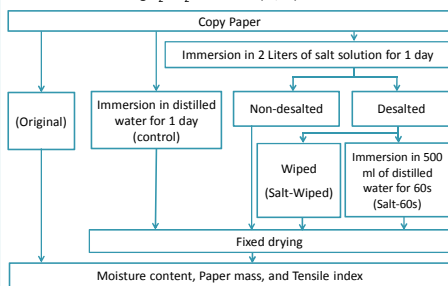


Methodology

1. Influence of NaCl and MgCl₂ solutions on paper properties

Material:

- Copy paper - P&W paper, 70 g/m² (Fine PPC, Kishu Paper)
- Handsheet - Hardwood bleached kraft pulp handsheet
- Salt solution - NaCl at 3.5% (m/m)
- MgCl₂·6H₂O at 1.6% (m/m)



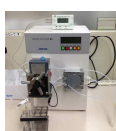
2. Desalination of paper immersed in salt solution

3.5% (m/m) NaCl solution

1 day

2 days

2 paper specimens (645 mm² each)

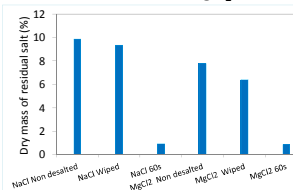


Instrument:

- Astom Acylizer S1
- Membrane AC 220-10

Result

1. Influence of NaCl and MgCl₂ solutions on paper properties



•Mass gain of paper due to salt particles remaining in interfibre or intrafibre pores or attached to paper surfaces

•Moisture gain as an effect of the deliquescent salts remaining in paper

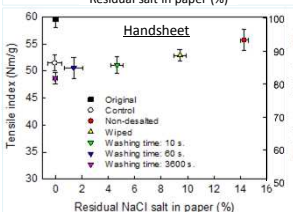
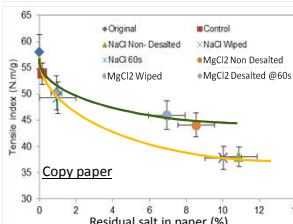
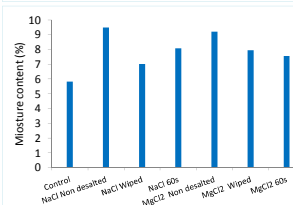
•Removal of salt tended to decrease moisture of paper

•More salt remaining in paper tended to decrease tensile index for both of NaCl and MgCl₂ solutions-immersed paper.

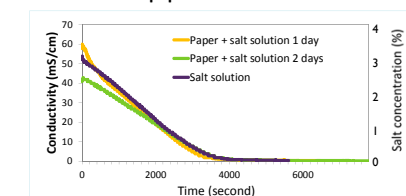
•Moisture content and salt crystallization caused different tensile indices of the copy paper treated by NaCl and MgCl₂.

•For Handsheet treated with NaCl solution, the remaining salt tended to increase tensile index.

•For copy paper, high sizing degree and starch applied for surface sizing of copy paper provided different fibre swelling behavior.

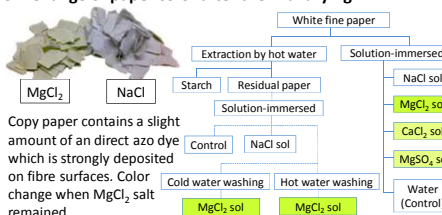


2. Desalination of paper immersed in salt solution



•Desalination speed was same irrespective of presence of paper in salt solution

3. Change of paper color after thermal drying



Conclusion

Saltwater immersion method is appropriately used as first aid for flood or tsunami damaged paper due to the fact of Cheap-Easy-Fast effective method

