

How can producers of packaging contribute to improved package handling for women in the food industry?

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# Addressing the issue - efficient package handling

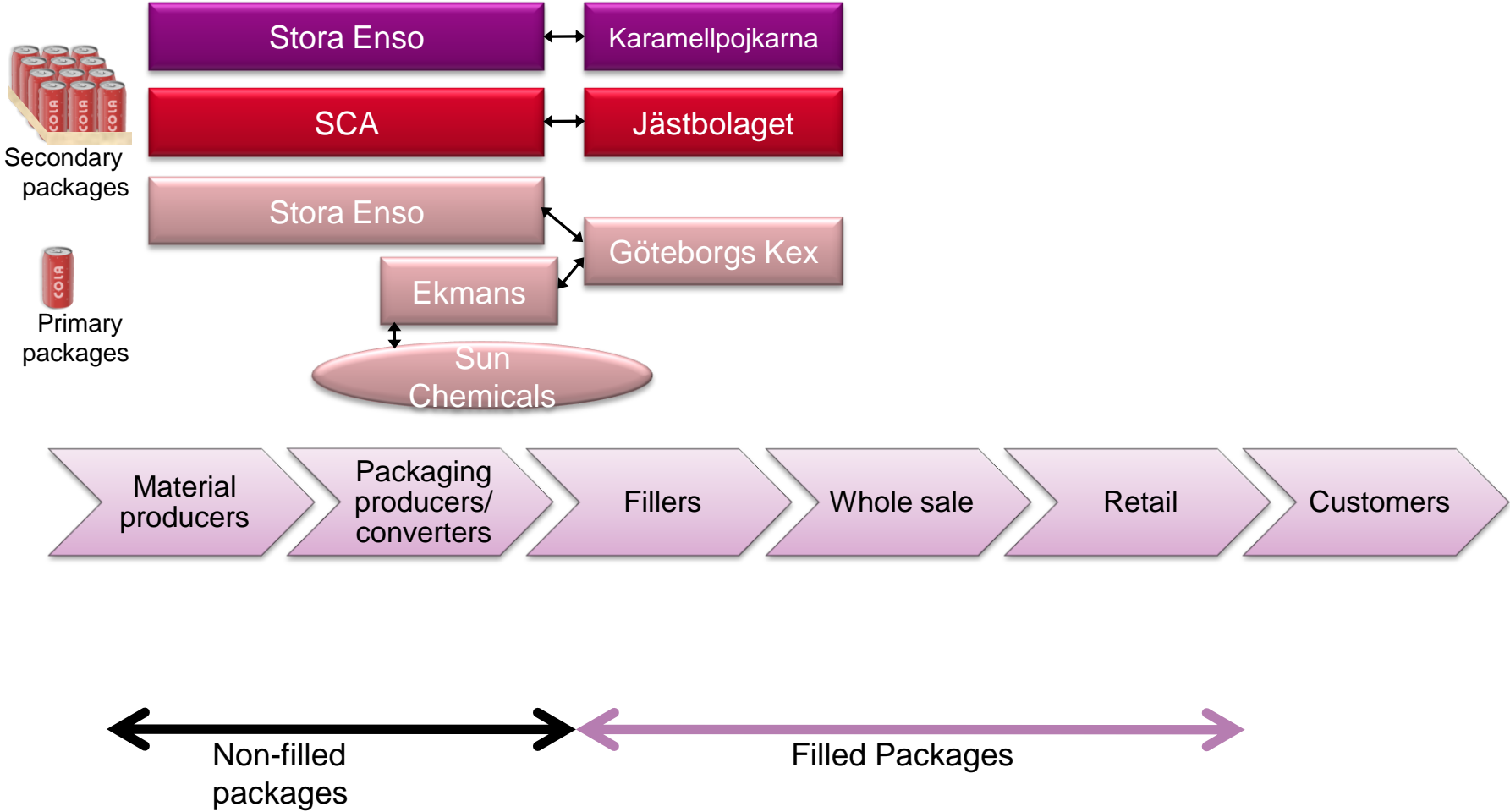
- Manual Handling
- Knowledge
- Responsibility
- Action



# Traditions



# The Packaging Producers



# Three foodstuff companies,

- Where women manually or semi-manually handle primary and secondary packages
- Research steps
  - identification
  - documentation
  - development
  - evaluation

# Identification

- Group discussions with workers concerning the packaging characteristics supporting or obstructing easy handling; followed by suggestions for improvements
- Questionnaires for self-evaluation of working conditions when handling packages
  
- Selection of project package
  
- Primary and/or secondary package

# Documentation

- Interviewing the next step in the value chain, e.g. bakers and shop replenishers, regarding suggestions for improvements to the project packages.
- Observation and measurement of the work content, working time patterns and ergonomic load when handling ordinary packages

# Development,

- Discussions with packaging producers regarding improvements to the selected packages and production of prototypes
- Taking into account the production requirements, food companies, in cooperation with packaging designers reflected on how packaging, could be modified to limit the risk of injuries

- Prototype at Karamellpojka





# Evaluation

- The physical workload
  - Postures and movement velocity of the upper back and upper arm were measured using inclinometers.
  - Wrist postures and movements were recorded using goniometers
  - The muscular activity of the forearm flexor muscles was measured using EMG (*Göteborgs Kex* and *Jästbolaget*)
- Questionnaires for self-evaluation of working conditions when handling prototypes

# Case study 1

## Göteborgs kex

- suggested modification
- result
- Increase in surface friction
- Reduced muscle forces in the forearm
- Reduction in packages slipping by 30%

## Project package; Salinas box



- 1 290 000 boxes/year, one week/month
- 850 production hrs
- 18 persons

# Evaluation of ordinary boxes and production prototypes in a production-like set-up

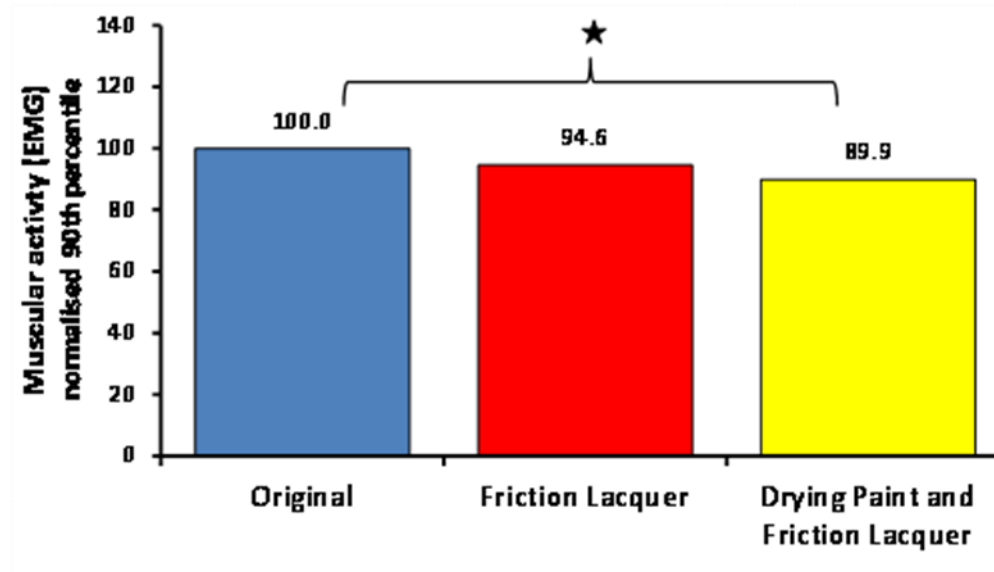
## Production



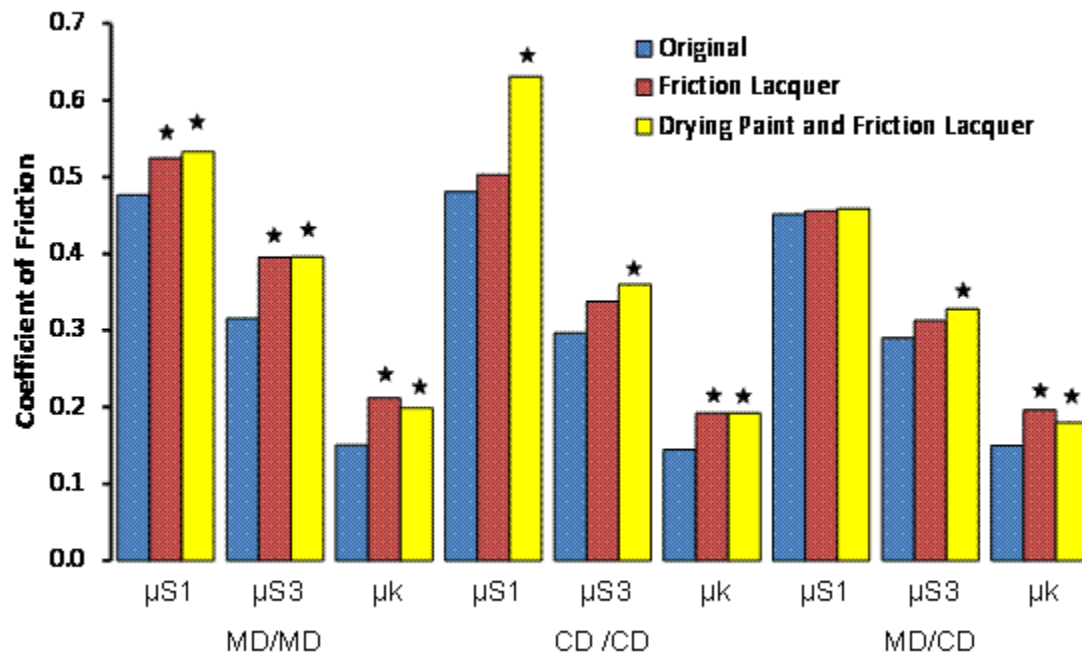
## Prototypes



# CS1 - Muscular activity handling original + prototypes at Göteborgs kex



# CS1 - Coefficient of friction Salinas box



Original vs friction lacquer / friction lacquer + paint  
<http://www.quantitativeskills.com/sisa/statistics/t-test.htm>

# Case study 2

- Jästbolaget
  - suggested modification
  - result
- Modification of
  - primary and 2ndary packages
  - production line
- Reduction in physical workload
- Reduction in no. of manual operations

- Project package; 500g dry yeast



- App. 270 tons/year and 2 tons/hrs. 4 persons



# Case study 3

- Karamellpojka  
  - suggested modification
  - result
- Modification of 2ndary packages
- Reduced wrist speed
- Reduction in no. of manual operations

- Project package; corrugated box



- 8 persons handles 126 tons of candybars/year
- App.1 ton per production day handled by 8 person

# Prototype and productivity estimates

- Production data was collected from the companies in order to evaluate the influence on the handling of prototype packages.
- Productivity was estimated on the basis of company information, interviews, observations, video materials
- The evaluation of the prototypes in the case studies did not show a negative impact on productivity



# In summary

- It is possible to reduce the workload in the manual handling of packages by changing the package per se.
- We believe that considerations to the ergonomics effects of a particular package should be included in the planning, design and specifications of that package throughout its value chain