Development of a unique indicator label

M. Habekost, J. Lisi, K. Rampersad
Ryerson University

Introduction

- Cleaning and disinfecting multi-touch surface in hospitals and other public place can be a daunting task
- A hospital can easily have 10,000 pieces of equipment that need cleaning every day
- Tracking the cleaning progress is difficult
- What can be done?

Some background information

- Improper sanitation and cleaning can lead to new infections that a patient did not have when being admitted to a hospital
- Health care associated infections (HAI) are on the rise
- CDC: In 2002 there were 1.7 million cases of HAI
- 99,000 were fatal
- Every 4.5 out of 100 patients get infected with HAI

Some background information

- In Europe:
  - 7.1 out of 100 patients get HAI
- In developing countries:
  - 15.5 out of 100 patients
- $4.5 to 6.5 billion spent in the US every year to treat HAIs
- $54 to 110 million spent in Canada to treat HAIs

Some background information

- Number of Patients (per 100) Contracting HAIs While in Hospital

<table>
<thead>
<tr>
<th></th>
<th>U.S.A</th>
<th>Europe</th>
<th>Canada</th>
<th>Developing Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>4.5</td>
<td>7.5</td>
<td>10</td>
<td>15.5</td>
</tr>
</tbody>
</table>
Some background information

- According to CDC an implementation of existing infection prevention strategies could lead to savings of US$ 25 – 31.5 billion in the healthcare system
- Also a 70% reduction of HAIs
- What is the solution to this problem?

Solution to the problem

- The IndiClean label!
  - Works with the most commonly used disinfecting agents
  - Can be tailored to indicate a 12 or 24 hour time frame since cleaning
  - The small label format allows the sticker to be placed on door handles, intravenous poles, light switches, wheelchairs, hospital beds etc.

Solution to the problem

Unique features of the label

- Various printing methods were evaluated for their practicality:
  - Offset printing
  - Screen printing
  - Flexographic printing
  - Inkjet printing

Unique features of the label
Manufacturing challenges

- Offset
  - Ruled out, due to the thin ink film that can be printed with an offset press
- Screen printing
  - Tests done, but not very successful
- Flexographic printing
  - Printing method of choice!

Manufacturing challenges

- Printing press used:
  - Comco Cadet 700
  - 4 print station
  - In-line design
  - Laminating capabilities

Manufacturing challenges

- First tests were made to find the best combination of anilox rollers to achieve optimum opacity
- Rollers with a BCM volume of 12, 7.7 and 5 were tested
- Multiple hits of the indicator ink were applied

Manufacturing challenges

- A functional barrier has to be applied to the printed label so it can work properly
- Various methods were tried to do this
  - Laminate with adhesive backing on it
  - Application of an adhesive in the press and application of clear barrier material afterwards
Results

- Initial tests of multiple hits of the indicator ink over black flexo ink
- Prints done with and without doctor blade applied
- Experimentation with various tint values to achieve optimum opacity

Results

- Triple hit of the indicator ink with different tint percentages

Results

- After various trials in regards to the ideal combination of anilox rollers and changes to the ink formulation the following production steps have been established:
  - Print artwork as single color (black)
  - Apply two hits of the indicator ink with 12 BCM anilox rollers
  - Apply glue pattern for lamination step
  - Laminate and die-cut

Results

- Tri-color artwork and lamination of artwork
- Does not work for applying indicator ink over prelaminted artwork
- Register could not be achieved
- Stretching effect when press was stopped
  - change artwork to a single color layout
Results

- Although various changes have been made to the ink formulation to improve opacity and ink transfer, the press results were not satisfactory.
- Require the help of an ink manufacturer to optimize the ink formulation.

Conclusions and outlook

- Design and press procedures have been established.
- Artwork needs to be protected by a film laminate.
- Final lamination has to be done through a lamination attachment for the flexo press.
- Final production on press still needs to be verified.
- Field test of the labels in a hospital.

Contact info

- Martin Habekost, J. Lisi, K. Rampersad
- Ryerson University
- 350 Victoria Street
- Toronto, Ontario, M5B 2K3
- mhabiakos@ryerson.ca
- jlis@ryerson.ca
- krishan.rampersad@ryerson.ca