Reduction of slips, trips and falls in fishing by using new anti-slipping boots

Olaf C. Jensen  
Lise Hedegaard Laursen  
Fabienne Knudsen

Center of Maritime Health and Safety, Esbjerg

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Problem

- Fishing is a high risk occupation
- Slips, trips and falls are frequent
- Low interest for footwear and the deck coating
- Anti-slipping boots and deck-coating is supposed important
- Lack of intervention studies of the evidence
Objectives

- Intervention study of the effect of anti-slipping boots:
- Comfort of footwear?
- Slips, trips and falls reduction?
Project plan

- 2004 Project start
- 2006 Data collection
- 2007 Data analysis and report
- 2008 Publication
Study population

- The study population n= 161 fishermen
- 16 of these are Norwegian fishermen
- 57 vessels in all
Methods

- Measurements before and after
- Baseline questionnaire about the old boots
- Intervention: new safety boots for free
- Using new boots on several fishing trips
- Questionnaire-2 about the new boots
Analysis

- Prevalences analyzed in the cohort
- Causal analyses of the incidents as a case-control study
- Odds ratios and
- Differences of proportions to estimate the effect
- 95%-confidence intervals
The injury model
The injury model

- **Risk Factors**
  - Machine guards, handrails
  - Lights, fatigue, anti-slip soles
  - And anti-slip deck-cover, housekeeping, rolling of ship etc.

- **INJURY MECHANISMS INCL.**
  - SLIP, TRIP AND/OR FALL

- **Before Injury**

- **Injury**
  - Contusion / struck by
  - Wound
  - Distortion
  - Injury of the back
  - Other injury (eye, teeth)

- **After Injury**

- **Lesion**
  - No Lesion

- **Near-Miss Incident**

- **Experiences for Prevention**
Definitions of effect variables

- A Near-miss happens without personal damage but might have been an injury, if the things were slightly different.

- An injury is sudden and unexpected with personal damage.

- Slips, trips and falls (STF) are not injuries, but...

- STF can be the initial incident (pre-event) leading to an injury.

- STF incident without an injury is a near-miss incident.
The intervention measure = new boots

- Steel toe
- Thermo isolated
- Anti-slipping soles rubber material
Results

- 161 fishermen completed questionnaire-1
- 140 (87%) used the new boots and completed questionnaire-2
- Mean days at sea for each fisherman with new boots: 45 days
- The old boots had been used for 1-2 years
### Results:

Assessment of the impact of the risk factors for old boots (n=57) compared with the new boots (n=23)

<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>% of total</th>
<th>NO</th>
<th>% total</th>
<th>NA</th>
<th>%</th>
<th>Odds ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Were slippery surfaces, fish ice a significant risk?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old boots</td>
<td>35</td>
<td>*61% (51-72)</td>
<td>17</td>
<td>30% (16-44)</td>
<td>5</td>
<td>9%</td>
<td>0.96 (0.27-3.1)</td>
</tr>
<tr>
<td>New boots</td>
<td>15</td>
<td>65% (49-81)</td>
<td>7</td>
<td>30% (8-53)</td>
<td>1</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td><strong>Did you slipped, tripped or fell or nearly doing that?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.9 (1.08-22.8)</td>
</tr>
<tr>
<td>Old boots</td>
<td>42</td>
<td>74% (65-82)</td>
<td>5</td>
<td>9% (0-25)</td>
<td>10</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>New boots</td>
<td>12</td>
<td>52% (34-71)</td>
<td>7</td>
<td>30% (8-53)</td>
<td>4</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td><strong>Did slippery soles had any impact as a risk factor?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.1 (2.5-15.0)</td>
</tr>
<tr>
<td>Old boots</td>
<td>31</td>
<td>54% (43-66)</td>
<td>20</td>
<td>35% (21-49)</td>
<td>6</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>New boots</td>
<td>2</td>
<td>9% (0-34)</td>
<td>17</td>
<td>74% (60-88)</td>
<td>4</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td><strong>Was rolling of the ship an important risk factor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.3 (0.41-3.8)</td>
</tr>
<tr>
<td>Old boots</td>
<td>33</td>
<td>58% (47-69)</td>
<td>20</td>
<td>35% (21-49)</td>
<td>4</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>New boots</td>
<td>13</td>
<td>57% (39-74)</td>
<td>10</td>
<td>44% (23-64)</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>
Results:

- STF were reduced by 22 % (p=0.052) with the new boots
- Incidents with slippery soles were reduced by 46 % (p < 0.00)
- STF were pre-events in 9 of 11 (82 %) injury cases
Results:

- The new boots were assessed as “much better” or “something better” by having a firm grip and a feeling of standing firmly by 93%.

- The comfort of the new boots in general and their ability to reduce the fatigue on the back and the legs was assessed as “much better” or “better” by 84% and 72% respectively.

- Information to the fishermen when buying new boots and different models of the boots available in the stores is needed.
Implications for the prevention (proposals):

- Use of safety boots with anti-slipping soles can improve safety and comfort in fishing

- Guidance on safety footwear at fishermen’s own stores and at safety courses can promote the use of safety-boots

- By including the footwear in the risk-assessments of the fishing vessels the safety can be improved

- Information about STF as a pre-event in the injury reports to the Maritime Authorities and Insurance, can improve safety
Final conclusions:

■ The study provides evidence that STF and incidents with slippery soles can be reduced by use of the new boots.

■ As these incidents are often pre-events of injuries, it is expected that the risk of injuries will also be reduced.

■ The new boots adds better comfort and less fatigue to the back and legs.
Thank You