Program Improving Occupational Safety in The Netherlands

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Safe to do the job? Make sure before you start!
Statistics Netherlands (2004):

- About 7,000,000 workers in 500,000 companies
- 87,000 occupational accidents \((\text{about 50 injured workers every working hour})\)
- 83 persons died \((\text{about 2 workers die of an accident every working week})\)
- Bulk of these incidents in 51 hazardous branches with 3,000,000 workers

Main causes:
- Falling from height
- Contact with machines
- Hit by vehicles
- Falling objects
Development in Occupational Safety Policy

Since 1980 Organisation

Up until 1980 based on Technology

Since 2000 Culture
Policy actions 2003-2007:

- Interventions with respect to safety culture and awareness in companies; Aim: 10-15% less incidents in 20 selected projects
  Development of a financial model for occupational incidents

- Risk based policy on basis of a quantitative risk model for workers

- High political commitment and thus the resources
Understanding accidents causes and effects

Development of risk management system (understanding employee risk)

Understanding the efficiency of measures

Culture interventions

Implementing safety improvement projects

Raising safety awareness (individual employees)

Improving safety culture (organisation level)

Implementing good practices

Reducing the number of industrial accidents by 10% - 15% in each of the 20 safety improvements projects.
Who are involved?

National

- Companies
  - Improvement projects
- Soc. Partners
  - Steering committee
- science
  - Risk model

International

- EU Commission
  - Risk Model
- UK, DK
  - Model, data
Why risk based policy and a risk model?

- Priority tool for regulator and company: deterministic approach will be more transparent
- Calculation of probability on an incident of a specific worker, the effect of measures taken and the cost effectiveness of those measures
- Start of an integral risk policy: connects with the land use planning and transport risk models
- The model is developed by an EU project group
Everything that leads to the incident

Fault tree

Incident

damage

Everything that is the result of the incident

Event tree
Building the model

- 9000 investigated incidents are converted into scenario’s and bow ties
- Barriers and management influences are modelled
- Quantification of the bow tie based on incident data and expert opinion
- Development of a cost effective risk reduction strategy
- Building of a six step QRA
Horrible Stories converted into storybuild scenario’s

- 12500 detailed accident reports of Dutch Labour Inspectorate
- 1998 – Feb 2004
- Around 9,000 accidents modelled in around 50 Storybuilds
- 5 person years of effort
## Occupational Risk Model

<table>
<thead>
<tr>
<th>Nr</th>
<th>Bowtie Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Fall from ladder (steps, stairs)</td>
</tr>
<tr>
<td>1.2</td>
<td>Fall from height roof/floor/platform</td>
</tr>
<tr>
<td>1.3</td>
<td>Fall from scaffold</td>
</tr>
<tr>
<td>1.4</td>
<td>Fall though hole/ opening</td>
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<tr>
<td>1.5</td>
<td>Fall from lift</td>
</tr>
<tr>
<td>1.6</td>
<td>Fall on same level</td>
</tr>
<tr>
<td>1.7</td>
<td>Fall other</td>
</tr>
<tr>
<td>2</td>
<td>Struck by vehicle</td>
</tr>
<tr>
<td>3</td>
<td>Dropped object</td>
</tr>
<tr>
<td>4.1</td>
<td>Flying Object ejected from machine</td>
</tr>
<tr>
<td>4.2</td>
<td>Flying Object ejected other</td>
</tr>
<tr>
<td>4.3</td>
<td>Flying Object blown by wind</td>
</tr>
<tr>
<td>4.4</td>
<td>Hoisted/ hanging/ swinging Objects</td>
</tr>
<tr>
<td>5</td>
<td>Contact rolling/sliding/moving object</td>
</tr>
<tr>
<td>6</td>
<td>Contact with object person is carrying/ using/ holding</td>
</tr>
<tr>
<td>7</td>
<td>Contact with hand held tools</td>
</tr>
<tr>
<td>8</td>
<td>Contact with moving part of fixed machinery</td>
</tr>
<tr>
<td>9.1</td>
<td>Blown/thrown against something</td>
</tr>
<tr>
<td>9.2</td>
<td>Walk, jump into object</td>
</tr>
<tr>
<td>9.3</td>
<td>Contact with rough or sharp surface/ object</td>
</tr>
<tr>
<td>10</td>
<td>Buried/suffocated</td>
</tr>
<tr>
<td>11</td>
<td>In or on moving vehicle</td>
</tr>
<tr>
<td>12.1</td>
<td>Person contacts charged object</td>
</tr>
<tr>
<td>12.2</td>
<td>Electric arc/discharge</td>
</tr>
<tr>
<td>12.3</td>
<td>Lightning</td>
</tr>
<tr>
<td>13</td>
<td>Contact with extreme hot/ cold surfaces or open flame</td>
</tr>
<tr>
<td>14.1</td>
<td>Spill/splash of hazardous substances in open container</td>
</tr>
<tr>
<td>14.2</td>
<td>Person contacts hazardous substance</td>
</tr>
<tr>
<td>14.3</td>
<td>Person contacts biological agent</td>
</tr>
<tr>
<td>15</td>
<td>LoC hazardous substance (active)</td>
</tr>
<tr>
<td>16</td>
<td>LoC hazardous substances (passive)</td>
</tr>
<tr>
<td>17</td>
<td>Fire</td>
</tr>
<tr>
<td>18</td>
<td>Exposure to damaging noise dose</td>
</tr>
<tr>
<td>19</td>
<td>Exposure to damaging non-ionising radiation dose</td>
</tr>
<tr>
<td>20.1</td>
<td>Human Agression</td>
</tr>
<tr>
<td>20.2</td>
<td>Animal+B9</td>
</tr>
<tr>
<td>21</td>
<td>Hazards related to entry into confined spaces</td>
</tr>
<tr>
<td>22</td>
<td>Deprived of oxygen/ clean air</td>
</tr>
<tr>
<td>23</td>
<td>Lost buoyancy in water / drawing</td>
</tr>
<tr>
<td>24</td>
<td>Diving related hazards</td>
</tr>
<tr>
<td>25</td>
<td>Extreme muscular exertion</td>
</tr>
<tr>
<td>26</td>
<td>Office risk</td>
</tr>
</tbody>
</table>
State of Affairs of the quantified risk model

• An incident model was adopted
• 9000 investigated incidents are analyzed and modelled in the so called tool “storybuilder”
• Storybuilder is a powerful tool for complex incident analysis (Amer power plant), Branch analysis (public and agricultural sector, machines) and training of safety professionals
• The scenarios were converted and quantified with the tool “bow tie builder”
• A first draft of the quantified model is ready
• A financial model for cost benefits of incident prevention has been build
• The model will be filled with storybuilder data and data from workers surveys
• In late 2006 the 2nd phase will start
Summary

• Storybuilds capture ALL known causes of Dutch reportable accidents
• The models can assist in understanding how "horrible stories" occur
• The models can be used for identifying the dominant conditions which give rise to accidents
• Policy makers, inspectors and company safety personnel can use these structures in e.g. accident investigation
Interventions in Safety Culture

• Have been successful in Europe: incident reduction in companies and branches up to 60%

• Main target is to change the basic assumption: “If you do dangerous work it is normal that you will have incidents”

• Create lasting commitment with management and workers
Culture and Safety Awareness campaign

Objectives:
• 10 -15% decrease in incidents in 20 projects
• Developing good practices as an example for other companies

Approach:
• Bottom-up: starts in companies, then good practices in branches
• Developing knowledge companies networks

The Ministry:
• Provides knowledge, financial contribution and monitors the projects
• Develops notions safety culture
• Develops network of experts in companies
Is this safety culture?
23 projects have started, examples:

- Chemical company
- Agriculture companies
- Corrugated cardboard companies
- Organisation of farmers
- Business estate with 400 companies
- Meat processing and sausage factory
- Building company
- Fire brigade
- Schiphol Airport
First results after one year

- Chemical company: 40% less accidents
- Building company: 30% less accidents
- Brewery: 20% less accidents
- Waste Processing: 50% less accidents

But also
- Metal company 80% of employees wear ear protection (was 20%)
- Brewery: 70% of employees wear ear protection (was 20%)
Building Company

Approach:
• Target awareness and communication
• Target knowledge

Means:
• Introduction of safety committee for top- and middle management
• Safety observation rounds by management
• Safety motivation training for employees
• Analysis of accidents
Fire brigade

Approach:
• Investment in awareness, communication, and leadership
• Investment in knowledge

Means:
• Coaching of new commanders
• Safety workshops for fire brigade
• Developing a method and system for evaluating safety during incidents
• Integrating lessons learned in an educational program
Safety network of companies

- 23 companies are in a network
- Companies help each other, the ministry facilitates
- Companies from different branches
- Meetings are thematic

In the future the number of companies in the network will further expand, via the pyramid approach.
Relevance to Ionising Radiation Accidents

• Many radiation incidents have cultural aspects (see ALARA website – *Incidents: lessons learned*)
  – Awareness
  – Learning from own/previous mistakes
  – Peer reviews and safety rounds
  – Practical, non hypothetical experiences
• Risk model brings insight into
  – risk factors
  – identifying big risks
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