Analysis and Assessment of Earth Moving Equipment for the Building Material Industry, under special Consideration of Occupational Health and Safety

Awarding authority:
Steinbruchs-Berufsgenossenschaft

by:
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Survey at the companies of the quarry industry

- Development of a questionnaire for the company management / the entrepreneur
- Development of a questionnaire for the staff
- Compilation of information about near-accidents and construction failures
- Compilation of suggestions of improvement and the safe operation of the equipment
Approach to analyze the data of the accidents

classification into excavator, loader, haulage trucks, dozer

depending on operation
- driving
- hazard area
- hoist
- maintenance
- loading
- cleaning
- stability
- fuelling

depending on construction
- access systems
- windows, hatches
- cabin
- view
- steering and controlling systems
- doors
- teeth of loading construction elements
Evaluation of the survey

- 2800 companies were contacted
- 983 questionnaires were sent back

- Staff: 652 questionnaires
- Company management / entrepreneur: 311 questionnaires

Distribution of answers (Company management / staff):
- 68% Staff
- 32% Company management/entrepreneur
Accidents according to equipment

- Wheel Loader: 56%
- Excavator: 24%
- Dozer: 9%
- Articulated trucks: 6%
- Trucks: 5%

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Design-related accidents

- Access system: 58%
- Cabin: 18%
- View: 11%
- Steering and controlling systems: 8%
- Loading system: 3%
- Windows, flaps: 2%
Operational accidents

- Driving: 31%
- Loading: 26%
- Cleaning: 25%
- Maintenance: 16%
- Stability: 2%

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Proportion of suggestions of improvement

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff with accident</td>
<td>17.5%</td>
</tr>
<tr>
<td>Staff without accident</td>
<td>13.1%</td>
</tr>
<tr>
<td>Management</td>
<td>64.9%</td>
</tr>
</tbody>
</table>
Proportion of suggestions of improvement relating to equipment

- Wheel Loader: 64%
- Excavator: 20%
- Trucks: 7%
- Articulated trucks: 7%
- Dozer: 2%
Summary and outlook

- The results of the evaluation and analysis of the accidents and the results of the survey show the same basic tendency.
- The design-related accidents occur 1.7 times more often than the operational accidents.
- About 80% of the accidents are associated with loading equipment.
- The severe accidents are associated with this equipment as well.
- Most of the accidents are linked to the use of wheel loaders.
- Most of the suggestions for improvement are handed in for loading equipment.
- Most of the construction-conditioned accidents are caused by the access systems.
Summary and outlook

• Construction-conditioned accidents often occur in connection with maintenance and cleaning tasks
• Urgent optimization of the construction of loading equipment in the areas of: access system, visibility conditions, dimension of the cabin
• Involvement of the manufacturers of the equipment into the optimization process
• The target of the process is the optimization of the equipment!