Case Studies on Accidents involving Lorry Cranes

Crane Safety Symposium 2011      05 August 2011

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Agenda

Presentation Outline

✓ Cases of Lorry Crane accident
✓ Case Study of fatal accident (Local)
✓ Case Study of fatal accident (Overseas)
✓ Intervention Effort by MOM
✓ Structured Training
Lorry Crane Accident
Lorry Crane Accidents on 16 July 2010
Spate of Incidents involving Lorry Loaders boom collision with bus

• On 16 July 2010 a lorry loader was collecting piles of pruned tree branches and leaves on the roadside.
• The boom swung out to the middle lane and struck a travelling double-decker bus which smashed through the left upper deck windows.
• A bus passenger was killed and several others injured.
Recent Case of Dangerous Occurences Involving Lorry Cranes

Lorry Crane toppling incident during lifting of steel plate

- Date: 6 November 2010
- Nature of Injury: NIL
- The lorry crane was attempting to lift a steel plate to be used for ground support. In the process, it tilted and toppled to its left side with its boom resting on some concrete beams nearby.
Past Dangerous Occurrences Involving Lorry Cranes
2006 - 2009

Lorry loader delivering metal pipes and flat bars collapsed - 23 Mar 09

Boom of lorry loader failed and hit the external scaffold - 30 Oct 09

Lorry loader carrying a container collapsed - 16 Sep 08
Past **Fatal Cases Involving Lorry Cranes** 2006 - 2009

Lorry loader was lifting timber planks when the load became dislodged and hit the Deceased on his head and shoulder - **23 Mar 09**

Lorry crane was sited at the edge of excavation. It was lifting some re-bars when it lost its stability and collapsed into an excavation. The operator subsequently succumbed to his injuries - **29 Mar 06**
Case Study 1 (Fatal) - Hit by Falling Load

- The deceased (lorry driver) had delivered 2 bundles of re-bars to the worksite.
- Two other workers assisted him in the unloading of re-bars.
- While deceased and other workers were unloading a bundle of steel re-bars from a lorry using the lorry crane, the bundle of re-bars fell onto the deceased.
### Case Study 1 (Fatal) - Hit by Falling Load

#### Root Cause Analysis

<table>
<thead>
<tr>
<th>Evaluation of Loss</th>
<th>• One Fatality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Accident</td>
<td>• Struck by Falling Object (Re-bars)</td>
</tr>
<tr>
<td>Immediate Cause</td>
<td>• Improper Lifting</td>
</tr>
<tr>
<td>Basic Causes</td>
<td>• Lack of Lifting Plan</td>
</tr>
<tr>
<td></td>
<td>• Lack of Knowledge</td>
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<tr>
<td></td>
<td>• Lack of Skill</td>
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<td>• Inadequate Supervision</td>
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</tbody>
</table>
Case Study 1 (Fatal) - Hit by Falling Load

Lesson Learnt

- A Lifting Plan should be established and implemented.
- The capacity of crane must be greater than the load to be lifted.
- The lifting operation must be closely supervised.
- The lifting procedures should be improved and well communicated to all lifting personnel.
Case Study 2 (Fatal) – Operator Pinned by Toppled Lorry Crane

• The deceased and three co-workers were transferring re-bars from a trailer into an excavation (about 6m deep) using a lorry crane.

• The lorry crane lost its stability and toppled onto the bank of the excavation.

• The deceased who was operating the lorry crane, was pinned under the falling re-bars (of about 1.5 ton) from the bed of the lorry crane.
# Case Study 2 (Fatal) – Operator Pinned by Toppled Lorry Crane

## Root Cause Analysis

<table>
<thead>
<tr>
<th>Evaluation of loss</th>
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<tbody>
<tr>
<td>Type of contact</td>
<td>• Struck by Falling Object (Re-bars)</td>
</tr>
<tr>
<td>Immediate Cause</td>
<td>• Overloading of Lorry Crane</td>
</tr>
<tr>
<td>Basic Causes</td>
<td>• Improper setting of Lorry Crane</td>
</tr>
<tr>
<td></td>
<td>• Lack of Lifting Plan</td>
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<td></td>
<td>• Lack of Safe Work Procedures</td>
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<td>• Inadequate Training</td>
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</table>
Case Study 2 (Fatal) – Operator Pinned by Toppled Lorry Crane

Lesson Learnt

- The importance of assessing and matching the appropriate lifting machine to the lifting operation.
- The lifting operation must be closely supervised.
- Lifting Plans and Safe Work procedures on operation of lorry cranes shall be maintained.
- Ensure that Lorry Crane Operators are adequately trained.
Case Study of Overseas

Fatal Lorry Crane accidents
Case 1 - Lorry Crane Toppled while trying to unload an excavator

• The deceased was unloading an excavator from the lorry bed into an excavation (about 1.8m deep) using a lorry crane.

• The blocks under the outrigger jack broke and the lorry crane toppled over.

• The deceased who was operating the lorry crane, was pinned between the retaining wall and the lorry crane.
### Case Study 1 (Fatal) – Operator Pinned by Toppled Lorry Crane

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<tr>
<td>Type of Contact</td>
<td>• Caught in Between Objects</td>
</tr>
<tr>
<td>Immediate Cause</td>
<td>• Instability of Lorry Crane</td>
</tr>
<tr>
<td>Basic Causes</td>
<td>• Lack of Lifting Plan</td>
</tr>
<tr>
<td></td>
<td>• Improper setting of Lorry Crane</td>
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Overseas cases of Lorry Cranes fatal accidents

Case 2 - Truck smashed into Lorry Crane used as a MEWP parked along road

• The deceased was working in the bucket of the Lorry Crane (in MEWP mode) to remove tree branches prior to installation of lighting fixtures.

• While working, a 10-ton truck intruded into the working area and crashed into the lower part of the Lorry Crane and its outriggers.

• The deceased was flung off to the roadway and was killed due to fractured skull.
### Case Study 2 (Fatal) – Worker killed during vehicle collision

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<tr>
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<tbody>
<tr>
<td>Type of Contact</td>
<td>• Fall from Heights (due to collision)</td>
</tr>
<tr>
<td>Immediate Cause</td>
<td>• Lack of Safe Exclusion/Demarcation Zones</td>
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<tr>
<td>Basic Causes</td>
<td>• Lack of proper Traffic Management</td>
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<td></td>
<td>• Lack of Supervision</td>
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<td>• Inadequate Training</td>
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Overseas cases of Lorry Cranes fatal accidents

Case 3 - Overturning of Lorry Crane while lifting steel plate

- The deceased was instructed to remove steel plates laid over the portion of the trench.

- The deceased lifted a steel plate and tried to swing 90 degrees to place it on the lorry bed.

- The lorry crane toppled over the deceased causing his left thigh to be pinned between an outrigger and bridge railing.
# Case Study 3 (Fatal) – Worker caught between crane and other structure

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<td>Immediate Cause</td>
<td>Overloading of Lorry Crane</td>
</tr>
<tr>
<td>Basic Causes</td>
<td>Lack of Lifting Plan</td>
</tr>
<tr>
<td></td>
<td>Narrow access outrigger not fully extended</td>
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<tr>
<td></td>
<td>Overloading beyond rated capacity</td>
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<td></td>
<td>SWP and measures to prevent toppling had not been specifically determined</td>
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Intervention Efforts by MOM
Intervention 1 – Launch of Joint Ops Woodpecker on 28 July 2010

- A Joint Ops codenamed “Operation Woodpecker” conducted on 28 July 10 by MOM, LTA, NParks and HDB
- Ops covered 15 worksites on public roads island-wide
- Ops aimed to reinforce safety guidelines for works on public roads and to allow the participating agencies to garner sense of the level of safety awareness and compliance to safety standards
Intervention 1 – Findings of Joint Ops
Woodpecker on 28 July 2010

- Workers carrying out tree-pruning activities in man-bucket were provided with necessary safety equipment (eg safety harness, safety gloves, glasses etc).
- All the lorry crane operators checked had undergone either a structured training course or OJT.
- Operators had also extended the outriggers of the lorry cranes to ensure stability.
- Contractors were generally aware of the need to demarcate the work zone through the placement of appropriate cones, barriers and warning signages, as stipulated in LTA's Code of Practices for Traffic Control at Work Zone. However there were sites inspected where the cones, barriers were found to have been placed too close to the work area.
- Some sites inspected did not conduct RA or implement a PTW for lifting operations involving lorry cranes.
Intervention 2 – Issuance of Technical Circular on SWP for Operating Lorry Cranes on Public Roads

- MOM issued a Technical Circular in July 2010 in response to spate of incident involving cranes. The circular focused on SWP for Operating Lorry Cranes on Public Roads.

- Circular intended to remind employers on common hazards involved in such works and preventive measures which included the following:
  - Risks due to Traffic Movement
  - Risks involved in Operation of Lorry Cranes
  - Risks due to Working at Heights
  - Risks due to Contact with Overhead Cables and Structures
Compliance Assistance

- Code of Practice Traffic Control and Road Safety by LTA
- WSH Guidelines for Landscape and horticulture Works by WSHC and CUGE
Structured Training for Lorry Crane Operators

• MOM in collaboration with WSHC and Crane Taskforce has developed a Training Curriculum for Lorry Crane Operators

• The course is intended to provide a more structured training for operators of Lorry Cranes in addition to brand-specific training provided by Manufacturers and Suppliers

• Pilot Run of the course was conducted in April 2011 by BCA Academy.
Thank You