

Accident Advisory: Steel plate toppled onto workers

Ref: [1819053](#) WSH Alert Accident Notification dated 16 October 2018

On 4 October 2018 around 10.25pm, a team of workers was fabricating an I-beam from steel plates at a workshop. While welding the steel plates together, a standing steel plate (weighing more than 1 tonne) suddenly toppled onto two of the workers. They were conveyed to the hospital where one of them succumbed to his injuries on the same day. The other worker sustained leg injuries.



Figure 1: Overview of accident scene where an overhead crane was used to keep the standing steel plate vertical for welding works.

Recommendations

One primary concern in I-beam fabrication is the way steel plates are lifted and supported to facilitate welding works. Persons in control of similar workplaces and work activities such as occupiers, principals and employers are advised to consider the following risk control measures to prevent similar a recurrence:

Safe Lifting Operation

- Establish a lifting plan to ensure that the lifting operation can be carried out safely. The lifting plan should take into consideration the technical aspects of the specific load to be lifted such as its shape, weight distribution and its centre of gravity (which can affect load stability).
- Conduct a Risk Assessment (RA) to identify possible hazards associated with the use of special lifting attachments such as a lifting clamp (e.g. faulty lifting clamp, insecure clamping, incorrect positioning of clamp) and implement measures (e.g. additional supports) to eliminate the risk of load toppling. In this case, the steel plates must be securely clamped and supported in a stable position before performing any welding works.

Equipment Inspection and Maintenance

- Conduct regular visual checks on the lifting machine (the overhead travelling crane in this case) and all lifting gears and appliances (e.g. hooks and shackles, chain slings, lifting clamps) to ensure that they are in good working condition and fit for use.
- Subject all lifting equipment to preventive maintenance (frequency of maintenance to be based on manufacturer's recommendation) to ensure proper functioning.
- Replace any defective lifting machine component or lifting gear immediately.

Safe Work Procedure

- Establish and implement a Safe Work Procedure (SWP) to ensure the safe performance of work activity. In this case, a safe work method for I-beam fabrication coupled with engineered solutions (e.g. for clamping, lifting and load support) must be put in place prior to work commencement. Workers should also be familiar with the SWP for the use of lifting clamps and the consequences of an accidental release.
- Provide the necessary supervision to ensure that both the lifting plan and the SWP are strictly adhered to.

Worker Training

- Ensure that lifting team members (crane operator, lifting supervisor, rigger, signalman) are competent and have successfully completed the relevant safety and health training in relation to their assigned roles and responsibilities (e.g. WSQ Supervise Safe Lifting Operations course for lifting supervisors).

Effective Communications

- Supervisors may use the daily toolbox meeting to communicate the lifting plan, safe work procedure and any WSH matters. Toolbox meetings should be conducted prior to work commencement and before shift handover.

Risk Assessment

Conduct a thorough Risk Assessment (RA) for all work activities to control any foreseeable risk that may arise during I-beam fabrication works. The RA should cover, but is not limited to, the following areas:

- Identification and demarcation of operational zone.
- Procedure for clamping and release of steel plates.
- Introduction of additional supports to eliminate the risk of load toppling.
- Emergency response procedure including site-specific rescue plan and medical evacuation.

Further Information

1. Workplace Safety and Health Act.
2. Workplace Safety and Health (Risk Management) Regulations.
3. Workplace Safety and Health (General Provisions) Regulations.
4. Workplace Safety and Health (Operation of Cranes) Regulations 2011.
5. Code of Practice on Workplace Safety and Health Risk Management.
6. Code of Practice on Safe Lifting Operations in the Workplaces.

7. SS 343: 2014 Specification for Lifting Gear – Part 1: Wire rope slings, Part 2: Hooks, Part 3: Shackles.
8. SS 497: 2011 Code of Practice for Design, Safe Use and Maintenance of Gantry Cranes, Overhead Travelling Cranes and Monorail Hoists.
9. SS 510: 2017 Code of Practice for Safety in Welding and Cutting (and other operations involving the use of heat).
10. SS 537: 2008 Code of Practice for Safe Use of Machinery – Part 1: General requirements.
11. SS 567: 2011 Code of Practice for Factory Layout – Safety, Health and Welfare Considerations.
12. SS 595: 2014: Steel Wire Ropes for Hoisting – Part 3: Code of Practice for the Care, Inspection and Maintenance of Steel Wire Ropes for Hoisting.
13. WSH Guide on Safe Use of Overhead Travelling, Cranes Gantry Cranes, Jib Cranes and Hoist.
14. WSH Guidelines on Safe Use of Machinery.
15. WSH Council’s Guidebook for Lifting Supervisors.
16. WSH Council’s Guide to Effective Toolbox Meeting.
17. WSH Council’s Activity Based Checklist for Effective Toolbox Meetings.
18. WSH Council’s Activity Based Checklist for Working Safely with Machines.
19. WSH Council’s Case Studies for Metalworking Industry.
20. WSH Council’s 6 Basic WSH Rules for Lifting Operations.
21. WSH Council’s 6 Basic WSH Rules for Working with Machines.

* Information on the accident is based on preliminary investigations by the Ministry of Manpower as at 26 October 2018. This may be subject to change as investigations are still on-going. Please also note that the recommendations provided here are not exhaustive and they are meant to enhance workplace safety and health so that a recurrence may be prevented. The information and recommendations provided are not to be construed as implying any liability to any party nor should it be taken to encapsulate all the responsibilities and obligations under the law.

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