WSHCOUNCIL
Tripartite Alliance for Workplace Safety and Health

MANUFACTURING SECTOR:
AMPUTATIONS IN METALWORKING

Of all the manufacturing sub-sectors in Singapore, the metalworking sub-sector contributes to majority (~15%) of all hand and finger injuries that have resulted in amputations. These incidents happened when workers were engaged in the following activities:

- Repairing and maintenance of rebars, wood and metals using mechanised tools
- Cutting of rebars and beams using cutting machines and mechanised tools
- Manual handling of metal items such as steel plates, pipes and bars

Source: Amputations at work: What do we know about it? WSHI Institute, WSH Institute Annual Report 2017

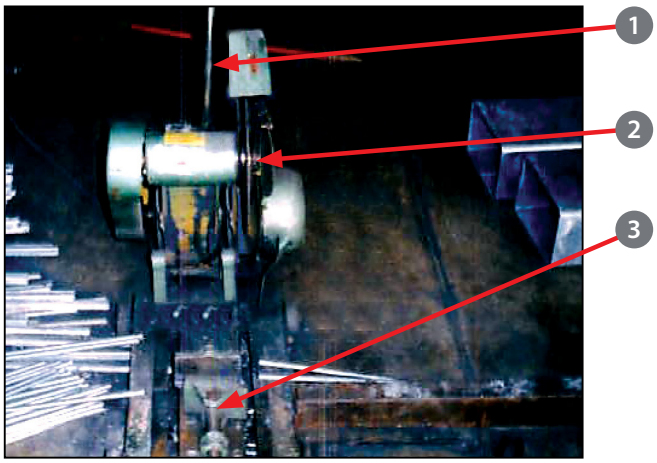
CASE STUDY OF AN AMPUTATION INCIDENT IN A METALWORKING COMPANY

A worker's thumb was severed when using a rotating abrasive disc cutter to cut a flat metal bar. This occurred when he tried to steady the disc cutter by holding down the metal bar while the machine was vibrating violently.

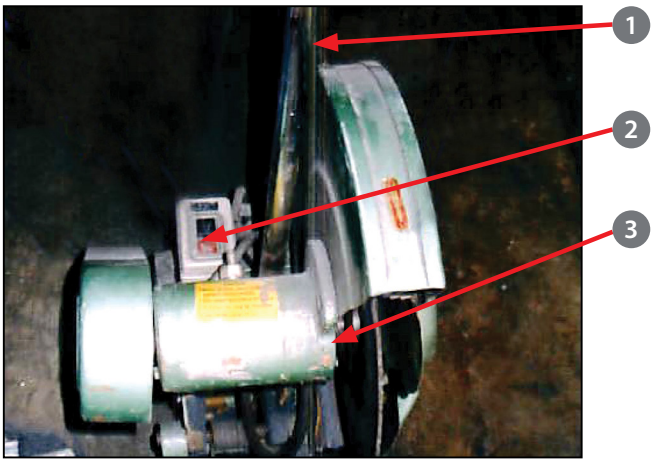
It was found that the disc cutter was mounted on 4 castor wheels and hence, started to vibrate as it was not balanced or maintained properly. A fixed guard covered the top half of the disc cutter, leaving the bottom half of the disc exposed for cutting works. The worker proceeded with the cutting by holding the metal bar down with his right hand, even though the metal bar had to be clamped on the vice before work could start. This resulted in his right hand coming in direct contact with the rotating disc cutter, which eventually caused his right thumb to be cut off.

The following recommendations and learning points can be taken into consideration when doing Risk Assessment:

- The fixed machine guard should be designed to cover the disc cutter so that the cutting edge exposed is minimal. It can be replaced with a self-adjusting guard that exposes the cutting edge only when needed during cutting.
- Grinding or abrasive cutting machines should not be mounted on castor wheels as it creates instability during cutting operations.
- Workers should be specifically trained to operate the disc cutter machine. The training should also cover the emergency response procedure on what and how to react under situations when operation is 'abnormal'. e.g. Noisy or strong vibration
- Safe Work Procedures should be developed to be in line with operation manuals. New hires or staff new to the job should be given on-the-job training and supervision till they are ready to work with the equipment safely.



1. The handle for moving the abrasive disc for cutting
2. The abrasive disc
3. The vice for clamping material for cutting



1. The handle for moving the abrasive disc for cutting
2. The "on/off" push button control for activating the disc cutter
3. The metal guard that exposed the bottom half of the abrasive disc for cutting

Source: Case Studies for Metalworking Industry, WSH Council

WSH COUNCIL MATERIALS FOR MANUFACTURING COMPANIES

1. WSH Guidelines on Managing Safety and Health for SMEs in the Metalworking Industry
2. WSH Guidelines on Safe Use of Machinery
3. Case Studies for the Metalworking Industry
4. Checklist for Working Safely with Machines
5. 6 Handy Tips for Safe Hands
6. Look. Think. Do. – 6 Basic WSH Rules for Working with Machines (English, Mandarin)