Case Study 1

Meat mincing machine

Rotating feeding worm (Auger)

Amputation of fingers
CS1- Synopsis of Accident

- A worker was tasked to mince 20 bags of prawns into paste using a mincing machine. To achieve a smooth prawn paste, the meat had to be minced 2 times.

- After completing the first round of mincing 10 bags of prawns, he carried out the second round of mincing the same paste. He then discovered that the paste had become sticky and had stuck to the throat of the mincing machine and did not come out from grinder housing.
CS1- Synopsis of Accident

- Without switching off the machine, he removed the feeding tray and used his left hand to push the paste deep down the throat into grinding housing.

- His fingers were caught and severely crushed by the rotating feeding worm (Auger).
CS1- Observations and Findings

☐ Generic RA / SWP was conducted to identify the hazards and risks of using the various machines

☐ Worker was briefed on all safety measures as part of his induction programme. On-the-job training and mentoring have been provided by his Supervisor on operation of the various food processing machines (e.g. Silent cutter, forming, pumping and meat mincing machines)

☐ Worker had operated the mincing machine more than 10 times and worked for 6 months prior to the accident

☐ Worker was working alone

☐ Machine was bought more than 15 years ago

☐ No problem was reported by any workers using the machine
CS1- Observations and Findings

Guarding provided at orifice

Push stick provided

Feeding tray

Throat (12cm deep)

Guarding provided at orifice

Push stick provided

Rotating feeding worm (Auger) and cutter inside grinder housing

No warning signage displayed to warn worker of the presence of dangerous part(s)

Mincing machine involved in the accident

Switches’ buttons damaged
CS1- Consequences of the accident

Amputation of 4 fingers
CS1- Can the accident be prevented?

- Use push stick
- Switching off machine before removing feeding tray
- Display adequate warning signage / markings
Case Study 2

Meat mincing machine

Rotating feeding worm (Auger)

Left hand crushed
CS2- Synopsis of Accident

- A production operator was tasked to mince cuttlefish head into meat paste at the processing room.

- The works involved thawing the frozen cuttlefish head block and removing any ink sac before using his hands to sweep the cuttlefish heads into the feeder through the orifice on the feeding tray.

- The accident occurred when he inserted his left hand directly into the feeder.
CS2- Observations and Findings

- Generic RA / SWP was conducted to identify the hazards and risks of using the various machines

- Worker was briefed on all safety measures as part of his induction programme. On-the-job training and mentoring have been provided by his Supervisor on operation of the various food processing machines (e.g. Silent cutter, forming, pumping and meat mincing machines)

- Worker had been operating the mincing machine for 8 months prior to the accident

- Worker just started work on the day of accident, with no unusual or symptoms of sickness or tiredness reported and proceeded with his work alone.

- Machine was bought more than 8 years ago and no problem was reported by anyone using the machine

- Push stick was provided
CS2- Observations and Findings

Typical industrial mincing machine

Rotating feeding worm (Auger) inside the grinder Housing

Feeding tray

Throat

Grinder housing
CS2- Observations and Findings

Part of the feeding tray, throat, rotating feeding worm (Auger) and grinder housing have been cut-off.

15 cm

Rotating feeding worm (Auger) inside the grinder Housing

Mincing machine involved in the accident
CS2- Observations and Findings

No guarding provided at orifice (19cm diameter) of feeding tray

- Operator’s hand or fingers could easily pass through and come in contact with the rotating worm during operation.

- No warning signage displayed to warn worker of the presence of dangerous part(s)
CS2- How did the accident happen?

- On the day of accident, the worker spotted an ink sac on the cuttlefish heads which he had accidentally swept into the feeder.

- Instinctively, he inserted his left hand through the orifice, directly to the feeder in the grinder house, trying to retrieve the ink sac as it would darken the paste.

- His left hand was suddenly caught by the rotating feeding worm and crushed by the rotating blades.
CS2- Consequences of the accident

Amputation of left hand below elbow
CS2- Can the accident be prevented?

Provide secured guarding at the orifice of feeding tray to prevent hands from being inserted into the throat.

Use push stick.
Case Study 3

Flour mixing machine

Rotating metal blades

Amputation of fingers
CS3- Synopsis of Accident

A production operator was tasked to fill-up and weigh the flour of doughnut mix into bags of 25 kgs by operating the mixer machine.

When the flour stopped flowing out from the discharge port suddenly, he tried to clear the choked flour by moving the handle of the discharge chute forward and backwards but was unsuccessful.

He next removed the magnetic hopper from the discharge port of the mixer machine and put his right hand directly into the discharge chute to clear the choked flour, while the machine was still in operation.

His fingers was caught by the rotating metal blades within the mixer machine.
CS3- Observations and Findings

- RA was conducted and SWP was developed for the “Manual Filling and Weighing Process”, including the cleaning / clearing of any choked flour at the discharge port / chute, where the operator must ensure that the power is switch off and LOTO procedures implemented before clearing the choke.

- On-the-job training have been provided by his Supervisor on safe operation of the mixing machines. Worker have been briefed and aware of the machine operating safety rules

- Worker had been operating the machine for 2 months prior to the accident

- Worker was working alone

- The machine was operating normally and no problem was reported
CS3- Observations and Findings

Mixer machine

Magnetic hopper with guards were installed at the discharge chute during normal operation.

Power switches not readily accessible in the vicinity of the machine.

No warning signage / label displayed to warn worker of the presence of dangerous part(s).
CS3- Observations and Findings

Discharge chute in “closed” position

Discharge chute with the magnetic hopper removed

To open

To close

Discharge chute in “open” position. Rotating metal blades located above discharge chute
CS3- How did the accident happen?

Re-enactment of the injured’s actions to clear the choked flour within the discharge chute using his right hand
CS3- Consequences of the accident

Amputation of 4 fingers on right hand
CS3 - Can the accident be prevented?

Implemented LOTO System during any servicing / maintenance

- Signal light / buzzer
- Emergency-stop button
- Safety sensors

Warning label
Case Study 4

Table saw

Rotating saw blades

Amputation of fingers
A carpenter was working alone operating a table circular saw to trim 1cm off the edge of a piece of plywood (L: 2m x W: 0.3m), when his fingers were cut-off by the rotating saw.
CS4- Observations and Findings

- No RA was conducted and SWP developed for the work activities in the workplace.

- Employer claimed to have briefed their workers on how to use the circular saw safely and what to watch out for during the course of their works. However, no documentations and records were available for inspection.

- Worker had been operating the machine for 2 years and confessed that he was aware of the risk of fingers getting cut by the rotating saw but was careless at the time of accident.

- Worker was working alone.
CS4- Observations and Findings

- The machine was operating normally and no problem was reported

- No warning signage displayed at or near the machinery to warn worker of the presence of dangerous part(s)

Rotating saw blades was exposed with no guarding, splitter and anti-kickback device provided
CS4- How did the accident happen?

- The worker had initially positioned himself a distance away from the blade, pushing the length of the plywood forward and towards the rotating saw.
CS4- How did the accident happen?

- As the plywood moved closer and closer to the rotating blade, the worker had to use more force to push the plywood forward. His body, as well as his hands supporting the plywood also moved closer to the rotating blade.

- As he was concentrating on using his right hand to push the plywood harder forward and he did not realize that his left hand had already moved too close to the rotating blade. His fingers then contacted the rotating blade together with the plywood.
CS4- Consequences of the accident

Left index, middle and thumb were being cut off.
Case Study 5

Table saw

Rotating saw blades

Amputation of fingers
CS5- Synopsis of Accident

- A site engineer was using the table saw machine to trim some recycle plywood. The plywood kickback strongly and move up suddenly.

- In order to prevent the plywood from further kickback and hitting him, he uses his right hand to press down the plywood and forgot that the rotating saw blade was still in operation underneath.

- His middle, ring and little fingers were cut off by the rotating saw.
CS5- Observations and Findings

- The RA conducted included the hazards and risks of operating and use of the table circulating saw, such as the provision of guards before operation.

- The SWP also spelt out the need to check and ensure that no nails and screws were embedded in the plywood before cutting and the potential risk of kickback of the recycled plywood.

- Worker had worked in the company for 3 months and was briefed on the RA / SWP monthly, with records of briefings kept.

- Prior to the accident, he had worked for 13 hours and was working alone that night. General lightings were provided.
CS5- Observations and Findings

- The table saw was operating normally

- No warning signage was displayed at or near the table saw to warn worker of the presence of dangerous part(s)

- Hood guard with splitter provided.

The table saw involved in the accident

Plywood (L: 2.4m x W: 0.3m x T: 10mm)
CS5- How did the accident happen?

- Investigation revealed that a hidden nail was embedded in the recycle plywood. When the rotating saw blade contacted the nail, the plywood kick-back strongly and move up suddenly, hitting the safety guard.

- In order to prevent the plywood from kicking back further and hitting him, the worker instinctively used his right hand to press down the plywood and forgot that the rotating saw blade was in operation underneath.
CS5- Consequences of the accident

• Right middle, ring and little fingers were cut off.
CS5 - Can the accident be prevented?

- Properly adjusted saw grade
- Provision of anti-kickback / Riving knife
- Properly adjusted Rip Fence
- Properly adjusted Cross-Cut Fence
- Using push stick
- Sawdust extraction outlet
- Table extension
- Table extension
Summary of Lessons Learnt

- Employer shall conduct specific RA and develop SWP for the respective work activities.

- Consider Human Factors, possible unsafe behaviour, etc.

- Ensuring employees’ awareness and knowledge of the specific WSH hazards and control measures

- Ensuring all machines are of inherently safe design for use (i.e. effective guarding of all dangerous parts, provision of splitter / riving knife to prevent kickbacks on circular saw table, etc.) and adjustable guards are correctly adjusted (e.g. above the rotating saw blades)

- Provide adequate warning notices, signage or markings at or near the machinery to provide warning of the presence of dangerous part(s), and the ‘dos & don’ts’ for machinery safety
Summary of Lessons Learnt

- Workers shall adhere to all safety procedures (e.g. using proper tools such as push stick, switching off machine before removing the feeding tray, etc.)

- Workers should report any unsafe machine / work conditions to their supervisor / employer for necessary follow-up rectification action

- Provide adequate supervision
References

- Workplace Safety and Health Act
- WSH (General Provisions) Regulations
- WSH (Risk Management) Regulations
- WSH (Noise) Regulations
- SS 537-1 (CP for the safe use of machinery – General Requirements)
- SS 537-2 (CP for the safe use of machinery – Woodworking Machinery)
- CP on WSH Risk Management
- Workplace Safety and Health Guidelines for Safe Use of Machinery
- Working Safely with machines Checklist
- Risk Assessment and Control Measures (Food and Beverage) Checklist
“Please be safe and prevent all injuries”

Thank You