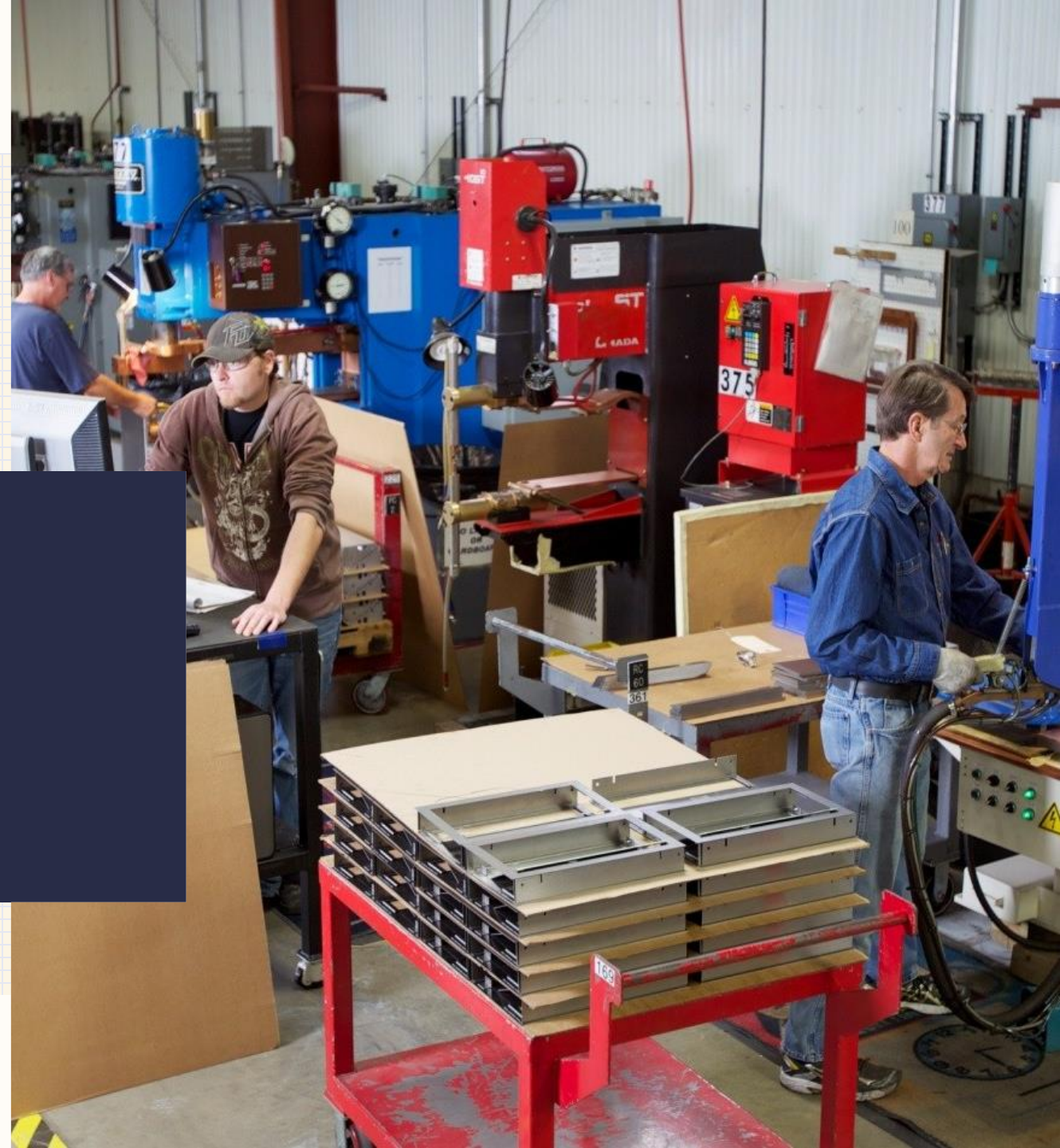# Workplace Safety & Health Dashboard

Purpose

Workplace Health and Safety (WSH) officers can make use of the dashboard to:

- Monitor the annual rate of workplace injuries and occupational diseases

- Identify the top incident types and corresponding top incident agent

- Communicate to employers on the importance of allocating resources to WSH

- Communicate to employees on the risks and measures

Accidents are costly

DIRECT COSTS

- Compensation

- Medical expenses

- Legal costs

INDIRECT COSTS

- Stop-work orders

- Productivity downtime

- Training replacement workers

- Lower staff morale and absenteeism

- Increased insurance premiums after every injury

- Repairing damaged equipment

Accidents are costly

According to a study conducted by the Workplace Safety and Health (WSH) Institute,

- Excluding lifetime costs, the cost for work injuries and ill health sustained for 2011 is estimated to cost Singapore **$2.62 billion, with employers bearing 88.2% of cost,** employees 9.5% and the community 2.3%

- If lifetime cost is included, i.e., net loss of future earnings and loss of human capital, the total cost of work injuries and ill health is estimated to be **$10.45 billion (equivalent to 3.2% GDP)**, with employers bearing 22.1% of cost, employees 50.5% and the community 27.4%.

Data Collection (1)

WORKPLACE INJURIES BY INDUSTRY AND INCIDENT TYPES

SOURCE: DATA.GOV.SG

Data on workplace safety and health are compiled based on incident reports made by employers, occupiers and medical practitioners in the fulfilment of their obligations under the Workplace Safety and Health (Incident Reporting) Regulations.

Managed By	Ministry of Manpower
Last Updated	May 14, 2019, 18:00 (SGT)
Created	June 8, 2016, 12:00 (SGT)
Coverage	January 1, 2006 to December 31, 2018
Frequency	Annual
Source(s)	Ministry of Manpower
Source URL	http://www.mom.gov.sg/workplace-safety-and-health/wsh-reports-and-statistics
Licence	Singapore Open Data Licence

Data Collection (1)

1) Figures are victim-based.
2) 2013 onwards data are not strictly comparable with previous years as data exclude work-related back injuries due to ergonomic risks and include work-related traffic injuries.

The degree of injury of a workplace injury is defined as:

- Fatal if it results in death;

- Major if it is an injury, other than fatal injuries, which are more severe in nature based on the nature of injury, part of the body injured, incident type and duration of medical leave. These injuries include: amputation, blindness, deafness, paralysis, crushing, fractures and dislocations, exposure to electric current, asphyxia/ drowning, hypothermia, burns and concussion with more than 20 days of medical leave; and

- Minor if it is an injury, other than fatal injuries and major injuries, which results in more than three days of medical leave, or at least 24 hours of hospitalisation.

Data Collection (2)

CONFIRMED CASES OF **OCCUPATIONAL DISEASES** BY TYPE OF DISEASE AND INDUSTRY

SOURCE: DATA.GOV.SG

Data on workplace safety and health are compiled based on incident reports made by employers, occupiers and medical practitioners in the fulfilment of their obligations under the Workplace Safety and Health (Incident Reporting) Regulations.

Managed By	Ministry of Manpower
Last Updated	May 15, 2019, 18:27 (SGT)
Created	June 8, 2016, 21:14 (SGT)
Coverage	January 1, 2006 to December 31, 2018
Frequency	Annual
Source(s)	Ministry of Manpower
Source URL	http://www.mom.gov.sg/workplace-safety-and-health/wsh-reports-and-statistics
Licence	Singapore Open Data Licence

Data Collection (2)

1) Occupational lung disease includes occupational asthma, silicosis and asbestosis
2) Figures are victim-based.

Occupational Disease is a disease contracted as a result of exposure to risk factors arising from work.
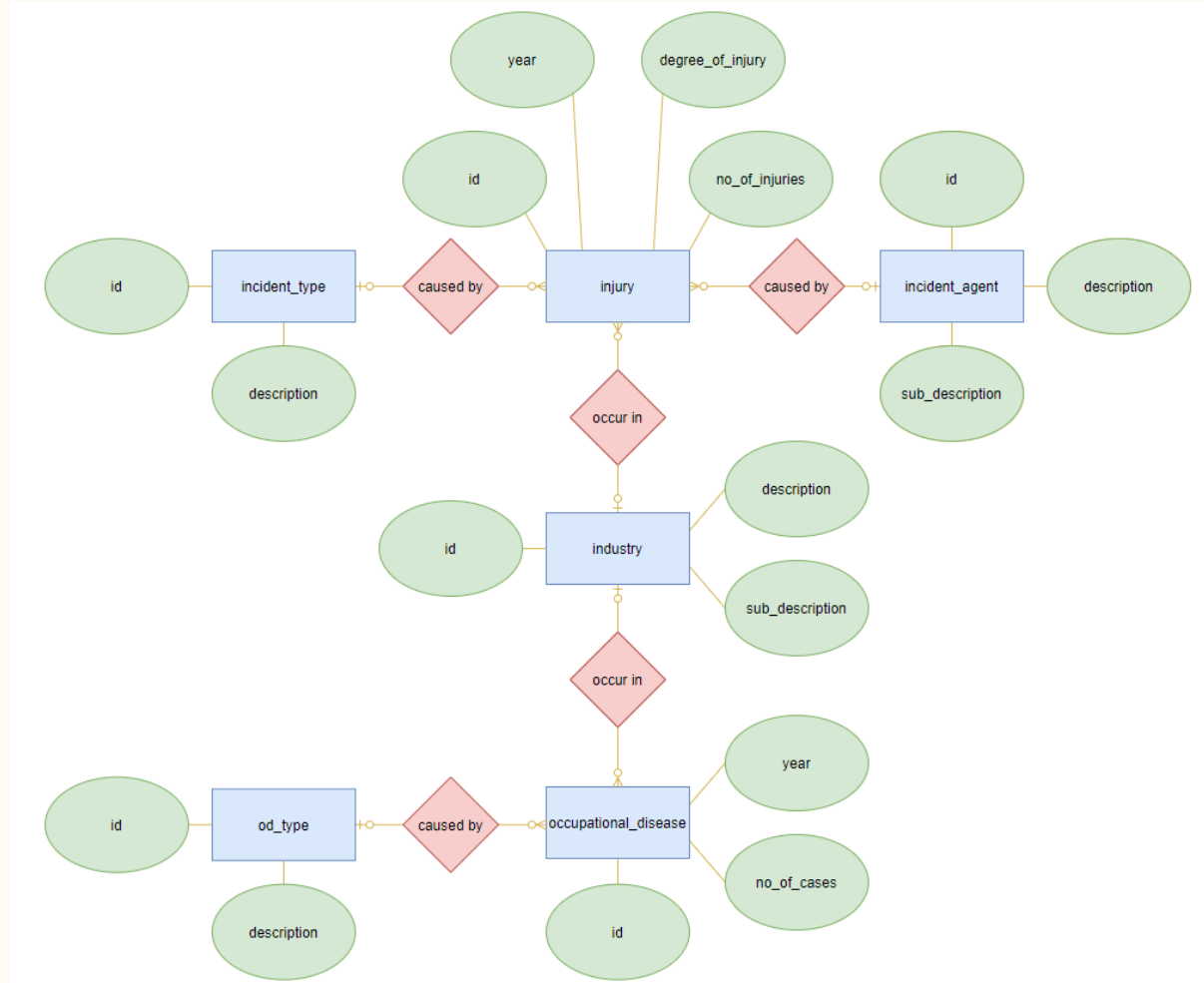
Data Preparation using Excel

Cleaning & Transformation

- Removed duplicate records

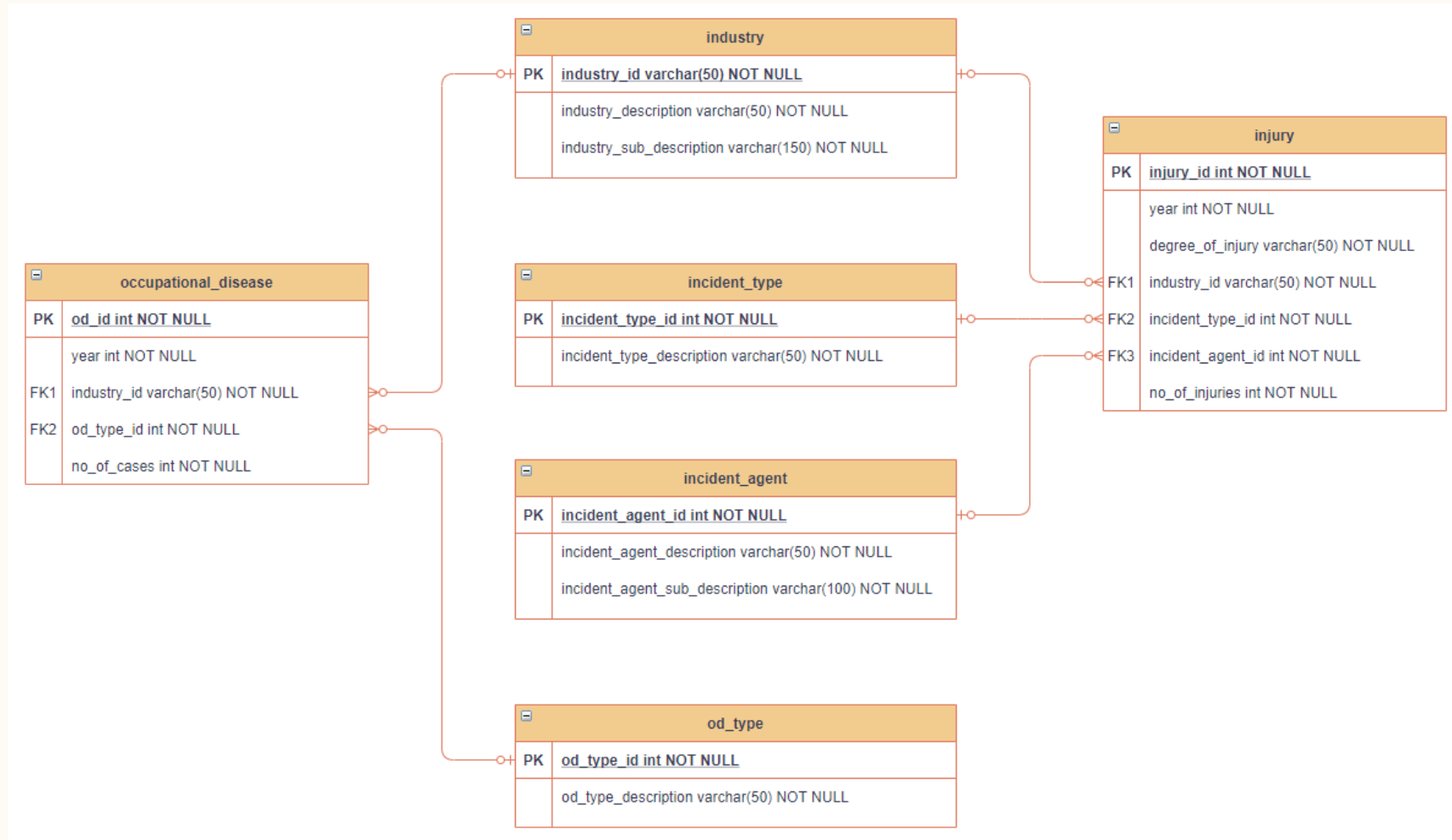- Corrected spelling errors

- Filtered data between 2013 and 2018

Normalization

- Split two tables into six tables

Entity Relationship Diagram

Schema Tables

Data Preparation using Excel

- Combined sub-industries that belong to the same category in the Singapore Standard Industrial Classification (SSIS) 2020:

a) "Logistics and Transport" and (replace second)

  "Warehousing & Support Activities for Transportation excluding Logistics and Transport" (replace first)

  grouped as "Warehousing & Support Activities for Transportation" with industry_id = H52

b) "Legal, Accounting & Management Services" and

  "Legal & Accounting Activities"

  grouped as "Legal & Accounting Activities" with industry_id = M69

c) "Repair & Maintenance of Vehicles" and (replace second)

  "Repair of Computers, Personal & Household Goods" (replace first)

  grouped as "Repair of Computers, Personal & Household Goods & Vehicles" with industry_id = S95

	sub_industry	count
28	Libraries, Archives, Museums & Other Cultural Activities	138
29	Logistics and Transport	955
30	Manufacture of Computer, Electronic & Optical Products	438
31	Manufacture of Food, Beverages & Tobacco	596
32	Manufacture of Furniture	266
33	Manufacture of Motor Vehicles, Trailers & Semi-Trailers	83
34	Manufacture of Non-Metallic Mineral Products	446
35	Manufacture of Other Transport Equipment	257
36	Manufacture of Paper Products and Printing	287
37	Manufacture of Petrochemical Products	368
38	Manufacture of Pharmaceutical & Biological Products	113
39	Manufacture of Rubber & Plastic Products	287
40	Manufacture of Textile & Wearing Apparel	106
41	Manufacture of Wood & of Products of Wood & Cork, except Furniture; Manufacture of Article...	220
42	Marine	761
43	Metalworking	1217
44	Mining & Quarrying	9
45	Motion Picture, Video & Television Programme Production, Sound Recording & Music Publishi...	28
46	Office Administrative, Office Support & Other Business Support Activities	390

Note: Used SQL to check that the number of replacements in Excel is correct for each sub-industry

Data Preparation using Excel

- Assigned new industry_id for categories not found in SSIS 2020:

    a) "Marine" with industry_id = V00

    b) "Activities Not Adequately Defined" with industry_id = W00

- Some sub-industries consist of multiple categories in SSIS 2020 and are assigned the first category in the group:

    E.g. "Manufacture of Food, Beverages & Tobacco" consists of:

    a) C10 Manufacture of Food Products

    b) C11 Manufacture of Beverages

    c) C12 Manufacture of Tobacco Products

    and is assigned with industry id = C10

Data Preparation using Excel

- Merged queries to assign industry_id for the 'injury' and 'occupational_disease' tables

- Added index column to form the primary key for the 'injury' and 'occupational_disease' tables

- Grouped, sorted and indexed data to form the respective primary keys for the 'incident_type', 'incident_agent' and 'od_type' tables

Data Analysis using SQL

(1) Number and rates of fatal injuries, major injuries, minor injuries and occupational diseases in Manufacturing

```sql
SELECT year, degree_of_injury, SUM(no_of_injuries) AS total_no_of_injuries

FROM injury

WHERE industry_id LIKE 'C%'

GROUP BY year, degree_of_injury;



SELECT year, SUM(no_of_cases) AS total_no_of_cases

FROM occupational_disease

WHERE industry_id LIKE 'C%'

GROUP BY year;
```
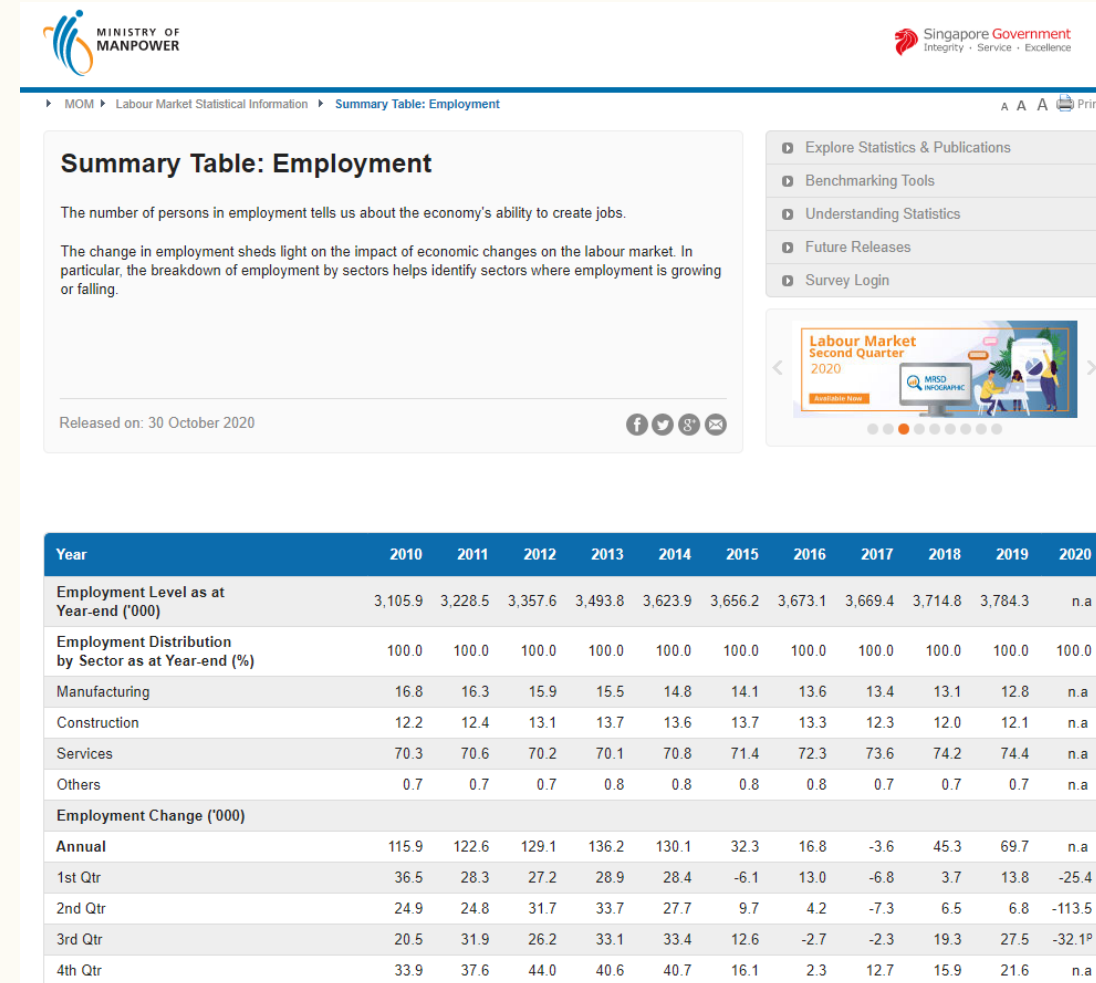
Data Analysis using SQL

(2) Number of injuries due to the top four incident types in Metalworking

```sql
SELECT a.year, a.degree_of_injury, a.incident_type_id, c.incident_type_description,
SUM(a.no_of_injuries) AS total_no_of_injuries

FROM injury a

JOIN incident_type c

ON a.incident_type_id = c.incident_type_id

WHERE a.industry_id = 'C24'

AND c.incident_type_id IN (123, 101, 121, 114)

GROUP BY a.year, a.degree_of_injury, a.incident_type_id, c.incident_type_description

ORDER BY SUM(a.no_of_injuries) DESC;
```

```
123: Struck by Moving Objects
101: Caught in/betw Objects
121: Struck by Falling Objects
114: Falls – Slips, Trips & Falls
```

Data Analysis using SQL

(3) Top incident agent for each incident type

```sql
SELECT a.year, a.incident_agent_id, d.incident_agent_description, d.incident_agent_sub_description,

SUM(a.no_of_injuries) AS total_no_of_injuries

FROM injury a

JOIN incident_type c

ON a.incident_type_id = c.incident_type_id

JOIN incident_agent d

ON a.incident_agent_id = d.incident_agent_id

WHERE a.industry_id = 'C24'

AND a.incident_type_id = 123

GROUP BY a.year, a.incident_agent_id, d.incident_agent_description, d.incident_agent_sub_description

ORDER BY SUM(a.no_of_injuries) DESC;
```

Repeat for 101, 121, 114

Visualization using Excel Dashboard

How to manage risks?

5-STEP GUIDE

1. Identify what might cause harm

2. Evaluate the risks

3. Implement measures to control the risks

4. Communicate and educate employees

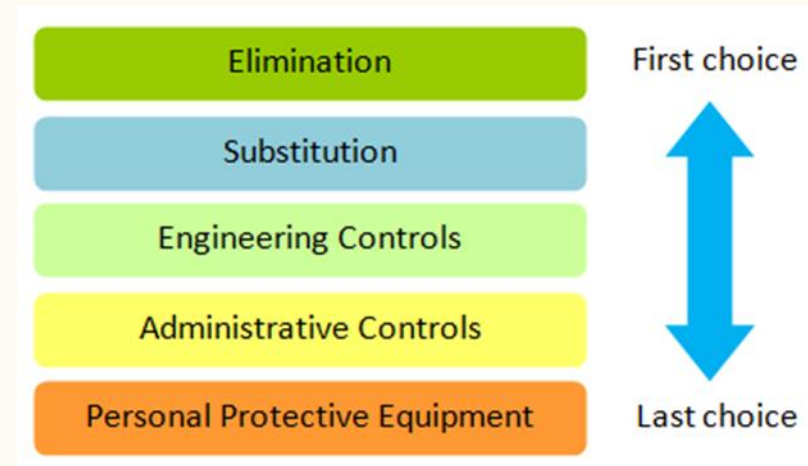5. Review risk assessment regularly

UPSTREAM RISK CONTROLS

IMAGE SOURCE: WSHC.SG

Struck by Moving or Falling Objects

- From 2013 to 2018, 27.0% and 13.3% of injuries result from being struck by moving or falling objects respectively in the metalworking industry

- Top incident agent: metal items (excluding knives/ needles)

- Elimination: controlling the process from a remote safe position

- Substitution: changing the process materials for a less hazardous one

Caught in/ betw Objects

- From 2013 to 2018, 16.9% of injuries result from being caught in/ betw objects in the metalworking industry

- Top incident agent: industrial machines

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

IMAGE SOURCE: WSHC.SG

Slips, Trips & Falls

- From 2013 to 2018, 13.9% of injuries result from slips, trips and falls in the metalworking industry

- Top incident agent: floor/ level surfaces

- Largely due to human factors, judgement error, people tend to perceive such hazards as a lot less risky

- Employees must adhere to safe work procedures and not endanger themselves through unsafe behaviour

- Housekeeping, routine inspections and near miss incident reporting are essential

IMAGE SOURCE: WSHC.SG