Safety and Health Manual

Version 1.1

Dept. of Chemical and Process Engineering

Faculty of Engineering

University of Peradeniya

Peradeniya 20400

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Document Revision

Date	Version	Amendments	Remarks
27/10/2020	1.0.0	Revised policy principles and procedures comparing current practices	
20/01/2022	1.1.0	Lab – in charge personnel updated	

Note to Users:

This document will be revised based on the recommendations of Department of Chemical & Process Engineering Safety and Health Committee time to time. Therefore, please make sure you carry out any operating procedures or use of laboratory facilities in accordance with the latest revision of the document, which will be available in the department web site. Use of outdated document and any consequence is not an excuse.

Abbreviations:

CHP	Chemical Hygiene Plan
DSHC	Department Safety and Healy Committee
DCPE	Department of Chemical & Process Engineering
DSHO	Department Safety and Health Officer
TO	Technical Officer
OSHA	Occupational Safety and Health Administration
PEL	Permission Emission Level

1. Introduction

Department of Chemical & Process Engineering, Faculty of Engineering, University of Peradeniya offers four-year BScEng programme catering to local and global industry needs complying with ISEL-Washington Accord. Thus, Safety and health is an integral part of chemical engineering curricular in the department and it gives high importance to safety and health education not only via core course module called CP406: Industry Safety and Health, but also through the practice of safety and health procedures when carrying out teaching and learning as well as research activities. The department consists of following laboratories for teaching and research activities.

1. Analytical Chemistry Laboratory (2nd Floor, New Building)
2. Energy Engineering Laboratory (2nd Floor, New Building)
3. Biochemical Engineering Laboratory (1st Floor, New Building)
4. Food Engineering Laboratory (1st Floor, New Building)
5. Analytical Instrument Laboratory (Ground Floor, New Building)
6. New Pilot-Plant - I (Ground Floor, New Building)
7. New Pilot-Plant - II (Ground Floor, New Building)
8. Main Pilot-Plant (Old Building)

2. Laboratory Safety & Health Policy

2.1. Purpose and Application

This policy document explains how to promote safe work practices and procedures amongst laboratory users when working with or near hazardous chemicals or situations such as high pressure and temperature or hazards with biological nature.

Further, this document applies to any individual who works in a laboratory in the Dept. of Chemical & Process Engineering, Faculty of Engineering, University of Peradeniya. The document is not intended to supersede laboratory safety procedures of other departments/workplaces in the Faculty of Engineering that may carry out our activities.

2.2. Definition and Scope

“Laboratory” means a facility, using relatively small quantities of hazardous chemicals on a non-production basis. “Dry” laboratories such as computer labs are not covered by this policy.

“Hazardous chemical” means a chemical that significant evidence indicates may cause acute or chronic health effects in exposed laboratory users. This includes specific OSHA- regulated substances such as methylene chloride and formaldehyde.

“Permissible Exposure Limit” (PEL) is the acceptable concentration of exposure set forth by the Occupational Safety and Health Administration (OSHA) of USA or equivalent.

“Chemical Hygiene Plan” (CHP) is a written program setting forth procedures, equipment, and work practices to protect students and employees from the health hazards associated with laboratory work.

3. Roles and Responsibilities

The Department Safety & Health Committee (DSHC) consists of Head, Dept. of Chemical & Process Engineering, Department Safety & Health Officer (DSHO), In-charge of each laboratory, assigned technical officer along with lab attendant. The DSHC is responsible for development and administration of the Chemical Hygiene Plan (CHP) in the department. Further, it establishes laboratory specific safety policies and provides a forum to discuss laboratory safety issues.

Each laboratory in-charge with assigned technical officer and laboratory attendant are responsible for maintaining adherence to CHP in his or her laboratory by the users (undergraduate, postgraduate or visiting students). Each laboratory plan contains standard operating procedures that apply to the activities within that laboratory. The assigned technical officer for a particular laboratory is responsible for properly managing chemical waste in the laboratory with the consultation of the in-charge of a particular laboratory.

The DSHC will inspect laboratories and provide necessary information/training to laboratory users as required. The DSHC may also provide assistance and guidance for the construction of new laboratories and the renovation or retrofitting of existing laboratories.

4. Procedures

4.1. Chemical Hygiene Plan (CHP)

The CHP contains procedures for working safely with chemicals as well as guidelines for emergency situations. Each laboratory prepares the CHP custom to its respective operation and outlines the roles and responsibilities of laboratory personnel, users and DSHC. This Department Safety and Health Manual contain the Chemical Hygiene Plan (CHP) of the DCPE.

4.2. Department Safety & Health Officer (DSHO) and In-Charge of Laboratory (ICL)

Head, Dept. of Chemical & Process Engineering nominate a Department Safety & Health Officer (DSHO) with consultation of all academic staff members in the department and his/her responsibilities will be reviewed periodically or as required against the department Safety and Health Policy. In-charge of laboratory, technical officer and laboratory attendant for a particular are also assigned by the Head of Department of Chemical & Process Engineering for monitoring and guiding users, who work with hazardous chemicals or similar operation which can lead to serious consequences. The DSHO will coordinate with relevant in-charge of laboratories, assigned technical officers and laboratory attendants to make sure laboratory-specific CHP is followed by the users during their experimental activities.

4.3. Exposure Monitoring

Laboratory in-charge, assigned technical officers may request the DSHC to monitor particular laboratory for exposure if there is reason to believe that chemical exposure levels have exceeded, or are likely to exceed, the allowable regulatory level or the PEL. The permissible exposure limits are used to determine associated risks before carry out any hazardous activity in a particular laboratory.

4.4. Training

The DSHC provides laboratory safety training/refresher annually for all laboratory employees and users as described in the CHP. This training covers the CHP, exposure monitoring, waste management, and emergency procedures. For refresher sessions, only changes to the CHP or concerns from the previous year activities are discussed.

4.5. Inspections

The DSHC conducts formal laboratory inspections periodically and informal inspections as needed. Inspection results and corrective actions are provided to the in-charge of laboratory and reviewed by the entire department whenever applicable.

4.6. Chemical Waste

Laboratories in the department manage chemical waste in accordance with the waste management plan of University of Peradeniya. Copies of all waste manifest and invoices are submitted to the DSHC for review and filing.

4.7. Spills and Emergencies

Laboratory users are responsible for knowing the hazards of the materials they work with and how to safely clean up small chemical spills. If a large spill occurs, assigned TO and Laboratory attendant are to follow the emergency procedures prepared for the department.

5. Appendices:

Appendix – 1: Composition of Department Safety & Health Committee

Appendix – 2: Laboratory In-charge, Assigned Technical Officers and Laboratory Attendants

Appendix – 3: Risk Assessment Form

Appendix – 4: Incident/Accident Reporting Form

Appendix – 5: Safety Posters

6. References

https://ehs.wisc.edu/

https://www.monash.edu/engineering/departments/chemical/ohs

https://www.acs.org/content/acs/en/chemical-safety/basics/nfpa-hazard-identification.html

https://protect.iu.edu/environmental-health/laboratory-safety/lab-safety-chemical-hygiene/intro.html

Appendix – 1: Composition of Department Safety & Health Committee

A.1. Operating Procedure: Overall implementation of safety and health plan roles and responsibilities, relevant key actors and communication pathway are shown in **Table A1.1** and **Figure A1.1**.

A.2. Roles and Responsibilities:

Table A1.1: Roles and Responsibilities:

No.	Actor	Responsibilities
1	Head of Department	Overall direction and guidance for safety and health in the department
2	Department Safety & Health Officer	Coordination and implementation of department safety and health policy
3	In-Charge, Laboratory	Making sure department CHP is in- placed in the assigned laboratory
4	Technical Officer	Assigned TO will work with the DSHO and Laboratory In-charge to carry out necessary Safety & Health recommendation by the DSHC. Required resources will be sourced accordingly.
5	Laboratory Attendant	Assigned LA needs to make sure that laboratory is clean and safe in terms of disposal of generated waste.

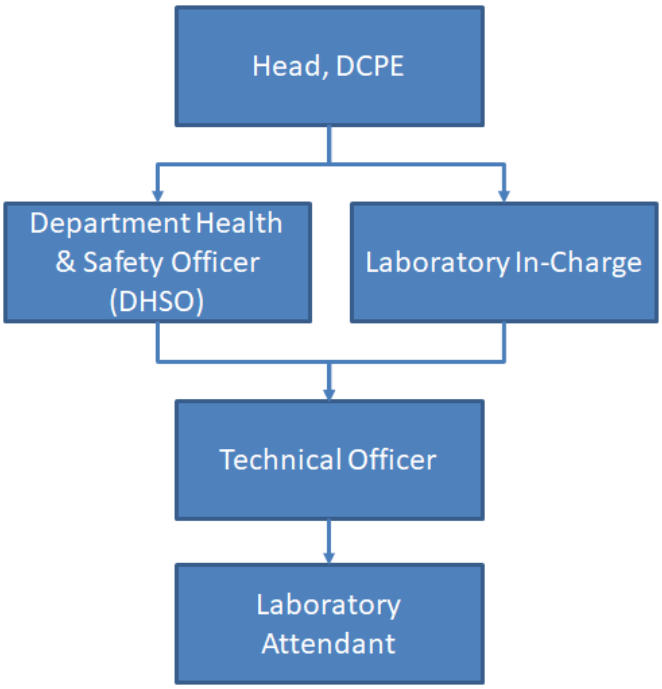


Figure A1.1: Department Safety & Health Committee (DSHC)

Appendix – 2: Laboratory In-charge, Assigned Technical Officers and Laboratory Attendants

A.1. Operating Procedure: Each laboratory is assigned with in-charge (senior lecturer or above), technical officer and laboratory attendant by the HoD, DCPE. The team is responsible for implementing the department safety and health plan decided by the DSHC. At the entrance of each laboratory, contacts details of the team are displayed including the contact details of Security Office, Faculty of Engineering.

A.2. Team for Various Laboratories:

Table A2.1: Team for Various Laboratories

No.	Laboratory/Location	In-Charge	Technical Officer	Laboratory Attendant
1	Analytical Chemistry Laboratory / Second Floor	Dr. A.N. Madusanka	Ms. W. Weerasekara	Mr. B. B. R. M. Paranagama
2	Energy Engineering Laboratory/Second Floor	Dr. A. Manipura	Ms. W. Weerasekara	Mr. B. B. R. M. Paranagama
3	Biochemical Engineering Laboratory/First Floor	Prof. M. Danthurebandara	Ms. C. Jayatilake	A.M.N. Banda
4	Food Engineering Laboratory/First Floor	Prof. R. Shanthini	Ms. C. Jayatilake	Mr. B. B. R. M. Paranagama
5	Analytical Instrument Laboratory / Ground Floor	Dr. M. A. Elangasinghe	Ms. W. Weerasekara	Mr. B. B. R. M. Paranagama
6	New Pilot-Plant – I/ Ground Floor	Dr. S. Preethika	Mr. N. Bandara	A.M.N. Banda
7	New Pilot-Plant – II/ Ground Floor	Prof. D.G.G.P. Karunaratne	Mr. N. Bandara	A.M.N. Banda
8	Main Pilot-Plant /Old Building	Prof. C. S. Kalpage	Mr. N. Bandara	Mr. B. B. R. M. Paranagama

Appendix – 3: Risk Assessment Form

Risk Assessment Form – Dept. of Chemical & Process Engineering
Faculty of Engineering, University of Peradeniya

1. Date:	**2. Period Valid:** From: To:	**3. Laboratory/Laboratories:**

4. Brief Description of Planned Activities (less than 100 words):

5. Chemicals Use & MSDS No:

6. Expected Operating Conditions: Temperature Range (°C): Pressure Range (atm):	**7. Equipment Use:**

8. Risk Analysis:

Risk Aspect	***Likelihood***	***Impact***	***Risk Score***	***Remarks***
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

9. Laboratory User Name & Signature:	**10.Supervisor's Name and Signature:**

11. Observations of Laboratory In-charge:

12. Observation of DSHO:

Name and Signature: **Date:**

13. Additional Notes:

13.1. Procedure:

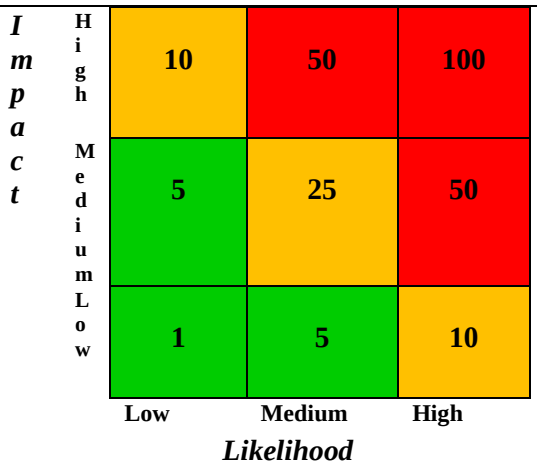
Risk assessment should be carried out by the laboratory user with consultation of academic supervisor according to the provided format above. Then, it will be referred to the laboratory in-charge and the DSHO. Accordingly assigned TO and laboratory attendant are informed for necessary actions.

13.2. Risk Matrix:

13.2.1. Scale for Likelihood and Impact

Scale	**Score**
Low	**1**
Medium	**5**
High	**10**

13.2.2. Risk Threshold



Appendix – 5: Incident/Accident Reporting Form

Incident/Accident Reporting Form – Dept. of Chemical & Process Engineering Faculty of Engineering, University of Peradeniya		
1. Date:	**2. Time:**	**3. Location:**
4. Incident/Accident (Strike Irrelevant Word):		
5. Potential Improvements/Solutions:		

6. Reported By (Name & Signature):	**7. Reported To (Name):**
8. Observation of DSHO:	
9. Actions by DSHC:	

Additional Information:

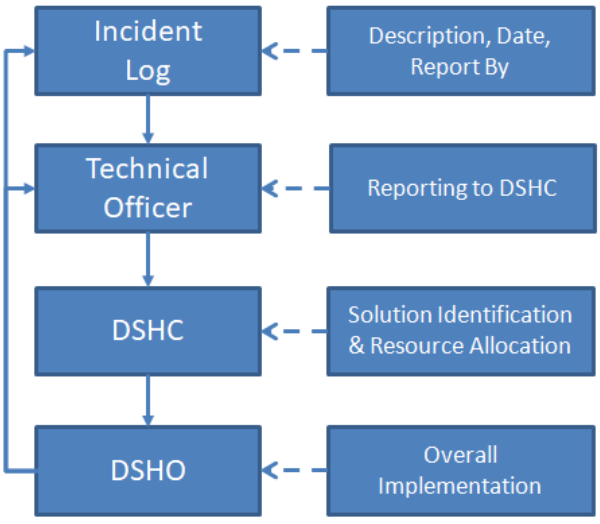


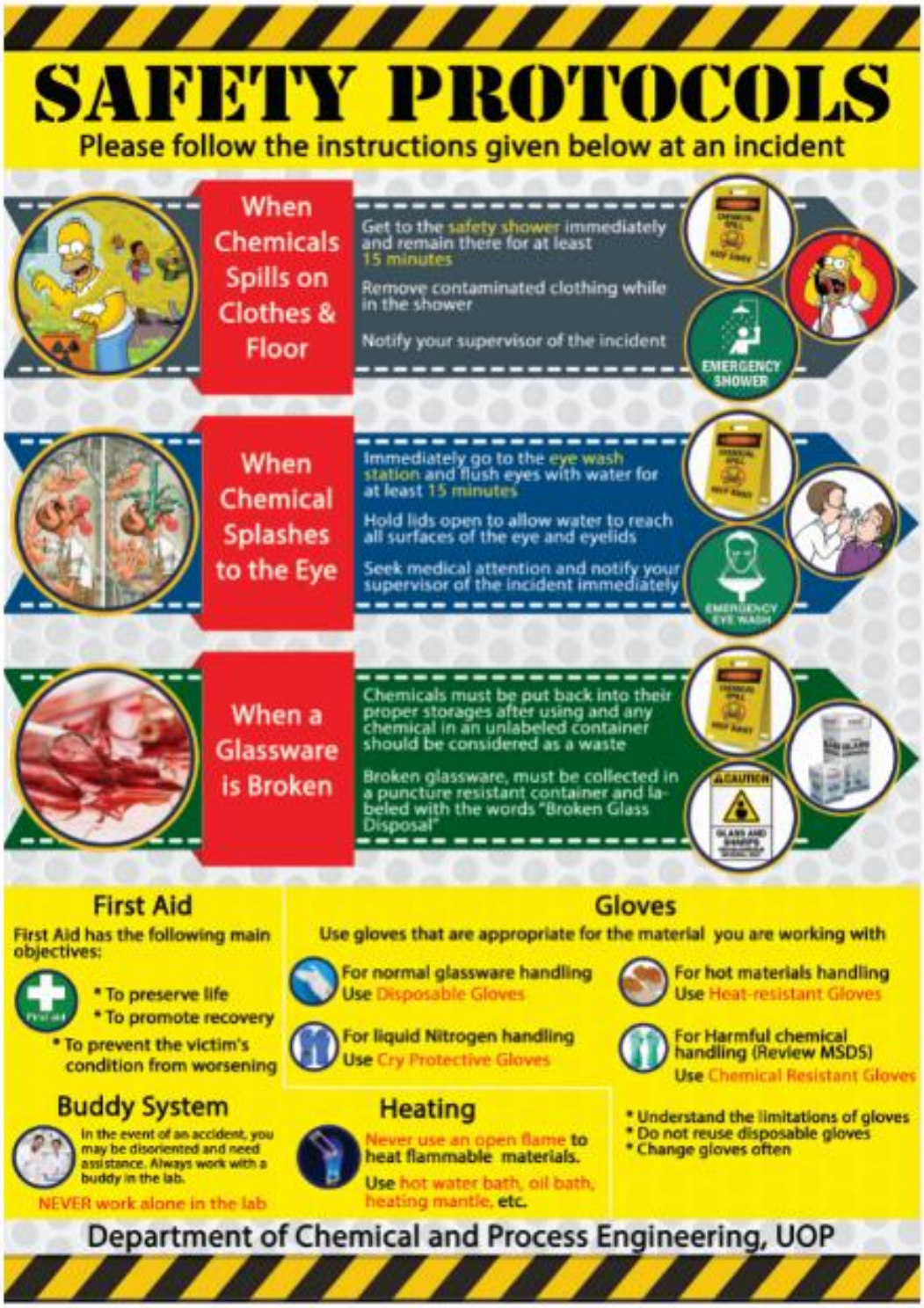
Figure A.5: Incident Reporting and Rectification

Figure A.5 shows the communication channels for incident reporting and rectification.

During routine checks TO, In-charge of Laboratory and DSHO will check the status of rectifications recommended by DSHC.

Appendix 5.1: Laboratory Entrance (e.g. Analytical Chemistry)

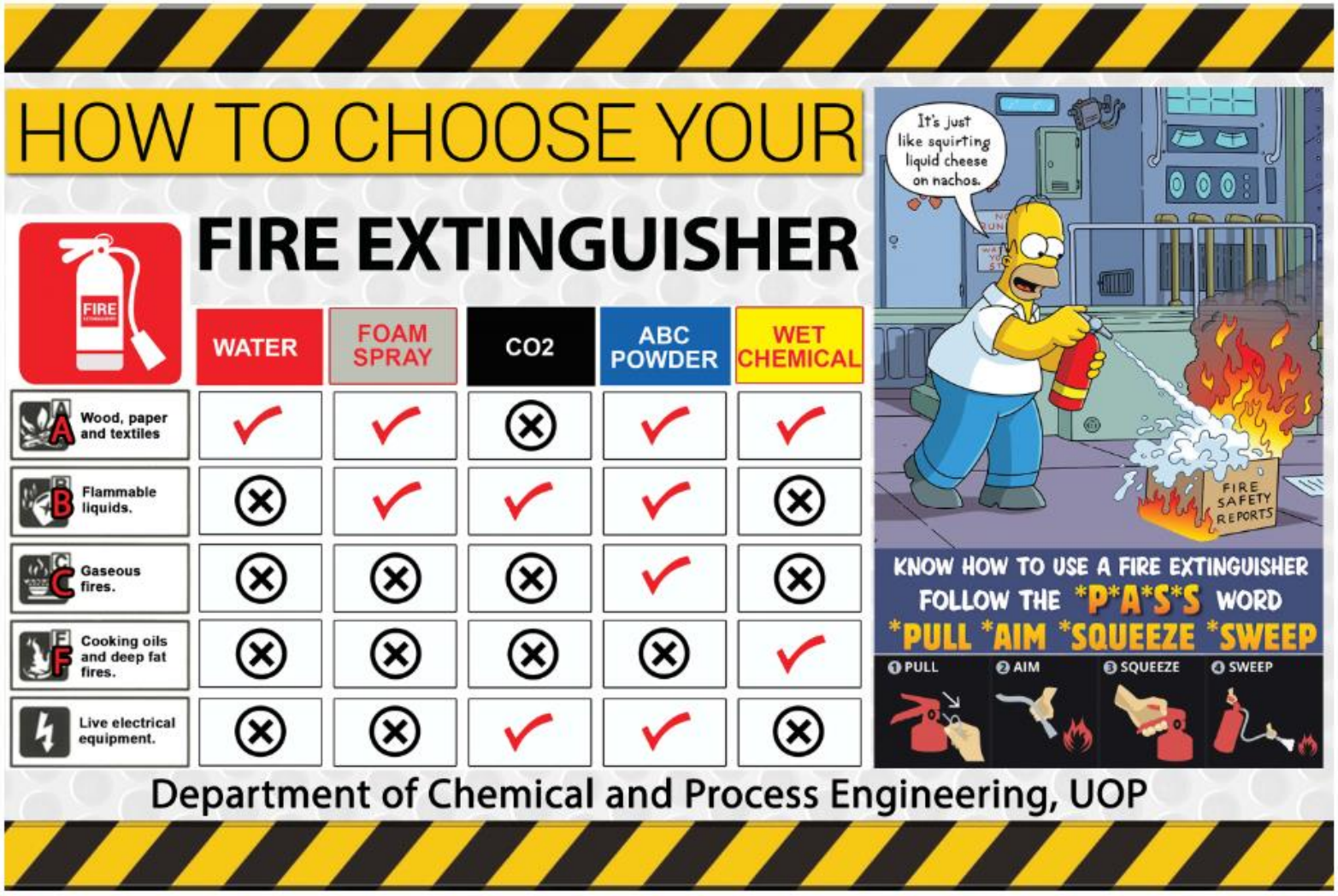
Appendix 5.2: Safety Protocols



Appendix 5.3: Safety Symbols & MSDS Notations

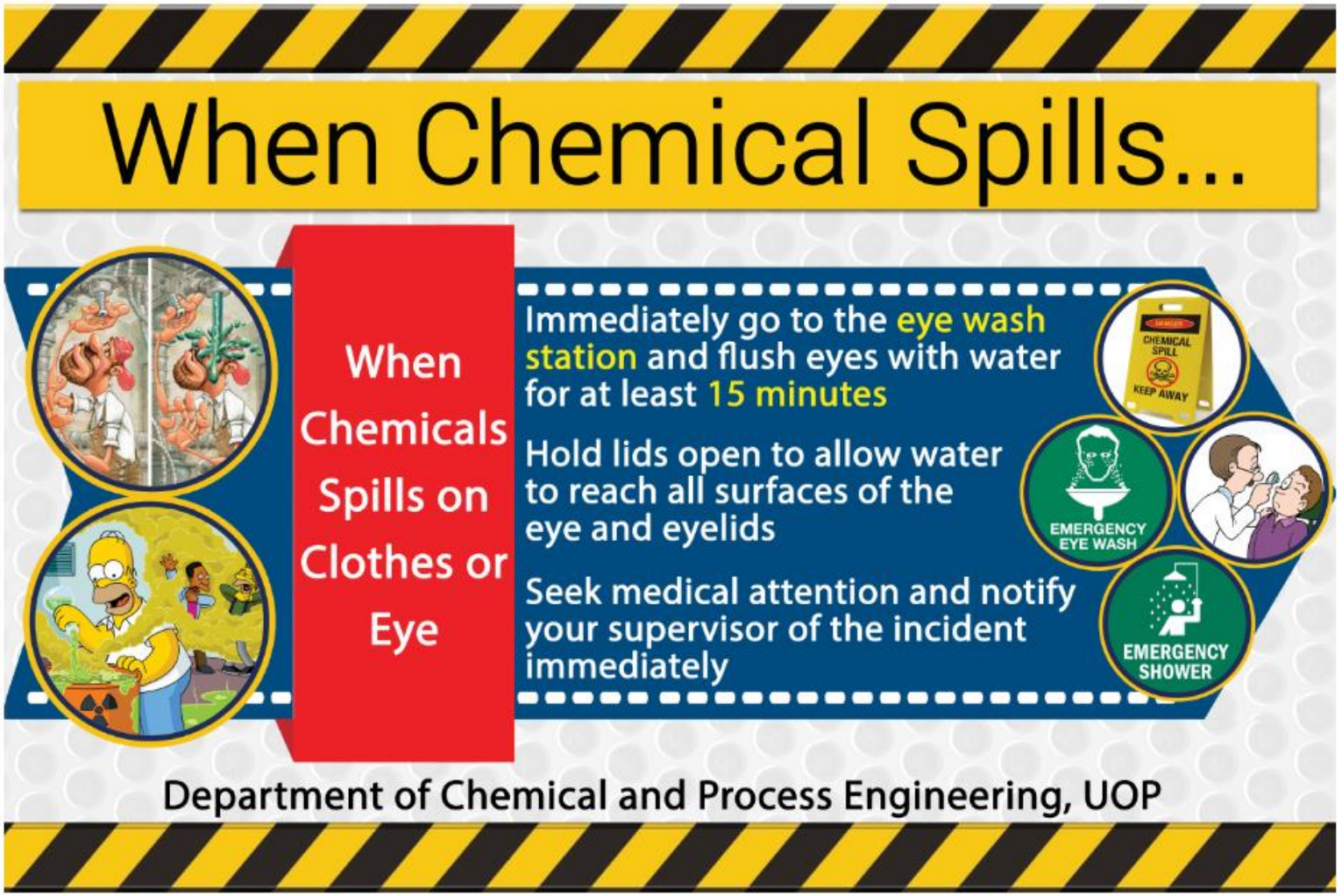
Appendix 5.4: Fire Safety

Appendix 5.5: Fire Safety – Selection of Fire Extinguisher



Appendix 5.6: Fire Dousing in Cloths

Appendix 5.6: Chemicals Spills Containment



Appendix 5.7: Material Safety Datasheets