GUIDE BOOK

OCCUPATIONAL SAFETY, HEALTH AND ENVIRONMENT (OSHE)

FACULTY OF AGRICULTURE,
UNIVERSITAS SUMATERA UTARA

Transformation
Towards the Ultimate

INTRODUCTION

The Faculty of Agriculture, Universitas Sumatera Utara (FP USU) always prioritizes aspects of occupational safety, health and the environment (K3L) as an important priority in achieving the goal of creating a comfortable, safe, orderly, safe and healthy atmosphere in the campus environment. FP USU is committed to maintaining the occupational safety and health of all academicians, related parties and maintaining and protecting the environment in the campus area. To realize this commitment, FP USU has implemented several policies, such as making aspects of occupational safety, health, and environmental protection an important part of university policy. As a vehicle for education, FP USU is also a place of work, teaching, research and community service that is inseparable from various potential work environment hazards that can affect the safety and health of all academicians in it.

FP USU formed the Safety, Occupational Health and Environment (K3L) Team based on the Dean's Decree number: 259 A/UN5.2.1.3/SK/KPM/2023. FP USU's commitment in realizing the maintenance of security, order, and comfort as well as K3L on campus is a challenge for the team in carrying out its duties and functions by compiling and planning the FP USU K3L program. The K3L team will conduct dissemination by compiling a Safety, Occupational Health and Environment Guidebook for FP USU academicians. This book can be used by students, teaching staff (lecturers), education staff, and guests, and the community around the FP USU campus environment, and can be accessed through the fp.usu.ac.id website. It is hoped that this guidebook can increase the sensitivity, participation and understanding of the FP USU academic community to comply with the aspects of order, security, and the environment on the FP USU Campus, so that it can help realize an orderly, safe, comfortable, and healthy and safe FP USU, and of course support the smooth implementation of the Tridharma of Higher Education and the realization of the vision and mission of FP USU.

Dean,

Prof. Dr. Ir. Tavi Supriana, M.S.
NIP. 196411021989032001

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DECLARATION OF DEAN OF AGRICULTURE FACULTY USU

SAFETY, OCCUPATIONAL HEALTH AND ENVIRONMENT (SHE) POLICYCOMMITMENT

FACULTY OF AGRICULTURE

UNIVERSITAS SUMATERA UTARA

We declare that the Faculty of Agriculture of USU has a high commitment to realizing Occupational Safety, Health and Environment for the academic community and stakeholders in all activities within the Faculty of Agriculture of the Universitas Sumatera Utara through the implementation of integrated SMK3L.

Medan, October 2023
Faculty of Agriculture
Dean

Prof. Dr. Ir. Tavi Supriana, M.S.

SAFETY, HEALTH AND ENVIRONMENT HANDBOOK (HSE)

FACULTY OF AGRICULTURE
UNIVERSITAS SUMATERA UTARA

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Decree of OSHE Team

KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,
RISET, DAN TEKNOLOGI

UNIVERSITAS SUMATERA UTARA
FAKULTAS PERTANIAN

Jalan Prof. A. Sofyan No. 3 Kampus USU Medan - 20155
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KEPUTUSAN DEKAN FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA

NOMOR 259^A /UN5.2.1.3/SK/KPM/2023

TENTANG

TIM PELAKSANA K3 (KESEHATAN DAN KESELAMATAN KERJA)
FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA

DEKAN FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA,

Menimbang :
a. Bahwa dalam rangka pelaksanaan K3 (Kesehatan dan Keselamatan Kerja) di lingkungan Fakultas Pertanian Universitas Sumatera Utara, perlu dibentuk Tim Pelaksana K3 (Kesehatan Dan Keselamatan Kerja) Fakultas Pertanian Universitas Sumatera Utara;
b. bahwa sehubungan dengan butir a tersebut di atas perlu ditetapkan dengan Surat Keputusan Dekan tentang Tim Pelaksana K3 (Kesehatan Dan Keselamatan Kerja) Fakultas Pertanian Universitas Sumatera Utara;

Mengingat :
1. Undang-undang Republik Indonesia Nomor 20 Tahun 2003 tentang Sistem Pendidikan Nasional;
2. Undang-Undang Nomor 12 Tahun 2012 tentang Pendidikan Tinggi;
3. Peraturan Pemerintah Nomor 48 Tahun 1957 tentang Pendirian Universitas Sumatera Utara;
4. Peraturan Pemerintah Nomor 16 Tahun 2014 tentang Statuta Universitas Sumatera Utara;
5. Peraturan Pemerintah Nomor 19 Tahun 2005 tentang Standar Pendidikan Nasional;
6. Peraturan Nomor 56 Tahun 2003 tentang Penetapan Universitas Sumatera Utara sebagai Perguruan Tinggi Negeri Badan Hukum (PTN-BH);

MEMUTUSKAN:

Menetapkan : KEPUTUSAN DEKAN FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA TENTANG TIM PELAKSANA K3 (KESEHATAN DAN KESELAMATAN KERJA) FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA.

KESATU : Membentuk dan mengangkat mereka yang namanya tersebut dalam lampiran surat keputusan ini sebagai Tim Pelaksana K3 (Kesehatan dan Keselamatan Kerja) Fakultas Pertanian Universitas Sumatera Utara.

KEDUA : Tim Pelaksana dalam bertugas bertanggung jawab kepada Dekan Fakultas Pertanian Universitas Sumatera utara.

KETIGA : Biaya penyelenggaraan dan pengelolaan pelaksanaan kegiatan ini dibebankan pada anggaran Fakultas Pertanian Universitas Sumatera Utara.

KEEMPAT : Keputusan Dekan Fakultas Pertanian Universitas Sumatera Utara ini mulai berlaku pada tanggal ditetapkan, dengan ketentuan apabila di kemudian hari terdapat kekeliruan dalam surat keputusan ini akan diperbaiki sebagaimana mestinya.

Ditetapkan di Medan
pada tanggal 9 Oktober 2023
DEKAN,

TAVI SUPRIANA
NIP 196411021989032001

Tembusan:
1. Wakil Dekan I;
2. Wakil Dekan II;
3. Wakil Dekan III;
4. Arsip.

LAMPIRAN
KEPUTUSAN DEKAN FAKULTAS PERTANIAN
UNIVERSITAS SUMATERA UTARA
NOMOR 259^A / UN5.2.1.3/SK/KPM/2023
TENTANG
TIM PELAKSANA K3 (KESEHATAN DAN KESELAMATAN KERJA)
FAKULTAS PERTANIAN UNIVERSITAS SUMATERA UTARA

1.	Penanggung Jawab	: Prof. Dr. Ir. Tavi Supriana, MS
2.	Wakil Penanggung Jawab	: Ir. Revandy I. M. Damanik, M.Si, M.Sc, Ph.D Prof. Dr. Ir. Elisa Julianti, M.Si
3.	Ketua	: Dr. Benny Hidayat, SP., MP
4.	Sekretaris	: Andi Siswoyo, SE
5.	Anggota	: 1. Irda Safni, Sp., MCP., Ph.D 2. Prof. Dr. Diana Sofia Hanafiah, SP., MP 3. Ir. Ismed Suhaidi, M.Si 4. Dr. Nauas Domu Marihot Romauli, STP., M.Eng 5. Ir. Tati Vidiana Sari, S.Pt., MP., IPM 6. Uswatun Hasanah, S.Pt., M.Si 7. Fuad Hasan, S.Pt., M.Si 8. Herdiyanto Prabudi, A.Md 9. Tonimin, SE
6.	Sekretariat	: 1. Pinde, S.Si 2. Rosneli, SP 3. Nurmalaila, S.Pt 4. Wahyudi Himawan Sutanto, S.Pt 5. Jasmine Aldrina Iswara, STP 6. Nurainun Mardhiah, S.Si 7. Tahan Suherlan

Ditetapkan di Medan
Dekan,

TAVI SUPRIANA

SAFETY, HEALTH AND ENVIRONMENT (K3L) HANDBOOK

FACULTY OF AGRICULTURE,
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01.INTRODUCTION

CHAPTER I
INTRODUCTIO
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1.1. Background Background

In order to implement article 10 of Law Number 1 of 1970 concerning Occupational Safety and Decree of the Minister of Health of the Republic of Indonesia number 405 / Menkes / SK / XI / 2002 concerning Health Requirements for the Work Environment, the Faculty of Agriculture USU appointed the Safety, Occupational Health and Environment Team (K3L). The existence of the Safety, Occupational Health and Environment (K3L) Team will be able to develop an active and effective role of the USU Faculty of Agriculture community in carrying out their duties and obligations together so as to create order, security, comfort and safety, occupational health and the environment (K3L) in the FP USU environment, especially in terms of laboratory use. As a guide to the implementation of the Laboratory Safety, Occupational Health and Environment (K3L) program that will be carried out, a technical guidebook is prepared as a reference that can be used by all parties who are and are involved in carrying out work and learning activities in laboratories in the FP USU environment.

1.2. Purpose of Establishment of Safety, Occupational Health and Environment Team (K3L) Faculty of Agriculture USU

The purpose of the establishment of the USU Faculty of Agriculture Safety, Occupational Health and Environment (K3L) team is to realize the implementation of K3L optimally, effectively, efficiently and continuously within the Faculty of Agriculture, North Sumatra University, through:

1. Ensure that the Safety, Occupational Health and Environment (K3L) Management System is well implemented, assist in the implementation of accident prevention efforts, as well as
2. Creating a healthy, safe, secure and comfortable workplace for FP USU human resources, students, visitors, and the FP USU environment so that the education process runs well and smoothly.
3. Assist in the implementation of efforts to prevent occupational accidents, occupational diseases, infectious diseases and non-communicable diseases for all human resources of FP USU.
4. Provide effective socialization to the USU Faculty of Agriculture community regarding Safety, Occupational Health, and Environment (K3L).

1.3. Planning Team Functions HSE

1. Carry out the preparation of plans, programs, activities, and budgets in the field of campus environment;
2. Evaluate the implementation of activities in their field;
3. Compile and submit reports on the organization of activities in their fields to the Dean of FP USU.

1.4. Foundation Law

1. Law no.1 of 1970 concerning Occupational Safety
2. Law no. 36 of 2009 on Health
3. PP. 50 of 2012 on the implementation of SMK3
4. PP. 66 of 2014 on Environmental Health
5. Minister of Public Works Regulation 45/PRT/M/2007 regarding technical guidelines for building construction
6. Permenaker PER.13/MEN/X/2011 concerning threshold values for physical and chemical factors in the workplace
7. Permenkes no. 48 of 2016 concerning office occupational safety and health standards
8. Permenkes no. 66 of 2016 concerning K3RS
9. OHSAS 18001:2007 Occupational Health and Safety Management systems.
10. Decree of the Minister of Health of the Republic of Indonesia number 405/Menkes/SK/XI/ 2002 concerning Occupational Environmental Health Requirements.

OCCUPATIONAL SAFETY, HEALTH AND SAFETY HANDBOOK AND ENVIRONMENT (HSE)

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02. HEALTH AND WORK SAFETY LABORATORY

CHAPTER II
LABORATORY HEALTH AND SAFETY

Law No. 1 of 1970 concerning Occupational Safety Article 2 states the guarantee and requirements of occupational safety in all workplaces, whether on land, in the ground, on the surface of the water, in the water or in the air, which are within the jurisdiction of the Republic of Indonesia. In addition to occupational safety, aspects of occupational health must also be considered in accordance with Law Number 36 of 2009 Article 4 which gives everyone the right to health and in Article 164 and Article 165 states that occupational health efforts are aimed at protecting workers to live healthy lives and be free from health problems and adverse effects caused by workers.

2.1. Safety at Laboratory

FP USU establishes general safety principles and regulations that apply throughout the Laboratory of the Faculty of Agriculture, Universitas Sumatera Utara and must be obeyed by all Laboratory users. Laboratory users in question are all parties (laboratory heads, technicians, laboratory assistants, laboratory assistants, practicum students, and researchers) who enter and move in the laboratory area.

1. Safety Equipment

1. Appropriate fire extinguishers for laboratory fire hazards should be properly attached to stationary objects that are easily accessible and cannot be dropped.
2. *Chemical resistant gloves* used must be in accordance with Indonesian national standards (SNI), not used repeatedly, kept in use so as not to touch objects other than those related to practicum needs, and disposed of in the designated laboratory organic or inorganic waste bins.
3. *Heat resistant gloves* used must be in good condition (no torn sides) in order to optimally protect the skin from the heat of the equipment used. The cleanliness of these gloves must be maintained if they are to be used repeatedly.
4. *The protective eyewear* used must comply with SNI standards. These glasses should be used personally, not used interchangeably with other users.

5. The laboratory coat used must be the right size so that it can optimally protect the body from the hazards of practical work (e.g. splashes) that may occur. The coat used should not be too small or large to hinder the freedom of movement of the body. The coat must be properly cleaned (washed) if it is to be used repeatedly.
6. Medical masks used must comply with SNI standards, must not be used repeatedly, must be replaced when it has reached 6 hours of use, and must be disposed of in a designated laboratory inorganic waste container.
7. The respiratory mask used must comply with SNI standards. This mask should be used personally, not shared with other users.
8. Closed shoes used should be of the correct size to optimally protect the feet from possible hazards of practical work (e.g. falling objects). Shoes must be properly cleaned if they are to be used repeatedly.

2. Awareness

1. All chemicals, electrical equipment, magnets, biological materials, radioactive materials, and extreme temperatures must be clearly labeled with warning signs.
2. All chemicals in the laboratory must be labeled with identification and the date of purchase or the date when the material was stored in its current container. This applies to all chemicals whether hazardous or non-hazardous.

3. Storage

1. All storage areas should be clearly defined and separated from routine work areas.
2. All gas cylinders must be securely chained or attached to a stationary object to prevent accidental drops.

4. Household

1. Hallways and exits should be easily accessible and should not be obstructed by equipment or objects stored within the laboratory.
2. When leaving the room, turn off all lights and electrical appliances not in use and lock the door.

5. Waste disposal

1. Spilled materials must be cleaned up immediately using the spill kits located in each laboratory.
2. Disposal of materials used for cleaning should be done immediately in accordance with waste disposal guidelines.
3. Each laboratory worker is responsible for waste disposal which is carried out as quickly as possible and in a safe manner in accordance with study program procedures.
4. Any sharp objects (e.g. razor blades, spatulas) that come into contact with infectious materials or hazardous biological materials should be disposed of wrapped in paper and wrapped in plastic bags before disposing of them in the trash.

6. Operation

1. Laboratory members and equipment must be protected from temperature, electrical and chemical hazards during operation.
2. Electrical contacts must not be overloaded. Electrical cables must be kept in good working order. Any cables on the floor must be protected from laboratory traffic by means of a cable bridge.
3. Equipment and operations must be properly installed on a safe, permanent and horizontal surface to prevent objects from accidentally falling.
4. Fume hoods should always be used when working with flammable solvents or toxic gases. Hazardous or irritating fumes should be vented outside the building. Work with the gas hose lowered as far as possible. This will allow the ventilation system to work more effectively.
5. Exits should provide free and unobstructed passage out.
6. Personal belongings and items not related to the practicum should not be placed in the corridor.

7. Personal Safety Practices

1. Contamination from food, drink and smoking are potential routes of exposure to toxic substances.
2. Smoking is not permitted in the laboratory premises.
3. Not allowed save or consume food or beverages in the laboratory.
4. Always pay attention to equipment and provide information on laboratory safety procedures to laboratory visitors.
5. Wash hands well before leaving the laboratory area.

6. Never leave the laboratory area or touch objects while wearing gloves that may be contaminated with unsafe substances.
7. Always wear closed shoes in the laboratory.
8. Never work alone in the laboratory. Make sure someone else is present in the laboratory in case emergency help is needed.

8. Working with Chemicals

Information on the physical and health hazards of chemicals must be provided and easily accessible to all laboratory users. This information should be provided in two places viz: chemical labels and Material Safety Data Sheets (MSDS). The label on the original container and the MSDS of the chemical provide information about the identity of the material contained and its physical and health hazards.

1. Label

The manufacturer's label must be kept attached. Never remove or damage the label before the container is empty. If a chemical is transferred from one container to another for storage, the new container should be labeled with the name of the substance, its chemical content and hazard warnings.

2. Material Safety Data Sheet

All chemical manufacturers and distributors must evaluate the hazards of their products and include the information in the MSDS. All MSDSs should be kept in one location in the laboratory.

3. Chemical Separation

Chemicals that are not compatible with each other should not be stored in the same location. Storage of chemicals in alphabetical order, without considering compatibility, may increase the risk of dangerous reactions, especially in the event of an accident resulting in a rupture of the packaging.

a. Acidic Materials

a. Mineral acids, including phosphoric, hydrochloric, nitric, sulfuric, and perchloric acids can be stored in cabinets designed for corrosive acids. These cabinets made of non-metallic materials do not have interiors made of metal, are lined with acid-resistant materials, and the floor of the cabinet is designed so that it can accommodate acid spills.

b. Volatile acids, such as oleum or fuming nitric acid, should be stored in a special, ventilated cabinet, such as the

bottom of the fume hood, especially if the package has been opened. Concentrated mineral acids can be highly reactive.

c. Concentrated acids can even react violently with dilute solutions of the same acid, if mixed quickly. For example: concentrated sulfuric acid mixed quickly with 1 Molar sulfuric acid will release a large amount of heat. Acids of different concentrations should be stored separately. If stored in the same cabinet, use a tray/pallet to keep them away from each other in the same cabinet.

d. Acetic acid is an organic acid and should be stored separately from mineral acids. Since acetic acid is flammable, it should be stored together with other flammable liquids.

e. Picric acid can form explosive salts when it reacts with various metals. Even picric acid crystals are explosive.

f. Perchloric acid is a very strong oxidizer and should be kept away from all organic materials, including wood.

g. Unstable Chemicals

Ethers, some ketones, and olefins can form peroxides when exposed to air or light. Since these materials may be packaged in non-airtight conditions, peroxides may form even before the package is opened. Some chemicals, such as dinitroglycerin are shock-sensitive and can decompose rapidly or explode if shaken or even stirred. These materials become increasingly sensitive to shaking with increasing length of storage. For potentially unstable chemicals:

1) On the label, write the date the package was received and the date the package was first opened.
2) After 6 months from the first opening of the pack, discard the pack and contents.
3) Discard unopened packages after 1 year of receipt, unless inhibitors have been added to them.

4. Spill Prevention

Most spills can actually be avoided. Here are some tips that can be done to prevent spills or reduce the size of spills:

a. Place chemical containers in a fume hood or workbench to reduce the chance of accidental knocks.

b. Put all unused materials in their proper storage and keep the workplace clean and free of u n n e c e s s a r y objects.
c. Plan your every move. Pay attention to where you are going so that you don't cause a spill.
d. Avoid moving chemicals through corridors when there are many people passing by, such as during class changes.
e. Move chemicals using chemical transport equipment or a cart.
f. Place chemical-absorbent sheets on countertops or fume hoods where chemical spills are likely to occur.

5. Chemical Transportation

Chemical spills and exposures can occur if materials are moved improperly even if they are only moved from a different part of the laboratory. To avoid such incidents, consider the following:

a. Use bottle carriers, strollers or *secondary containers* when moving chemicals stored in breakable containers (especially if more than 250 ml) through corridors or between buildings. Secondary containers are made of rubber, metal or plastic with a carrying handle and are large enough to hold the entire contents of the package in case of breakage.
b. The transfer of hazardous materials in individual containers exceeding four liters between buildings is strongly discouraged.
c. When moving around the laboratory, anticipate others turning around or changing direction suddenly. If you stumble or fall while carrying glassware or chemicals, try to throw them away from yourself or others.
d. The person moving the chemicals must know the hazards of the chemicals being carried and how to handle them in the event of a spill.
e. When transporting a gas cylinder, the cylinder must be tied to the cart and the valve protected with a cap. Never lift or roll the gas cylinder to move it.

6. Treatment If Exposed to Chemicals

The following procedures should be followed under conditions of chemical exposure. All incidents should be reported to the laboratory head, supervisor or principal investigator.

a. Chemicals on Skin or Clothing.

1) Rinse immediately with water for no less than 15 minutes (except for hydrofluoric acid, flammable solids or phenol >10%). For large exposures a safety shower should be used.
2) When rinsing quickly remove contaminated clothing and jewelry. Every second counts. Don't waste time on matters of modesty.
3) Be careful when removing unbuttoned shirts or sweaters, to prevent contamination of the eyes.
4) Read the MSDS for any future consequences.
5) Discard contaminated clothes or wash them separately from other clothes.
6) Skin materials cannot be decontaminated and must be disposed of. For flammable solids that come into contact with the skin, first remove as much of the material as possible from the skin and then follow the procedure above. For hydrofluoric acid, rinse with water for 5 minutes. Use 2.5% calcium gluconate. If not available, continue rinsing for 15 minutes. Then seek immediate medical attention at the nearest hospital emergency department.

b. Chemicals in the Eyes

1) Rinse the eyes immediately with water for at least 15 minutes. The eyes should be forced open while flushing and the eyeball should be rotated so that the entire surface is flushed. It is preferable to use an eywash fountain so that the hands can be free to keep the eyes open.
2) If no eye jets are available, pour water into the eyes, flushing from the nose outwards so as not to contaminate the eyes that are not exposed to the chemical.
3) Remove contact lenses during rinsing. Do not waste time by removing contact lenses before rinsing. Do not attempt to rinse and re-wear contact lenses.
4) Seek medical attention immediately regardless of the severity of the effects. Explain what chemicals you were exposed to. If possible, bring along the MSDS.

c. Chemical Inhalation

1) Close the container immediately, open a window or increase the ventilation and move to fresh air.

2) If symptoms such as headache, nose or throat irritation, dizziness or nausea persist, contact medical personnel immediately. Describe the chemical inhaled.
3) Check the MSDS to see what health effects will occur including those that are not immediate.

d. Accidental Ingestion of Chemicals

1) Go to the nearest hospital emergency department immediately.
2) Do not force vomiting.

7. Working with Gas

Many types of gases are used in the laboratory and all must be handled with care. Classification of gases and their properties:

a. Flammable gas: H2, CO, NH3, H2S, methane, propane, etc.
b. Oxidizing gas: air, O2, O3, Cl2, NO, NO2 etc.
c. Explosive gas: A mixture of flammable and oxidizing gas.
d. Inert gas (inner gas): N2, He, Ar, etc.
e. Liquefied/solidified gas: N2, He, LPG, dry ice etc.
f. Toxic gases: CO, CO2, NH3, halogens (Cl2, F2), hydrogen halide (H, HCl), H2S, HCN, arsine (AsH3), phosgene, silanes, ozone, etc.
g. Corrosive gas: Cl2, HCl, O3, etc.
h. High-pressure gases: many gases are stored in high-pressure cylinders and mishandling them can lead to serious accidents.

8. Fire, Burn and Explosion Prevention

a. Gas explosion

If flammable gases and oxidizing gases are mixed in certain proportions, an explosive gas mixture will form. To prevent the formation of explosive mixtures, gas leaks must be prevented and the room must be adequately ventilated. It is necessary to ensure that the experimental room has adequate ventilation and exhaust fans.

b. Source of fire

For a fire/explosion to occur, three elements are required, namely: fuel, oxidizing gas, and a source of ignition. Sources of fire that can cause fires are not only open flames but also high-temperature equipment or materials, static electricity sparks, or collisions.

c. If a leak occurs

Planning and training of personnel around the gas source should be conducted to ensure everyone knows what to do in the event of a gas leak. Safe evacuation routes must be prepared and precautions must be taken to ensure that there are no sources of ignition that could trigger a fire/explosion.

9. High Pressure Gas Handling

Pressurized gases present a hazard not only from the gas itself, but also from the large amounts of energy contained in pressurized cylinders. Large cylinders weighing 130 lb or more may present an injury hazard if they strike the feet or hands.

a. All cylinders should be tied to a wall, bench, or structure by chains or ropes. A stand can also be used for the cylinders.
b. Separate the cylinders by gas type (e.g. flammable, inert, etc.).
c. Keep the cylinder away from heat sources and extreme weather conditions.

2.2 Response Emergency

An emergency is an abnormal or uncontrolled situation that has the potential to cause loss of life or damage which includes fires, accidents, technical disturbances, earthquakes and other disasters that can cause danger or can be life-threatening, which requires quick action to protect people, buildings, equipment, and the environment from any damage. The importance of emergency response and evacuation guidelines is to provide implementation instructions regarding actions to be taken when an emergency occurs which is expected to ensure that everyone is able to handle correctly and safely from all types of emergencies. Emergencies consist of several levels, namely:

1. Level 1 (Local Emergency Situation), which is an emergency that can immediately be fully overcome by the personnel of the Faculty of Agriculture Emergency Response Team and does not require additional power, and does not have an impact on the stopping of an activity process for a long time.
2. Level 2 (Limited Emergency Situation), which is an emergency that occurs in one or more work units in one Faculty area and may require some additional resources from the Emergency Response Team available in other work units, and can have an impact on stopping an activity process for one day or more.

3. Level 3 (Major Emergency Situation), which is an emergency that can spread beyond the boundaries of one work unit or even the boundaries of the Universitas Sumatera Utara campus, and for its handling requires additional resources from authorities outside the Universitas Sumatera Utara such as the fire department, police, local government, and others.

1. Procedures when a Work Accident Occurs

a. Victims who experience work accidents or helpers can contact the K3 Team of the Faculty of Agriculture or directly contact the Universitas Sumatera Utara Hospital ambulance at (061) 8218928.
b. The K3L team or security guard of the USU Faculty of Agriculture contacted the ambulance.
c. The ambulance then took the patient to the Universitas Sumatera Utara Hospital for further treatment.
d. The OSH Team of the Faculty of Agriculture contacted the patient's guardian.

2. Fire Fighting Procedures

Fire suppression procedures include the following:

a. Shout if there is a fire.
b. Immediately inform the security officer/employee/HS Team of the Faculty of Agriculture and other people encountered.
c. Extinguish the fire if you are confident and have been trained, if in doubt it is better to undo the intention.
d. Find a wet cloth and cover the source of the fire.
e. Grab the nearest fire extinguisher to put out the fire, if you are confident and trained.
f. If the fire has not been extinguished, evacuate by removing everyone from the laboratory through the *emergency exit*.
g. When evacuating, stay calm and take only the necessary valuables with you.
h. Don't carry too much luggage.
i. Do not place items in the evacuation path and be careful when running out to avoid potential fall and collision hazards.
j. If you are on the 2nd floor and above, and in an emergency, do not jump until the fire brigade arrives/evacuates.
k. If you are caught in the smoke of a fire, keep heading towards the emergency stairs while taking short breaths, try to crawl or crawl to avoid the smoke, do not turn around as you will collide with people behind you.
l. If you are forced to brave the smoke, hold your breath and make a beeline for the fire exits.

m. Immediately follow the emergency evacuation route to the assembly point closest to you.
n. Contact DAMKAR Medan at (061) 4515356 as soon as possible if the fire cannot be extinguished.

Some things to consider if there is a fire in the laboratory:

1. If it is clothing that is on fire, the victim should lay down while rolling around. If there is a blanket, cover the fire to extinguish it quickly. Never let the victim run around as this will allow a bigger fire to break out.
2. In the event of a small fire, such as a burning solution in a beaker or in a swimmer, cover the affected area with a wet sack or cloth.
3. In the event of a large fire, use fire extinguishers. Then immediately turn off sources that can cause fire, such as electricity, gas, stoves, and keep flammable materials away.
4. In the event of a fire due to flammable substances (organic solvents), do not use water to put out the fire, as it will cause the fire to get bigger and spread following the water. Use sand or fire extinguisher to put it out.

When a fire occurs, use fire extinguishers to put out the fire. The procedure for using fire extinguishers is commonly known by the acronym PASS (*Pull, Aim, Squeeze, Sweep*) with more detailed information in the form of:

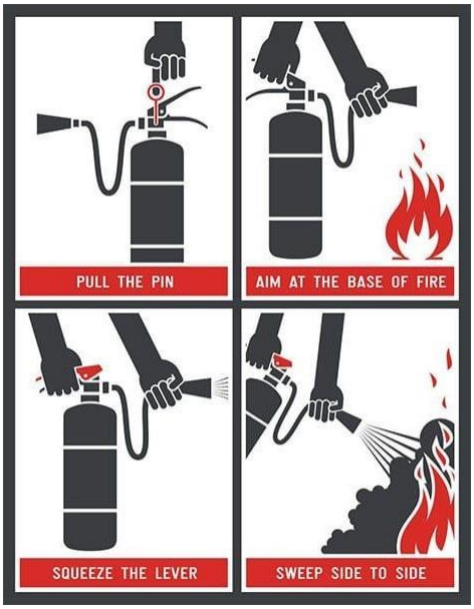


Figure 2.2. APAR Usage Procedure

a. Pull

   At this stage, pull the seal or safety pin on the existing fire extinguisher. When pulling this safety pin, do not press the APAR handle or handle. If pressed, then you will have difficulty in removing the safety pin.

b. *Aim* or aim

   Aim the hose at the base of the fire. Don't forget to make sure the tube is standing upright.

c. *Squeeze* or press

   Press the valve or handle until the fire dies or until the contents of the tube run out.

d. *Sweep* or sweeping motion

   Move the *nozzle* tip in a sweeping motion from side to side or from left to right as if sweeping.

   In the process of extinguishing a fire using fire extinguishers, there are several important aspects that need to be considered. Of all these aspects, personal safety is the main aspect that must be considered. These aspects include:

   1. Extinguish the fire by yourself or by calling the fire brigade. If the fire is still small then you can try to put it out using fire extinguishers. However, if the fire is very large with thick smoke conditions that block the view and there is a possibility that you are trapped by the fire, then immediately leave the area and call the firefighters.
   2. Wind direction.

      If the fire occurs outdoors, pay attention to the wind direction. Do not spray the fire against the wind.
   3. Your distance from the source of the fire.

      For effective results and to maintain safety, keep a distance between you and the source of the fire. The ideal distance is about 1-1.5 meters. During the fire extinguishing process, keep sweeping. When the fire starts to get smaller, you can move closer but make sure to keep sweeping from left to right continuously.
   4. Type of burning object.

      Pay attention to the type of burning object. This is to ensure you are using the right tube and contents. Not only that, by knowing the type of burning object, you can also estimate the risks involved. Some types of objects are very prone to explode, and in this case, you have to be extra careful.

3. Fire Classes

Knowledge of the classes of fire is necessary so that the type of fire extinguisher used is effective in controlling the fire. The following are the classes of fire:

a. Fire Class A

Class A fires are fires caused by non-metallic solid materials such as paper, plastic, cloth, wood, rubber and so on. The types of fire extinguishers suitable for extinguishing Class A fires are liquid type fire extinguishers (*water), foam type fire extinguishers* (*foam)* and dry chemical powder type fire extinguishers (dry chemical powder).

b. Fire Class B

Class B fires are classes of fires caused by flammable liquid materials such as oil (gasoline, diesel, oil), alcohol, paint, solvents, methanol and so on. The types of fire extinguishers suitable for extinguishing Class B fires are carbon dioxide (CO2) fire extinguishers, *foam fire extinguishers* and dry chemical *powder fire* extinguishers.

c. Fire Class C

Class C fires are a class of fire caused by electrical installations that are under voltage. The types of extinguishers suitable for fighting Class C fires are carbon dioxide (CO2) extinguishers and *dry* chemical *powder* extinguishers.

d. Class D Fire

Class D fires are classes of fires caused by flammable metal materials such as sodium, magnesium, aluminum, lithium and potassium. This type of fire needs special fire extinguishers in extinguishing it.

e. Class K Fire

Class K fires are a class of fire caused by cooking oil (vegetable oil, animal oil) or fat which is usually used in cooking kitchens. The types of fire extinguishers suitable for extinguishing Class K fires are *wet chemical powder* and carbon dioxide (CO2) fire extinguishers.

4. Earthquake Countermeasure Procedure

a. If you are in the building immediately run carefully out of the building following the evacuation route to the designated open space (gathering point).
b. Avoid taking cover near trees, electricity poles, billboards or any object that could potentially collapse.
c. If it is difficult to leave the building, immediately take shelter in a safe place, for example, take shelter under a table for a while.
d. Stay away from glass or items attached to the wall (such as clocks, blackboards) to avoid them hurting you.
e. If you are on the 2nd floor and above, go down the stairs slowly and don't panic.
f. Report your situation to the Faculty of Agriculture OHS Team after the earthquake has occurred.
g. Call an ambulance if any employee or student requires further medical attention.

2.3. Evacuation Routes and Gathering Points

An evacuation route is a specially designed rescue route that connects all areas to a safe area as a Gathering Point for everyone who is in the area. Evacuation routes are a form of emergency response efforts to mobilize people from hazards to safer places when a disaster occurs. This evacuation route is used as a rescue action from all disasters such as fires, earthquakes and floods. The faster the evacuation time that can be done, the greater the number of people who survive the disaster.

In accordance with Law No. 28 of 2002 on Building and states that "*Every building, except single-dwelling houses and simple row houses, must provide evacuation facilities that include a hazard warning system for users, emergency exits, and evacuation routes that can guarantee the ease of building users to evacuate from inside the building".*

building safely in the event of a disaster or emergency". This is reinforced by Government Regulation No. 36 of 2005 on Building.

Evacuation routes are designed to find the shortest way using existing roads so that the time taken to reach a safe area can be shortened or shortened.

Figure 2.3. FP USU Evacuation Path Direction Signs

An assembly point is a gathering place on an evacuation route. With this point, people will easily find a safe place during an emergency. Signs indicating the assembly point in case of an emergency at the USU Faculty of Agriculture can be seen in Figure 2.4.

Figure 2.4. Assembly Point of FP USU

SAFETY, HEALTH AND ENVIRONMENT (K3L) HANDBOOK

FACULTY OF AGRICULTURE, UNIVERSITAS SUMATERA UTARA

" Transformation Towards the Ultimate

03. FIRST AID IN ACCIDENTS

CHAPTER III
FIRST AID IN ACCIDENTS (P3K)

First aid is the provision of immediate help to people with illness or injury/accident that requires basic medical treatment, before further help by a doctor or paramedic. The first-aid performer is the person who first arrives at the scene who has the ability and is trained in basic medical treatment.

3.1. General First Aid

The general first aid procedure is as follows:

1. Assessment of the situation, check the surroundings whether it is safe to be able to perform first aid or not.
2. Perform CAB (Circulation-Airway-Breathing)
   Press the victim's heart immediately, to check whether the victim is conscious or not.
   a. If there is no response/breath, then perform CPR as number 3.
   b. If there is a response / breath, then go directly to number 4

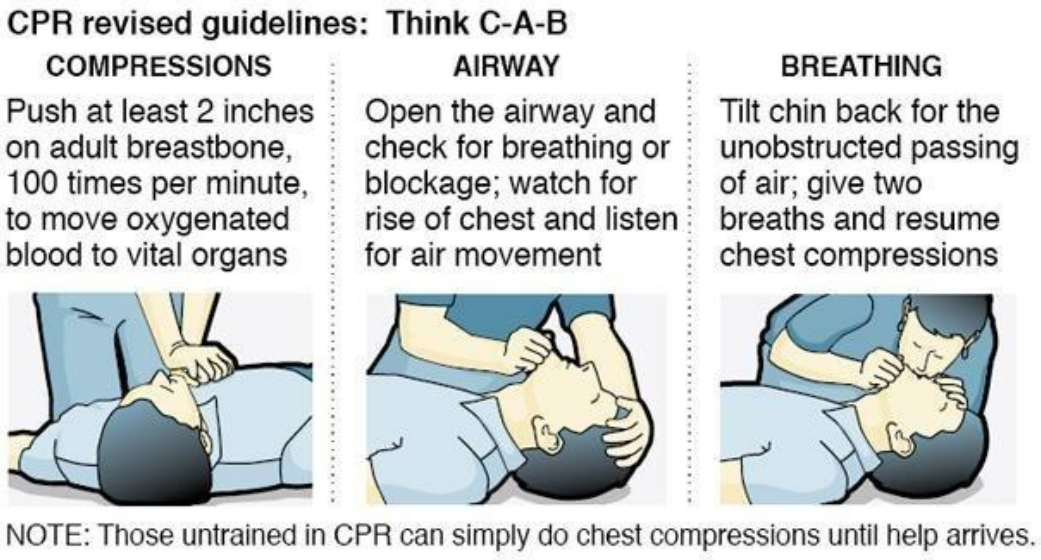


Figure 3.1. Circulation-Airway-Breathing

3. Cardiopulmonary resuscitation (CPR)
   Combination technique of external cardiac massage and assisted breathing
   a. Adults: 30 PJL & 2 assisted breaths (4 cycles)
   b. Children & infants: 5 PJL & 1 assisted breath (20 cycles) CPR can be performed with:
      1) Using the helper's mouth
         a. Mouth to mask CPR
         b. Mouth to PPE
         c. Mouth to mouth/nose
      2) Using assistive devices: BVM (*Bag valve mask*)
4. Check blood circulation (*circulation*)
   a. Check the victim's pulse
   b. Check if there are any wounds that are oozing blood. If there is, then close or press the wound first, so that the blood does not flow anymore.
5. Open the airway, press the forehead lift the chin, if there is a blockage in the mouth then remove it using the index finger.

6. Check *breathing*,
   See if the victim's chest rises and falls
   Listen > hear if there is any sound of breathing movement
   Taste > feel if there is air blowing from the nose or mouth
7. Call for help, either by shouting for help, seeking medical attention or authorities or taking it to the PKM.
8. Evacuate the victim to a safer place or assume a recovery position

3.2. Specialized First Aid

First aid for special conditions includes the following:

1. Fainting
   If a person experiences an event that results in unconsciousness, it can be done:
   a. Lay the patient down with the limbs elevated.
   b. Apply an odor or squeeze with the forefinger and thumb, the part of the victim's wrist between the thumb and forefinger.
   c. Loosen the clothes.
   d. Try to let the patient breathe fresh air.

e. Check for other injuries.
f. Give sweet drinks, if the patient is conscious.
g. Take the patient to the nearest medical team/PKM/RS.

2. Asthma

If a person experiences an event that causes the person to develop asthma, it can be done:

a. Calm the patient.
b. Help the patient to sit leaning forward and rest.
c. Make sure the patient gets fresh air.
d. If patient bring medicine, help them get and use the medicine.

3. Sprains/ Sprain/ Muscle Tension

If a person experiences an incident that results in a sprain, it can be done:

a. Place the dislocated / sprained / strained muscle, higher than the rest of the body, to prevent swelling and bleeding from the inside.
b. Place ice on the body part for 10 minutes and leave it without ice for 10 minutes and so on every 10 minutes. Do this for 1-2 days.

4. Nosebleeds

If a person experiences an event that results in the person having a nosebleed, it can be done:

a. Press the bridge of the nose for about 5 minutes. Usually the blood will have coagulated by then.

Breathe with your mouth for a while as you do this.

b. Avoid cigarette smoke as it dries out the lining inside the nose and makes the delicate blood vessels in the nose prone to bursting.
c. Avoid using aspirin as it thins the blood.
d. If the blood doesn't stop for a long time, rush to the hospital as you may need further treatment.

5. Heat Exhaustion

If a person experiences an event that causes them to experience fatigue, it can be seen with symptoms: rapid breathing, weak pulse, cold skin, pale, weak, thirsty, dry tongue. Treatment:

a. Bring to the shade
b. Loosen the clothes
c. Elevate the limbs
d. Give oxygen and drink if you are conscious.

6. Epilepsy

If someone experiences an event that results in person the person fatigue, it can be seen by symptoms: Symptoms/signs:

a. The patient's vision suddenly goes blank
b. Muscle spasm movements
c. Sudden fall, momentary rigid lying, arched back
d. Frothy mouth sometimes bleeding
e. Bluish and puffy face and neck

f. No response
g. Loss of urinary control

Then treatment can be done:

a. Protect the patient from injury
b. Do not resist/resist seizures
c. Protect the patient's tongue from being bitten, so insert a spoon or other hard object into the mouth.
d. Stable position
e. Treat injuries caused by seizures
f. When the attack has passed, the patient is asleep, do it:
   a) Maintain the airway
   b) Let it rest
g. Avoid tension and embarrassment all around

3.3 Box Contents Standard First Aid

Based on PERMENAKERTRANS Number: PER-15/MEN/VIII/2008 regarding First Aid for Accidents in the Workplace, the contents of the first aid kit are:

1. Wrapped sterile gauze
2. Bandage (5 cm wide)
3. Bandage (10 cm wide)
4. Plaster (1.25 cm wide)
5. Quick plaster
6. Cotton (25 grams)
7. Triangular cloth/mittela
8. Scissors
9. Safety pin
10. Disposable gloves (couple)
11. . Mask
12. Tweezers
13. Flashlight
14. Eye wash cup
15. . Clean plastic bag
16. Aquades (100 ml Saline solution)
17. . Povidone Iodine (60 ml)
18. . 70% alcohol
19. . Workplace first aid manual
20. . Books notebookand forms accident reporting forms

Figure 3.2. First Aid Box

3.4. Symbols - Symbols of Hazardous and Toxic Substances (B3) at Laboratory

Each symbol is a specific image to indicate the nature/characteristics of hazardous materials and wastes in a storage packaging and collection or transportation. There are 10 types of symbols, namely:

1. Explosive

Materials that at standard temperatures and pressures (25 'C, 760 mmHg) can explode or through chemical and or physical reactions can produce gases with high temperatures and pressures that can quickly damage the surrounding environment.

Examples: Acetylene, Diazo, Nitroso, Nitro, Alkyl Polynitro, Oxime, Azo, N-Nitroso

2. Flammable

a. May become hot or increase in temperature and ignite on contact with air at ambient temperature.
b. Solids that are flammable on contact with a source of ignition
c. Flammable gas at normal temperature and pressure
d. Emits dangerous quantities of highly flammable gases, if mixed or in contact with water or moist air.
e. Combustible solids (sulfur/sulfur, phosphorus, paper/rayon, metal hydride, cotton)
f. Flammable liquid substances (alcohol, acetone, benzenehexane)
g. Combustible gases (natural gas, acetylene, hydrogen, ethylene oxide)

3. Reactive

A material that can release a lot of heat or cause a fire when reacting with other chemicals, especially materials that are flammable even in a vacuum.

4. [illegible] for humans

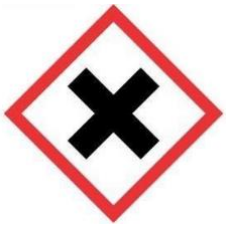
It is toxic to humans, which can cause serious poisoning or illness if it enters the body through breathing, skin or mouth.

5. Corrosive

a. Causes irritation (burning) of the skin
b. Causes a rusting process on the steel plate.

c. Have a pH equal to or less than 2 for acidic B3 and equal to or greater than 12.5 for alkaline B3.

6. *Harmful*



A material in the form of solids, liquids or gases that in contact or through inhalation or oral can cause harm to health to a certain degree.

7. Irritant

a. Solid irritants, e.g: NaOH, phenol
b. Liquid irritants, e.g. sulfuric acid, formic acid
c. Gaseous irritants, e.g. ammonia, formaldehyde, sulfur dioxide

8. *Dangerous for the environment*

A substance that can cause harm to the environment. These chemicals may damage or cause death to fish or other aquatic organisms or other hazards may be caused, such as damaging the ozone layer (e.g. CFCs = Chlorofluorocarbons), persistent in the environment (e.g. PCBs = Polychlorinated Biphenyls).

9. Carcinogenic, teratogenic and mutagenic

Health effects due to exposure:

a. Carcinogenic i.e. causes cancer cells
b. Teratgenic, which is the nature of materials that can affect the formation and growth of embryos.

c. Mutagenic is the property of materials that cause chromosomal changes, which means they can change genetics.
d. Systemic toxicity to specific target organs
e. Toxicity to the reproductive system
f. Respiratory tract disorders

10. Pressurized gas (pressure gas)

The danger of pressurized gas is that this material is high pressure and can explode when the tube is heated / exposed to heat or ruptured and its contents can cause a fire.

3.5. Things to Do in the Event of an Accident at Laboratory

The following are tips on how to handle early as First Aid in Accidents (P3K) in the Laboratory.

1. Small Wounds

   Any accident, no matter how minor, should be treated immediately as it can be fatal. Small wounds should be cleaned first before medication is applied and then covered or bandaged with a cloth or similar.

2. Large Wounds

   For major injuries such as burns or injuries caused by damaged materials, medical assistance must be given quickly, by providing assistance using the medicines in the First Aid Kit, if the necessary drugs are not available, the victim must be immediately transported to the nearest hospital and the patient must not move much. To prevent accidents after the incident, the scene must be secured first and ask other practitioners not to stand too close to the scene.

3.6. Handling Wounds

Wound management based on the cause that can be done includes the following.

3.6.1. Acid Burns

1. Exposure to Acid Solution
   If a person experiences an event that results in the person being exposed to an acidic solution, it can be done:
   a. The skin is immediately wiped off with a cotton pad or soft cloth,
   b. Washed under running water as much as possible,
   c. Next, wash with 1% Na2CO3,
   d. Then wash again with water,
   e. Dry and apply with Levertran ointment.
2. Exposure to Sodium or Potassium Metals
   If a person experiences an event that results in the person coming into contact with sodium/ potassium metal, it can be done:
   a. Any metal that is attached should be removed immediately,
   b. The skin is washed under running water for approximately 15-20 minutes,
   c. Neutralize with 1% Acetic Acid solution,
   d. Dry and apply Levertran ointment or cover the wound with sterile cotton or cotton soaked in Picric Acid.
3. Bromine Exposure
   If a person experiences an event that results in the person being exposed to bromine, it can be done:
   a. Wash immediately with Liquid Ammonia solution,
   b. Cover the wound with Na2CO3 paste.
4. Exposed to Phosphor
   If a person experiences an event that results in the person being exposed to phophor, it can be done:
   a. The affected skin is immediately washed with plenty of water,
   b. Wash with 3% CuSO4 solution.

3.6.2. Burns Caused by Hot Objects

If a person experiences an incident that results in the person being exposed to a hot object, then treatment can be carried out in the form of smearing with fish oil ointment (levertran) or dipping in ice water as soon as possible or compressing until the pain is somewhat reduced.

1. Eye Sores
   a. Exposure to Acid Solution Splash

If a person experiences an incident that results in the p e r s o n g e t t i n g acid splashed in the eye area, it can be done:

1) If splashed with Liquid Acid, the eyes can be washed with clean water for about 15 minutes continuously,
2) Washed with 1% Na2C3 solution,

b. Exposure to splashes of alkaline solution

If a person experiences an incident that results in the person b e i n g splashed with alkaline solution in the eye area, it can be done:

1) Washed with clean water for about 15 minutes continuously,
2) Washed with 1% Boric Acid solution with an eyewash glass.

3.6.3. Shock Caused by Electricity

If there is an accident caused by electricity, turn off the electricity before attempting to help the victim who has come into contact with the electricity. If this is not possible, protect hands with rubber gloves or dry material or wool before touching the victim for further treatment.

3.6.4. Toxic Gas

In the case of poisoning, the best course of action is to send the victim to medical attention, and keep the victim warm and calm. Usually, the most common first aid is to give plenty of milk and move the victim to a place with fresh air. For toxic substances, antithetics should be available to remove the toxic substances, but these antithetics cannot be given to unconscious victims. There are three principles that can be followed viz:

1. Give plenty of water, give milk to drink,
2. Give an emetic (only if there is no sign of burning of the mouth and lips), this aims to show the poison is *corrosive*,
3. In the usual way, move the victim to fresh air, lay and warm the victim, undress from waist to neck. Do not give any medicine other than hot coffee, give oxygen if necessary, but only via artificial respiration if breathing has obviously stopped.

Guide Book

OCCUPATIONAL SAFETY,HEALTH AND ENVIRONMENT(OSHE)

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