جامعة الباحة
Al-Baha University
2006
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LABORATORY SAFETY MANUAL

IN CIVIL ENGINEEING

BY
CIVIL ENGINEERING DEPARTMENT

Laboratory Safety Manual in Civil Engineering-First Edition

Vision of College of Engineering

Excellence in engineering education, scientific research and community service.

Mission of College of Engineering

Preparation of distinguished engineering cadres that are able to keep up with the needs of the labor market and providing innovative research that contribute in solving engineering and environmental problems for the community, in addition to providing a good environment for learning.

Mission of Civil Engineering Department

Providing sophisticated academic education to graduate qualified civil engineers to meet the needs of the labor market, contribute to community service, and keep up with the professional development through self-learning and scientific research

Objectives of Civil Engineering Department

The objectives of the civil engineering program are summarized as follows:

- Prepare graduates to become qualified engineers in the field of civil engineering
- Prepare graduates to work and communicate professionally and ethically with stakeholders in the labor market
- Prepare qualified students for postgraduates programs

MESSAGE FROM THE HEAD OF CIVIL ENGINEERING DEPARTMENT

We are delighted to have you join us as we embark on each new academic year. Our department provides students with the highest quality education in civil engineering, and we are proud of our commitment to excellence. Our faculty and staff are passionate about their work and strive to create an environment that encourages learning, innovation, and collaboration.

As a student in our department, you will have access to a wide range of courses and research opportunities. We offer courses in structural engineering, geotechnical engineering, water resources engineering, transportation engineering, construction management, environmental engineering, and more. Our faculty members are experts in their fields and will provide you with the knowledge and skills necessary for success in your chosen career path.

In addition to our course offerings, we also provide students with numerous research opportunities. Our faculty members are actively engaged in research projects that span a variety of topics related to civil engineering. We encourage students to participate in these projects as they gain valuable experience while making meaningful contributions to the field.

We also offer several student organizations that provide opportunities for networking and professional development. These organizations host events throughout the year such as guest lectures from industry professionals, panel discussions with alumni, field trips to local construction sites, and more.

Finally, our department is committed to providing students with the resources they need for success both inside and outside of the classroom. We look forward to having you join us! If you have any questions or concerns, please do not hesitate to reach out – we're here for you.

Dr. Abdulaziz Alzahrani

Assistant Professor and Head, Civil Engineering Department

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1. Introduction

Welcome to the First Edition of the Laboratory Safety Manual for Civil Engineering. This manual has been meticulously crafted to prioritize the safety and well-being of every individual working within our laboratory environment. Safety is not just a priority; it is a core value that underlines our commitment to fostering a secure and healthy workplace for all.

This manual serves as a comprehensive guide outlining the necessary safety protocols, procedures, and guidelines essential for conducting civil engineering activities within our laboratory. Its primary purpose is to provide a framework that minimizes risks, prevents accidents, and ensures the protection of personnel, equipment, and the surrounding environment.

Civil engineering, by its nature, involves a wide array of tasks, from materials testing to structural analysis. Each activity presents unique challenges and potential hazards. Recognizing the significance of laboratory safety is integral to creating a culture that values the well-being of every individual involved. By adhering to the guidelines presented in this manual, we collectively contribute to a safe and secure work environment.

Safety is a shared responsibility. Every individual, from laboratory personnel to management, plays a crucial role in maintaining a safe workplace. This manual outlines the specific responsibilities each person holds in upholding safety standards, fostering accountability, and ensuring continuous improvement in our safety practices.

As we embark on this journey to establish a culture of safety excellence, let this manual serve as a constant companion, providing guidance and support to all who engage in civil engineering activities within our laboratory.

Thank you for your commitment to safety. Together, we create an environment where innovation, learning, and discovery thrive in harmony with the utmost regard for the well-being of every one of us.

2. Objective

"Laboratory Safety Manual in Civil Engineering" serves as a comprehensive guide to safe practices for all personnel, including staff, students, and visitors, within any laboratory under the Department of Civil Engineering at Al-Baha University. It outlines essential Work and Safety instructions, guidelines, and regulations to be followed during all activities within these laboratories, whether for work, teaching-learning purposes, or general visits.

3. Scope

This manual encompasses the safety protocols and procedures applicable to all laboratory activities within the Department of Civil Engineering at Al-Baha University. It addresses the needs of:

- Students: Provides essential guidelines for safe participation in laboratory experiments, coursework, and research projects.
- Staff: Outlines regulations and best practices for maintaining a safe working environment for themselves and others.
- Faculty: Establishes safety expectations for planning, conducting, and supervising laboratory activities.
- Visitors: Offers essential information for safe conduct during authorized visits to the laboratories.

This manual is not intended to be an exhaustive guide to all potential safety hazards. It is the responsibility of all personnel using the laboratories to exercise common sense and caution, and to seek additional guidance when necessary.

4. List of laboratories

Sr. No.	Name of the Laboratory
1.	STRENGTH OF MATERIAL AND CONCRETE LABORATORY
2.	SOIL MECHANICS LABORATORY
3.	LABORATORYFLUID MECHANICS AND HYDRAULICS
4.	SURVEYING LABORATORY
5.	TRAFFIC AND TRANSPORTATION LABORATORY

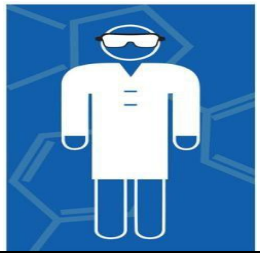
5. General safety guidelines

These guidelines are crucial for preventing any possibility of accidental occurrences or haphazard incidents within the laboratories of the Civil Engineering department. Whether entering for academic or non-academic purposes, everyone present in the laboratory premises must adhere to these guidelines to ensure the highest level of safety.

Purpose of the Guidelines

- Enhancing Safety: Elevate the safety of everyone working in the laboratories to the highest possible level.
- Accident Prevention: Implement measures to avoid any accidental hazards with the utmost care.
- Minimizing Danger and Losses: Develop strategies for minimizing danger and losses in the unfortunate event of an accident.

Laboratory Rules and Guidelines (print)

Rule	Guideline/Prohibition	Rationale
1	No Eating, Drinking, or Chewing Gum	To maintain a sterile and safe environment. 
2	No Smoking in the Laboratory Area	To safeguard the laboratory and its occupants. 
3	Dress Appropriately	Appropriate attire for personal safety and experiment integrity. 
4	Conduct Yourself Responsibly	Maintain a focused and serious atmosphere. 
5	Hazard Symbols Awareness	Identify potential dangers in the laboratory. 
6	Equipment Shutdown	Conserve energy and prevent equipment damage. 
7	Equipment Cleaning	Promote equipment longevity and prevent cross-contamination. 
8	Maintain Cleanliness	Ensure a safe, efficient, and well-maintained laboratory. 

6. Safety regulations (print)

In the realm of civil engineering laboratories, safety is paramount. These regulations are a concise guide tailored to address the unique challenges of our environment. From appropriate attire to safety footwear and protective gear, these rules are designed to ensure the well-being of everyone involved in the diverse tasks within the laboratory. Let's delve into these essential safety measures, each crafted to create a secure and protected working environment for every individual in the pursuit of advancing civil engineering knowledge:

1. Appropriate Dress Code:

An attire suitable for the work at hand must be worn when inside the civil engineering laboratory.

2. Safety Footwear Requirement:

Proper safety shoes are mandatory for all individuals working inside the civil engineering laboratory to prevent accidental foot injuries and ensure convenient movement.

3. Eye Protection:

When specific machines are in operation, it is mandatory to wear suitable safety goggles or specially designed safety glasses to protect the eyes.

4. Permission for Machine Usage:

Prior to operating any new machine, individuals must obtain permission and safety guidelines from the civil engineering laboratory supervisor.

5. Compressed Air Machine Caution:

Extra caution is required when using machines that employ compressed air mechanisms to prevent accidents and ensure safe operation.

6. Ear Protection:

To safeguard the ear drums and hearing, proper ear protection measures must be followed, especially when working on noisy machines within the civil engineering laboratory.

7. Avoid Working Alone Outside Normal Hours:

It is strongly advised to refrain from working alone outside of the regular working hours in the civil engineering laboratory to enhance personal safety and security.

Laboratory Safety Symbols and Rules


Electrical Hazard


Combustible Materials


No Open Flames


Corrosive Materials


Flammable Symbol


Fire Extinguisher


Toxic Chemical


Non-potable water


Environment Hazard


Eyewash Sign


Recycling Sign


Toxic Materials Sign


Explosive Materials Sign


Flammable Sign


Radioactive Sign


Biohazard Sign


Chemistry Hazard Label

General Safety Rules:

1. Read all directions for an experiment and follow the directions exactly as they are written. If in doubt, ask the teacher.
2. Never perform experiments that are not authorized by your teacher. Always obtain permission before experimenting on your own.
3. Never handle any equipment unless you have specific permission.
4. Take care not to spill any materials in the lab. If a spill occurs, ash your teacher immediately about the proper clean-up procedure.
5. Dispose of all material according to the teacher's instructions. Never empty materials into the sink or trash can.
6. Never eat in the laboratory. Wash your hands before and after each experiment.
7. Never horse play or run in the laboratory. This will earn you a zero and dismissal from the lab.
8. Know the location and function of all laboratory safety equipment.

8. Emergency

In the unpredictable environment of civil engineering laboratories, preparedness for emergencies is paramount. This section outlines essential procedures to be followed in the event of unexpected situations, ensuring the safety and well-being of all individuals present.

8.1 Response procedures in emergency situations

A designated Emergency Response Team has been trained to handle various emergency scenarios. In the event of an emergency, follow their directives promptly. Emergency response team members are identified by specific attire and can be found in key locations throughout the laboratory.

For following the response procedures in emergency situations, all staff and students working in laboratory must be aware of placement of the following things:

a. Fire extinguishers

b. Emergency showers/eyewash

c. Fire blanket if available

d. First aid medical kit

e. Exit routes for emergency evacuations

f. Assembly point or meeting point outside the building area

Remaining calm and quiet, understanding and gathering information about the incident and continuous assessment of the situation are highly required to confine any further damage and loss that the emergency situation may incur.

8.2 Emergency Alarm sounds

Emergency alarm systems are critical components of laboratory safety, providing timely alerts during unexpected situations. It is essential for all personnel to be familiar with the different alarm sounds and their corresponding meanings to facilitate a swift and coordinated response to emergencies.

Types of Emergency Alarms

a. Fire Alarm:

Sound: Continuous, loud siren or bell.

Meaning: Immediate evacuation is required. Proceed to the nearest exit using established evacuation routes. Do not use elevators. Assemble at the designated meeting point outside the laboratory.

b. Chemical Spill or Hazardous Material Alarm:

Sound: Intermittent or pulsed alarm.

Meaning: Evacuate the immediate area. Notify the laboratory supervisor or emergency response team about the spill. Do not attempt to handle hazardous materials unless properly trained.

c. General Emergency:

Sound: Repeated short blasts or a distinctive pattern.

Meaning: Listen for specific announcements or check communication systems for further instructions. Be prepared to follow additional safety measures as directed by the emergency response team.

d. All Clear:

Sound: Series of short, continuous blasts.

Meaning: The emergency situation has been resolved. Resume normal activities but remain vigilant for further instructions or updates.

Response to Emergency Alarms

- **Stay Calm:** Upon hearing an emergency alarm, remain calm and focused. Do not panic.
- **Immediate Action:** Act promptly according to the type of alarm.
- **Follow Evacuation Routes:** Evacuate the area following established evacuation routes.
- **Assemble at Designated Points:** Gather at the designated assembly points outside the laboratory.
- **Listen for Instructions:** Pay attention to announcements or instructions from the emergency response team.
- **Avoid Elevators:** Do not use elevators during evacuation.

It is imperative for all personnel to recognize and respond promptly to emergency alarm sounds. Regular drills and training sessions can enhance preparedness and ensure a swift and coordinated response during unforeseen circumstances.

8.3 Practicing Fire Extinguisher Use

Fire extinguishers are our trusty warriors against the fiery but wielding them effectively requires more than just grabbing and spraying. Let's dive into the art of extinguisher practice, ensuring you're prepared to face any fiery foes!

Step 1: Know Your Weapon:

Familiarize yourself with the different types of extinguishers, like the ABC extinguisher (a multi-purpose hero) or the CO2 extinguisher (ideal for electrical fires). Each has its own quirks and limitations, so understanding their labels and operating instructions is crucial.

Step 2: Remember the PASS Technique:

This handy acronym will guide you through the extinguishing process like a fire-fighting maestro:

- P - Pull the pin: This releases the pressure holding the extinguishing agent. Imagine it as unsheathing your sword from its scabbard.
- A - Aim at the base of the fire: Don't be a dragon chasing its tail! Target the fuel source, not the flames themselves.
- S - Squeeze the handle: Unleash the extinguishing agent! Channel your inner water ender and release the pressurized stream.
- S - Sweep side to side: Don't let the fire outsmart you! Move the extinguisher in a sweeping motion to cover the entire area.

Step 3: Practice Makes Perfect:

Knowledge is power, but practice makes you a fire-fighting legend! Find a safe, controlled environment (like a designated training area) to put your skills to the test. Many fire departments offer extinguisher training sessions, so be sure to check them out!

Remember: Never attempt to extinguish a fire that's too large or poses immediate danger. Evacuate the area and call the fire department immediately on 998.

Bonus Tip: Consider using a training extinguisher filled with water or inert substances. This allows you to get comfortable with the mechanics without the heat and potential hazards of a real fire.

By following these steps and practicing regularly, you'll be equipped to handle any fiery situation with confidence. Remember, fire safety is everyone's responsibility, so let's all become champions of the extinguisher!

9. Communication:

Maintain clear communication during emergencies. Use emergency communication systems, such as alarms and intercoms, to relay information. Follow instructions provided by the Emergency Response Team and avoid unnecessary panic.

Remember, your safety and the safety of others depend on prompt and effective action during emergencies. Familiarize yourself with these procedures to ensure a swift and organized response in any unexpected situation.

SAFETY FIRST (print)

(General Administration Of Safety and Risks)
الإدارة العامة للسلامة والمخاطر
Phone: 0177257700 - 15424
Email: safety@bu.edu.sa

(Important Phone Number)
ارقام مهمه

الجهة	رقم التلفون	الجهة	رقم التلفون
الشرطة Police	999	طوارئ الكهرباء Electricity Emergency	933
الدفاع المدني Fire Department	998	طوارئ المياه Water Emergency	939
الاسعاف Red Crescent	997	استشاراة طبية Medical advice	937
امن الطرق Roads Security	996	الدوريات الامنيه Emergency Number	911
المرور Traffic	993	مكافحة الفساد Corruption (Nazaha)	980

10. Responsibilities

10.1 Teaching Faculty Members in Civil Engineering at Al-Baha University

Teaching faculty members leading various laboratory courses in civil engineering at Al-Baha University bear the responsibility of ensuring strict adherence to the safety protocols detailed in this manual by the laboratory instructors.

10.2 Laboratory Instructors:

- Anticipate and comprehend the tasks to be undertaken in the laboratories beforehand.
- Furnish comprehensive written and visible instructions in the laboratory, tailored to the specific context and individuals or groups involved in the work.
- Identify and elucidate potential hazards, addressing and clarifying associated risks.
- Articulate standard and suitable procedures that must be followed in the laboratory setting.
- Promptly report laboratory conditions and activities to the relevant authorities for necessary actions.
- Report the status of equipment and instruments to maintenance personnel.
- Address any student misbehavior promptly and effectively.

10.3 Laboratory Supervisors:

- Oversee the adherence to safety guidelines within the laboratory.
- Monitor conditions with consideration for the age and experience of the students.
- Avoid leaving students unattended, except under highly exceptional circumstances.
- Maintain zero tolerance for student misbehavior.
- Transfer supervisory responsibilities to another competent person if required.

10.4 Maintenance Personnel in Civil Engineering at Al-Baha University

- Ensure a safe environment for the teaching-learning process and all involved individuals.
- Guarantee that non-functional or faulty machines are not utilized.
- Place appropriate guidance instructions wherever instruments/machines are undergoing maintenance.

- Establish a regular inspection schedule and procedure for all machines/instruments/equipment, electricity, water, etc.
- Record all potential harmful notifications.

10.5 Students in Civil Engineering at Al-Baha University

- Adhere to all etiquettes and guidelines.
- Work only under the supervision of a competent person.
- Pay diligent attention to every instruction provided.
- Read and comprehend the given experimental work procedure before commencing experimentation, clarifying any doubts beforehand.
- Execute the work responsibly, following each step precisely as instructed.
- Be prepared for emergency situations, with awareness of Dos and Don'ts and standard emergency procedures.
- Utilize machines and instruments following manuals and instructions from instructors or supervisors.
- Seek permission before leaving the class, even for a casual break.
- Report any sudden unsafe situation to the instructor and supervisor.
- Refrain from bringing potentially dangerous objects or substances into the laboratory.
- Organize bags and stationery responsibly, considering the safety of materials and the laboratory setup.
- Uphold discipline and order within the laboratory.