

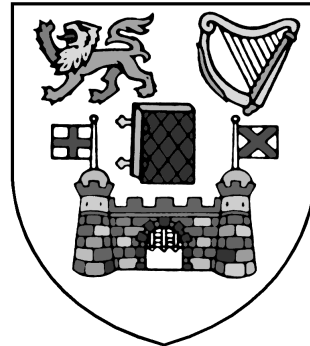
# Safety Statement

for

## The School Engineering

Encompassing Disciplines of  
Electronic & Electrical Engineering  
Civil, Structural, & Environmental Engineering  
Mechanical & Manufacturing Engineering

**Trinity College Dublin.**



*This Safety Statement is adapted from the Mechanical Engineering Safety Statement and is a general Safety Statement for the School of Engineering and all of its disciplines.  
With thanks to the original authors October 2009*

## IN THE EVENT OF AN EMERGENCY RING 1999

The internal telephone number 1999 provides immediate access to professional assistance on a 24-hour basis. Be prepared to state:

1. Type of assistance required (ambulance, fire brigade, police etc.)
2. Type of emergency (fire, injury, etc)
3. Name, extension number and location.

If possible and safe to do so, stay close to the telephone, in order to give further information should it be required by the emergency services.

*This number should only be used in a genuine emergency.*

### Departmental Staff, phone numbers etc., related to safety

Title	Present Holder	email	Tel # prefix 896
Head of School	Prof J A Fitzpatrick	<a href="mailto:john.fitzpatrick@tcd.ie">john.fitzpatrick@tcd.ie</a>	1778
Electronic & Electrical Engineering Head of Discipline	Dr. Martin Burke	<a href="mailto:martin.burke@tcd.ie">martin.burke@tcd.ie</a>	1740
Civil, Structural & Environmental Engineering Head of Discipline	Dr. Laurence Gill	<a href="mailto:gilll@tcd.ie">gilll@tcd.ie</a>	1047
Mechanical & Manufacturing Engineering Head of Discipline	Prof H Rice	<a href="mailto:hrice@tcd.ie">hrice@tcd.ie</a>	1996
Faculty Safety Officer	TBA		

### College Special Hazards Officers

The following members of staff have been appointed by the Board as specialist advisors in the fields outlined below. They advise the College Safety Officer, Local, Faculty and College Safety Committees & the College Community in general on matters relating to their respective fields. If you have a query in relation to safety in the use of lasers, radioactive materials, biologically hazardous materials, fire safety or hazardous chemicals, the relevant specialist in College can be contacted at the Tel #'s or addresses shown.

- **Hazardous Chemicals** Dr. Michael Bridge, Chemistry Department, Chemistry Building, College *tel:*6081264 *e-mail:* [mbridge@tcd.ie](mailto:mbridge@tcd.ie)
- **Bio-Hazards, Bio-Safety & Genetic Manipulation.** Dr. Ronnie Russell, Microbiology Department, Moyne Institute, College *tel:* 6081194 *e-mail:* [rrussell@tcd.ie](mailto:rrussell@tcd.ie)
- **Bio-Resources.** Mr. Peter Nowlan, Bio-Resources Unit, Biochemistry Building, College *tel:* 6081008 *e-mail:* [peter.nowlan@tcd.ie](mailto:peter.nowlan@tcd.ie)
- **Laser Safety** Dr. Lousie Bradley, Physics Department, Physics Building, College *tel:*6083595 *e-mail:*[louise.bradley@tcd.ie](mailto:louise.bradley@tcd.ie)
- **Radiological Protection** Ms. Elaine Lee, Director of Buildings' Office, West Chapel, College *tel:*6082887 *e-mail:*[elaine.lee@tcd.ie](mailto:elaine.lee@tcd.ie)

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## **General statement of School Safety Policy**

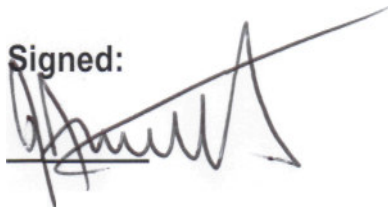
The school of Engineering encompasses the following Disciplines (i) Electronic & Electrical Engineering (ii) Civil, Structural & Environmental Engineering (iii) Mechanical & Manufacturing Engineering. It is the policy of School of Engineering to ensure, in so far as is possible, the health, safety and welfare of all its staff and students in accordance with the College Safety Policy, the Safety, Health and Welfare at Work Act of 1989 and relevant, later, subsidiary legislation and statutory instruments. All reasonable steps will be taken to ensure that no person's – be it staff, students or others – health, safety and welfare is put at risk by, or as a result of the activities of the School or it's various disciplines.

In so far as reasonably possible, adequate resources in relation to health, safety and welfare matters will be made available. Both proactive and reactive approaches towards health, safety and welfare will be taken.

The School of Engineering will ensure that it meets its objectives for health, safety and welfare of:

- establishing a safe environment for all;
- establishing and maintaining safe working procedures for staff and students;
- encouraging health and safety as an integral part of work by all staff and students;
- developing and maintaining a safety consciousness and a safety culture in all within the School;
- conforming to the requirements laid down in the Safety, Health and Welfare at Work Act. 1989, any further provisions made under the Act, other applicable legislation and the College Safety Statement, College Policies and Codes of Practice documents.

**Signed:**

A handwritten signature in black ink, appearing to be 'A. Smith', written over a horizontal line. The signature is stylized and somewhat cursive.

**Head of School**

## Safety Responsibilities and Duties

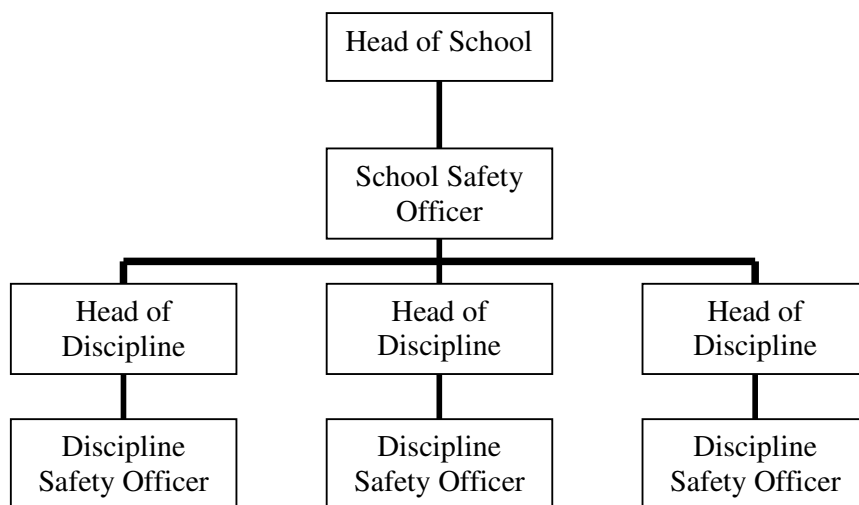
**All personnel (staff, students and visitors) have a personal responsibility to ensure the health and safety of themselves and of others who may be affected by their activities within the School of Engineering and it's various disciplines.**

### Executive Responsibilities

The Head of School is ultimately responsible for safety in the School of Engineering. He will appoint another member of staff of the School to act in his absence, and a record of the name of this acting Head of School will be retained in the office of the School.

The School Safety Officer (DSO) has executive responsibility for safety and reports to the Head of School. He is supported by the Heads of Discipline and Safety Officers with the various Disciplines.

The organisation chart for health and safety within the School is given below.



### Monitoring Safety Performance

All personnel within the School have a responsibility to contribute to the continuous monitoring of safety performance within the School. The Discipline Safety Officers will maintain detailed records of all accidents, injuries, property damage and near misses. These reports must be sent to the college Safety Officer. Periodical Safety Audits (at least once a year) of each Discipline and reports on these audits will be given to the Head of Discipline.

Any deficiencies in equipment or procedures must be rectified promptly.  
Where equipment is deemed to be unsafe **it must not be used** until corrective action is taken.

### Safety training

All new staff and postgraduate students are required to attend College Safety Training Courses. Fire safety training is mandatory for demonstrators and all Staff working in undergraduate teaching labs. Additional training may also be mandatory for personnel working in special hazards areas.

**The Smoking Ban:**

The Minister for Health and Children has announced that a ban on smoking comes into place on March 29th 2004. The ban is as a result of the implementation of the Tobacco Smoking Regulations, 2003 (various) made under the Public Health (Tobacco) Act, 2002.

**From 29<sup>th</sup> March 2004 smoking is prohibited by law in all buildings in College**

The prohibition does not extend to external places of work but the ban extends to Front Arch and, perhaps more significantly to the covered area between the Nassau Street gate and Fellows Square. The legislation has been approved by the Board of TCD.

**Section I – General Safety for the Engineering School and its Buildings**

The following are the general safety rules which apply to all personnel within the School including staff, students and visitors.

**Note: All accidents must be reported to either the DSO or the Chief Technical Officer who will complete the statutory ‘Accident Form’, a copy of this form is then sent to the College Safety Officer who registers all accidents in College**

Additional more specific safety rules apply to the personnel working in the various disciplines and they should be made aware the relevant Safety Statement of the Discipline within which they are working.

- Undergraduate Teaching Laboratories,
- Workshops.
- Research Laboratories.

**Access to Buildings**

The normal opening hours for each Discipline are 0830- 1730hours, Monday to Friday.

Although free access is available to most buildings during normal working hours access outside normal working hours is limited strictly to authorized staff, postgraduate students, authorised students, visitors and contractors. Contractors & maintenance personnel must be made aware of the hazards in the areas to which they are admitted.

**Visitors.**

- Visitors to the School/Discipline must immediately contact their staff host (or the Discipline office) on entering the Building. Staff, who have visitors, are responsible for ensuring that their visitors are aware of all safety rules, are fully aware of local fire evacuation procedures and have been informed of any special risks associated with the area being visited.
- Visitors who are not technically qualified must not be left unattended in any laboratory.
- Casual visitors should go to the Enquiries/Main Office of the Discipline.
- School students who may be temporarily attached to a Discipline will be classified as visitors.

**Disabled Persons**

**Before entering any of buildings in any the various disciplines Physically Disabled persons should be fully informed of the following Emergency Procedures.**

Progressive Horizontal Evacuation or Lateral Evacuation will be practiced where there is no alternative means of evacuation from the upper floors of a building and where no Fire Lift or Evacuation Lift is installed. All Lifts must be clearly Identifiable with Visible Signage. Physically Disabled occupants will be moved horizontally within the building away from the hazard and brought to a safe refuge location if available. A ‘Buddy System’ should apply whereby the staff member concerned will be responsible for the disabled Visitor/Student. Disabled Visitor(s)/Student(s) may be left for the arrival of the fire brigade to execute complete evacuation. The staff member concerned must inform the fire service of the person’s location

**All visitors, contractors & maintenance personnel must comply with the Safety regulations.**

**EMERGENCY 1999.**

The internal telephone number 1999 provides immediate access to professional help on a 24-hour basis. This number should only be used in an emergency.

**Fire safety**

The legislation governing fire safety in the School is the Fire Services Act of 1981 and The Building Control Regulations of 1991.

When a fire alarm sounds all personnel must immediately leave the building using the nearest available exit route (or the exit route specified by local fire wardens). In the event of an emergency evacuation all personnel must obey, promptly, all instructions given by the fire warden/Safety officer.

- Emergency exit routes are clearly indicated on all corridors.
- Escape routes are lit by emergency lighting in the event of failure of the electricity supply.
- Lifts must not be used during emergency evacuation.
- After evacuation go directly to the designated assembly point which should be clearly indicated. Do not congregate at the building entrance.

**Fire drills**

Fire drills are held twice during each calendar year and are attended by the College Fire Officer and or Safety Officer, and by members of the College security staff. Drills are held without prior warning and during working hours when the building occupancy is likely to be high. Security staff will check each building for defaulters before the all clear is given. A written record of each fire drill is maintained, indicating the date, the approximate number of persons evacuated from the building, and the time taken for complete evacuation.

**Fire wardens.**

Each Building has its own dedicated Fire wardens these are named in each Discipline Safety statement.

**Fire Alarm and Evacuation Procedures.**

The Buildings are provided with an automatic fire alarm system, which is regularly tested by the College Buildings Office. The fire alarm can be manually triggered from any of the several break-glass alarm boxes, which are placed in strategic areas around each Building. In the event of a fire the fire alarm system should be activated immediately and the building evacuated. Persons in charge of lecture theatres and teaching labs should assist with the evacuation of their areas.

• **ASSEMBLY POINT** - Each building has its own dedicated assembly area, occupants should make themselves aware of its location.

**Fire fighting equipment**

College appointed professional fire control companies carry out regular inspection, renewal and servicing of fire extinguishers under the direction of the College Buildings Office.

Any person who has used one of the Building's fire extinguishers, even for a very short time, must report the fact immediately to the Discipline Safety Officer or Chief Technician, so that it can be fully recharged or replaced. Additionally, an Accident/Incident Report Form must be completed in respect of each such use of any fire extinguisher.

**Frivolous & unauthorised use of any fire-fighting equipment is a criminal offence and will be dealt with most severely.**

**Action in the event of fire**

If any member of the School discovers a fire the following actions must be taken. The person discovering the fire will:

- Activate the Fire Alarm
- Call the College Emergency Number 1999
- Provided that to do so does not compromise their personal safety, briefly attempt to extinguish the fire using the equipment provided.
- Leave the building.

**Liaison with the Fire Brigade**

The School recognises the special hazards in certain areas of the various disciplines, which the use of compressed gases presents to fire service personnel. Each Discipline will seek to reduce these as follows:

- It will pursue, as far as is practicable, a policy of piping in gases rather than keeping gas cylinders on the premises.
- It will keep records of the main hazards relating to cylinders of compressed gases in each area of the building. These will be kept at the Chief Technician's office and sent to the Chief Steward's office.

**Fire Doors.**

Fire doors must not be left open under any circumstances.

**First Aid.**

It is the policy of the School that first aid will not take the place of professional treatment. In the case of minor injuries such as cuts or burns, assistance may be sought from members of the Staff who have valid First Aid Certification. Those currently qualified in First-Aid should be listed at the beginning of the Safety Statement of each Discipline.

For more serious injuries the person injured will be accompanied to the College Health Centre or an ambulance will be summoned.

**First aid boxes**

First aid boxes will be kept in all laboratories and workshops and corridors. Names and telephone numbers of the nearest personnel with First Aid expertise should be posted on all First Aid Stations, as is the College emergency number and that of the College Health Centre.

First aid Stations will be maintained by the Chief Technical Officer of the respective discipline who will at regular intervals check that the contents of each box is in order, and replace missing or outdated items.

Each Discipline will carry a stock of commonly used first aid materials which will be employed to replace items necessarily used. These will be available from the Chief Technical Officer.

**First aid training**

It is the policy of the School to encourage volunteers from the permanent staff and postgraduate students to attend First Aid courses. A sufficient number of First Aiders must be available within each Discipline, minimum of 3 persons.

**Hazardous Areas.**

Areas within the School, which contain potentially hazardous equipment and/or substances, must be clearly marked with warning signs. Access to these areas is prohibited for unauthorised personnel.

**Notices describing the hazards present in a laboratory are displayed on the exterior of its door. Before entering a laboratory it is the duty of each person to acquaint themselves of the hazard/s present and to don the appropriate safety clothing or devices necessary for personal protection.**

**Working hours.**

There are no defined, normal, working hours for the School Disciplines. However, all access doors will be locked outside 08.30-17.30hrs, Monday to Friday and at all times Saturdays & Sundays – ‘Local’ opening hours may vary slightly.

The only circumstances in which those other than staff members, postdoctoral workers, graduate & undergraduate students and accompanied visitors that will be permitted outside the above hours are as follows:

- i. Persons attending evening lectures.
- ii. Persons attending society meetings.
- iii. Security Staff.
- iv. Cleaning Staff.
- v. Maintenance Staff.
- vi. Persons with special permission of the Head of Discipline.

Persons in categories (i), (ii), (iii) and (iv) above need not sign the night book. Persons in charge of society or research group meetings must sign the late book.

**Working in Isolation.**

Working on experimental systems or machinery outside normal working hours is not permitted without prior authorization of the project supervisor or person-in-charge after he/she has conducted a full assessment of risk and devised a safe system of work.

No staff member, postdoctoral worker or postgraduate student will be permitted to carry out experimental or technical work of any kind in the School or any of the buildings used in areas of activity at any time unless there is another person close by, who is aware of their presence so that they can summon assistance in the event of an accident.

**Isolated individuals must never carry out potentially hazardous work or activities.**

**Clearways.**

As far as is practically possible all entrances/exits, corridors, stairways and doorways must be kept clear of obstructions. All temporary obstructions (e.g. during movement of large equipment or maintenance work) should be notified to the Discipline Safety Officer who will designate alternative temporary emergency exit routes.

**Electrical Switch Rooms/Plant Rooms.**

These rooms must be kept clear of obstructions at all times. Access to these areas must be kept clear.

**Reporting of Hazards.**

All personnel using buildings contained within the School have an individual responsibility to report, directly to the Discipline Safety Officer or Chief Technical Officer, all potential hazards and/or hazardous occurrences, which they may observe. Undergraduate students who observe hazard/s may report to their class representatives who in turn will report to the Safety Officer.

**Reporting Accidents and Dangerous Occurrences.**

All accidents and dangerous occurrences, even those of a minor nature, must be immediately recorded in the Accident Record Book of the Discipline held by the Chief Technician. In the case of accidents leading to personal injury and/or potentially dangerous occurrences the Discipline Safety Officer will

provide an official College Accident/Incident Form which must be completed as soon as possible after the incident and send to the College Safety Officer

Details of witnesses to the incident, if any, will also be noted and forwarded, along with the report form, to the College Safety Officer as soon as possible after the incident. Copies of the form will be retained in the Department.

## **Section II - Safety rules for Teaching Labs & Lecture Theatres**

The general safety rules and procedures, which apply to all personnel within buildings, including staff, students and visitors, are detailed in the GENERAL SAFETY RULES section of this document. The following rules apply specifically to all personnel (including staff, demonstrators, and undergraduate students) who are authorised to enter and work in the teaching laboratories and lecture theatres of the various buildings.

### **Training**

As indicated previously, all teaching assistants, demonstrators and all staff must have completed a Fire safety training course. These courses are organized by the College Safety Officer and details may be obtained from the Director of Buildings.

### **General laboratory rules**

- Incoming students must read and abide by the Health and Safety Guidance Manual issued by each Discipline. A statement to this effect will be inserted into all student information booklets.
- Guidance for the use of hazardous equipment, materials and procedures (such as lasers, chemicals or electrical equipment for example) may be found in the Safety Statements of the respective Disciplines.
- Coats, bags etc must not be left on lab benches or anywhere that they could cause an obstruction.
- Students are not allowed to work unsupervised without the explicit permission of the lab supervisor.
- Students should not congregate at the entrance to a laboratory or lecture theatre, or at building entrances.
- Students should be made familiar with these rules by the person in charge of the lab or lecture theatre.

## **Section III: Safety rules for Offices, Research Labs & Workshops**

The general safety rules and procedures, which apply to all personnel within School buildings, including staff, students and visitors, are detailed in the GENERAL SAFETY RULES section of this document. The following rules apply specifically to all personnel (including staff, post-graduate research students, visiting researchers and undergraduate project students) who are authorised to enter and work in research laboratories (additional rules apply for bioengineering labs, section IV) within the Department.

### **Responsibility**

Overall responsibility for health and safety within the Discipline rests with the Head of Discipline. Although at a local level the responsibility for ensuring a safe working environment and safe working practices in individual research laboratories rests mainly with the individual research supervisor, or person in charge of the laboratory, all research workers have a responsibility not to endanger themselves and others by their actions or omissions.

### **Specialist safety consultants**

In areas where specific identified hazards exist (lasers, chemical, electrical etc.), specialist safety consultants will be designated. These should be consulted prior to undertaking any work in these areas.

### **Authorised access to research laboratories**

Access to each individual research laboratory is strictly limited at all times to those individuals authorised by the appropriate research supervisor or person in charge. In the case of visiting researchers and new staff the research supervisor is responsible for ensuring that the appropriate safety training is provided, if necessary by specialist safety consultants, before laboratory access is authorised.

Laboratories which contain specific identified hazards (e.g., laser systems, hazardous substances etc.) must be clearly marked with warning signs. Access to such areas is strictly limited to authorised personnel with the appropriate training and expertise. For such areas prior authorisation must be obtained from the research supervisor before visitors or other unauthorised personnel are permitted to either enter the laboratory or undertake any work within the laboratory.

### **General Laboratory Practice**

1) All researchers have a responsibility to maintain a tidy well organised and safe laboratory environment with a safe means of rapid access to and egress from all working areas. Access to all services (water valves, electrical fuse boxes/switches etc.) should be kept clear at all times.

2) All experimental systems should be designed to be fail-safe.

3) All researchers should carry out a detailed assessment of the likely hazards and risks associated with their experimental systems and procedures. Research supervisors have a responsibility for ensuring that such systems and procedures meet the appropriate safety standards. Research supervisors must keep written records of risk assessments carried out (Appendix III) and provide, where necessary, appropriate written work instructions and additional written local safety rules. The essential steps that are taken in order to complete a risk assessment are as follows:

- Identify the hazards to health or safety arising from the activity or the workplace.
- Decide who might be harmed and how.
- Evaluate the risks and decide whether existing precautions are adequate or more needs to be done.
- Record your findings.
- Review your assessment and revise it if necessary.

A guidance document on the preparation of a risk assessment is available from the Discipline Safety Officer.

4) A copy of the risk assessment should be lodged with the Discipline Safety Officer. If in any doubt consult the appropriate safety consultant.

5) All researchers have a personal responsibility to make correct and full use of all protective clothing, personal protection equipment and safety aids provided in order to minimise risks.

6) Researchers must not attempt new procedures or tasks without consulting their supervisor and receiving appropriate safety training.

7) All researchers within a laboratory should be kept fully aware of day-to-day modifications carried out on experimental systems or operating procedures and clearly visible warning notices of any resulting potential hazard must be provided.

### **Unattended experiments/apparatus**

Systems should not be left running unattended without consulting with the relevant research supervisor. Where systems operate unattended for any period of time, an UNATTENDED APPARATUS form must be completed and clearly displayed beside the equipment. This notice must be removed when the condition no longer applies

When carrying out the risk assessment for such systems, special attention should be given to the effects of a loss of services (water, electricity etc.) on the safety of the system.

### **Computers & VDU Equipment**

A booklet, outlining the correct use of VDU equipment, is available from the Safety Officer for each Discipline. Personnel using VDUs should consult this booklet. Any users of VDU equipment who experience health problems, which they feel may be associated with their working environment or facilities, should contact the Student Health Centre for advice. If necessary a full ergonomic risk assessment will be carried out.

### **Protective Clothing and Personal Protective Equipment**

It is the policy of the School that, where necessary, staff and students should be provided with protective clothing and personal protective equipment. Provision of protective clothing (lab coats, overalls, aprons, gloves) is the responsibility of the research supervisor.

### **Laser safety consultation (*College Laser Safety Officer*).**

The NSAI determines the regulations governing the safe use of lasers, these are defined in Irish Standard IS EN 60825-1 1994.

All members of staff and postgraduates who work with laser equipment (Classes 2-4) must undertake the College 'Laser Safety Training course', details from Discipline Safety Officer or College Laser Safety officer. Postgraduate workers must satisfy their supervisors that that they have taken the safety course and are competent to use laser equipment. Evidence of attendance shall be given to the Dept Safety Officer. It is the responsibility of research supervisors to ensure all relevant safety precautions have been met.

### **In the case of a laser Accident:**

Get immediate medical attention at the **Royal Victoria Eye & Ear Hospital**, Adelaide Road, Dublin 2  
**Do not** use the laboratory or disturb the equipment until after an accident investigation has been performed.

**Report all** laser accidents to the Departmental Safety Officer.

### **Chemical safety consultation (*Chemicals & Biohazards Officer*).**

The use of dangerous chemicals is strictly controlled by specific legislation, *Safety, Health & Welfare at Work (CHEMICAL AGENTS) Regulations, 2001*. The Regulations cover all chemical agents in the workplace. In particular it applies to chemicals, which are classed as very toxic, toxic, harmful, corrosive or irritant. In brief the Regulations require each Discipline:

- a) To assess the health risks which arise from hazardous substances in the workplace and to identify and provide effective controls to protect people's health.
- b) To ensure that the controls are properly used and maintained in effective working order.

- c) To provide training and information for those who may be affected.
- d) To monitor exposure and implement health surveillance where necessary.

A copy of the regulations is available from the Discipline Safety Officer. A code of practice for the legislation is also available.

The following rules and procedures apply for all work involving chemical agents within each Discipline.

- 1) Hazardous substances may not be ordered (or otherwise procured) before a suitable and sufficient risk assessment has been carried out.
- 2) Hazardous substances or chemicals may only be procured through the Chief Technical Officer on foot of a signed requisition from the research supervisor.
- 3) Chemical safety training is given as part of the annual Discipline safety day. No one may work with hazardous chemicals without having completed the Departmental safety course or an equivalent.
- 4) All personnel using a particular chemical should read the manufacturer's Material Safety Data Sheet (MSDS) for that chemical.
- 5) All work involving chemicals should, as far as is reasonably practical, be carried out in a fume hood making full use of the safety goggles, safety clothing and other safety aids provided.
- 6) For work requiring use of a fume cupboard, users must at all times adhere strictly to the guidelines for correct fume cupboard usage.
- 7) Suitable bottle carriers must be used, when transporting Winchester, Quart and Euro-bottle containers of chemical substances, in order to prevent accidental spillages and personal injuries.
- 8) All stocks of chemicals or hazardous substances used in each Discipline must be properly stored in suitable chemical storage presses.
- 9) All chemicals or hazardous substances used in the Department must be clearly labelled including warning signs.
- 10) All chemical waste must be clearly labelled and disposed of promptly through College's Hazardous Materials Facility (HMF). Containers sent to the HMF should be no more than 2/3 full.
- 11) Solvent waste should be divided into chlorinated and non-chlorinated waste (and kept apart from acid waste!). Special safety-cans for solvent waste may be obtained from the HMF.
- 12) All broken glassware and other "Sharps" should be disposed of in the Sharps bins provided. Bins containing contaminated sharps should be labelled and disposed of via the HMF

#### **Compressed gases safety.**

With compressed gases cylinder pressures may be as high as 300 bar and the gas or gas mixture may be flammable and/or toxic so great care must be exercised in their storage, handling and use. In addition the use of some gases will also be subject to the Chemical Safety Rules given above.

Flammable or Explosive Gases constitute a particular hazard within the laboratory environment. Guidance for use of such gases is provided in *CP8 - The Safe Storage of Gaseous Hydrogen in Seamless Cylinders & Similar Containers: 1986*, produced by the British Compressed Gases Association. Such gases may be used only after appropriate local safety rules and procedures have been established by the research supervisor, in consultation with the College Safety Officer.

Such rules and procedures must be formally recorded and clearly displayed along with appropriate warning notices at all entrances to the designated work area.

The following safety rules apply for all compressed Gases.

- 1) All users of compressed gases must be fully familiar with the appropriate manufacturer's identification codes and cylinder configurations.
- 2) Never remove or deface cylinder identification.
- 3) Store cylinders vertically and clamp securely to prevent toppling. Cylinders must not be left free standing at any time.
- 4) Store in a well-ventilated area away from any fire risk.
- 5) Valves should be closed and valve outlets plugged or blanked. Valve guards or caps should be securely fitted.
- 6) Separate cylinders of flammable gases from those of oxygen or oxidants by at least 3m.
- 7) Cylinders may not be used in a laboratory except by permission of the College Safety Officer. Only those cylinders, which are in current use, may be kept within the laboratory. Do not store cylinders in the laboratory.
- 8) Where possible pipe gases from a secure location outside the laboratory.
- 9) Ensure that you have read a current Material Safety Data Sheet (**MSDS**) for each gas in use in your laboratory and that these are clearly displayed either on or adjacent to the cylinder.
- 10) A "Compressed gas cylinder in use" form (Appendix V), listing all the compressed gas cylinders currently in use must be displayed outside the entrance to all laboratories containing compressed gases. A compressed gases warning sign (Appendix V) must also be displayed.
- 11) In rooms where flammable or other hazardous gases are in use, appropriate signage must be displayed on the room entrances.
- 12) Always use the appropriate trolley to move heavy cylinders.
- 13) Only suitably equipped and trained personnel may move gas cylinders.
- 14) Gas cylinders should not be transported in occupied lifts.
- 15) Use only approved regulators. Check their suitability for the gas in use.
- 16) It is recommended that regulators are either replaced or refurbished after (at maximum) 5 years from date of purchase.
- 17) Before connecting the cylinder to your apparatus check the complete system for suitability particularly in terms of pressure rating and materials compatibility. All new pipe work should be inspected and leak tested by qualified personnel.
- 18) Never transfer gas from one cylinder to another.
- 19) Report all faulty cylinder valves and regulators immediately to the Chief Technical Officer.
- 20) Always close the main cylinder valve when a cylinder is not in use and ensure that an appropriate cylinder key is readily available for rapid shut down of cylinder output.
- 21) All compressed cylinder gases should be ordered through the Chief Technical Officer on foot of a signed requisition from the research supervisor.

In addition to the above, the use of gas cylinders is governed by the protocol in Appendix V. Gas cylinders may not be used until all the necessary paperwork is completed.

### **Empty Cylinders**

Empty cylinders are not truly empty. They contain gas at atmospheric pressure. Thus the cylinder still contains gas at a pressure of at least 1 bar. Depending on cylinder size, this can be a substantial quantity of toxic or flammable substance. It is important to ensure that gas containers are in a safe condition after use.

Before returning empty gas containers, a check should be carried out to ensure that:

- the cylinder valve is closed and not leaking.
- the cylinder valve outlet plug or cap nut, if supplied, has been securely refitted. This is particularly important if the contents of the container are toxic

More information can be found in the BOC booklet '*Safe Under Pressure*'.

### **Mechanical safety consultation (*Local Chief Technical Officer*).**

The guarding of dangerous parts of machines & machine tools is a legal requirement (British Standard BS5304 - Safety of Machinery provides a guideline). All the equipment in our Workshop's comply with the standard. However, machine tools are potentially the most hazardous pieces of equipment and great care must be exercised in their use. Local specific safety rules apply to technical staff normally working within the Workshops and they have been trained in the use of the full range of workshop equipment. The following rules therefore apply only to research workers and students who enter a Workshop.

- 1) Any person entering a workshop, while machining is in progress, should wear the safety glasses provided.
- 2) Persons entering a workshop must not directly approach anyone operating machinery, but should wait until someone is available for consultation.
- 3) Only suitably qualified staff are permitted to operate the main workshop machinery.
- 4) Permission may be given, on an individual basis, for some undergraduate & postgraduate students to operate a limited range of machinery. This is granted by the Chief Technical Officer, and only if, he is satisfied that the person in question has adequate experience in the use of the machinery in question.
- 5) Physical movements within the workshops should be calm and unhurried in nature.
- 6) Long hair must be 'tied up', jewellery and loose clothing should be secured prior to using workshop equipment.
- 7) All commands, applying to, safety or the use of equipment given by members the Technical Staff should be obeyed.
- 8) All machines involving dangerous moving mechanical parts must be fitted with the appropriate safety guards/interlocks and should be inspected regularly by appropriately qualified staff.
- 9) Welding operations of any kind are to be carried out by technical staff only. Appropriate eye protection and gloves must be worn whilst welding. A clearance certificate must be obtained from the College Safety Officer before welding in any location other than the Mechanical workshop.

For those contemplating the use of our workshops further guidance may be found in the HSE book, "*Health and safety in engineering workshops*". Berkley Library, official publications section. (OPUB GB HEAC 14E:6 or OPUB GB HEAC 14J:1)

**Electrical safety consultation (*Dept Safety Officer*).**

Due to the variety of electrical appliances within the School electricity is a major hazard. Research supervisors and persons in charge of research laboratories have a responsibility to ensure that, new, or visiting research, staff have received appropriate training in electrical safety before authorisation of access to research areas and that good general working practices prevail within their research laboratory.

The following electrical safety rules will apply to all mains-powered equipment used in research laboratories.

- 1) Alteration of or maintenance to any part of a building's electrical services may only be carried out by staff of the College Buildings Office.
- 2) All new mains-powered electrical equipment must be inspected by suitably qualified personnel prior to installation.
- 3) Repair and servicing of mains-powered electrical/electronic equipment must be carried out by, or under the supervision of, qualified electrical/electronic technical staff.
- 4) All electronic circuitry constructed or modified within the laboratory and which will ultimately be either directly mains-powered or electrically coupled to mains-powered units must be tested by qualified technical staff prior to the mains power being switched on.
- 5) All research supervisors have a responsibility to carry out periodically, detailed assessment of risks associated with electrical equipment under their control and to ensure that all electrical equipment is tested and maintained on an appropriate and regular basis.
- 6) Hazardous mains-powered equipment undergoing modification or test must not be left powered and unattended without consultation with the responsible member of the technical staff.
- 7) Areas containing equipment capable of generating high voltages, which may on occasion be exposed, must display warning signs on the entrance doors.
- 8) Experiments involving electrical equipment, which operate overnight must be designed to be inherently failsafe and capable of safe shut down via the mains isolation switch.
- 9) The use of rotary transformers without suitable ELCB protection is expressly forbidden
- 10) Mains cables and plugs should be regularly inspected. Faulty cables are to be replaced immediately.
- 11) Extension cables and sockets must not be left on the ground. If this cannot be avoided the cable/s must be housed in a 'safety cable cover'.

## **VDU Safety Assessment:**

### **Implementation of the Regulations on Computer Usage**

Under the Safety Health and Welfare at work act 1989 and 1993 all employees who use a Visual Display Unit (VDU) for more than one hour on a daily basis should have their workstation assessed for any potential hazards. Issues such as poor ergonomics, unsatisfactory seating, poor lighting or glare etc. can be identified and rectified at an early stage. If these are not dealt with they can lead to Work Related Upper Limb Disorders (WRULD's), effects on the eyes, fatigue and stress.

### **Requirements**

Each Discipline is obliged to appoint a person as VDU assessor with the intention to provide training and information on the use of VDU's. This document will highlight the areas under which each VDU user should be assessed:

- **The Screen:**

Characters and Image well defined no flickering, adjustable brightness and contrast, no reflective glare.

- **Keyboard:**

Sufficient resting space for hands and forearms, it must rest on a matt surface, it must be detachable, it must be positioned such that the elbow angle is between 70-90 degrees, the symbols legible.

- **Seating:**

Chairs should be stable and allow freedom of movement; it should have adjustable height and have a backrest which is adjustable in height and tilt, it should have casters. Feet should rest on the floor, or a floor rest should be provided.

- **Environment:**

There should be sufficient space to change position & vary movement. Lighting should be sufficient the ambient light should be 300/500 lux, and if required have florescent light diffusers fitted. There should be no glare or reflection from the screen or surface of the desk. The VDU should not be positioned facing a window with the light facing the user or backing onto a window such that the sunlight reflects off the screen, it should be positioned side-on where possible. In the event that the position of the VDU cannot be changed blinds (vertical type is recommended) should be provided where needed. In relation to radiation; WHO advises that levels of radiation from VDU's do not pose significant risk to health, most radiation emitted from VDU's occurs from the side of the unit. Therefore it is recommended not to position a VDU such that it is located side on to another user.

- **Employees:**

Employees are required to take a break within the hour of starting work using a VDU and each hour thereafter. Preferable before the hour has lapsed. They are advised to move away from the VDU for a period.

- **Eyesight testing:**

Eye tests should be undertaken before users commence using a VDU. Any local Optician can be used, to have the eye test. The cost of the eye test can be recovered from the department provided that prior notice is given of the eye test. If the employee has social welfare (PRSI) eligibility to an eye test this must be claimed before making any claim on Department/College. Ideally such tests should be undertaken at regular intervals.

In the event that a large number of staff need to be catered for this can be accommodated through the Student health services who will make arrangements with an optician.

If an employee already wears glasses and routine changes of lens are needed, "if these glasses are adequate also for VDU work, then the Department is not liable for the cost". Claims costs for should be submitted in advance with a copy of the prescription to the Head of Discipline who may then seek verification of the prescription from the College Occupation Health Service provider.

- **Further Information:**

For further information of all these issues the College safe Working with VDU's web site can be accessed at the following URL <http://www.tcd.ie/Buildings/newsite/safetyworkingwithvdus.php>

**Note:** Laptops are not covered under these regulations. Where laptops are used they should have docking stations where the keyboard is detachable. If by the owners choice they wish to use a laptop they must sign off on its use.

## Section IV: External Activities

### Field Trips / Industrial Visits PROTOCOL

**Fieldwork is defined as any practical work carried out by staff or students of the University for the purpose of teaching and / or research in places which are not under University control, but where the University is responsible for the safety of its staff and students and those exposed to their activities. All Persons in the School of Engineering involved in organising Field trips must read their respective Discipline Field Trip Safety handbook prior to undertaking fieldwork.**

Any person(s) undertaking fieldwork whether, Staff, Postgraduate Student or Undergraduate Student, must firstly consider the proposed fieldwork, students must discuss the proposed fieldwork with his/her Academic Supervisor and have their consent prior to undertaking any work. Similarly, any associated laboratory work should be agreed upon by the relevant Academic Supervisor before being undertaken. All have a legal responsibility to take due care, safe practices must be adhered to at all times. If any questions arise and students cannot contact their Academic Supervisor please contact the Head of Discipline or the Discipline Safety Officer.

The following activities could be considered as examples of fieldwork. Surveying, Sampling in all disciplines on land, in water and in air; industrial visits to factories, visits to/working with external research partners etc.

The risks involved in voluntary and leisure activities are not included in any Fieldwork Safety Statement. However, staff and students on residential fieldtrips should be aware of the particular risks inherent in spending recreational time in unfamiliar locations, particularly bars and clubs, and in travelling to and from those locations and their place of temporary residence. All residential fieldtrips are advised to take necessary precautions during their recreational time, and students must keep staff on fieldtrip informed of their plans.

- 1) **Safety is paramount.** Field trips must follow all safety rules and regulations indicated by the trip leader based on the respective protocols laid down in the Discipline Safety Statement.
- 2) Field trip leaders will establish regulations for specific trips and will make final decisions regarding any proposed activity as appropriate. Participants will be expected to comply with all rules and regulations established by the trip leader.
- 3) Students are required to complete the appropriate student health form and make field trip leaders aware of special health conditions and medical needs.
- 4) The Head of Discipline must ensure that workers are not only adequately trained but also adequately informed.
- 5) There is also a duty on the fieldwork participants to take reasonable care for their own safety and that of those affected by them

It is the responsibility of the Head of Discipline to ensure that a risk assessment for all fieldwork is made and to ensure that a safe system of work has been established for all staff and students. Risk Assessment Forms must be filled out by fieldtrip leaders and signed by Head of Disciplines or someone assigned by him.

Frequently the Head of Disciplines will delegate this duty to the member of staff organizing the fieldwork. In such circumstances the Head of Disciplines must be satisfied the person to whom he has delegated has the competence to lead and has sufficient awareness of the legal situation to those under supervision. The Head of Discipline must ensure that the fieldwork meets the safety criteria of the Disciplines and that, accidents are reported and investigated. Some staff and students may be unable to carry out certain types of fieldwork due to physical or psychological problems and early identification of such problems is essential. Therefore it is compulsory to have all forms supplied filled in by each participant.