

**UNIVERSITY OF DEBRECEN**

**WORK AND FIRE SAFETY**

**For first-year university students**

**Debrecen  
2014**

## **I. General knowledge of work safety**

### The provisions related to the execution of work:

- All university students are obliged to show up at the place of work in a suitable condition for the execution of work and to carry out the assigned tasks with observation of work safety regulations.
- All types of behavior that obstruct or disturb the execution of work (e.g. indiscipline, playing etc.) are prohibited.
- People, except for employees and those authorized for inspection, must not stay at workplaces of the university territory, where the source of danger is of greater effect. The prohibition is indicated by standard notice boards.
- The number of staff required for every task must be determined by observing the safe execution of work. In case of work outside the scope of activities of the university (organized social work, professional practice etc.), the responsible employer is obliged to ensure the work safety conditions (instructions, protective equipment etc.) for employees and students as well. In case of unsatisfactory conditions, the assigned leader is obliged to point the deficiencies out to the responsible person. Under unaltered (dangerous) conditions, he is obliged to stop the execution of work. In such cases, the leader is obliged to notify the person ordering the execution of work or the university's executive granting permission for it.
- The execution of work must be suspended if anyone's life or bodily health is endangered, until the resolution of danger.
- The machines, appliances and items of equipment requiring supervision must not be left unattended during operation. If the continuous operation of the equipment is required, the meal-breaks must be arranged so that a sufficient number of workers may ensure the safe execution of work and supervision.
- Wearing rings, bracelets, necklaces and other pieces of jewelry (in case of necessary wrist-watches) is not permitted during the execution of work as they may cause injuries during loading and handling of materials.
- The transportation of materials and tools held in hand while on a bicycle is prohibited.
- The use of a cigarette lighter to light a welding-soldering torch, a Bunsen burner or a gas-stove is forbidden!

Students under the influence of alcohol or other narcotics must be prohibited from executing work.

People, except for employees and those authorized for inspection, must not remain in:

- infectious work places (clinical wards and sections classified as such),
- inflammable and explosive environments: inflammable liquid stores, gas-bottle stores, boiler house,
- environments with direct danger of electric shock: transformer stations, switching areas, distributors and similar equipment items,
- work places with danger of radiation,
- places with danger of poisoning.

Smoking:

Smoking in university buildings and in the entire territory of the Medical School is FORBIDDEN! As regards the territory of the university, smoking is only allowed in the designated smoking areas, in the open air and in the courtyard.

Furthermore, smoking is forbidden in the whole territory of demonstration schools; in case of demand by smokers, a separate smoking area must be designated for them.

Fundamental work safety information:

- Sitting up on railings surrounding the formal courtyard is not permitted!
- A communication passage of a width demanded by the type of work pursued in the room must be provided in the rooms of university work places. The passages must have a minimum width of 1 meter.
- Furniture or other objects must not be positioned in common areas and corridors.
- Platforms, stands and ladders required for service from library shelves and cabinets must be secured against overturning, with tilt-free, trip-free and slip-free surfaces.
- Only safe ladders and mobile step-ladders, secured against slipping and tipping, in good condition and suitable for the current objective and utilization, are allowed to be used.
- Ladders and mobile step-ladders made of wood must have tenon-joint steps. Lean-to ladders must be secured against slipping, with a slip-preventing element at the top or the bottom, or in any other way. In every case, the use of ladders must be checked in advance.
- In order to avoid accidents, only walk on the pavements. Although these are cleared of snow and spread with sand in the winter period, they can easily become a source of danger, therefore precaution is necessary!
- The floor in the rooms (the carpeting as well) must be slip- and trip-free.
- The doors of work places – if nobody is in the room – must be kept locked by key. While the room is being used, the doors must not to be locked by key in order to ensure escape routes and the provision of first aid.
- Before commencing the work – in case the students have not participated in an instruction within 1 year – a fire and work safety instruction must be held for them, similarly to that of the workers. After completing the work, the work place must be checked whether no circumstances have remained that could produce the danger of fire, explosion or any other type of danger after leaving.

- The entrance doors of university study buildings are closed at 9PM; you must leave the building by this time. In justified cases, on written request by the Department Manager or work place leader, the Secretary-General of the university may grant permission to stay in the building after 9PM. It is required to indicate the reason for staying in the building, on the permit.

#### Provision of protective appliances and equipment:

In any work place, university students must be provided with protective equipment and clothing identical with that of the workers employed in the department. Beyond the above, medical students must be provided with 1 piece of protective smock for general use, changed once a week. The system for the provision of the above is established by the faculty/independent institute.

Students not using the specified and provided protective equipment despite being warned must not be employed further.

Protective vaccinations are the duty of the employment-health service; on notification, students are obliged to report for the required protective vaccinations. In lack of a compulsory protective vaccination, students must not be employed.

In case students work under climatic conditions – established in legal regulations –, cool or warm beverages must be provided for them for protective reasons, similarly to workers.

In every work place and at the corresponding social premises, the possibility of hand washing and the related necessary materials must be ensured. In places where hands can become dirty or infection is also possible, hand disinfectants must also be provided. If skin protection creams are also required – e.g. after disinfecting hands – due to the excessive wear, these must be provided along with the above-mentioned materials.

#### Extraordinary activity:

In case of exercises and work different from the regular working hours, plan of work, work place or if they are carried out in extraordinary situations, the leader is obliged to appoint a person in charge of work safety and to inform the parties concerned. Work safety instruction related to the extraordinary type of work is required to be given by a person in charge being clearly aware of the characteristics of the extraordinary situation. Protective equipment suitable for the circumstances of the extraordinary type of work must be provided accordingly.

#### Inspection of appliances and implements:

Before each activity, the leader is obliged to inspect the appliances and implements to be used by students during the exercise, from the aspect of work safety. Students must not commence work with damaged appliances and implements, not even under direct supervision, as they may cause accidents.

In case of electrical appliances, beyond the foregoing work safety inspection, an inspection by a technician must be performed every six months, and on every third occasion, the shock protection inspection of the instrument is also required. Beside the above-mentioned inspections, special attention must be paid to the condition of electrical appliances in hostels, subject to excessive use.

The use of privately owned electrical heating appliances (radiant heaters, irons etc.) is prohibited!

## **Rights and obligations of students**

### Students are entitled to:

- a.) safe working conditions and to protective measures specified in legal regulations,
- b.) work safety instructions on the safe execution of work,
- c.) work equipment and protective implements required for the execution of the work.

Students cannot encounter any disadvantage due to proceeding and reporting missing requirements for the safe execution of work.

### Obligations of students:

- Students must attend periods in a condition suitable for the safe execution of work.
- As far as possible, students must make sure of the safe condition of working implements made available to them. Students are required to use and clean them properly and to look after them in the expected manner.
- Students are required to wear appropriate clothing not endangering health.
- Students must behave in an orderly manner in the working area and maintain order and cleanliness there.
- Students must be provided the work safety instructions and they must observe them during the execution of the work.
- Students are required to attend the specified medical examinations and shall receive the compulsory vaccinations.
- Students are obliged to report all dangerous irregularities and malfunctions to their supervisors and to terminate these or reduce the danger as far as possible, until further measures are taken.
- If students encounter an accident or a danger directly risking life, they must immediately interrupt the execution of work, call the attention of their colleagues to it and notify their supervisors.
- Students must refuse the work, if it would risk the life, health or physical safety of themselves or others.
- Students are obliged to immediately report their accident or sickness; in case they are prevented by their condition, their colleagues encountering the case are obliged to do this.
- Students must provide injured colleagues first aid.

Pregnant students are required to personally contact the University of Debrecen Independent Work Safety Section concerning their work safety problems.

Students breaching the work safety regulations commit a disciplinary offense. The university disciplinary procedural regulations related to students must be applied for disciplinary proceedings.

## Student and work accidents

A student accident is one which occurs in connection with the legal status of the student, and not during a practical exercise. Further reporting of these accidents is not obligatory; however, in order to avoid similar accidents, the university investigates them within its own jurisdiction.

A student work accident is one which occurs to students during or in connection with a practical exercise. The reporting and recording of these accidents must be carried out on the printed forms entitled “Accident reports on accidents to pupils or children” and “Records of accidents to pupils and children,” issued by the Ministry of Education dated 9<sup>th</sup> September, 1999. The local government of students must be involved in the examination of accidents.

If a work accident occurring to a student took place outside the territory of the university, it is the obligation of the employing institution to investigate, report and record the accident, while notifying (in the case of serious accidents, immediately) the university. The work safety specialists of the university must take part in the investigation of the accident.

Students must immediately report accidents, indispositions, even the smallest injuries suffered during the practical exercise to the supervising instructor and/or to the Head of Department/janitor of the dormitory.

The injured party or the person noticing and/or gaining knowledge of the accident is obliged to report the accident to the supervisor, work safety manager or administrator of the university, without delay; furthermore they must be informed of any possible dangerous situation still existing.

### TELEPHONE NUMBERS

Organizational unit	University extension
University of Debrecen Medical School	55939
Non-medical Faculties of the University of Debrecen	56510
Ambulance (non-university line)	104, 112

The leader directly supervising the work of the injured student is obliged to report all accidents coming to his knowledge, without delay to the Head of Department, manager of the organizational unit, the work safety delegate, the work safety manager or administrator of the university.

The person observing an accident or the foreman of the injured party is obliged to take measures for the medical treatment of the injured party and to secure the scene of the accident until the arrival of those carrying out the investigation.

The University of Debrecen Chief Economic Administration Independent Work Safety Section Internet home page: <http://munkavedelem.unideb.hu>

## II. Information in connection with electricity

In Hungary, the large majority of workplaces and households draw their electric energy from a 400/230 V alternating current mains. There is a voltage difference of 400 V between any two phase leads of this mains and 230 V voltage difference between any phase lead and the zero lead. For operational reasons, the zero lead must be connected to the ground at several points along the network. This, however, also means a danger, because there is a voltage of 230 V between any phase lead and the ground (stone paving, concrete, brick wall and gas pipe can also be “ground”).

If we connect an electric machine or appliance to any connection point, we close an electric circuit that was open up so far. Electric current is produced in this closed electric circuit. The current strength depends on the obstacles in its path. We call these various obstacles resistances. The resistance in closed electric circuits is small. The internal resistance of connected electric machines and appliances is, however, much higher. Therefore we can say that the magnitude of the current strength is determined by the parameters of appliances consuming the electrical energy.

We need to know this, because every section of the network is sized and installed for established loading up to the connection point. Thus, if too many or too large power-consuming appliances are connected to the mains, a higher level of current can flow in it than the permitted, which heats, and can inflame the lead and may also cause fire. To avoid this, it is necessary to install protection against overloading (fuses, circuit-breakers, thermal cut-outs etc.) in the wire network.

In case of dangerous overloading, the protection switches off the circuit. If the protection breaks down or is damaged (e.g. the fuses are shoed), the lead network can burn out and fire can break out.

In most cases, the over-current is always the result of a fault, which is called short-circuit current. Its strength can be several hundred times or thousand times the nominal current. In a short time, it develops great heat, causes fire, and electric sparking can be produced, resulting in the damage and burning out of mains appliances and leads.

If either phase-lead contacts the zero lead in the mains network, or in the electric appliance or machine, or the phase leads contact each other a short-circuit occurs immediately. The current-circuit closes over a shorter rout, avoiding the consumer appliance. Therefore the resistance in the short circuit is extremely small and the current-strength is dangerously great (for example an internal short circuit in a 1.2 A nominal current coffee grinder can result in a closed-circuit current of several hundred of amperes in an unprotected circuit).

Short circuit also occurs, if – due to a fault – any live phase lead comes into contact with the ground or an object classed as ground. The closed-circuit current flows back to the network through the ground. This is called ground closed-circuit current.

When the short circuit occurs, the short-circuit protectors come into operation immediately and, in most cases, switch of the mains within a fraction of a second, but also restrict the high short circuit current.

## About electric shock accidents

If the human body becomes part of a short circuit, it behaves as a good conductor, (the internal resistance is about 10.000 Ohm; resistance of the external skin layer can vary between 20.000 and 100.000 Ohm for each cm<sup>2</sup>). In actual fact, this external skin layer is a very weak “insulating material,” for to be sure a voltage of around 100 V “breaks it down” (inactivates it). The external current flowing through the human body is very dangerous, for to be sure the operation of our organism, the breathing, operation of the heart and the movement are executed by tiny bio-currents from the brain and any one of these can be paralyzed by the current flowing through. The alternating current causes muscle spasms (we cannot release the caught-up current lead) the respiratory spasm stops the breathing and the myocardial spasm stops the blood circulation. The human brain can only withstand the lack of oxygen-rich blood for a few minutes, after which an irreversible process is produced.

All of this is felt as tingling with a flowing current of 1-2-milliamperes. 5-6-milliamperes can already cause hand and arm spasms. At this time the external skin layer resistance is broken down and a 100-200-milliamperes current flows through the remaining 1.000 Ohm body resistance. (Even 20-30-milliamperes are now sufficient for stopping the breathing and for myocardial spasm).

Thus, the everyday 230 V current is amply “sufficient” to also cause electric shock resulting in death.

With suitable care, however, the electric shock can easily and safely be avoided. When can the current flow through our body?

a.) When we simultaneously contact the bare live conductor section (phase) and the machine or appliance fitted with zero lead or protective lead, or the ground suitable for conducting current (mainly coming near metal objects).

## The main viewpoints of prevention

- Do not use faulty, fractured or dented appliances. Do not contact grounded metal objects when using electric appliances, and if possible, also insulate our body from the ground;
- If the connecting lead of the appliance is split, the rubber or plastic insulation is fractured, or the lead is damaged, do not use it until it has been repaired by a specialist;
- Do not prepare lead extensions in a homemade, do-it-yourself manner. The binding of spliced leads with insulation tape is not safe and is forbidden;
- Carry out even the most simple operations (e.g. changing bulbs, changing fuses etc.) on a switched off or disconnected appliance.

Thus, the protection devolves to the person; the avoidance of trouble depends on his carefulness. However, there is a general danger which cannot be observed previously or in the meantime, and we must protect ourselves against it:

b.) When damage occurs to electric machines and appliances (due to faulty insulation) the external metal coverings can suddenly become under voltage.

When the internal operational insulation is damaged (aged, fractured, worn out etc.) the phase-lead inside imperceptibly contacts the metal body of the appliance; this is the body contact. At this time, those parts of the appliance that must be held for handling, become under voltage and can become dangerous phase-conductors. Moreover, this dangerous voltage can also be conducted to other places by metal structures (e.g. water pipes) connected to the faulty machine. Observation of the electric shock protection specifications provides protection against the above-mentioned hidden danger.

## **Electric shock protection**

The most dangerous internal fault of electric appliances and machines is the body contact. The appliances with body contact operate perfectly, the user does not notice anything; however, while standing on a stone floor or wet floor and contacting such an appliance, his life is in danger. Thus, the task of electric shock protection for the machines and appliances is to prevent the dangerous electric shock even in the case of the body contact as well.

Which appliances must be provided with electric shock protection in every case?

- Where the operating voltage is greater than 50 V.
- Appliances held in the hand during use (electric hand-tools, curling-tongs, electric shaver, hand-lamp etc.).
- Electric motors, refrigerators, (also machine driven by electric motor) because the operating insulation can become faulty much faster than, for example the wall-mounted leads running in a protective conduit.
- Where the utilization environment is excessively dangerous. For example in the open, in a wet and warm environment and all such places where the operator can also contact the earth (water pipe, heating pipe, bigger metal structure etc.).
- In all other cases, if the flooring itself cannot be regarded as electrically insulated (e.g. ground, brick or metal sheet), thus classified as good conducting “ground” for the person standing on it.

There are various types of technical solutions for electric shock protection.

## **Main elementary methods of the protection**

With many mobile electric appliances and those of small size held in the hand or frequently contacted during operation, electric shock protection must obviously (and economically) be solved inside the appliance. With these appliances beyond the operational insulation, the manufacturer has also built-in further insulation (protective insulation), due to which the insulating capacity is good and durable. These class II shock protection appliances (have double of reinforced insulation) which is indicated by a uniform symbol on the data table: two squares, one on the other: □. These are mainly 230 V appliances having two-wire leads (phase-zero) and their plugs can be connected to any 230 V connector. For most of the electrically operated appliances used at workplaces, it is difficult (therefore expensive) to solve the installation of protective insulation, for to be sure this protective insulation is endangered by greater temperature and mechanical effects here. Because of this, the protective conduit shock protection is more general.

The essence: the protective conductor, with which the tangible metal-body of the appliance and a grounded point of the building's electric network are carefully connected together. This way, the body contact cannot become treacherous, because it immediately becomes a short circuit (or earthed short circuit) and the suitably calibrated over-current protection (fuse or circuit-breaker) switches off the faulty appliance within a fraction of a second, in the majority of cases even before it is touched. This protection (the protective conductor) must be carefully constructed, not only in the machine and the appliance, but in the building's electric network also. Both the plug pins and the socket should be of a construction so that when connecting, the protective conductors of the network and the appliance make effective contact. These are the so-called plugs and sockets with protective contact. The standard symbol for this type of appliances:  These are class I shock protection appliances.

The most important task when using this kind of appliance is to connect the appliance exclusively to a connector with protective contact. The protective shock protection is only safe if the protective conductor installed in the building's electric network is continuous, and if the nominal current value of the fuse or circuit-breaker automatic is also calibrated for shock protection cut-out (is not bridged with so-called "shoeing"), and if the binding or connection of the class I. shock protection appliances also ensures effective contact of the protective conductors.

- The safest from the shock protection point of view are the extra-low voltage appliances (class III shock protection); here the operating voltage of the appliances is restricted below a value (50 V, and 25 V for children's toys) which is not dangerous even when touching body-contact appliances. This voltage is only allowed to be produced from standards safety transformers. (The standard number MSZ 9229 is shown on the transformer.)

The (class 0 shock protection) appliances manufactured without shock protection bear only operational insulation. The main distinctive feature of such appliances is the two-pole round plug fitted to the simple, two-wire connecting lead, which cannot be plugged into a shock protection socket. There on double square symbol on the appliance's data table, and the appliance has no earth terminal. (Such can be for example, certain electric appliances in non-commercial circulation brought in from abroad.). The use of these items of equipment in this country is very dangerous – not permitted – because of the star-point grounding distribution network.

### **III. General questions on the application of first aid**

The very first task is to help those in trouble; this is the human and civil obligation of everyone. This is the first assistance – often deciding the fate of the person suffering the accident – which, if necessary, is followed by the expert assistance: a treatment provided by paramedics, or a medical assistance, possibly hospital treatment, which can be supplemented by a treatment in specialized institutes etc. The work of those applying first aid is extremely significant, because they can intervene to the benefit of the injured person in the critical period passing between the occurrence of the accident and the arrival of the doctor or the ambulance. The more serious the condition of the injured person is, the longer this period seems to be.

Following a sprained ankle resulting from a fall, the injured person can calmly wait to be transported by the ambulance called by someone being unaware of how to apply first aid. With intense bleeding resulting from an accident, the injured person could bleed to death within minutes. In such cases, hemostasis must be started immediately. Where breathing is obstructed, the air passages must be made passable within moments and, if necessary, apply artificial respiration, because without breathing, there is no life.

The inexperienced applier of first aid must first decide whether the injured person is still alive, or is unconscious. Tasks of the person applying first aid: approaching from the side, suddenly blow onto the eyelids of the person appearing to be unconscious. If the eyelids flutter the person is conscious. An unconscious person's eyelids do not flutter when blown on. The muscles are completely limp and the raised limbs fall back when released. The person appears to be dead, but is not because he/she is breathing and there is blood circulation.

The task of the respiratory system is to take in oxygen from the air for the cell building up the organism and to remove the harmful metabolic products and the carbon dioxide from the cells.

The respiration and blood circulation are fundamental functions of life. Without these, there is no life. The respiratory disorder regularly produces the blood circulation disorder, just as the blood circulation disorder also produces a respiratory disorder. If one is paralyzed, the other follows after a short time. Cessation of the breathing and blood circulation causes death: the cells do not receive nutrition, their operation ceases and they become necrotic.

The condition where the respiration and blood circulation cease and the cells do not operate – but have still not suffered irreversible damage – is called clinical death. The organism can still be saved from this condition if the terminated fundamental life functions are supplemented artificially.

The process, which must be started within four minutes following paralysis of the respiration and blood circulation, is called resuscitation. The essence of resuscitation: blowing air into the lungs with free air passages, together with providing blood circulation. The tasks are carried out in the order shown below:

- providing traversable air passages,
- give artificial respiration by blowing,
- produce circulation (by massaging the region of the heart).

## **Providing free air passages**

The air passages are not traversable if:

- Something compresses the air passages from outside. The compressing article of clothing – or other object – must be removed immediately.
- Removal or wiping out of extraneous body – blood, vomit, mud, false teeth etc. – getting into the mouth, with a cloth wound round the finger.
- The unconscious person's muscles – also the muscles moving the tongue – are limp. The tongue of a person lying on his back falls backward and closes the air passages. In this case the head must be angled backward. An unconscious person breathing regularly can also suffocate because of the tongue falling backward. The method of prevention is to turn the injured person onto his/her side.

## **Resuscitation of the respiration**

### **Tasks with an unconscious injured person**

The first task is to decide whether he is alive, his heart is beating, and he is breathing. Check the respiration: observe the uncovered chest and stomach of the injured person lying on his back, looking from the side at the level of the breast bone. In this way, the rising and falling characteristic of breathing can be seen. If this cannot, or can only vaguely be observed, then the respiration does not exist, or is insufficient. If there is respiration, the injured person must be placed lying on his side. If there is no respiration, make the air passages traversable and apply artificial respiration by blowing in.

The artificial respiration by blowing in is the oldest and most effective method of artificial respiration. There is still sufficient oxygen in the used air to supplement for the lacking respiration successfully. Its advantage is that it does not require any kind of appliance, the person applying the first aid does not have to exert great bodily effort, and more air can be passed into the lungs than with other artificial respiration procedures. It is advisable to carry out the blowing in artificial respiration through a loose-woven material laid over the face. This can be an opened handkerchief, light scarf, loosened bandage etc. It is fundamentally important to keep the head continuously tilted back sufficiently. Without this, the air passages are not traversable and the air cannot be blown in.

Tilt the head backward. Stretch the material covering the face. Place your mouth closely around the nostrils and blow air into the non-breathing lungs. Under the effect of the blowing the chest rises. Check the effectiveness of the breathing in after each blowing in. Rise up from the face, turn towards the chest and observe the rising and subsiding, and meanwhile take another inhalation. After this, without releasing the backward tilting of the head, repeat the blowing in about 16 times a minute. The properly executed mouth to mouth artificial respiration does not contain danger in itself.

### **Assurance of blood circulation**

The existence of blood circulation is determined by palpating the big artery in the neck. Learning how to palp it, requires practice.

Artificial supplementation for blood circulation is made with the help of external heart compression. Its essence: through the wall of the chest the heart is pressed against the inflexible spine. The blood is pressed out of the compressed heart into the arteries. When the pressure is stopped, passive blood flows into the expanding heart, which is again passed into the arteries with the next compression. Fresh blood – containing oxygen – can only be provided by suitably executed mouth to mouth

artificial respiration. External heart compression may only be carried out by a person trained to do this because this procedure is not without danger. If observation of the blood circulation is incorrect – that is to say the heart is operating – the person executing the heart compression works against the circulation and obstructs operation of the heart. A further danger is the possibility of causing of harsh chest injuries. Fractured rib, fractured breast-bone, split spleen or stomach can also occur. The person applying first aid can also provide valuable assistance even if there is someone who is experienced in the application of heart compression. He/she can help in laying the injured person on a solid base – because otherwise the heart compression is ineffective. He/she can execute the mouth to mouth artificial respiration, while the other person trained to do so, applies the heart compression.

The resuscitation procedure can be more easily applied by first-aid personnel. After the customary preparation – exploratory examination, freeing the air passages and placing on a hard base – they carry out the work in co-ordination. The entire resuscitation procedure is started with four deep blow-ins, followed by four heart compressions. Following this, the respirator carries out one blow-in, followed by four heart compressions. Execution of heart compression during blowing-in, and blowing-in during heart compression is forbidden! It is best if the person applying heart compression counts out loud. The head tilted back must not be released during the heart compression either.

## **Treatment of injuries**

Injuries on the body result from the artificial or other effects of external force. Bones can break or fracture, sprains and dislocations can occur in joints and the internal organs can be damaged. The result of intrusion can be bleeding, infection and other complications.

Wounds occur if the external impact breaks the skin's continuity. The aim of treating the wound is to reduce the bleeding and the pain, prevent infection of the wound and to inactivate the injured part of the body. The wound must be protected from infection, the injured person from the pain, and care must be taken that the injury, a does not spoil the further condition of the injured as a trauma.

Infection is produced by the pathogens which are present everywhere at all times. They can get into the wound from the implement causing the wound, from the materials contacting the wound and from the environmental air also. The prevention of infection is a sterile wound covering. The material is sterile, which has been antisepticated and freed of pathogens by a suitable process. The bandages are sterile and their special packaging ensures that they are sterile. Bandages with damaged packaging can no longer be considered as sterile. Only sterile bandages are allowed to be placed directly on the wound!

To the end of avoiding further infection, the wound must not be washed, no kind of material (wound-powder, cream etc.) must be put on the wound, or non-sterile material placed on the wound. Generally, the wound is painful, thus it is forbidden to knead it, examine its depth by pulling apart, or to wash the surroundings roughly. Poking out or pulling out objects from the wound which do not fall out by themselves is not allowed. The use of an iodine ampoule precedes bandaging of the wound. The aim of applying iodine is to neutralize the germs in the area of the wound. Break off the neck of the ampoule over the covering pad. Holding it upside down the iodine is absorbed into the pad. Apply the iodine to the wound surrounding with the soaked pad, wiping with strokes starting outwards from the edge of the wound.

The sterile gauze pads are of various sizes. They are sterile, thus when they are unpacked, hold them so that the untouched surface is placed on the wound. The bandages are in rolls of various width and length. In general, they are not sterile. Their designation is for holding in place the sterile gauze pad covering the wound.

## **Burns**

A frequent injury to the skin is burning and scalding. The degree of danger depends on what area of surface does the burn cover and to what depth it penetrates. With the mildest burns we can see redness of the skin surfaces exposed to the effect of the heat. This area is extremely painful. In more serious cases, blisters appear on the damaged skin surface. Puncturing them is forbidden! If they open up on their own they must be covered with sterile dressing. Mild burns over a small surface are frequently seen in everyday life. It is most expedient to hold the burnt surface under cold running water and let the water run onto it for at least fifteen minutes. The effect of the cold water obstructs the forming of blisters. It also reduces the pain well. Mild burns must also be bandaged. Sterile top dressing must be put on all other burns. The use of so-called household remedies – oil, fat, egg-white, cream etc. – is strictly forbidden! The burn should be seen by a doctor as soon as possible.

## **Injuries to bones and joints**

The cartilaginous bone-ends fitting to each other and moving in certain directions are called joints. Under harsh force impact the bones forming the joint move away from each other for a short period then return to their original positions. Under excessive impact the tissue envelope – joint casing – enclosing the joint can be torn and smaller-greater hemorrhage and bruising can be caused. The damaged tissue is very painful. In such a case the applier of first aid must proceed as if faces with a fracture. The surfaces of the joint can move away from each other, such that with termination of the impact they do not return to their original places. They become fixed in an abnormal position, their form is changed, and they are immobile and are extremely.

Rectification of the sprain is an urgent task, but even so the person applying first aid may not attempt this. Under particularly harsh impacts the bones can be fractured. The shape of the fractured limb becomes distorted. The injured person cannot use the fractured limb. The veins and nerves can get caught between the fractured ends of the bones and can be cut through by the fractured ends. The fractured bone-ends also damage the muscles and bleeding results in the area of the fracture. The fracture in itself also causes great pain. The pain increases with every movement and attempt to move. The most important task of the first aid applier when dealing with a fracture: sterile dressing of the open fracture, inactivation of the fractured limb and taking steps for specialist treatment as soon as possible. In the case of a closed fracture of an upper limb the first aid applier must make the injured person sit down, fix the fractured limb to the chest, using the injured person's clothing, a triangular scarf, or possibly by winding a bandage round it.

In the case of an open fracture, cut off the clothing, if possible along the seams. Cover the wound with a sterile gauze pad and immobilize the limb. Do not move the injured person with a fractured lower limb. Support the limb with a rolled up coverlet so that it can't move. If the fractured lower limb does not show great deformity, carefully position it beside the undamaged limb and bind the limbs together with a triangular scarf of bandage coils. In this way the undamaged limb supports the fractured one. Cut through the shoelace on the fractured limb.

If as a result of some sudden external harm the injured person feels pain in the hip on one side and when lying down cannot raise the leg with the knee straightened out, the first aid applier must think of pelvic fracture. First aid: lie the injured person down on flat hard ground and call the ambulance.

The spinal fracture is perhaps the most dangerous of fractures, because movement of the fractured vertebra could break through the spinal cord, and this could make the injured person paralyzed for life.

An injured person found lying or sitting motionless in a rigid position, who feels great pain at one point of the spinal column, must be treated as if the spine is broken. In the case of suspected spinal fracture the first aid applier must not move the injured person, but call a doctor or the ambulance immediately. Bleeding from the mouth or the nose or possibly from the ear indicates a fracture of the skull. If the injured person is unconscious, free the air passages as described previously and position him/her in a stable position lying on the side.

### **Hemostasis (checking bleeding)**

The blood is fluid tissue. It conveys the oxygen, nutrients and protective corpuscles indispensable to the cells and the entire organism, and the harmful metabolic products needing to be expelled. Every drop is very precious! We must economize with it and not allow the injured person to bleed to death. The arteries convey fresh blood full of nutrients and we can feel the pulsing at the same rate as the heartbeat.

If the arteries are damaged the blood gushes out of the wound with great force. The veins convey blood from the cells towards the heart. If the veins are damaged, copious dark-red coloured bleeding issues from the wound. The blood only oozes out of superficial wounds, which is a sign that the capillaries are damaged. All the bleeding must be treated, stopped or checked.

### **The rules for checking bleeding**

1. Lie the injured person down and raise the bleeding point higher than the heart.
2. Above the wound – between the bleeding wound and the heart – release all pressure.
3. Apply a compression bandage to a profusely bleeding wound.

#### Preparation of a compression bandage:

Cover the wound with a sterile pad. Place an inflexible cushion, made of coiled gauze bandage, hard compressed cotton-wool, etc., over the sterile pad and fix it with increasingly tightened bandage coils. This compresses the gaping wound and the mouth of the damaged artery. A bleed through compression bandage must not be undone. A newer compression bandage must be placed over it.

Very strong bleeding, particularly a bleeding artery, can be checked well until the compression bandage is put on, if the arteries leading to the wound are compressed with our fingers against a bone lying under them. Compress the artery stem at a so-called selected point. This is a point lying towards the heart from the place of bleeding, where the artery runs close to a bony base and is only covered by a thin soft part. Here, the pulsing artery and the bone lying under it can be felt easily.

Among the most important arteries, we can successfully compress:

The temporal artery: In front of the conch-cartilage connecting to the front wall of the external auditory canal A.

The face artery: On the edge of the jaw-bone, at the front of the sharp chewing muscle.

The neck artery: Beside the frontal edge of the sternocleidomastoid, pressing the cervical spine.

The arm artery: Behind the inner-back edge of the biceps at the limit of the top third of the arm.

The thigh artery: At the fold of the groin, about two finger-widths to the side from the protrusion of the pubic bone.

With head, neck and trunk injuries it can occur that there is no selectable compression point from the injury towards the heart. In this case, as a compulsory solution, reaching deep into the wound we try to compress the damaged artery against the nearest hard base. The bleeding wound must be treated by a doctor as soon as possible.

Treatment of other injuries:

### **Electric shock**

The first task is to determine whether the injured person is still in the circuit. Before anything else free the injured person from the circuit. It is most expedient to shut off the current at the main switch. We can break the circuit by pulling the lead causing the accident out of the connector, or possibly by insulating ourselves and removing the injured person from the circuit with the help of a stick.

If there are no signs of life with the person suffering an electric shock, the resuscitation must be started without delay, at the same time calling for help. If the injured person is still alive, possibly his/her wounds must be treated. The injured person must be laid down comfortably with slackened clothing until the ambulance arrives. Medical treatment is compulsory in every case of electric shock.

### **Accidents in the water**

Only persons, who can swim well and are trained for this should attempt rescue. Otherwise the rescuer could also become a victim. After the rescue, before anything else the penetrability of the air passages must be provided for. With clearing of the air passages the water must not be „poured out“. If signs of life are not observable the resuscitation must be started. If conscious, the person suffering the accident must be laid on the side with wet clothes removed then we rub him dry, cover him and rest him until the ambulance arrives.

### **Carbon monoxide poisoning**

Signs with a mild degree of this poisoning are head ache, nausea, weak muscles and reddened skin. With a more serious degree, unconsciousness, respiratory paralysis, or suffocation due to aspiration of the vomit can occur. The poisoned person must be immediately taken into the open air. In a closed place we must create a draft. If the poisoned person taken into the open air is unconscious, clear his air passages and place him in a stable position lying on his side. If he is not breathing, start mouth to mouth artificial respiration.

## **Fainting**

Its essence is a sudden reduction in blood supply to the brain. The cause is mainly a mental effect (e.g. the sight of blood, fright, alarm etc.). Frequently it can be brought about by pain, standing in one place for a long time, tight clothing, poor air in an enclosed room, etc. Introductory symptoms: rapidly increasing giddiness, nausea, ringing in the ear, blurred vision, loosing color, large drops of perspiration and weak, almost unobservable pulse. The loss of conscious following the introductory symptoms can be prevented, if the patient is placed immediately in a horizontal position, the head hangs down and the legs are raised.

The procedure to be applied at the start of the introductory symptoms is to hold our two hands round the patient's nape of the neck and standing in front of him tell him to try and raise his head against the pressure of our hands. The simple fainting quickly passes by itself with lying down, loosening tight clothing and provision of fresh air. In every case the patient should be seen by a doctor, because more serious trouble can lie behind the fainting.

## **General rules for the application of first aid:**

- 1.) A correct, determined attitude influences the surroundings, can forestall a panic and incorrect measures.
- 2.) Collecting of information must be directed towards the first aid. The first aid applier should not deal with security, technical and criminal factors.
- 3.) Confusion-free and correct work. Only those can work precisely who do not rush it.
- 4.) Placing the injured person and ourselves in safety. In the interest of avoiding a further accident, remove the injured person from the dangerous surroundings as soon as possible.
- 5.) Lie or sit the injured or ill person down.
- 6.) Start the undressing on the uninjured side. Always start loosening the clothing with piece of clothing on the neck. The clothes must also be loosened on the injured part of the body. If necessary the clothing must be cut open along the seams.
- 7.) On the scene the viewpoints of the injured person are the primary. Take care not to disturb or erase possible traces unnecessarily.
- 8.) The first aid applier should only undertake the execution of tasks which he/she can solve with certainty.
- 9.) Making provision for further assistance. Calling a doctor, the ambulance, industrial nurse and more highly qualified first aid personnel. Transporting the injured person in a vehicle unsuitable for this purpose is forbidden! Even if time is lost, the ambulance must be waited for. The ambulance can be called by anybody at any time, to accidents occurring in public areas, at workplaces and in dwellings, to sickness, births, bleeding, poisoning, suicide, etc.

Telephone numbers of the employment-health doctors:

<b>Campus</b>	<b>Internal tel. No.</b>	<b>Address</b>
University of Debrecen Medical School	23007, 23012	Debrecen, Egyetem tér 1.
Non-medical Faculties of the University of Debrecen	23009, 88269	Debrecen, Egyetem tér 1.
College Faculty of Education-Hajdúböszörmény	5146	Hajdúböszörmény

## **The ambulance telephone No.: 104**

When calling the ambulance, state:

- WHAT HAPPENED,
- HOW MANY INJURED ARE THERE,
- PRECISE DATA OF THE SCENE,
- POSSIBILITY FOR ACCESS,
- OWN NAME, ADDRESS, NUMBER WHICH CAN POSSIBLY BE CALLED BACK.

If possible, the caller should give information on the circumstances and seriousness of the accident. In less well known areas, please give a location point and send someone there, who will wait for the ambulance.

## **IV. Fire prevention knowledge**

### **Fundamental fire prevention information**

The possibility for fire signals must be provided from every building and structure in the university territory.

### **Fire station call number: 105**

This must be positioned at the telephone sets in a clearly visible manner.

If the size of the observed fire, or the danger to the surroundings makes it's extinguishing with fire extinguishers doubtful, or extinguishing of the fire requires assistance, **then the official fire service must be notified without delay**, and the **porter of the given building**, who must be informed whether the fire service has been called. The porter warns the people being near the fire, by shouting in a loud voice. If you are not in the proximity of the fire the signal bell gives notice with broken ringing – in the main building, the ringing is supplemented by continuous siren – of the event taking place in the surroundings. When hearing the broken ringing you must start to leave the given building.

The porter and people in the proximity of the fire, if necessary notify the fire service and continue extinguishing the fire and rescue of personnel and property in every possible way.

The fire-alarm must contain the following:

- PRECISE PLACE AND ADDRESS OF THE FIRE (CASE OF DAMAGE),
- WHAT IS BURNING, WHAT DAMAGE HAS HAPPENED, WHAT IS ENDANGERED,
- WHETHER HUMAN LIFE IS IN DANGER,
- APPROXIMATE EXTENT OF THE FIRE,
- POSSIBILITY FOR ACCESS,
- NAME OF PERSON GIVING THE FIRE ALARM,
- THE TELEPHONE NUMBER USED FOR GIVING THE ALARM.

The porter on duty, after notifying the fire service arranges for opening the entrance doors, keeping them free and switching of the automatics, tells the first arriving fire chief where the fire is, how they can approach it and hands over the fire alarm plan to him.

Until arrival of the fire service the leader of the fire fighting is the manager of the establishment or his deputy, or the duty manager, or the oldest worker present of the organizational unit. After calling the fire service the security service must also be alarmed.

Anybody is obliged to make their usable telephone implements available and if necessary to provide assistance with means of transport. Every active and not disabled worker and student is obliged to participate actively in the fire fighting, rescue of people and property in the manner expected of them, without endangering their bodily wellbeing.

The fire extinguishing must be carried out with the locally available manual fire extinguishers and water jets from the wall-mounted fire hydrants. Extinguishing of electrical or fluid fires with water jets is not allowed.

When the fire service arrives the leader of the unit turning out must be informed of the measured taken up to then and he must be informed whether there is still any flammable and explosive near the fire which was not managed to be removed, whether there is any human life in danger and the fire alarm plan must be handed over! The obstruction of fire fighting and rescue work by passive presence is not allowed.

After sounding the fire alarm use of the lifts in the building is not allowed, because due to breakdown or power cuts there is the danger of being trapped in them. Every worker and student is obliged to have knowledge of the fire alarm plan. This must be practiced on one occasion a year within the framework of the instruction. One copy of the fire alarm plan must be positioned with the porter, if there is no porter then it must be placed in the secretary's office.

Fires occurring in the working area and locally extinguished, must be notified to the chief fire prevention administrator. Non-fulfillment or omission of the above will result in being called to account dependent on the seriousness.

## **Fire prevention**

In order to reduce the probability of fire occurring, here are some thoughts on its prevention:

- Before throwing a match or cigarette away put it out (except for the case of a water filled collection vessel).
- Don't throw a burning match or cigarette in any place where this could cause fire and when smoking, put the ash into a collecting vessel of inflammable material.
- Carrying out activities with an open flame is not allowed in the university's territory – except for activity in connection with the instruction, under supervision.
- Leaving electric heating appliances in a switched on condition without supervision is not allowed.
- The use of heating appliances placed on flammable material is only allowed with the use of a heat insulation sheet.
- When leaving the room, electric appliances must be switched off.

- The doors of rooms in which there are people must not be locked with a key.
- Blocking or restricting the communication paths and exits in the buildings and rooms, even temporarily is not allowed.
- The switches of electrical appliances and fire prevention equipment must be kept in a constantly accessible and usable condition, and their obstruction, even temporarily is not allowed.
- Flammable materials must be positioned at a distance from electrical appliances, so that overheating – possibly arcing – occurring in the course of correct use or fault does not cause fire.
- The operation of faulty electric appliances and those not satisfying the standard specifications is not allowed.
- The use of individual heating appliances in the living-rooms of hostels and nurses accommodation is strictly forbidden! The use of these is only permitted in the rooms designated for this purpose.
- Electric equipment, machines and appliances must be switched off after completion of the activity. In the case of their being put out of use, after completing the daily work they must be disconnected from the electric network. The monitor of the continuously operating computer must be switched off after carrying out the work.
- The electrical equipment must be kept clean and particular caution must be taken with combustible soiling.
- The electrical equipment and appliances may only be repaired by a university worker authorized, and having specialist qualifications for this or by a specialist company.

### **Basic questions on the harmful effects of the fire and the escape**

In the course of the burning as a result of the complicated chemical processes energy is released, flame is created, smoke occurs and various combustion products are produced. Among the gaseous combustion products carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) are produced in the course of almost every burning. The carbon monoxide is a strongly poisonous material and its inhalation even in small concentration stops the capability for intake of oxygen and causes death. In a concentration of 10 volume % the carbon dioxide also causes unconsciousness and death. Near to the fire the oxygen content of the air is reduced and breathing is made difficult. The surrounding temperature can also rise to a high degree, which is difficult to bear for a long period. The direct effect of the flames causes serious burning wounds.

The smoke is created by the very small combustion products. The density of the smoke can differ with cases of fire. While spreading of the fire depends on the occurrence of flammable materials, the smoke can quickly fill a building of several storeys. The smoke reduces the visibility until the people lose their sense of direction, particularly if they are in an unknown place.

We can speak of escape and rescue if the extent of the fire is so big that extinguishing by the workers is hopeless and dangerous right from the beginning and the task is to get the people still inside to a safe place or outside as soon as possible. We pass through places full of smoke with a wet handkerchief held over our mouth and breathing as little as possible. The smoke and hot air fills the room or corridor from above downwards, so the fresher air is still near the floor. Don't panic if suddenly all the lights go out and it is dark. If there is emergency lighting we can get our bearings with the help of this. If there is a smoke extraction device, then switch it on. Only travel downwards from upper storeys by the stairs or by so-called security lift.

If we get out into the open air (balcony, terrace or roof) this can mean temporary safety. The fire service will help us to get to a safe place. If we wet our clothing, it won't catch fire so easily. Put out burning clothes on a person by shutting it off from the air (covering, lying on the ground). Try to avoid panic, and help the rest of the people to escape.

The types of fire extinguishers and the use of these:

Manual fire extinguishers are found everywhere near the workplaces. Their purpose is that the workers can use them to put out small fires which have just started. For this however we must know the method of putting the manual fire extinguishers into operation.

From the extinguishing material point of view the appliances below can be differentiated:

- Powder extinguisher,
- Water extinguisher,
- Carbon dioxide extinguisher,
- Foam extinguisher.

There are different quantities of extinguishing materials in the appliances, between 1-12-kg. Generally, appliances with 6-kg of filling are used. The total weight of the 6-kg powder-filled fire extinguisher is 9-kg. With the 2-3-kg appliances it should be taken into account that these are only suitable for putting out fires of very small extent.

Every appliance is in fact a cylindrical shaped container, to which three kinds of head can be connected: push-arm head-valve, impact-pin head, and pistol-valve operation head. To put the appliances into operation first the security element must be removed. With the push-arm head-valve this is a distance piece between the arms which prevents the appliance from coming into operation accidentally when out of use. With the pistol-valve appliance the push-button movement is prevented by a security fork, which must be removed first. With the impact-pin appliance the power-gas is in a separate small container inside the appliance. This container must be punctured with the impact-pin. Firstly the security fork under the impact-button must be removed with the help of the ring on it.

The method of putting into operation is shown on every fire extinguisher container:

## When To Fight The Fire...

Fight the fire only if all of the following are true:

- Everyone has left or is leaving the building.
- The fire department is being called.
- The fire is small and confined to the immediate area where it started (wastebasket, cushion, small appliance, etc.).
- You can fight the fire with your back to a safe escape route.
- Your extinguisher is rated for the type of fire you are fighting and is in good working order.
- You are trained to use the extinguisher and know you can operate it effectively.

If you have the slightest doubt about whether you should fight the fire — **DON'T!** Instead, get out and close the door behind you.

### PROTECT YOURSELF AT ALL TIMES!

Stay low. Avoid breathing the heated smoke and fumes or the extinguishing agent.

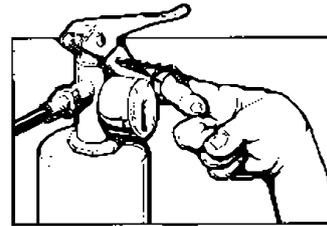
If the fire starts to spread or threatens your escape route, get out immediately!

## Remember:

If you are called on to use an extinguisher, just think of the word "P.A.S.S.:"

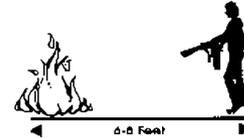
# PULL

the safety pin at the top of the extinguisher.



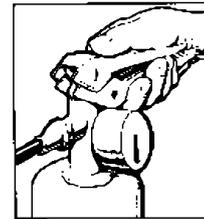
# AIM

the nozzle or hose at the base of the flames. Stay between six and eight feet away from the flames.



# SQUEEZE

or press the handle.



# SWEEP

from side to side at the base of the fire until it goes out.



By following these procedures, a fire can be extinguished in the quickest and safest manner possible.

Fire extinguisher appliances must always be in a working condition. On pressurize gas appliances a small instrument (in the indicating green band) indicates whether the gas pressure inside the appliance has reduced below the permitted value. In general the manual fire extinguishers are not allowed to be positioned in places above a temperature of 40 C or subjected to sunlight for long periods.

When using the manual fire extinguishers it must be taken into account that their extinguishing capacity is restricted. A fire with a flame are of about 1.5 m can be extinguished with a 6-kg powder filled fire extinguished. If the occurring fire is significantly bigger than this leave the extinguishing to the fire service. The ideal extinguishing effect of the manual fire extinguishers is exerted at a determined distance. This distance is between 2-3-m, thus the fire must be approached to this distance when extinguishing the fire.

The effect of extinguishing with powder is exerted in the flames, so the appliance must be directed towards them. The foam and the carbon dioxide must cover the burning surface. The extinguishing must be constantly continued until the flames go out. The operating time of the manual fire extinguishers is 10-15 seconds. After a broken-off extinguishing the entire area quickly bursts into flame again. In the case of using several appliances, it is more advantageous to use them at the same time than one after the other.

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