Module 3: First Aid

TERMS AND DEFINITIONS

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Terms and Definitions

Ready for review

• Accident is a suddenly occurring, unintentional event that causes injury or property damage.

• Acquired immune deficiency syndrome (AIDS) is a life-threatening bloodborne disease that depresses the immune system. It is caused by the human immunodeficiency virus (HIV). AIDS is eventually fatal.

• Airway obstruction is a blockage of the airway that prevents air from reaching a person’s lungs.

• Anaphylactic shock is a severe and sometimes fatal reaction to a substance such as a food, drug, or insect venom. It is characterized by respiratory distress, fainting, and itching.

• Antiseptic is a substance that blocks or slows the growth of certain microorganisms but does not kill them.

• Arteries are blood vessels that carry oxygen-rich blood from the heart to all parts of the body.

• Bloodborne pathogen is a disease-causing microorganism found in infected blood and blood products.

• Cardiopulmonary resuscitation (CPR) is a technique used to restore circulation and breathing for a victim whose breathing and heart has stopped. CPR combines chest compressions (cardio-) and mouth-to-mouth breathing (pulmonary).

• Carotid arteries are major blood vessels that supply blood to the head and neck.
  
  Note: Blockages in these arteries cause strokes. These are the arteries commonly felt when taking a pulse.

• Choking is the blockage of the airway by food, fluids, or other foreign objects.

• Consent is permission to provide care, given by the victim to the rescuer.

• Coronary arteries are the blood vessels that supply the heart muscles with oxygen-rich blood.
  
  Note: Blockages in these arteries cause heart attacks or cardiac arrests.

• Diabetes is a condition in which the body does not produce enough insulin.

• Emergency medical services (EMS) are trained and equipped personnel dispatched through a local emergency number to provide emergency care for ill or injured people.

• Epilepsy is a chronic condition characterized by seizures that vary in type and duration. Epilepsy can usually be controlled through medication.

• First aid is immediate care given to a victim of injury or sudden illness until more advanced care can be obtained.

• Heimlich maneuver is the procedure for forcing a foreign object from the airway of a choking victim.

• Hepatitis is an infectious disease marked by inflammation of the liver. There are several types of hepatitis, and some severe cases may be fatal.

• Injury is a condition that occurs when a body is subjected to an external force.

• Medical emergency is any sudden illness requiring immediate medical attention. Some examples of medical emergencies are heart attack, stroke, diabetic coma, epileptic seizure, etc.

• Pressure points are sites on the body where pressure can be applied to major arteries to slow the flow of blood to a body part.

• Pulse is a beat felt in arteries with contraction of the heart.

• Trauma is any wound or injury caused by violence or excessive physical force.

• Unconsciousness is a state in which a person experiences no sensory impressions.
  
  Note: A victim who is unconscious may look asleep, but you cannot awaken them.

• Veins are blood vessels that carry oxygen poor (dark red) blood from all parts of the body back to the heart.
Major Causes of Accidents

Note: 98% of all accidents and injuries are caused by one or a combination of the following causes. Only 2% of accidents are attributed to unpreventable acts of nature.

Unsafe acts.
- Cleaning, oiling, adjusting, or repairing of moving, energized, or pressurized equipment.
- Failure to receive proper instruction.
- Failure to use personal protective equipment.
- Failure to secure area or warn others of danger.
- Horseplay, quarreling, or fighting.
- Ignoring instructions or operating without permission or authority.
- Improper use of equipment.
- Improper use of hands or body parts.
- Inattention to footing or surroundings.
- Operating or working at unsafe speed.
- Removing safety devices.
- Using unsafe equipment.

Unsafe personal factors.
- Being under the influence of alcohol/drugs.
- Fatigue.
- Illness.
- Improper attitude.
- Lack of job knowledge or skill.

Unsafe conditions.
- Defective tools, equipment, substances.
- Dress or apparel hazard.
- Environmental hazards such as temperature extremes or contaminated air.
- Hazardous methods or procedures.
- Inadequately guarded machines or area.
- Improper illumination.
- Improper storage of hazardous and flammable materials.
- Poor housekeeping.

Sources of Accidents in the Diesel Shop

- Horseplay may cause others to fall against sharp objects or moving machinery.
- Air hose—one blast may rip clothing or skin.
- Grinder may cause eye or face injury from flying sparks or metal chips.
- Batteries may explode when near an open flame or an electrical spark.
- Moving parts may catch fingers or clothing.
- Loose clothing may catch in rotating parts.
- Tools have sharp edges that may puncture skin.
- Electrical power tools may cause a shock if they are not grounded properly.
- Lack of or improper supporting devices under heavy objects may result in a fall that could cause a fatal injury.
- Lifting heavy objects improperly can cause a severe back injury.
- Welding may cause injury to eyes and to skin if protective equipment is not worn.
- Pneumatic tools operate with high air pressure that can seriously damage eyes and skin if improperly handled.
- Spills on the floor may result in falls.

Basic Type of Accident Injuries

- Amputation results in the loss of an arm or leg.
- Burn is tissue damage caused by fire or heat (thermal), chemicals, electricity, or certain radiations.
- Contusion or a bruise is tissue damage caused by force (blunt trauma). Broken blood vessels under the skin cause discoloration (black or blue).
- Dislocation is the displacement of a bone at a joint.
- Electric shock or electrocution is nerve and muscle damage caused by electricity traveling through the body. It may cause burns and death by electrocution if the heart is stopped by the electricity.
- Exposure to severe weather, frostbite, heat stroke, heat exhaustion, or sunstroke can cause various types of damage to the body caused by extremely high or low temperatures. The victim may be unconscious.
- Foreign body is the entrance of an abnormal substance into the body. Examples can be dust particles that get into the eye, rust fragments under the skin, or debris into a wound.
- Fracture is a broken bone. It may be closed, below the skin, or open, protruding through the skin.
Internal injury is damage to abdominal or pelvic body organs. It is usually caused by force.

Open wound, otherwise known as a cut, laceration, puncture, or abrasion, is a break in the skin's surface. An open wound typically has bleeding involved with it.

Sprain is the twisting or wrenching of a joint, and a strain is the twisting or wrenching of a muscle. Both of these usually occur with ligament damage.

Primary Steps for Giving First Aid

- Safe place—make sure the victim is in a safe place, and never move victims unless they are in danger where they are such as from fire, traffic, or dangerous fumes. You can further injure victims by moving them.
  
  Note: There may also be dangers present that will prevent you from helping the victim such as downed power lines or deep or swift moving water. Call emergency medical services if you cannot help.

- Breathing—check the victim's breathing, and check the airway to see if it is clear. If the victim is not breathing, give mouth-to-mouth breathing.

- Circulation—check the victim's circulation. To do this, you check the pulse on their wrist (radial) or on the carotid artery (side of the neck) to see if their heart is still beating. If their heart has stopped, begin CPR if you are trained.

- Bleeding—stop any severe bleeding. Put on your first aid gloves, and then apply pressure to the wound or to a pressure point.

Secondary Steps for Giving First Aid

- Call for emergency medical help or have someone else make the call. Emergency numbers should be posted by the phone or listed in the front of the phone book. 911 is used in many cities. Also call for your instructor or supervisor.

- Reason—always have a reason for what you do, and never try to do anything you have not been trained to do. Be sure that what you are doing will help and not hurt the victim.

- Stay calm and talk to the victim. You want to reassure the victim that someone knows they are hurt and that something is being done.

- Ask the victim what happened and where he/she is hurt. If the victim is unconscious but breathing, begin to check from head to toe for injuries.

- Check for a medical alert bracelet, necklace, or wallet card. This may be worn by someone with a serious medical condition such as epilepsy, diabetes, heart disease, or allergies.

- Care—take care of other injuries, which may include broken bones, burns, cuts, etc.

Calling for Emergency Medical Service (EMS)

- It is always better to be safe than sorry when dealing with injuries or medical emergencies. If you are not sure how serious the injury is or do not know what to do, call for emergency help.

- You should always call for emergency medical service when the victim:
  - Is unconscious, unusually confused, or seems to be losing consciousness.
  - Has trouble breathing, is breathing in a strange way, or is not breathing.
  - Has persistent chest pain or pressure.
  - Has pressure or pain in the abdomen that does not go away.
  - Is vomiting or passing blood.
  - Has seizures, severe headaches, or slurred speech.
  - Appears to have been poisoned.
  - Has injuries to the head, neck, or back.
Information to Give During an Emergency Phone Call

What happened and tell the nature of the story. Some examples of this are: man is bleeding severely, woman has fallen off a ladder and is unconscious, man is having a heart attack, woman has a chemical burn, etc.

How many are involved. This will tell them how many rescue squads need to be sent.

Where the victim is located. Give the city, street name, street number, description of the building, and any other information that will help them find the victim.

What help (first aid) is currently being given, or has been given.

Your name.

Phone number from where you are calling from.

Do not hang up until the dispatcher hangs up. The emergency dispatcher may have other questions or be able to give you advice or instructions on what to do.

Please remember that while conducting this call, you need to speak slowly and clearly. Shouting is very difficult for the operator to hear.

Legal Aspects of First Aid

Under most situations, you are not legally obligated to give first aid.

However, once you start administering first aid, you cannot stop until you can turn over their care to others of equal or greater competence such as trained medical emergency workers or experienced supervisors or coworkers, or until the victim refuses treatment.

You must tell the victim who you are, how much training you have, and how you plan to help.

Consent should be obtained from every conscious, mentally competent adult. Oral consent is valid.

Consent should be obtained from the parent or guardian of a child or mentally incompetent adult.

Do not give first aid if the victim refuses consent.

Consent is implied for giving emergency life saving first aid to an unconscious victim.

Good Samaritan Laws protect first aiders in most states if you are acting in good faith and without gross negligence or willful misconduct.

Contents of a First Aid Kit

Adhesive bandages (such as Band-Aids) are useful for covering small wounds. You should have various sizes.

Adhesive tape is used for securing the dressing or bandage.

Alcohol or antiseptic wipes are used to cleanse a wound area or your hands.

Antiseptic skin ointment is used to prevent infection, especially for minor cuts.

Face shield or mask is used as a barrier between the victim and first aider when giving mouth-to-mouth breathing.

Gauze bandage is used for wrapping around a wound or for holding a larger dressing on the wounded area.

Individual gauze dressings or pads are used for cleaning and covering wounds.

Disposable gloves are used to act as a barrier between the victim and the first aider when blood or bodily fluids are present.

Scissors are used to cut bandages and tape.

Tweezers are used to remove splinters.
Bloodborne Pathogens

Bloodborne pathogens are disease-causing microorganisms carried in the blood, including:
- HIV (human immunodeficiency virus), which eventually develops into AIDS (acquired immune deficiency syndrome), a fatal disease.
- Hepatitis B (HBV), a virus that causes serious and sometimes fatal liver disease.

Special precautions must be followed to protect you when giving first aid. You must treat all victims as if they were infected, because you cannot tell by looking at someone if they are infected with HIV or HBV.
- To protect yourself, always wear disposable rubber gloves as a barrier. These need to be included in every first aid kit. If gloves are not available, use the most waterproof material available (such as plastic bags) or extra gauze to form a barrier.
- Cover all wounds with dressings to prevent both the victim and the first aider from coming in contact with each other's blood.
- Use face masks with one way valves for protection when doing mouth-to-mouth breathing, especially if there is blood or vomit in the mouth. Every first aid kit should have one.
- Do not eat, drink, or touch your nose, mouth, or eyes when giving first aid.

Clean up procedures must also be followed.
- Vigorously wash your skin in hot, soapy water, and rinse well.
- Notify designated personnel in your facility to clean up any materials or surfaces contaminated by blood or bodily fluids.
- These personnel will wash all clothing and other items contaminated by blood or bodily fluids in hot, soapy water, and they will also wash floors and other blood contaminated surfaces with a solution of one part liquid chlorine bleach to nine parts of water and rinse well, and lastly, they will then dispose of cleanup materials properly in plastic biohazard bags.

Basic First Aid for Various Emergencies

Bleeding
- Minor bleeding.
  - Apply antiseptic solution.
  - Dress with sterile bandages.
- Severe bleeding.
  - Apply pressure dressing or manual pressure to wound.
  - If bleeding does not stop, apply pressure to appropriate pressure points–brachial arteries for arms and hands, femoral arteries for legs and feet.
  - Watch for signs of shock and treat as necessary.

Broken bones.
- Open fractures (bone has broken through the skin surface).
  - Control bleeding.
  - Cover bone and wound with a dressing.
  - Do not try to push the bone back into place.
  - Do not try to clean the cut.
  - Do not move the victim. If the victim must be moved, splints should be applied from the joint above to the joint below the break.
- Closed fractures (bone has not broken through the skin surface).
  - Check for these indications of fractures: swelling, deformity, pain/tenderness, loss of use, or grating sensation.
  - Immobilize the break using splints, slings, or wraps.
  - Do not move the victim.

Spinal injuries (neck or back).
- Do not move the victim.
- Do not let the victim try to move.
- Call for help immediately.

Convulsion (including epileptic seizure).
- Help victim lie on the ground or floor if possible.
- Clear area of hard or dangerous objects to protect the victim from self-injury.
- Turn victim to the side to allow saliva to drain from the mouth.
- Give CPR if necessary.
- Do not try to restrain victim.
- Do not place a blunt object between the victim's teeth.
- Do not pour liquids into the victim's mouth.

Electrical accident.
- Do not provide any medical assistance until all electrical current has been shut off.
  Caution: If the victim is still in contact with a live electrical hazard, do not endanger yourself by touching the victim, metal objects, water, or the wet ground. You may become a victim yourself as the current passes into your body.
- Check breathing and pulse, and perform CPR if necessary.
• Watch for signs of traumatic shock, and treat as necessary.
• Check for signs of electrical burns at entrance wound and exit wound, and treat as necessary.

■ Eye injury.
• Minor.
  ° Have the victim close his/her eyes, and put a piece of moist cotton over the closed lid.
  ° Place a bandage over the cotton.
• Severe.
  ° Have the victim close his/her eyes, and apply a sterile dressing.
  ° Place a loose bandage over the dressing.
  ° Do not allow the victim to rub his/her eye.
• Chemical.
  ° Flush eyes immediately at an eye-flushing station, or use a bottled, portable flushing solution.

■ Falls.
• Head injury.
  ° Lay victim flat.
  ° Check breathing and pulse, and perform CPR as necessary.
  ° Control bleeding.
• Less severe falls.
  ° Check for injury and provide first aid as appropriate.
  ° Do not move victim or allow victim to move if a neck or back injury is suspected.

■ Heart attack.
• Signs and symptoms of a heart attack.
  ° Chest pain (most common symptom) that may radiate to the arms, neck, jaw, and upper back.
  ° Profuse sweating and chills.
  ° Nausea, vomiting, indigestion.
  ° Difficulty and pain in breathing.
  ° Weakness.
  ° Apprehension.
  ° Pale or blue-looking skin, lips, or nails.
• Help the victim to a less painful position.
• Loosen victim's clothing around the neck and abdomen.
• Check breathing and pulse and perform CPR if necessary.

■ Heat exhaustion.
• Signs and symptoms of heat exhaustion.
  ° Approximately normal body temperature.
  ° Profuse perspiration.
  ° Pale, clammy skin.
  ° Rapid, weak pulse.
  ° Rapid, shallow breathing.
• Move victim to a cool place.
• Have victim lie on back.
• Elevate victim's feet slightly (8–12 inches).
• Loosen victim's clothing.

■ Heat stroke.
• Signs and symptoms of heat stroke.
  ° High body temperature (105 or higher).
  ° Little or no perspiration.
  ° Red skin.
  ° Rapid pulse.
  ° Rapid, shallow breathing.
  ° May be unconscious.
• Move victim to a cool location.
• Cool victim as quickly as possible; remove victim's outer clothing and sponge bare skin with cool water or rubbing alcohol.
• Place cold packs at neck, armpits, head, and groin.
• Use fans for additional cooling.
• Give cool water to drink, if conscious.

■ Insect bites/stings (from bees, wasps, spiders, etc.).
• Ordinary reaction.
  ° Scrape stinger sideways away from wound or remove with tweezers.
  ° Wash wound with soap and water.
  ° Apply cold pack (or ice) to reduce swelling.
• Allergic reaction.
  ° If possible, immediately transport victim to a hospital or a doctor's office.
  ° If not possible, call for emergency medical help.
  ° Lay victim down or help the victim to a position in which he or she can breathe more easily.
  ° Elevate victim's legs if possible.
  ° Remove the stinger and perform first aid actions as for an ordinary sting.
  ° Check breathing and pulse and perform CPR if necessary.
  ° Note that a victim with an allergic reaction to the insect poison may suffer anaphylactic shock and needs prompt treatment with epinephrine by injection or inhalation.

■ Shock/trauma.
• Signs and symptoms of shock include:
  ° Damp, very cold, pale skin.
  ° Fast, weak, uneven pulse.
  ° Fast, shallow, uneven breathing.
  ° Weakness.
  ° Thirst may be unconscious.
• Lay victim down on his/her back or side if vomiting occurs.
• Elevate victim's legs slightly (8–12 inches) if there are no neck, back, or hip injuries.
• Cover to prevent loss of body heat.
• Make sure victim's clothes are loose. Loosen or cut, if necessary.
• Do not give fluids unless victim is fully conscious and medical care will be delayed.

Note: Fluids may cause vomiting.
First degree burns
- A first degree thermal burn is a burn affecting only the outer skin layers.
- It is characterized by redness and pain.
- Hold under cold water.
- Apply dry, sterile dressing.

Second degree burns.
- A second degree thermal burn is a burn penetrating beneath the superficial skin layers.
- It is characterized by swelling and blisters.
- Cool with a damp compress.
- Cover with a dry, sterile dressing to prevent infection.
- Do not break blisters.

Third degree burns.
- A third degree thermal burn is a burn that destroys all skin layers and underlying tissue.
- It is characterized by white, leathery appearance and lack of pain.
- Cool with a damp compress.
- Cover with a dry, sterile dressing.
- Do not put oil, butter, ointments, or any kind of medicine on a serious burn.

Chemical burn.
- Flush skin thoroughly with clean water.
- Check MSDS for more first aid instructions.
- Apply dry, sterile dressing.

Electrical burn.
- Locate both the entrance and exit burns.
- Treat as a third degree burn.

Choking

Ask the victim, “Are you choking?”
If the victim cannot speak, stand directly behind them so you can begin to administer abdominal thrusts using the Heimlich maneuver.
Wrap your arms around the victim’s waist, and place your finger on their belly button.
Make a fist with the other hand, and put the thumb side of the fist just above your finger on the belly button (and below the ribs).
Take your finger off their belly button, and place this hand over your fist.
Give quick, upward thrusts into the abdomen. This forces air trapped in the lungs to push the object out of the airway.
Repeat thrusts until they work or until trained help arrives.

Mouth-to-Mouth Breathing

Check.
- Check to see if the victim is conscious or unconscious. Tap his or her shoulder and loudly shout, “Are you okay?”
- If the person responds, they are conscious, you should begin a secondary survey.
- If the person does not respond, they are unconscious, and you should immediately call for emergency help (or send someone else to call) and go to the next step.
- Roll the victim so that they are lying on their back. Try to roll them all at once so that you can keep their neck and back inline.
- Tilt the victim’s head back and lift their chin so it is pointing straight up in order to make the airway straighter and more open.
- Check breathing.
- Check the victim’s breathing for 5 seconds to see if they are breathing, and watch the victim’s chest to see if it is rising and falling. Do this while you are listening to the victim’s breaths with your ear near their mouth, and you should feel their breath on your cheek.
- If the victim is breathing, they DO NOT need mouth to mouth breathing. Watch them and wait for help to arrive.
- If the victim is not breathing, go to the next step.
- Pinch the victim’s nose shut, put your mouth tightly over the victim’s mouth, and gently give two breaths into the victim’s mouth, each lasting about one and a half seconds.

Note: If the victim is a child, you will need to seal off both the child’s nose and mouth and use less force on the breaths you give.

Check chest.
- Check the victim’s chest to make sure it rises and falls with each breath.
- If it does not rise and fall, then the air is not getting in.
- Re-tilt the head and give two more breaths to ensure the airway is open.
• Check the airway for obstructions and give abdominal thrusts (Heimlich) to force out the obstruction.

Check pulse.
• Check the victim's pulse by placing your fingers flat against the side of the neck (in the crease of the neck).

Cardiopulmonary Resuscitation (CPR)

Check.
• Check the victim's pulse and breathing, and call for emergency help.
• If the victim has a pulse but is not breathing, give mouth-to-mouth breathing. No CPR is necessary.
• If the victim has no pulse, go to the next step to begin CPR.

Position.
• Position your hands correctly on the victim's chest.
• Find the notch where the lower ribs meet the breastbone.
• Place the heel of your hand on the breastbone, next to this notch area. Place your hand on top of the first.

Kneel.
• Position yourself kneeling next to the victim with your shoulders directly over your hands, with your elbows locked.

Depth.
• Compress the chest by pressing down at least 2 inches and then release.
• Push with the weight of your upper body.

Steady.
• Keep a steady up and down rhythm, and don't pause between compressions.
• Count “one and two and three and four and five and six and...” to establish a smooth, steady rhythm.

Ratio.
• Give 30 compressions, then give 2 slow breaths.
• This cycle of 30 compressions and 2 breaths takes about 30 seconds total.

Continue.
• Give four continuous cycles of CPR, and then recheck pulse.

Pulse.
• If there is a pulse, check victim's breathing.
• If they are still not breathing, begin mouth-to-mouth breathing but discontinue chest compressions.

No pulse.
• If there is still no pulse, continue giving CPR in cycles with a pulse check every four cycles until emergency personnel arrive.

• If the person has a pulse but is not breathing, continue mouth-to-mouth breathing.
• If the person has no pulse, perform CPR if trained.
• Continue to give breaths with 4-second waits between breaths until the victim starts to breathe or until trained help arrives.

• Check pulse.

Check the victim’s pulse by placing your fingers flat against the side of the neck (in the crease of the neck).