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By Dennis J. Murphy, John Pollock, Gary Smith, Thomas Bean, and Marty Sailus
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Preface

First on the Scene serves its greatest purpose in alerting rural residents and workers to the primary concerns and responsibilities of being first on the scene and the potential dangers of farm accident situations. This bulletin encourages the reader to be aware of decisions to be made and emphasizes the need for first aid training; it is not intended to be the answer or remedy for a specific accident situation, nor is it intended to replace formal training in first aid or CPR (cardiopulmonary resuscitation). Readers of this bulletin must realize that the decisions and actions required in a real emergency will be dictated by the accident situation.

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Introduction

Most rural and farm family members are aware of hazards on the farm, but are not sure of procedures to follow if they arrive first on a farm accident scene. Such accidents often occur in isolated areas and may involve entrapment by farm machinery or in structures which are difficult to enter. Many victims are discovered by family members or farm workers who must be able to act quickly and effectively to save the victim without injuring themselves.

The ability to make the right decisions when a farm accident is discovered depends on whether you, the first person on the scene, have been trained in assessing farm accident scenes and first aid. You must be familiar with the machinery, storage facilities, and structures on the farm so that decisions made will not further injure the victim or put yourself in danger. This bulletin is intended to provide background knowledge of farm accident situations that will assist in making good decisions.

Your goal as the first person on the scene is to keep the victim alive until emergency medical services (EMS) arrive. Training in CPR (cardiopulmonary resuscitation) and first aid is required to judge whether the victim needs resuscitation and to perform procedures properly. Intuition cannot be used to accomplish these tasks. Understanding the basics of first aid and farm accidents will improve the victim's chances for survival.

All family members and full-time farm workers should receive training in first aid and CPR. Develop a plan to accomplish the required training over a reasonable period of time. To inquire about training, contact the American Red Cross, American Heart Association, local fire department, or county Cooperative Extension office.

Obtaining professional help for a farm accident victim can be difficult. It may take several minutes to notify someone after an accident is discovered, and sometimes fifteen to thirty minutes or more before emergency services arrive. Chances of recovery decrease when emergency services are delayed. Farm accident victims can die from shock or other complications as well as from the initial injuries.

Nearly all emergency medical and rescue services are provided by volunteers in rural areas throughout the U.S. Without the help of these highly trained and dedicated individuals, injury, death, and loss of property would be much greater. Even so, there are many uncontrollable factors which determine the outcome of an emergency response, such as time of day and distance of the accident from the station. This emphasizes the need for farm workers and family members to be trained in CPR and first aid.

Chapter 1 of this bulletin discusses the primary considerations for the person who discovers an accident. This includes assessing and stabilizing the scene and the most important considerations for the victim. Chapters 2 through 5 discuss categories of farm accidents in depth; machinery, storage facility, chemical, and electrocution accidents are discussed, including specifics of accident site assessment and patient care. Chapter 6 outlines a procedure for reporting farm accidents, and Chapter 7 reviews patient care concerns. Three appendices include a lesson on shutting off tractors and suggestions for two different first aid kits. A form for posting accident reporting information near phones is printed on the inside back cover.

First on the Scene is written for the untrained person, as opposed to trained responders. The bulletin does not

review farm accident rescue procedures which would be performed by Emergency Medical Services (EMS). Local EMS or fire departments can receive training in rescue procedures recommended for farm accidents from Cooperative Extension or private educational services. The bulletin *Farm Accident Rescue, NRAES-10*, reviews the special rescue procedures required for many typical farm accidents.

Decisions and Actions

The decision and action steps in this book are based on the following assumptions: 1) The accidents occur in a remote area, several minutes from a telephone or other method of activating EMS; and 2) The person first on the scene is alone. As you read through the accident

scenarios in this bulletin, keep these assumptions in mind. If the accident is not in a remote location or is discovered by more than one person, the actions may be different, although the primary concerns would be the same.

In this bulletin, decision trees illustrate proper sequencing of decisions and actions. A key decision question is presented and, based upon the answer, alternative actions are outlined (Figure I.1). The person "first on the scene" is assumed to be alone and able to make independent decisions. In Chapter 1, there are two decision trees: one that reviews the primary considerations when a farm accident is discovered, and another that outlines decisions and actions for patient care. The decision trees in Chapter 2 through 5 are directed to specific farm accident types, such as tractor overturns or grain bin entrapments.

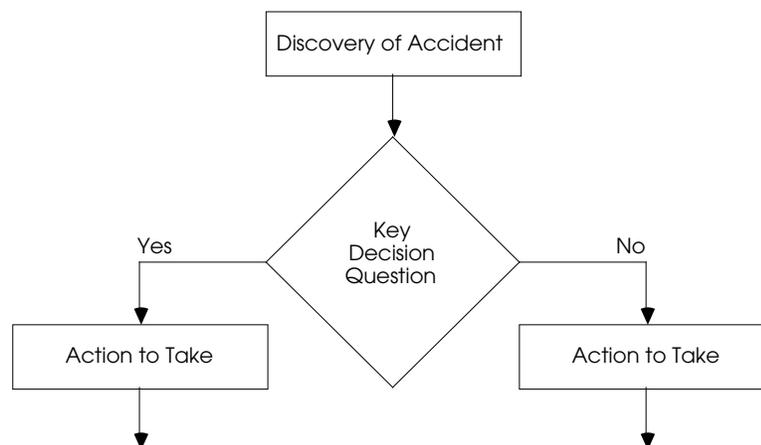


Figure I.1 Sample Decision Tree

CHAPTER 1

Primary Concerns

When you discover a farm accident, your primary concerns are getting professional help to the accident scene, assuring that the victim and yourself are not in further danger, and providing patient care. At times, the accident situation will be such that you will have to make difficult decisions between these primary concerns. This chapter discusses the primary concerns and the initial decisions that you must make.

Three phrases are used extensively in the following decision-and-action discussions: Activate EMS, Return to scene, and Wait for EMS. **Activate EMS** means to seek additional help from trained medical professionals. Usually, activating EMS means dialing the local emergency number and reporting the accident (Figure 1.1). If no phone is available, activating EMS may involve contacting a neighbor, flagging down a passing motorist, calling on a two-way radio, or sending an available second person to contact EMS.

Return to scene means to return to the accident site after activating EMS. Before returning to the scene, you may have to find someone to direct emergency services to a remote accident site. For some types of accidents, you may have to gather materials (a tractor, chains, boards, etc.) needed to reach the site or to rescue a trapped victim. If necessary, find a first aid kit (see Appendix C).

Wait for EMS means to wait for additional help to arrive at the accident scene, whether it be a neighbor, passerby, fire fighters, rescue team, or ambulance. During the wait, the victim should be given first aid if necessary and if safe to do so.

The first rule when responding to any emergency is to keep calm. Fear and anxiety are normal reactions when a severely injured victim is discovered. The ability to overcome these emotions and act rationally and effectively depends on preparation. Thinking of, reading

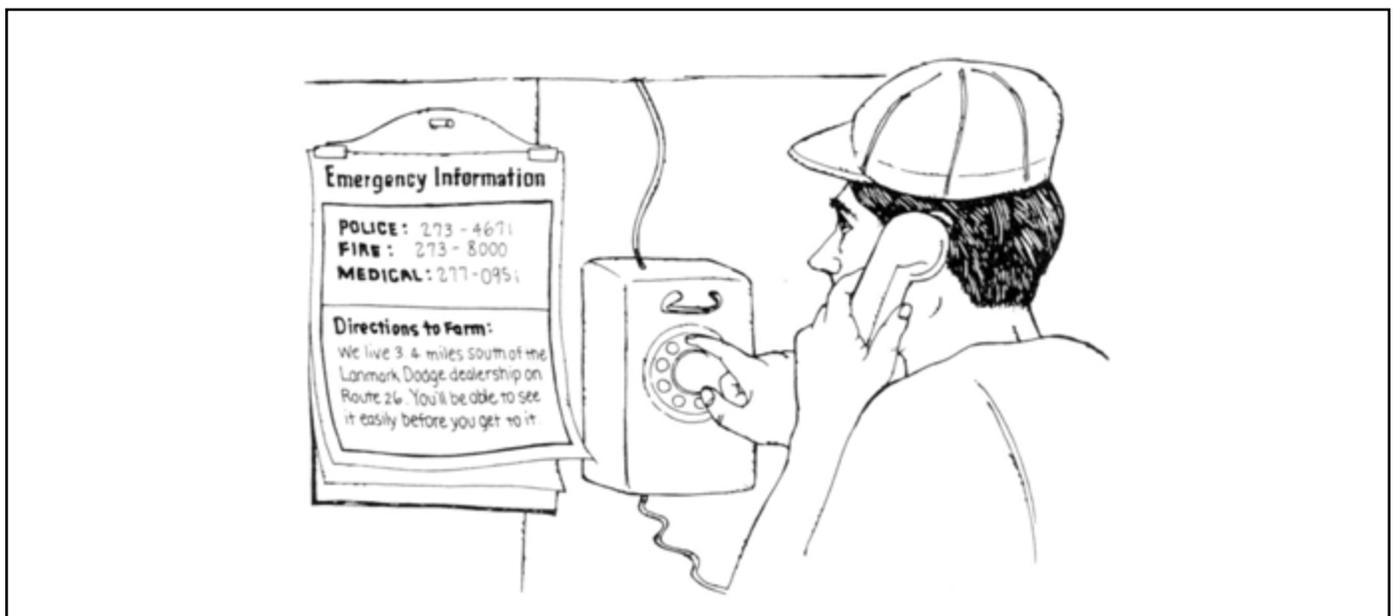


Figure 1.1 Posted phone numbers and information enable this man to quickly activate EMS and provide clear directions to the accident site.

about, and training for emergencies will greatly increase your chances of making good decisions. The decision tree in Figure 1.2 on the opposite page provides a general outline of the decisions and actions involved when a farm accident is discovered.

Activating EMS

The first decision to make when you witness or discover an accident is whether to remain at the accident site or to seek additional help. The condition of the victim, hazards at the scene, and the time required to activate EMS are important factors to consider. Timing is crucial because the victim may not be breathing, may not have a pulse or may be bleeding severely. If breathing stops, irreversible brain damage could occur in four to six minutes, and the heart may stop beating. Thus, in the time required to reach a telephone and report an emergency, the victim may die or suffer permanent brain damage. You may be able to prevent this if you can administer CPR (cardiopulmonary resuscitation) or first aid before leaving to activate EMS.

Regardless of the training you have, however, there are situations where you may not be able to improve the victim's chances for survival. **The sooner the victim receives advanced medical care, the better.** As a rule, if you can activate EMS quickly by flagging down a passing motorist or using a telephone or radio, do so. After activating EMS, return to the scene and assess it as described below. If you later determine that EMS personnel are not needed, the call can be cancelled. Fire departments, rescue services, and emergency medical volunteers prefer to be called and then canceled, rather than to be called when it's too late.

If the accident occurs in a remote location and EMS cannot be activated quickly, as is assumed in this bulletin, decide whether you can stabilize the scene or safely approach the victim, as described below. If you cannot, your first action should be to activate EMS.

Stabilizing the Scene

Controlling hazards at the scene that could harm you or cause further harm to the victim is called "stabilizing the scene." Typical hazards include uncontrolled movement of machinery, fire and explosions, spills of hot liquids or chemicals, exposed electrical current, and toxic fumes. Guidelines for stabilizing specific types of emergency scenes are provided in later chapters.

While approaching the accident scene, assess the apparent injury to the victim as well as the potential danger to yourself and the victim. Your safety must be the primary concern—if you are injured, there may be no one left to go for help. This is particularly true if the accident occurs in a remote location and EMS has not been activated. In the decision tree, the assumption is made that whatever you decide about the victim also applies to you; therefore, if the victim is in no further danger, you should not be either.

If the scene cannot be stabilized, but you can still safely approach a victim who is in danger of further injury, then move the victim to safety. If there is a chance that spinal injury has occurred, the victim should not be moved unless there is **imminent** danger of further injury. Accidents which could cause spinal injury include entanglement in farm machinery, entrapment under farm machinery, being thrown from equipment, or falling a long distance. Moving a victim with spinal injuries may result in paralysis or death.

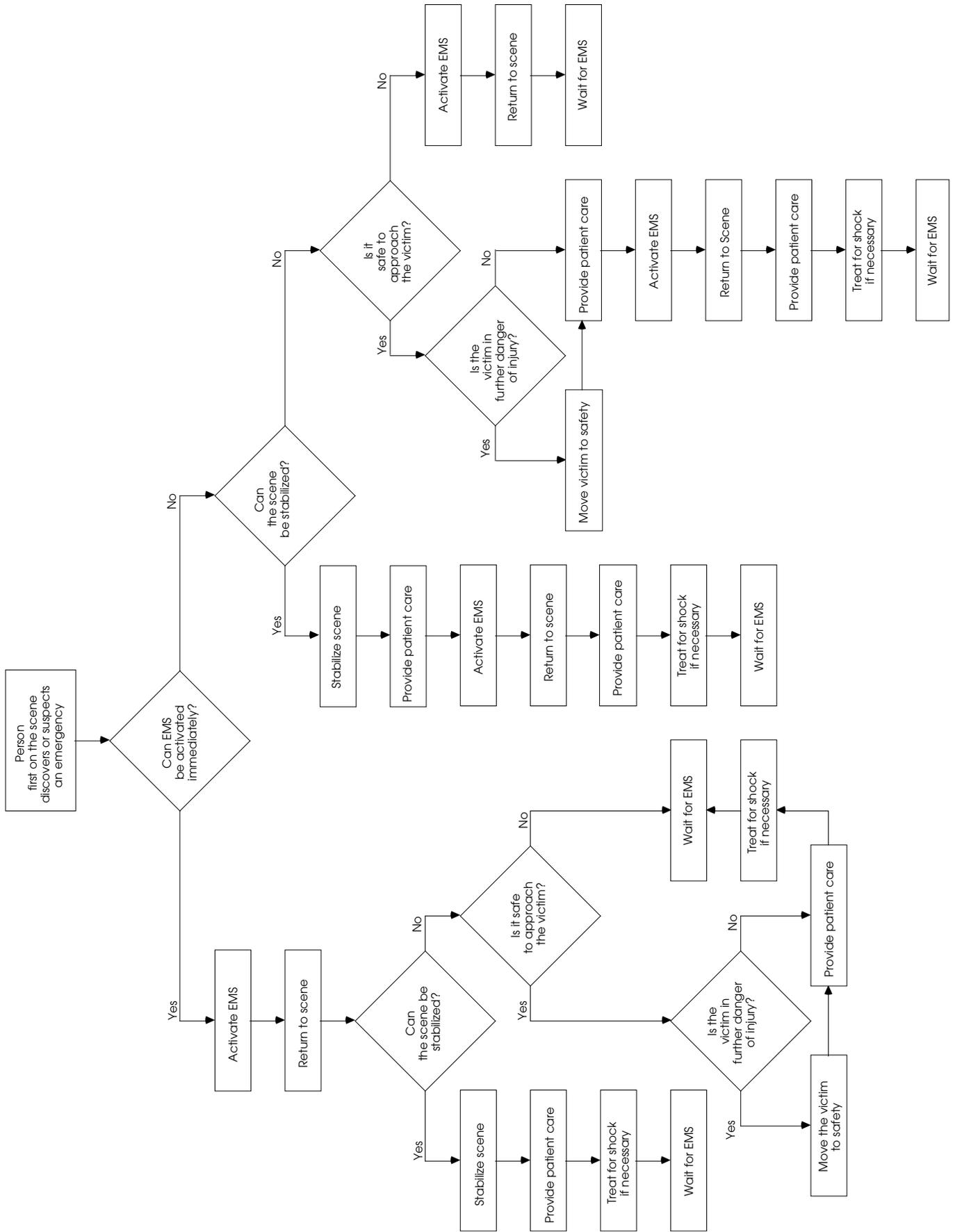


Figure 1.2 Decision: *Trevral Response to Farm Accidents*

Moving a Victim with a Spinal Injury

The spinal cord is a bundle of nerves that runs through the center of the back bones or spine. If a person's injuries result in severe displacement of a disk or vertebrae, the cord can be pinched or cut. All damage to the spinal cord is permanent, because nerve tissue cannot heal itself. The result of nerve damage is paralysis or death.

DO NOT move the limbs or body of a victim with a suspected spinal injury unless the accident scene is such that there is imminent danger of further injury or unless it is necessary to establish breathing. The victim's body should be stabilized (sand bags are ideal) to prevent any movement of the head, neck, or body. Be aware that any movement of a victim with spinal injury may result in paralysis or death.

If the victim must be moved, keep the midline of the body as straight as possible and pull in a direction that is in a straight line with the victim's spine. Pull the body from the feet or shoulders (using both feet, both shoulders, or both arms pulled over the shoulders). It is also possible to pull the victim by the clothing, as shown in Figure 1.3. Grab the victim by the collar of the shirt and support the victim's head with your forearms while pulling. The "clothes drag" is preferred because the victim's head is supported while being moved. Do not pull the body sideways.

When providing patient care, it may be necessary to roll the victim over on his or her back to clear an airway or evaluate breathing. When rolling the victim over, the head, neck, and torso should be moved together so that no twisting occurs.



Figure 1.3 "Clothes drag" method for moving a victim.

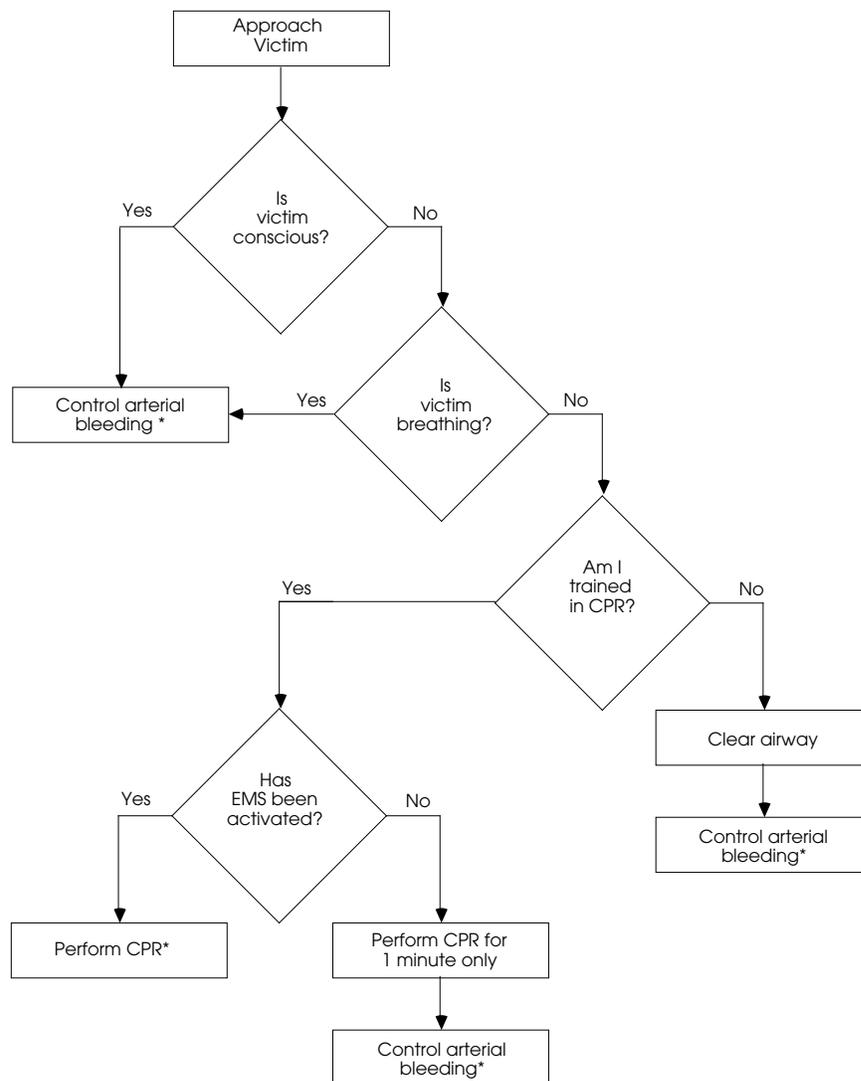
Providing Patient Care

Many of the decision trees in this bulletin, including Figure 1.2, contain a “Provide patient care” action box. When you see this instruction, follow the appropriate sequence of decisions and actions outlined in Figure 1.4 below. After completing this sequence, return to the original decision tree and continue with the decisions and actions which follow the “Provide patient care” action box.

The following description of patient care outlines the decisions and actions necessary to increase the

probability that the victim will be alive when EMS arrives. If you are not trained in CPR, assuring a clear airway and controlling arterial bleeding are the primary concerns, but the sequence of decisions and actions will be based on your training.

When neither the victim nor yourself are in danger, assess the degree of lifesaving emergency care you can provide. As part of the assessment, consider whether EMS has been activated. The situation will dictate the amount of patient care to provide before activating EMS. The following discussion is outlined in Figure 1.4; review this decision tree as you read through the section.



*Return to previous decision tree

Figure 1.4 Decision Tree for Providing Patient Care

The first step in providing patient care is to determine whether the victim is conscious. Approach from the side facing the victim, so that the victim will not have to move his or her head to see you. This is especially important if there is a potential for spinal injury. You should tap or gently shake the victim and shout "Are you okay?"

If the victim is responsive, then you can assume that the victim is breathing and has effective heart action. As indicated in Figure 1.4, in this situation the rescuer should next control any arterial bleeding. A victim can bleed to death within minutes or go into shock, so it is important to control arterial bleeding before leaving the scene to activate EMS. Arterial bleeding can usually be identified as bright red blood squirting from an open wound, as opposed to a constant flow or ooze of blood.

Control arterial bleeding by placing a cloth, if readily available, over the wound and applying direct pressure with the palm of your hand (Figure 1.5). Since sterile bandages usually are not available at the scene, you may have to improvise with clothing, rags, or old sacks. Infection from dirty materials is a secondary consideration and will be treated at a hospital if the victim survives.

If the victim does not respond, the next step is to determine whether the victim is breathing. To check for breathing, look for chest movement, listen for escaping air, and feel for airflow. If there is a potential for spinal injury, check breathing without moving the victim. If the victim is breathing, the next step, as indicated in Figure 1.4, is to control arterial bleeding.

If the victim is lying face down, chest expansion is not evident, and you cannot evaluate breathing, you have no choice but to roll the victim over. Even if there is a chance that spinal injury has occurred, the victim must be rolled over—breathing takes precedence over other potential injuries, since without air the victim will die or suffer permanent brain damage within four to six minutes. The description of moving a victim with spinal injuries (page 6) also discusses how to roll a victim over.

If the victim is not breathing, your next action depends on whether you know CPR. If you now CPR, EMS has not been activated, and the victim's condition indicates that mouth-to-mouth breathing or chest compressions are needed, perform this procedure for one minute only. If EMS has been activated, perform CPR until EMS arrives or until you are exhausted.

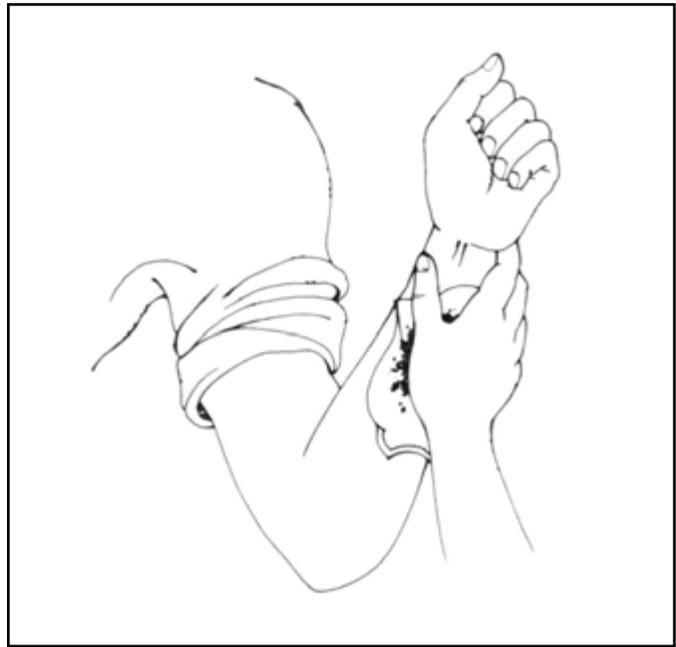


Figure 1.5 Stop arterial bleeding by pressing a cloth directly over the wound and applying pressure with the palm of your hand.

If you do not know CPR, then the next step is to "clear an airway." To clear an airway, the victim must be lying flat on his or her back. If a spinal injury is not suspected, tilt the head and lift the chin to clear an airway, as illustrated in Figure 1.6. If blood or mucus is present in the airway, turn the head to the side and let the fluid drain out, then reposition the head.



Figure 1.6 If no neck injuries exist, clear an airway by tilting and turning the head.

If spinal injury is possible, then the modified jaw-thrust maneuver should be used to clear the airway. To perform the modified jaw-thrust, the victim should be lying on his or her back. Kneel at the top of the victim's head facing the victim's feet and rest your elbows on the same surface on which the victim is lying. Carefully reach forward and gently place one hand on each side of the victim's chin at the angles of the lower jaw. Push the victim's jaw forward and upward, applying most of the pressure with your index fingers (Figure 1.7). Do not tilt or rotate the victim's head.

The procedures for clearing an airway are taught during CPR training. These procedures, especially the modified jaw-thrust, should be learned from professionals. After clearing an airway, control any arterial bleeding.

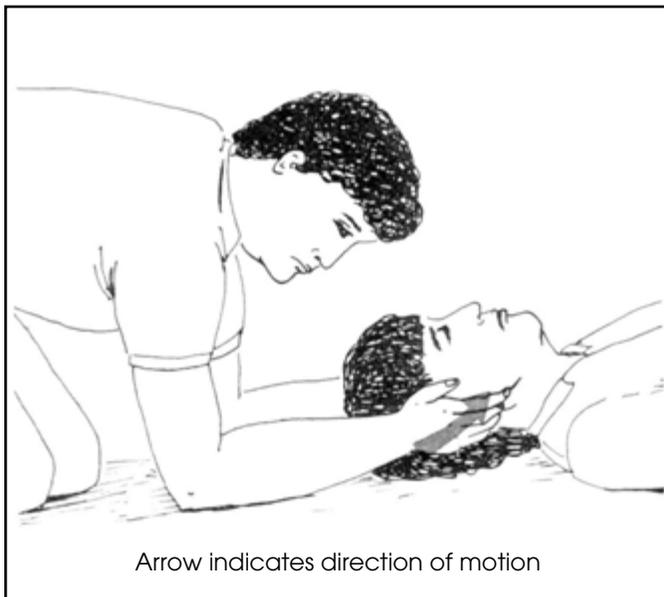


Figure 1.7 If spinal injury is possible, clear an airway by performing a modified jaw-thrust.

Infectious diseases can be readily transmitted by body fluids, especially blood. Consider including goggles or glasses and rubber gloves in your first aid kits. Be careful of blood squirting in your eyes or mouth. Be sure to wash your hands or other parts of your body that become exposed.

Summary

The following chapters present different farm emergency scenarios and are accompanied by decision trees which outline action steps for specific accidents. In the decision trees, one action may be to “provide patient care.”

When this action is specified, refer to Figure 1.4. After following the steps in Figure 1.4, return to the decision tree for the specific accident you are confronting. For a more complete discussion of respiration, CPR, blood loss, shock, and other emergency first aid, read Chapter 7: *Emergency Care Concerns*.

Remember, throughout the text and decision trees, it is assumed that the accidents occur in a remote area and that you, the person first on the scene, are alone. Once you can respond appropriately under these conditions, your response will be quicker and easier when there is more than one person on the scene or when the accident is not in a remote area.

CHAPTER 2

Farm Machinery Accidents

Most farm machinery is capable of seriously injuring a person. Tractors and PTO-powered equipment are commonly involved in farm accidents. Sometimes, a would-be rescuer can make the situation worse and may even become a second victim if not familiar with the equipment and the potential dangers. To assist farm accident victims effectively, you should be familiar with the dangers and operation of the equipment involved.

Tractor Overturn Emergencies

Tractor overturns are common farm emergencies, and two tractor overturn scenarios are presented in this section. The first involves a victim trapped by the tractor, and the second considers the victim thrown clear of the tractor.

Victim Trapped Beneath Tractor

If trapped under a large or medium-sized tractor, the victim must be freed with heavy lifting equipment; inform the EMS dispatcher if such equipment is needed. As indicated in Figure 2.2 on the next page, your first decision upon approaching the scene is to decide whether the tractor is stable.

Whether an overturned tractor is on a slope or on level ground, it may be unstable. An overturned tractor that is partially supported by an extended front-end loader or other hydraulically operated equipment can be particularly dangerous. You cannot tell if the hydraulic system (hoses, connections, controls) is about to fail. Also, in trying to get close to or in administering emergency care to the victim, a control lever could be accidentally bumped, causing uncontrolled movement of the tractor.

Evaluate the tractor's stability; do not approach the tractor from the direction toward which it may fall. If the tractor is on a slope, approach it from the uphill side where you may still be able to get close enough to eliminate a fire hazard, shut off the tractor, or aid the victim. This is especially true if the tractor is small and the victim is trapped on the uphill side. Do not climb onto an unstable tractor. Remember, your safety is the primary concern.

If the tractor appears to be stable, make sure both the engine and electrical system are shut off. On diesel tractors, shut off the fuel as well (See Appendix A, page 41). Most overturned tractors will stall, but this does not eliminate the hazard. If the ignition is left on, sparks from a damaged electrical system may contribute to a fire or explosion. As a tractor is uprighted or lifted during a rescue, a rear wheel may turn and cause the engine to turn over if the ignition is on. The tractor could lurch forward and injure rescuers. Always turn off the tractor.

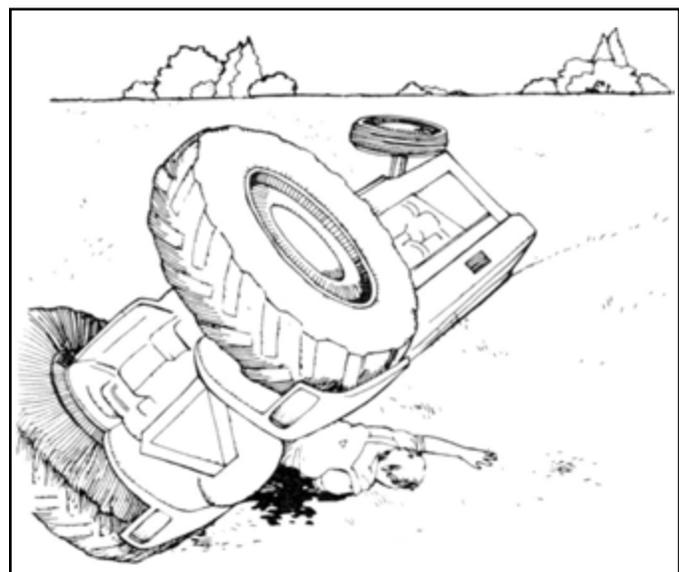


Figure 2.1 This tractor rolled down a hillside and trapped the operator underneath.

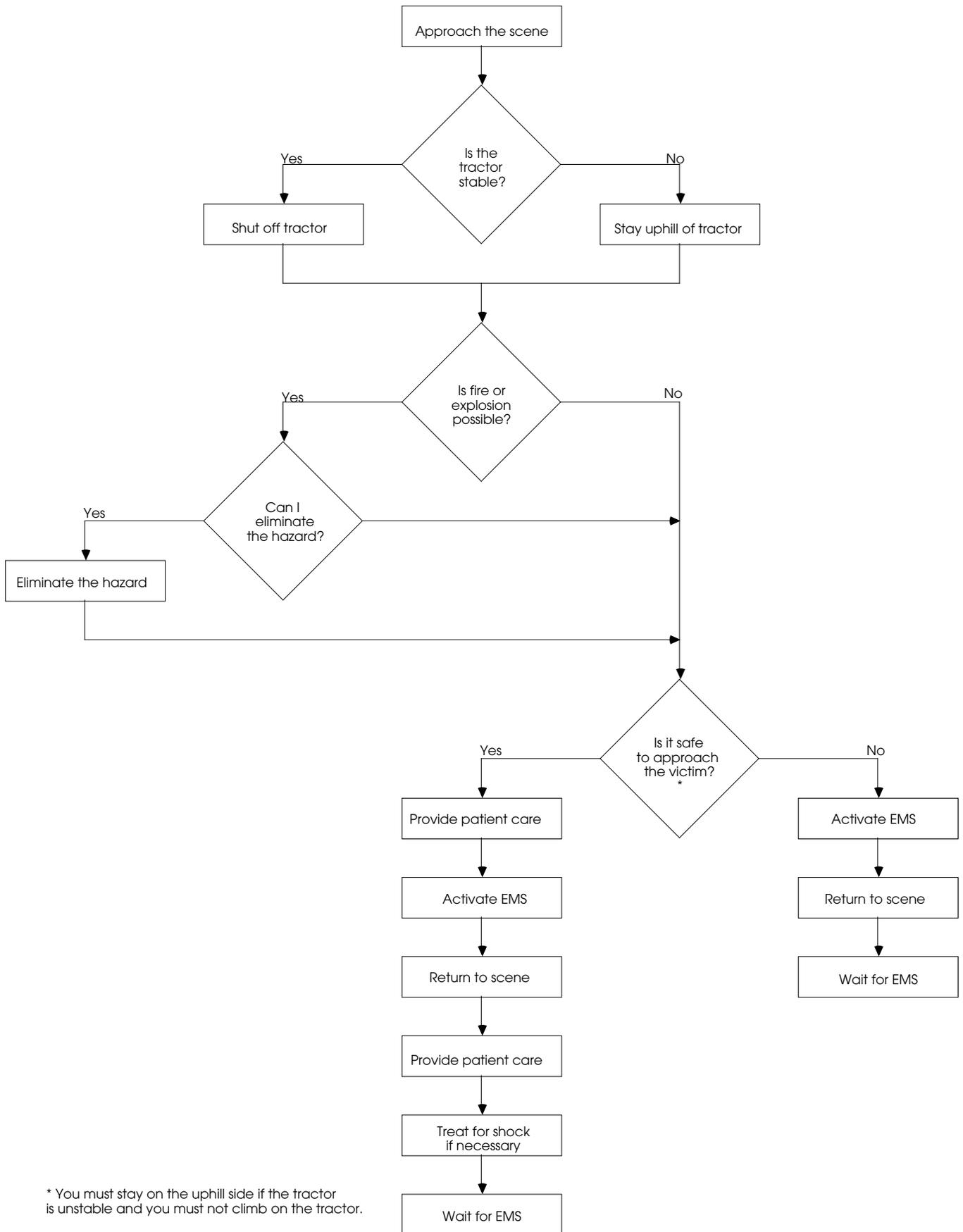


Figure 2.2 Decision Tree for Tractor Overturn Accidents: Victim Trapped Under Tractor

The next step, according to Figure 2.2, is to determine the possibility of a fire or explosion. Most overturned tractors will spill fuel. Motor oil, hydraulic fluids, and battery gases are also possible sources of fire or explosion. The fire hazard may be reduced by turning off the tractor, but if fuel has spilled or is dripping from the cap and you are unable to reach the ignition key (or the fuel shut-off on a diesel), additional action may be needed.

If a hazard does exist, decide whether or not you can eliminate it. In case of fire, discharge a class BC fire extinguisher (approved for flammable fuel and electrical fires), if available, around the fuel tank or spill area. If you can see or hear sparking, disconnect the battery if it is accessible. Expect additional sparking as you disconnect the positive or negative cable from the battery post.

If a diesel tractor continues to run after it has overturned and you cannot reach the fuel stop near the instrument panel, look for a fuel shut-off control near the fuel tank. Another possibility for stopping a diesel engine is to block the engine air intake manifold with heavy cloth or to discharge a dry chemical fire extinguisher into it. These steps are most likely to work on small tractors.

If the hazard cannot be eliminated, decide whether it is safe to approach the victim. If a fire is not currently burning, fuel is not leaking, and there is no sparking from the electrical system, it may be safe to approach the victim. If fire or explosion appears possible, the best way to help a victim is to take no chances with your own safety. If you cannot approach the victim, activate EMS and return to the scene.

If you are able to approach the victim, provide patient care as discussed in Chapter 1, then activate EMS. Return to the scene and repeat the patient care steps described in Chapter 1 and Figure 1.4. Treat for shock if necessary, and wait for EMS.

Victim Thrown Clear of Tractor

In this second tractor accident scenario, the victim is thrown completely clear of the tractor. The stability of the overturned tractor is of no immediate concern unless the victim is lying downhill from the tractor. In such cases, proceed as if the person were actually trapped. Figure 2.4 on the opposite page outlines the decisions and actions related to the victim being thrown clear of the tractor.

First, decide whether a fire or explosion appears possible and, if so, whether you can eliminate the hazard. These first two decisions are similar to the first scenario. The response, however, differs from the first scenario because the victim may be moved to a safe location, if absolutely necessary, when not trapped by the tractor. Once the victim is at a safe distance, provide patient care. Review the similarities and differences between Figure 2.2 and Figure 2.4.

Do not move a victim unless there is danger of further injury, such as when there is a fire or a strong smell of gas and visible sparking. Anyone thrown from a tractor and incapacitated may have internal, spinal column, or neck injuries that are not readily apparent. Refer to Chapter 1, page 6, for information about moving a victim with potential spinal injuries.

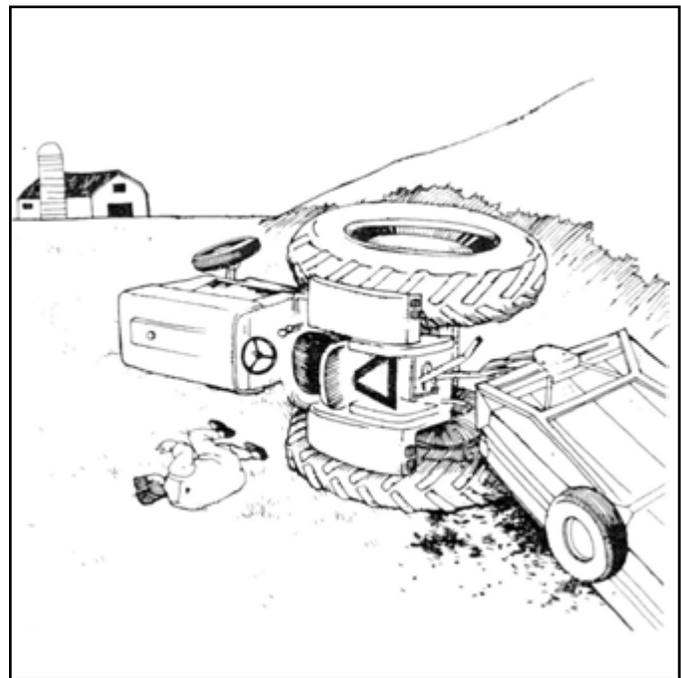


Figure 2.3 This farmer was thrown clear of the tractor as it overturned.

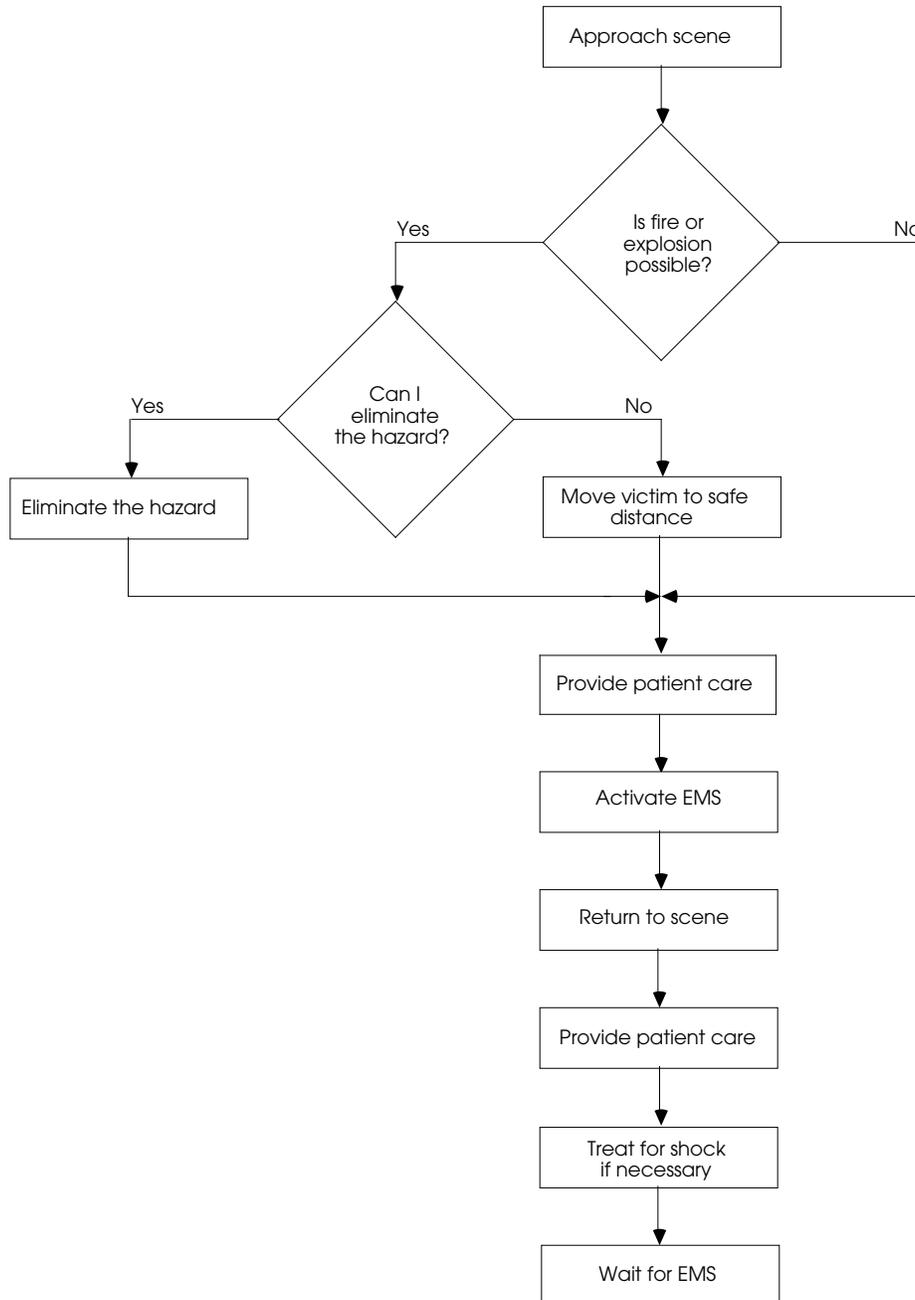


Figure 2.4 Decision Tree for Tractor Overturn Accidents: Victim Thrown Clear

PTO-Powered Machinery Accidents

Accidents involving entanglement with a power take-off (PTO) shaft or PTO-powered machinery can be the most difficult farm accidents to confront. They may involve amputations, severe bleeding, and suffocation. Incorrect rescue actions can result in further injury to the victim. Regardless of the particular machine involved, responses to different PTO-related accidents are essentially similar, as shown in Figure 2.6 on the opposite page.

Upon reaching the scene, first make sure the tractor is shut off. When a PTO-related accident occurs, the tractor is usually running and the PTO engaged. The PTO shaft and the machine itself may still be running, unless slip clutches or broken pins and keys have caused all movement to stop. The tractor may have stalled out because of the entanglement. In any case, turn off the ignition key and shut off the fuel on a diesel tractor (Appendix A).

While you are on the tractor to turn it off, make sure it is in a secured position and cannot move unexpectedly. Any tractor movement can make an entanglement worse for the victim. Place the tractor gear lever in park if it has a park gear selection, or set the tractor's brakes. This may have been done by the victim before the accident.

If you do not know how to move gear levers and set brakes or cannot tell whether the tractor is already secured, do not touch anything. Instead, place any available large objects in front and back of a rear tractor wheel to prevent movement. Some tractors may creep forward when the engine is stopped and in gear, especially on a hill.

Never disengage the PTO, as this can cause additional movement of, or injury to, a victim. For instance, if the victim is wrapped around the main driveline shaft, as shown in Figure 2.7 on page 16, there may be enough tension on the PTO-shaft to allow it to complete a revolution. This is undesirable, because the victim may also move, or the movement of the shaft may cause bleeding or further strangulation of the victim. Do not touch the PTO lever, but remember to mention the

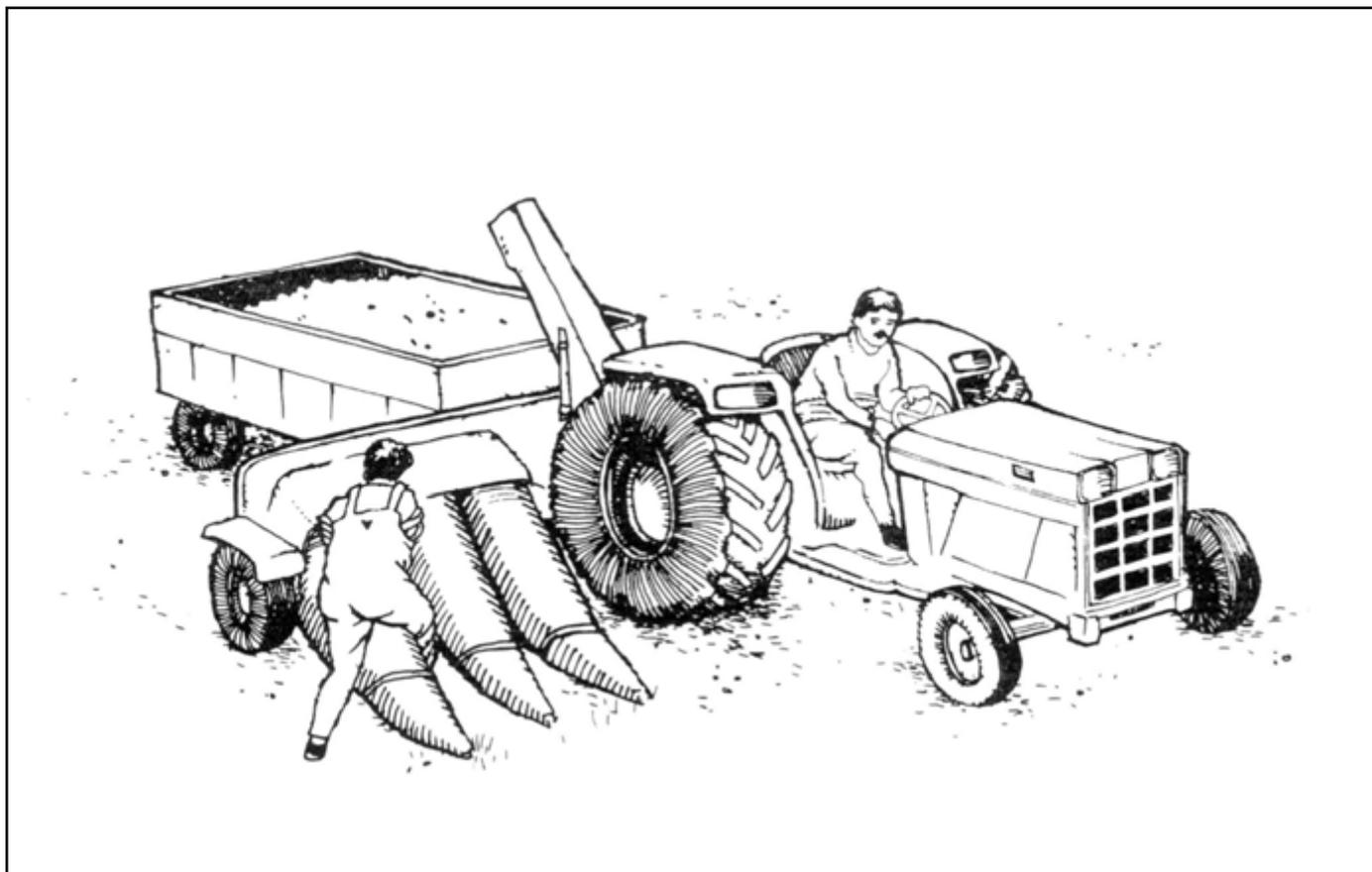


Figure 2.5 The person first on the scene is turning off the tractor so that the victim caught in the corn picker head will not be further injured.

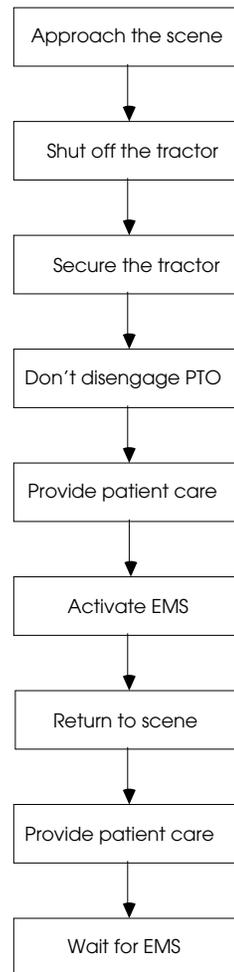


Figure 2.6 Decision Tree for PTO-Powered Machinery Accidents

control to EMS when they arrive. You should learn the location and operation of PTO controls for all tractors on your farm.

Once the tractor is secure, check on the victim. Machinery and PTO entanglements may involve life-threatening respiration and bleeding problems that are very difficult to treat. If the victim is wrapped around a PTO shaft, an article of clothing may be pulled so tightly that the victim cannot breathe. The clothing must be cut or torn carefully. Do this with caution to prevent the victim from moving. Any movement may

allow an amputated limb to fall free and may aggravate internal and spinal injuries or cause severe blood loss.

Any action you take must be necessary for the victim's survival.

Surprisingly, many PTO and machinery accidents result in little external blood loss. Revolving shafts wrap an arm or leg and any clothing so tightly that blood flow is restricted, even though a limb may be partially or totally amputated. In other cases, a limb may be pinched so tightly between moving components that blood loss is minimal. Pulling on or tearing clothing, or physically

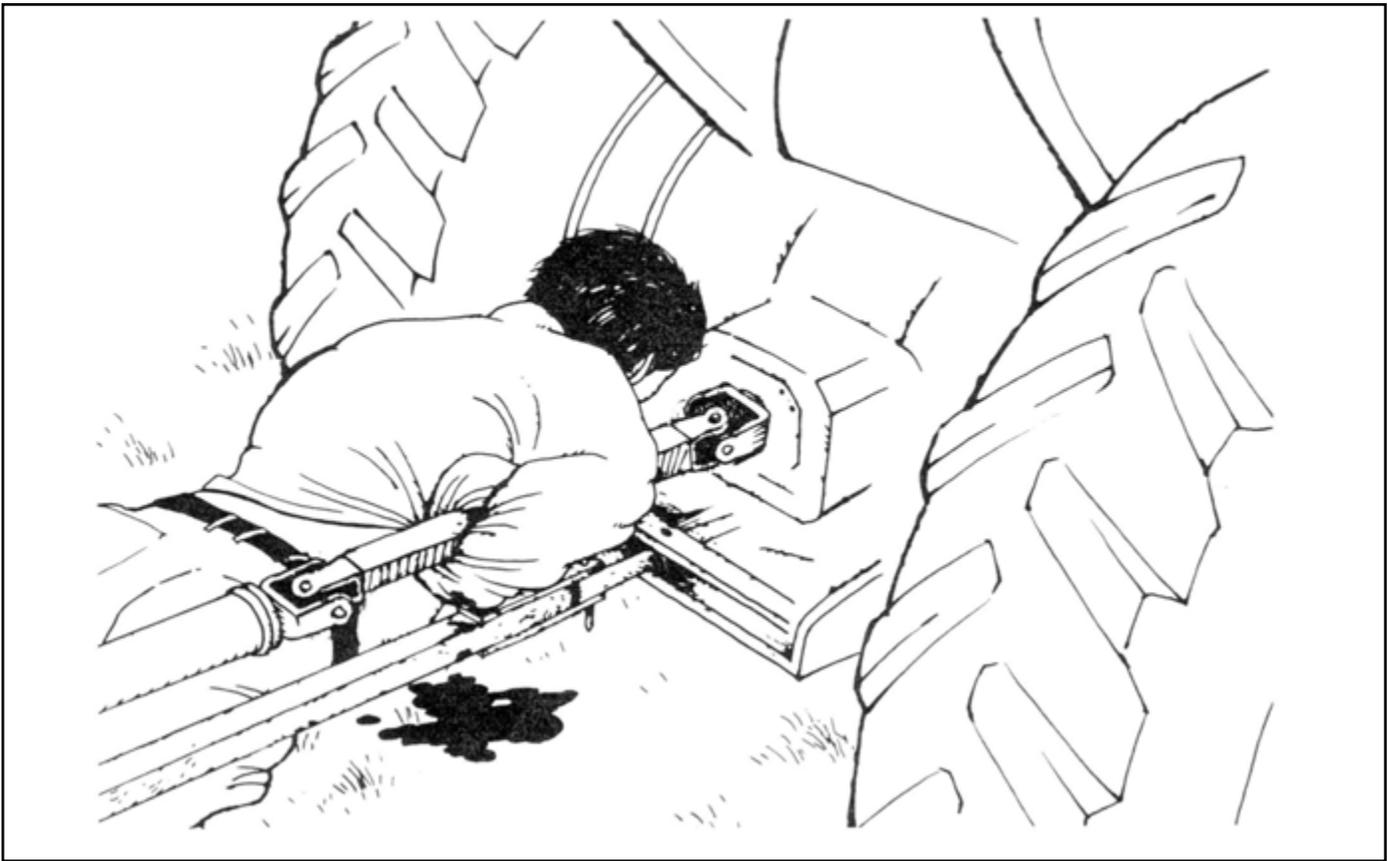


Figure 2.7 This victim, who became entangled around the PTO shaft, is suffering from severe bleeding and arm injuries that may result in amputation.

inspecting a wound can start a serious bleeding problem. In the event of clear and complete amputation of a major limb, attempt to control bleeding by bandaging and applying direct pressure; a tourniquet is sometimes used, but only as a last resort, since it will cause further injury even if used properly. Chapter 7 includes instructions for handling amputated tissue.

Respiration is the most important factor in your decisions. If the victim cannot breathe, he or she will die. Causing a bleeding problem or aggravating an unknown injury is a risk you may have to take. For injuries such as PTO entanglements, where there is great pressure on part of the body, severe shock will almost always occur when the pressure is released. Treatment for shock is discussed in Chapter 7.

CHAPTER 3

Storage Facility Accidents

Farmers store many varieties of materials on their property, including equipment, harvested crops, chemicals, and manure. Depending on the nature of materials stored, farm storage facilities can be dangerous and should not be entered without proper safety equipment. This chapter reviews the dangers and appropriate actions for accidents involving manure storages, grain bins, and silos, which are the most hazardous facilities.

Manure Storage Facility Emergencies

Manure storage facilities are typically present on dairy or other livestock operations. Manure may be stored in below-ground pits, off-barn holding facilities, or above-ground tanks. The dangers of manure storage facilities include inhaling toxic gases and drowning.

Below-ground Manure Storages

Below-ground manure storages, or pits, often cause two or three deaths per incident. The following scenario has been repeated several times: someone enters a pit and immediately passes out, another person attempts to rescue the first victim and also passes out, and so on. Figure 3.1 on page 18 illustrates such a case. In some cases, up to five individuals have attempted rescues only to become victims themselves. Such tragedies have involved both farm family members and fire and rescue personnel.

The primary hazard of an underground manure storage is hydrogen sulfide gas. Other gases, such as ammonia, carbon dioxide, carbon monoxide, and methane may also be present in toxic quantities. When the pit is being agitated for pumping out, the amounts of these gases

increase dramatically, especially hydrogen sulfide. When exposed to high concentrations of hydrogen sulfide gas, a person becomes unconscious after a breath or two and dies within seconds.

Most accidents in below-ground manure storages occur in empty or nearly empty pits. Hydrogen sulfide gas is heavier than air, so the gas can remain for months in an empty storage. If the storage is totally enclosed, as are many pump-out pits, the gas may remain indefinitely.

If you discover or suspect someone is in a below-ground manure storage pit, there is little you can do to help. As the decision tree (Figure 3.3 on page 18) indicates, **never enter a below-ground storage**. Entering a pit without a self-contained breathing apparatus (SCBA) and rescue line is suicide. If the storage has an automatic ventilation system that you can turn on within a few seconds, turn it on, but it is still unsafe to enter the pit. If you cannot turn it on within a few seconds or you do not know where the controls are, do not waste time. Immediately activate EMS.

After activating EMS, do anything you can to introduce air into the storage. If you were unable to start the ventilation system previously, try to start it now. If there is no ventilation system, locate a barn or house fan and blow air into the pit, but **do not lower a fan down into the storage**. Methane is highly explosive and may be present in sufficient quantity to be ignited by sparks from the fan motor. Besides providing auxiliary ventilation, all you can do is wait for EMS.

Off-Barn Holding Facilities

Another common type of manure storage is a holding facility located just outside a barn or housing area. Manure is usually pushed or scraped into these storage facilities, which resemble ponds or open lagoons; they are common in dairy operations.

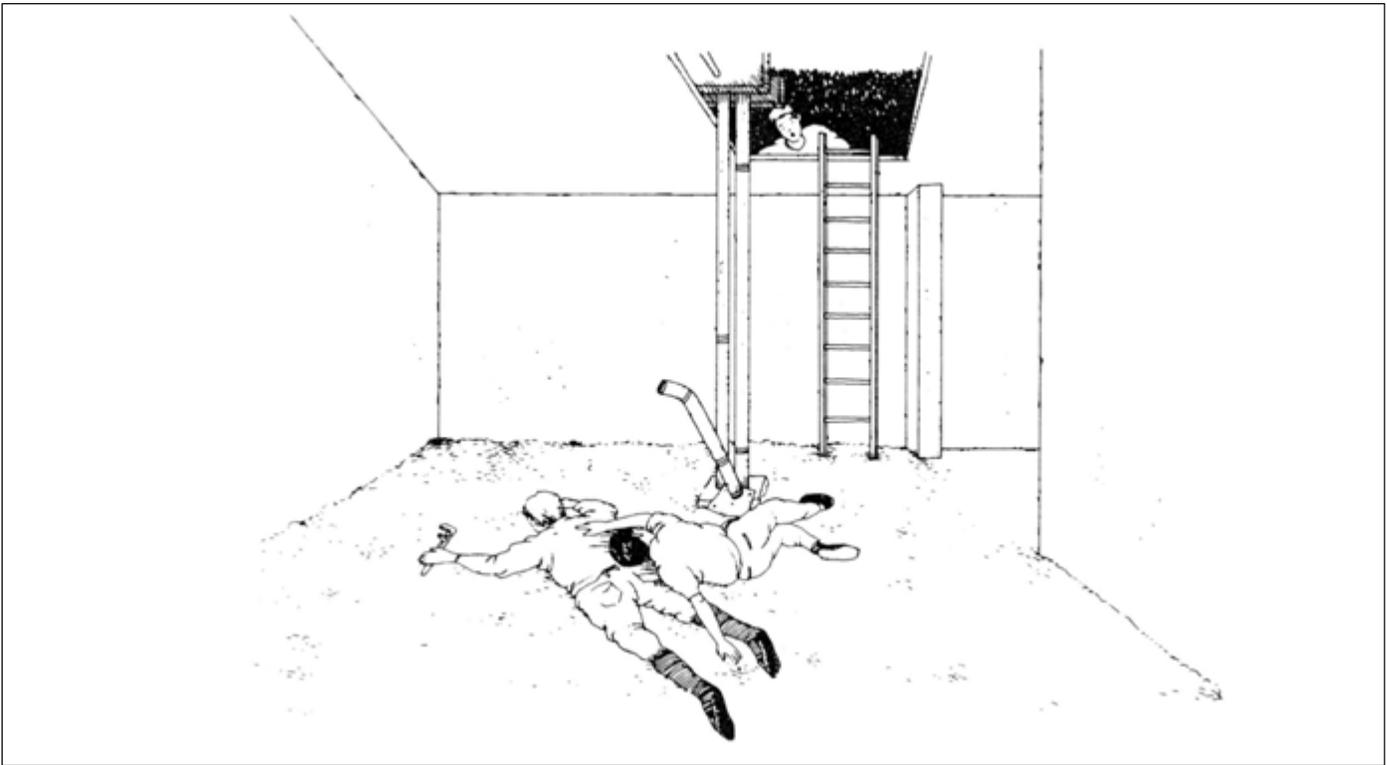


Figure 3.1 This below-ground manure pit has claimed the lives of two persons, the original victim and a would-be rescuer, who entered the pit unprotected.

In extremely cold or hot temperatures, a crust may form over an off-barn storage. A manure crust will not be as solid during hot weather as in cold weather, and can be compared to ice on a pond. Just as with ice, manure crust is thick near the edges and thin in the center, mainly due to the higher concentration of manure solids around the edges. **Never walk on a manure crust**, no matter how solid or strong it appears.

If you are first on the scene of a crust breakthrough, your actions will be similar to those of rescuing someone who has fallen through ice on a pond. The first step is to see if the victim is visible. If the victim is completely submerged in the manure pond, all you can do is activate EMS. Do not tie a rope around yourself and enter the storage to find the victim. Even if the victim is visible and holding onto a solid chunk of manure or otherwise keeping afloat, as shown in Figure 3.2, do not enter the storage. Make all rescue attempts from solid ground, as indicated in Figure 3.4 on page 20.

A rescue station, as shown in Figure 3.2, should be placed near all manure storage ponds (and other farm ponds as well). The rescue station should include materials for a rescue attempt, such as rope and a long pole, and a sign that states the location of the nearest phone and an emergency number. Use these materials to

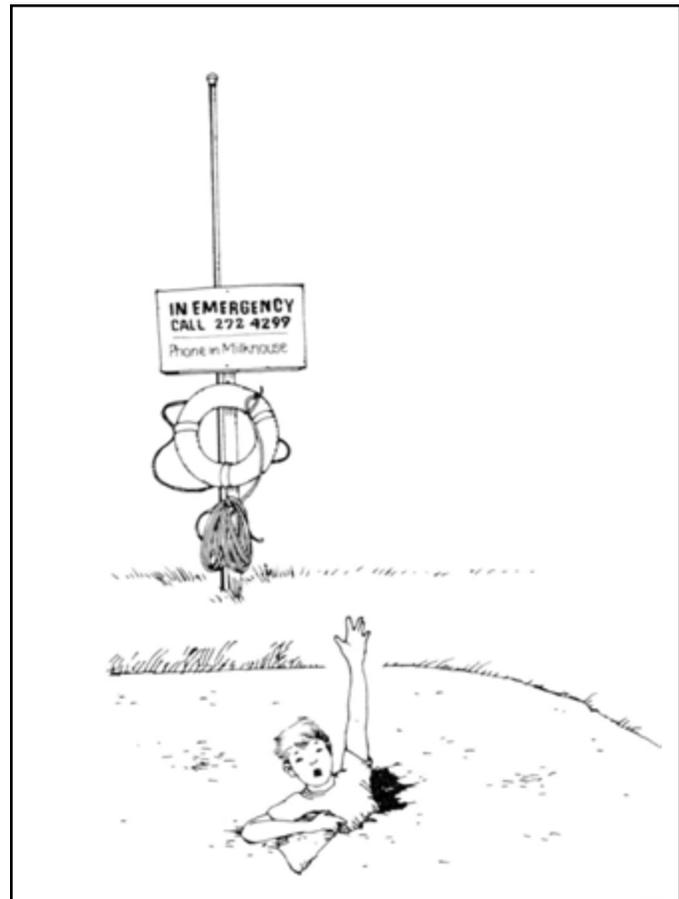


Figure 3.2 If the victim manages to stay afloat, the rescue station can provide materials for a rescue attempt

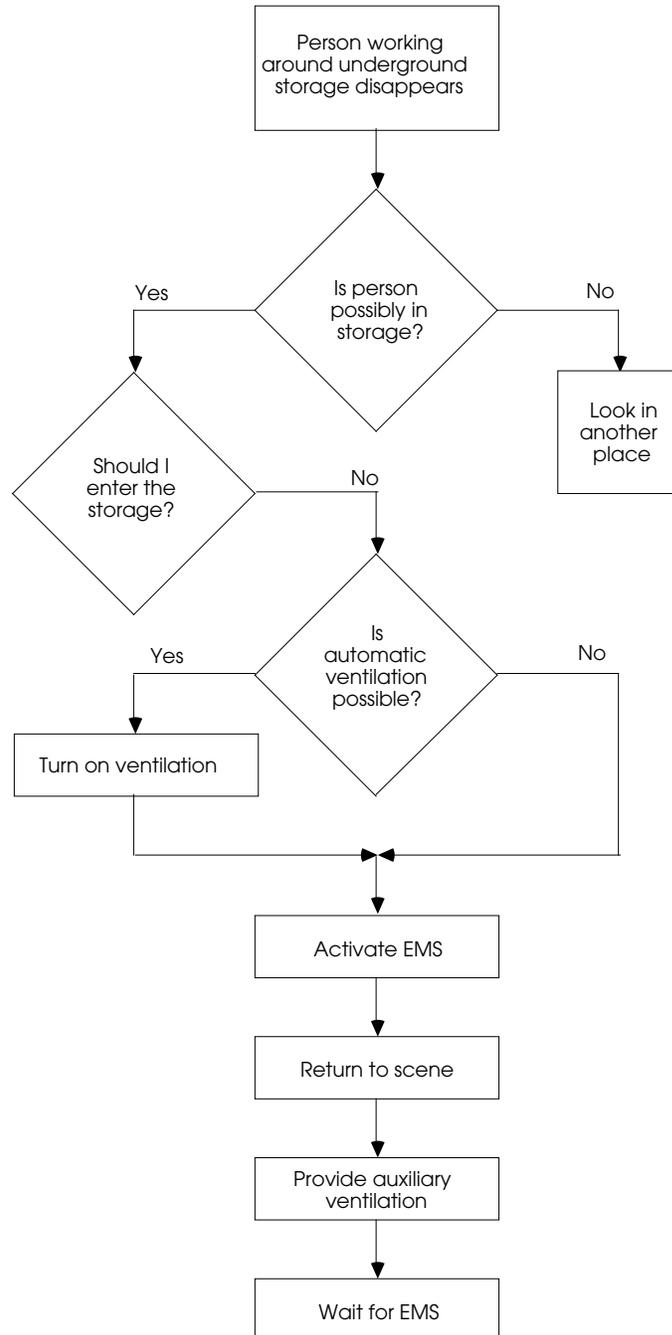


Figure 3.3 Decision Tree for Below-ground Manure Storage Facility Accidents

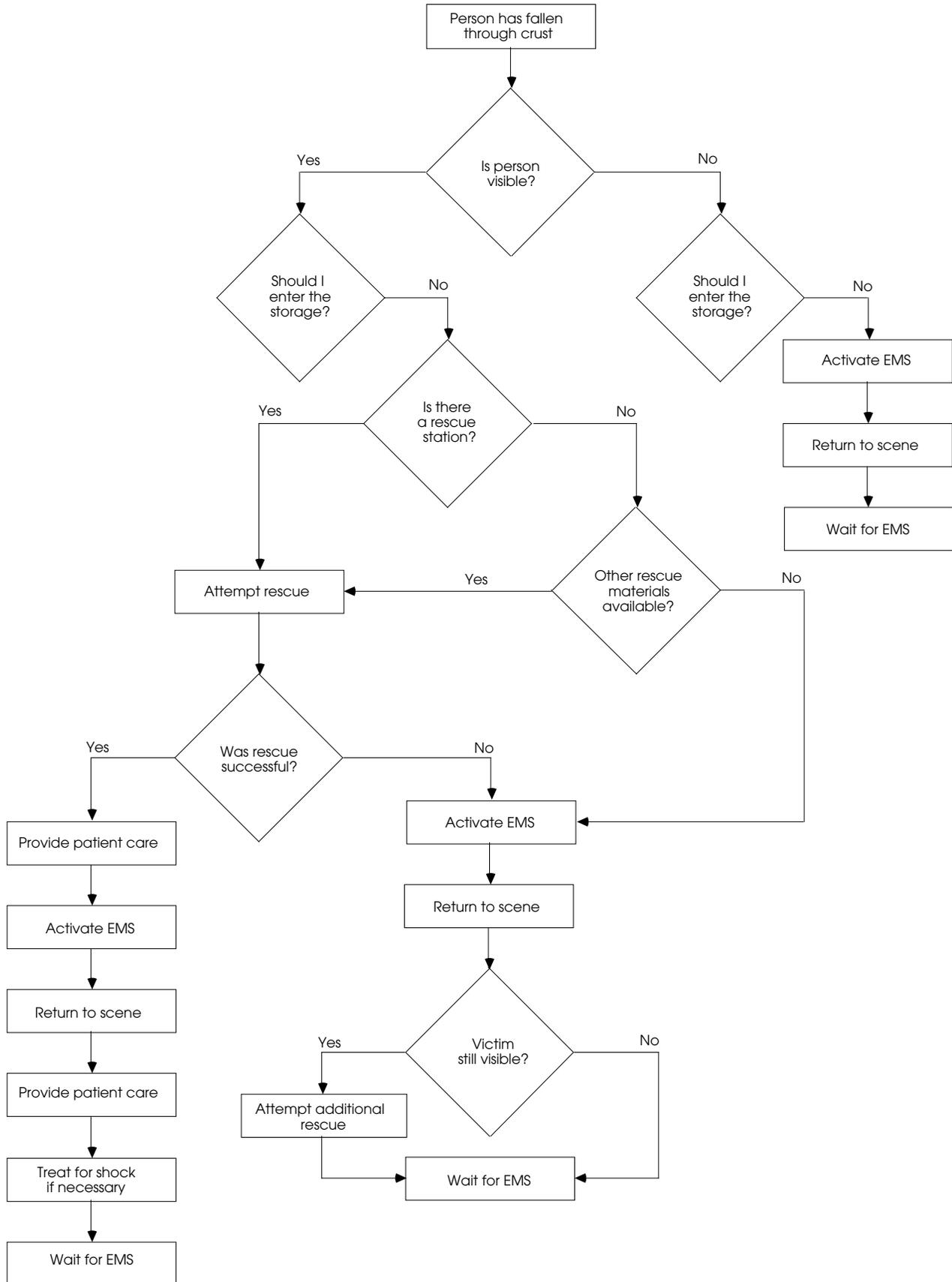


Figure 3.4 Decision Tree for Off-Barn Manure Storage Facility Accidents

attempt a rescue if the victim is visible. If there is no rescue station and the victim is still visible, decide quickly whether other rescue materials are available. If possible, throw a board or log to help the victim stay afloat, or throw a rope or extend a pole or ladder to the victim and pull the victim to safety. Do not delay activating EMS more than a couple of minutes to attempt a rescue.

If no rescue materials are immediately available or a rescue attempt fails, activate EMS, then return to the scene and see if the victim is still visible. If not, all you can do is wait for EMS. If the victim is visible, search for additional rescue materials, attempt additional rescues if appropriate, and wait for EMS.

If you are successful in a rescue attempt, provide patient care as described in Chapter 1. Always activate EMS; even if rescued, the victim should be examined by a doctor. Patient care in such emergencies will likely include mouth-to-mouth resuscitation and treatment for shock.

Above-ground Tanks

There is little you can do for anyone who falls into an above-ground manure storage tank. The sides of the tank are slick, and there is nothing to hold onto. Victims usually fall from the platform area at the top of the tank

and land in close proximity to agitation blades inside the tank. Do not turn on these agitation blades; they are unguarded and may further injure a victim.

If the victim is not visible, he or she will be very difficult to find because of the solids in the tank; there is little chance of survival. There is no decision tree for this emergency; all you can do is activate EMS, return to the scene, and wait for EMS.

Grain Bin Emergencies

Grain bins which unload from the bottom center are sites of numerous farm emergencies. When the unloading auger is on, grain is removed from the bottom center of the bin first. As this grain is removed, a column of grain directly above center flows downward, developing a funnel-shaped motion similar to that of liquid flowing down a funnel.

The speed at which grain flows through a bottom unloading auger presents a little understood danger on a farm. A six-inch diameter auger can unload twenty cubic feet of grain per minute. Within five to seven seconds, a person would be knee deep and helplessly trapped. Within twenty seconds, the victim could be totally submerged (Figure 3.5).

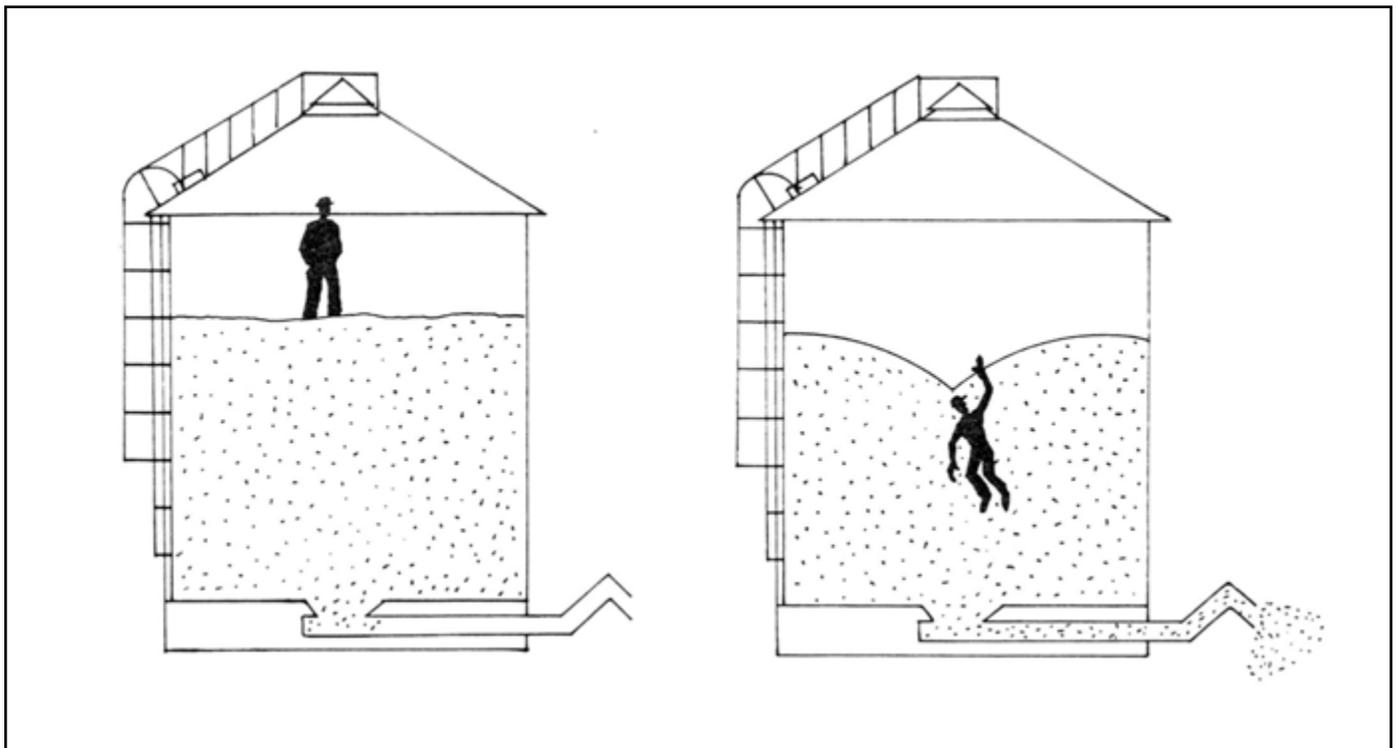


Figure 3.5 An adult victim can be totally submerged in a grain bin in twenty seconds.

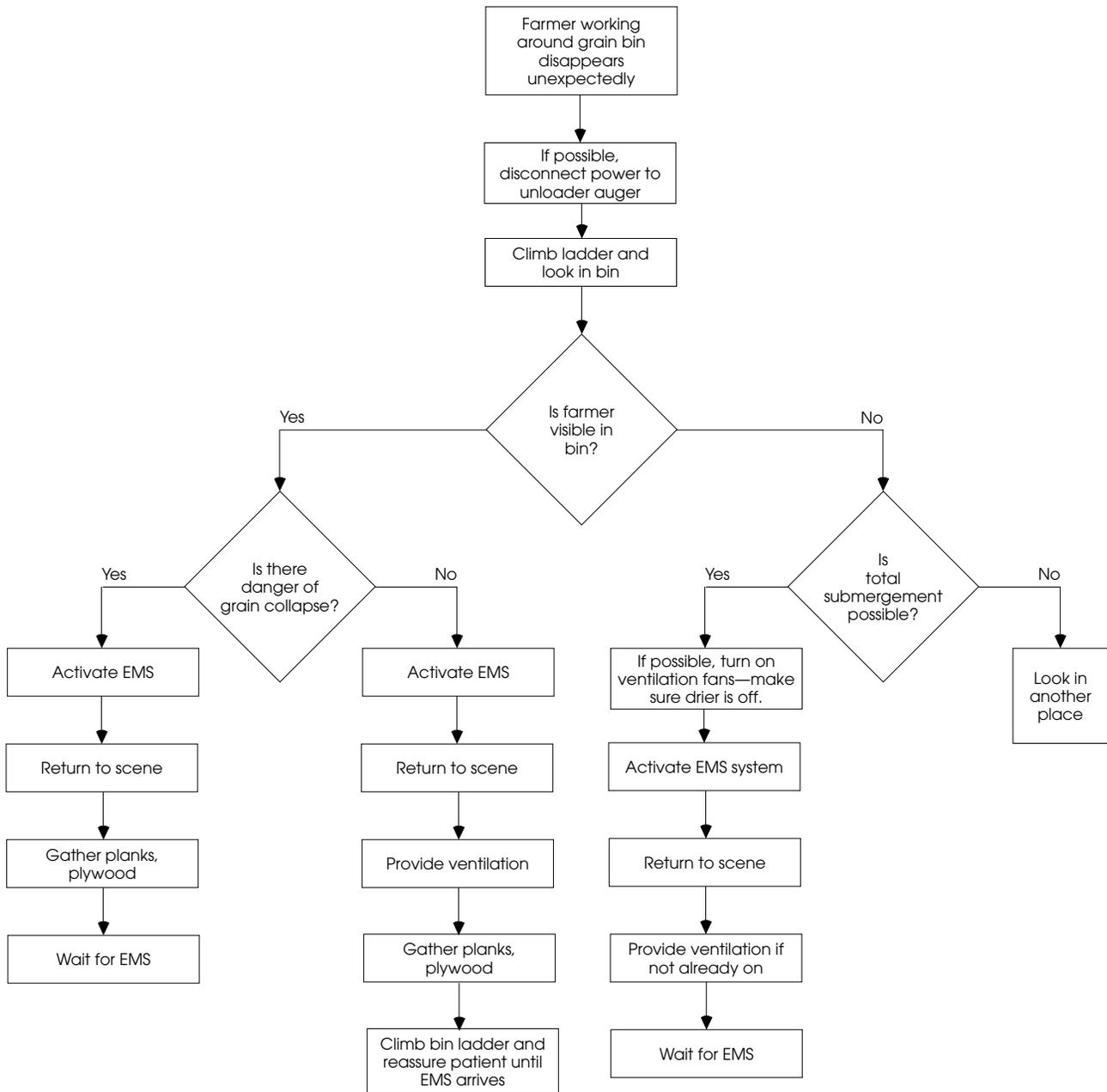


Figure 3.6 Decision Tree for Grain Bin Accidents

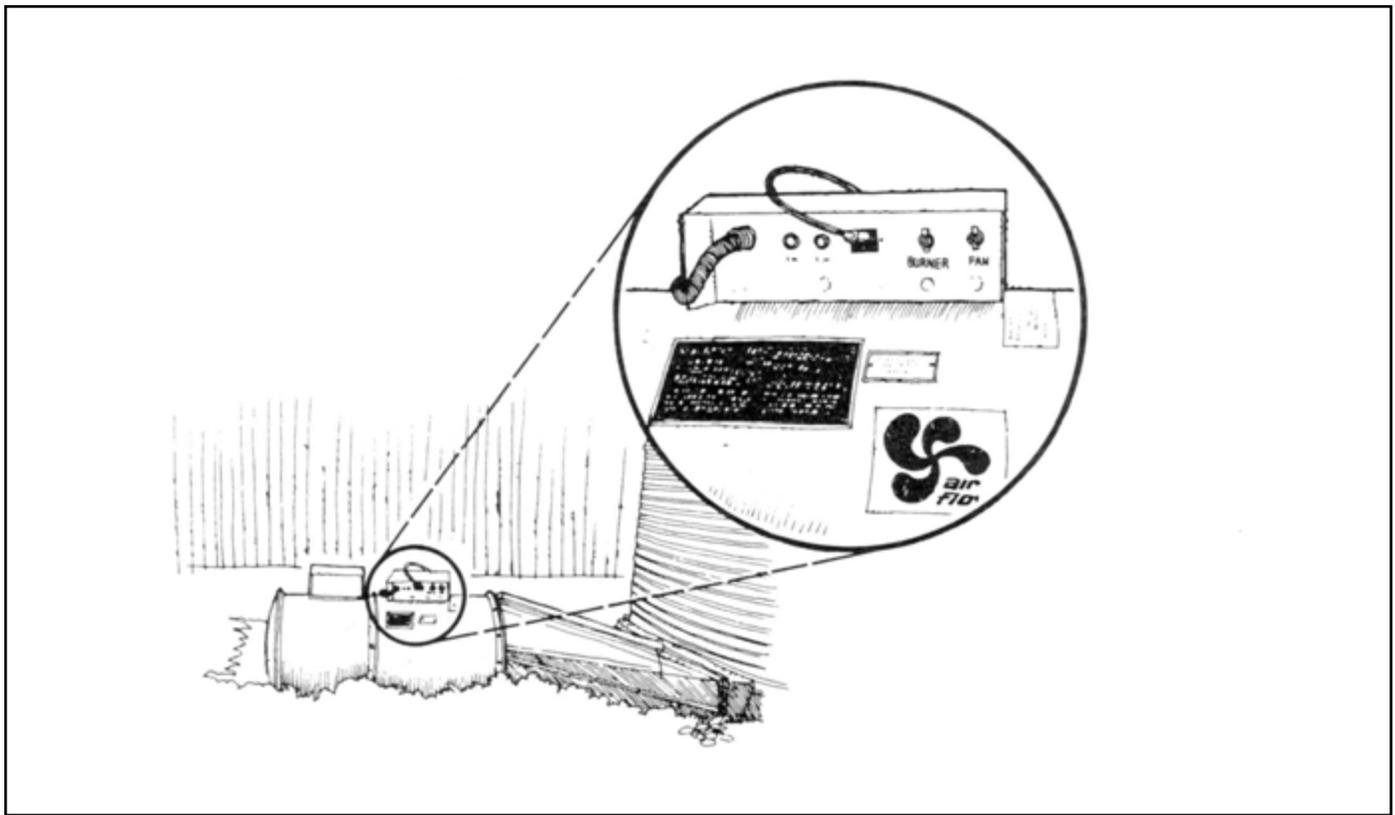


Figure 3.7 One type of ventilation/dryer controls on a grain bin.

Unless witnessed by someone, grain bin entrapments usually are not suspected until after an extensive search has been made for a missing person. By process of elimination, the grain bin gradually looms as a possibility (Figure 3.6). Even when you only suspect that someone may be trapped in a grain bin, disconnect the power to the unloading auger if you know how. Otherwise, the auger may be started and further injure the victim.

After the power has been disconnected or you have decided that you cannot do it, climb the outside bin ladder, look in through the bin roof hatch, and see if the victim is visible. If no one is visible in the bin, decide whether the missing person could possibly be buried. If you believe someone is buried, immediately turn on the ventilation fans, but do not turn on the heater/dryer. If you do not know where the controls to the ventilation system are or do not understand them, do not waste time trying to figure them out; activate EMS immediately. Then, return to the scene and attempt to provide ventilation again. Gather some planks, sections of plywood, metal sheeting, or similar materials for rescuers to use in getting close to the victim. Wait for EMS.

Figure 3.7 shows one type of control for a grain bin ventilation system. Become familiar with ventilation system controls on your farm. The labels on the switches may be worn off your system. If you are not sure of what you are doing, leave things alone. If there is not enough grain stored to bury a person, continue your search elsewhere.

If the victim is only partially buried in grain, your actions will depend on how deeply the victim is buried and on the danger of grain collapse. If the grain has not reached the knees, the victim could probably be pulled out with a rope and additional help. If the victim is in above the knees, do not attempt rescue with a rope. The lateral pressure exerted by the grain on the victim's legs may cause injury during such an attempt. Activate EMS and let trained technicians perform the rescue. A victim's situation is particularly precarious if the grain is up around chest level, because the lateral pressure may limit the ability to breath.

If you discover someone almost totally submerged in grain, ask the victim if there is danger of grain collapse. If the victim entered the bin to break up bridged or caked grain, there may be an unseen cavity below the grain surface or large chunks of grain attached to the

side wall of the bin. The slightest movement or additional weight may cause a cavity to fill in or additional grain to collapse onto the victim. If the victim is unconscious, assume there is a danger of grain collapse.

If danger of grain collapse exists, do not turn on the ventilation fans; activate EMS immediately. Do not climb the bin ladder again to check on the victim and do not turn on the ventilation fan; the resulting vibration may cause further grain collapse. Gather some planks, sections of plywood, metal sheeting, or similar materials for the rescuers to use in getting close to the victim. Rescue squads may not carry these materials, so you can save time by having them ready.

In cases where a conscious victim tells you that bridged or caked grain did not contribute to the entrapment, the decisions and actions are the same as explained above, except that you may turn on the ventilation fans as well as climb up the bin ladder to reassure the victim after activating EMS and gathering planks or plywood. Your presence at the bin hatch door will help keep the victim calm. Some victims have said their anxiety was eased when the ventilation fans came on. Partially buried victims have died from excessively struggling to work free. Their panic caused the entrapments to be fatal.

Silo Emergencies

Two basic types of tower silos are found on farms: the oxygen-limiting silo and the conventional silo. The decisions and actions for a silo emergency depend on the silo type. An approach for each type of silo is presented.

Oxygen-Limiting Silos

Oxygen-limiting silos have a limited number of openings: one or two at the top and one other at the bottom where the silage is unloaded. A few oxygen-limiting silos have a manhole near the bottom for servicing the unloader.

The oxygen-limiting silo is designed to ensile the crop in an almost oxygen-free atmosphere, and should not be entered. In fact, signs should be posted to warn farm workers that there is insufficient oxygen to support life. Safe entry is possible only by using a self-contained breathing apparatus and lifelines.

Occasionally, farm workers ignore the warnings and

enter an oxygen-limiting silo without life support. Death usually occurs rapidly; since almost no oxygen is available, there is little chance for survival. If you are first on the scene, all you can do is activate EMS and ventilate the silo with the silo blower when possible. **Never enter an oxygen-limiting silo.** No decision tree is included for this accident because the only actions to take are to activate EMS and attempt to ventilate the silo.

Conventional Silos

In contrast to an oxygen-limiting silo, a farm worker may enter a conventional silo for routine maintenance, trouble shooting, or as part of a filling or feeding out process. Victims are most commonly incapacitated by silo gas poisoning, entanglement in the silo unloader, a heart attack, electrocution, or stroke. Figure 3.8 on the opposite page shows decisions and actions for accidents involving conventional silos.

As in grain bin emergencies, sometimes silo emergencies are discovered by process of elimination. Immediately disconnect the power to the unloading auger in the silo if you decide an emergency may exist. Next, decide if it is possible for silo gas to be present. If the silo is currently being filled, has been filled within the past three weeks, or is being opened for feeding-out purposes, then gas may be present. If the silage level has not been increased during the past three weeks or feeding of silage has been occurring regularly, there should be no gas present. If you are not absolutely sure, proceed as if silo gas is present.

As indicated by the decision tree, the next action may involve climbing a considerable height. Many people are physically unable to climb a silo or have a real fear of heights. If you cannot climb the silo, activate EMS, return to the scene to turn on the silo blower if possible, and wait for EMS.

The remaining discussion describes actions for those capable of climbing a silo ladder. There are two different ladders on conventional silos: the inside chute ladder and the outside blower pipe ladder (Figure 3.9 on page 26). The chute ladder is built into the silo unloading doors and is enclosed. If silo gas is present in the silo, it may also be in the chute enclosure. The silo blower pipe ladder is located along side the blower pipe and is open to the air.

When silo gas is a possibility, climb the outside blower pipe ladder and look for the victim. If the victim is in the

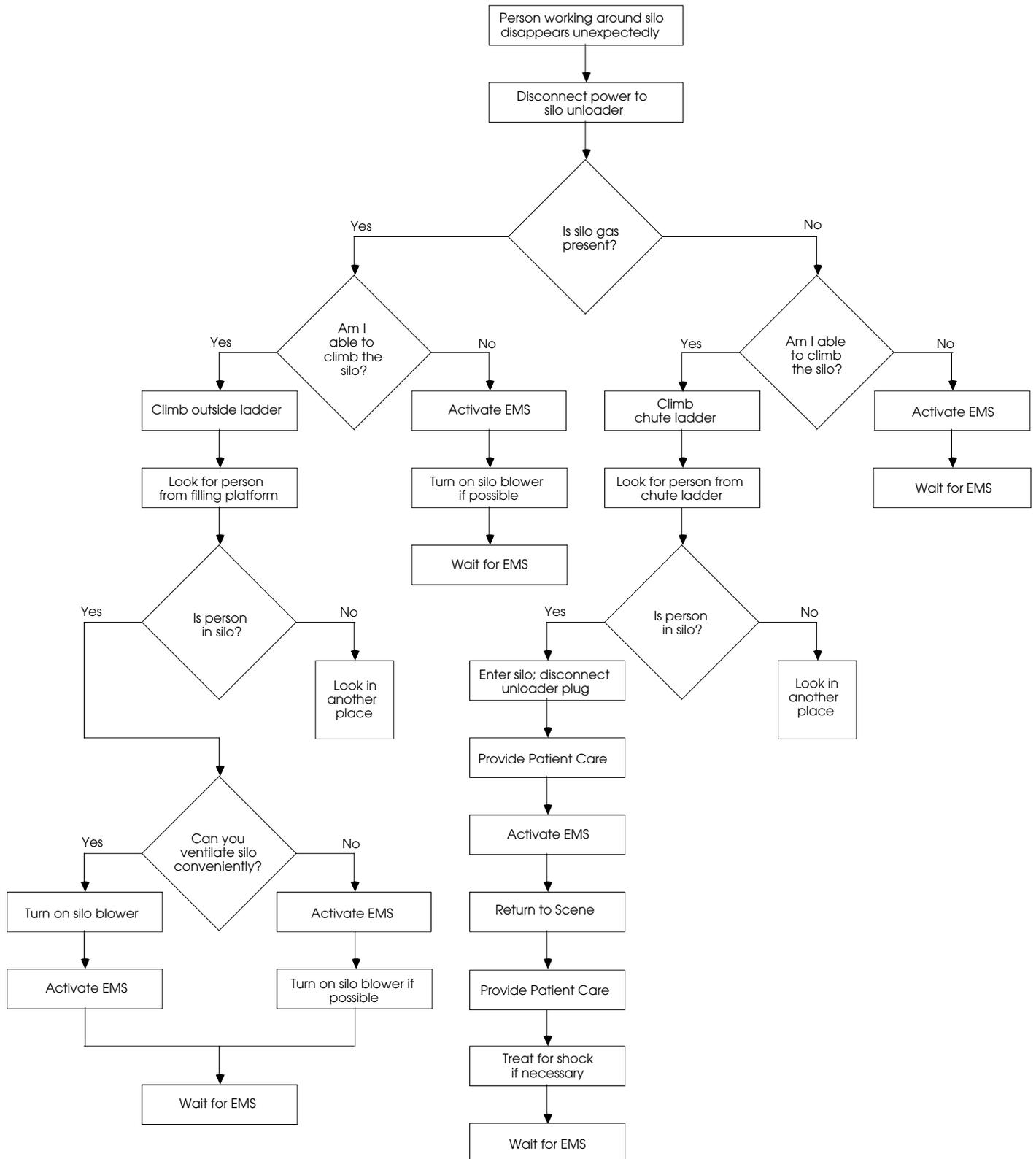


Figure 3.8 Decision Tree for Conventional Silo Accidents

silos, decide whether you can immediately provide ventilation. If the silo blower is hooked up and you can operate it within seconds, turn it on and then activate EMS. Otherwise, activate EMS first, and then try to operate the blower. Wait for EMS. Do not enter the silo.

When silo gas is not a possibility, climb the inside chute ladder, which allows you to observe and enter the silo at silage level. If the victim is in the silo, stabilize the scene by controlling possible hazards, attend to patient care, and activate EMS. If you are unsure about the presence of silo gas, climb the outside blower pipe ladder.

The most likely hazard to be controlled in this situation is unexpected start-up of the unloading auger. Even though you disconnected the unloader at ground level before climbing the silo, now unhook the disconnect plug found just above the unloader unit, as shown in Figure 3.10 below. Otherwise, someone on the ground who is unaware of the accident may return power to the unloader or you may have mistakenly disconnected something other than the auger. Assure complete power cut-off by unhooking the disconnect plug at the silo unloader. Quickly move on to patient care. If the victim is entangled in the unloader auger, blood loss may be severe.

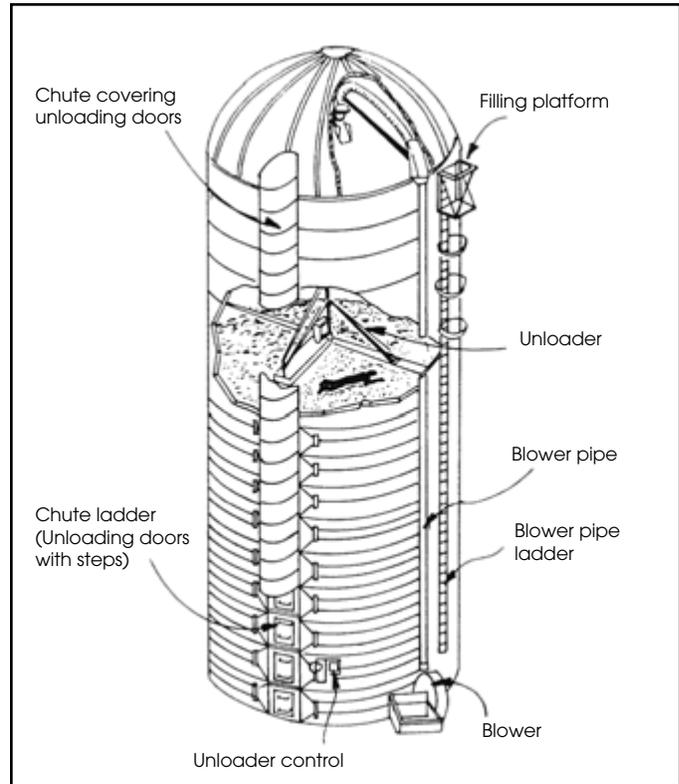


Figure 3.9 Climb the chute ladder if no gas is present; climb the blower pipe ladder if gas is present.

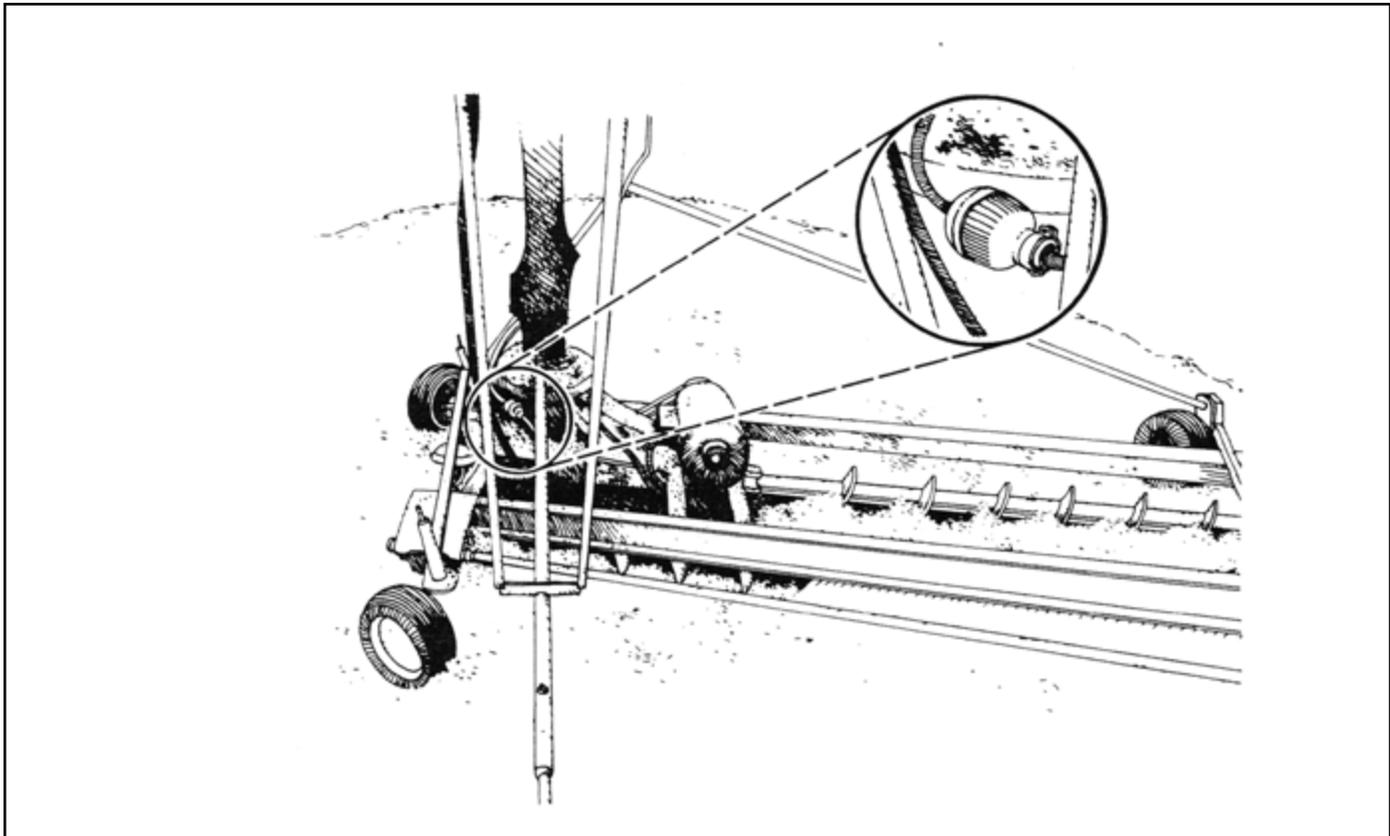


Figure 3.10 On the silo unloader, the circuit can be broken by disconnecting the plug.

CHAPTER 4

Chemical Accidents

Chemical emergencies can occur any place on the farm where chemicals are stored, mixed, or applied. Pesticides and anhydrous ammonia are probably the most dangerous chemicals commonly present on farms. This chapter discusses the decisions and actions for several types of chemical emergencies.

Pesticides

Pesticides are commonly used for controlling weeds, insects, and pests. Although few fatalities are attributed to pesticide use, overexposure accidents do occur. Follow the decision tree for pesticide emergencies (Figure 4.2) on page 29.

If you find someone in distress, check for signs or symptoms of pesticide poisoning. Early symptoms of pesticide poisoning are similar to many other ailments and include headache, fatigue, blurred vision, and excessive sweating. Advanced symptoms may include nausea, contracted pupils, drooling, diarrhea, and nervous twitching. If pesticide poisoning is not possible, continue to watch the patient and respond as necessary. If pesticide poisoning is a possibility, determine the type of overexposure the victim has suffered and, if possible, secure the pesticide label. Before approaching the scene, determine whether you are in danger of becoming overexposed.

Dermal Overexposure

If the victim has been overexposed to a pesticide through skin contact, called dermal exposure, quickly remove all contaminated clothing and wipe any excess contaminant from the skin with a cloth. Next, flush the contaminated skin areas with water, trying not to contaminate clean skin areas. Use cool water to flush the victim; if the flushing water is warm, the victim's pores will open and

allow excess chemical to be absorbed. Ideally, flushing with water should continue for fifteen minutes. Avoid coming into contact with the chemicals yourself. If your hands, eyes, or clothes become contaminated, rinse them with water immediately.

A conscious victim may be able to continue flushing while you secure the pesticide label and activate EMS. If a victim is losing consciousness or has already passed out, only flush for a minute or so before activating EMS. Most of the chemical will wash off with the initial water, and you can continue flushing after returning to the scene. A victim who has lost consciousness because of pesticide overexposure urgently needs professional emergency care.

Inhalation Overexposure

Breathing pesticide fumes or vapors is called inhalation overexposure. Before you approach the scene, determine whether the victim is in an enclosed area, such as a grain bin, controlled atmosphere (CA) storage, or garage. When products stored in enclosed areas are treated with pesticides, air in the facility becomes contaminated.

Do not enter a pesticide-contaminated enclosed area without self-contained breathing apparatus (SCBA). These areas are just as dangerous as gas-filled silos and agitated below-ground manure pits, described in Chapter 3. If you can quickly provide ventilation into the structure, do so before activating EMS. Again, take the label with you, if possible, to report the emergency.

Inhalation overexposure can occur when someone is handling pesticides inside a barn or shed that is not adequately ventilated. A person can usually escape the area before pesticide effects become too severe. If the victim has been overcome and cannot escape, remove the victim from the area, if possible. If you cannot safely remove the victim, direct fresh air into the area by

Securing the Label

The pesticide label is probably in the vicinity of the work area where the overexposure occurred. Determine whether more than one chemical was being used. Take the label (Figure 4.1) or the entire container if necessary, with you to report the emergency. When you report the emergency, identify the type of overexposure involved and the name of the pesticide. The emergency dispatcher or poison control center needs the name of the chemical to locate the prescribed first aid treatment. It is not always possible

to cross-reference the brand name with the chemical name or active ingredient; it is important to have the label and not just the brand name when activating EMS. If you cannot find the label quickly, activate EMS and then continue searching.

The dispatcher may give you specific instructions for first aid treatment before EMS arrives. While waiting for EMS, return to the scene, and either administer the prescribed first aid or try to find the label if you did not find it earlier.

**GENERIC
HERBICIDE**

ACTIVE INGREDIENTS:	
Chlorpyrifos-methyl (0,0-dimethyl 0-(3,5,6-trichloro-2-pyridyl) phosphorothioate)	43.2%
Xylene range aromatic solvent	46.0%
INERT INGREDIENTS	10.8%
TOTAL	100.0%

Contains 4 lb. chlorpyrifos-methyl per gallon

KEEP OUT OF REACH OF CHILDREN
DANGER
SEE REMAINDER OF LABEL FOR ADDITIONAL
PRECAUTIONARY STATEMENTS

GENERIC HERBICIDE is a Reg. TM of XXXXXX Co., Inc.
 U.S. Patent No. X,XXX,XXX
 EPA Est. No. XXXXX-XX-X
 EPA Reg. No. XXXX-XX

FACSIMILE LABEL
 000 Nowhere Street
 Noplace, USA XXXXX

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
DANGER**

Corrosive, causes eye and skin damage or irritation. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Do not breathe vapors and spray mist. Keep container closed. Wash hands, arms and face thoroughly with soap and water after handling and before eating or smoking. Routinely shower or bathe after work and wash all clothing with soap and hot water before reusing. Keep away from food, feed stuffs and water supplies.

STATEMENT OF PRACTICAL TREATMENT

If Swallowed: Do not induce vomiting. Call a physician immediately.
 If on Skin: Remove contaminated clothing and immediately wash with soap and water.
 If in Eyes: Flush eyes with plenty of water for 15 minutes and call a physician.

NOTE TO PHYSICIAN: Chlorpyrifos-methyl is a cholinesterase inhibitor. Treat symptomatically. Atropine by injection is the preferable antidote. Oximes such as 2-PAM may or may not be therapeutic, but it is recommended they not be used in place of atropine.

ENVIRONMENTAL HAZARDS

GENERIC HERBICIDE is toxic to fish, birds, and other wildlife. Do not apply directly to water. Do not discharge directly or indirectly into surface waters. Do not contaminate water by cleaning or equipment or disposal of wastes.

PHYSICAL OR CHEMICAL HAZARDS

Combustible—Do Not Use or Store Near Heat or Open Flame.
 Do Not Cut or Weld Container.

Figure 4.1 Sample pesticide label.

(Note: The label above does not represent an existing product. Its purpose is to show the reader what a label may look like and what information it may provide.)

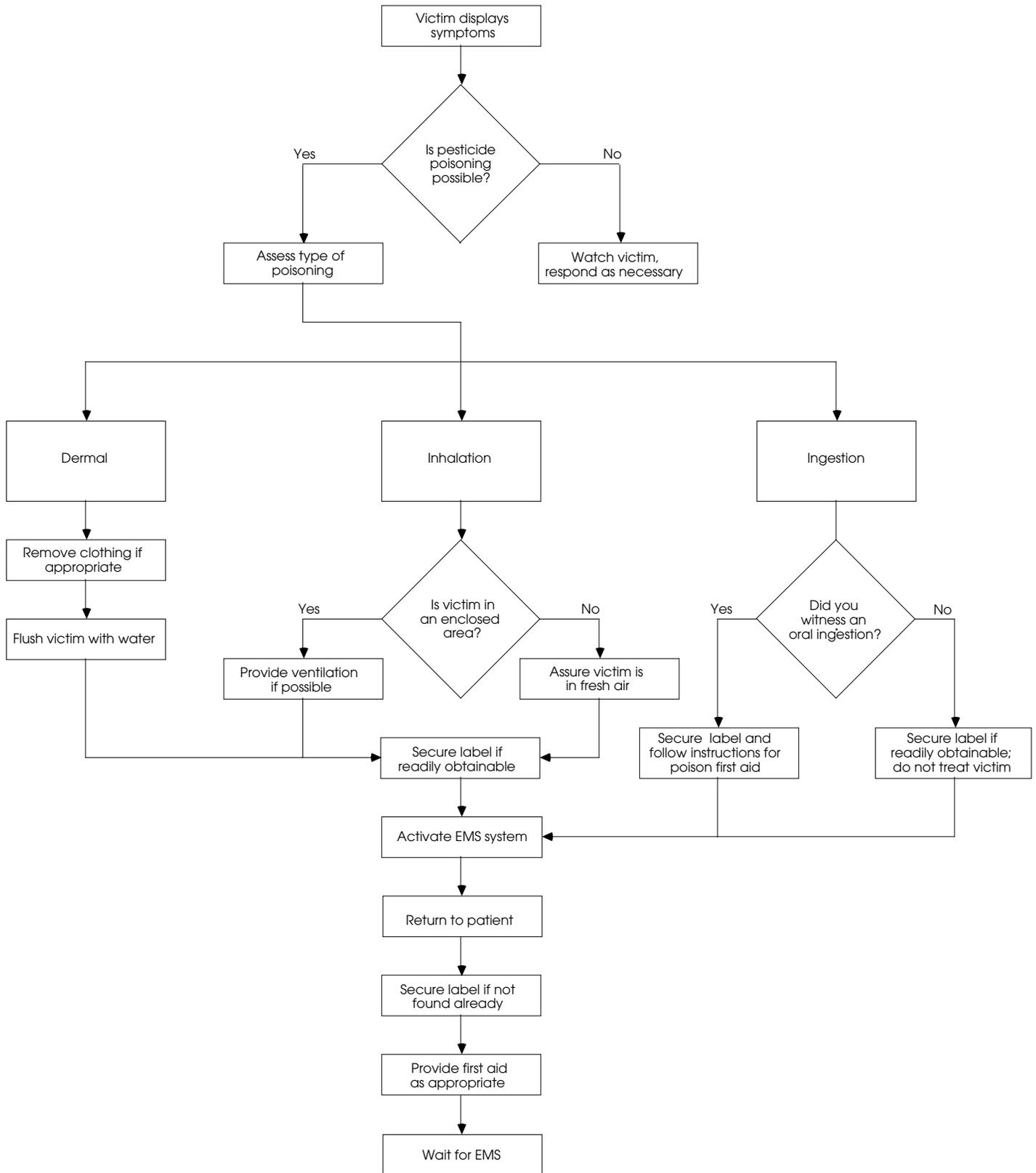


Figure 4.2 Decision Tree for Pesticide Accidents

opening doors and windows or turning on fans. Fresh air is the best first aid for an inhalation victim until professional medical care arrives.

Ingestion Overexposure

Most cases of swallowing a pesticide, called ingestion overexposure, involve small children who drink leftovers from various bottles used by adults to mix, store, or apply pesticides. However, adults who handle pesticides and do not wash their hands before eating can also ingest the poisons when eating, smoking, or chewing tobacco.

If you know or suspect someone has ingested a pesticide, secure the label and, in most cases, activate EMS prior to administering first aid as indicated on the label. However, in cases where you witness a child ingesting a poison for which the label indicates induced vomiting as first aid, do so before activating EMS. **Inducing vomiting should not be done unless the label, EMS dispatcher, or poison control center recommends it.**

Anhydrous Ammonia

Anhydrous ammonia damages human tissue in two ways: 1) as a strong alkali, it causes painful skin burns and 2) due to its low boiling point, it also burns by freezing. Mild exposure to anhydrous ammonia can cause irritation to the eyes, nose, and lungs, while prolonged exposure can result in suffocation. If a victim is trapped in a continuing anhydrous ammonia discharge, do not enter the area without a self-contained breathing apparatus (SCBA) and a complete suit of protective clothing.

To provide emergency first aid, flush the exposed body areas with water. Flush the eyes first; eyes exposed to ammonia will close involuntarily and must be forced open to be rinsed. Water should be carried on all anhydrous ammonia tanks for emergency purposes. Look for a five-gallon bag or plastic container on the side of the nurse tank or on the tractor. Pour or squeeze water into the eyes for a minimum of fifteen minutes. Continue to irrigate the eyes with water until further medical help becomes available. Always activate EMS in cases of anhydrous ammonia injury.

Do not attempt to remove clothing that has been saturated with ammonia because it may be frozen to the skin. Apply water to the exposed area first, and continue to saturate the area for at least five minutes before leaving to activate EMS. If the victim is conscious, he or she can continue flushing and allow you to activate EMS even sooner. Return to the scene and wait for EMS. Continue flushing for a minimum of fifteen minutes. Saturated clothing should be removed after water treatment has eliminated the freezing effect of the ammonia. Allow skin burns to remain open to the air—do not apply any salves or ointments.

CHAPTER 5

Electrocution Accidents

Time is critical for victims of electrical shock, who may be suffering from respiratory paralysis, heart fibrillation, internal injuries, or severe burns. Heart fibrillation is a disruption of the normal heart beat sequence, which, if not restored, will cause death. As in other emergencies, irreversible brain damage may occur in four to six minutes if breathing has stopped.

If you know or suspect a victim has been electrocuted (Figure 5.1), do not approach the site if the victim is still

in contact with the power source. If you can quickly turn off the main power source to the farm, do so. Always assume that any downed power lines are “hot” and any equipment in contact with a power line is still energized.

If the power is still connected, the next step is to activate EMS; if the dispatcher does not contact your power supply company, then call them as well. Both numbers should be posted near all phones with other emergency numbers. Return to the scene and prevent others from

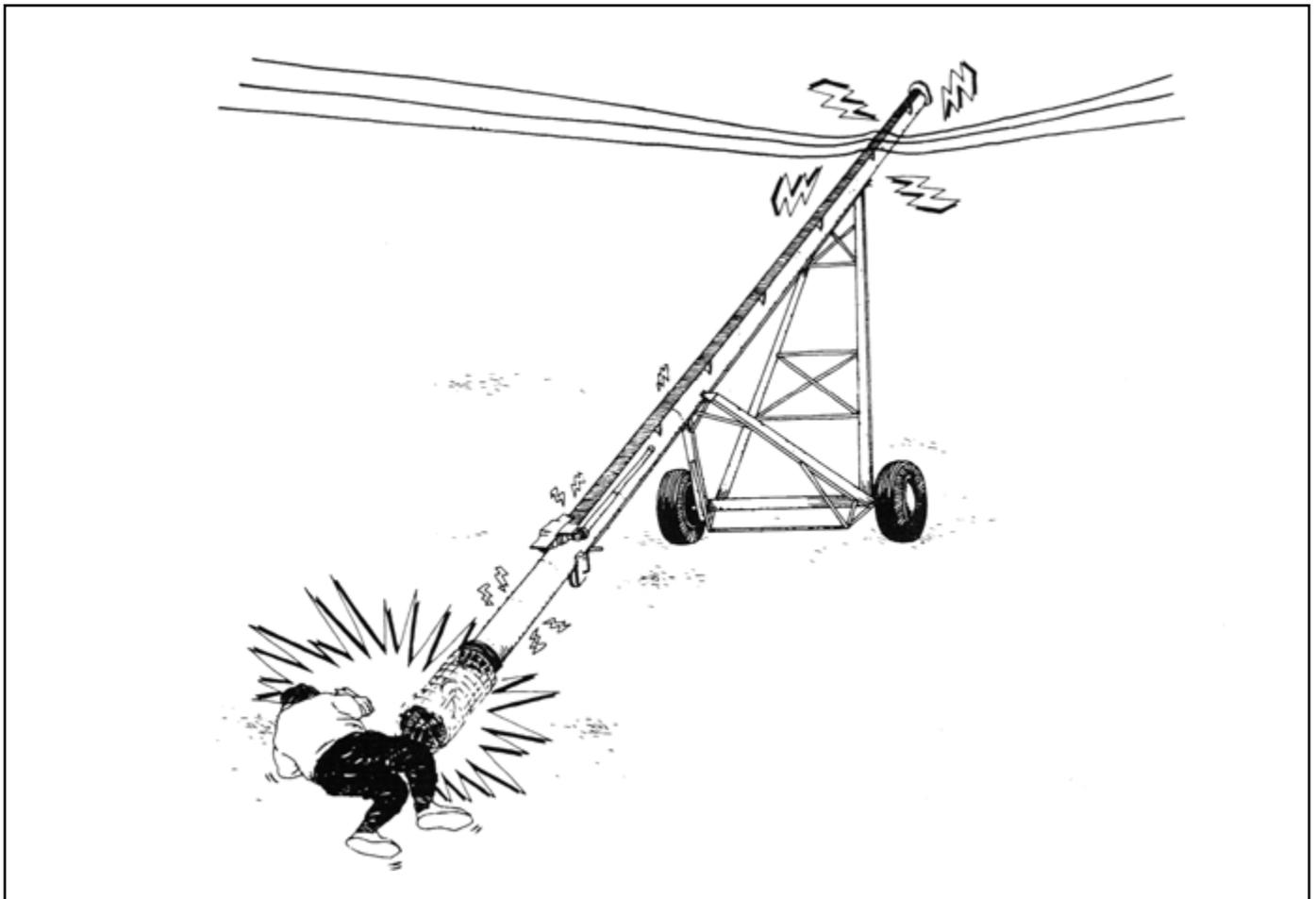


Figure 5.1 A farmer moved an unloader into charged power lines and is still in contact with the energized equipment.

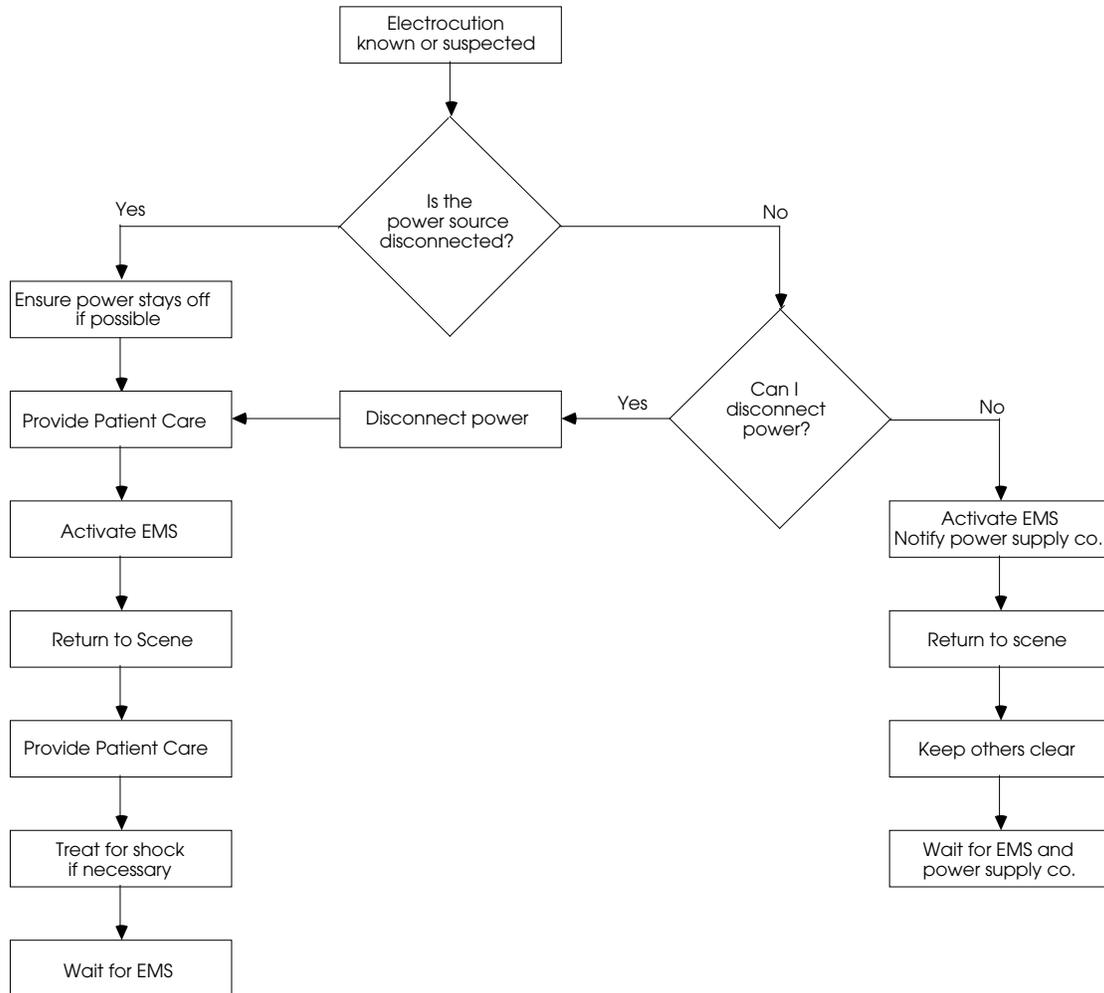


Figure 5.2 Decision Tree for Electrocutation Accidents

approaching a dangerous situation. Wait for EMS and the power supply company. Do not attempt a rescue if you are not trained in handling high voltage power lines. Do not try to separate the victim from the power source by using a stick or board—it is very hazardous and you may be electrocuted.

If you know immediately upon reaching the scene that the power is off, try to insure that it cannot come back on or that someone cannot unknowingly turn it on. Padlock a control box in the “off” position or remove all fuses. If possible, shut off power at the main control panel to the farmstead (Figure 5.3).

When you are certain that the power is off, assess the victim’s condition as described in Chapter 1. If necessary, perform CPR for one minute, then activate EMS. Return to the scene and wait for EMS. Repeat the patient care steps as described in Chapter 1. Electrocuted victims may also suffer burns; see Chapter 7 for a discussion of burn treatment.

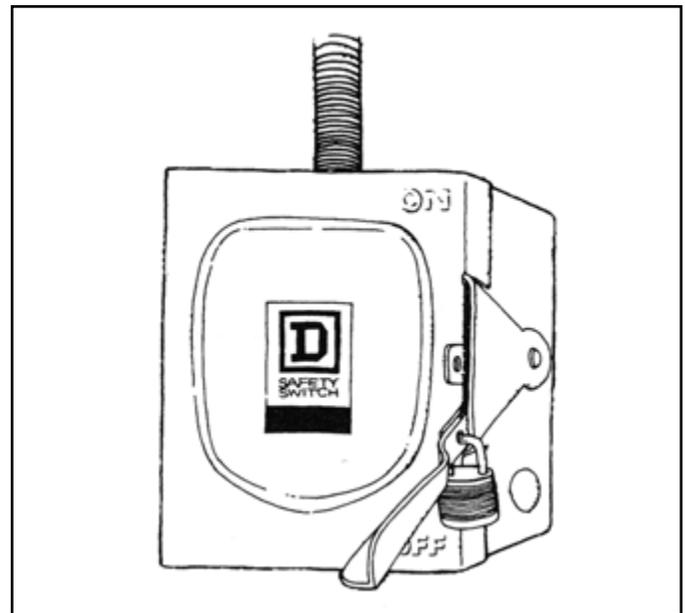


Figure 5.3 Padlock the control box to prevent anyone from inadvertently restoring power during an electrocution emergency.

CHAPTER 6

Reporting Farm Accidents

Procedures for contacting emergency service personnel by telephone vary greatly across the U.S. In some areas, “911” is dialed in all types of emergencies. Many areas may have a central dispatch number for fire/rescue/ambulance services, while some may still have separate local numbers to call for each type of service.

No matter what the situation is in your local calling area, post emergency numbers at all telephone locations and make sure all family members and workers understand the purpose of each number. Ideally, you should post emergency numbers for fire/rescue/ambulance services, poison control center, power supply company, the state police, sheriff, and local police. Periodically, make sure the numbers are still in place, readable, and still accurate. On the inside back cover of this bulletin is a form that can be cut out or copied and used to post phone numbers and a clear set of directions to the farm, so those reporting emergencies can give accurate, helpful information to the EMS dispatcher and others.

Rural areas may have one dispatcher who is responsible for calls from a large area. The dispatcher may not be able to assist by calling the poison control center, power supply company, or other needed services. In these cases, it is especially important to have phone numbers for these services posted.

Never hang up the phone until the dispatcher/operator tells you to. The dispatcher may start the emergency response procedure and then come back to you for additional information.

Provide clear, concise directions to the accident site or to a place where someone can meet responders. A specific address may or may not be appropriate. Provide accurate mileage distances and, if you mention landmarks, make sure they are current, visible year around (even in snow), and visible day and night. Direct responders to turn left or right on country roads,

as opposed to north, south, east, or west. The driver of the emergency response vehicle may be completely unfamiliar with the area in which your farm is located.

Sample phone conversations of farm accident reports in Figure 6.1 on the opposite page provide comparisons of good, efficient accident reporting and poor, ineffective accident reporting. Of course, the exact words used to report an accident will vary with the individual and accident type. The blank form on the back cover will assist your family in providing accurate, effective information to a dispatcher in case of an emergency. You may need to expand this form or fill out more than one if directions vary for different parts of the farm.

Calling a Dispatcher

When reporting a farm accident, give the EMS dispatcher the following information:

- 1) the location of the accident scene,
- 2) the telephone number from which the call is made,
- 3) the nature of the accident (electrocution, entrapment by tractor, etc.),
- 4) number of victims,
- 5) condition of victims (bleeding, heart attack, amputation, shock, etc.),
- 6) type of aid that has been given to the victims (CPR, bandaging, etc.),
- 7) whether someone will meet EMS at the entrance to a remote location,
- 8) any special conditions that will hinder rescue efforts, and
- 9) other information as necessary.

Poor Farm Accident Reporting	Good Farm Accident Reporting
Identification: "My name is Betty."	Identification: "My name is Betty Smith and my phone number is 555-1234."
Nature of Problem: "My husband is caught under a tractor." (Explain the type of incident, medical condition of victim, and accident location.)	Nature of Problem: "My husband is trapped under a 6-ton tractor with a front-end loader on it. The tractor is in a 6 ft. deep ditch. He's unconscious but I know he's breathing. The accident happened a few hundred yards from the driveway to our house."
Directions to Accident: "Hurry, please, and get somebody out here. We live on that place just past the gas station that has the Angus cows. It's on Whitehall Road."	Directions to Accident: "Go to the intersection of Route 26 and 322; go 3.4 miles on 322 South to the Landmark Dodge dealership; turn left on Whitehall Road. We are the first house on the left past the Texaco station and have a big Smith Angus Farm sign. You can see the accident from the driveway entrance."
Any special considerations or problems? (Caller hung up without waiting for further instructions or questions from dispatcher.)	Any special considerations or problems? "The tractor engine isn't running. I could smell gasoline but I couldn't see it dripping or spilling. The tractor turned downhill into the ditch and will be hard to reach."

Figure 6.1 Sample phone conversation of farm accident reports are shown. The example on the left is a poor, ineffective report which provides almost no directions for reaching the scene; the example on the right is a good, efficient report which includes complete, helpful information that will enable EMS to reach the scene and rescue the victim.

CHAPTER 7

Emergency Care Concerns

If you are the first person on the scene of a farm accident, you may be faced with severe injuries that require immediate attention for the patient to survive. This chapter reviews some of the common injuries that occur in farm accidents, the actions to take when confronted with these injuries, and some actions that could cause further injury. The chapter is not meant to be a substitute for professional training, which is needed to develop proficiency in CPR and first aid procedures.

CPR and first aid training are available from the local American Red Cross, American Heart Association, or emergency medical service groups. Contact the local fire department or Cooperative Extension office to inquire about training. Your objective should be to have each family member and full-time farm worker trained in CPR and first aid. Develop a plan to accomplish this over a reasonable period of time.

Respiration

Respiration is essential to maintain human life. If this basic process stops or becomes insufficient, all other life processes stop. Helping a victim to breathe is the most important medical consideration once an accident scene has been stabilized.

Breathing is an automatic function controlled from respiratory centers in the brain. As a person breathes, oxygen is brought into the body and carbon dioxide is expelled. Blood passing through the lungs receives oxygen and leaves carbon dioxide wastes which are then exhaled.

Breathing and the heart beat are two different but interrelated processes. If breathing stops, blood being pumped to the brain will lack oxygen, so the center in the brain that controls the heart will shut down unless breathing is soon restored. In contrast, if the heart beat is disrupted or stopped, as can happen during an

electrocution, no oxygen-fresh blood will be pumped to the brain; the respiratory center will stop the breathing process unless the heart beat is restored.

Cardiopulmonary Resuscitation (CPR)

CPR is a procedure used to restore breathing and heart activity. If you have had training in the past, be advised that the procedure for CPR is constantly being reassessed. Contact the agencies mentioned previously to see if your training is current. The guidelines below for one-person CPR on an adult victim is current at the printing of this bulletin.

Mouth-to-mouth breathing or chest compressions should not be done unless you have determined that the victim is not breathing or has no pulse. Before beginning the following procedure, determine whether the victim is conscious by shouting "Are you okay?" and gently tapping or shaking the victim. Then, determine whether the victim is breathing. If spinal injury is possible, the victim should not be moved to clear an airway unless breathing can't be evaluated or has stopped, as described in Chapter 1.

Airway, breathing, and circulation are the ABCs to remember when providing patient care to a farm accident victim. "Airway" refers to making sure the victim's throat is in a position to allow breathing to occur. The victim's head may be turned in such a way that the throat is closed, which prevents breathing. Mucus, blood, or vomit may collect in the throat and prevent breathing. No action is necessary to open the airway if the victim is breathing.

"Breathing" refers to determining whether the victim is breathing after the airway has been opened. If the victim is not breathing, then perform CPR if you can.

“Circulation” refers to determining whether the victim has a pulse, which indicates heart activity. If there is no pulse, then perform CPR if you can. As indicated in Figure 1.4, the amount of time to spend on CPR is determined by whether EMS has been activated. Actions will depend on the accident situation.

To Administer CPR:

Rescuer Position—By kneeling at the level of the victim’s shoulders, a trained person can perform rescue breathing and chest compressions without moving the knees.

1. Clear an airway.

The victim should be placed flat on his or her back on a firm, flat surface. If it is necessary to roll the victim over, the head, neck, and torso should be moved together so that no twisting occurs.

- A. If no neck or back injury is evident, tilt the victim’s head back (see Figure 1.6, page 8).
- B. If a neck injury exists—perform a modified jaw thrust, moving jaw only (Figure 1.7, page 9).

2. Look, listen, and feel for breathing.

Look for a rising and falling chest. Listen for air movement from mouth or nose. Feel for air movement by placing your cheek near the victim’s nose and mouth.

3. Give two one to one and a half second breaths if the victim is not breathing.

(Use “mouth puffs” if the victim is a child, since children have smaller lungs than adults). Training should be received in the correct technique for mouth-to-mouth breathing.

4. Check for a pulse.

(Check the carotid artery—the major artery in the neck).

5. If there is no pulse, begin compressions.

Note: The following description is taken with permission from the *Journal of the American Medical Association*, Volume 255, No. 21, June 6, 1986.



Figure 7.1 Check for a pulse in the carotid artery in the victim’s neck.

Proper Hand Position—Proper hand placement, illustrated in Figure 7.2, is established by the following guidelines:

1. With the middle and index fingers of the hand nearest the victim’s legs, the rescuer locates the lower margin of the victim’s rib cage on the side next to the rescuer.
2. The fingers are then moved up the rib cage to the notch where the ribs meet the sternum in the center of the lower part of the chest.
3. With the middle finger on this notch, the index finger is placed next to it on the lower end of the sternum.
4. The heel of the hand nearest the victim’s head (which had been used on the forehead to maintain head position) is placed on the lower half of the sternum, close to the index finger that is next to the middle finger in the notch. The long axis of the heel of the rescuer’s hand should be placed on the long axis of the sternum. This will keep the main force of compression on the sternum and decrease the chance of rib fracture.
5. The first hand is then removed from the notch and placed on top of the hand on the sternum so that both hands are parallel to each other.
6. The fingers may be either extended or interlaced but must be kept off the chest.

7. Because of the varying sizes and shapes of different persons' hands, an alternate acceptable hand position is to grasp the wrist of the hand on the chest with the hand that has been locating the lower end of the sternum. This technique is helpful for rescuers with arthritic problems of the hands and wrists.

Proper Compression Techniques—Effective compression is accomplished by attention to the following guidelines:

1. The elbows are locked into position, the arms are straightened, and the shoulders of the rescuer are positioned directly over the hands so that the thrust for each external chest compression is straight down on the sternum. If the thrust is other than straight down, the torso has a tendency to roll, losing part of the force, and the chest compression may be less effective.
2. The sternum must be depressed 1.5–2 in. (3.8–5.0 cm.) for the normal-sized adult.
3. The external chest compression pressure is released to allow blood to flow into the heart. The pressure must be released completely and the chest allowed to return to its normal position after each compression. The time allowed for release should equal the time required for compression.
4. The hands should not be lifted from the chest or the position changed in any way, lest correct hand position be lost.

Rescue breathing and external chest compression must be combined for effective resuscitation of the cardiopulmonary arrest victim. **For adult victims, perform one-person CPR at a rate of 80–100 heart compressions per minute. After every 15 heart compressions, interpose two breaths.**

External Bleeding

Once respiration has been established, the next concern is to control any severe external bleeding. Internal bleeding will not be addressed in this bulletin, as it must be treated by professional medical care personnel.

The three types of external bleeding are listed below in order of seriousness:

Arterial Bleeding—Blood is flowing from an artery. The color is bright red and the flow is in spurts, often pulsating as the heart beats. Blood loss can be rapid and in large volume.

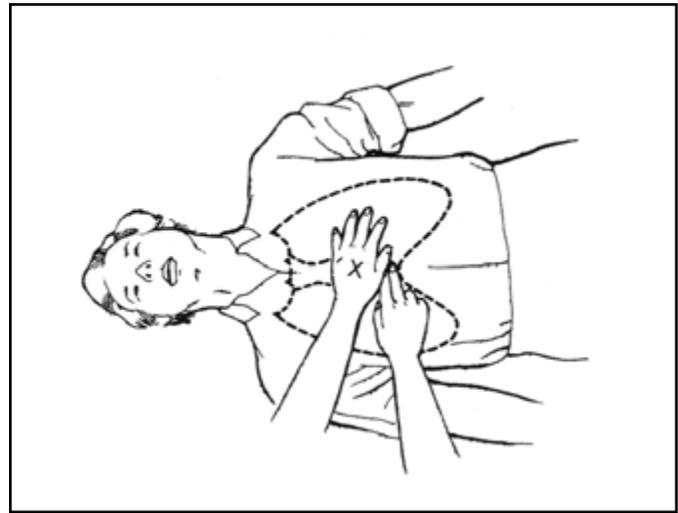


Figure 7.2 Proper hand placement and position for performing one-person CPR.

Venous Bleeding—Blood is flowing from a vein. The color is dark red and may be so dark it appears to be blue. The flow is steady, rather than in spurts, and can occur in large volume, but not as rapidly as arterial bleeding.

Capillary Bleeding—Blood is flowing from a bed of capillaries. The color is red, but usually not as bright as blood from an artery. The flow is slow and oozing, as in scrapes and shallow skin cuts, and is not serious.

The following recommended treatments are offered under the assumption that a medical kit is available. In the absence of a kit, use the cleanest materials available. A somewhat grimy handkerchief used as a dressing is much preferred to letting bleeding continue.

1. Apply a clean dressing to the wound. Press firmly to stop bleeding.
2. Bandage wound firmly.
3. Secure emergency medical care.
4. If a finger or other appendage is severed, handle it as described under "Amputated Tissue," on the opposite page.
5. Do not use tourniquets, except for severe arterial bleeding which may occur with partial or complete loss of an extremity. Direct pressure and bandages should be tried before using a tourniquet.
6. Unless there is evidence of a fracture, a severely bleeding open wound of the hand, neck, arm, or leg should be elevated by raising the injured part of the body above the level of the victim's heart, while at the same time pressure is applied to the wound.

Shock

Shock is a serious condition caused by the failure of enough blood to circulate to vital parts of the body. Shock may accompany serious burns, wounds, fractures, heart attacks, or allergic reactions. Usually, it is caused by the external or internal loss of large quantities of blood or body fluids. Do not confuse shock with simple fainting or with the natural apprehension and anxiety which may accompany injury. A shock victim may be pale and cold, and may have moist skin, vacant eyes or a lackluster look, nausea, or a weak and rapid pulse, and may be unconscious. If head, neck, or spinal injuries are not evident, treat for shock as described below:

1. Keep victim lying down and quiet with legs slightly elevated above head level if there is no evidence of head injury or leg fractures. If in doubt of injuries, keep the victim flat.
2. Keep the victim warm with blankets if necessary. Put blankets both over and under the victim if possible. Do not add heat.
3. Loosen any constricting clothing.
4. Handle the victim carefully and gently.
5. Call for emergency medical help immediately.
6. Render first aid for the injuries.
7. Do not give the victim anything to eat or drink, not even water.

Specialized First Aid for Farm Accidents

Many emergency first aid procedures are particularly appropriate for farm audiences. Common farm-related injuries include amputations, head injuries, puncture wounds, and burns.

Amputated Tissue

If an appendage or skin has been removed due to an accident, try to locate the amputated tissue for possible reattachment. However, do not delay the transport by EMS of a severely injured victim to look for amputated tissue. It can be sent to an emergency facility at a later time.

Follow the steps below to properly preserve the tissue:

1. Wrap the appendage in a dry, sterile dressing or towel and secure it with a self-adhesive gauze bandage.
2. Place the part in a clean plastic bag and label it with the victim's name, the date, and the time. Seal the bag.
3. Place the package in a cooler or other appropriate container on top of a sealed bag of ice or cold packs for transport to the hospital.

Never allow an amputated part to be submerged in or even come in contact with ice or ice water. Never use dry ice to keep an amputated part cool.

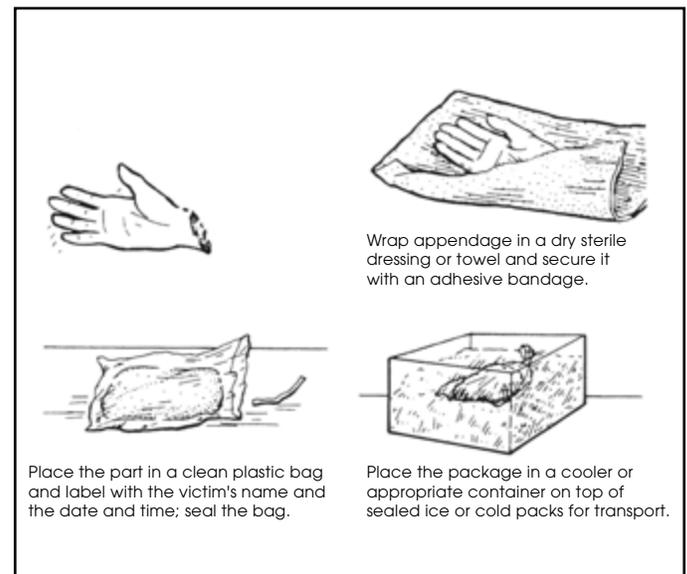


Figure 7.3 Procedure for saving and transporting amputated tissue.

Head Injuries

If a spinal injury is not suspected, lay the victim on his or her back with head and shoulders slightly elevated. Never attempt to stop ear or nasal bleeding associated with a head injury. If no bone fragments or depressions are evident, control bleeding by applying light pressure over the wound with a clean dressing. Assume a neck injury has occurred with a head injury and handle the victim accordingly. If a victim remains unconscious, turn the head to one side to prevent the victim from choking on any vomit. Activate EMS.

Even if a victim is only briefly unconscious and seems to fully recover, contact a doctor. Do not allow a victim to resume activities before being examined by a doctor. Head injury victims may become combative, so expect aggressive behavior.

Sucking Chest Wounds

A sucking chest wound is a puncture wound to the chest and may or may not be indicated by a hissing, sucking, and fluttering noise produced as the patient breathes.

A sucking chest wound is a true medical emergency and must be closed immediately. Apply a dressing which blocks air from entering the wound and seal all four edges with tape. Seal the last edge when the victim exhales (breathes out). If no first aid supplies are available, use your hand to seal the wound.

Activate EMS as soon as possible, because this wound is life-threatening and requires professional medical attention. Return to the scene quickly to recheck the dressing. Sometimes this type of dressing can cause tension and pressure in the chest cavity. If the victim has increased breathing problems, a weak pulse, and seems to be getting worse rapidly, lift a corner of the sealed dressing to allow air to escape. The victim should respond almost immediately as the pressure is released. Reseal the dressing and watch the patient. You may have to repeat this action many times before EMS arrives.

Burns

Burns are classified by the degree of damage they cause to the skin. In a first-degree burn, only the top layer of skin is burned and reddened, as with a sunburn.

In a second-degree burn, the skin blisters and there is damage to deeper layers of the skin. In a third-degree burn, the most serious kind, the entire thickness of the skin is burned. The skin is usually dry and pale, but burned skin may be brown or even charred. In third-degree burns, a loss of sensation in the area may result due to the destruction of nerve endings. The intensity of a burn is dependent on temperature and the length of time the skin is exposed to the cause of the burn.

Burned areas should be covered with a clean, dry dressing. The Maryland Burn Center recommends putting cool water on a burn only if it covers less than 9% of the body. If the burn covers more than 9% of the body, applying cool water may result in hypothermia—an abnormally low body temperature. Wrap the burned area in a clean dry sheet. Never use grease (e.g. butter, lard, Vaseline, etc.,) on a burn. Activate EMS immediately.

APPENDIX A

How to Shut Off Diesel Tractors in an Emergency

Your ability to shut off the engine in the event of a tractor or machinery accident may save the life of or prevent further injury to the victim. The following instructions will teach you to shut off nearly all types of diesel tractors. Just turning off the ignition key will not stop most diesel engines; you must shut off the fuel supply to the engine. Most diesel tractors use one of four methods for shutting off diesel fuel supply. The instructions help identify which fuel shut-off system is used on any given tractor and explain how to shut the engine off.

WARNING: Do not approach a tractor that is on fire. Call the local fire emergency number and follow the steps in Figure 2.2 on page 11.

Fuel shut-offs are usually located near a tractor's steering wheel, although on some models they are near the seat. If the tractor is in a normal, upright position, climb up and sit in the driver's seat. If the tractor has overturned and appears unstable, approach it only from the uphill side. If you cannot safely turn off the tractor, try to assess the victim's condition and activate EMS.

If the tractor can be approached safely, first shut off the ignition key whether or not the tractor is running. Turning off the key may cause the engine to stop. If not, perform steps one through four until the diesel tractor stops.

Step 1

Look for a red knob on the right or left side of the dashboard area. The knob may be located along the side or close to the key. "PULL TO STOP" may be imprinted

on or near the knob. Pull the knob toward you as far as it will go to stop the engine. Go to Step 2 if you do not find this knob.

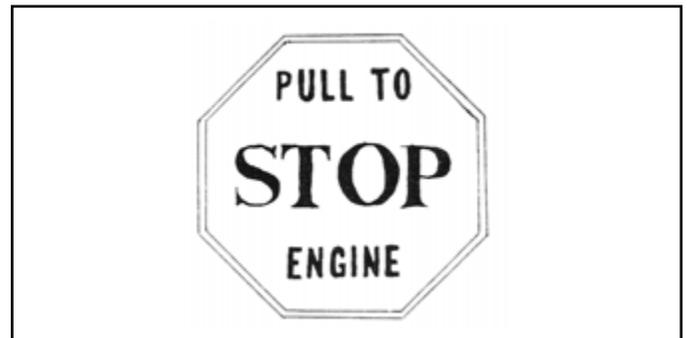


Figure A.1 "Pull to STOP Engine" decal.

Step 2

Look for a thin rod that looks like an extra turn signal lever behind and to the right of the steering wheel. This is the throttle, which increases or decreases the speed of the engine. Push the rod up in a counterclockwise direction as far as possible. The engine will slow down and may shut off. If the engine does not stop, go to Step 3; if you do not find this rod, go to Step 4.

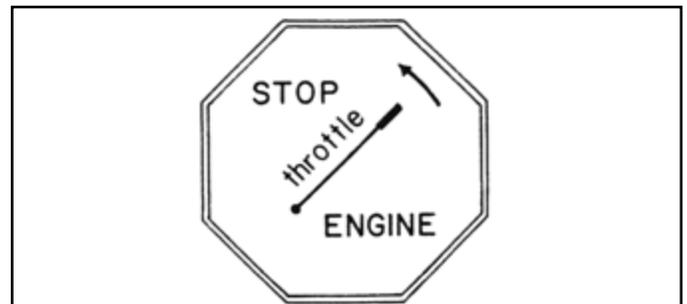


Figure A.2 "Stop Engine" decal of 'clock-like' throttle.

Step 3

Further movement of the throttle is needed to stop the engine. Pull out on the rod as if you were trying to make it longer. If it does not move a few inches, push in on the rod. If this is unsuccessful, pull the rod toward you. After you have completed whichever motion is successful, hold the rod at that length and move it up in a counterclockwise direction, as in Step 2. The engine will stop.

Step 4

Look for a lever with a black knob or T-shaped end sticking out of a slot. This may be the throttle, which changes engine speed, and may be on the right side of the dashboard near the steering wheel or to the right of the driver's seat. If the lever is on the dash, push it down to the very bottom of the slot. If the throttle is to the right of the seat, push it to the rear as far as it will go. The tractor engine will shut off.

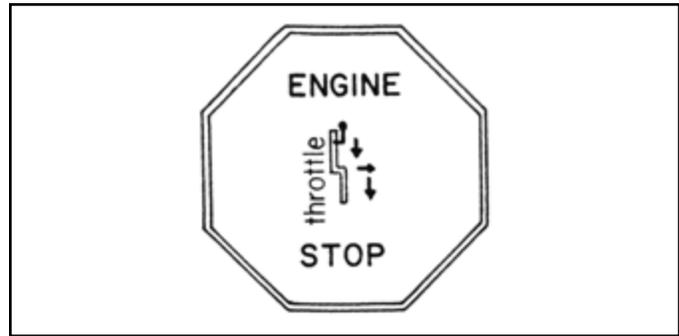


Figure A.3 "Engine Stop" decal of slot-like throttle.

Show every member of your family or work force how to perform the above procedure on every diesel tractor on your farm. In an emergency, everyone should be able to shut off a running tractor quickly. Be sure to always turn off the key, regardless of whether or not the tractor is running.

An appropriate decal should be placed on every piece of farm equipment that has an engine. Decals similar to Figures A.1, A.2, and A.3 are available from:
The Maryland Agricultural Safety and Health Federation, c/o Department of Agricultural Engineering, University of Maryland, College Park, MD 20742.

APPENDIX B

Pesticide First Aid Kit

Make your own first aid kit using a sturdy box with a tight-fitting cover that can be securely latched. Store the kit where it will not become contaminated by pesticides. Label all containers clearly. Use a waterproof marker or nail polish to label plastic bottles. You should include the following items in your kit:

- A one-ounce bottle of syrup of ipecac for inducing vomiting.*
- One teaspoon.
- A small package or pint bag of activated charcoal to be mixed with water and swallowed. Activated charcoal absorbs many pesticides.
- Two one-quart containers of clean water. If bottled water is unattainable in an emergency, use pond or stream water.
- Disposable rubber gloves, eye goggles
- A supply of plastic bandages and tape to cover cuts and scrapes to prevent them from becoming contaminated by pesticides.
- Tongue depressors to mix materials.
- Two small, plastic, empty jars with tight-fitting lids. One can be used for a drinking glass or for mixing activated charcoal, the other to collect a sample of vomit for the doctor.
- A can of evaporated milk to give to the patient, to help dilute the poison, and a can opener.
- A blanket for treating shock which must be kept where it will not become contaminated by pesticides. A “space blanket” is excellent for first aid use.

* Note: Never induce vomiting unless the pesticide label, EMS dispatcher, or poison control center recommends it.

APPENDIX C

General First Aid Supplies

Many types of first aid kits are available to the public. Place a small, regularly maintained kit on every major piece of farm equipment, truck, or auto. Display a larger kit at each farm building, shop, or home.

- Red Cross First Aid Manual and The American Academy of Pediatric Surgeons First Aid Chart
- Poison First Aid Kit with syrup of Ipecac and charcoal (to be used under direction of Poison Control Center only)
- Sterile first aid dressings in sealed envelopes; 2" x 2" for small wounds; 4" x 4" for larger wounds and for compress to stop bleeding (Do not make your own)
- Two trauma dressings for covering large areas
- Small sterile compress with adhesive attached in sealed envelopes
- Roller bandages; 1", 2", and 6" cling bandages
- Adhesive tape: a roll of assorted widths to hold dressings in place
- Triangle bandages for slings or as a covering over a large dressing
- Soap for cleaning wounds, scratches, and cuts
- Tongue depressors
- Bandage scissors; heavy-duty scissors to cut clothing
- Tweezers to remove stingers from insect bites or to remove small splinters
- Splints 1/4" thick x 3" wide x 12"–15" long for splinting broken arms and legs
- Sterile saline solution (8 ounces for small kits, 2 quarts for large kits)
- Safety pins
- Ice packs (chemical ice bags) to reduce swelling
- A pocket mask for resuscitation
- Three small packages of sugar for diabetics
- Disposable rubber gloves, eye goggles

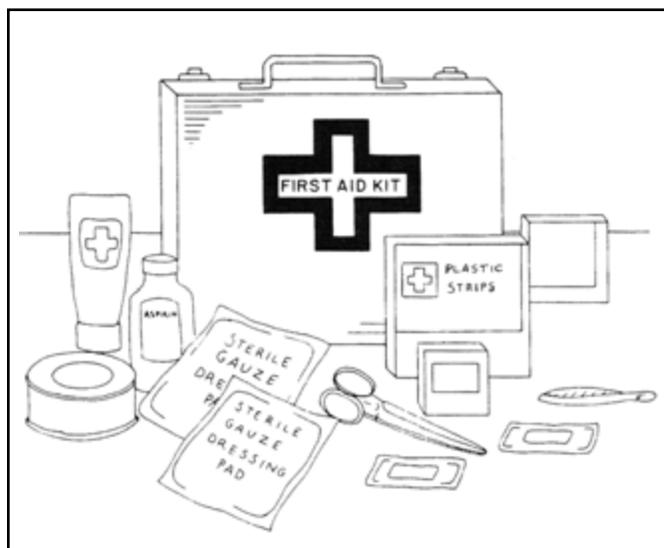


Figure C.1 A first aid kit containing all the items listed above should be placed on all major equipment and vehicles.

FARM ACCIDENT EMERGENCY INFORMATION

Always provide the dispatcher with your name and phone number:

Name: _____

Phone: _____

EMERGENCY NUMBERS

Fire Department _____

Local Police/Sheriff _____

State Police _____

Ambulance _____

Poison Control Center _____

Electric/Gas Supply _____

DIRECTIONS TO YOUR FARM:

(Provide Specific Miles and Mention Visible Landmarks)

SPECIAL CONSIDERATIONS

Special considerations that may make it difficult to reach a specific site or any medical conditions of potential victims (diabetes, epilepsy, heart trouble, etc.) which EMS should know about:

WHAT TO TELL DISPATCHER:

- 1) The location of the accident scene
- 2) The telephone number from which the call is made
- 3) The nature of the accident (electrocution, entrapment by tractor, etc.)
- 4) The number of victim(s)
- 5) The condition of victim(s) (bleeding, heart attack, amputation, etc.)
- 6) The type of aid that has been given to victims (CPR, bandaging, etc.)
- 7) Whether someone will meet EMS at the entrance to a remote location
- 8) Any special conditions that may hinder rescue (mud, fallen trees)
- 9) Other information as necessary

DO NOT HANG UP THE PHONE UNTIL THE DISPATCHER TELLS YOU TO

FARM ACCIDENT EMERGENCY INFORMATION

Always provide the dispatcher with your name and phone number:

Name: _____

Phone: _____

EMERGENCY NUMBERS

Fire Department _____

Local Police/Sheriff _____

State Police _____

Ambulance _____

Poison Control Center _____

Electric/Gas Supply _____

DIRECTIONS TO YOUR FARM:

(Provide Specific Miles and Mention Visible Landmarks)

SPECIAL CONSIDERATIONS

Special considerations that may make it difficult to reach a specific site or any medical conditions of potential victims (diabetes, epilepsy, heart trouble, etc.) which EMS should know about:

WHAT TO TELL DISPATCHER:

- 1) The location of the accident scene
- 2) The telephone number from which the call is made
- 3) The nature of the accident (electrocution, entrapment by tractor, etc.)
- 4) The number of victim(s)
- 5) The condition of victim(s) (bleeding, heart attack, amputation, etc.)
- 6) The type of aid that has been given to victims (CPR, bandaging, etc.)
- 7) Whether someone will meet EMS at the entrance to a remote location
- 8) Any special conditions that may hinder rescue (mud, fallen trees)
- 9) Other information as necessary

DO NOT HANG UP THE PHONE UNTIL THE DISPATCHER TELLS YOU TO