

EMS Operations and Transportation

**EMS Continuing Education
Technician through Technician-Advanced Paramedic**

**Consistent with the
National Occupational Competency Profiles
as developed by
Paramedic Association of Canada
and
“An Alternate Route to Maintenance of Licensure”
as developed by Manitoba Health**

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Disclaimer

These documents were developed for improved accessibility to standardized continuing education for all paramedics in Manitoba.

This training package is consistent with the National Occupational Competency Profiles and the core competency requirements (both mandatory and optional) as identified in “An Alternative Route to Maintenance of Licensure” (ARML). It is not the intent that this package be used as a stand-alone teaching tool. It is understood that the user has prior learning in this subject area, and that this document is strictly for supplemental continuing medical education. To this end, the Paramedic Association of Manitoba assumes no responsibility for the completeness of information contained within this package.

It is neither the intent of this package to supersede local or provincial protocols, nor to assume responsibility for patient care issues pertaining to the information found herein. Always follow local or provincial guidelines in the care and treatment of any patient.

This package can be used in conjunction with accepted models for education delivery and assessment as outlined in “An Alternative Route to Maintenance of Licensure”. Any individual paramedics wishing to use these continuing education packages to augment their ARML program should contact their local EMS Director.

This document was designed to encompass all licensed training levels in the province (Technician, Technician – Paramedic, Technician – Advanced Paramedic.). Paramedics are encouraged to read beyond their training levels. However, it is suggested that the accompanying written test only be administered at the paramedic’s current level of practice.

This package has been reviewed by the Paramedic Association of Manitoba’s Educational Subcommittee and is subject to review by physician(s) or expert(s) in the field for content.

As the industry of EMS is as dynamic as individual patient care, the profession is constantly evolving to deliver enhanced patient care through education and standards. The Paramedic Association of Manitoba would like to thank those practitioners instrumental in the creation, distribution, and maintenance of these packages. Through your efforts, our patient care improves.

This document will be amended in as timely a manner as possible to reflect changes to the National Occupational Competency Profiles, provincial protocols/Emergency Treatment Guidelines, or the Cognitive Elements outlined in the Alternate Route document.

Any comments, suggestions, errors, omissions, or questions regarding this document may be referred to info@paramedicsofmanitoba.ca , attention Director of Education and Standards.

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Introduction

This module deals with EMS Operations and Transportation.

Conventions Used in this Manual

The cognitive elements contained in this training module apply to all EMS licensure levels. Therefore no conventions have been used to differentiate between Technician, Technician Paramedic and Technician Advanced Paramedic

Provincial Legislation Related to Operating an Ambulance

Emergency Vehicle Operations

All EMS personnel must be familiar with the various Federal, Provincial, Municipal, and local laws, regulations, and Regional Health Authority policies or operating guidelines affecting the operation of an ambulance and a designated emergency medical services vehicle.

1. In order to operate a vehicle registered as an ambulance or designated emergency medical services vehicle the operator must
 - be at least 18 years of age
 - possess a valid Class 4 or higher Manitoba driver's license
 - be licensed under the provisions of the Manitoba Emergency Medical Response and Stretcher Transport Act and Regulation
 - be familiar with local policies
 - be familiar with the operation of all communication devices and local policies regarding communications
2. As stated in the Manitoba Health ETG's (G16): Local policies must state that no one shall be permitted to operate an ambulance or designated emergency medical services vehicle
 - if they have been consuming alcohol in the 24 hours prior to operating the ambulance or designated emergency services vehicle (**zero tolerance**)
 - are taking drugs or medications, either prescription or non-prescription, that preclude the operation of machinery, could affect motor skills, or could impair judgement
 - are incapable of operating such a vehicle due to illness, injury, or fatigue.
3. As stated in the Manitoba Health ETG's (G16): The ambulance operator must contact the dispatch centre that the ambulance is enroute and to which facility they are transporting to.
 - All communications should be restricted to the fleet net radio or approved fixed mount cellular telephone.
 - Ambulance operators are restricted from using mobile/cellular phone for personal calls.
4. Under the Provincial Highway Traffic Act, ambulances and designated emergency medical services vehicles may proceed through a controlled intersection against a red traffic control light or stop sign only if it is safe to do so
 - all ambulances and designated emergency medical services vehicles must come to a full stop at all red traffic control lights and stop signs before proceeding through the intersection and should only enter the intersection when it is safe to do so
 - ambulances and designated emergency medical services vehicles must utilize their emergency lights and warning signals when proceeding

through an intersection against a red traffic control light or stop sign, or at any time they are contravening the normal operating rules under the Provincial Highway Traffic Act

5. As stated in the Manitoba Health ETG's (G16): Local policies MUST be established on speed limits for ambulance designated emergency medical service vehicles.
 - These vehicles will not be driven faster than twenty (20) kilometers per hour above the posted speed limit with a maximum speed of no more than one hundred and twenty (120) kilometers per hour
 - speed should be reduced accordingly due to road, traffic, weather, and patient conditions
6. The vehicle should be operated utilizing defensive driving techniques focusing on due care and consideration of other drivers, pedestrians, passengers and patients
7. Ambulances and designated emergency medical services vehicles may be driven in an emergency mode (i.e. lights and siren) only when
 - dispatched as such to a known situation requiring this level of emergent response
 - dispatched to an unknown situation potentially requiring this level of emergent response
 - the patient's condition requires emergent transport to advanced medical care
8. Every person must wear seat belts in the ambulance or designated emergency medical services vehicle unless they are actively treating a patient
 - seat belts should still be worn during patient care if at all possible
9. No smoking is permitted in any ambulances or designated emergency medical services vehicles
10. EMS personnel should not eat while in the ambulance or emergency services vehicle
11. Ambulances and designated emergency medical service vehicles must be operated in a careful and controlled manner
 - rapid accelerations, heavy or hard braking, de-accelerating, and radical maneuvering of the vehicle are not acceptable practices
12. When transporting a patient the vehicle operator must adjust the speed and handling of the vehicle so as to provide as smooth a transport as possible
 - this not only minimizes any detrimental effects of the transport but will provide a safe environment for the treating EMS personnel to attend to the patient

NOTE

- Even though the Provincial Highway Traffic Act allows the driver of an emergency vehicle certain privileges it does not excuse the driver from exercising due care, caution, consideration and common sense when operating the emergency vehicle
 - the operator of the emergency vehicle could be held liable if deemed responsible for an accident or injury
- An inexperienced driver may request to trade places with the attendant provided training levels are appropriate

- The ambulance operator is responsible to operate the ambulance or dedicated emergency response vehicles within the limits of his or her own licensure, the limits of the road conditions, the mechanical limitations of the vehicle, and environmental limitations

- The ambulance operator is the "final authority" as to whether a particular response or transport can be safely carried out and should refuse any requests or orders to initiate a trip that he/she feels is unsafe, this includes unsafe weather conditions

Additional Information

Appendix 1 Highway Traffic Act Excerpts

Emergency Medical Response and Stretcher Transport Act – On CD

Land Emergency Medical Response System Regulation – On CD

Preparing an Ambulance for Service

Vehicle and Safety Check

Due to the varied frequency of use and extremely high demands placed on an ambulance, a comprehensive schedule of maintenance is a must for all ambulance operators. Both periodic inspections by a reputable service person and routine in-house inspections by the crew have proven themselves beneficial. Preventative maintenance is necessary for 2 reasons:

1. Because the vehicle must be ready for service at all times;

2. Because it is operated by many individuals. Due to the many types of ambulance services and their varied call volumes, there is no specific inspection and maintenance program established for all. Each must set up their own program to include frequent checks of the following:
 - a. **fuel** - refueling should take place following each call, if there is 3/4 of tank or less

- b. **oil** - oil consumption levels should be checked regularly
- c. **battery** - frequent checks should be made due to heavy power demands (ie. lights, radio, siren)
- d. **tires** - check for correct pressure, signs of abnormal wear, cuts and foreign objects that may be loaded in the tread
- e. **radiator** - check coolant levels frequently, especially when vehicle idles for a long period
- f. **lights** - inspect all lights, including compartment lights
- g. **warning devices** - check all warning and flashing lights, vehicle horn and air horns; sirens should also be checked for full-range operation
- h. **mirrors** - check for tightness, proper position and cleanliness
- i. **other equipment** - include routine checks of the following:
 - gauges and instruments, particularly warning or 'idiot' lights
 - steering mechanisms
 - clutch, if so equipped
 - hydraulic fluid levels
 - air brake supply tanks, if so equipped
 - windshield wipers
 - doors and windows
 - heater and defroster
 - safety belts

Although the safety and efficiency of the ambulance are primary concerns, appearance is also important. Maintaining the ambulance's appearance not only enhances the organization's image, it also helps to reassure the public that the unit is always ready to respond. Efficiency is often equated with appearance. Although a shiny ambulance does not make an efficient operation, it reflects well on the squad, there is a correlation between appearance and efficiency; those who take pride in their work take pride in their appearance as well.

The cleaning of an ambulance need not be regarded as a chore. While wielding a cleaning rag, a paramedic can also function as an inspector. While cleaning lights, for example, he can look for cracked lenses and missing bulbs. While cleaning compartment doors he can also be checking the operation of the doors and the locks. Every time that he opens a door he becomes more familiar with the items inside.

Note: If a fleet vehicle is used, follow all service requirements as provided by Fleet agency. Remember prior authorization is required before any work can be done on the unit.

Conditions Requiring Removal from Service

There are several mandatory or discretionary reasons for removing an ambulance from service. These include:

- failure to meet Highway and Transportation Inspections
- failure to meet Manitoba Health Inspections
- mechanical failures

- equipment failures
- lack of qualified personnel
- regular maintenance

It is the responsibility of the service coordinator to ensure compliance with the Highway Traffic Act, Ambulance Act and Regulations, and repair any failures promptly so as to minimize the interruption of service.

Operation of all Devices within an Ambulance

Check all medical equipment and supplies as per requirement depending on in-house policies, including all the oxygen supplies, the jump kit, splints, dressings and bandages, backboards and other immobilization equipment and emergency OB kit. Is the equipment functioning properly? Are the supplies clean? Are there enough of them? All battery operated equipment, including the defibrillator, should be operated and checked on a regular schedule. Rotate the batteries according to an established schedule.

Disinfecting and Cleaning

After a call, you must complete and file any additional written reports that may be required and inform dispatch of your status, location, and availability if not previously done.

You are also responsible for maintaining the ambulance so that it is safe and available on a moment's notice. This means routine inspections on a regular schedule. Use a written checklist to document needed repairs or replacement of equipment and supplies. In addition, you must ensure that the following steps are taken after each trip:

- Clean and disinfect the ambulance and all equipment used (use the infection control guidelines listed below).
- Dispose of any contaminated waste in the manner prescribed by your agency.
- Clean the outside of the ambulance as needed.
- Replace or repair broken or damaged equipment without delay. This must be reported immediately to a supervisor so that the item may be ordered if required.
- Replace any equipment or supplies that were used.
- Refuel the vehicle if the fuel tank is below required reserves. The oil level should be checked each time the vehicle is refueled.

Levels of Decontamination

Proper cleaning and decontamination of emergency vehicles and equipment is important in preventing the transmission of communicable diseases.

Sterilization

Destroys all microorganisms, including highly resistant bacterial spores.

Used for instruments or devices that penetrate the skin or contact normally sterile areas of the body during invasive procedures. The instruments or devices should be cleaned prior to being sterilized. This does not usually apply to prehospital care, where sterile products are purchased for single use.

Methods used to accomplish this are:

- steam under pressure i.e. autoclave
- gas sterilization i.e. ethylene oxide
- dry heat
- immersion in an approved chemical sterilizing agent for a prolonged period (6-10 hours or as specified in the manufacturer's instructions). This method is useful for instruments that cannot be sterilized with a heat process.

High Level Disinfection

Destroys all bacteria, fungi, viruses, and some spores. Proper use of these disinfectants provides reasonable assurance that the objects are free of pathogens. Most disinfectants of this level can also achieve sterilization if used for a longer time period.

Used for reusable equipment that comes into contact with mucous membranes i.e. airway bags, laryngoscope blades, magill forceps, nitrous oxide mask and hose.

Methods used to accomplish this are:

- hot water pasteurization by placing articles in water 80 C to 100 C for thirty minutes.
- exposure to an approved chemical for 10 to 45 minutes (or as directed by the manufacturer) e.g. Cidex, Coldspor, Sonacide, Virox, BM-28, Metricide, etc.

Intermediate Level Disinfection

Destroys tuberculosis bacteria, other bacteria, vegetative bacteria, most viruses and fungi, but not bacterial spores. The level of disinfection varies widely among different products and cleaning situations.

Used for surfaces that only contact intact skin and have been visibly contaminated with body fluids. Surfaces must be pre-cleaned of visible material before disinfection. Equipment requiring intermediate level disinfection include: backboards and splints contaminated with blood, stretcher etc.

Methods used to accomplish this are:

- wiping with a disinfectant/chemical germicide
- Alcohols e.g. 70% Ethanol, Isopropanol (10 min. immersion)
- Phenols e.g. Sanikleen, Surgikleen, Stat III
- Halogens e.g. Bleach (1:10 dilution, 10 min. immersion)

Low Level Disinfection

These disinfectants will kill some bacteria, viruses and fungi, but not destroy tuberculosis bacteria or bacterial spores.

Used for routine housekeeping or removal of soiling when body fluids are visible. Equipment requiring low-level disinfection includes: backboards and splints not contaminated with blood, blood pressure cuffs, stethoscope, drug box, monitoring equipment.

Methods used to accomplish this are:

- wiping with a disinfectant:

- Quaternary ammonium compounds (QUATS) e.g. Zephiran, Fulltrol Plus, Barbicide etc. Most "QUATS" contain benzalkonium chloride.

- Applicable phenols e.g. Pinesol, Lysol, Dettol

Safe Operation

As you and your partner prepare to respond to the scene, make sure you fasten your seat belts and shoulder harnesses before you move the ambulance. At this point, you should inform dispatch that your unit is responding and confirm the nature and location of the call. This is also an excellent time to ask for any other available information about the location. For example, you might learn that the patient is on the third floor or that the best door to use is around the side of the house.

While en route, the team should prepare to assess and care for the patient. Review dispatch information about the nature of the call and the location of the patient. Assign specific initial duties and scene management tasks to each team member, and decide what type of equipment to take initially. Depending on your operation procedures, you may also decide which stretcher to bring to the patient.

Be careful not to focus too much on the dispatch information so that a broader view of the patient and surroundings is not missed.

Driver characteristics. In many ways, the en route or response phase of the call is the most dangerous for you. Collisions between automobiles and emergency vehicles cause most job-related injuries among Paramedics. Therefore, drivers should be screened carefully. Not everyone who drives an automobile is qualified to drive an emergency vehicle.

One basic requirement is physical fitness. Many accidents occur as a result of physical impairment of the driver. You should not be driving if you are taking medications that may cause drowsiness or slow your reaction times. These include cold remedies, analgesics, or tranquilizers. And, of course, you should never drive or provide medical care after drinking alcohol.

Another requirement is emotional fitness. Emotions should not be taken lightly. Personality often changes once an individual gets behind a steering wheel. Emotional stability is closely related to the ability to operate under stress. In addition to knowing exactly what to do, you must be able to do it under trying conditions.

The proper attitude is very important for an ambulance driver. Being able to drive to your destination without interruption and to move into the opposite lane are valuable, time-

saving privileges that must never be abused. Do not ever get behind the wheel thinking that you can do whatever you like.

In addition to training and experience, the good judgment and knowledge that you need to drive an ambulance require practice. Remember, even the best drivers can benefit from practice. You can practice anytime, any place, in any vehicle.

Safe driving practices. Safe driving is a very important part of the emergency care of sick and injured patients.

The first rule of safe driving in an emergency vehicle is that speed does not save lives; good care does. The second rule is that the driver and all passengers must wear seat belts and shoulder restraints at all times. These are the most important items of safety equipment on every ambulance. Other Paramedics should wear restraints en route to the scene and whenever they are not performing direct patient care.

Learn how your vehicle accelerates, corners, sways, and stops. For example, disc booster brakes make braking more efficient but increase sway. You must know exactly how your particular vehicle will respond to steering, braking, and accelerating under various conditions.

Getting a feel for the proper brake pressure comes with experience and practice. Each vehicle has a different braking action. For example, the brakes on types I and III vehicles have a heavier feel than the brakes on a type II vehicle. Braking on a diesel-powered unit will be different from braking on an identically equipped gasoline-powered unit. Certain heavy vehicles use air brakes, which have yet another feel. Get to know each vehicle you drive, and be sure you understand its braking characteristics and the best downshifting techniques.

The EMS driver often assumes that motorists and pedestrians will do the right thing when an emergency vehicle is in the vicinity. This is a mistake. Motorists may indeed pull over to the nearest curb and stop or drive as close to the curb as possible, but you cannot take this behavior for granted. At any time, a motorist might stop suddenly in front of the ambulance, causing a serious accident.

When you are driving an ambulance on a multi-lane highway, you should usually stay in the extreme left-hand (fast) lane. This allows other motorists to move over to the right when they see or hear you approach.

Most important, you must always drive defensively. Never rely on what another motorist will do unless you get a clear visual signal. Even then, you must be prepared to take defensive action in the case of a misunderstanding, panic, or careless driving on the part of the other driver.

The problem of excessive speed. Only in extreme life and death emergencies is speed an important factor. In most instances, if you properly assess and stabilize the patient at the scene, speed during transport is unnecessary and undesirable. No matter what the situation, you should never travel at a speed that is unsafe for the given road conditions.

Studies have shown conclusively that excessive speeds are unnecessary and, in most cases, do not add to patient survivability. More often, using excessive speed while driving to and from the scene has resulted in accidents in which the Paramedics, patient, and occupants of other vehicles are killed.

The following five factors contribute to the use of excessive speed:

1. Lack of expertise on the part of the dispatcher, resulting in calls being given an inappropriately high priority. Dispatching requires a trained, experienced paramedic or emergency medical dispatcher. Only someone with training and a working knowledge of emergency calls can determine the urgency of a call, especially when the caller is excited and distraught. Untrained dispatchers cannot make such decisions properly
2. Inadequate equipment in the ambulance. If you do not have the equipment and supplies that are necessary to stabilize the patient, you may have little choice but to speed to the hospital.
3. Inadequate training of the Paramedic. Without adequate training and confidence in your ability to care for the patient, you may tend to act like a chauffeur rather than a paramedic
4. Inadequate driving ability. This is the most important factor. If you do not understand the added risks that go with high-speed driving and the principles of safe ambulance operation, you might tend to choose speed over safety.
5. Siren syndrome. The siren may have a psychological effect on the driver, who may not recognize that he or she is driving faster and faster.

Note: An increased speed of 20 KM over the posted speed limit, generally equates to only a saving of 1 minute in a 15-minute response. This 1-minute is then lost with increased braking and cornering requirements of the ambulance.

Emergency vehicle control. As the driver of an ambulance, you have only two ways to control the vehicle: by changing its direction or changing its speed. Either maneuver requires a continuous rolling contact between the surface of the tires and the surface of the road. Two factors are involved in this contact. The first is the coefficient of friction, which is a measure of the tire's grip on the road; friction is the resistance to motion of one body against another. The second factor is the footprints of the tires, which is the area of contact between the tire and surface of the road. On the typical ambulance, the footprint is about 8" long and as wide as the tire.

The coefficient of friction may vary widely on different parts of the same road, depending on the condition of the surface, the age of the road, and the weather. It also varies according to the tire's tread design and wear. As a driver, you must constantly evaluate the road surface: At a given speed, how much frictional force can the tires apply before the ambulance becomes unstable? This is especially important in cornering, in which additional centrifugal force is acting on the vehicle.

Steering techniques. Steering technique includes the way you hold the steering wheel, the way it moves, and the timing of the movements. Hold the wheel with your hands at the nine o'clock and three o'clock positions. This allows you to turn the wheel without removing either hand; one hand pulls while the other slides so that they remain parallel.

Your hands should not pass the twelve o'clock or six o'clock positions, because they will cross and become tangled; instead, let the hand that was pulling start to slide, and use the opposite hand to pull.

Timing of steering wheel movements relates to the speed of the vehicle. All vehicles lag somewhat when responding to steering input. The faster the speed, the greater the lag.

Chassis set. The chassis is the vehicle frame of the ambulance. Chassis set is the transfer of weight (center of mass) to different points on the chassis. Basically, the weight of a vehicle is concentrated over one of three points on the chassis: the front wheels, the rear wheels, or the center between the front and rear wheels. The transfer of weight from one point to another is caused by acceleration, or increasing speed, or deceleration, or slowing down. When a vehicle accelerates, the weight is transferred to the rear; the front wheels lose some traction, which means that you lose some ability to steer. The ambulance will have a tendency to travel in a straight line. With braking, the opposite weight shift occurs; this is why the rear end of the vehicle tends to slide to the outside of a curve when cornering.

Vehicle size and distance judgment. Vehicle length and width are critical factors in maneuvering, driving, and parking an emergency vehicle. They are especially important with types I and III vehicles, which are wider than they look from behind the steering wheel. To brake and pass effectively, you must know the width and length of your vehicle. Crashes often occur when the vehicle is backing up. Always use someone outside the ambulance as a ground guide when you are backing up, to avoid any surprises. Vehicle size and weight will greatly influence braking and stopping distances. Good peripheral vision and depth perception will help you to judge distances, but they are no substitute for intensive training, experience, and frequent evaluation of the vehicle. Also remember convex mirrors do not accurately portray depth. Do not use them to backup, but rather as a tool to identify the proximity of something close to the side or rear of the ambulance.

Road positioning and cornering. Road position means the position of the vehicle on the roadway relative to the inside or outside edge of the paved surface. To corner efficiently, you must know the vehicle's present position and its projected path. The aim is to take the corner at the speed that will put you in the proper road position as you exit the curve. The process works in the following way: The apex of the turn through a curve is the point at which the vehicle is closest to the inside edge of the curve. If you reach the apex early in the curve, the vehicle will be forced toward the outside of the roadway as it exits the curve. If you reach the apex late in the curve, the vehicle will tend to stay on the inside of the roadway; this helps you to keep the vehicle in the proper lane.

Controlled acceleration. Controlled acceleration is the use of acceleration to control the vehicle; it is done by applying foot pressure on the accelerator pedal. Acceleration is most efficient when the vehicle is traveling in a straight line, because the force of linear acceleration is equally distributed to the rear wheels. If you accelerate in a curve or during a turn, however, you force the vehicle to the outside of the curve. If acceleration in

this direction becomes excessive, the vehicle may drift out of control and become unstable.

Controlled braking. Controlled braking is the use of the brakes to control the vehicle. Brakes not only control the movement of the vehicle, causing it to slow or stop; they also help to control its direction. Braking while the vehicle is traveling in a straight line is the safest, most efficient method. Braking in a turn causes a loss of efficiency. You might not notice this at low speed, but it becomes more apparent at higher speeds. Applying the brakes while cornering is not an effective way to slow the vehicle and may actually cause a skid or spin. Instead, maintain your speed by simultaneously easing off brake pressure and increasing accelerator pressure. Getting the feel for the proper brake pressure comes with experience and practice driving your assigned vehicle.

Considerations for Safe Operation of a Vehicle in Adverse Weather Conditions

Weather and road conditions. You should be constantly alert to changing weather, road, and driving conditions. Whether going to or coming from an emergency, you must modify your speed according to road conditions. Take warnings of ice or hazardous conditions seriously, and be prepared to take an alternative route, if necessary. During a major disaster, all public safety and emergency services should be coordinated. If you run into unexpected traffic congestion, notify the dispatcher so that other emergency vehicles can select alternative routes.

Even the most careful drivers will occasionally run into unexpected situations that may require special driving skills. However, if you drive at a speed that is appropriate for the weather and road conditions, you will minimize these situations. For example, it is safer if you decrease speed in weather situations involving hard rain, snow or ice.

Hydroplaning. On a wet road, a tire usually displaces the water on the road surface and stays in direct contact with the road. However, at speeds greater than 30 mph, the tire may be lifted off the road as water "piles up" under it; the vehicle feels as if it were floating. This is known as hydroplaning. At higher speeds on wet roadways, the front wheels may actually be riding on a sheet of water, robbing the driver of control of the vehicle. If hydroplaning occurs, you should gradually slow down without jamming on the brakes. Shimmying the steering wheel may also help to cut through the water and allow the tires to regain road surface, but this technique requires a great deal of practice.

Water on the roadway. Wet brakes will slow the vehicle and pull it to one side or the other. If at all possible, avoid driving through large pools of water; often, you cannot tell how deep they are. If you must drive through standing water, make sure to slow down and turn on the windshield wipers. After driving out of the pool, lightly tap the brakes several times until they are dry. If the vehicle is equipped with anti-lock brakes, apply a steady, light pressure to dry the brakes.

Decreased visibility. In areas where there is fog, smog, snow, or heavy rain, common sense tells you to slow down after warning cars behind you. At night, use only low headlight beams for maximum visibility without reflection. It is law that you use headlights during the day to increase your visibility to other drivers. Also, watch carefully for stopped or slow-moving cars.

Ice and slippery surfaces. A light mist on an oily, dusty road can be just as slippery as a patch of ice. Good all-weather tires and an appropriate speed will reduce traction problems significantly. If you are in an area that often has snowy or icy conditions, consider using studded snow tires, if they are permitted by law. You should be especially careful on bridges and overpasses when temperatures are close to freezing. These road surfaces will freeze much faster than surrounding road surfaces, because they lack the warming effect of the ground underneath.

Air Ambulance Interface with EMS

The appropriate authority of the local EMS system develops criteria for requesting aeromedical services to the scene of an emergency. The paramedic generally should consider air transportation when emergency personnel have found one or more of the following:

- A. The time needed to transport a patient by ground to an appropriate facility poses a threat to the patient's survival and recovery.
- B. Weather, road, or traffic conditions would seriously delay the patient's access to ALS.
- C. Critical care personnel and specialized equipment are necessary to adequately care for the patient during transportation

Notification of Aeromedical Services

Most aeromedical transportation providers accept requests for medical services from physicians, EMS and fire service personnel, or other on-scene public service agency personnel. If the paramedic requests air service for medical, trauma, or search and rescue events, he or she should advise the flight crew of the type of emergency response, number of patients, location of a landing zone (LZ), and any prominent landmarks and hazards (e.g., vertical structures or power lines). Direct ground-to-air communications must be available between a designated LZ officer and the aeromedical staff on board the responding aircraft.

Landing Site Preparation

Space requirements for a helicopter LZ generally must be 100 by 100 feet. The ideal LZ should have no vertical structures that can impair takeoff or landing. It should be relatively flat and free of high grass, crops, or other factors that can conceal uneven terrain or hinder access. The LZ also should be free of debris that can injure people or

damage structures or the helicopter. If patients are close to the LZ, the paramedic should provide protection by covering wounds and eyes. Rescue personnel close to the landing site should wear protective equipment such as helmets with lowered face shields and safety glasses.

If a nighttime LZ is used, emergency vehicles with lighted bar lights should be situated at the perimeters of the LZ. If white lights are used, they should be directed down to the center of the LZ as spotlights, because white lights (spotlights or head-lights) directed toward the aircraft can temporarily blind the pilot. Traffic cones with reflectors can help identify the LZ. Flares should not be used because the helicopter rotor wash can blow the flares from the site and create a fire hazard. A fire crew should wet down dusty LZs, especially if vehicle traffic is moving in the area. This prevents the pilot and vehicle drivers from being temporarily blinded by the dust.

Helpful radio communications with the pilot include notification of wind direction and any possible obstructions or hazards. Wind direction can be determined by throwing grass or dirt, wetting a finger, or by smoke patterns from smoke canisters. If hazardous materials are present, the paramedic should advise the flight crew of the substance, location of the hazardous materials site, and the possibility of patient contamination. The pilot generally will not land the aircraft until all dangers of fire or explosion are eliminated. After the aircraft is coming in to land, one emergency responder should stand facing the LZ so the pilot can see the landing area.

Safe Approach to a rotary-wing aircraft

Helicopter safety is nothing more than good common sense, along with a constant awareness of the need for personal safety. The types of helicopters that are used for medical operations vary, but the dangers are the same. If you are familiar with the way helicopters work and follow the pilot's instructions, you will minimize these dangers. You should be sure to do nothing near the helicopter and go only where the pilot or crew directs you.

The most important rule is to keep a safe distance from the aircraft whenever it is on the ground and "hot," which means when the tail rotor is spinning. Stay away from the tail rotor; the tips of its blades move so rapidly that they are invisible. In fact, never approach the helicopter from the rear, even if it is not hot. If you must move from one side of the helicopter to another, go around the front. Never duck under the body, the tail boom, or the rear section of the helicopter; the pilot cannot see in these areas. The proper approach area is between nine o'clock and three o'clock as the pilot faces forward (Figure 36-28). When enough personnel are available, someone should stand toward the rear of the aircraft, outside the arc of the rotor blades, to warn bystanders and others away.

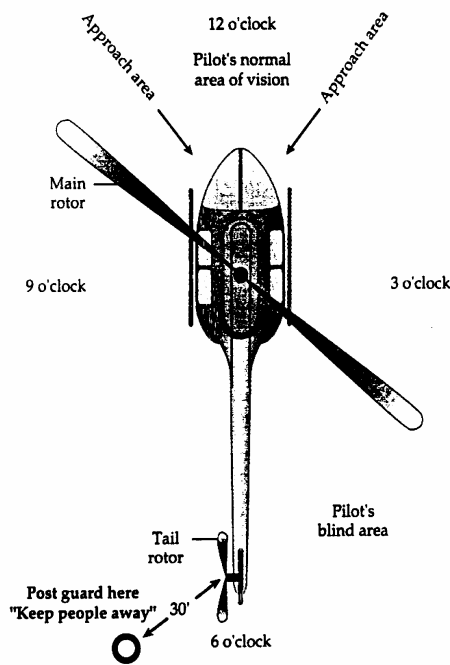


FIGURE 36-28 Approach a helicopter between the nine o'clock and three o'clock positions as the pilot faces forward.

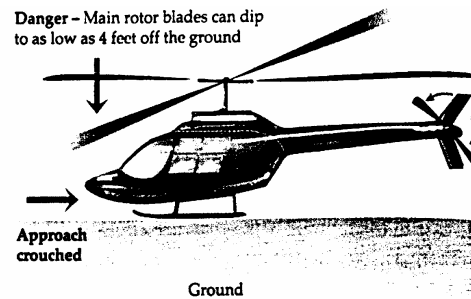


FIGURE 36-29 The main rotor blade of the helicopter is flexible and may dip as low as 4' off the ground.

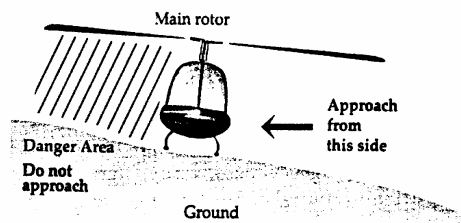


FIGURE 36-30 Approach a helicopter on a grade from the downhill side only.

Another area of concern is the height of the main rotor blade. It is flexible and may dip as low as 4' off the ground (Figure 36-29). When you approach the aircraft, walk in a crouched position. Wind gusts can alter the blade height without warning, so be sure to protect equipment as you carry it under the blades. Air turbulence created by rotor blades

can blow off hats and loose equipment. These, in turn, can become a danger to the aircraft and personnel in the area.

When accompanying a flight crew member, you must follow directions exactly. Never try to open any aircraft door or move equipment unless a crew member tells you to. When told to approach the aircraft, use extreme caution and pay constant attention to hazards.

Transport of a Patient in an Air Ambulance

Patient Preparation

Preparing a patient for aeromedical transportation requires the following special considerations:

- The paramedic must establish and secure the patient's airway before loading.
- The paramedic must apply the pneumatic anti-shock garment (PASG) before loading (per local protocol).
- The paramedic should position external cardiopulmonary resuscitation (CPR) devices according to aircraft configuration.
- Restraints or pharmacological control may be required for combative patients.
- Despite excellent patient assessment and management at the scene, aeromedical crews will perform a brief reassessment before liftoff to verify

E.M.S. Assistance In Air Transport

E.M.S. will be involved in most air transports of medical patients, to transport to and from the airport. If the patient needs to be stabilized before boarding the aircraft, E.M.S. may also be requested to transport a flight nurse or paramedic or paramedic or flight physician from the airport to the sending health care facility.

If flight nurse or Paramedic requires assistance, the land ambulance crew may be asked to assist patient care delivery to the level of their training, and EMS will be needed to assist with the loading and unloading of the patient, equipment or belongings onto the ambulance, at the airfield, and/or at the receiving facility.

Communications

E.M.S. must monitor the normal communications network during these responses. In the event of a change in ETA, the responding Air Ambulance has the option to communicate with your local health care facility, which could then advise you through the Fleetnet radio network.

Securement and transfer of the patient

The patient should be secured on a Ferno-Washington #9 adjustable stretcher or variation thereof, with a lifting sheet placed under the patient to facilitate transfer.

Whenever possible, the lifting and transfer of a patient from stretcher to stretcher should be done in a sheltered location offering some degree of privacy. This could include:

- airport terminal
- land ambulance unit
- aircraft

Safety Around Aircraft

Ambulance crews should exercise caution when approaching and working about the aircraft as damage to vehicle or bodies can occur.

While awaiting arrival of the aircraft, the land ambulance should park near the air terminal or proximal to the location where the aircraft will stop. The EMS crew should have the red lights or flashers on to alert aircraft.

Never park on the runway or any place where obstruction could occur.

Never approach the aircraft until signaled by the pilot (hand or radio). This will normally take place after shut down of engines.

After being signaled, one crew member should approach the aircraft on the aircraft loading door side, and guide the ambulance as it backs up. Approach only in the safety zone marked in the diagrams below. The land ambulance should stop at least 20 feet from any part of the aircraft. Extreme caution must be exercised under icy conditions.

The flight crew will open the aircraft loading door and direct loading or unloading procedures.

REMEMBER:

Never back up to the aircraft without guidance, as damage can result – stay in the safety zone (diagrams).

Never approach the aircraft until signaled by the pilot (hand or radio).

The ambulance crew should enquire how they can assist in loading or unloading patients onto or out of the aircraft.

Avoid areas around the jets or propeller, as these are extremely dangerous.

Never touch wires or antennae that hang from the aircraft, as these are delicate instruments, which could be damaged. The exterior probes are also heated in flight and may be extremely hot after landing.

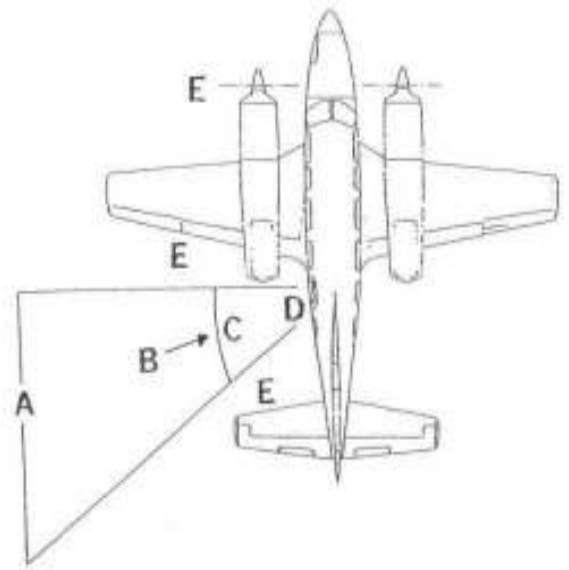
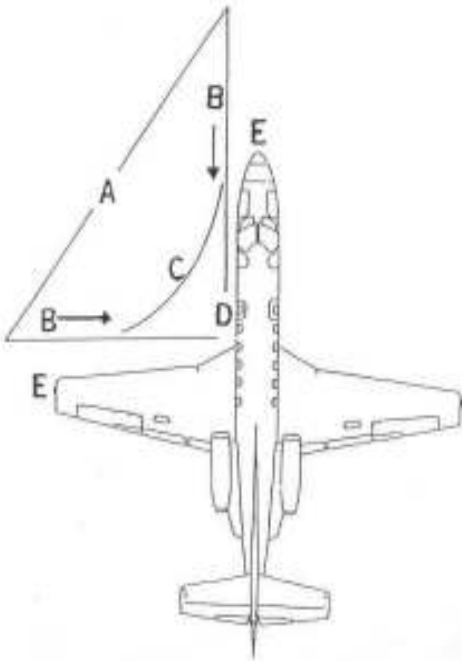
Responsibility for Patients Transported by Land Ambulance

Ultimately, the referring physician is responsible for the patient in transport, unless the Air Ambulance physician is available to assume responsibility.

When there is no physician present, the flight nurse or paramedic will make all emergency medical decisions. The flight nurse or paramedic will provide, whenever possible, all relevant information to the ambulance crew, such as billing information, patient condition and status.

TYPICAL AIR AMBULANCE CRAFT

- A. Safety Zone
- B. Ambulance Approach
- C. Park (Loading Doors to Aircraft)
- D. Loading Door of Aircraft
- E. Areas to Avoid – CAUTION



Appendix 1

The Highway Traffic Act

All Emergency Services personnel should be familiar with the various Federal, Provincial, Municipal and local regulations and policies that might affect them. The function of an emergency medical attendant encompasses not only the rendering of care to the sick and injured but also safe transport of those same patients. Therefore, an understanding of the Provincial Highway Traffic Act and the local policies on driving is extremely important.

The following pages contain relevant excerpts from the Manitoba Highway traffic Act, Chapter 26 of the Provincial Statutes, the Highway Traffic Act Amendment (Miscellaneous Provisions) Act, Assented to November 19, 1996 amending Chapter H60. These are EXCERPTS only. The Highway Traffic Act itself should be reviewed for detailed information. Interpretations of the clauses and their implications to individuals driving an ambulance should be done in consultation with the RHA's legal council.

All emergency medical attendants should be familiar with local policies on driving. Limitations on speed, local conditions and any other information and / or policies should be clearly understood. A regular review of this material by all staff will help to ensure the safest, most effective transport of every patient.

REMEMBER: even though the Highway Traffic Act allows the operator of an emergency vehicle certain privileges it does not excuse the operator from exercising due care, caution, consideration, and common sense when operating the emergency vehicle.

Definitions

1(1) In this Act,

"ambulance service" means an ambulance service licensed under *The Ambulance Services Act*;

"authorized emergency vehicle" means a vehicle used for fire-fighting or rescue purposes by an organization, other than the government or a municipality, local government district or other local authority, that

- (a) operates the vehicle primarily for its own use, and
- (b) is authorized in writing by the registrar for the purpose of this clause

"driver" means a person who drives or is in actual physical control of a vehicle, and the expressions

"drive" and **"driving"** have a corresponding meaning;

"emergency vehicle" means

- (a) a vehicle used by a police force,
- (b) a vehicle used by a fire department,
- (c) a vehicle used by an ambulance service,
- (d) an authorized emergency vehicle,
- (e) a vehicle used to respond to emergencies and operated under the authority of a government emergency organization,
- (f) a vehicle used for the purpose of maintaining a public utility and designated as an emergency vehicle by a traffic authority, or
- (g) a vehicle not ordinarily used for emergency purposes that is operated by a volunteer, part time or on-call fire-fighter or emergency medical responder for the purpose of responding to a fire, medical or other emergency;

"government emergency organization" means the Fire Commissioners Office, the Manitoba Emergency Management Organization or the Emergency Health Unit of the Department of Health;

"vehicle used by a police force" means a vehicle equipped as an emergency vehicle and includes a vehicle equipped as an emergency vehicle that is owned or leased by the government and used by a person employed by the government as a peace officer for the enforcement of an Act or regulation of the Parliament of Canada or the Legislature, but does not include a vehicle equipped as an emergency vehicle when it is used for non-enforcement purposes by a person who is not a peace officer;

LIGHTING EQUIPMENT PROHIBITED

Prohibited lamps

38(1) Except as otherwise provided in this Act, the regulations or the *Motor Vehicle Safety Act* (Canada), or when authorized by permit under subsection 37(6) or (7), a motor vehicle on a highway shall not be equipped with

- (a) more than five lamps of over four candle power (of which not more than four are headlamps) on the front of, or visible from in front of, the vehicle; or
- (b) any search light or any lamp other than a stationary lamp; or
- (c) any lamp
 - (i) that casts a light of a color other than white, or
 - (ii) that lights intermittently or in flashes; or
- (d) any lamp casting a light of over four mean spherical candle power unless it is so constructed, arranged, and adjusted, that no portion of the parallel beams of reflected light, when measured 25 metres or more ahead of the lamp, rises above 1.07 metres from the level surface on which the vehicle stands, as those heights are determined while the vehicle is fully loaded.

White lights on rear

38(2) Subject to subsection 37(10), a vehicle other than highway construction or maintenance equipment being operated within an area in respect of which signs are erected under subsection 77(7), on a highway shall not carry and display a lamp casting a white light to the rear of the vehicle while it is moving forward.

LIGHTING EQUIPMENT ON EMERGENCY VEHICLES

Vehicles used by police forces

38.1(1) An emergency vehicle that is used by a police force shall be equipped with at least one of the following:

- (a) white alternating flashing headlamps;
- (b) one or more rotating, oscillating, pulsating or flashing red or red and blue lamps, alone or in combination with a white rotating, oscillating, pulsating or flashing lamp;
- (c) one or more amber lamps on the roof or rear of the vehicle that light intermittently or in flashes.

Vehicles used by fire departments etc.

38.1(2) An emergency vehicle that is used by a fire department, that is an authorized emergency vehicle or that is a vehicle used to respond to emergencies and operated under the authority of a government emergency organization shall be equipped with at least one of the following:

- (a) white alternating flashing headlamps;
- (b) one or more rotating, oscillating, pulsating or flashing red lamps, alone or in combination with a white rotating, oscillating, pulsating or flashing lamp;
- (c) one or more amber lamps on the roof or on the rear of the vehicle that light intermittently or in flashes;

(d) one or more red lamps on the side or rear of the vehicle that light intermittently or in flashes.

Vehicle used by an ambulance service

38.1(3) An emergency vehicle that is a vehicle used by an ambulance service shall be equipped with at least one of the following:

- (a) white alternating flashing headlamps;
- (b) one or more rotating, oscillating, pulsating or flashing red or red and white lamps, alone or in combination with a white rotating, oscillating, pulsating or flashing lamp;
- (c) one or more amber lamps on the roof or on the rear of the vehicle that light intermittently or in flashes;
- (d) one or more red lamps on the side or rear of the vehicle that light intermittently or in flashes.

Lamp on roof of vehicle not ordinarily used for emergency purposes

38.1(4) An emergency vehicle that is a vehicle not ordinarily used for emergency purposes that is driven by a volunteer, part-time or on-call fire-fighter emergency medical responder and is responding to fire, medical or other emergency is permitted to be equipped with a red rotating, oscillating, pulsating flashing lamp on the roof only while the vehicle being used to respond to the emergency.

Lamp on dash of vehicle not ordinarily used for emergency purposes

38.1(5) An emergency vehicle that is a vehicle not ordinarily used for emergency purposes that is driven by a volunteer, part-time or on-call fire-fighter emergency medical responder for the purpose responding to a fire, medical or other emergency may be equipped with a red rotating, oscillating, pulsating or flashing lamp on the dash.

Lamp to be covered except during emergency response

38.1(6) When a vehicle described in subsection () is equipped with a red rotating, oscillating, pulsating flashing lamp on the dash, the lamp shall be covered as to obscure it except when the vehicle is driven by volunteer, part-time or on-call fire-fighter emergency medical responder while responding to fire, medical or other emergency.

Certain utility vehicles

38.1(7) A vehicle owned by Manitoba Hydro, The Manitoba Telephone System or The City of Winnipeg that is equipped or designed for overhead wire construction or repair work may be equipped with one or more amber lamps that rotate, oscillate, pulsate, flash or light intermittently.

Spot or flood lamps permitted

38.2 A vehicle described in subsection 38.1(1), (2), (3) or (7) may be equipped with one or more spot or flood lamps.

WARNING DEVICE

Horn, and use thereof

44(1) Every motor vehicle while being driven on a highway shall be equipped with a horn in good working order and capable of emitting sound audible, under normal

conditions, from a distance of not less than 60 metres and the horn shall be sounded whenever it is reasonably necessary.

Sirens

44(2) Subject to subsection (3), no vehicle shall be equipped with a siren or any device that is capable of producing a sound that resembles that of a siren.

Exception

44(3) Subsection (2) does not apply to an emergency vehicle that is

- (a) used by a police force;
- (b) used by a fire department;
- (c) used by an ambulance service;
- (d) an authorized emergency vehicle; or
- (e) a vehicle used to respond to emergencies and operated under the authority of a government emergency organization.

EMERGENCY VEHICLES

Operation of emergency vehicles

106(1) Notwithstanding anything in this Part, but subject to subsections (2), (3) and (4),

- (a) the driver of an emergency vehicle;
- (b) a peace officer driving a vehicle;
- (b.1) the driver of any vehicle
 - (i) who is accompanied by a peace officer or is driving a vehicle that is escorted by a vehicle driven by a peace officer, or
 - (ii) that is carrying first aid or rescue equipment; when responding to an emergency or when in pursuit of an actual or suspected violator of the law, may

- (c) exceed the speed limit;
- (d) proceed past a traffic control signal showing a red light or a stop or arrêt signal without stopping;
- (e) disregard rules and traffic control devices governing direction of movement or turning in specified directions; and
- (f) stop or stand.

Requirements respecting emergency vehicles

106(2) Subject to subsection (3), the driver of a vehicle to which subsection (1) applies shall not exercise the privileges granted under that subsection unless

- (a) the driver is sounding the horn or siren; and
- (b) if the vehicle is an emergency vehicle, it is equipped with lighting that complies with section 38.1 for that type of emergency vehicle and the lighting is illuminated.

Application of subsection (2)

106(3) Subsection (2) does not apply where compliance therewith

- (a) is unnecessary; or
- (b) would inhibit a driver in responding to an emergency or in apprehending an actual or suspected violator of the law; and the driver is proceeding with due regard for the safety of other persons using the highway.

Safety requirements

106(4) The driver of a vehicle to which subsection (1) applies, when exercising any of the privileges granted under that subsection, shall drive with due regard for safety having regard to all the circumstances of the case.

Prohibitions re use of sirens and emergency lighting

106(7) Subject to subsection (2), the driver of an emergency vehicle on a highway shall not sound the siren or illuminate any of the forms of lighting described in section 38.1 unless the vehicle is responding to an emergency or is in pursuit of an actual or suspected violator of the law.

Exception to subsection (7)

106(7.1) Subsection (7) does not apply to

- (a) a vehicle used by a peace officer in connection with the exercise of his or her powers under section 76 or 76.1;
- (b) an emergency vehicle used in a parade, special event or in a public demonstration of the use of its equipment.

Obligation of emergency motor vehicle drivers

106(8) Nothing in this section or in subsection 35(11.1) shall be construed

- (a) as permitting the driver of a motor vehicle described in subsection (1) to operate or park the motor vehicle in a negligent manner; or
- (b) as relieving the driver of a motor vehicle described in subsection (1) from complying with subsection (2) or subsection 35(11) while pursuing another motor vehicle driven by a person who is attempting to avoid apprehension.

Emergency vehicles to have right-of-way

132 Unless otherwise directed by a peace officer, a driver of a vehicle on a highway shall, on the immediate approach of an emergency vehicle that is sounding its siren and has illuminated the lighting required under section 38.1,

- (a) yield the right-of-way to the emergency vehicle by immediately driving to a position parallel to and as close as possible to the curb of the roadway and clear of any intersection; and
- (b) stop and remain stopped until the emergency vehicle has passed.

Reference

“An Alternative Route to Maintenance of Licensure”, Manitoba Health Emergency Services, Revised April 2006

National Occupational Competency Profiles, June 29, 2001, Paramedic Association of Canada

AAOS Emergency Care and Transport of the Sick and Injured, Seventh Edition, 1999, Jones and Bartlett.

Manitoba Health Emergency Treatment Guidelines, Manitoba Emergency Services, Revised August 2007

Mosby’s Paramedic Textbook, Revised Third Edition, Mike Sanders, Mosby, Inc. 2001

Highway Traffic Act – Province of Manitoba

Emergency Medical Response and Stretcher Transport Act – Province of Manitoba

Land Emergency Medical Response System Regulation – Province of Manitoba