How to Respond to Equine Trailer Crashes on the Roadside

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As a de-facto member of the emergency response component, it is important for the veterinarian and their staff to know how to safely, efficiently, and effectively function on 911 animal transport crash scenes (Fig. 1). The effectiveness of the practitioner will depend primarily on their ability to appropriately interact with the various types of responders to an equine transport crash. Major safety and security concerns are inherent to all emergency scenes, particularly on trafficked roads and roadways. Essentially responders are reacting to two scenes: the motor vehicle crash and an equine medical incident where animal(s) are stressed, injured, unpredictable, and generally dangerous. The purpose of this paper is to provide guidelines and best practices to assist the responding equine veterinarian to function in an efficient, effective, and safe manner during equine transport crashes in their role as an advisor to the local emergency response Incident Commander on the roadway or roadside. Methodology and procedures for equine field response, first aid treatment, field euthanasia, and clinical medicine as often required on scene are well covered in other sources, thus will not be addressed in detail here. Author’s address: 1787 Georgia Highway 18 East, Macon, GA 31217; e-mail: delphiacres@hotmail.com. © 2021 AAEP.

1. Introduction

Equines are frequently transported via ground transportation, both domestically and internationally, for pleasure, show, performance, work, veterinary assessment, teaching, and breeding. Crashes with horse trailers occur during all phases of transport—loading, underway, and unloading. Horses are on national road systems in a multitude of transports including “bumper-pull” tag along trailers, “gooseneck” trailers, small and large (semi-trailer) commercial horse transports, boxes, floats, modified trailers, stock trailers, livestock liners, and even home-made horse trailers. Smaller trailers are commonly owned by individuals who are not required to get a Commercial Driver’s License and whose trailers may be subject to incorrect trailer hitching, inadequate maintenance, and lack of driver training (Fig. 2). Even professional commercial haulers have challenges with transport due to impaired driving (i.e., drunk driving, drug-impaired driving, drowsy driving, and distracted driving), human factors, or actions of other drivers—crashes have included fires on board, animals fallen out of transport, overturned trailers, and a variety of collisions. Horses are transported more often than any other type of livestock, since cattle and pigs are normally transported by professional commercial drivers just a few times in their lifetime; in contrast, horses may travel to shows, events, for breeding, racing, pleasure or...
trail riding to hundreds or even thousands of separate transported events in their relatively long-life span (15 to 25 working years). Thus, the statistical probability of an individual horse being involved in a crash with a trailer is far greater than individual livestock. There is far more research on crash frequency (415 between 1994–2007), causality (driver error 85%), and outcomes for commercial cattle transport wrecks\(^1\) than for horse crashes. There is minimal published data available on the number of horse trailer crashes that occur in any country, and information on factors associated with horse injuries sustained during transportation in small trucks and trailers is limited. A 2016 study in South Australia surveyed 223 drivers transporting their horses to equestrian events—a total of 55 (24.7%) participants reported transportation-related injuries to their horses. Of these, 72% were described as horse associated (scrambling, slipping, and horse-horse interaction), 11% due to mechanical failure, and 6% due to driver error. There was a modest positive association between increasing trailer age and the number of injuries. The study highlighted the potential for horses to sustain transportation injuries (Fig. 3) and suggested further study to address this risk to horse welfare.\(^2\) Another 2016 Australian study featured an online survey with 797 responses to determine associations between transport management and transport-related injuries and diseases in horses. The survey looked at transport management strategies or procedures (before, during and after transportation) and transport diseases. Modeling explored associations between variables and possible transport-related diseases as outcomes: traumatic injuries, diarrhea, heat stroke, muscular problems, laminitis, transport pneumonia, and colic. Traumatic injuries were the most common transport-related problem, with a reported incidence of 45.0% in this study.\(^3\) The total number of crashes that occur annually are unknown and poorly reported except through local media, anecdotes from practitioners and owners, or documented on social media (e.g., Large Animal Rescue Facebook Study Group with 15,000+ global members). Crashes may be due to a single cause or a combination of causalities, including poor maintenance of the trailer and/or towing vehicle (Fig. 4), inexperienced driver or lack of trailer driving skills, incorrect response to the situation, impaired driving, or exhaustion.\(^5\) Crashworthiness research encompasses new and improved vehicle design, safety...
countermeasures, and equipment to enhance occupant safety, but is nonexistent in livestock and horse trailers in any country. The collective result is that horse transport crashes of various types (overturned, off-road, impacted, floor failure, separated from tow vehicle) are a common source of callouts for fire/rescue response services, and calls to the local equine practitioner. Every crash is different, thus there is no standard operating procedure that can be applied to every crash; however, best practices in equine technical rescue do exist—providing the basic concepts of safest approaches to these crashes.3 “Best practices” in emergency services refers to procedures that produce superior results at a particular type of crash; and constantly evolve based on knowledge and technology available at the time. Responders in field environments must consider many variables: safety (for the human responders and the animals), resources (people, equipment, mechanical, logistics), environment (rain, cold, heat, humidity), medical (stability of the patient, arrival time of medical treatment), and unusual situational concerns such as accessibility, stability, and structural integrity (e.g., Is the overturned trailer down an embankment? In the water? On fire (Fig. 5) or crushed by another vehicle?). Practitioners should involve 911 personnel from the very beginning in these crashes (trailer overturn, horse trapped over or under chest bar, hoof caught in divider, etc.) because it speeds up the overall efficiency of the response.5 Fire/rescue departments have the techniques and expertise to stabilize trailers and provide safety and security; after all, they do extrications of people from on-road vehicle crashes as a matter of course. Very few horse owners or practitioners will have the equipment, training, and expertise to attempt equine extrications safely on their own—it takes teamwork to achieve safety and efficiency for all on scene. In the past, human emergency responders devoted much effort to extricating animals without veterinary assistance. Sadly, minimal attention to the health concerns and status of the horse was paid. Ironically, this is opposite to their intense human medical training where the patient is always stabilized before extrication, with subsequent packaging for transport. Their incorrect assumption was that horses were big and strong—but several hours to days after a seemingly “successful” rescue, untreated equine victims often died “unexpectedly” (Fig. 6). Today, human responders are taught that they are fragile medically and need veterinary attention immediately, and to utilize the “golden hours” concept to remind responders of the steadily deteriorating medical condition (Fig. 7) of affected horses.6 The fundamental challenge on scene is to balance the need to extricate, safety for personnel, and providing medical care to the patient. Numerous fallacies related to equine transport are derived from the lack of scientific rigor available or contributed to inappropriate methods being used by responders on scene. Practitioners are de-facto members of the emergency response team on scene—their effectiveness will depend primarily on their ability to appropriately interact with the various
responders on scene. There are two crashes—the motor vehicle/transport crash and simultaneous equine crash—that should be approached in an organized manner.

2. Materials and Methods

Callouts of emergency responders for equine transport crashes frequently result in a request for a local veterinarian through dispatch at the local 911 center. In this article, it is assumed that the veterinarian has decided to respond to local crashes, therefore, it is important that practitioners and their staff be prepared with a basic response plan before that 911 dispatch call comes. No two responses or scenes will be the same, some practitioners will go the entire career and never respond to a live wreck on the road, while others will receive numerous calls for assistance. When it occurs, it is best to have some idea of how to proceed.

Example 1

When responding to an overturned cattle trailer crash with 50 horses on September 15, 2004, in Lawrenceburg, IN, one veterinarian and technician triaged all 50 animals, euthanized 12, verified nine horses dead, and provided treatment to the surviving 29 horses (http://www.thehorse.com/articles/14759/be-prepared-for-the-worst).

The attending vet was Dr. John Nenni, who described the scene as “a horseman’s worst case scenario”; until 2007, this was the largest equine mass casualty transport crash documented in North America. Although he had been a graduate of veterinary school for only three months and two days, he fully credited his Boy Scout training for his ability to organize an effective scene response with local firefighters, law enforcement, horse lovers, and other responders.

Example 2

On September 26, 2006, in St. Louis, MO, Dr. Stuart Robson was requested to respond to an overturned horse trailer crash with 42 horses on I-44 at 3 a.m., with Longmeadow Rescue Ranch, Missouri Emergency Response Service, and Humane Society of Missouri team members. They deployed to the scene, triaged all the animals, euthanized 17, verified 17 horses dead, and provided transport for 25 horses off scene to a secondary triage location by direction of the State Highway Patrol in coordination with Technical Large Animal Emergency Rescue, Inc. (TLAER) trained personnel to further technical veterinary treatment at a local humane society rescue ranch, which also sought custody of the animals. He was interviewed thusly: “They don’t prepare us in vet school for anything like this,” he said. “I’ve been a vet for 10 years and I don’t ever get too excited about any emergency I see, because I’ve seen most things, and most things you can quickly solve. But having 42 animals trapped in a trailer like this was your worst nightmare come true.”
Example 3

On July 30, 2015, a veterinarian was called to treat seven horses that survived a horrific multiple vehicle crash on a bridge on Interstate I-76. The driver of the towing vehicle, a popular polo player, was pronounced dead along with his dog in the pickup, hauling originally 10 horses in the trailer, immediately three were pronounced dead, but others were loose and running on the interstate. Emergency responders provided first aid, then caught and delivered the horses to local farms for examination and treatment by the veterinarian.7

Example 4

A stock trailer with 14 polo horses swerved in the rain to avoid a vehicle then flipped onto the left side of Interstate 75 south of Atlanta, GA, on September 8, 2012. Within minutes, local horsemen driving past the crash start a calldown of their saddle club asking for assistance, successfully marshalling a local equine veterinarian and her staff to the scene and six horse trailers within 30 min of the crash. The author happened upon the crash just minutes later by sheer chance and offered assistance to the Incident Commander, a state patrol officer with no horse experience. Although one horse was killed instantly in the overturn, the responders were able to safely open the back door of the trailer (Fig. 8) and cut or lead out the other 13 horses, to which the local veterinarian and her staff provided immediate triage and first aid on the scene (Fig. 9). Almost immediately, the horses were loaded on trailers and taken to her clinic for follow-up treatment and shelter. The scene was cleared, and traffic restored within 1 hr and 30 minutes.8

Frequency of Transport Crashes

There is minimal scientifically maintained or reported data available on the number of horse transport crashes, so collecting the actual number of these events is impossible at this time, there is no nationalized reporting system. No data is available from the Department of Transportation, the National Highway Traffic Safety Administration nor the Centers for Disease Control and Prevention, which are normal venues for communicating statistics and prevention information. A literature search reveals a small pool of information about frequency and treatment of transport injuries in horses and “in transport” behavior related to research into improving transportation methods, especially for slaughter horses, but is not relevant to nor intended for response to crashes. This is a gap in the knowledge and represents a rich opportunity for research and statistical analysis. Thus, much knowledge in response to transport crashes—or suggestions for better prevention and response—come from a combination of the author’s extensive collection of journalistic and anecdotal reports, unpublished data from colleagues, training events with full size trailers and transports placed into scenarios duplicating past crashes, professional firefighters sharing their career knowledge, actual owner accounts, social media postings/photos, and personal reports from veterinarians/technicians/nurses that have responded to these crashes.

Worst Case Scenario

The largest mass casualty equine transport wreck is the October 27, 2007, crash in Wadsworth, IL, of fifty-
nine draft horses being transported in a double-decker trailer designed for cattle. A total of nine animals died in the crash, seven were euthanized on scene, and 43 were moved to a humane rescue ranch. The owner of the animals was relinquished for adoption. Later, the owner and the driver of the transport were arrested and charged with four misdemeanor counts of cruel treatment of animals, and one count of failure to provide humane care and treatment of animals. Practitioners can imagine the challenges with responding to such a large crash in a public area, with well-intentioned but untrained responders. Seven veterinarians and their staff were involved with the response, including the state veterinarian's office. 8

Factors to Consider Before Responding

• Time: Crashes commonly occur at busy traffic times of the day, in the middle of the night, or during bad weather. Responding to a crash may cause the practitioner to miss their normal calls for part of the day. Does the practitioner have an understanding with dispatch that will provide a police escort to the scene?
• Payment: Will the veterinarian get paid for his/her services/medications or lose money? Emergency response services do not charge for the extrication/rescue. For the practitioner, this is a difficult question, and answers come after the crash. Do you write off their expenses, request a donation to a related equine charity, or charge a professional fee? Opinion from emergency management professionals is slowly changing to this reasoning. If humans get transported to a hospital and treated, someone pays for it; so animal owners should pay for the professional medical treatment of their animals in these scenarios.
• Liability: Check the animal Good Samaritan laws in your state and ask the State Veterinarian's office for legal advice on liability and requesting payment, even just to cover costs. Practitioners cannot afford to respond to many of these scenarios if it continues to require their donation of time, effort, drugs, and expertise.
• Distance: How far is the practitioner willing to drive to a crash site? Within the county? Within a certain region? Across the state? If there are limitations, consider a memorandum of understanding with the local 911 dispatch office to provide escort services to the scene.
• Training: Do you have training in Incident Command System (ICS) protocols (utilized by all 911 professional emergency response services) and rescue procedures? Emergency field medicine and emergency field rescue are very different subjects and require training to handle the wide variety of scenarios encountered in horse trailer crashes. Human safety is paramount and roadside situations are some of the most dangerous working conditions that can be found.
• Equipment: The basic load of equipment needed by the practitioner will include field medical equipment, lengths of webbing for manipulations, and various tools to induce euthanasia. Responding 911 services rarely have specialty TLAER types of large animal rescue equipment (Rescue Glide sled or large animal relocation skid systems, Nicopolous Needle, etc.) However, a variety of useful extrication equipment used for a variety of rescue situations will be brought to the scene by fire/rescue services.

Risk Assessment/Animal Evaluation

It is important to perform a risk assessment of the crash before proceeding to determine the health status of the horses involved. Both the veterinarian and the IC should work together to decide at what point the horse(s) can be approached safely for evaluation. No one should attempt to enter any trailer (or enclosed space) with horses until there is safe egress established. Stepping over live horses is dangerous, they will react and can severely injure rescuers. Evaluation of the horse(s) should include the following:

• Primary triage, secondary triage
• Initial first aid and treatment
• Clinical assessment
• Transport to definitive care location for further treatment and observation
• Evaluate the potential for infectious disease outbreak (especially mixed loads of horses)

Veterinarians should consider wearing a minimum level of personal protective equipment (PPE; gloves, coveralls, helmet) before establishing contact with on-scene horses. Horses can go into shock and die much faster than a human in a similar scenario. Recumbent animals entrapped in an overturned trailer are subject to abnormal orientation, gravity impacting muscle causing ischemia, with subsequent hyperemia and reperfusion injuries. 9 These factors, over a prolonged period (>4–6 hr) have been shown to cause localized and distant organ injury or death in the horse, and muscle death and ongoing injury after 6–7 hr 10 especially in sedated and anesthetized horses (Fig. 10; These factors must be considered to provide appropriate and timely prophylactic treatment to the animal – treatment methods are well covered elsewhere in the literature.)
Interaction with the Owner/Bystanders/Good Samaritans

Familiarity with, or knowledge about human medicine does not qualify a person as a professional emergency rescuer of humans. That is the recognized specialty and function of trained emergency responders (fire department, rescue squad, paramedics, etc.). Similarly, familiarity with, or knowledge about horses or even equine medicine does not qualify a person as a professional equine emergency responder. However, horse owners and good samaritans will tend to become “instant rescuers” during a crash. Allowing horse owners or bystanders to take charge of a crash is dangerous and unsafe to everyone else on the scene. The presence of the owner is important as a source of information and for authorization about the victim’s disposition and treatment, but not as a rescuer. The veterinarian should maintain control of the situation as the most veterinary medically qualified person on scene, others will look to them for leadership and advice.

Animal Handler

If possible, the animal handler should be personnel with advanced horse handling expertise, or an equine technician/nurse. Remember, most police and fire officers do not have experience with horses – and animal handling skills for emergency situations are a specialty skill set. Lack of training may cause them to underestimate the extreme weight, strength, and reflexive speed of a terrified, trapped or injured horse. The Incident Commander will direct the handler to take over this job from emergency responders when they arrive on scene. The handler at the head of the animal (if it is a safe place to be) is in the best position to advise about the medical status, potential behavior or reactions of the animal, approach techniques, and body positioning. The importance of safe positions around the horse should be emphasized by the handler to operational personnel.

3. Results

A database of horse transport crashes in published press reports, social media and privately reported anecdotes has been privately maintained (with caution that many crashes never make the newspaper, which contributes to skewed data on reportable crashes.) Analysis shows an interesting trend – over half of horses in various types of overturns and collisions walk away with minimal injuries (if they survive the crash.) Results were collected from August 1978 through August 2006. Of 204 crashes reported, there were 564 horses involved, and 464 people involved. In over 20% of reported crashes, the number of animals in the trailer was not mentioned or the trailer was empty. These data also tend to be better reported in the media if animals or people died – thus the study recorded 71 deaths of people and 127 horses either killed in the crash or euthanized on scene by responders. Of the horses that did not die initially, 255 had some injury mentioned, over 75% of these were noted to be minor (lacerations, bruising, bleeding). Followup on their condition was impossible to find or poorly reported. Trends noted in this study demonstrate the following:

- Inappropriate following distance between vehicles is commonly due to smaller vehicles cutting in front of the rig. Alternatively, it can be due to unsafe following distances or if the driver cuts off another driver. Numerous crashes caused by vehicles behind the trailer slamming into the trailer (often noted were poor reflective markings and non-working lights on the trailer). In these cases, animals in the trailer often received severe injuries, or were able to get loose onto the road. This type, and crash types due to unsafe speed for traffic conditions and road conditions, are very common (23%). Although this crash type rarely kills the horses in the trailer, it does kill people, particularly in the vehicle ahead. Special concerns derived from this crash type are the rig

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**Ischemia Reperfusion Injury**

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<tr>
<th>ENTRAPMENT / RECUMBENCY</th>
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<td><strong>Compression</strong></td>
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<td><strong>MUSCLE</strong></td>
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<td>Lack of blood supply (ischemia)</td>
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<td>Buildup of breakdown products in muscle</td>
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**RESCUE > 4 hours after entrapment**

<table>
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<tr>
<th><strong>↑ Relief of compression</strong></th>
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<tr>
<td><strong>MUSCLE</strong></td>
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<tr>
<td>Sudden restoration of blood flow</td>
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<td><strong>↓ Release of breakdown products in the circulation</strong></td>
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**INJURY**

Fig. 10. Injury in equines that have been laterally recumbent or impinged by weight of other animals or objects in trailer crashes can cause latent injuries that might not be recognized on scene. With permission from Gimenez, T. The Golden Hours of Equine Emergency Rescue. Equine Vet 2012;2:26–29.
jackknifing on impact, then rolling over (Fig. 11), and/or becoming unhitched (7%).

- Many single rig crashes (16%) showed that the driver went off road from inattention or excessive speed for conditions, lost control, sleepiness, or alcohol involved (3%). This number of crashes due to inappropriate speed or response (driver error) and inexperience pulling trailers is approximately what is expected from surveys of standard motor vehicle driver injury and death statistics in general.

- Trailer tire blowouts are not the cause of crashes, for every tire blowout that causes a crash there are over 100 that do not,¹ unless they occur on the tow vehicle (2%) or are combined with a tow vehicle that is not appropriate (4%). However, if two tires on one side blow simultaneously (due to road hazard, poor quality two-ply tires or retreads) a crash more often occurs.

- There are numerous examples (8%) where another vehicle fails to yield the right of way or runs a stop sign, which results in being side-swiped or T-boned by another vehicle. How much of this is due to poor reflective warnings on the side of many transports is unknown. This type of crash is often fatal or generates horrific injuries for the driver of the other vehicle because trailers stand up very well to side impacts, even if it is so hard a collision that the trailer is pushed or rolled by the impact. Horses seem to do okay in these types of crashes.

- Incorrect or nonexistent vehicle and trailer maintenance contributes to many crashes and increases severity of the wreck. It represents the single most important prevention area for transport owners. Non-working lights, lack of reflective tape, incorrect hitching, and no brakes contribute to crash occurrence, and may arise because the vehicle industry has minimal standards for trailers that weigh less than 10,000 lbs.

Federal commercial vehicle regulations do not apply to trailers smaller than 10,000 pounds. Gross vehicle weight is the greater of the manufacturer's gross weight rating (GVWR), or the actual weight of the vehicle plus the load. If the transport vehicle consists of a truck and trailer, add the GVWR or actual weight of the truck to the GVWR or actual weight of the trailer to obtain the gross vehicle weight of the combination. Many gooseneck trailers and other combinations do weigh more than 10,000 pounds and by the book should be regulated, but most states seem to ignore horse trailers for this rule. Other recommendations from manufacturers, insurers, and safety advocates to prevent issues include purchase of heavier duty axles, wheels, and tires, having two spares for the trailer, using a minimum of two axles on trailers to match the load, and better matching of the towing vehicle—appropriate to trailer size and weight.¹¹

- In this study, unsafe hitching was associated with tag-along trailers (96% of hitching issues) and more rarely (4% of reported crashes) for the gooseneck type trailers. The chains of tag along trailers in combination with the emergency brake engaging mechanism are important to prevent roll-away trailers when the hitch comes off the ball. Standardization of the correct ball size, maintenance and checking for correct hitching (i.e., locking the hitch, tightening the nut on the bottom of the ball, hitch correctly attached to the frame of the tow vehicle, appropriate lubrication of the ball to prevent microcracks) would prevent this type of crash where trailers become separated.
(10%). Properly hitched gooseneck trailers have even survived horrific impacts from trains (1.5%), head on collisions (8%), and side impacts (2%) without becoming separated from the tow ball — although the horses, if still inside the trailer, fare poorly.3

Proactive Involvement

Practitioners can contact their 911 call center dispatch and ask if there is a local, regional, or state team or Fire Department/Rescue Squad that has had training in methods and procedures to safely rescue horses in transport crashes. These teams may be private ambulance services, may be associated with a veterinary clinic or school, or with a fire department. Practitioners are encouraged to provide their 24-hr contact information to their 911 emergency dispatch center in their jurisdiction so that they can be contacted easily (if they are willing to respond to this type of crash).

Examples

1. Horsemen in the St. Louis area of Missouri recognized this gap in training and equipment, with the goal of minimizing risk of injury to rescuers and animal; in 2002, a group of volunteer horsemen, veterinarians and firefighters was formed to create the Missouri Emergency Response Services (MERS) response team. The members of this team have undergone specialized training in large animal emergency response and how to safely approach crashes such as overturned and wrecked trailers or livestock haulers. Their training and equipment cache immensely contributed to the success and professionalism of the response to the St. Clair, MO, crash, k and at least three similar situations (cattle trailer wrecks, horse trailer wrecks) since. Similar results with numerous teams in other states and countries demonstrates that prior coordination between agencies and equine practitioners contributes to efficient, effective responses for these crash types.

2. In 2012, Alberta Farm Animal Care (AFAC), Canada launched the Emergency Livestock Handling Equipment Trailer and Training Program. There are now 17 cached livestock response trailers throughout the province, housed at county offices and fire departments.12 Connected to 911 emergency dispatch, they can be called out as needed across the province in response to trailer rollover and other emergencies involving horses. They have become the “go to” for emergency response to livestock or equine emergency or disaster response.

Each trailer contains equipment that may be used in these situations including a generator, livestock panels, ropes, portable lighting, various cutting tools and saws, tarps, livestock handling items, hand tools, Large Animal Relocation Sked systems,1 Nicopolous Needles, N Mud Lances, Häst Becker Slings, Rescue Glide sled, various specialty equipment, and plastic snow fence for containment and guidance. AFAC and Lakeland College’s Emergency Training Centre developed the accompanying training program “Livestock Handling in Emergencies.” This course is fully mobile and is aimed at first responders, veterinarians, and others involved in rescue—teaching coordination, safe response methods, equine handling, and behavior.

3. Over the last 30 years an increasing number of professional emergency responders and veterinarians have received training in technical emergency and disaster rescue of large animals (TLAER) and animal search and rescue (ASAR) for equines both domestically and internationally. These courses are aligned with National Fire Protection Association (NFPA) Standards for Technical Rescue 1006, 1670 and 150—which includes teaching proper and safe tactics, procedures and techniques for equine transport crash response, extrication of live and dead animals, dealing with vehicles on fire, trailer stabilization and cutting methods for overturned trailers to firefighters.13

4. The Canadian Livestock Transport (CLT) Program is a comprehensive training course and support service for livestock truckers, shippers, and receivers. The program offers core content for all species and breakout modules for beef and sheep, hogs, horses, and poultry. AFAC developed the original CLT program with funding assistance from industry partners and the Alberta Livestock Industry Development Fund. As of 2013, the CLT course transitioned to a national home with the Canadian Animal Health Coalition and was renamed the Canadian Livestock Transport Certification Program.14

4. Discussion

The Role and Responsibilities of the Practitioner

The veterinarian or their technician/nurse should direct medical stabilization, but should not go into the trailer, pull on assist/extrication devices, or perform the actual extrication. Let the professional emergency responders do their job. By taking a management and advisory role, and a less hands-on approach for the extrication, the practitioner can plan and prepare for treatment options, advise the IC and the owner, and prevent injury to themselves by staying out of the danger zone. Different from clinical and field practice, there are many dangers on the side of the road or even field environment where the veterinarian is not the “authority having jurisdiction” (AHJ) over the scene (the AHJ will be the fire department or police officer that arrived first) and the practitioner is expected to fit into the working model of ICS on scene (see below). The IC is ethically and legally responsible for the safety and lives of all personnel and the victim on his/her scene. Firefighters and police officers will quickly arrive to control traffic around the crash and extricate people (and deal with bystanders and frantic owners), paramedics for human injuries, and finally the IC will consider assisting the animal(s) when the scene is stable and safe. A good
risk assessment should be done to evaluate the risk versus benefit of various strategies for extrication of the horse(s) and should involve the veterinarian’s opinion (Fig. 12; for example, if the animal is not savable, why risk anyone’s life to extricate it and why make it suffer? It should be euthanized first.) The veterinarian will be crucial as an advisor to the IC for making decisions about the animal’s savability, extrication options, handling, and behavior – as well as bringing knowledge of physical and chemical methods of restraint that will be useful to the extrication effort. Animals are a secondary consideration for responders—while the veterinarian’s primary concern may be the animal victim—but he/she must work inside the constraints of the Incident Command System on scene for everyone’s safety. Many animal owners will be emotional on scene, while veterinarians have training to remain calm, make rational decisions, and handle the situation professionally. Close coordination with the owner can ensure better outcomes based on diagnosis and early treatment options, or at the least in euthanasia being selected for induction at a rational point. The owner (if present) should consult with the veterinarian for timely decisions as to savability, transport to definitive treatment, or decisions on euthanasia. Bystanders will offer suggestions that may or may not be helpful – the veterinarian will be needed to sort through this barrage of “help” that is offered.

Incident Command Response Framework

Whether a single crash (e.g., two horse trailer runs off on the road) or a large-scale disaster (e.g., commercial hauler with million dollar valued horses in a fiery Interstate crash), the veterinary practitioner is just one member of a large group of emergency responders. Regardless of crash size, all individuals and organizations respond under a common protocol known as the ICS. In both scenarios it is essential to know how to interact as part of the team with other emergency response individuals from county, state, federal, and private emergency response organizations. Lack of understanding of, or respect for the chain of command on crash scenes result in power struggles that detract from the response, and when combined with the fear of distressed horses inside the transport, are a recipe for injury of personnel and animal victims. Every equine practitioner responding to a crash or disaster of any size or type should have at least a basic understanding of ICS which will benefit them by:

- Knowing how to properly interact with emergency responders;
- Understanding the language used on emergency response scenes;
- Behave in the correct manner on scene for safety and security;
- Work as a team member; and
- Be considered an asset—instead of a liability—by the Incident Commander.

Example

In the Lawrenceburg, IN crash, responders included the county Sheriff department, EMS service, two local Fire departments, Police department, State Department of Transportation, and the State DOT Police Enforcement, which demonstrates that even in the presence of professional emergency responders, a crash is a controlled chaos environment. In this crash, Dr. John Nenni, the veterinarian on scene, made a call to the state veterinarian’s office to check the Coggins and health transport paperwork on these horses. He also checked the bill of sale paperwork for the horses to ensure that they were not stolen. It is always a good idea to contact the State Veterinarian and the USDA/APHIS Area Veterinarian in Charge for large and out of state transports. The basic principles of ICS are fully applicable to trailer collisions and include the following:

- Planning: A crash action plan must be developed (simple and verbal, or complicated and written) depending on the size of scene and complexity or danger.
- Team approach: Every responder is part of a team and knows their job.
- One coordinator: The IC coordinates the crash response; he/she is the leader and shoulders the responsibility for the entire scene. This is normally a firefighter or police officer that has extensive professional training, leadership experience and certifications in scene safety and management.
- Span of control: One supervisory person can only coordinate the activities of five to seven responders. They respond to the chain of command for tasks.
- Safety: Safety is priority on scene, for both the animal victim and all human rescuers.
- No freelancing: Individuals responding/acting on their own constitute a risk and a liability to others on the scene. The IC has the authority to forcibly remove them from the scene (practitioners should normally not be the IC unless they have extensive training in crash management and safety.)

When the Call Comes in to Your Office
The caller may be the 911 dispatcher, client, or an unknown horse owner or bystander, especially since it is common for horses to be hauled for sales, shows or trail rides. On-road crashes are inherently very dangerous; the veterinarian should not respond on their own. If the caller is a 911 dispatcher, ask them to send Fire/Rescue Department and Law Enforcement to the scene. If the driver/horse owner calls directly to the practitioner, they should also call 911 and request their assistance. Preliminary information to obtain during the call is below:

- Name and contact information of caller
- Exact location and clear directions to the crash
- Type of transport
- Brief description of crash (text photos if possible)
- Number of horses

If the crash occurred on a major road, there will already be a traffic backup in which case the 911 dispatcher will need to provide you assistance in reaching the crash (via police escort, etc.). Photos and short videos of the scene should be requested; they will allow you to develop some possible plans and coordination while responding to the crash location. At the scene, ensure you are properly parked off the road surface; employ use of flashers and lights before getting out of the vehicle. Horses accommodate quickly to the consistency of strobes; on active roadway human safety standard operating procedures require that these be used. A retro-reflective vest with bright colors is required to be worn by OSHA (Occupational Safety and Health Administration) on all crashes, best practice is a retro-reflective vest and helmet for personal safety in the chaos of a crash. Upon arrival to the scene, the veterinarian should contact the Incident Commander, and the person transporting the horses (agent/owner) to obtain information on the following:

- Origin
- Destination
- Contact information of home veterinarian (name, address, phone number)
- Health documentation (Coggins/health certificate)
- Manifest (large commercial transports must have a manifest) or bill of sale

Because of the mobility of horses across different regions of the country, an important role of the veterinarian during equine transport crashes is the assessment of possible biosecurity risks. (Veterinarians are encouraged to follow the Infectious Diseases Control Guidelines recommended by the American Association of Equine Practitioners (https://aaep.org/guidelines/infectious-disease-control/using-guidelines.)

From the Horse’s Perspective
A trailer wreck, from the perspective of the animal in the trailer, is very different from what humans perceive. Rubber mats, horse bodies, and divider gates each move differently throughout the changing velocity vectors through the active part of the collision, which will be influenced by the structural stability and current maintenance level of the trailer. Horses that appear to be laying calmly are actually very stressed. Recumbent and trapped horses often lay quietly for a few minutes due to exhaustion (Fig. 13), but because their instinct is “a down horse is a dead horse,” they will struggle. They do not comprehend that the humans are there to assist. Instead, they interpret new noises and activity as threats to their survival and may panic and

![Fig. 13. Horse down in a trailer with head trapped in the door. While the horse appears to be lying quietly, any stimulation from sounds or sight will cause the horse to struggle violently. Photo Courtesy Becca Speer.](image-url)
struggle harder. Horses can hear everything going on (voices, tools, vehicles, footsteps, extrication equipment) and outside the trailer they may be able to see shadows and reflections—thus your advice should be to limit loud sounds (sirens, cutting equipment) until necessary. There are certain apparatus that are extremely loud (air chisel, reciprocating saw, K-12 saw, and chain saws); others (hydraulic tools) are silent but cut very jagged edges. Once a tool is started operators should keep it running; most animals accommodate to the sounds and vibration if used efficiently. Generally, selection and use of cutting tools are the responsibility and expertise of the fire department since trailer construction materials run the gamut from wood to rubber to steel to fiberglass, and all require different strategies to overcome. More dominant equines in these crashes will continue to exhibit aggressive behaviors to less dominant animals within range of teeth, hooves, and threatening behavioral expressions—thus “horse on horse” injuries are common in trailers of all types. Their desperate attempts to get away from more dominant animals can cause further injury and panic inside a trailer, another reason for a good plan and efficient extrication strategy.

Make the First Assessment from the Outside

Veterinarians routinely get close to horses to do their jobs, and due to work-related exposure frequency (or complacency), they can get injured. Emergency services actively work to reduce the chance of injury to responders; thus it is preferred that no one go into the trailer to halt or treat a horse because it is a confined space. Often, the trailer must first be stabilized (Fig. 14) or moved to a safe area before the animals are extricated (down an embankment, hanging off a bridge, trapped in trees or sinking into water, etc.). In real crash scenes, there are very few situations where an overturned trailer should be turned back onto its wheels while live animals are inside—this only causes more injuries. Horse trailers can come to rest in left- or right-side lateral, dorsal, posterior or even anterior recumbence. Fire/Rescue will have equipment to safely stabilize the weight of such a large object, then to make access (cutting may or may not be required) large enough for the animals to self-extricate or be removed safely. Approach slowly while talking to the horses, evaluating their stress and orientation by looking in a window or other existing opening and make an assessment without opening doors or ramps to prevent escape. Horses are well known to attempt to egress through openings too small for their body; a panicked horse lunging towards the light is dangerous to itself and handlers. What is the orientation of the trailer? Use a ladder to access the windows or access points on the top of the trailer if necessary. Ask the fire/rescue personnel to provide lighting for the scene for everyone’s safety. A good assessment of the inside areas of the trailer should include the following: Are animals dead or alive? What are the obvious injuries? Are they haltered and tied in the trailer? Is one on top of the other? Standing or lying down? Are the dividers/gates/rubber mats intact or fallen? Can you assist the horse to extricate himself from the trailer? Is there a safe way to cut or release the trailer tie without crawling over the horse’s body or head? The firefighters can make better decisions for extrication based on this type of information. Ask yourself questions based on the scenario—is the trailer flat on the ground or balancing on tree roots or the guard rail? Trailers are lightweight, unstable, and easy to move when in an overturned configuration—they should be stabilized for approach and to minimize any chance of the trailer harming a person or rolling and moving as a horse attempts to unload. Difficult scenarios will require stabilization of the trailer and perhaps re-orienting it by a few degrees to prevent a slanted standing surface for the animals, to provide an egress path for extrication. In others, it may be safer to pull the entire trailer back onto the flat road surface prior to extrication. Access holes into the trailer should be minimum 1.5m wide and as tall as possible while providing structural integrity, while an egress lane for leading the animal from the trailer to a safe area off the roadway should be cleared. Generally, if a horse is able to get up, it will do so immediately after the collision; if it is still recumbent upon arrival, there is a reason. Slick floors, obstacles, and lack of leverage or space may contribute to a horse’s failure to rise as much as injuries and must be evaluated. The most frequent injuries reported are head, neck and lower leg injuries after wrecks. Horses tend to fight to stand if physically possible, then stand quietly (feed hay to keep them quiet while you evaluate your next steps). Slapping or stimulating a downed horse that is entrapped and not able to move is not helpful; for example, short trailer ties (especially ones that don’t break) will guarantee that the horse cannot get up. Breakable halters can break—try not to release a horse outside of the trailer without control of the
head or use secondary containment with fencing outside the trailer. Beware of bungee-type trailer ties, they are extremely dangerous to people and horses when loaded with weight. The three top scenarios with very high injury and mortality rates are trailer floor failure, horse being ejected from the trailer, and horse trailers hit by semi-trucks, trains, or similar catastrophic collisions. When animals are ejected (trailer disintegration or floor failure), the results are similar to human crashes and usually result in severe injuries with poor prognosis for survival (Fig. 15). Horses are capable of surviving catastrophic trailer collisions, as long as they stay inside the trailer. High-speed catastrophic collisions can cause horses’ bodies to cut through bulkhead walls, doors, and windows in a macabre equivalent of cartoon characters breaking through a brick wall, but with bloodier results. Animals are often in shock, endure severe injuries and pain, and rarely have relevant bone, muscle, or tendon anatomy left available to make a surgical attempt at recovery.

Best Practices Responding to Trailer Collisions

It is easiest and safest for responders to assist an animal to self-extricate. If possible, remove all obstacles, such as divider gates, equipment, “removable” tack rooms, ramps, and doors that obstruct the exit. Cover windows (which now are holes in the overturned trailer’s “floor”) with a backboard or rubber mat, so a leg does not step thru them. Prevent the horse(s) unintentional exit before responders are ready to manage them—secondary containment may be set up around the rear of the trailer with cattle panels, tarps, parked vehicles, or snow fencing to prevent a loose horse situation once extricated. Do not remove animals from trailers until secondary containment is set up and traffic is stopped, if animals get loose on the roadway, they may cause secondary collisions and harm themselves or humans. Have extra halters and lead ropes available to catch and control the horse (or use an emergency rope halter). Control of the head is crucial unless the animal is obviously not halter broke—in that case consider secondary containment using cattle panels around the back of the trailer and allow the animal to extricate itself, then drive into a waiting alternative transport. Unloading a horse on the side of the interstate under the best of conditions is hazardous, and always requires law enforcement officers to stop traffic during actual extrication and unload/reloading operations. When performed in the dark, the rain, or on steep hazardous terrain, these problems are compounded. Get scene lighting from fire/rescue early in the crash. Once a door or ramp is opened, it should be tarped to cover the opening, then tied off so that it cannot slam back into place. Often, gates, dividers and doors will have to be removed or cut even for standing animals to be safely extricated. Doors and metal pieces do not make safe ramps when in abnormal configurations. If the horse’s head is tied inside the trailer, it must be released before extrication is attempted. The safest way to release a trailer tie is to cut it without crawling over the horse’s body or head. No one should go inside the wrecked trailer for any reason without sedation or anesthesia, unless the animals are standing and have a clear way out; then it may be possible for a person with proper PPE to go in, cut the trailer tie and attach a lead, then bring the animal out safely. A seat belt cutter or curved sharp knife secured to a long painter’s pole allows responders to stay in a safe position outside the trailer (a serrated knife can work, but the push/pull motion on the tie strap stimulates the animal and causes accidental stabs). People have endured broken arms and fingers by advancing them into trailers, thus the recommendation is to use a long pole. A pole syringe can be fashioned from a long pole and duct tape to induce the animal with sedation or anesthesia intramuscularly, and without entering the trailer.

Triage

Triage should be part of the plan for veterinarians willing to become involved in response to emergencies/disasters. The level of triage applied to the scene will vary with the amount of personnel available, equipment and supplies, and the efficiency of the extrication. Some transport crashes will be mass casualty crashes from two to 25 injured horses in semi-trailer commercial transports. Be familiar with basic triage procedures, conduct a cursory inspection of all animals, then salvage animals that are easiest to retrieve from the transport, have cooperative
dispositions, and present the least threatening injuries. Primary triage should be conducted in an efficient manner, secondary triage may be conducted at the clinic or an off-site field hospital for mass casualty crashes. Severely injured horses may not be transported to definitive treatment without appropriate methods for medical support (i.e., horses with a fracture should not be loaded on a trailer without a splint, analgesia, and combating shock). For animals that have a reasonable chance of survival, wait to euthanize until the owner can be contacted. Documentation of injuries with pictures or video of animals before euthanasia is wise practice. Bystanders will be very upset that some animals have to wait for triage by the veterinarian. In the Lawrenceburg, IN crash, bystanders offered to shoot both dying and surviving horses with their personal weapons - the sheriff on scene had to threaten to handcuff anyone with a gun. Expectant animals (ones that have the poorest prognosis) should be euthanized efficiently to prevent suffering - based on resources and personnel.

Euthanasia and Field Euthanasia

Before providing medical attention or euthanasia to a horse(s) at a crash, consult with the owner/agent about possible treatment/cost and prognosis. Exhausted, stressed, and dehydrated animals often lie down after being extricated; this is not always an indicator of a poor prognosis. Some owners refuse veterinary attention to horses even in cases where the prognosis is good or fail to authorize euthanasia. Welfare considerations in some jurisdictions allow the animal’s ownership to be transferred to Animal Control or a humane organization, which can authorize further treatment or euthanasia. Check local and state regulations that affect decisions about animal welfare and ownership. The practitioner must be prepared to perform field euthanasia at the site of a transport crash. Practitioners may be able to use euthanasia solution as performed under normal circumstances; however, if there are insufficient amounts of euthanasia solution, horses in shock, or venous access is impossible without a safe egress for the responder, the veterinarian will need to direct the performance of euthanasia with a firearm by a police officer with guidance as to landmarks, proper bullet placement, and angle of introduction. The person performing euthanasia should be willing to follow the veterinarian’s instructions to ensure proper landmarks for placement of the projectile. Alternatively, the veterinarian or animal control officer may perform the euthanasia with a penetrating captive bolt gun, or a firearm. In the absence of projectile weapons and euthanasia solution, field euthanasia may include intrathecal injection of lidocaine into the atlanto-occipital space in sedated animals, or exsanguination (jugular vein or posterior vena cava per rectum) in unconscious animals. Whether as a result of euthanasia or immediate to the original crash, it is not uncommon to have dead horses after response to transport crashes, these are called “recoveries” in ICS terminology. Navy-blue king-size bedsheet or drop cloths can be used to cover dead horses after crashes—this shows respect and hides the distasteful sight from onlookers - preventing secondary crashes from rubberneckers.

Concerns Special to Technical Extrication for Equines

Horses entrapped in abnormal positions (dorsal, posterior, lateral recumbence) are subject to a variety of consequences based on efficiency of pre- and postextrication examination and treatment.16 Even when a trained large animal rescue team effects an efficient rescue and the on-scene veterinarian treats the animal immediately—the animal can still die. Failing to treat a horse for crush syndrome and accidental hypothermia in cold or wet situations immediately after the extrication is a common iatrogenic cause of death. Loading a horse is one of the most difficult and most dangerous activities to attempt for both the horse and human. Anecdotes abound where humans get crushed, kicked, dragged, and run over by horses; while horses acquire lacerations, rope burns, hang their head on the roof and metal obstacles, and de-gloving injuries struggling to avoid going into trailers. Always stay out of the way of the horse while loading and unloading. Training horses to load should not be the job of the practitioner on the side of the road; however, injured horses will need to be loaded for transport and the emergency responders will look to the practitioner and their staff for assistance in emergency loading techniques (Fig. 16).

Recommended Equipment on Hand

Practitioners should carry basic equipment and tools to facilitate extrication of a horse trapped or injured, either in or out of a trailer (Fig. 17). Trailer crashes are common emergency responses for practitioners, so it makes sense to be prepared.
Personal Kit

- Gloves (high dexterity)
- Boots (with or without steel toe)
- Protective headwear (helmet with chinstrap; OSHA approved)
- Jacket or vest (brightly colored and retro-reflective)
- Protective goggles or glasses
- Knife and/or multi-tool
- Ear protection
- Professional shirt/jacket or scrubs with your logo to identify yourself
- Primary and secondary ID badge/card (one for yourself on scene and second for “manpower accountability”) if you have prior coordination with local dispatch

In Vehicle Trailer Response Kit

- A road hazard warning kit, reflective tape on rear surfaces of vehicles, working flashers on vehicles, and a retro-reflective vest for personnel on the side of the road. (Responders will be more worried about human safety than the horse victim, roadsides are a very dangerous place to be.)
- Cell phone to call 911 immediately for scene safety assistance.
- A good first aid kit for both equines and humans.
- A sharp curved knife or seatbelt cutter to be used for emergencies—capable of cutting thru tie straps and rope that may be entrapping the head or legs.
- A battery powered reciprocating saw capable of cutting metal or wood that may entrap extremities.
- A piece of 8 cm wide webbing 7 m to 10 m long with loops at each end (tow strap) to control a leg; or around the chest and abdomen to maneuver the animal into a safer position (forward assist, backwards or sideways drag). The head, neck, and tail are never safe anchor points with which to drag an animal out of anything—they can be severely injured or traumatically amputated.
- An extensible cane or pole to manipulate webbing, induce sedation (via pole syringe), or cut webbing (via curved knife) without having to get too close. An aluminum boat hook or painter’s pole extendable to 4-m or pike pole (used with interchangeable accessories; e.g., cutters, knife, carabiner hold-open, hook, etc.)
- A hammer to drive the pins out of a chest bar or divider gate, especially with a horse on top or under it.
- A towel or blanket to cover the head and eyes of a recumbent horse to calm it.
- Good quality hay to allow trapped or extricated horses to eat and relax while waiting for assistance or transport.
- Emergency rope halters 12.5-mm kernmantle rescue rope or yacht braid rope 7 m to 10 m long
- Insulated horse blanket (heavy duty).
- Häst Head Protector® or similar whole head protection (or human life vest, towel, sweatshirt, etc.) to protect the eyes.
- Large animal physical restraint (nose twitch, various halters, lariats, etc.)
- 33-m containment portable fencing (construction plastic fencing).
- Heavy duty tarps.
5. Conclusion

Local equine practitioners are the responder of choice when an on-road crash involves equine(s). Prior preparation and simple equipment will contribute to more professional results; prior coordination with local law enforcement and fire/rescue will lead to improved relations for responders on scene and successful outcomes of trailer related crashes. Use of best practices allows the responding equine veterinarian to function in an efficient and safe manner, according to the Incident Commander on a live horse trailer crash scene on the roadway or roadside.

Acknowledgments

Declaration of Ethics

The Author has adhered to the Principles of Veterinary Medical Ethics of the AVMA.

Conflict of Interest

The Author has no conflicts of interest.

References and Footnotes


"Methodology and procedures for equine field response, first aid treatment, field euthanasia and clinical medicine as often required on scene are well covered in other sources, thus will not be addressed in detail here."

This publication uses "crash," "wreck", or "collision" instead of "accident"; most road safety research publications have moved away from "incident" or "accident" because it implies that nothing could be done to prevent the crash, promoting a perception of inevitability and lack of understanding that these crashes are preventable. New policy initiatives aim to educate the public that crashes are not inevitable and aspire to eliminate traffic fatalities and serious injuries.

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