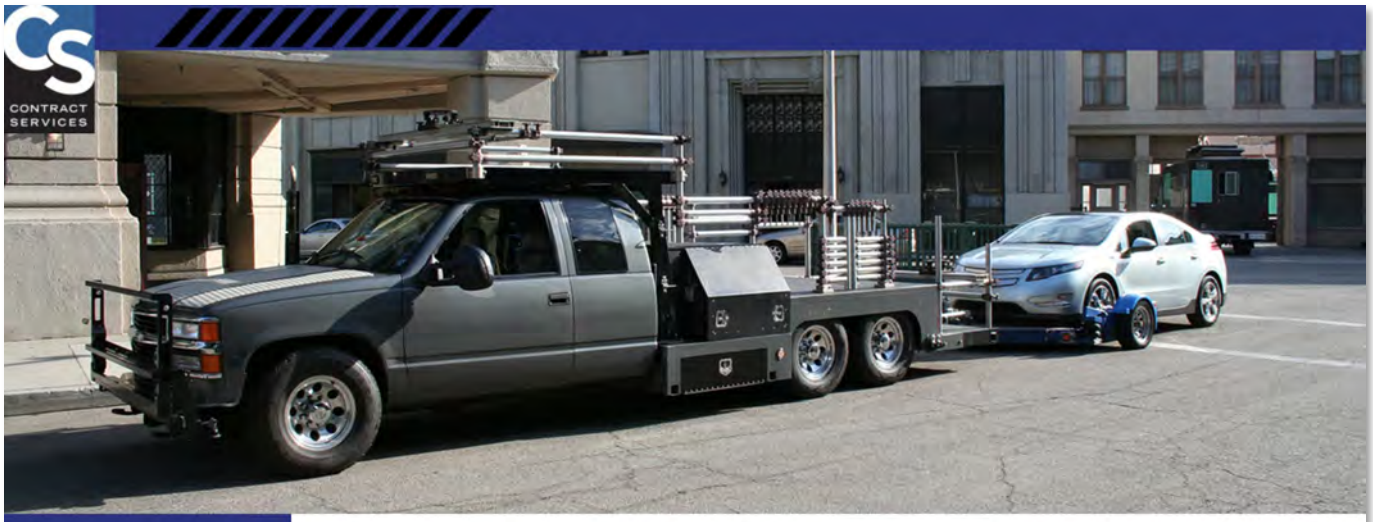
NOTE: Reading this PDF course book is not a substitute for completing the Self-Paced Online training portion of this course. This PDF course book is a resource that accompanies the online training.




# B5 TRADITIONAL INSERT CAR SAFETY

## Slide 1 - Welcome


Hello, and welcome to course B5, *Traditional Insert Car Safety*.

This 90-minute course is part of the Safety Pass training program for the motion picture and television industry; it is presented to you by the Contract Services Administration Training Trust Fund.

When you reach the end of the presentation, you will be directed to a test. You must score at least 70 percent to successfully complete the course.

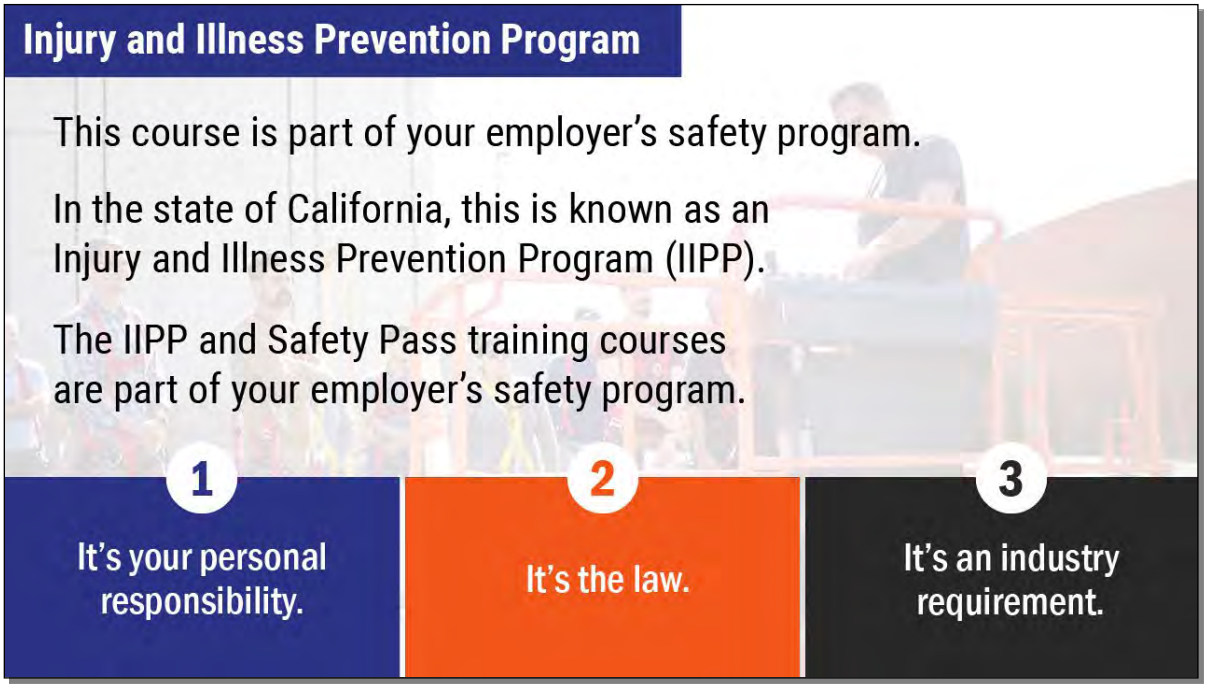
If you're ready to begin, click START.

## Slide 2 - Navigation and Resources


At any time during the presentation, you can use the buttons on the side of the player window to view the Table of Contents, open the course book PDF, link to course references and resources, get technical support or help from an instructor about course content, and control the player.

When you're ready to continue, select the NEXT arrow.

## Slide 3 - IIPP




This course is part of your employer's safety program.

In the state of California, this is known as an Injury and Illness Prevention Program (IIPP). The IIPP and Safety Pass training courses are part of your employer's safety program.

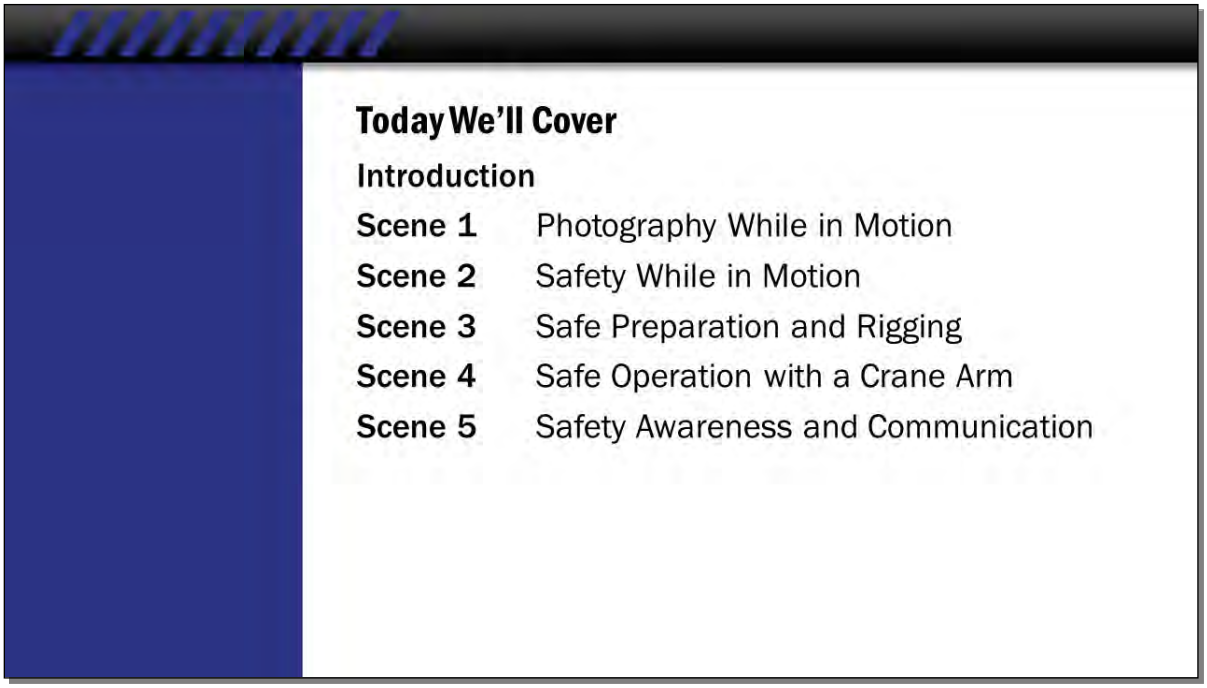
There are three reasons to get safety training.

First, you are personally responsible for your safety. You owe it to yourself and to your coworkers to avoid accidents and injury. The way you make a living and your quality of life depend on it.

Second, it is the law. Occupational safety and health standards guarantee the right to a safe workplace and require employers to train their employees in safety.

And third, the industry requires it. This course is part of a cooperative commitment between major motion picture and television studios and industry labor unions to deliver safety training.

## Slide 4 - Today We'll Cover




In this course, we are going to cover general safety rules for filming from a traditional insert car.

We'll look at the various options for capturing moving shots using vehicles.

We'll discuss precautions that need to be used when working in roadways and around vehicles in motion.

We'll review prepping and rigging.

We'll discuss safety considerations when using a camera crane on an insert car, and we will finish up with a discussion of safety awareness and communication during insert car operations.

## Slide 5 - Introduction


Introduction.

## Slide 6 - Insert Car/Camera Car


A traditional insert car, commonly known as a camera car, has a truck chassis with a bed or deck designed for the purpose of mounting cameras, lighting equipment, and for carrying a limited crew to operate the equipment.

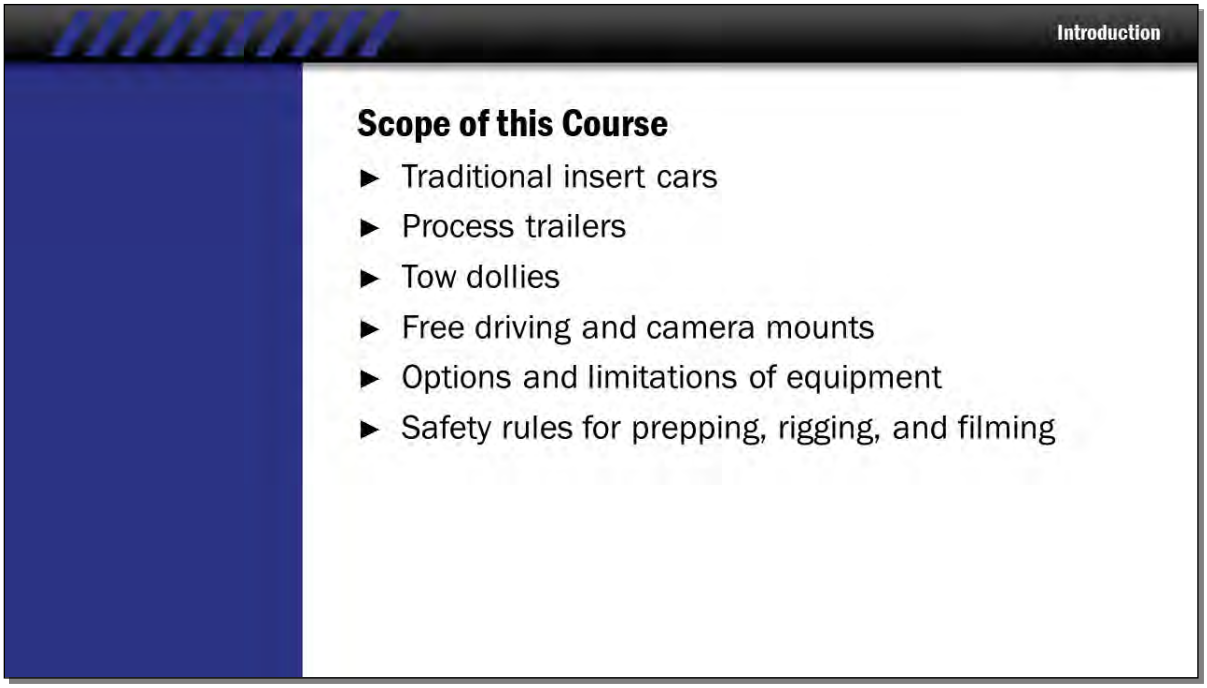
An insert car may also be used to tow a picture vehicle or process trailer.

The term *camera car* refers to any purpose-built vehicle used for filming vehicles and fast tracking shots.

In this course we'll use the term *traditional insert cars* to refer to camera cars like the one shown here, as opposed to other more specialized types of camera cars.

Another term we'll be using a lot is *picture car* (or *picture vehicle*). A picture car is the vehicle being photographed.

## Slide 7 - Scope of this Course



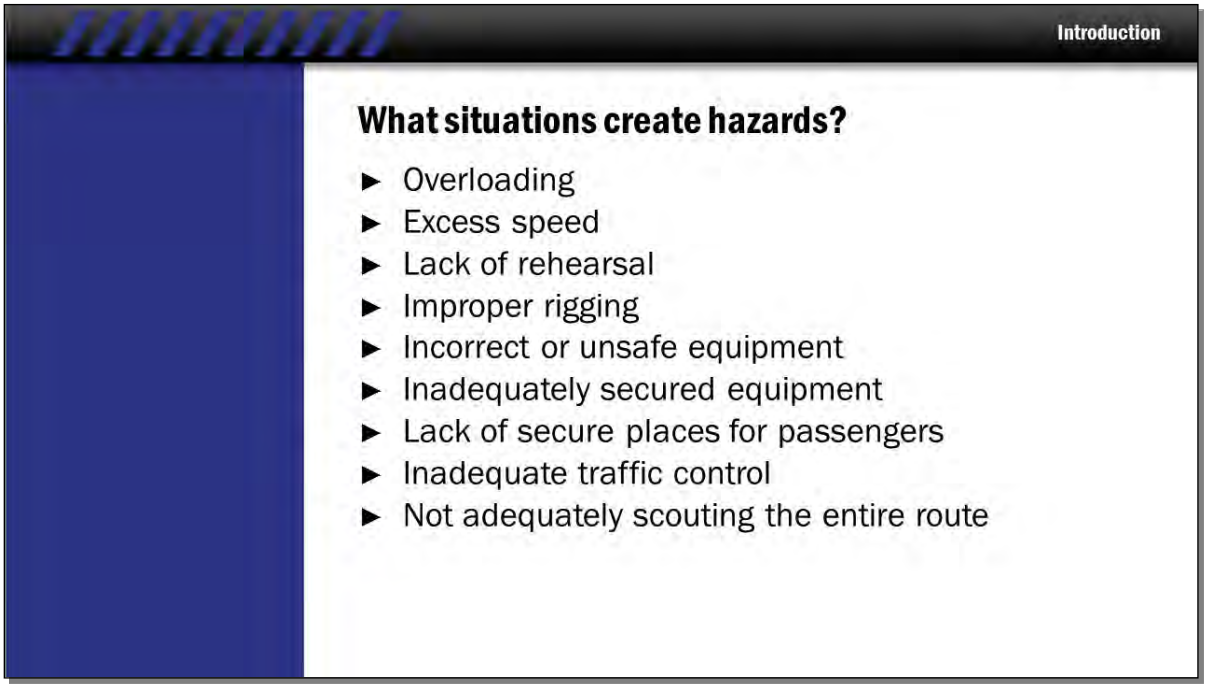

This course covers using traditional insert cars, process trailers, tow dollies, and free driving.

It also covers options and limitations of the equipment used, as well as basic safety rules for prepping, rigging, and filming when using insert cars. This course does not cover every possible way of doing driving shots.

Vendors have developed many types of custom equipment and methods over the years.

Any special safety considerations for custom-made vehicles are under the supervision of the personnel provided by the equipment supplier.

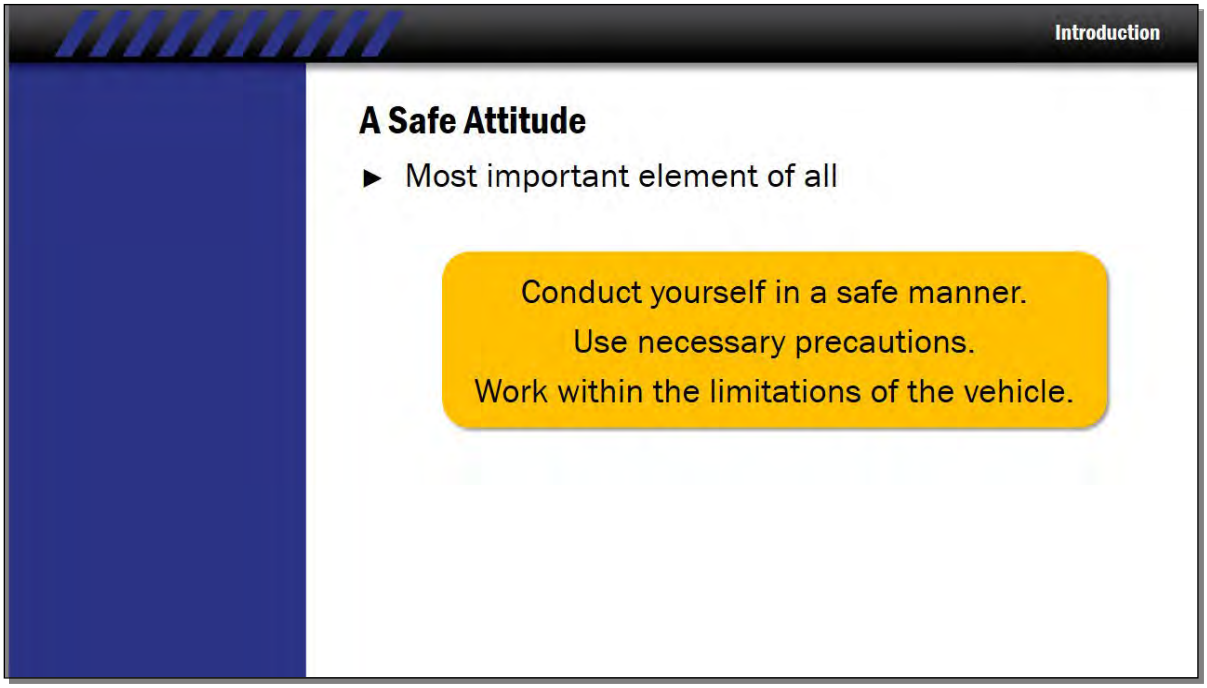
## Slide 8 - What Situations Create Hazards?




Today we will be covering many potential hazards associated with filming from a vehicle in motion.

Hazards include: overloading the vehicle with people and equipment, excess speed, lack of rehearsal, improper rigging, using incorrect or unsafe equipment, inadequately securing equipment, lack of restraint or secure places for passengers, inadequate traffic control, and not adequately scouting the entire route. These are some of the situations that can create hazards.

## Slide 9 - A Safe Attitude




When working on roadways and on moving vehicles, everyone needs to be especially safety conscious.

A safe attitude is an important element of preventing accidents. Do not accept situations that pose unnecessary risk to yourself or others.

Some examples include failing to wear the orange vest when working in roadways, standing on a moving vehicle when you should be seated, texting or talking instead of paying attention to announcements, tunnel vision, rushing, and not being aware of people and events around you.

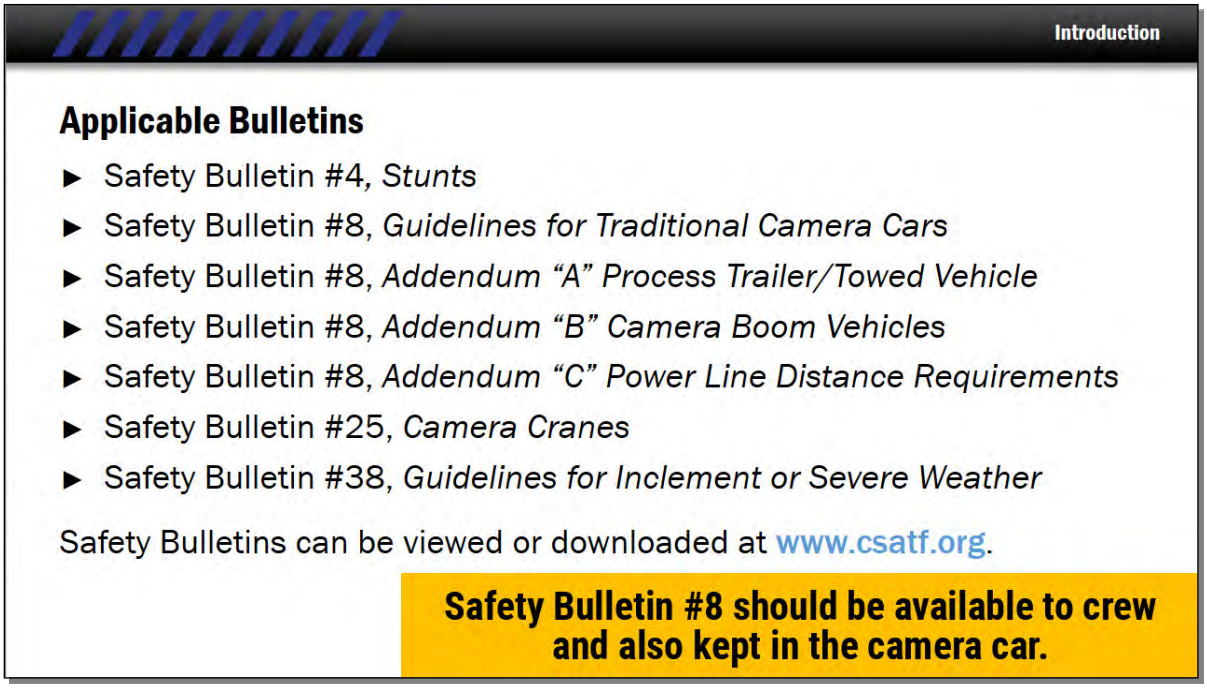
Do not let external pressures affect your safe decision making. These are the kind of things that lead to accidents.

On a camera car, everyone must remain continuously aware of their environment. This requires people to adjust their normal way of working.

Decide to conduct yourself in a safe manner and use all necessary safety precautions during operations on and around a traditional insert car.

Working within the limitations of the vehicle and having a safe attitude can help prevent accidents.

## Slide 10 - Applicable Bulletins




The safety bulletins listed here are part of the source material for this course, and can also be downloaded at www.csatf.org.

When a camera car is on set, Safety Bulletin #8 should be available to crew.

Typically, it is attached it to the call sheet. A copy should also be kept in the camera car.

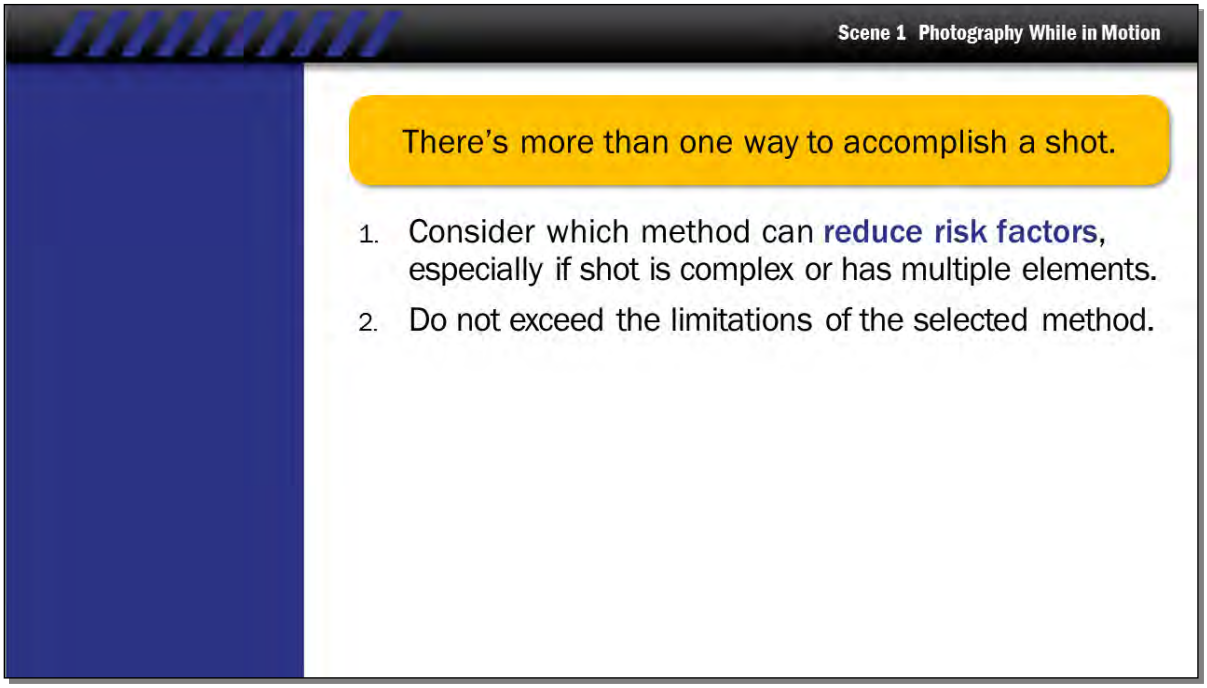
## Slide 11 - Photography While in Motion


Scene 1, Photography While in Motion.

Let’s begin with an overview of the different ways moving shots can be captured.

In this scene we’ll go over some of the pros and cons of different methods and identify associated safety concerns.

## Slide 12 - Accomplish a Shot

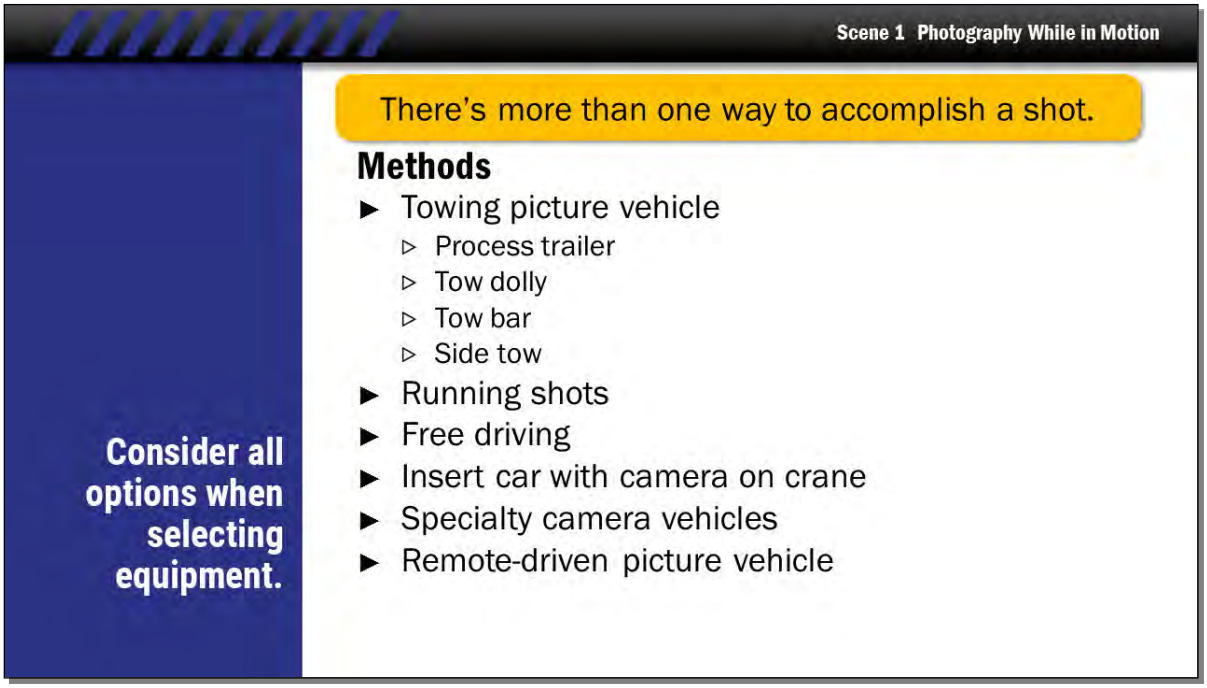



There's more than one way to accomplish a shot.

The people who are responsible for planning the work should consider which method can reduce risk factors, especially if the shot is complex or has multiple elements.

Problems can occur when you start pushing the limits of the selected method. Consider the capabilities and limitations of the vehicle, and address safety concerns of each option. Stay current with technology and consult qualified professionals.

## Slide 13 - Methods




Here is a list of common methods for capturing vehicle action. First, there is towing.

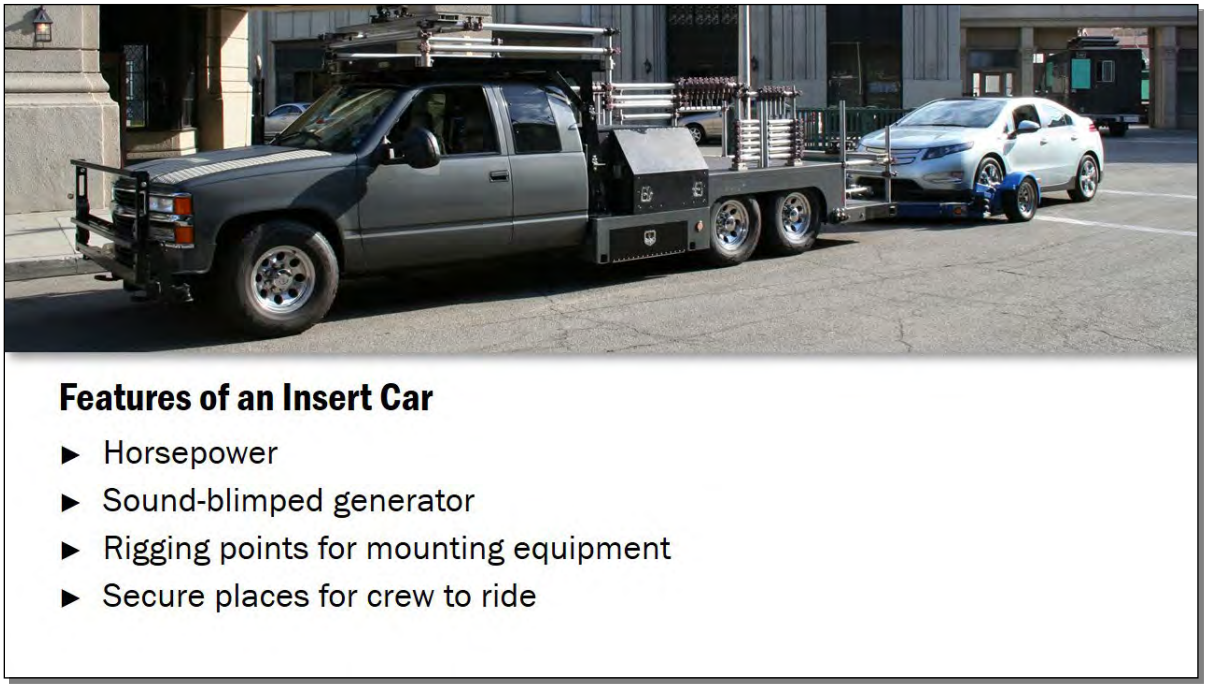
There are a variety of ways to tow the picture vehicle, such as using a process trailer, a tow dolly, a tow bar, or using a side tow.

Next, running shots are when the camera car acts as a moving camera platform that is free from the picture car. With free driving, no insert car is used and the performer is actually driving the vehicle.

A camera crane uses a camera crane mounted to the camera car enabling greater versatility for camera positions and camera movement. Another method for capturing vehicle action is by using specialty vehicles. There are a variety of specialty camera vehicles, such as motorcycles and ATVs, that may be better suited for certain conditions than a traditional camera car.

And lastly, there are remote-driven picture vehicles, which are picture cars that are significantly modified so a professional driver actually controls the vehicle from a pod mounted in front, behind, or above the passenger compartment of the picture car. Remote-driven vehicles are beyond the scope of this course, but we will take a look at each of the other methods.

## Slide 14 - Features of an Insert Car




An insert car typically has the horsepower to tow a process trailer and its load, a sound-blimped generator to power the lights and other equipment, rigging points for mounting equipment, and secure places for the crew to ride.

## Slide 15 - Experienced, Qualified Driver:

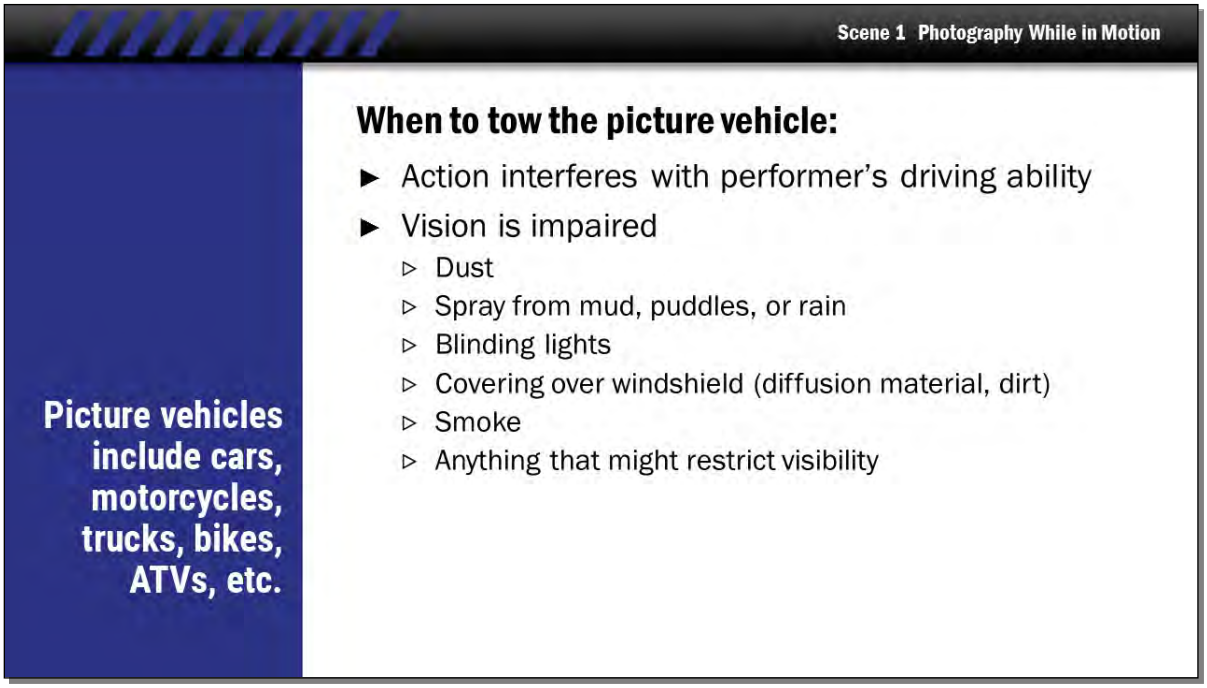

An experienced and qualified insert-car driver usually accompanies and operates the insert car.

The insert-car driver is a valuable resource when planning a moving sequence to help evaluate the capabilities and limitations of different equipment and approaches.

The insert-car driver must possess a commercial driver license and should have the appropriate experience for the type of work to be performed.

Consult with the insert-car driver regarding safety and protection.

## Slide 16 - When to Tow the Picture Vehicle 1

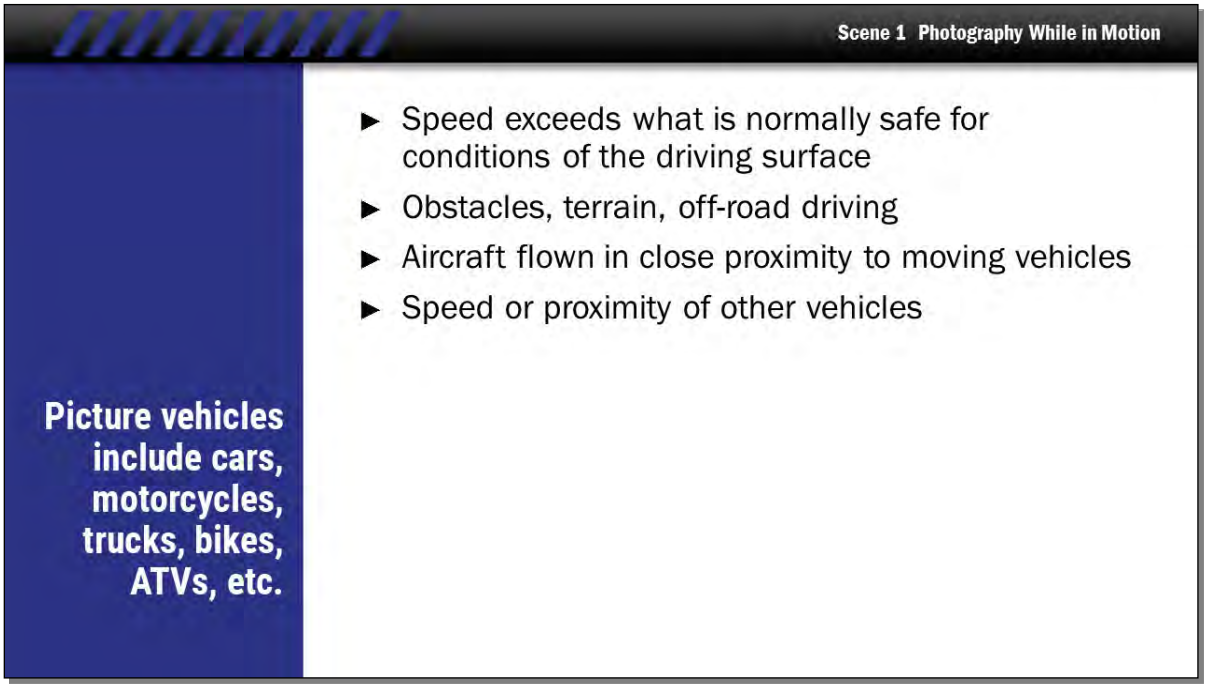



Some considerations that may determine if the picture vehicle should be towed include: if the performance could interfere with the actor's ability to drive safely, and if the performer's vision will be impaired.

For example, the driver's vision may be impaired by clouds of dust and dirt in the air or obscuring the windshield by spray from driving through water and mud. It may also be impaired by lights shining at the performer or by diffusion materials covering the windshield. There may be smoke effects.

There may be other items, such as a hood-mounted camera, that restrict the driver's normal vision.

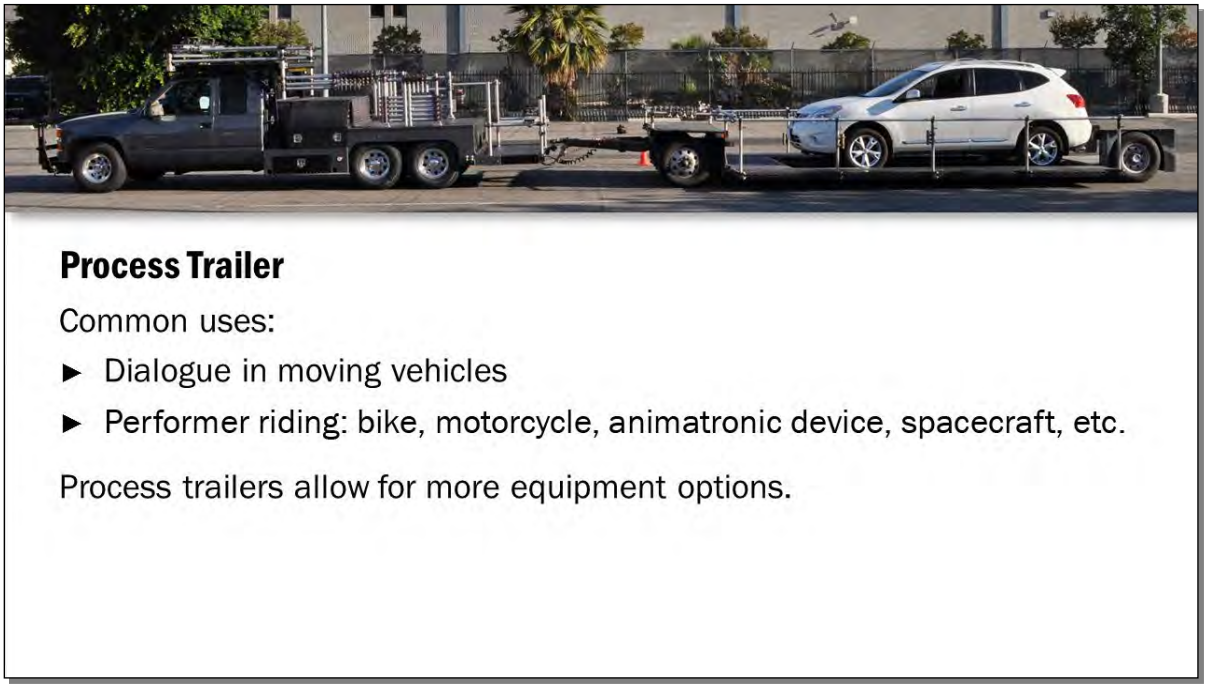
## Slide 17 - When to Tow the Picture Vehicle 2




Other conditions to consider include when: the speed of the vehicle exceeds what is normally safe for the conditions of the driving surface; obstacles or difficult terrain exist or when off-road driving is required; aircraft are flown in close proximity to the vehicle; or when speed or close proximity of other vehicles create potentially hazardous conditions.

Additionally, some performers simply cannot drive, such as children, animals, animatronic characters, and so on.

## Slide 18 - Process Trailer




A process trailer is a low riding trailer used to mount the picture vehicle in order to produce driving shots without requiring the actor to actually drive. It is used when filming ordinary driving sequences, such as performers conversing in a moving car. It can also be used when filming a performer on a bike, motorcycle, animatronic device, or spacecraft.

A process trailer also allows for more equipment options.

## Slide 19 - Features of a Process Trailer

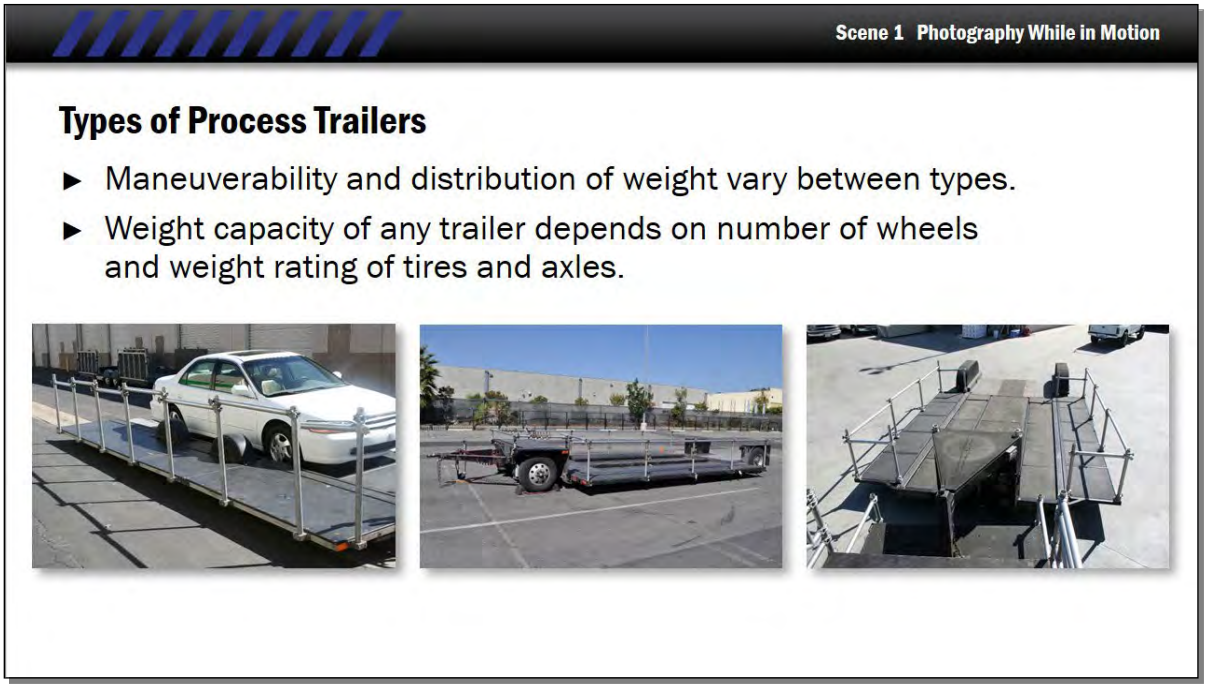

The process trailer typically has a wide working platform, ranging from 12 to 16 feet wide and 18 to 35 feet long, with room for a vehicle, cameras, dollies, lights, grip equipment, and crew. It has low ground clearance so that the scene visible to the camera looks realistic.

However, this may cause the trailer to bottom out where there are dips in the road, high spots, and on driveway aprons.

A process trailer has a system of rails to provide personal safety for passengers, and mounting positions for cameras, lights, and grip rigging.

It has an adaptable system such as E-clips and a track, D-rings, welded tie-down points, and a wooden deck to secure the picture vehicle and equipment to.

## Slide 20 - Types of Process Trailers 1




Process trailers can be divided into three types based on the configuration of the wheels: a *standard* trailer, *steering axle*, and *fifth wheel*.

Maneuverability and distribution of weight vary between types.

The weight capacity of any trailer varies depending upon the number of axles and wheels.

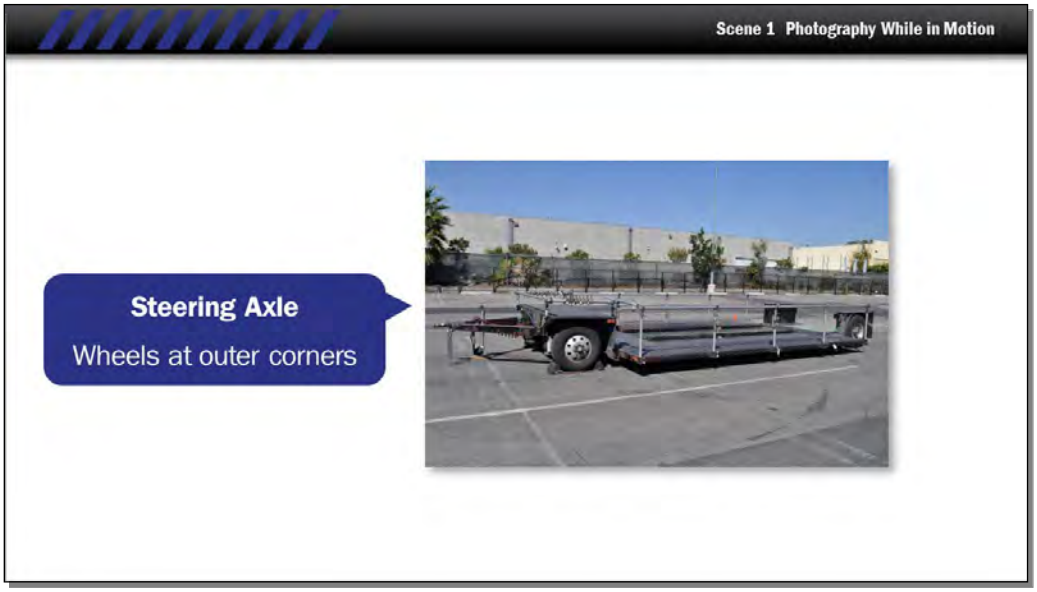
## Slide 21 - Types of Process Trailers 2


On a standard process trailer, the wheels are near the center of the trailer and the center of gravity is slightly forward of the middle of the trailer.

The photo shows a standard trailer that is fitted with side *wings* which provide side platform space for crew and equipment.

You can see the wheel well of the trailer is just behind the front wheel of the car, which can make it difficult to open the vehicle's doors.

## Slide 22 - Types of Process Trailers 3

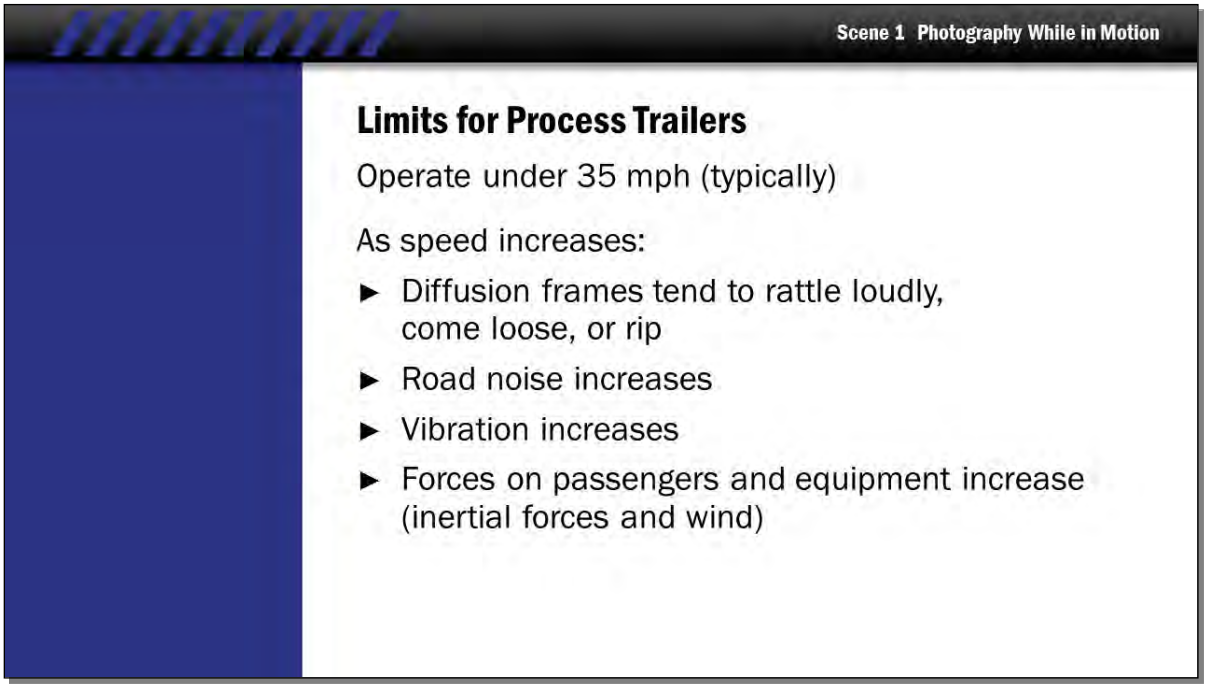



A steering-axle-type process trailer has wheels on the outer corners of the trailer, allowing the trailer to accommodate wider vehicles,
like large SUVs.

## Slide 23 - Types of Process Trailers 4

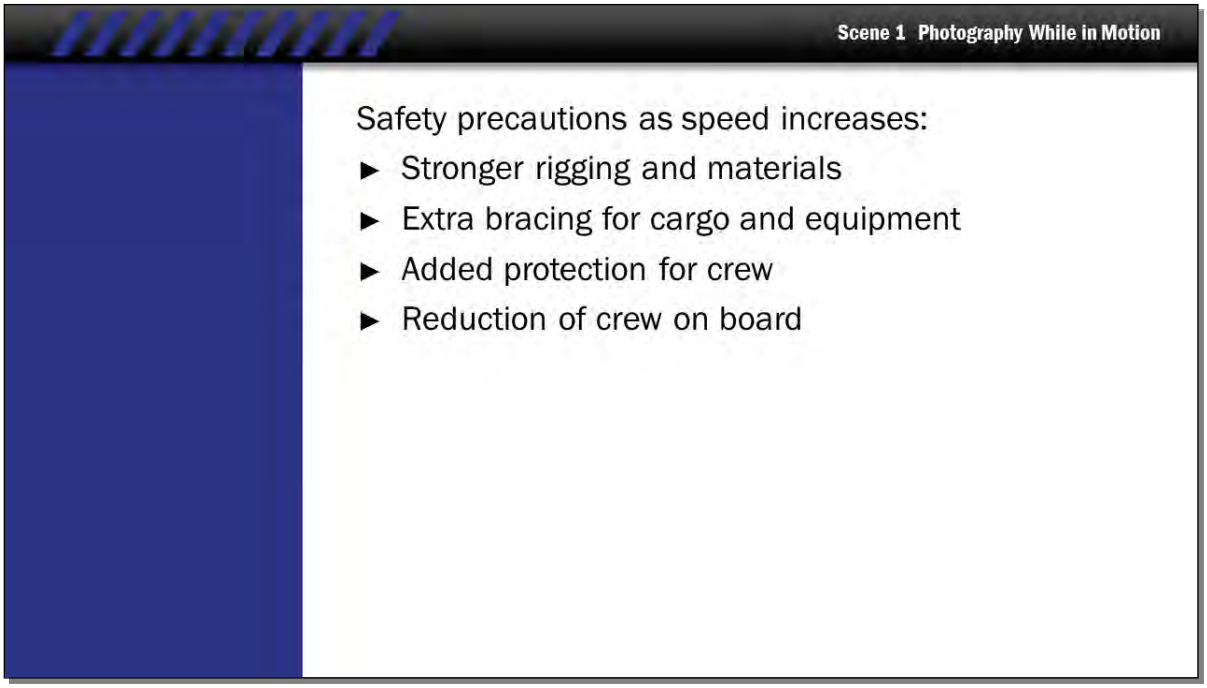

A fifth-wheel-type trailer has wheels off the back end and distributes a significant amount of the trailer load directly onto the insert car.

## Slide 24 - Limits for Process Trailers 1




The maximum speed for a typical process trailer is 35 miles per hour and usually operating speeds are closer to 25 miles per hour. As speed increases, diffusion frames start to rattle loudly (which can come loose or rip), road noise and vibrations increase, and forces on passengers and equipment increase.

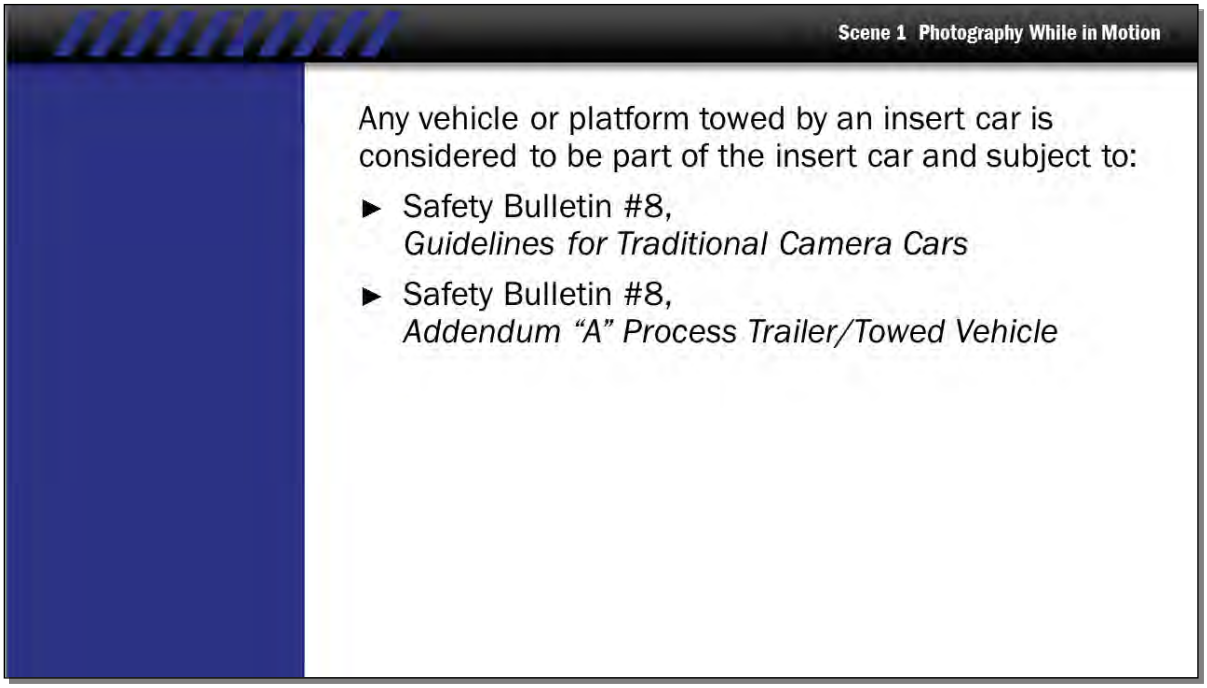
## Slide 25 - Limits for Process Trailers 2




At higher speeds, additional precautions need to be taken.

These precautions may include stronger rigging and extra bracing to secure cargo and equipment, added protection for crew, and possibly a reduction of crew members on board the process trailer.

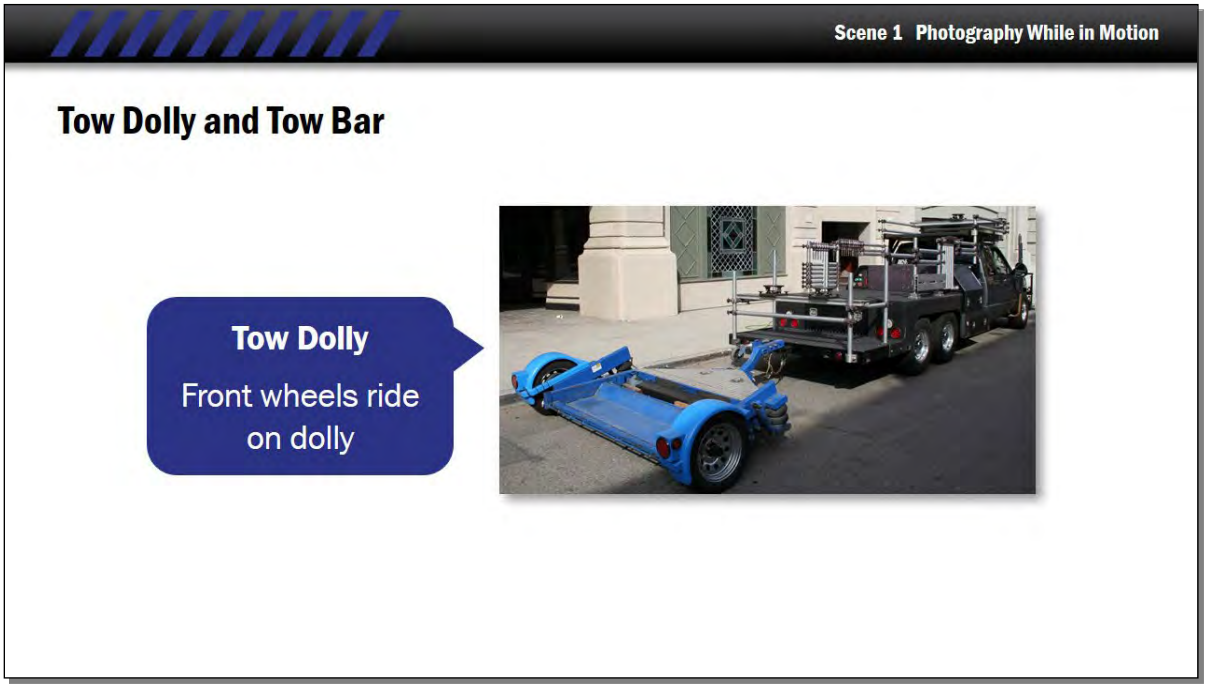
## Slide 26 - Limits for Process Trailers 3




Any vehicle or camera platform towed by an insert car is considered to be a part of the insert car and is subject to the guidelines outlined in the relevant safety bulletins.

For example, if there is a nine-person limit for the number of passengers, that limit **includes** the crew riding on the process trailer.

## Slide 27 - Tow Dolly and Tow Bar 1



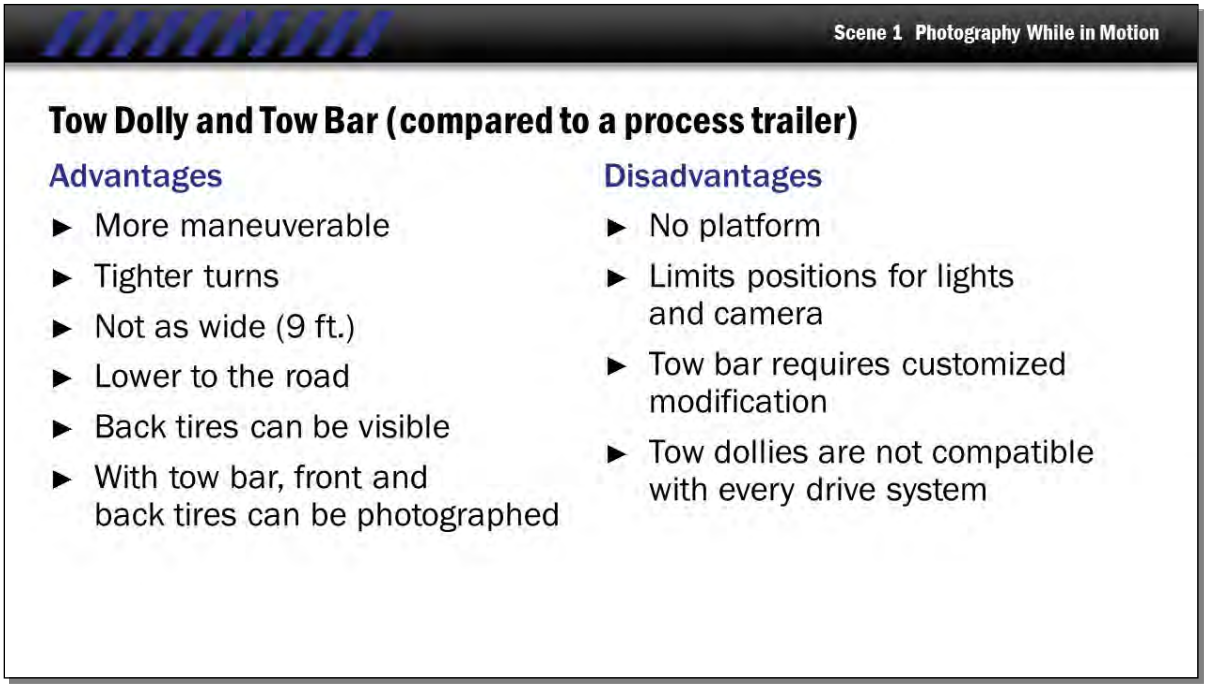

A tow dolly or tow bar can be used to tow the picture vehicle as an alternative to using a process trailer. With a tow dolly, only the front wheels of the vehicle ride on the dolly.

## Slide 28 - Tow Dolly and Tow Bar 2


When using a tow bar all wheels are in contact with the road. With a tow bar, tabs or clamps are attached to the picture vehicle.

Cars with molded bumpers usually require vehicle modifications, such as bolting or welding the tow-tabs to the chassis.

## Slide 29 - Tow Dolly and Tow Bar 3



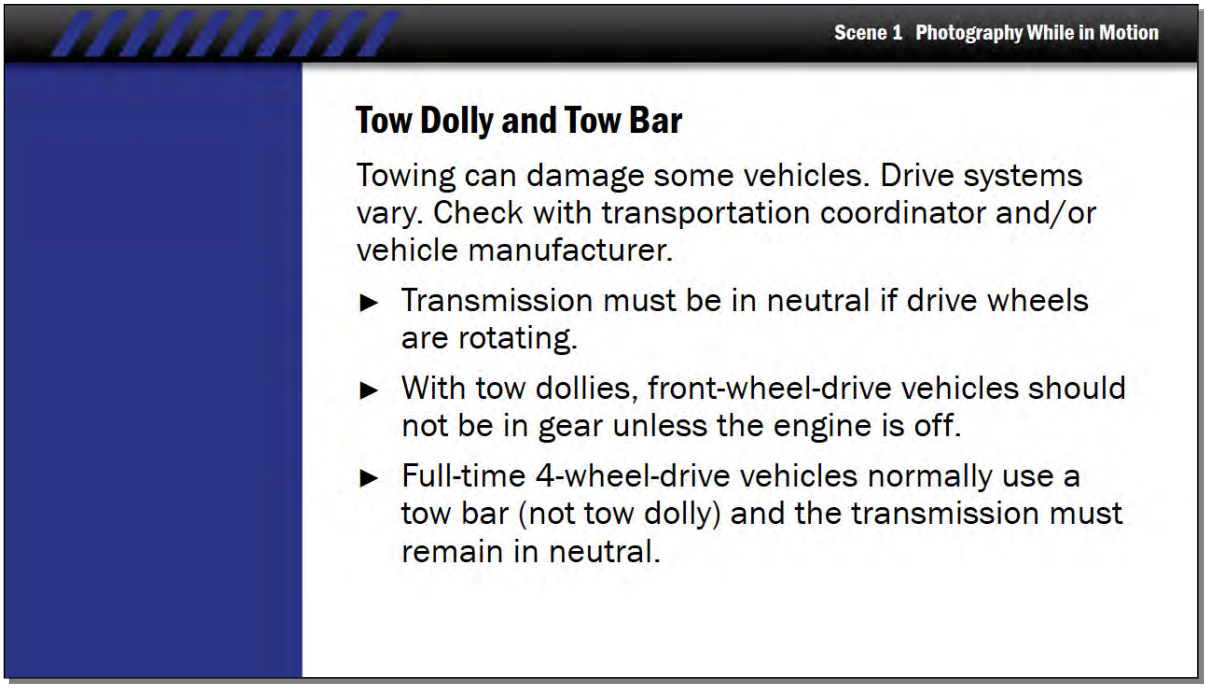

There are advantages of using a tow bar or tow dolly instead of a process trailer.

Some of these advantages include that the vehicle is more maneuverable and can make tighter turns.

Also, the rig is not as wide (a tow dolly is approximately 9 feet wide as compared to a process trailer which is about 12 to 16 feet wide). The vehicle is lower to the road, and the back of the picture car can be shown in the shot whereas when using a process trailer, the trailer has to be framed out.

However, there are also disadvantages to tow dollies and tow bars, such as: there is no platform for equipment and crew, there are limited positions for lights and cameras, the tow bar may require customized modification of the vehicle, and tow dollies are not compatible with some drive systems.

## Slide 30 - Tow Dolly and Tow Bar 4




It is important to check with the transportation coordinator and/or the manufacturer before using a tow dolly or tow bar because drive systems vary and towing could damage some vehicles.

Ensure the following guidelines are met when using a tow dolly and/or tow bar:

Transmissions must be in neutral if drive wheels are rotating.

When using a tow dolly with a front-wheel-drive vehicle, the vehicle should *not* be in gear unless the engine is off.

When the engine needs to be on (because the performers need air conditioning or heat for example), front-wheel-drive vehicles should never be put into a drive gear (forward or reverse) when the drive wheels are secured to the tow dolly.

And finally, full-time four-wheel-drive vehicles normally use a tow bar (not a tow dolly) and the transmission *must remain in neutral*.

## Slide 31 - Side Tow 1


Insert cars that are designed with the side tow capability can tow a picture vehicle alongside the insert car.

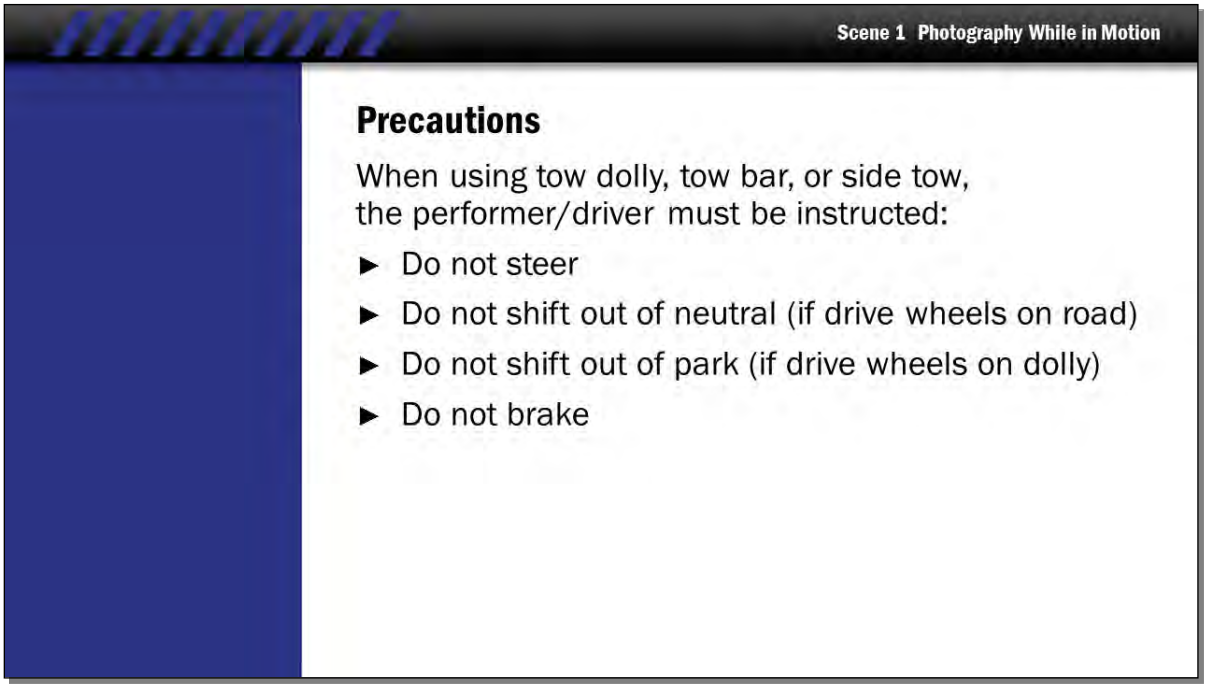
## Slide 32 - Side Tow 2


The advantage of the side tow is that cameras can shoot profile shots from the back deck of the insert car, and lighting and grip equipment can be mounted to the insert car or on the picture vehicle.

This eliminates the need for a process trailer.

There are also a couple of disadvantages to using a side tow, such as: the insert car can turn sharply in only one direction-with the picture vehicle on the inside of the turn; additional road space is needed with the side tow, usually at least two lanes wide; and adequate space must be available to turn around at the end of the run.

## Slide 33 - Precautions




When towing a vehicle with a tow dolly, tow bar, or side tow, the person in the driver's seat of the picture car must be instructed not to attempt to steer the vehicle, change gear, shift out of neutral, or step on the brakes.

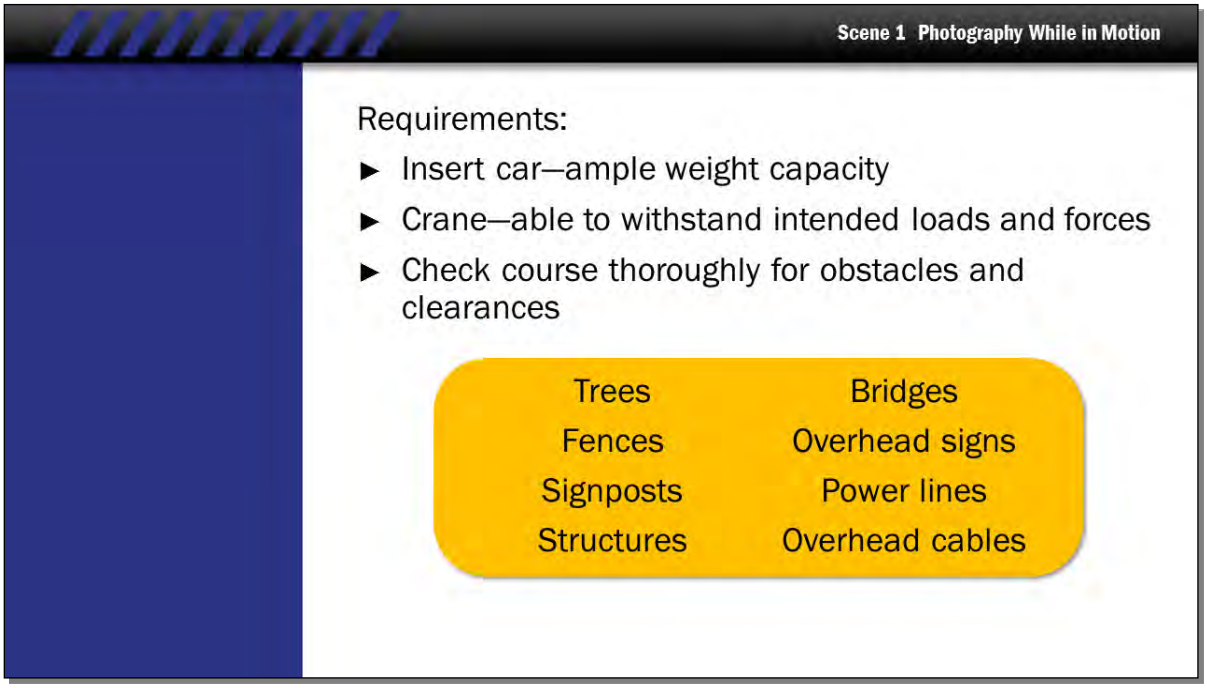
## Slide 34 - Crane Arm on an Insert Car 1


Using a crane arm on an insert car for traveling shots enables camera mobility and provides the ease and flexibility of placing the camera in almost any position around the picture vehicle.

For example, by moving the crane arm the illusion can be created of a car accelerating into or out of a shot that would otherwise require a performer or driver with precision driving skills.

Cranes also provide production efficiency for filming sequences that are not traveling shots.

## Slide 35 - Crane Arm on an Insert Car 2



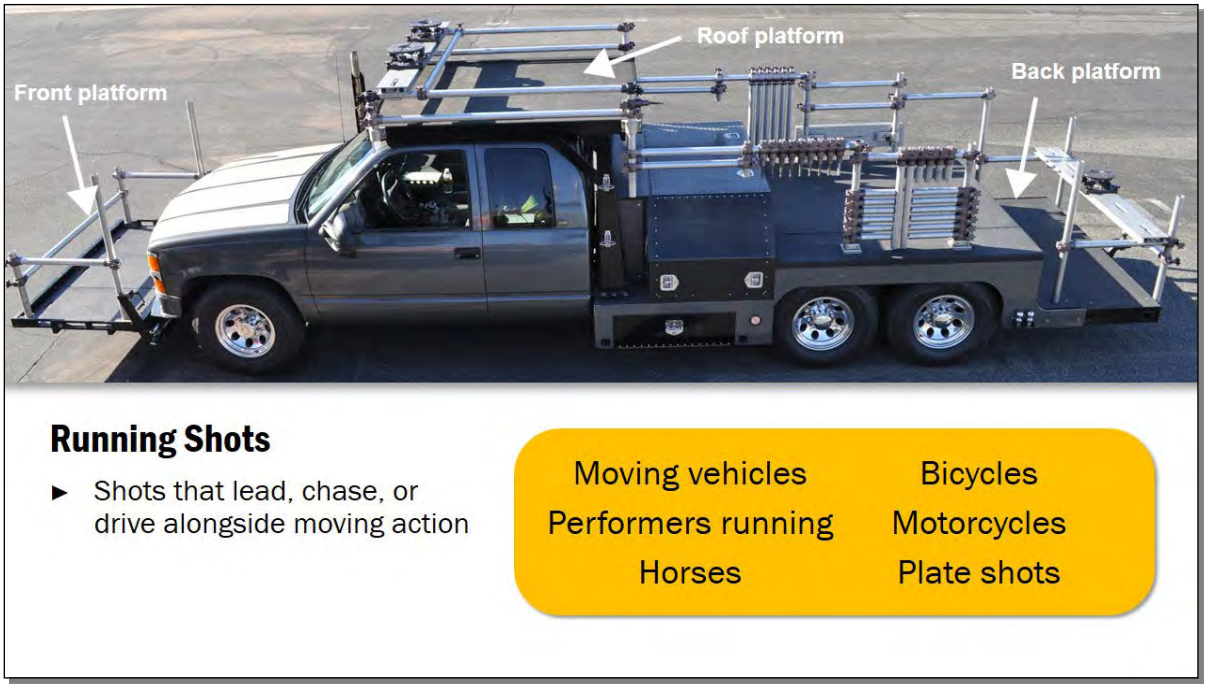

The insert car must have ample weight capacity to support the crane.

The crane and equipment used on the insert car should be able to adequately handle intended loads and forces.

When using a crane on an insert car, the planned course must be checked thoroughly for obstacles and clearances from objects such as trees, fences, signposts, structures, bridges, power lines, and overhead cables.

The consequences of a crane strike can be very serious.

## Slide 36 - Running Shots




The insert car can be used to chase, lead, or drive alongside moving action.

This moving action may be another vehicle, but it could also be a person running, riding a horse, or on a bicycle. It can also be used to film plate shots.

Insert cars typically provide a variety of camera platforms. A front platform allows a 180 degree view forward and to the sides. A back platform allows a 180 degree view rearward and to the sides. A roof platform, allows a 360 degree view.

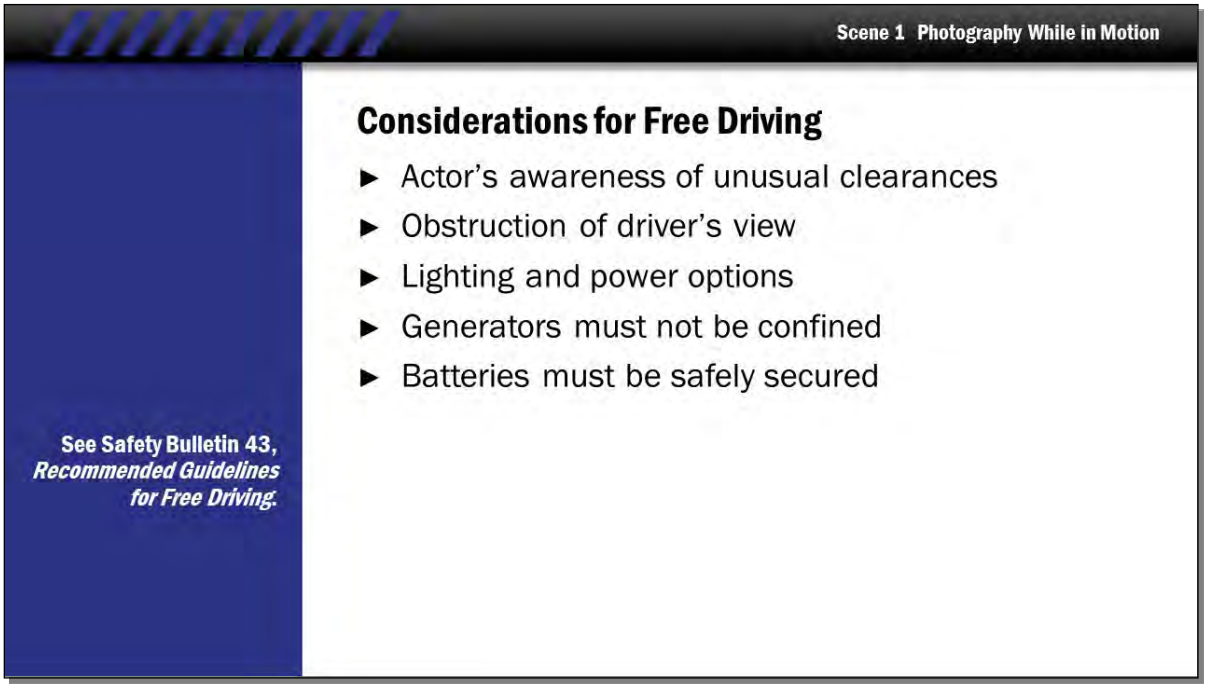
## Slide 37 - Free Driving


Free driving presents a large number of potential risk factors and is the most limited option for accommodating the camera, lighting, and sound equipment.

The primary concern is that the actor is required to drive the vehicle while performing and being photographed.

The camera operator shoots from the passenger or backseat of the car, or the camera is mounted to the vehicle, locked off, and has no camera operator.

## Slide 38 - Considerations for Free Driving 1




Some of the safety issues that have to be addressed before selecting this method of filming include the ability of the actor to remain aware of the additional side clearance required for rigging equipment that extends beyond the vehicle body, while simultaneously performing dialogue and driving the vehicle.

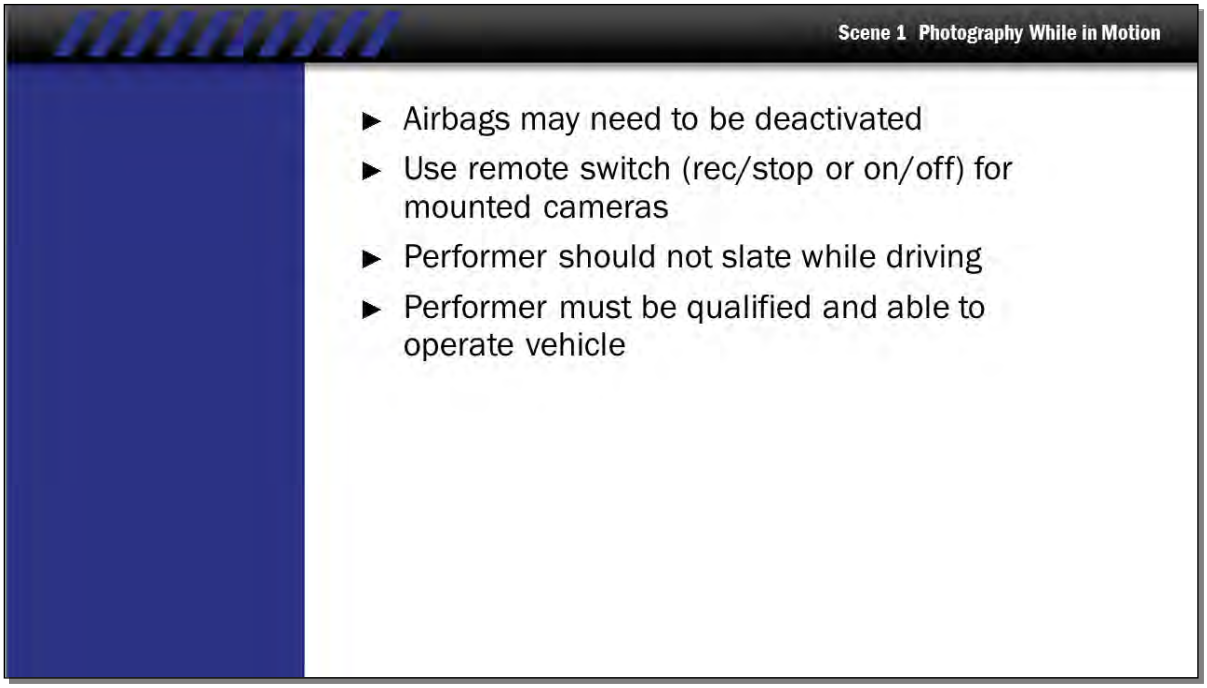
The driver's view cannot be substantially obstructed by cameras, lights, or other equipment, and lighting options are limited, including the means for powering lights.

Also, a generator, when needed, must *not* be confined within the trunk, or placed inside the vehicle or positioned anywhere the cast and crew could be exposed to the exhaust.

And, if using batteries, the batteries must sit flat and be secured in an upright position.

Batteries can get hot and should not be placed against anything combustible.

## Slide 39 - Considerations for Free Driving 2




In addition, airbags may need to be deactivated for safety.

The position and posture of camera personnel in the passenger seat could expose them to injury if the airbags deploy.

A remote on-off control switch should be used to run and stop the camera when it is mounted to the vehicle.

Avoid having camera personnel rushing up to the picture vehicle to turn off the camera as that can be hazardous.

The performer should not be the one who slates the shot if the vehicle is moving.

Of course, the performer must also be qualified to operate the vehicle and should have the appropriate license, although, on a closed course, a license may not be required by law.

Some performers may need additional training to be qualified to drive an unfamiliar vehicle or course.

## Slide 40 - Specialty Camera Vehicles 1


Specialized vehicles are designed to enable shots that may be too difficult to accomplish with the traditional insert car.

These vehicles are equipped with a roof-mounted, remote-operated crane arm and camera.

The vehicles have upgraded internal structure, engine, and suspension.

Everything is controlled from inside the vehicle where crews are buckled into legal car seats with 5-point harnesses.

The vehicle is capable of tackling rough terrain and speeds that would be high risk in a traditional insert car.

## Slide 41 - Specialty Camera Vehicles 2


Camera vehicles have been built from converted utility-task vehicles (UTVs), all-terrain vehicles (ATVs), golf carts, snowmobiles, rally or race cars, motorcycles, and sidecars.

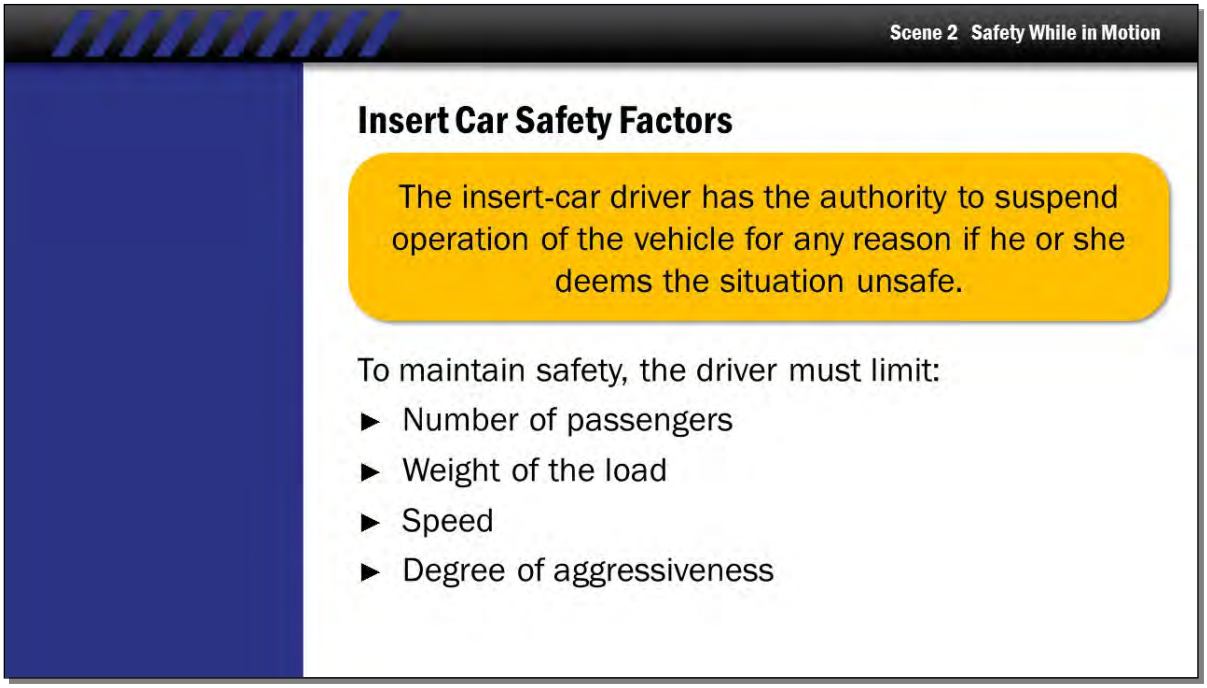
Before any crew members may ride in a specialty camera vehicle, the employer must approve them to do so, and they must receive a complete safety briefing from the camera car vendor's representative.

The completion of this course does not fulfill those additional safety training requirements.

## Slide 42 - Safety While in Motion

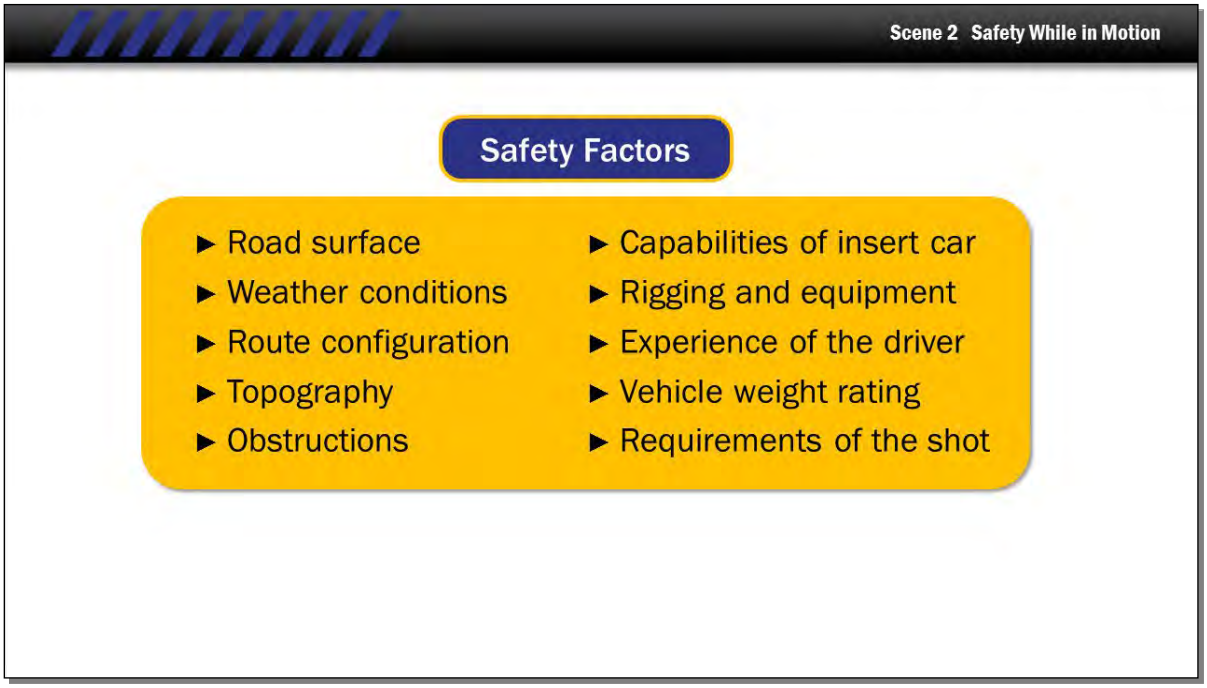

Scene 2, Safety While in Motion.

## Slide 43 - Insert Car Safety Factors



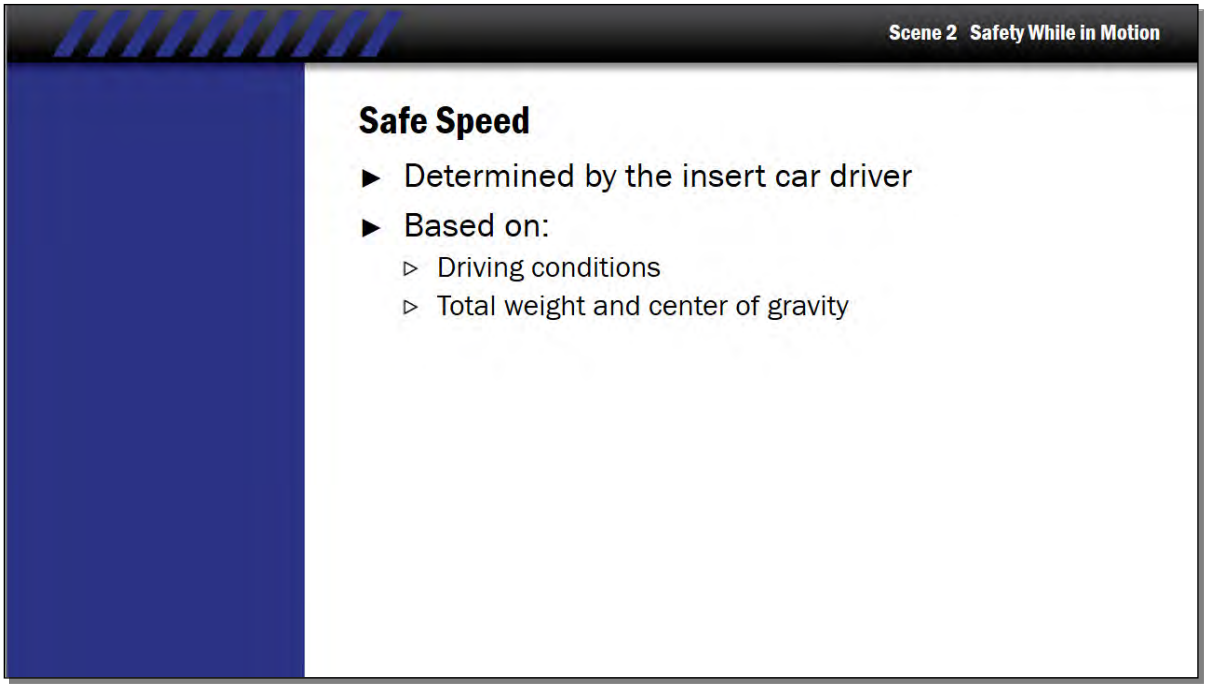

The insert-car driver has the authority to suspend operation of the insert car for any reason if he or she deems the situation to be unsafe. In order to maintain safety, the insert-car driver must limit the number of passengers, the weight of the load, the speed of the insert car, and the degree of aggressive driving used.

## Slide 44 - Safety Factors



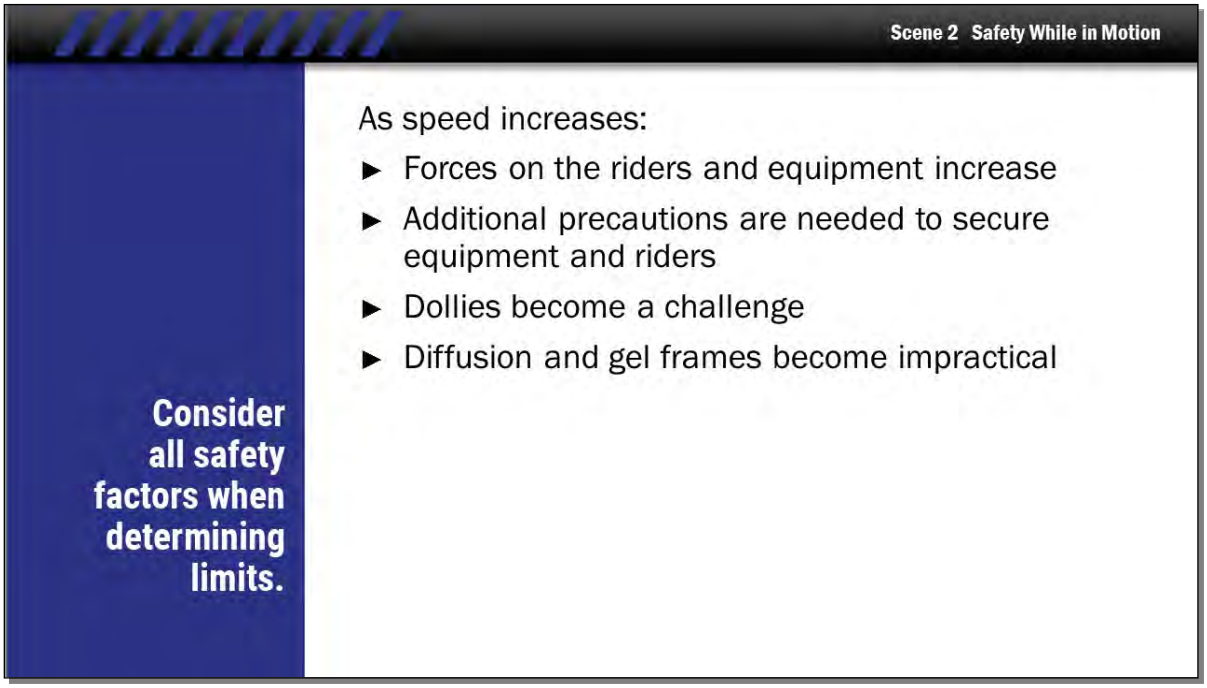

Some factors that influence the driver's assessment of safe limits are the road surface, weather conditions, route configuration, topography, overhead and side obstructions, the capabilities of the insert car, rigging and equipment attached to the vehicles, the ability and experience of the insert-car driver, the gross vehicle weight rating of the insert car and the process trailer or tow dolly, and the requirements of the shot at hand.

## Slide 45 - Safe Speed 1




The insert-car driver will determine a safe driving speed based on road conditions, and consider the total weight of the insert car and the center of gravity of the load to determine a speed that maintains adequate stability.

## Slide 46 - Safe Speed 2




As speed increases, so does the force on riders and equipment.

Additionally, precautions may be needed to secure equipment or personnel, the use of camera dollies may become challenging, and diffusion gel frames may become impractical.

## Slide 47 - Secure Place to Ride 1

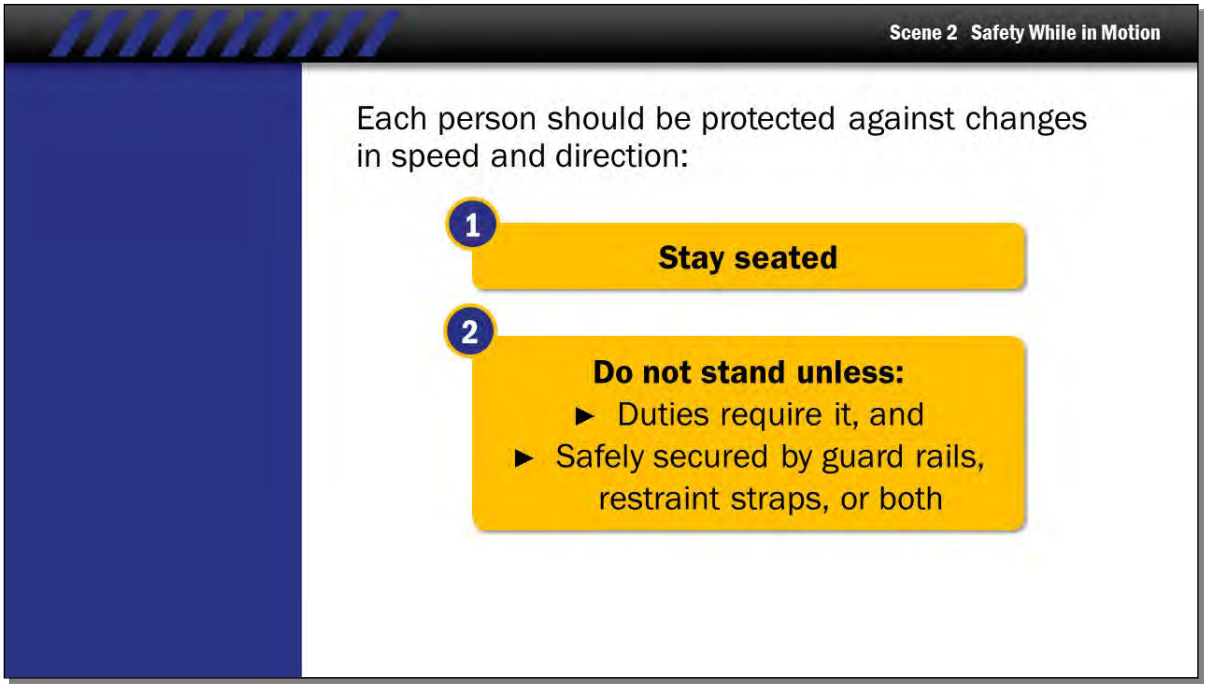

All personnel riding on the insert car must be provided a safe and secure place to ride to avoid the possibility of a fall.

Do not underestimate the forces acting on personnel when traveling in a vehicle without car seats and seatbelts.

For example, if a person is traveling on a vehicle that is moving at 20 mph, and the vehicle suddenly stops, unless there is something to stop their forward momentum, that person will continue to travel at 20 mph.

Again, as speed increases, forces also increase exponentially.

## Slide 48 - Secure Place to Ride 2



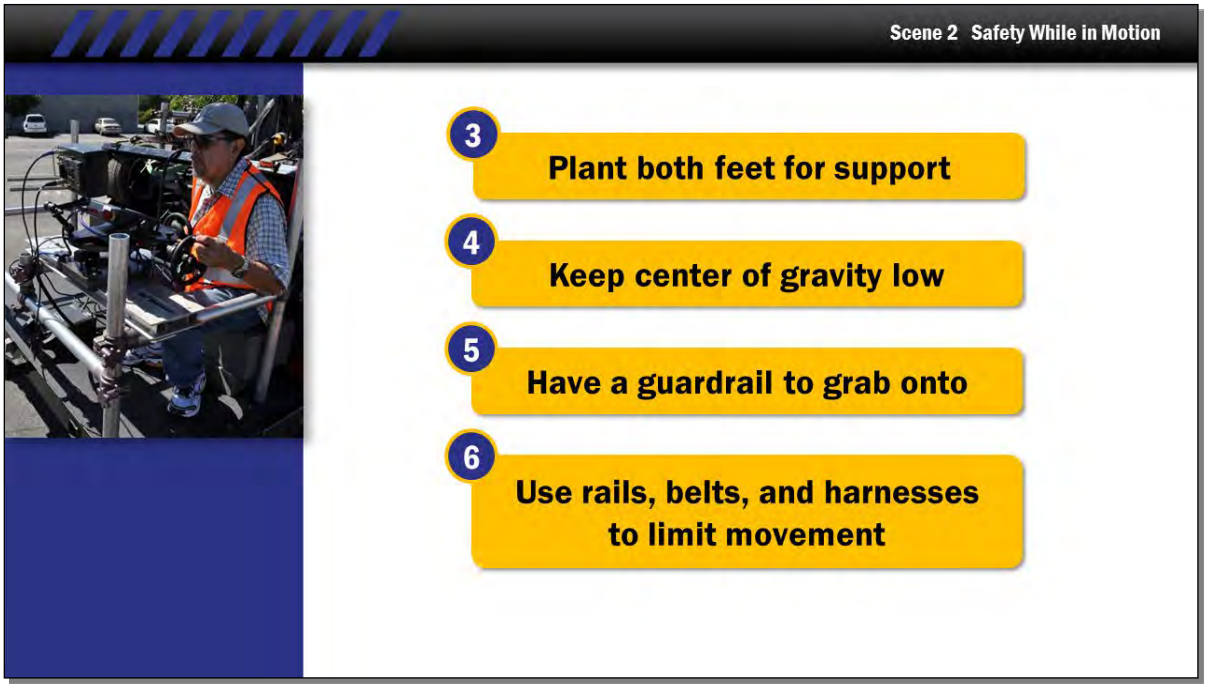

Personnel riding on the insert car should be protected from sudden changes in speed or direction.

Everyone should be seated when the vehicle is moving.

Exceptions can be made for persons required to stand in order perform work duties, such as the crane operator.

In that case, guardrails, restraint straps, or both should be used to provide a safe work position.

## Slide 49 - Secure Place to Ride 3

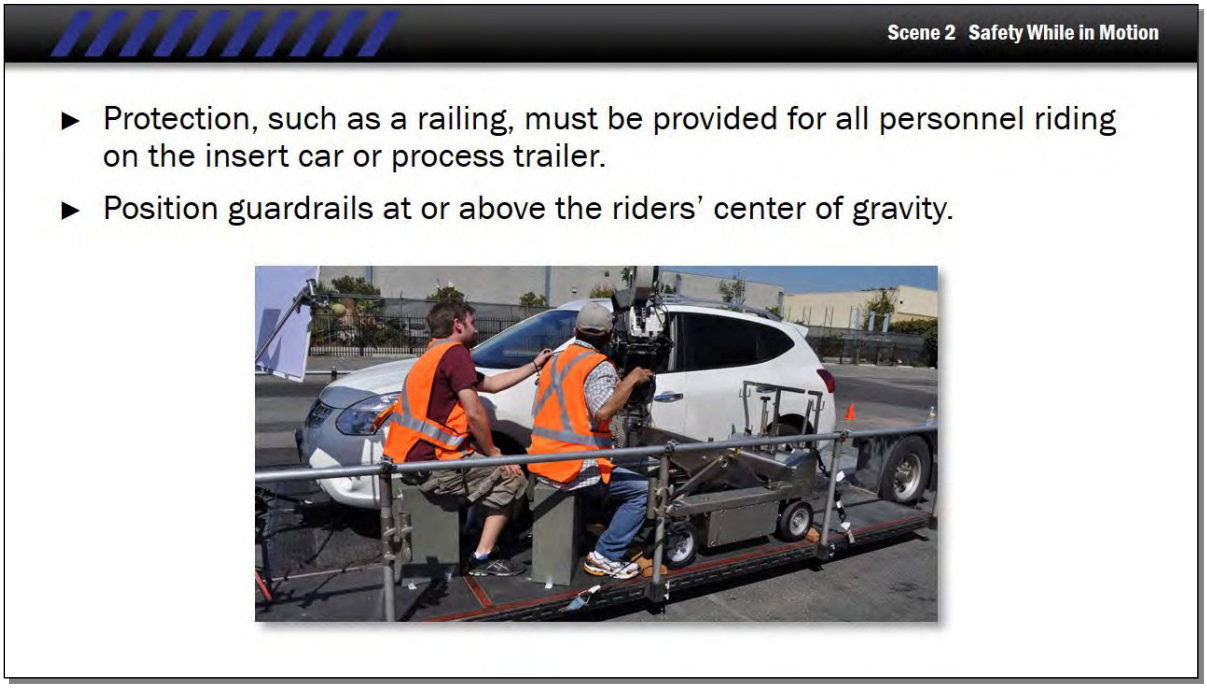



While in motion, place both feet on the floor and keep a low center of gravity.

Have something secure to grab onto, such as guardrails, and use rails, belts, and harnesses to limit movement.

All individuals must be positioned safely and securely.

## Slide 50 - Secure Place to Ride 4

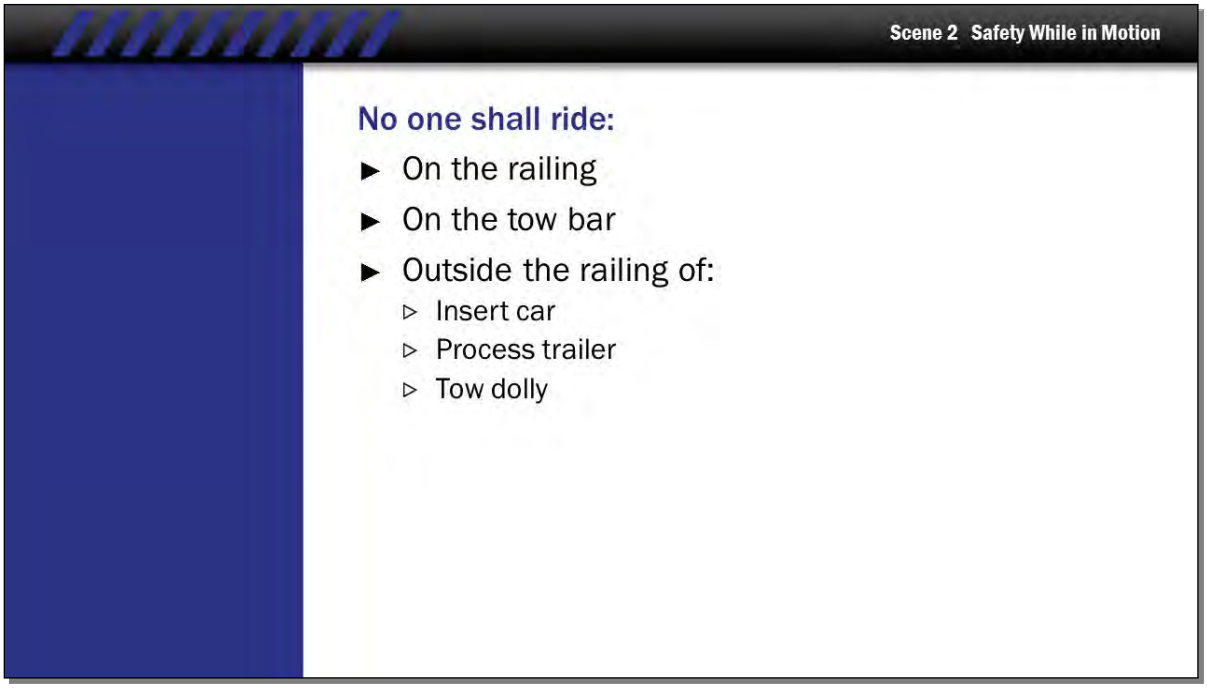



When personnel are on the insert car or process trailer, protection such as railings must be provided for all occupants.

Railings must be placed at the appropriate height--at or above the riders' center of gravity--waist to shoulder height when seated.

Never sit or stand on the rails.

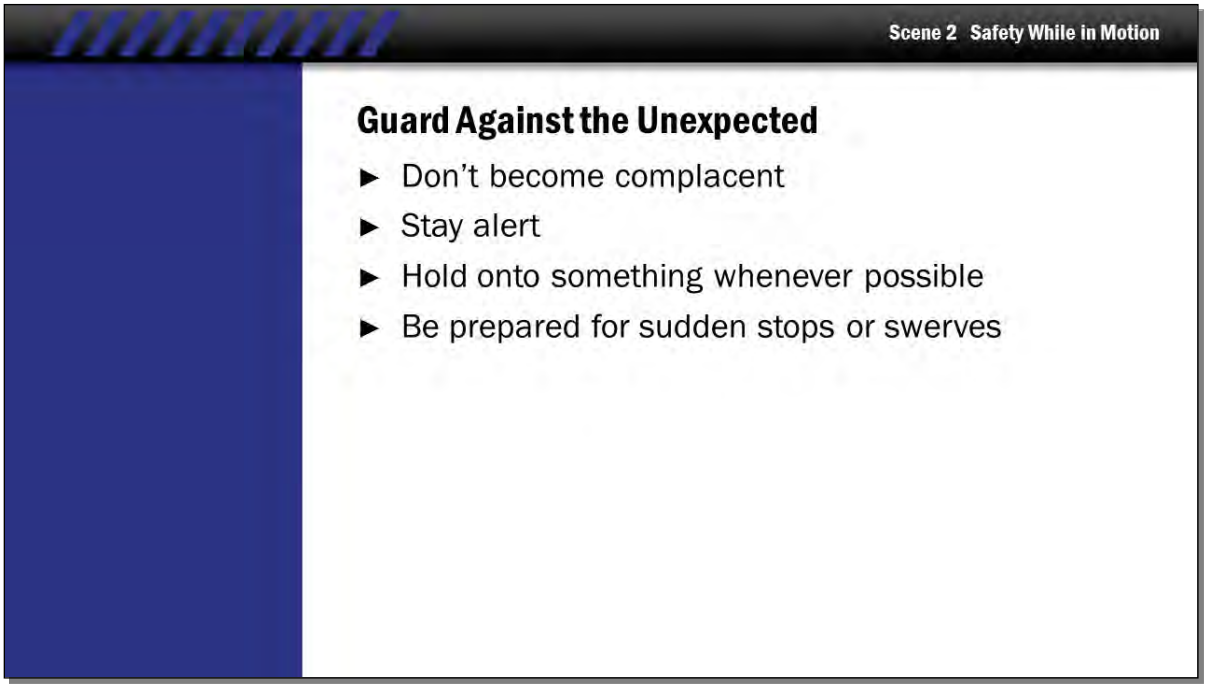
## Slide 51 - Secure Place to Ride 5




No one is permitted to ride on the railing, on the tow bar, or outside the railing of the insert car, process trailer, or tow dolly.

Personnel are to remain in a secure position when the insert car or process trailer is moving.

## Slide 52 - Guard Against the Unexpected



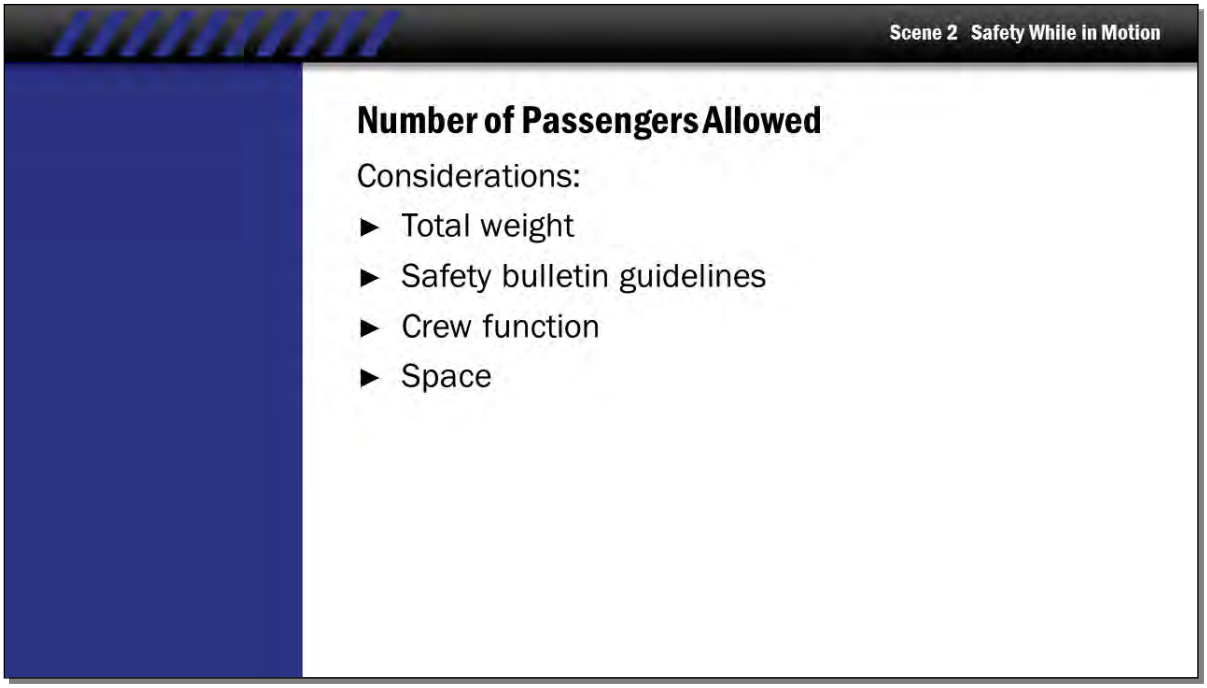

Guard against the unexpected. A camera car can make a series of runs that are perfectly smooth and then encounter a sudden bump or need to swerve or stop.

Complacency causes people to let down their guard. Stay alert.

Consider what you will do if the vehicle has to stop or swerve suddenly.

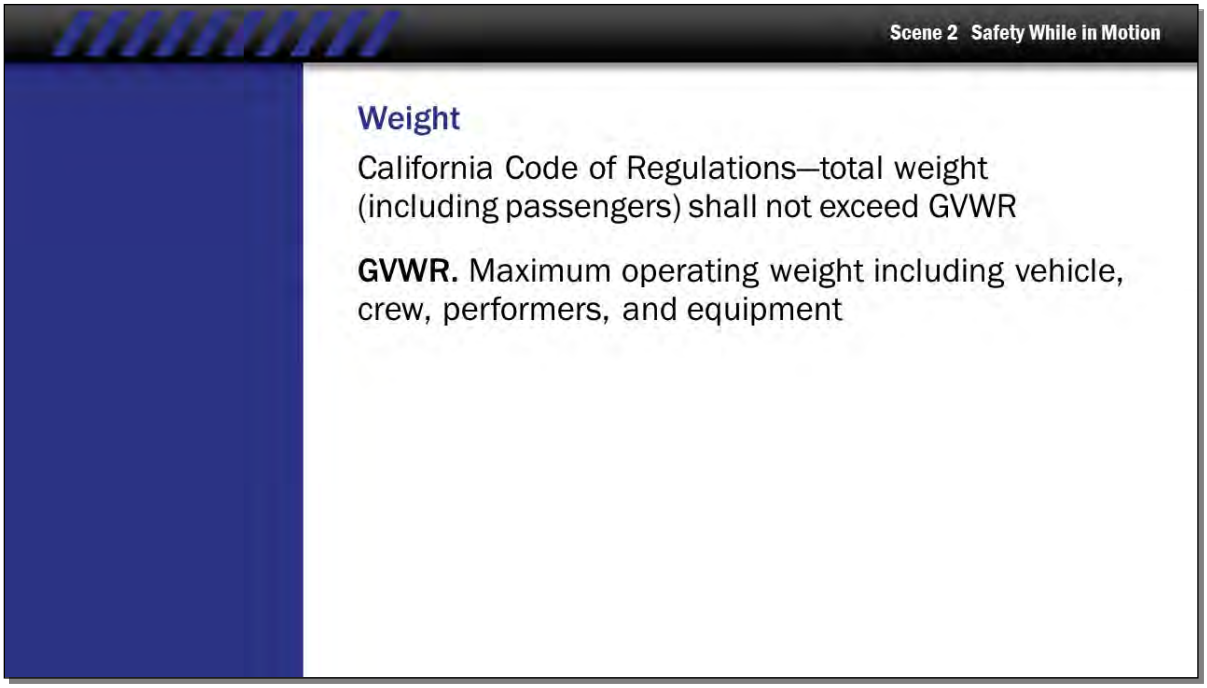
Hold onto something whenever possible.

## Slide 53 - Number of Passengers Allowed




The maximum number of passengers allowed on the insert car and process trailer is based on the vehicle's weight rating, the recommendations of industry guidelines (from Safety Bulletin #8), crew function, and available space.

## Slide 54 - Weight 1

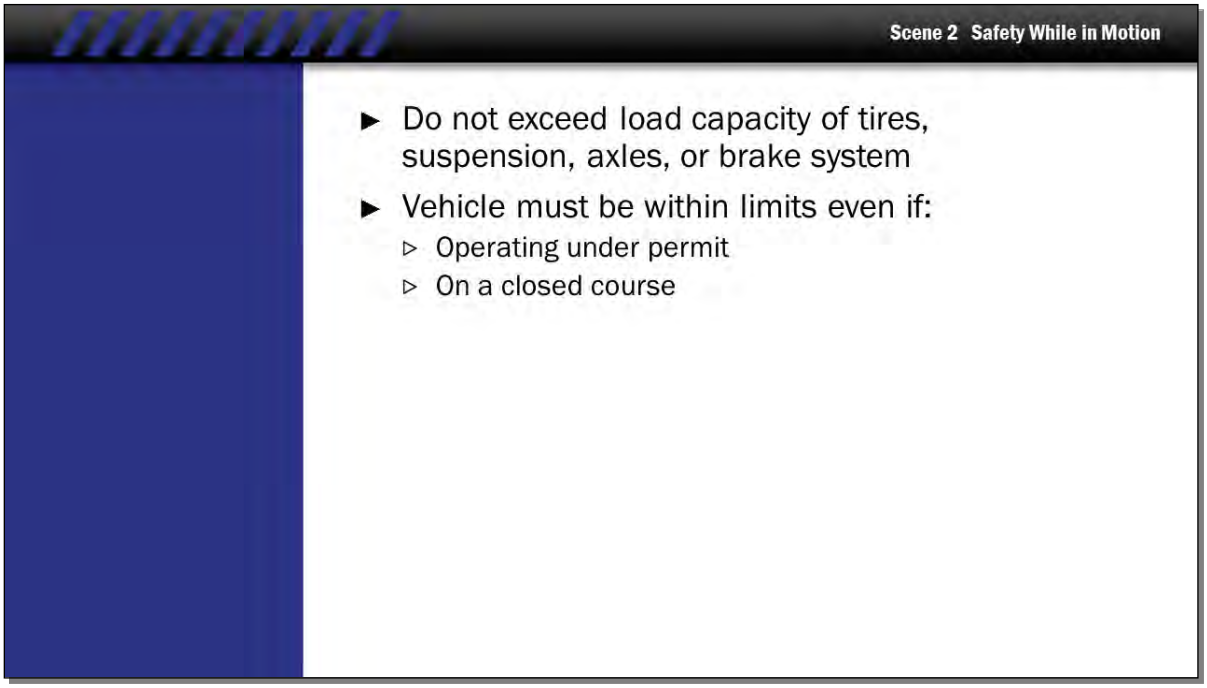



The California Code of Regulations mandates that the total weight, including passengers, shall not exceed the Gross Vehicle Weight Rating (GVWR).

The GVWR is the maximum operating weight including the vehicle, crew, performers, and equipment.

The insert-car driver knows the rating of their vehicle.

## Slide 55 - Weight 2

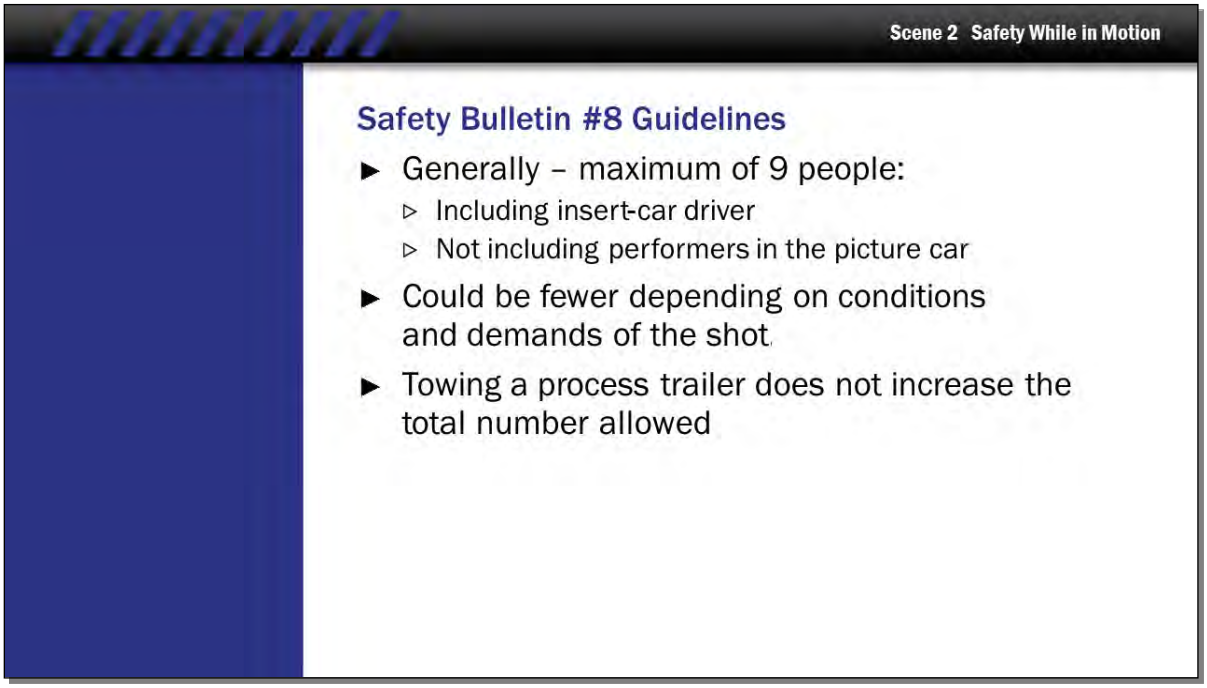



Exceeding the load capacity of the tires, suspension, axles, or brake system is potentially dangerous.

Sometimes operating under permit or on a closed course allows use of the road that would not normally be legal, but even with a permit, you can't bend the laws of physics.

The vehicle must remain within its designed weight limit.

## Slide 56 - Safety Bulletin #8 Guidelines

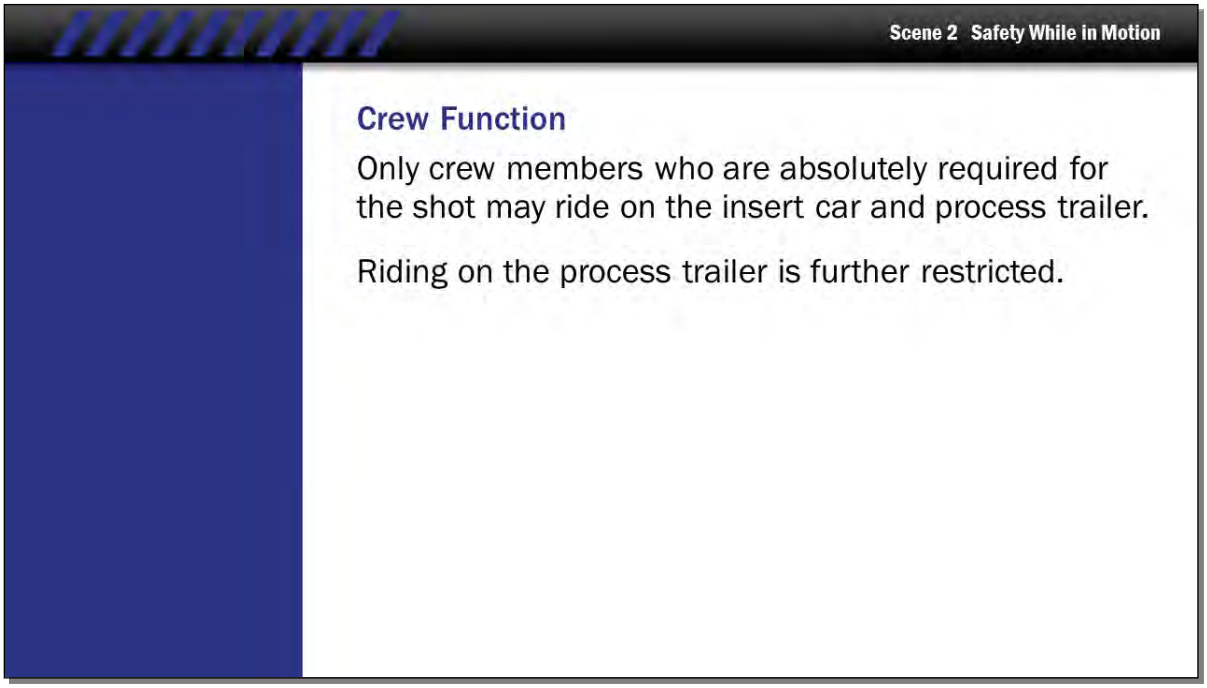



Generally the maximum number of crew members allowed on an insert car should not exceed **nine**.

This includes the insert-car driver but does not include actors riding in the picture vehicle. Keep in mind, in some cases, conditions may exist where operations cannot be safely performed with nine people on board.

Towing a process trailer does not increase the total number of crew allowed on board, because the process trailer is considered part of the insert car.

## Slide 57 - Crew Function




Only crew members absolutely required for the shot may ride on the insert car or process trailer.

All other persons should be riding in the **follow** vehicle.

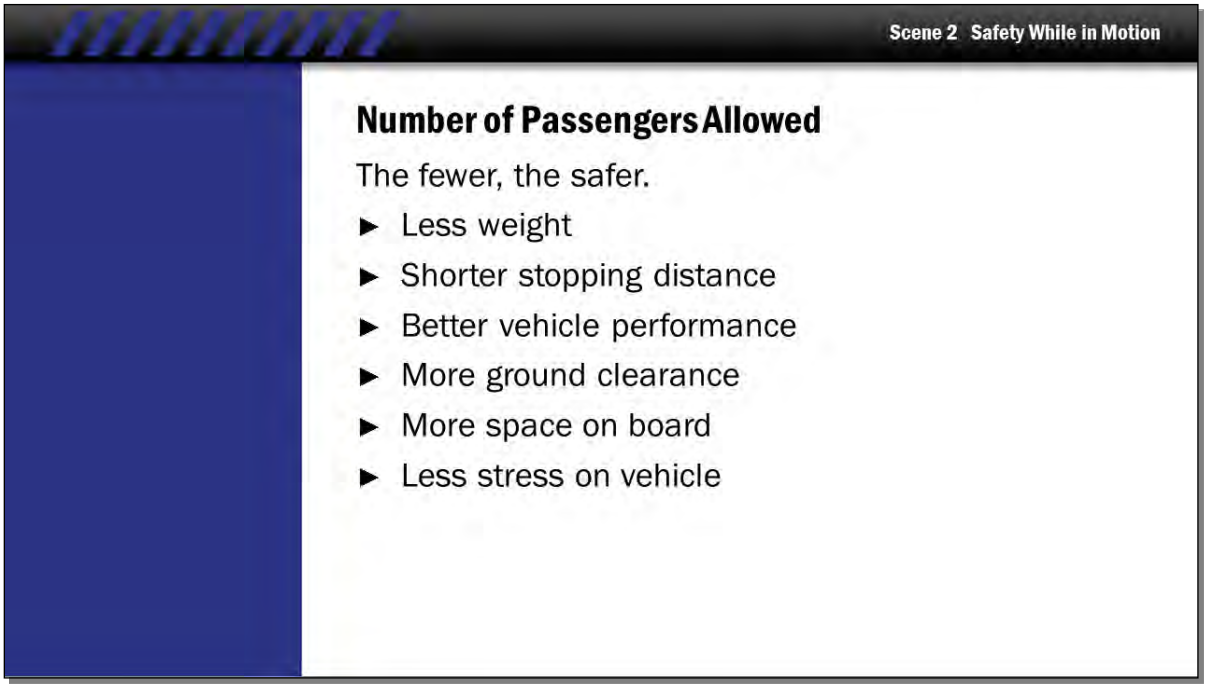
Personnel riding on the process trailer should be limited to those whose job requires them to ride there.

## Slide 58 - Available Space


The performance and capacity of insert cars vary, and the number of people on board may be limited by space available.

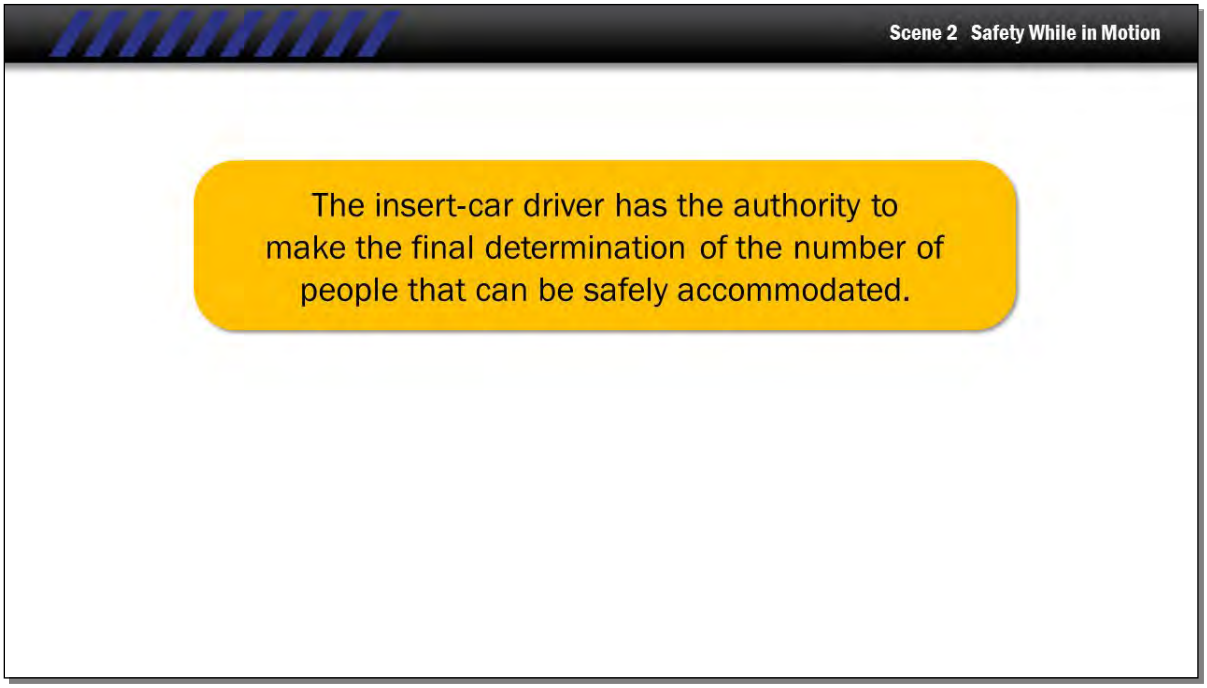
Each person must have a safe and secure place to ride, and this may require reducing the number of crew to less than nine.

## Slide 59 - Number of Passengers Allowed



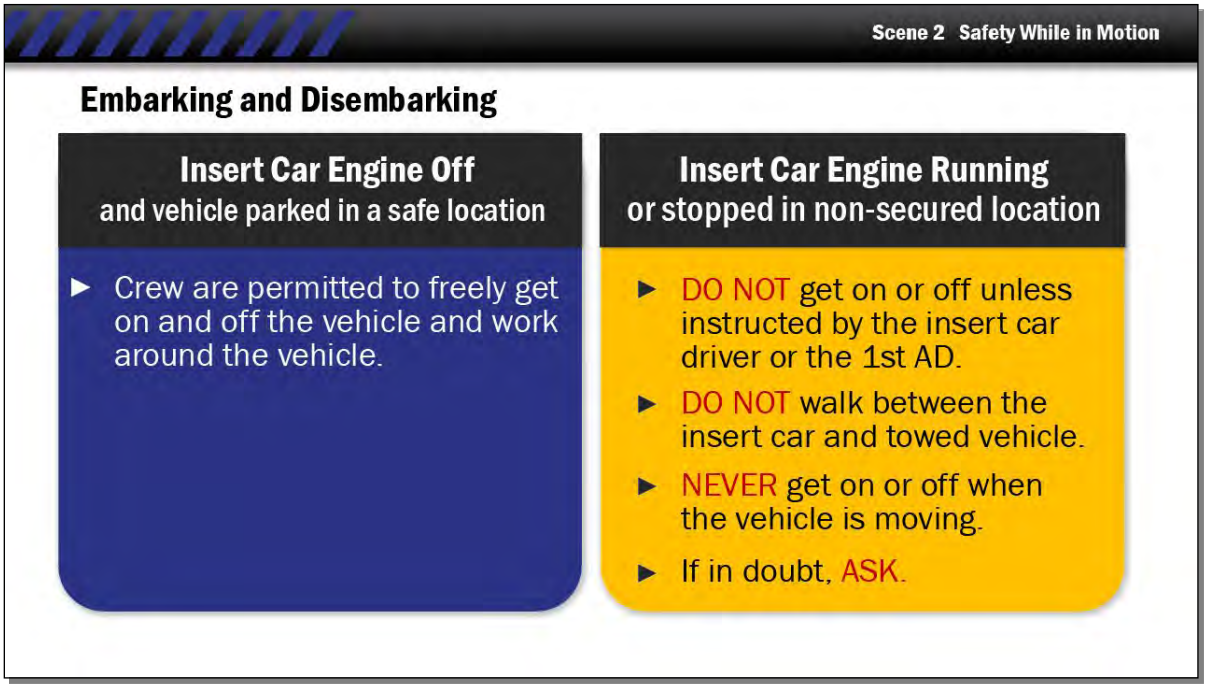

Fewer people means less weight, shorter stopping distance, better vehicle performance, more ground clearance, more space on board, and less stress on the vehicle. The fewer, the safer.

## Slide 60 - Insert-Car Driver Authority




The insert-car driver has the authority to make the final determination on the number of people that can be safely accommodated.

## Slide 61 - Embarking and Disembarking




While people are working around the insert car and climbing on and off the vehicle, the insert car driver ensures safety by leaving the insert car's engine off.

When the insert car is parked in safe location, free from hazards, with the engine is off, crew are permitted to freely get on and off the insert car and work around and between the insert car and the process trailer, as necessary.

The rules change when the insert car's engine is running. Whenever the engine is on, crew are only permitted to get on or off when instructed by the insert-car driver or the first assistant director that it is safe to do so.

When the engine is running, no one is permitted to walk between the insert car and the towed vehicle.

Once the insert car is working on the road, if it stops somewhere other than the designated end point or start point, the location may pose other hazards, like close proximity to traffic.

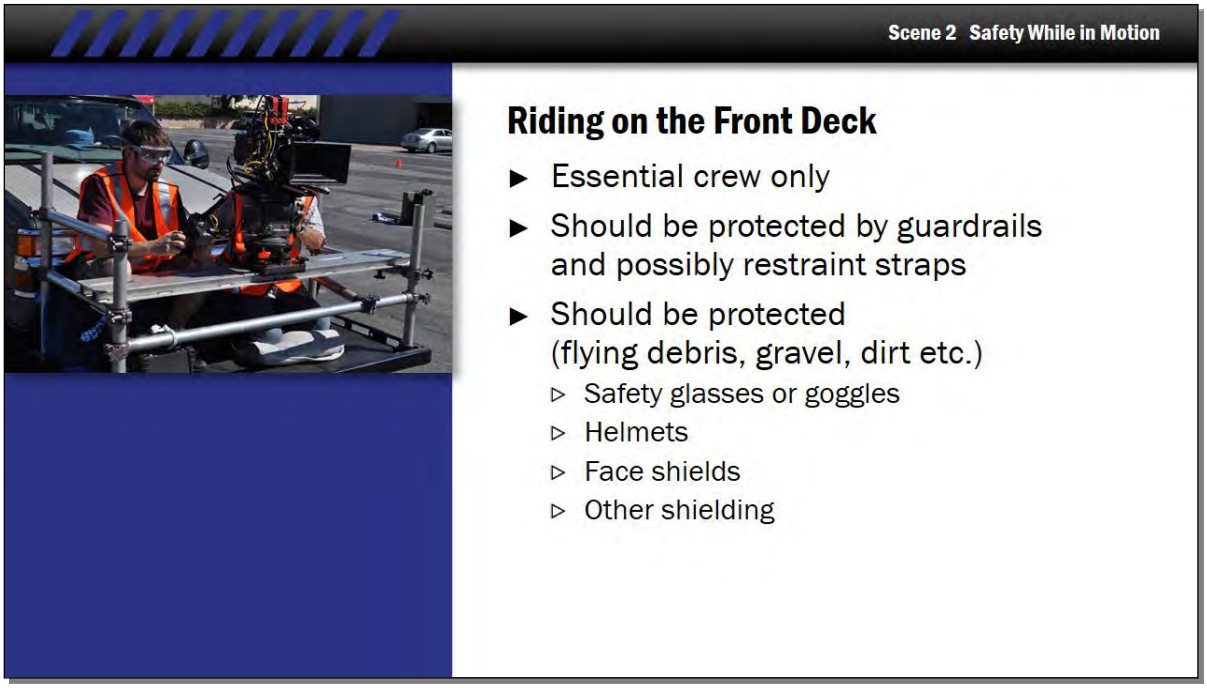
Crew should coordinate with the 1st AD before getting off the vehicle to ensure safety is maintained.

Never get on or off the insert car or process trailer when the insert car is moving, no matter how slowly.

Generator noise can make it hard to tell if the engine is running.

If you're not sure, ask the insert-car driver or the 1st A.D.

## Slide 62 - Riding on the Front Deck 1

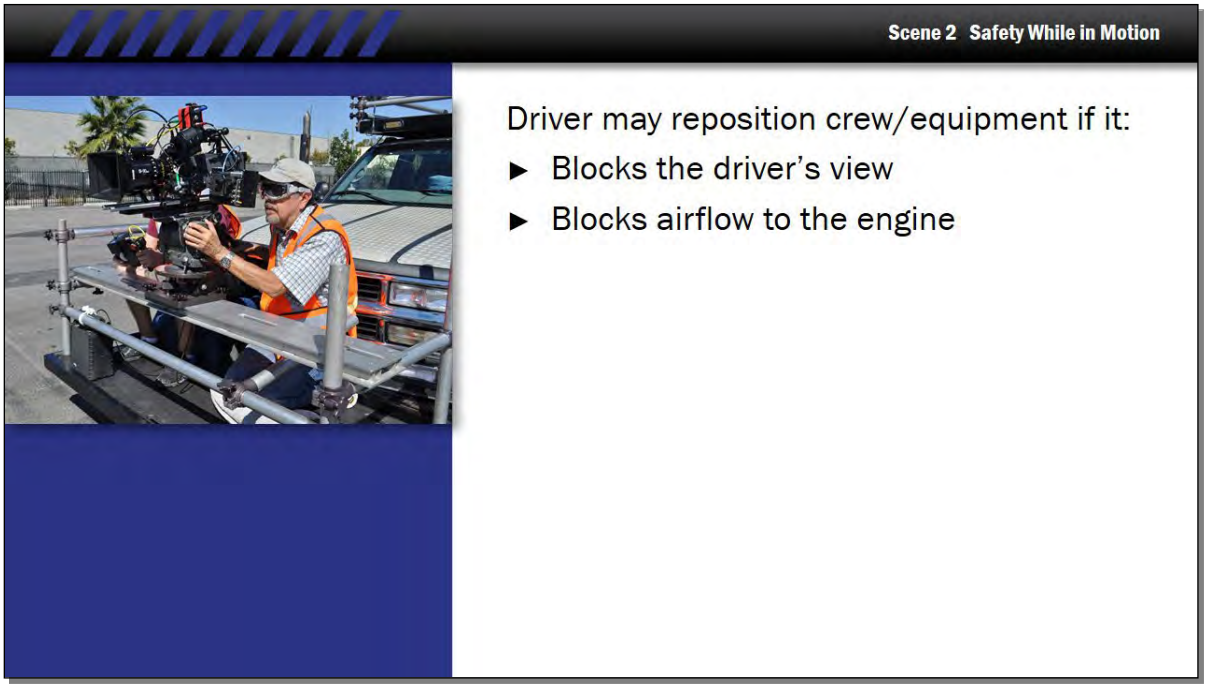



Only personnel required for the shot should ride on the front deck. For example, this may be the camera operator, first assistant camera (1st A.C.), or possibly a grip flagging the lens.

All crew riding on the front deck should be protected by guardrails and possibly safety restraint straps.

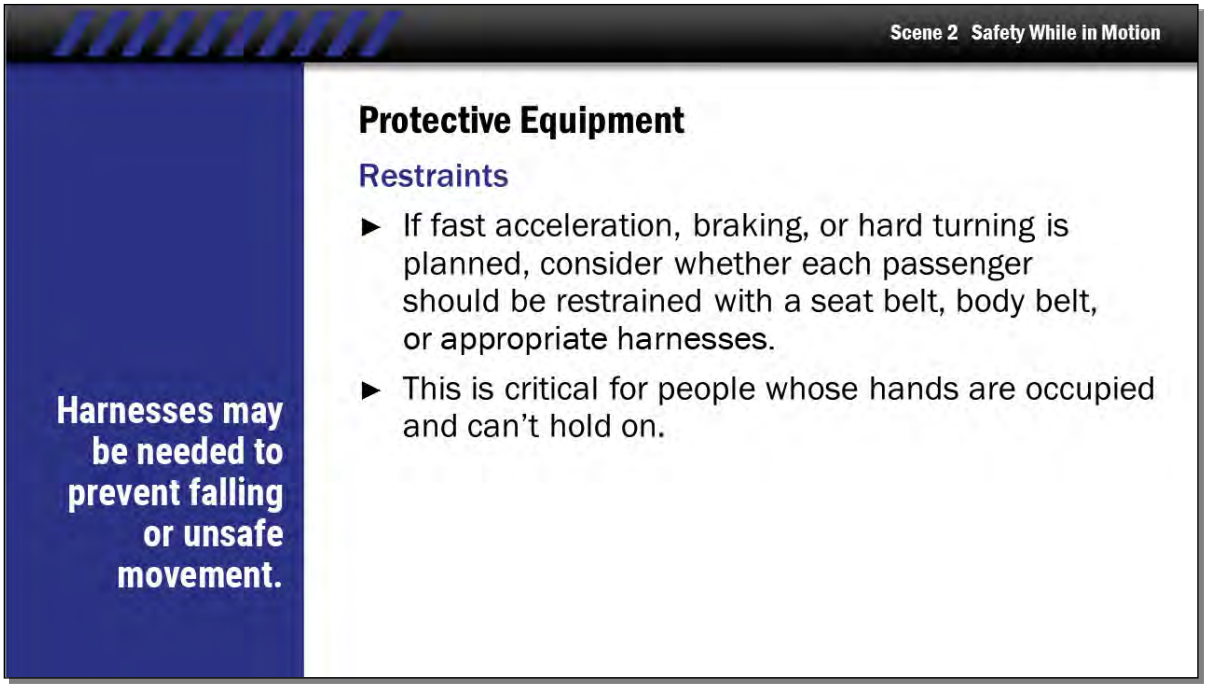
Protection, such as safety glasses, goggles, helmets, face shields, or other types of shielding should be used to guard against flying debris, such as gravel, dirt, other road hazards, rain, and anything that can get into your face or your eyes.

## Slide 63 - Riding on the Front Deck 2




The insert-car driver may need to reposition crew or equipment if it blocks the insert-car driver's view or blocks the airflow to the engine.

## Slide 64 - Protective Equipment 1

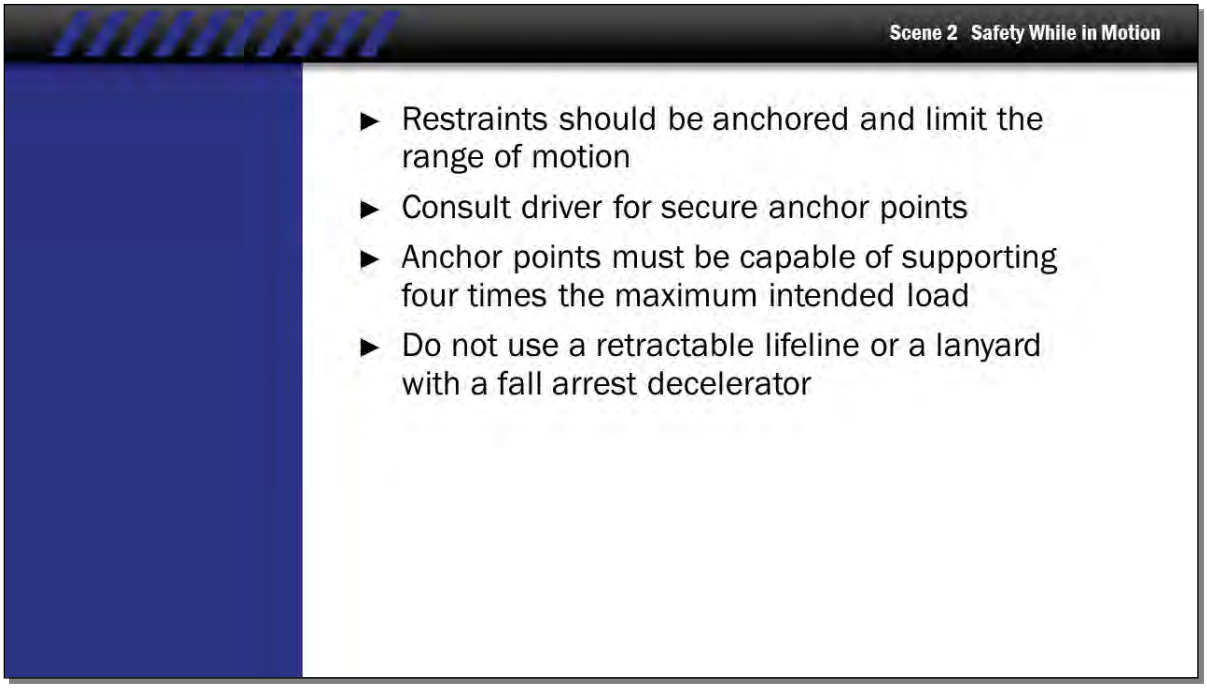



If fast acceleration, braking, or hard turning is planned, consider whether passengers should be restrained with the seatbelt, body belt, or appropriate harness.

This is critical for people whose hands are occupied and can't hold on.

Harnesses may be needed to prevent falling or being thrown around.

## Slide 65 - Protective Equipment 2



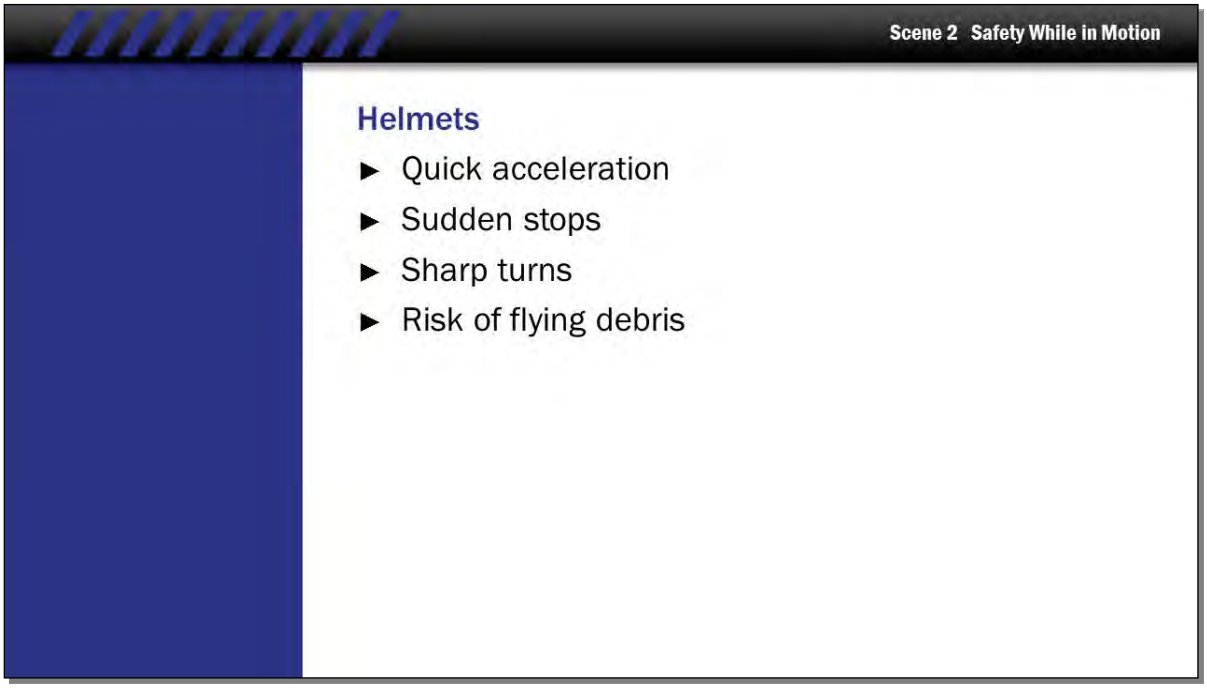

The restraint strap should be anchored and limit the range of motion to that which is required to perform the job.

Consult with the insert-car driver for secure anchor point locations, each of which must be capable of supporting four times the maximum intended load.

Do not use fall arrest equipment, such as a retractable lifeline or shock-absorbing lanyard.

The range of motion is not limited properly by that type of equipment.

## Slide 66 - Helmets

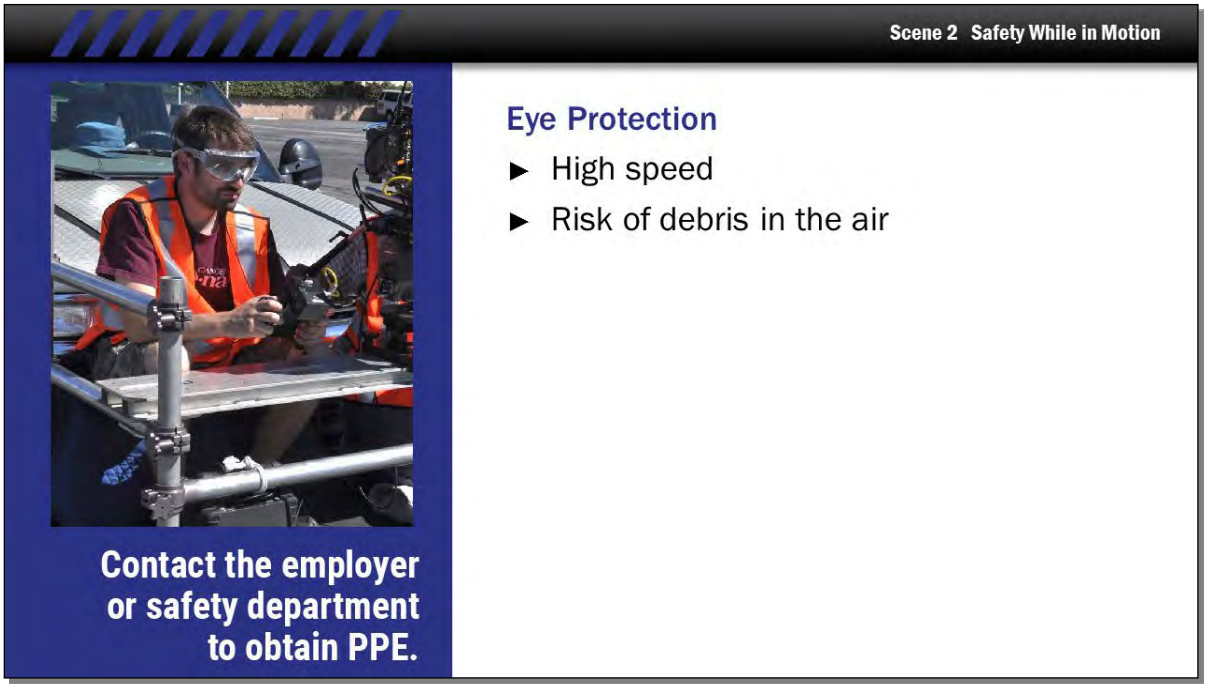



There are times when wearing a helmet should be considered, such as when the shot requires a high rate of speed, quick acceleration, sudden stops, sharp turns, or there is a risk of flying debris.

This should be discussed during prep so that appropriate head protection will be available when needed.

Some insert car vendors will provide helmets if requested.

## Slide 67 - Eye Protection




At high rates of speed or any time there is risk of debris in the air, appropriate safety glasses or goggles should be worn by anyone riding in the open on the insert car or process trailer.

Consult your employer or safety department to obtain the needed PPE.

## Slide 68 - High-Visibility Reflective Vest


All personnel exposed to vehicular traffic on public streets, highways, and rights-of-way must wear American National Standards
Institute (ANSI) / International Safety Equipment Association (ISEA) approved reflective high-visibility vests.

Please contact your employer or safety department to obtain the high-visibility vest.

## Slide 69 - Special Considerations


The surfaces of the roadways need to be considered. Are they wet? Is it soft dirt?

Are there other surface conditions that could affect the operation of the insert car, process trailer, or camera crane?

These elements need to be carefully considered when planning the route for the vehicle.

Also, consider weather conditions and use caution during times of high winds, rain, hail, snow, or other adverse weather.

When there is a potential of lightning, the use of a reliable lightning detection system is highly recommended, such as a lightning app on a mobile device or a lightning meter.

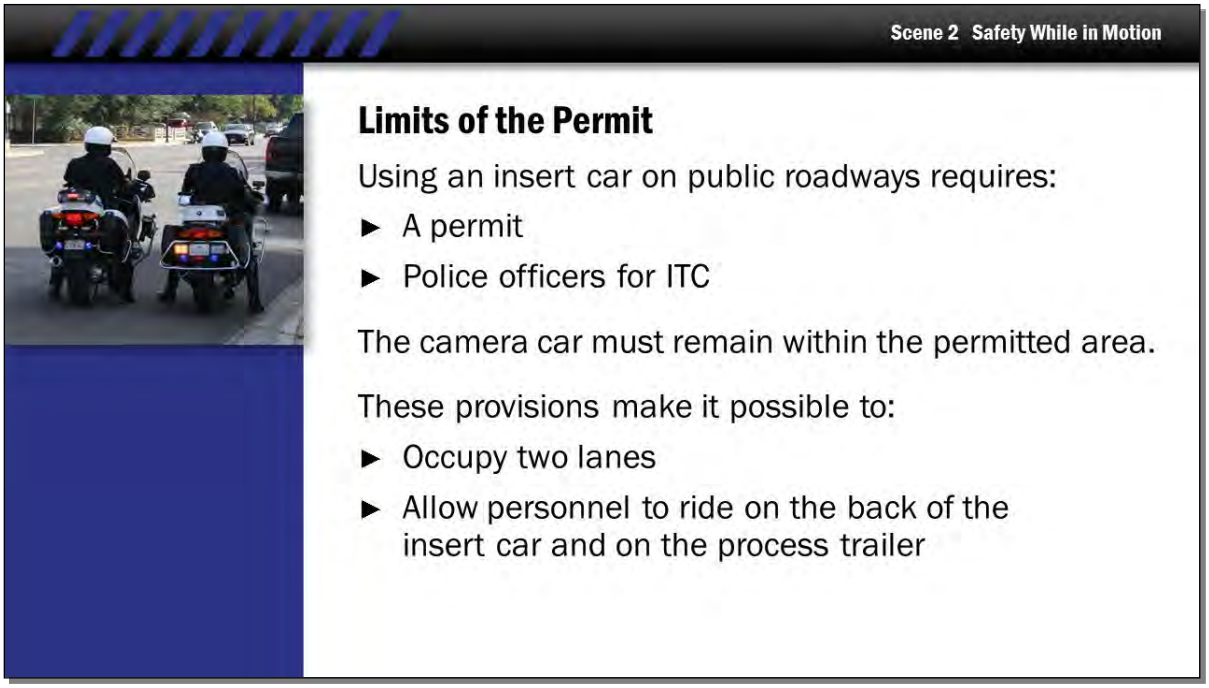
Do not work on or around an insert car, process trailer, or camera crane during a lightning storm.

Seek shelter in a sturdy building, or if that is not an option, inside a hardtop vehicle with the windows rolled up.

Work may need to be put on hold until more favorable weather conditions exist.

Safety Bulletin #38, regarding inclement weather, can be viewed or downloaded using the Safety Bulletin link under the *Safety Pass Information* tab.

## Slide 70 - Limits of the Permit




Using an insert car or process trailer on a public roadway requires a permit from the authority having jurisdiction (AHJ) and police officers to perform intermittent traffic control (ITC).

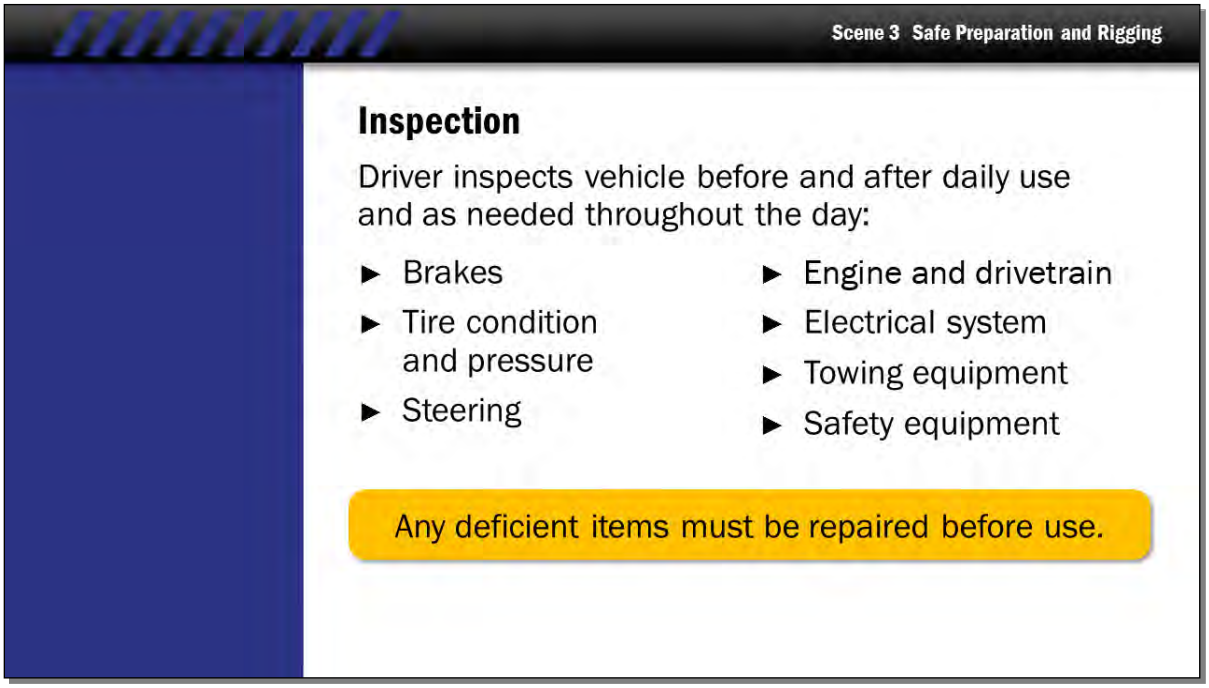
While the insert car is rigged for carrying personnel, it must remain within the operating area of the permit.

The closed course provided by the permit and the officers performing ITC make operations possible that are not normally allowed by law, such as occupying two lanes with the process trailer, or having personnel on the back deck of the insert car and process trailer.

## Slide 71 - Safe Preparation and Rigging


Scene 3, Safe Preparation and Rigging.

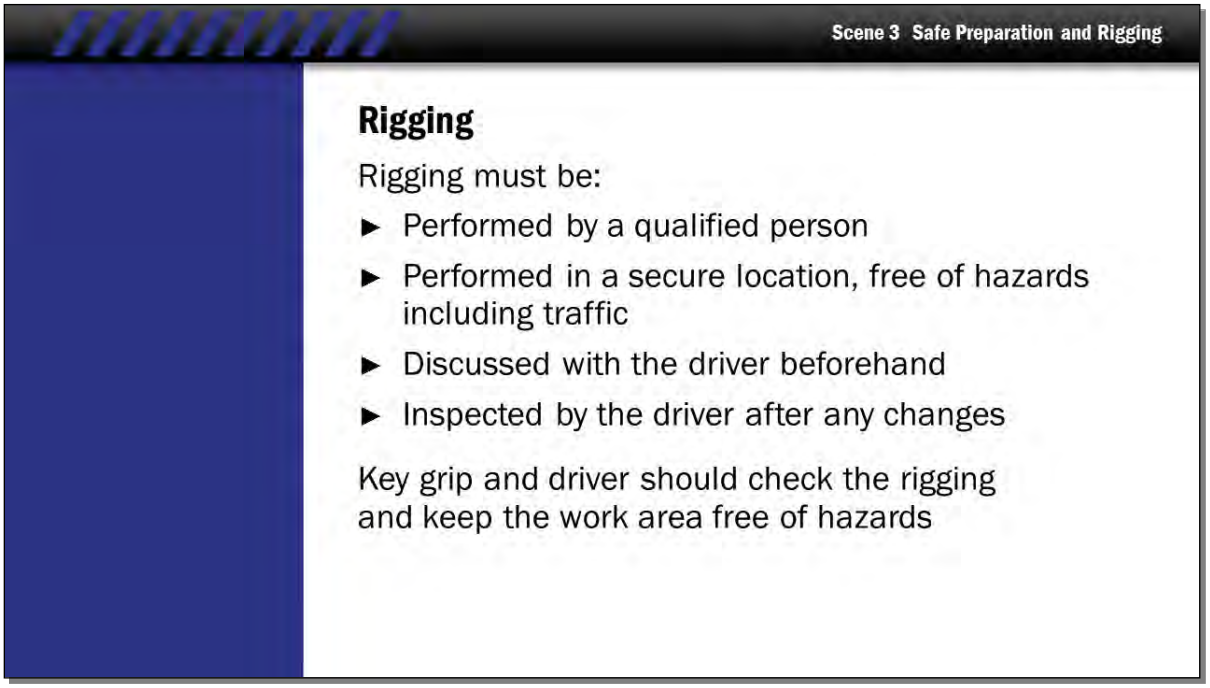
## Slide 72 - Inspection




The insert-car driver must inspect the insert car and process trailer before and after daily use and as needed throughout the day. The inspection should include brakes, tire condition and pressure, steering, engine and drivetrain, vehicle electrical system, towing equipment including the safety chain and ball mount, and all safety equipment. Any items not fully functioning must be repaired by a qualified person before use.

Note: Towed vehicles or trailers must be secured to the insert car with adequate safety chains. If you ever see a safety chain that is not connected, please bring that to the attention of the insert-car driver.

## Slide 73 - Rigging



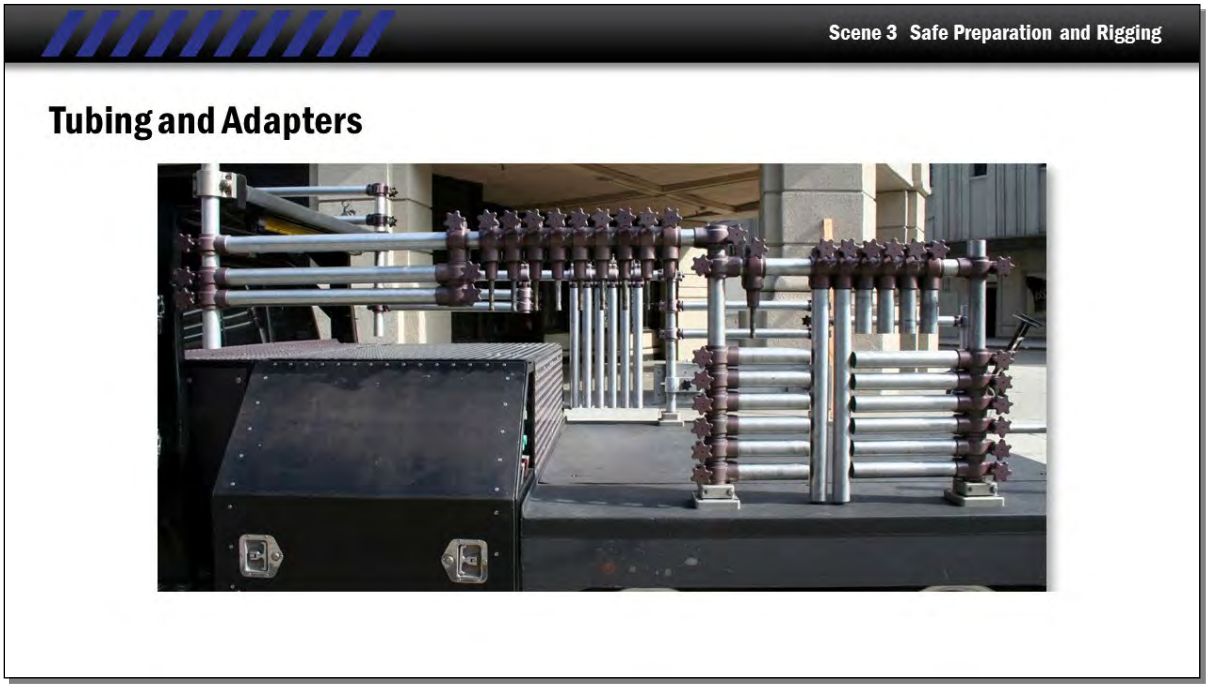

Rigging must be performed by a qualified person and must be performed in a secure location, free of hazards, including traffic. All rigging must be discussed with the insert-car driver beforehand and inspected by the insert-car driver after any changes.

This is important for safety because rigging can affect visibility and clearances.

In addition, the driver often can provide accessories that provide a more secure way to achieve the goal.

The key grip and insert-car driver should check the rigging and keep the work area free of hazards.

## Slide 74 - Tubing and Adapters 1

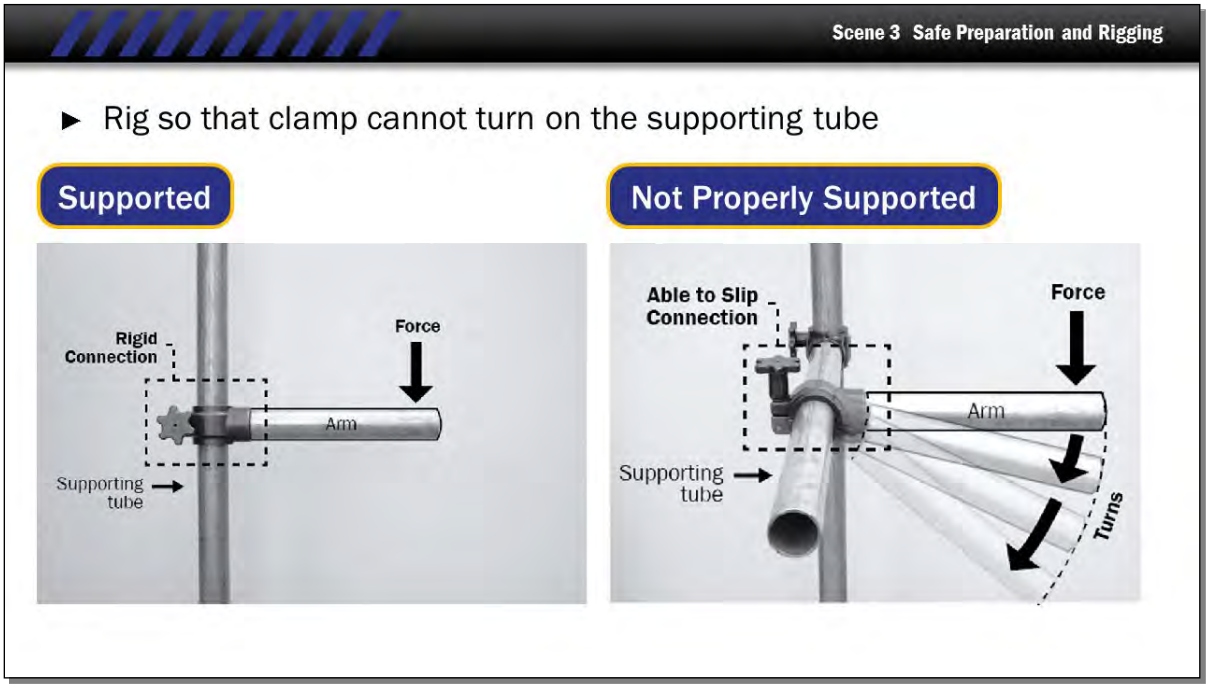



Insert cars provide a post and rail system using 2-inch tubing and a friction clamp system.

Tubing is not the same size as common Speed-Rail®.

Check with the insert-car driver for connection options and adapters.

## Slide 75 - Tubing and Adapters 2

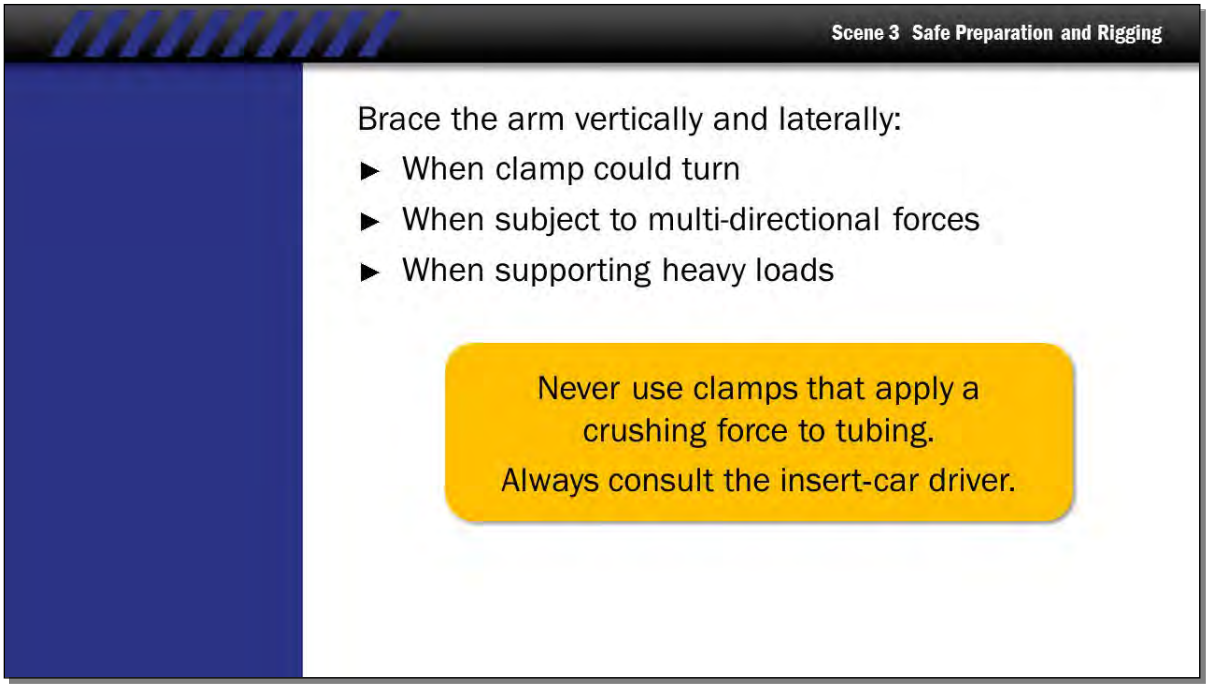



Tubing clamps make a strong, reliable connection between two pieces of tubing.

However, no amount of tightening can guarantee that the clamp will not turn on the tubing, especially when the tubing is subjected to a lot of leverage in one direction.

Therefore, it is safer to attach tubes that will have downward forces acting on them to vertical posts and attach tubes that will have lateral forces acting on them to horizontal rails.

## Slide 76 - Tubing and Adapters 3




When the forces will act on a joint in multiple directions, or when any heavy load is attached, the load should be supported and braced vertically and laterally as necessary.

Consider the forces of wind, vertical forces caused by bumps, and forces of acceleration and braking.

Camera cars are typically equipped with pre-made hardware such as welded right-angle braces that are used to mount heavier lights.

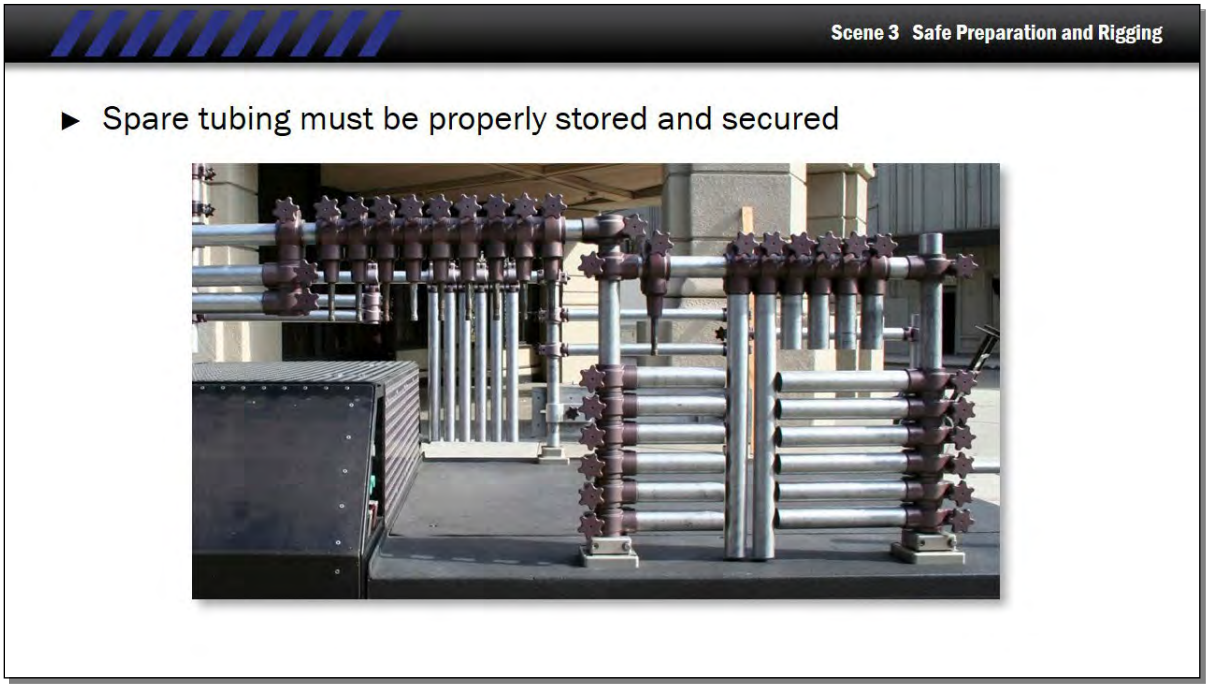
When rigging, crew members should work in conjunction with the insert-car driver.

The insert-car driver may be able to supply equipment, such as Speed-Rail® adapters, junior pin adapters, and adapters to other common rigging equipment. In order to preserve the shape and integrity of the rail system on the insert car, the insert-car driver should oversee the attachment methods used.

Standard grip clamps that apply a crushing force to the tubing should not be used.

Do not alter any equipment on the insert car except with the explicit permission of the insert-car driver.

## Slide 77 - Tubing and Adapters 4



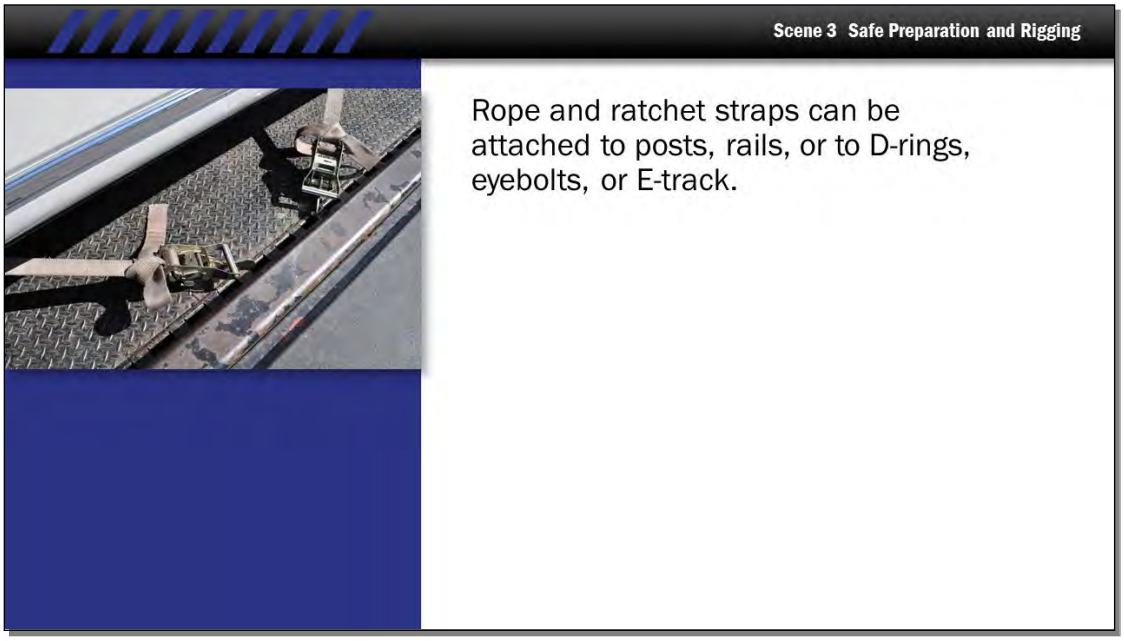

Spare tubing should not be left where it could roll around.

It should be secured to the insert car, strapped or tied down, or stored in a jockey box.

## Slide 78 - Securing to Deck 1

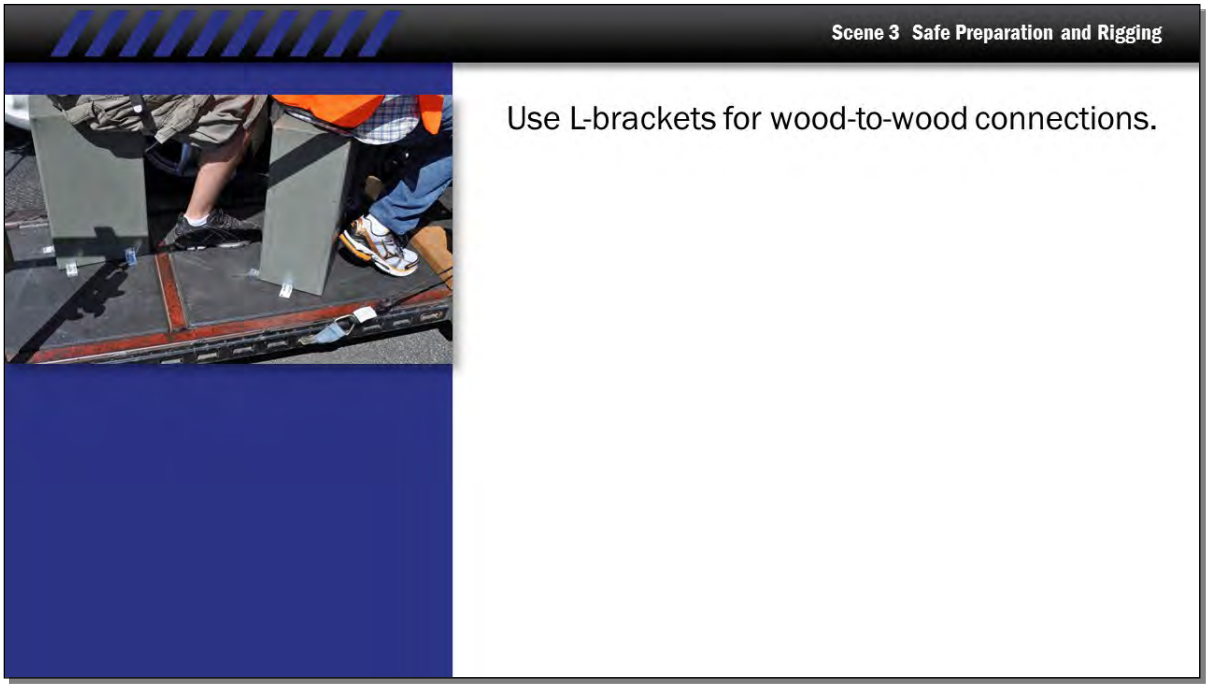

Typically the deck of the process trailer is thick plywood. On a plywood deck, screws or bolts can be used to secure hardware with the consent of the insert-car driver.

## Slide 79 - Securing to Deck 2



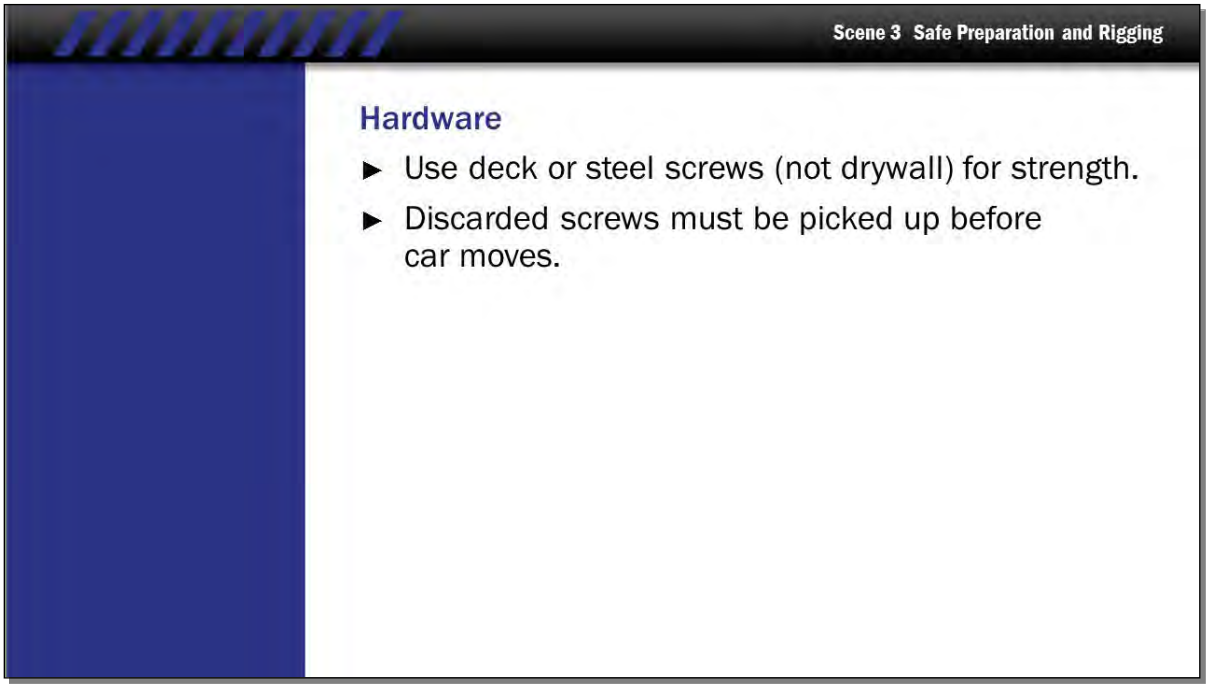

Ropes and ratchet straps can be attached to posts, rails, or to D-rings, eyebolts, or E-track.

## Slide 80 - Securing to Deck 3




L-brackets or angle iron should be used for wood-to-wood connections, such as for mounting an apple box.

## Slide 81 - Hardware

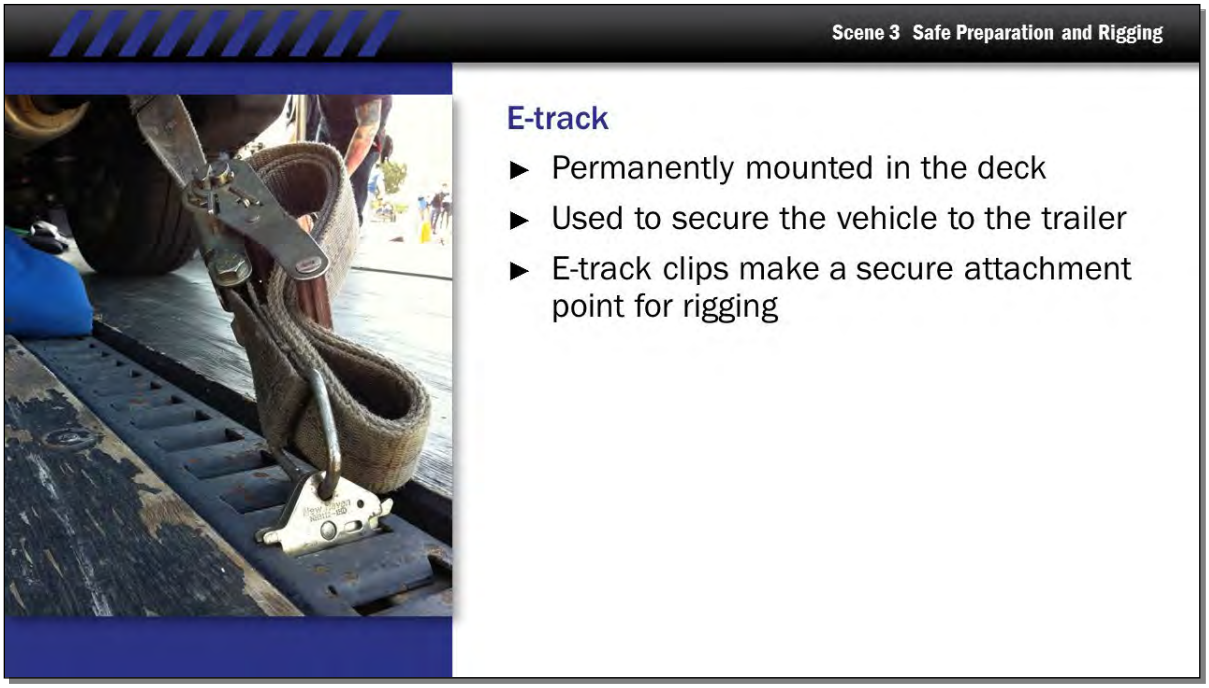



When attaching items to the deck, the type of screws used must have sufficient strength for the purpose.

Deck screws or steel screws are designed to provide strength. Drywall screws are brittle and should not be used.

Collect any discarded screws as the work is done. They must be picked up before the insert car moves.

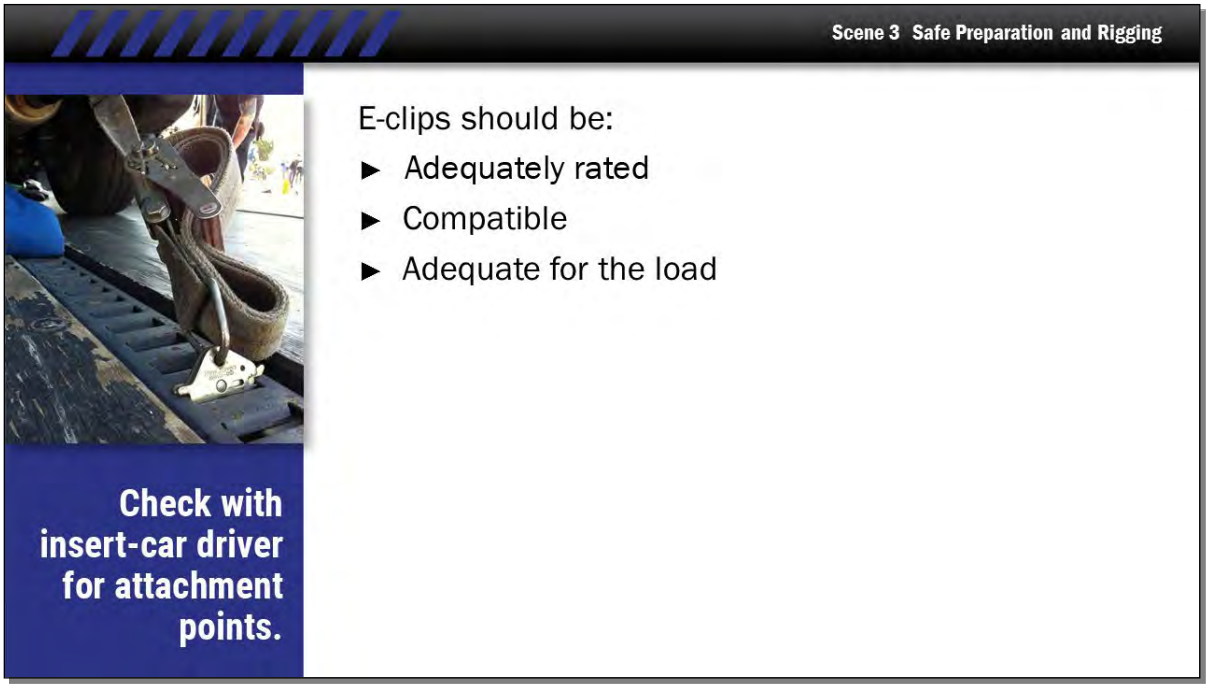
## Slide 82 - E-track




E-track is a thick metal that is permanently mounted to the deck of the process trailer and is used to secure the straps that hold the picture vehicle firmly on the process trailer.

E-track clips are designed to snap quickly and securely to the E-track. With the insert-car driver's permission, E-Track systems can provide a secure attachment point for rigging other equipment.

## Slide 83 - E-clips

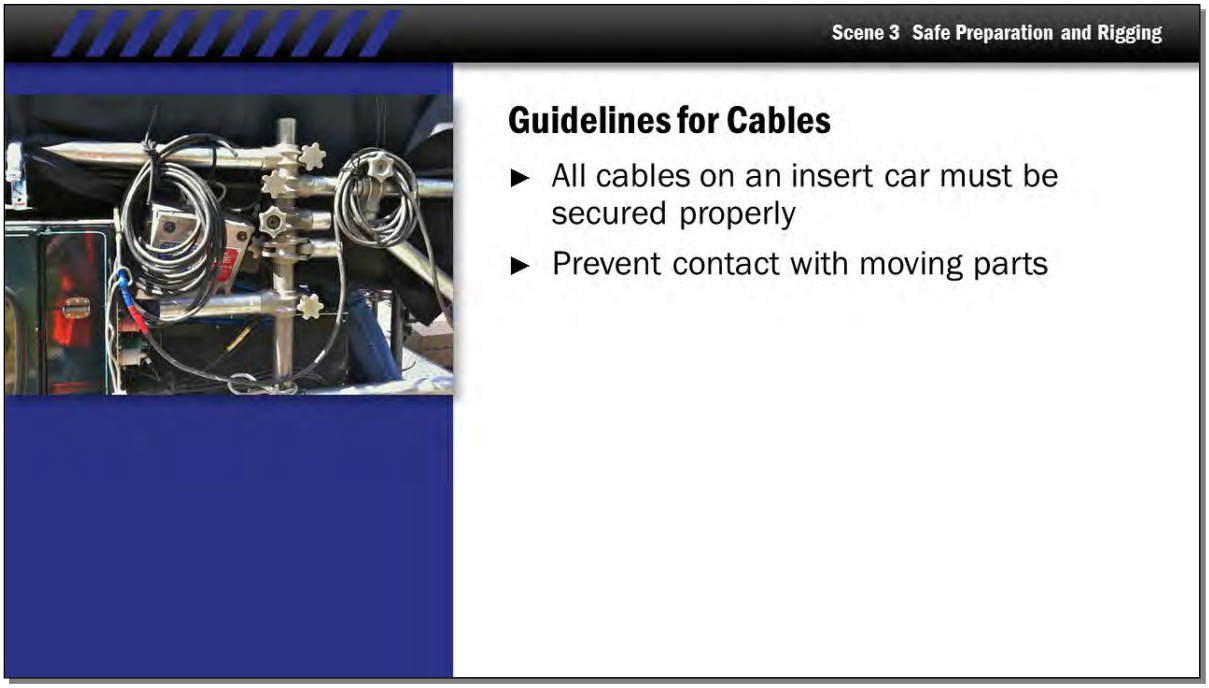



Know the load rating of the system and its components. The E-track may be rated to hold the weight of a vehicle, but E-track clips are available with various ratings.

Be sure E-track clips are rated adequately for the load and compatible with the track.

Always check with the insert-car driver for attachment points on the deck of a process trailer.

## Slide 84 - Guidelines for Cables




All cables must be secured properly and not come in contact with moving parts of the vehicle.

## Slide 85 - Cables 1

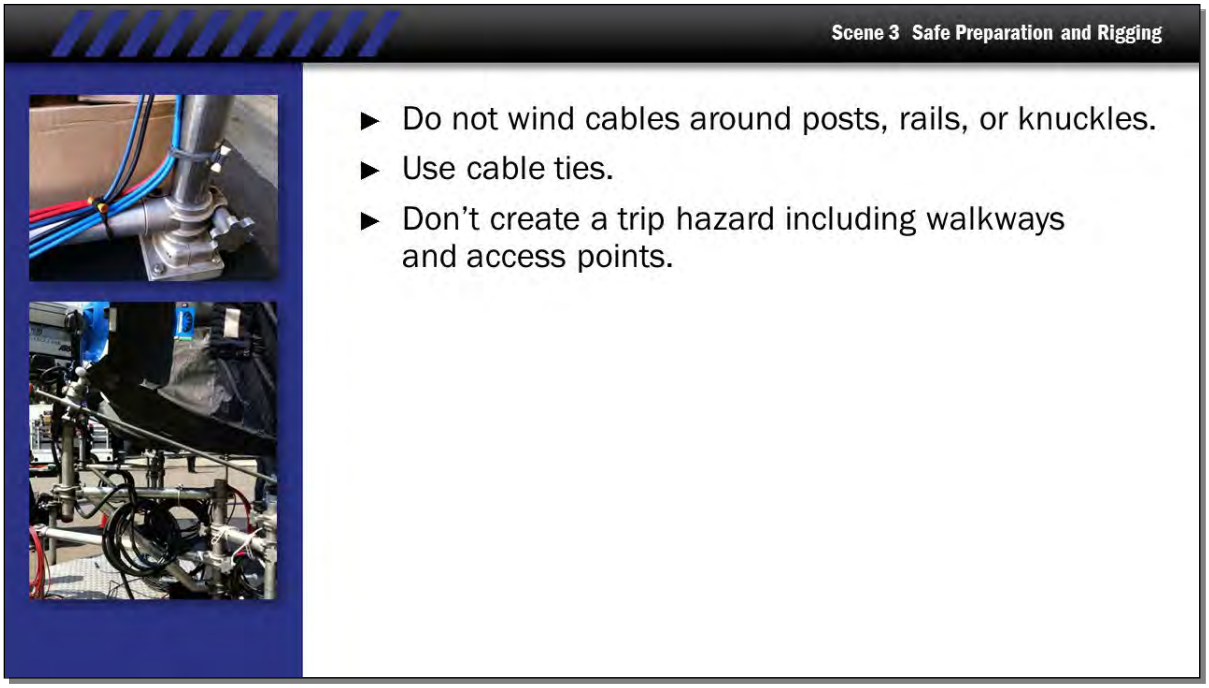

When running cables between the tow vehicle and a process trailer, use only a small amount of slack between vehicles.

Big loops are not necessary and can pose a hazard. Do not allow cables to drag.

If you're not sure, follow the arc of the safety chain for the proper amount of slack.

Also, cables must be tied securely on both sides of the hitch.

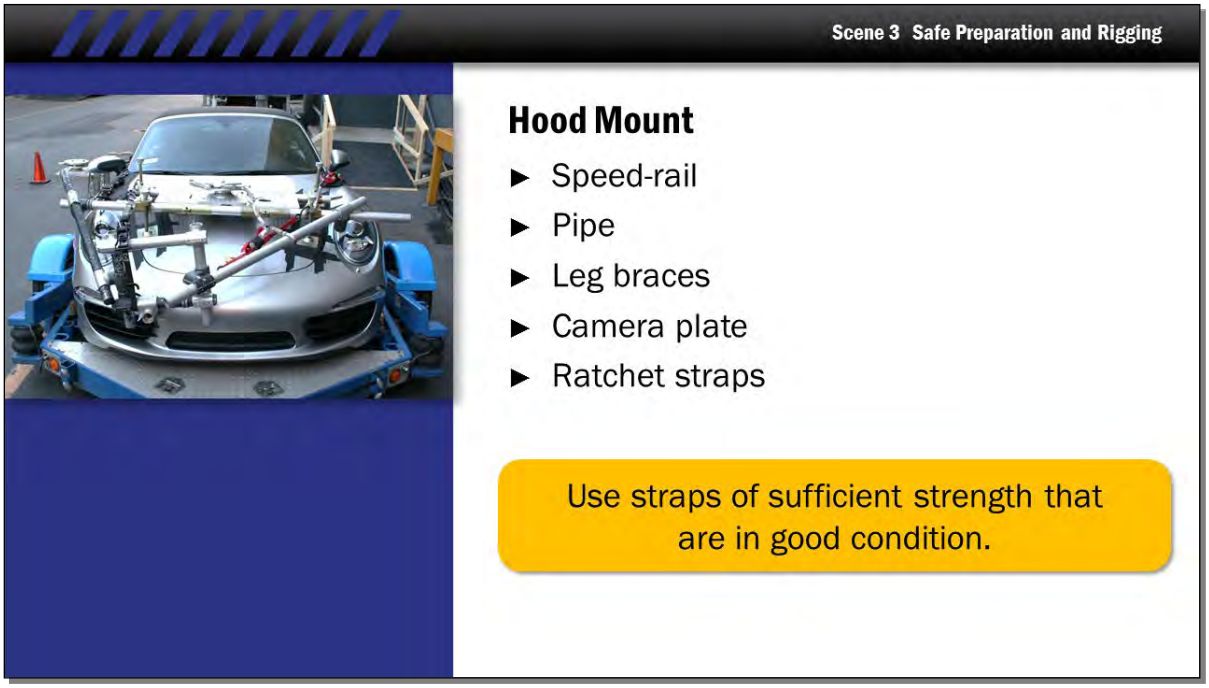
## Slide 86 - Cables 2




All cables must be secured. Use the appropriate ties that are easy to remove, such as rope, Velcro wraps, or bongo ties. Do not wind cables around rails or posts, or wrap them around tubing-clamp knuckles.

Do not allow cables to become a trip hazard. Keep cables away from walkways and access points.

## Slide 87 - Hood Mount




Cameras are often attached directly to the picture vehicle by the use of hood mounts or side mounts.

Hood mounts usually consist of a Speed-Rail® pipe connection system using two 1¼-inch or two 1-inch pieces of aluminum pipe combined with two or four leg braces to form the body of the mount.

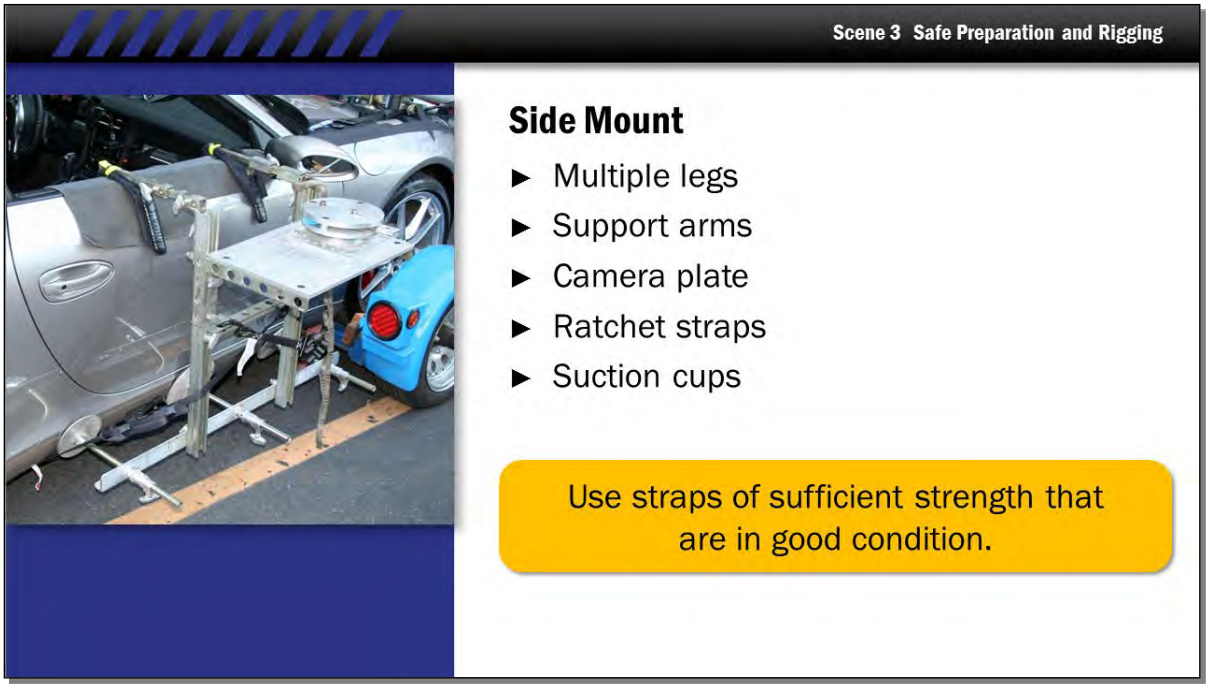
A camera plate can be attached to the pipe.

Threaded baby pins are sometimes added as mounts for lights.

Secure a hood mount with ratchet or cam straps attached to the frame, fender, or other secure anchor point on the vehicle.

Use straps that have sufficient strength for the tension required, and check that the webbing is in good condition before each use.

## Slide 88 - Side Mount




A side mount, also known as a hostess tray, hooks over the door, and has legs that brace against the bottom of the vehicle door.

The mount is secured to the vehicle with ratchet or cam straps.

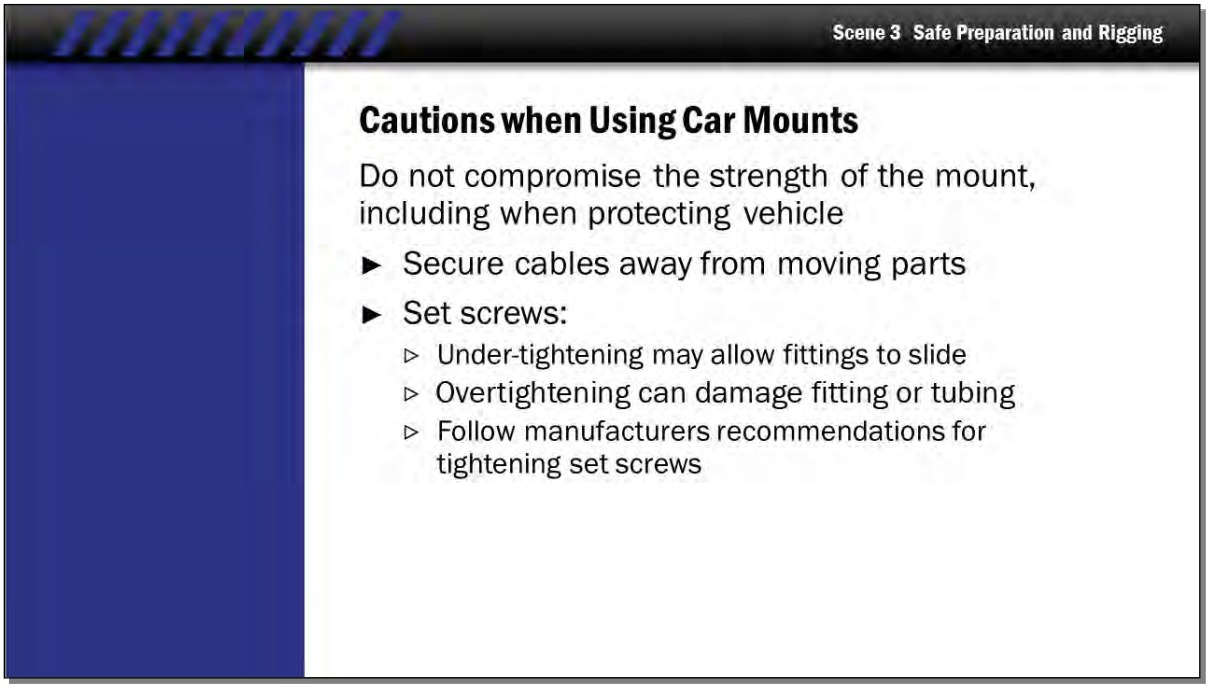
Suction cups are another option for mounting hardware and equipment or for creating bracing points to stabilize a rig. Attach a tie-down strap or safety cable to a secure point of the vehicle to prevent the equipment flying off if it becomes dismounted from the rigging.

## Slide 89 - Car Mount


Ball leveling heads or four-way leveling plates are used to level and position the camera.

Additional clamps are often used to stabilize the camera. Attach these accessories properly and secure them adequately to resist the forces acting on them when in motion.

## Slide 90 - Cautions when Using Car Mounts 1




Whether using hood mounts or side mounts, caution should be used when attaching cameras to vehicles.

The integrity of the mount should not be compromised, including when protecting the vehicle from physical damage.

Use care with cables when connecting to the camera or lights, secure properly, and do not allow contact with moving parts of the vehicle, including the wheels and suspension.

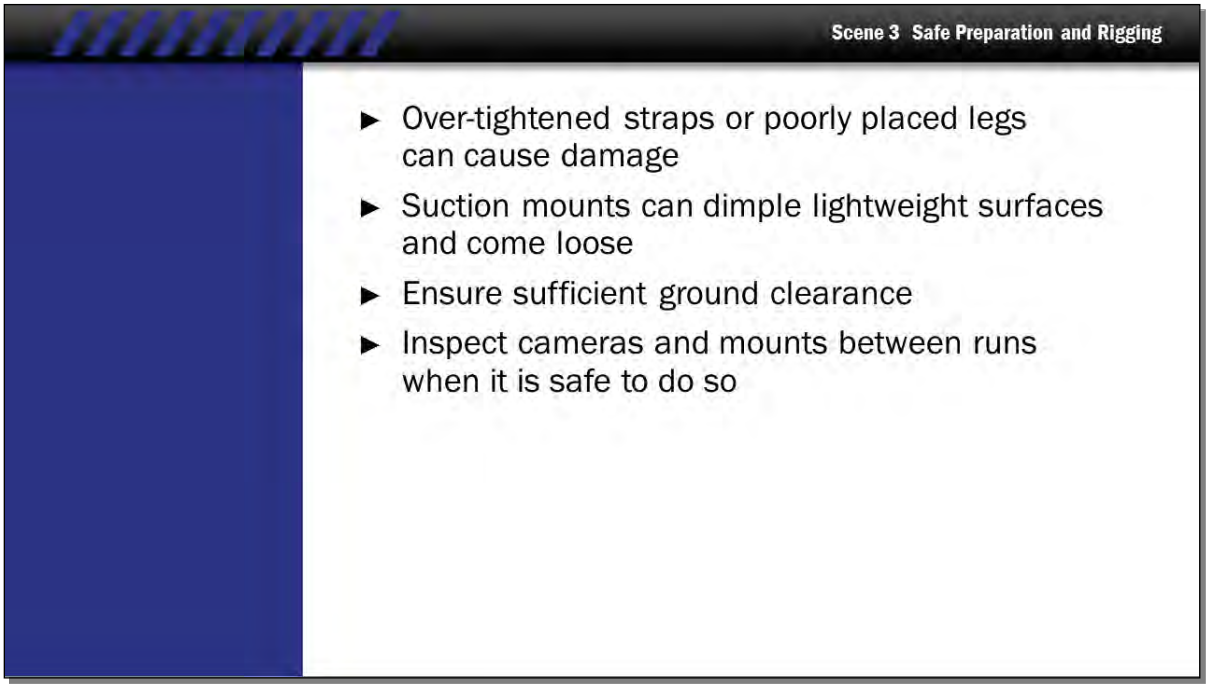
Set screws should be properly tightened to secure the fittings.

Under-tightening may cause the fitting to slide or come loose.

Overtightening can damage the tube or the fittings.

Always follow manufacture’s recommendations for tightening set screws.

## Slide 91 - Cautions when Using Car Mounts 2




Overtightening of straps, or poorly placed legs, can compromise mount integrity and damage the vehicle.

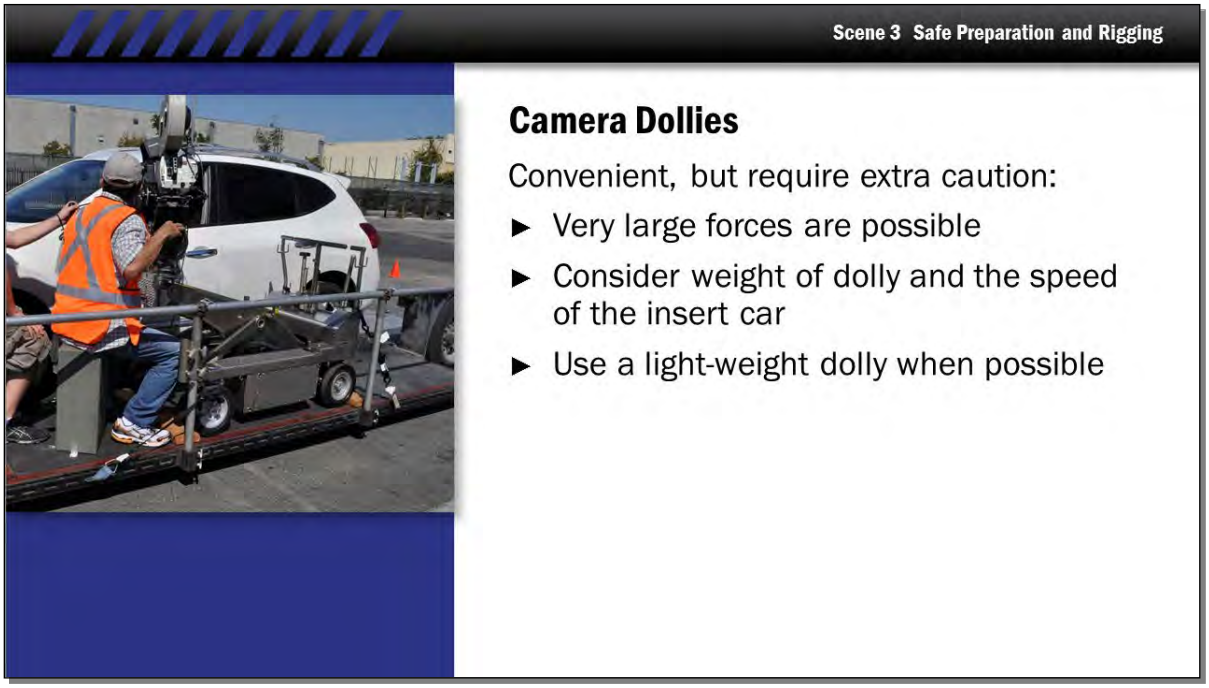
Take care when using suction cup mounts because they may cause dimpling of the surface, causing loss of suction.

Leave sufficient ground clearance between mounting hardware and the ground.

Allow for the fact that, with the weight of crew and equipment, the suspension will compress.

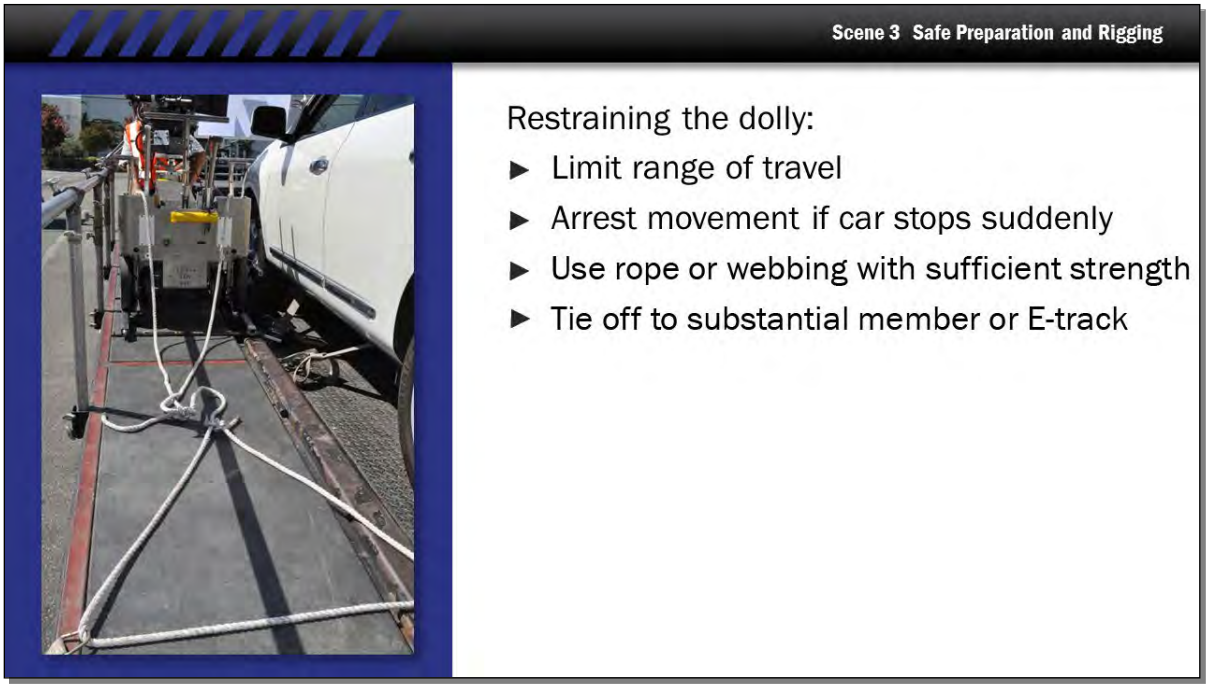
Inspect cameras and mounts between runs when it is safe to do so.

## Slide 92 - Camera Dollies 1




It is often desirable to use a camera dolly on a process trailer to allow for easy camera adjustment or to make a camera move during a shot. However, given that dollies are heavy, abrupt stops or swerves can create significant forces. Use a lightweight dolly when possible.

## Slide 93 - Camera Dollies 2




A physical restraint should be attached to the dolly to limit the range of travel.

The restraint should be designed to arrest the movement of the dolly if the vehicle stops suddenly.

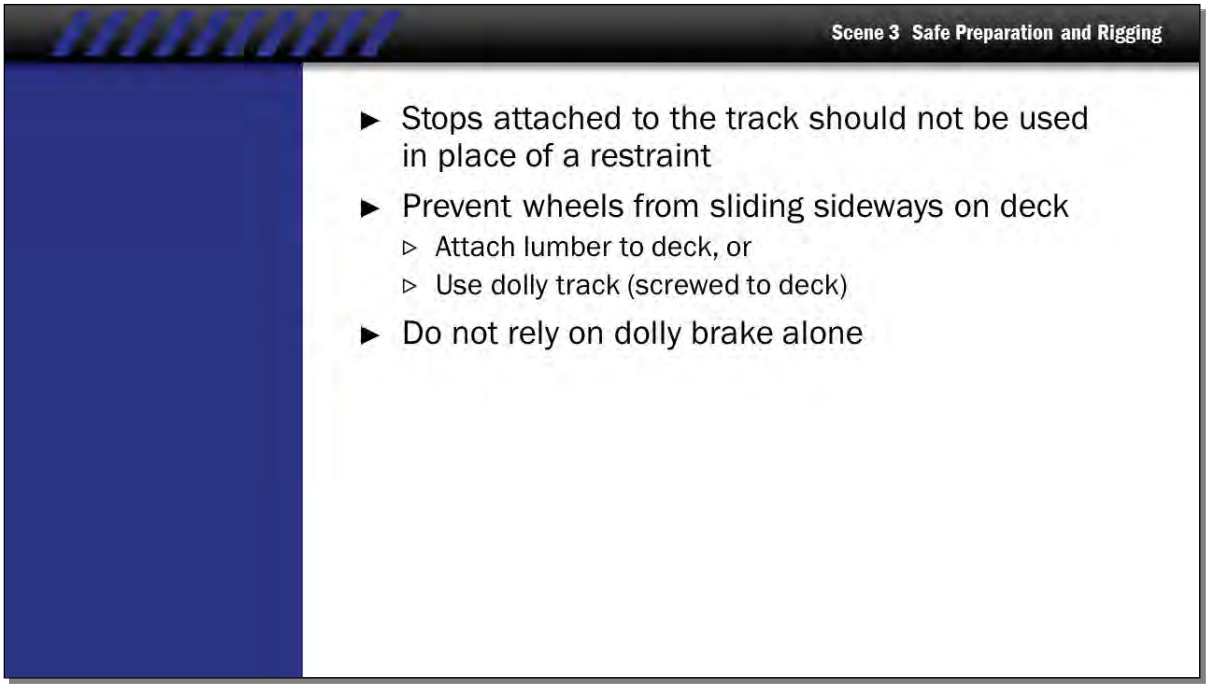
The material used (rope or webbing) must have the strength to absorb the forces.

A climbing rope that is designed to stretch under tension is ideal because it helps absorb shock.

Manila rope is not generally strong enough and should not be used.

Tie off the dolly restraint to a substantial structural part of the vehicle or to E-track as directed by the insert-car driver.

## Slide 94 - Camera Dollies 3




Placing stops, such as securing a clamp to the dolly track, should not be used in place of a restraint.

Consider ways to restrict lateral movement of the dolly.

Attaching a length of the lumber to the deck on the outside of the dolly helps prevent the wheels from sliding sideways on the deck.

Even when it is not required for the shot, it helps to put the dolly on track, because the track can be secured to the deck.

A fixed dolly with a moving jib arm may be better than moving the dolly itself.

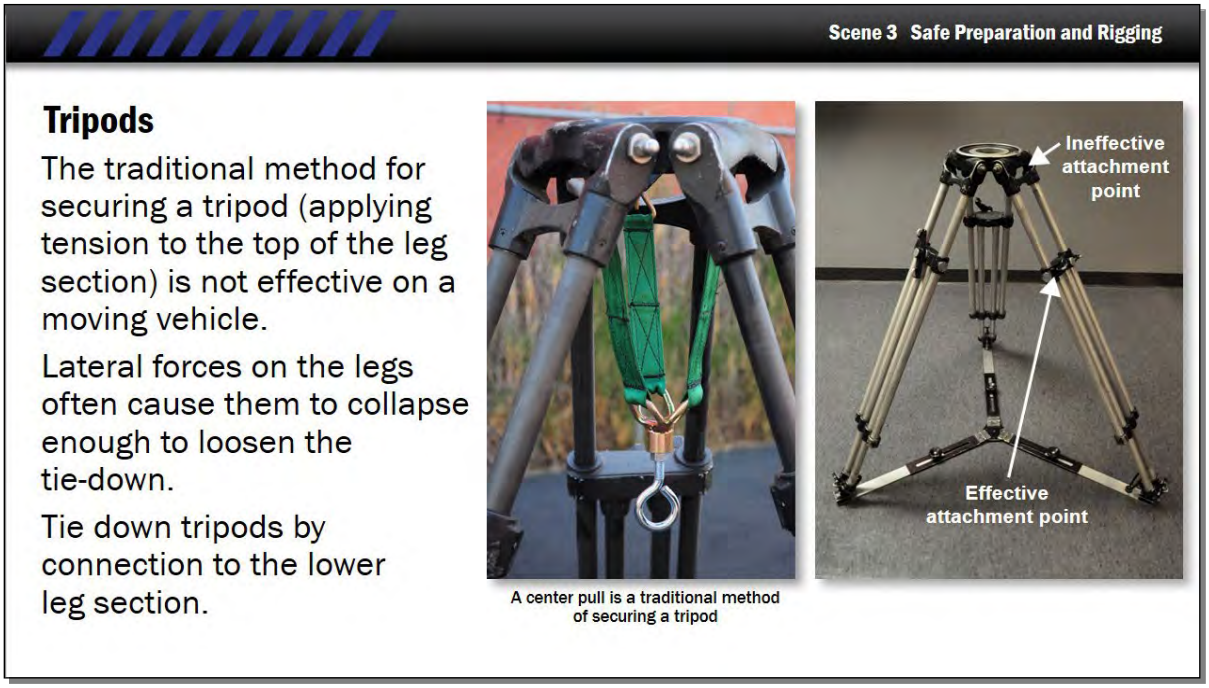
If the dolly does not need to move, using wooden blocks attached to the deck is another way to keep the dolly stationary.

Do not rely on using the dolly’s brake to prevent movement.

## Slide 95 - Camera Dollies 4


Using a remote-operated dolly system, such as a powered slider, is another alternative for safely making camera moves.

## Slide 96 - Tripods 1




The traditional method for securing a tripod to a platform is to use a center pull (like the one shown here) or a similar type of strap.

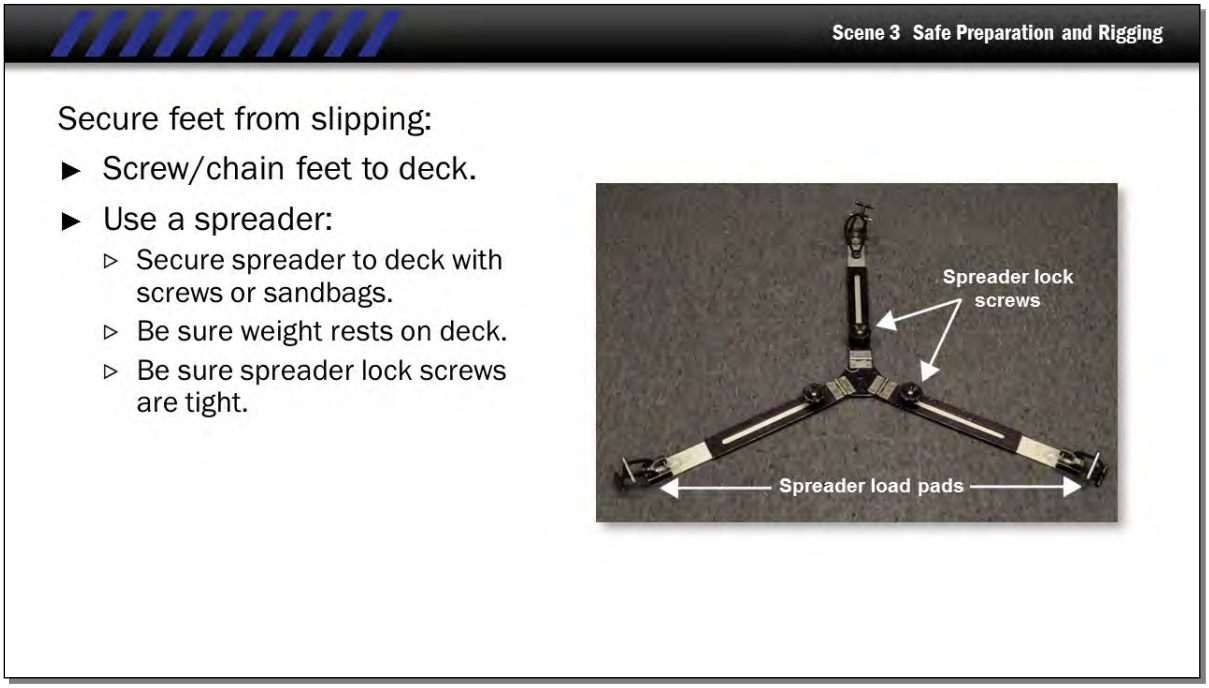
However, this method is likely to fail on a moving vehicle because lateral forces, from jolts or hard braking, can cause the telescoping tripod legs to collapse enough to loosen the tie-down.

A center pull relies on tension to secure the tripod in place, but lateral forces can overcome the holding power of the leg's friction locks.

The tripod should not be secured solely to the upper leg section.

The lower leg section should be secured to the deck.

## Slide 97 - Tripods 2

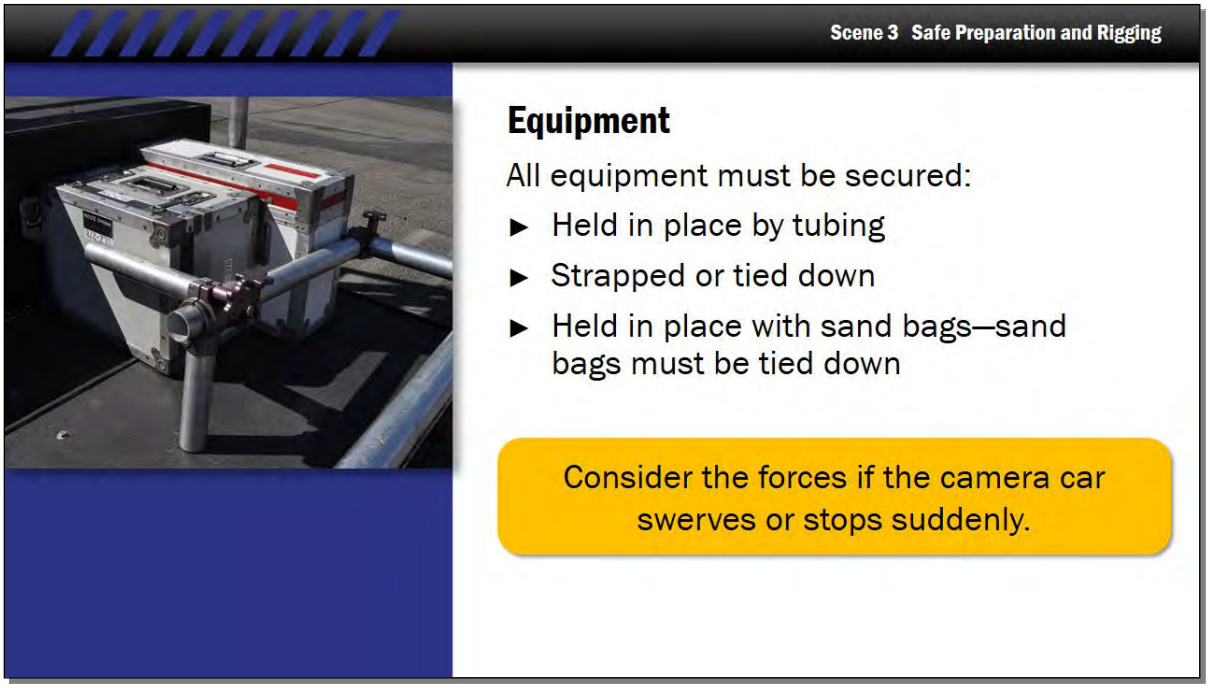



Use a spreader under the tripod, or screw or chain the individual legs to the deck to ensure that the feet of the tripod cannot slip. The spreader should also be secured in place with screws or sandbags. Be sure that the spreader lock screws are tight.

Be sure the spreader's end pads are directly supported, sitting flat on the deck.

When the end pads extend over the edge or rest on an irregular surface they tend to make the center of the spreader bow upward, allowing the camera and tripod to move vertically, which can cause the tie downs to come loose.

## Slide 98 - Equipment 1



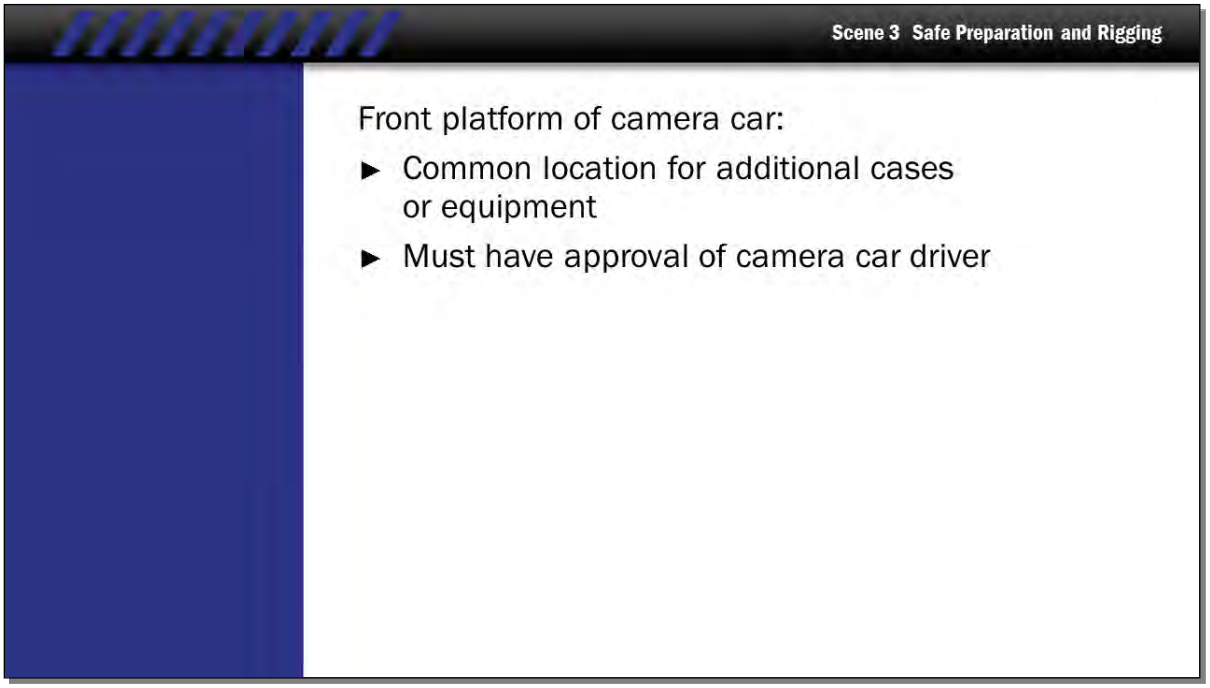

Cargo must be secured in place.

This can be done by placing tubing around it, strapping or tying it down, or holding it in place with sandbags.

Note: If you're using sandbags, the sandbags must also be tied down, and all equipment must be secured.

Consider the forces if the camera car swerves or stops suddenly.

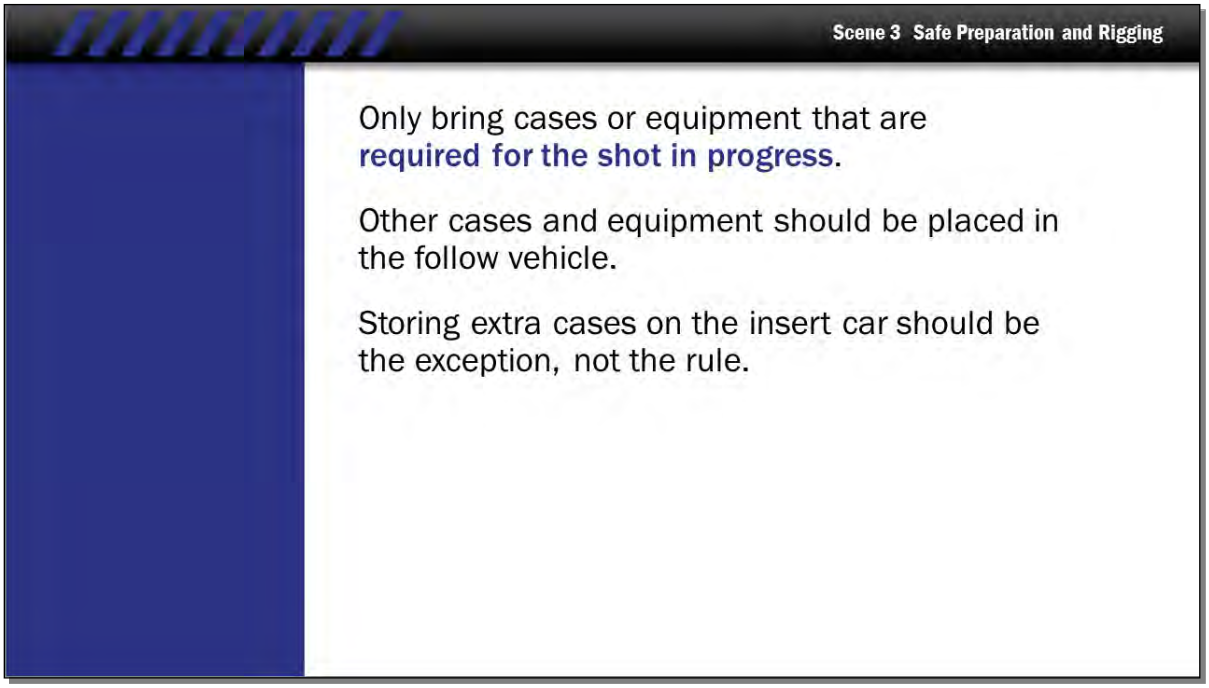
## Slide 99 - Equipment 2




The front platform of the insert car is sometimes used to carry additional cases or equipment, but excessive amounts of equipment can block airflow to the engine or block the view of the driver.

Check with the insert-car driver for appropriate cargo locations.

## Slide 100 - Equipment 3




Only bring cases or equipment that is required for the shot in progress.

Other cases of equipment should be placed in the follow vehicle.

Storing extra cases on the insert car should be the exception, not the rule.

## Slide 101 - Safe Operation with a Crane Arm

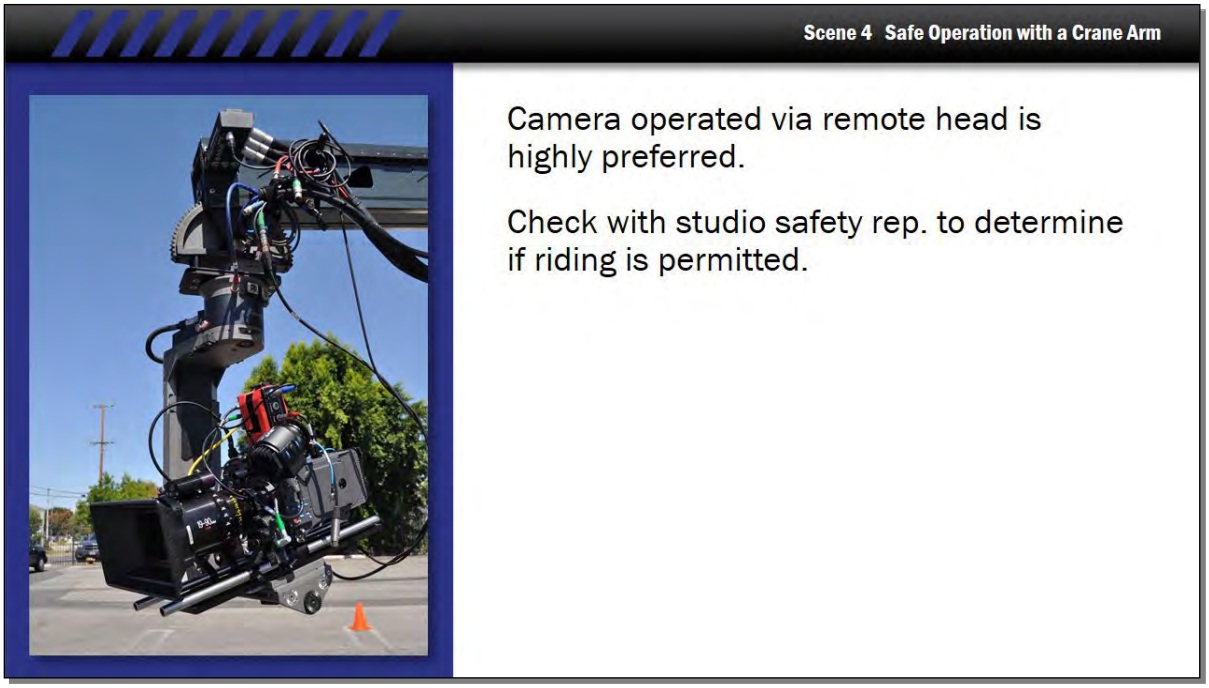

Scene 4, Safe Operation with a Crane Arm.

## Slide 102 - Crane Safety 1


This scene considers safety when using a crane mounted to the back deck of an insert car.

This discussion does not include cranes permanently mounted on a motorized base, like the Chapman Super Nova or similar vehicles.

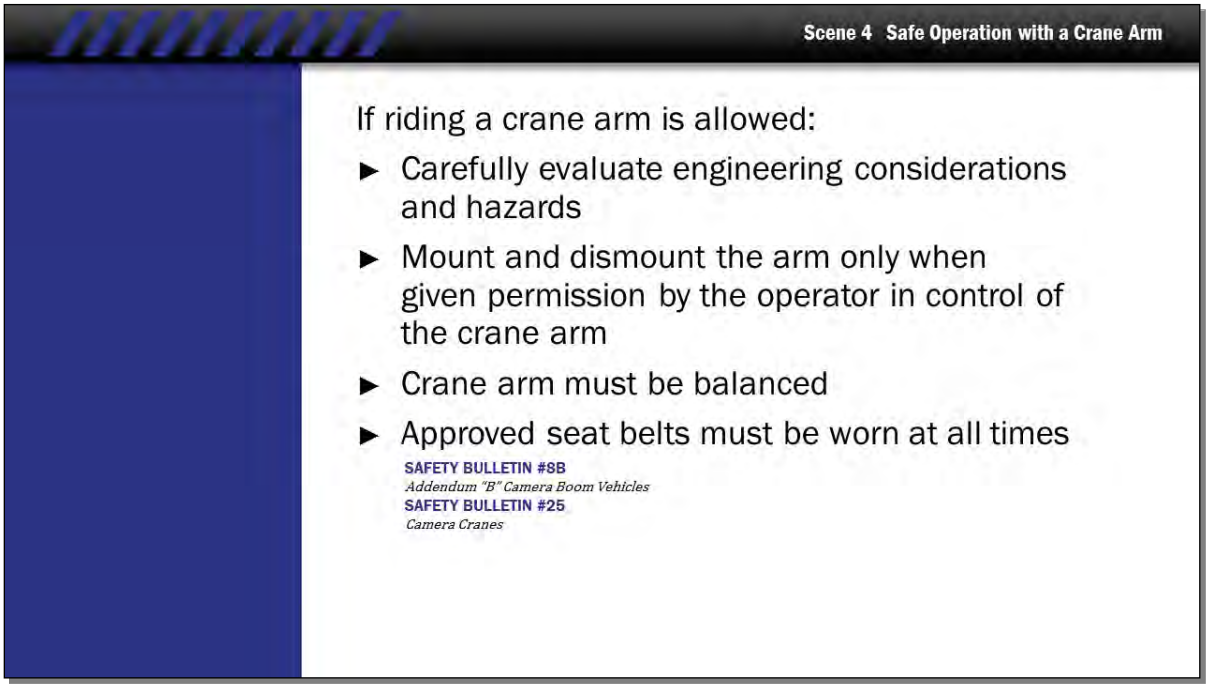
## Slide 103 - Crane Safety 2




When a camera crane is used on an insert car, the use of a remote head is highly recommended.

Contact your studio safety representative to determine whether personnel are allowed to ride a crane arm on an insert car.

## Slide 104 - Crane Safety 3




If the employer and crane manufacturer allow personnel to ride the crane, additional safety precautions must be used.

The engineering would need to be evaluated for potential hazards.

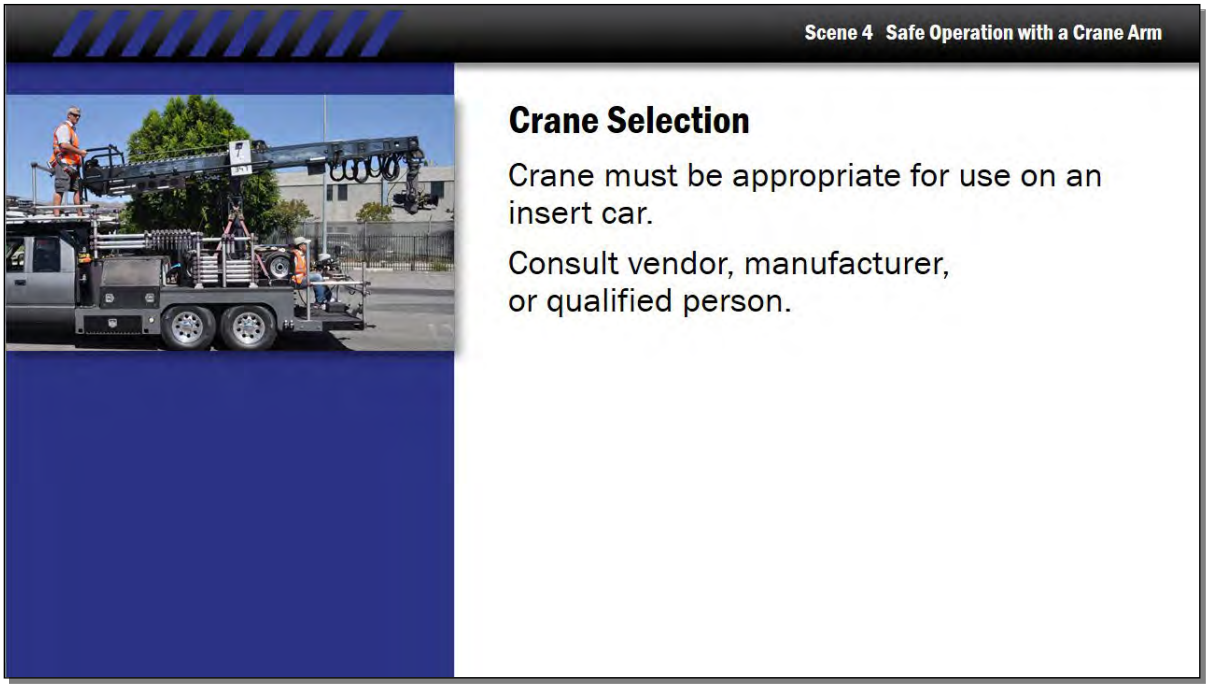
Personnel must only mount and dismount the arm when given permission by the operator in control of the crane arm.

Crane balance must be maintained at all times.

Also, approved seatbelts must be worn at all times when riding the crane arm.

See the relevant Safety Bulletins.

## Slide 105 - Crane Selection 1

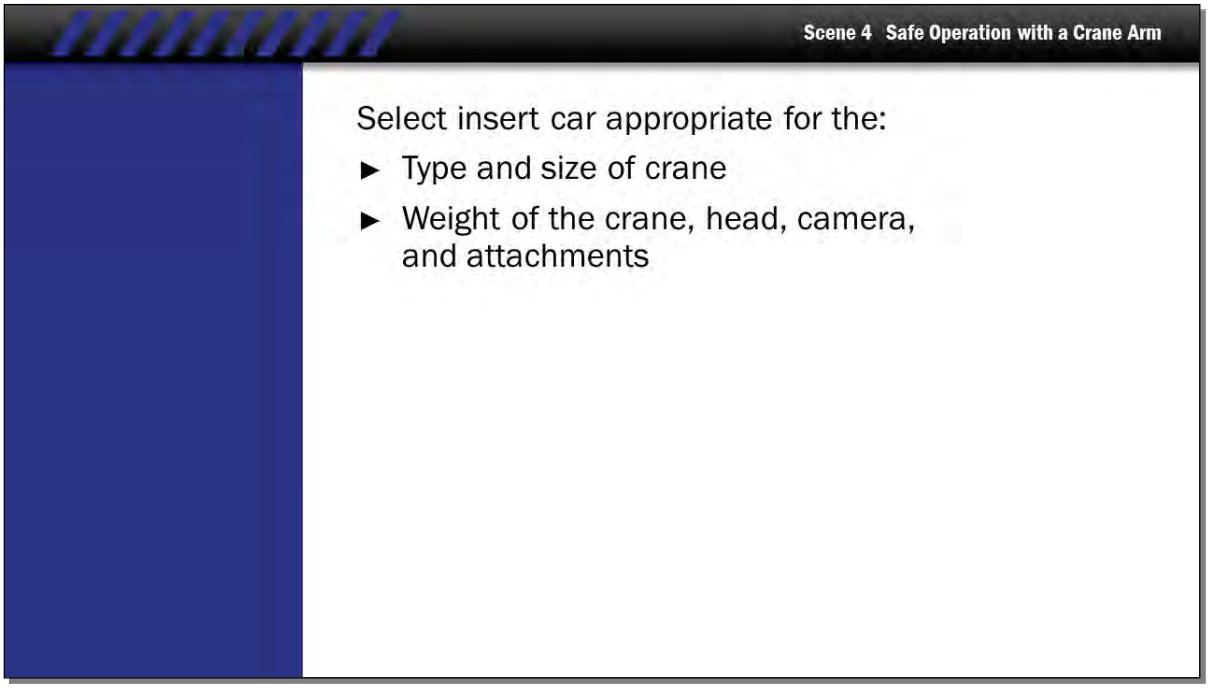



A crane mounted on an insert car experiences significant dynamic loading and G-forces in every direction.

Cranes selected for this purpose must be of sufficient strength to withstand these forces.

Check with the vendor, manufacturer, or qualified person to determine whether the crane is appropriate for this use.

## Slide 106 - Crane Selection 2




Select the appropriate insert car for the type, size, and weight of the crane.

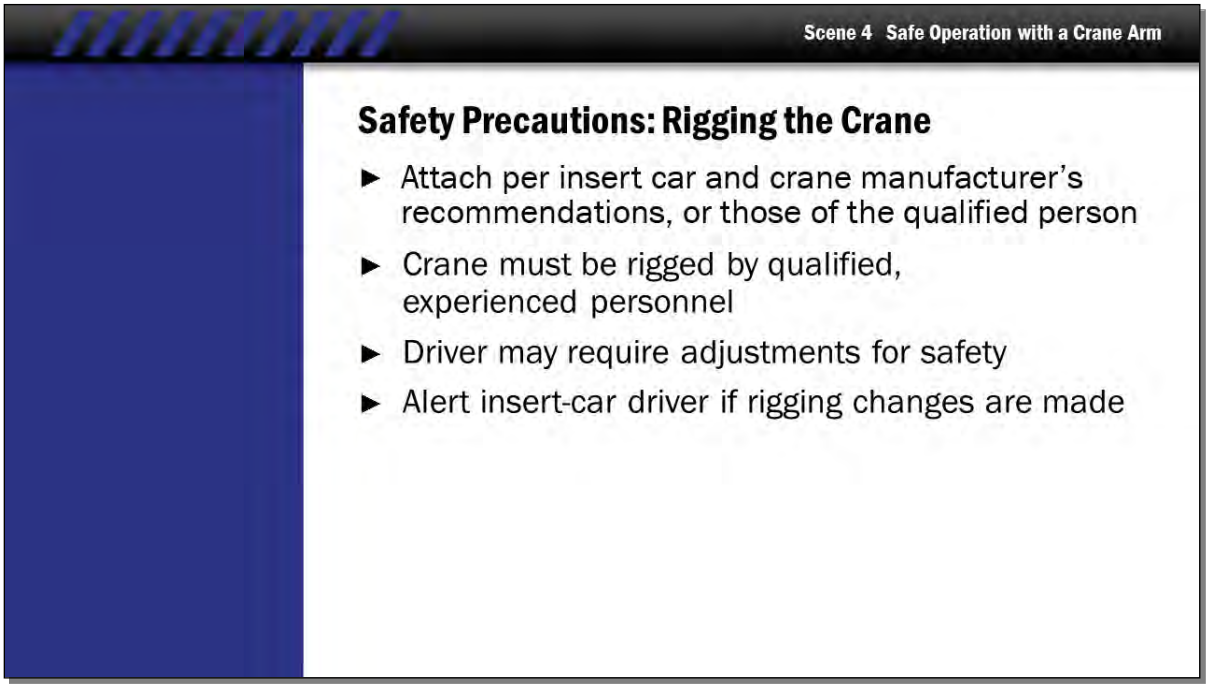
The weight of a telescoping arm will vary considerably between different makes and models.

Cranes can overload a typical two-axle insert car.

A standard flatbed truck that is not designed for this purpose should not be used as a platform for a crane.

Consult with the insert car vendor to determine the appropriate vehicle for the load.

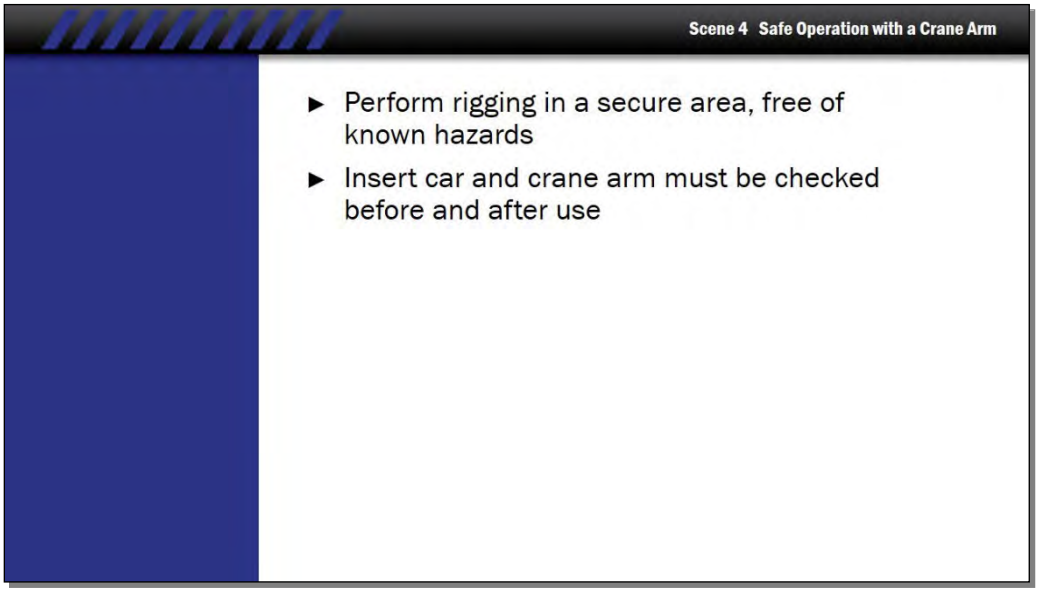
## Slide 107 - Safety Precautions 1




The crane must be rigged by qualified experienced personnel and tied down using the method recommended by the crane manufacturer and appropriate for the insert car.

The insert-car driver may require adjustments for safety, and always alert the insert-car driver if rigging changes are made.

## Slide 108 - Safety Precautions 2




Perform rigging of the crane in a secure area, free of known hazards.

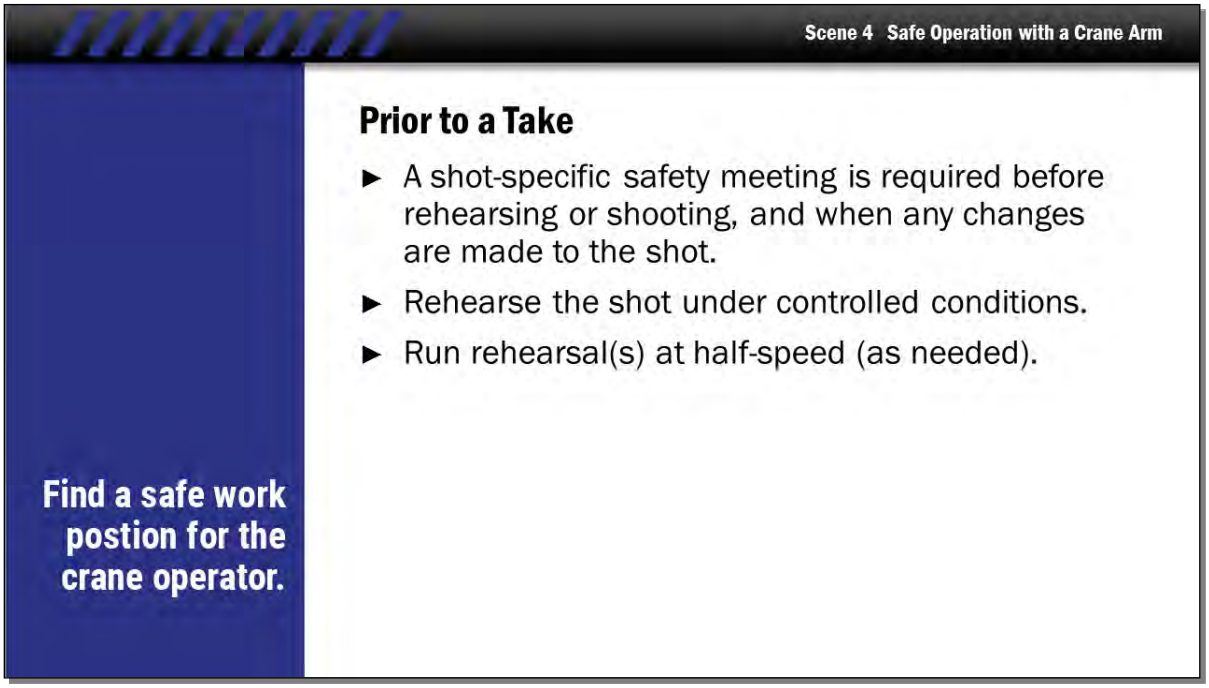
The insert car and crane must be checked before and after use.

## Slide 109 - Safety Precautions 3


Remember, the demands of the shot and the configuration of the crane will determine the safety measures needed.

If any rigging adjustments are needed, the insert-car driver must inspect the vehicle after the change.

## Slide 110 - Prior to a Take

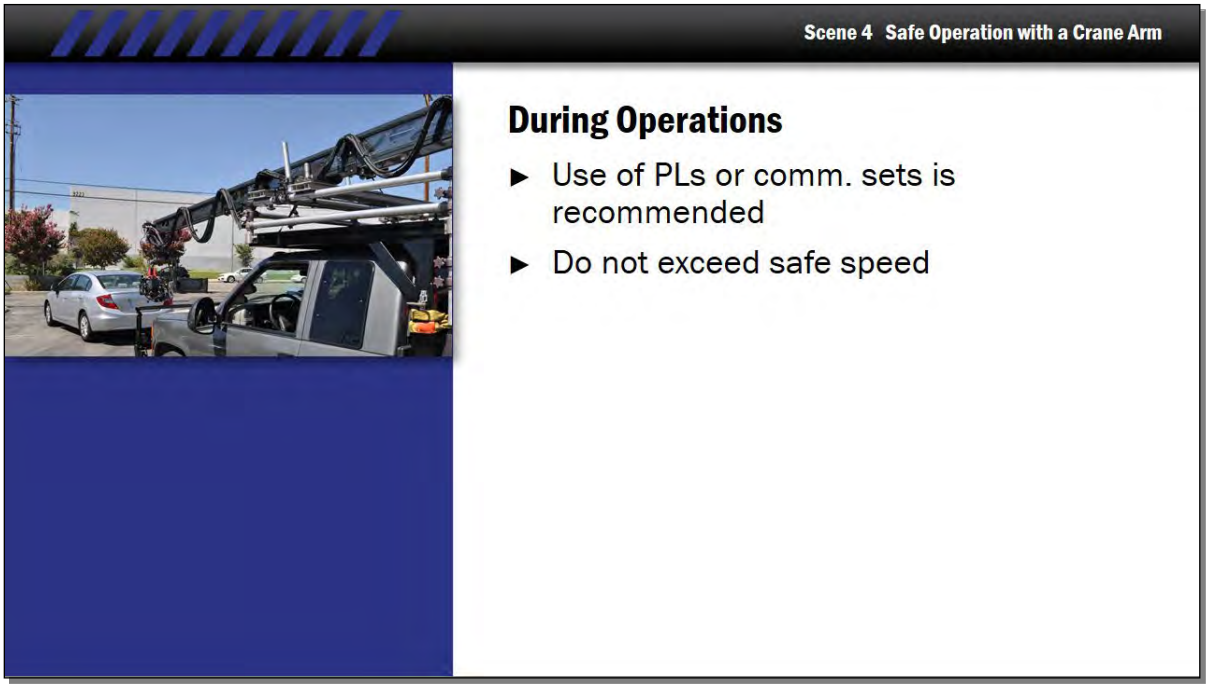



A shot-specific safety meeting is required before a rehearsal, a take, and when any changes are made to the shot.

Rehearse the shot under controlled conditions to confirm the safe movement of both the vehicle and the crane arm.

Begin with slow or half-speed rehearsals before rehearsing at full speed.

## Slide 111 - During Operations

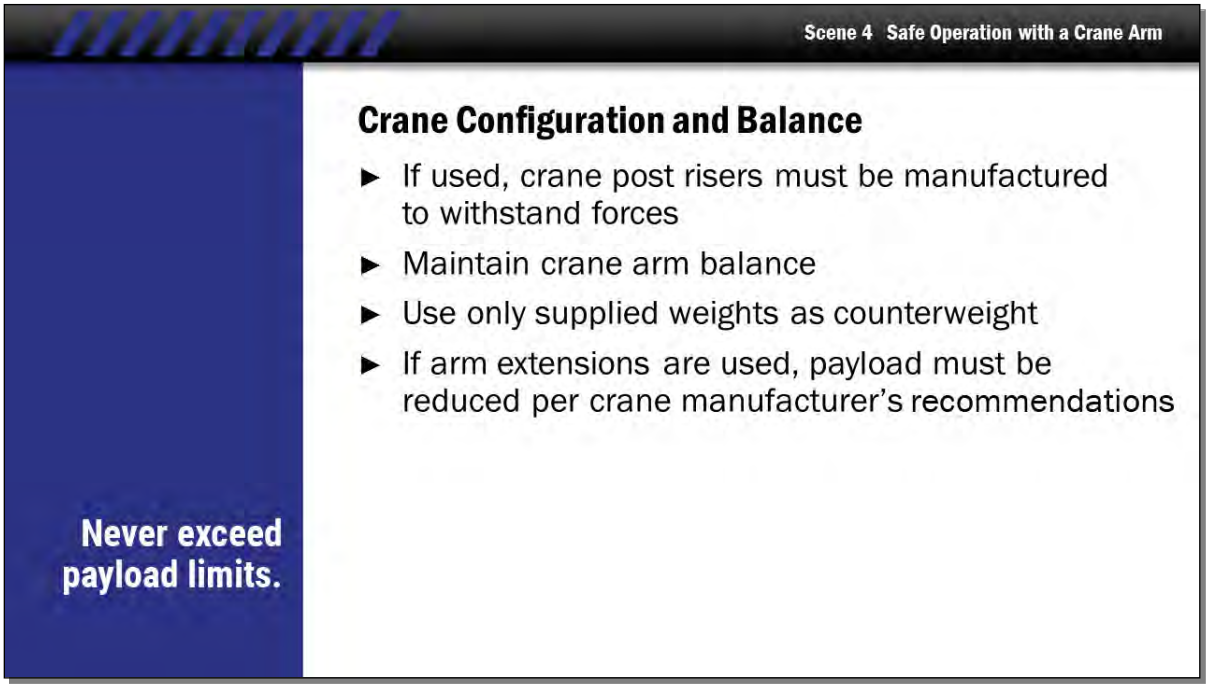



The use of private lines, also known as PLs or comm. sets, is recommended for communication between the director, insert-car driver, crane operators, and camera operators.

The combination of wind and movement of the vehicle can create significant wind resistance and impact control of the arm.

Do not exceed a safe speed.

## Slide 112 - Crane Configuration and Balance



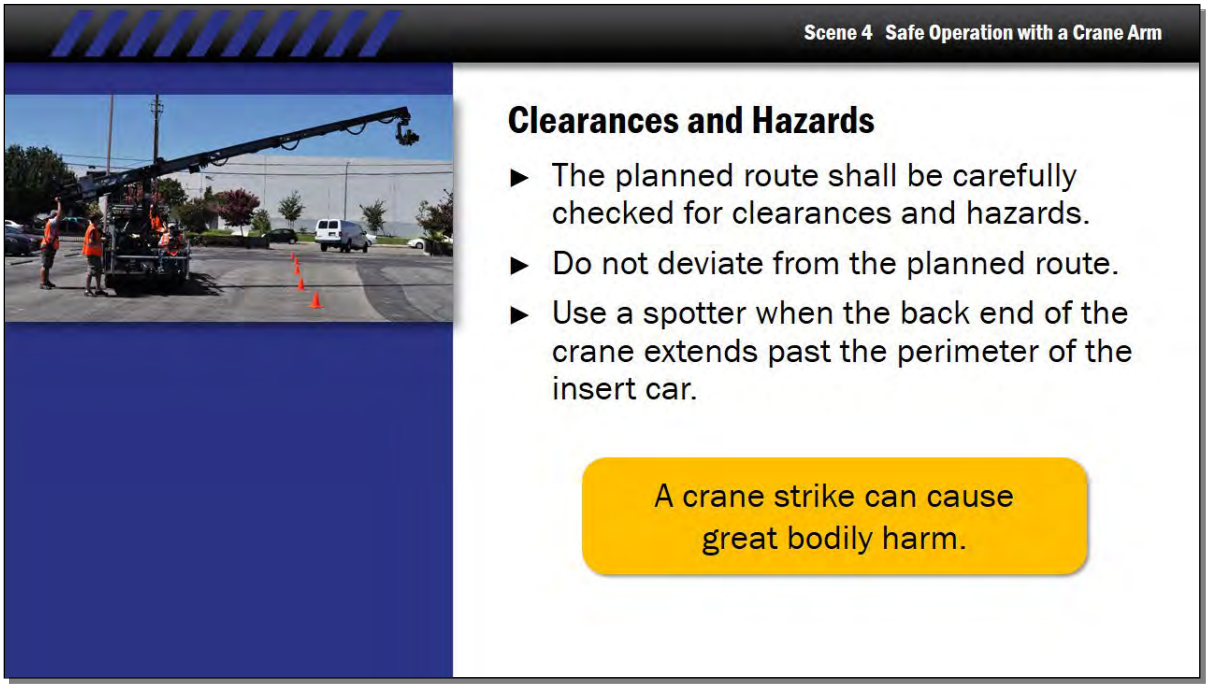

If a riser is used on the crane post, it must be a riser provided for that purpose by the crane supplier, and designed for this application. Maintain crane arm balance at all times.

The maximum payload on the nose of the crane should never be more than that which can be balanced by the supplied counterweight system. Do not add sandbags or other ballast as counterweight.

If you cannot achieve balance with the supplied weights, you are overloading the crane arm.

Never exceed payload limits.

## Slide 113 - Clearances and Hazards



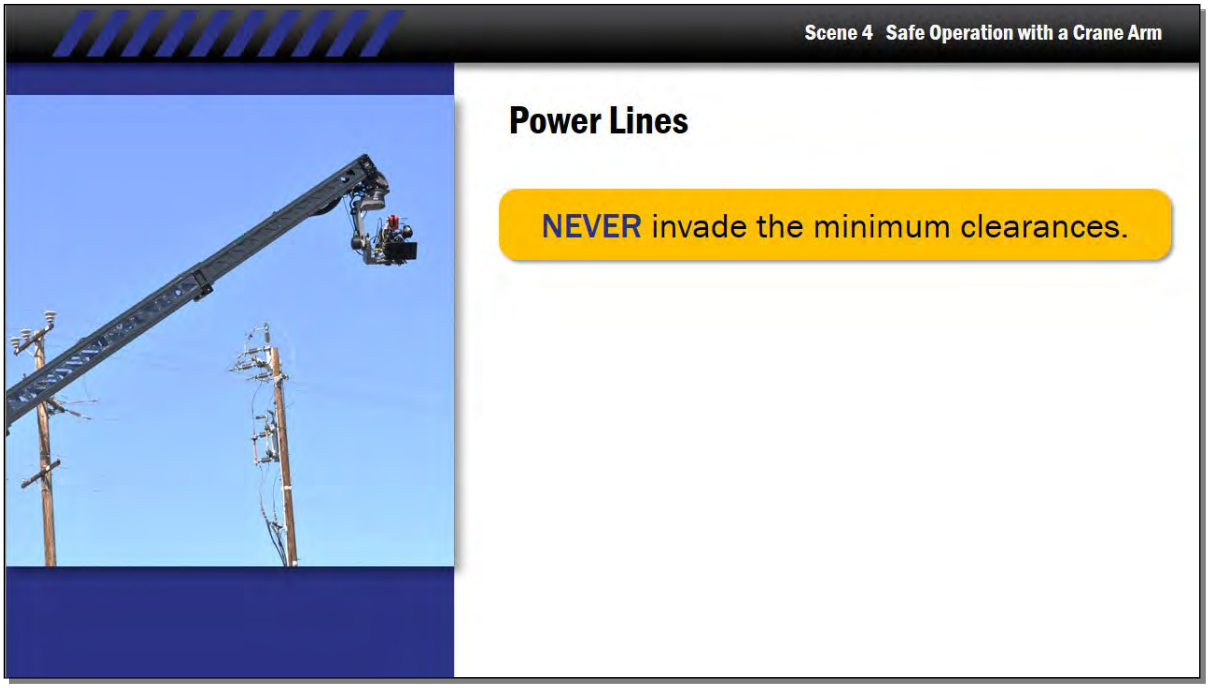

The planned route must be carefully checked for clearances and hazards.

Do not deviate from the planned route until the new route has been checked for power lines and other obstacles.

Use a spotter when the back end of the crane extends past the perimeter of the insert car.

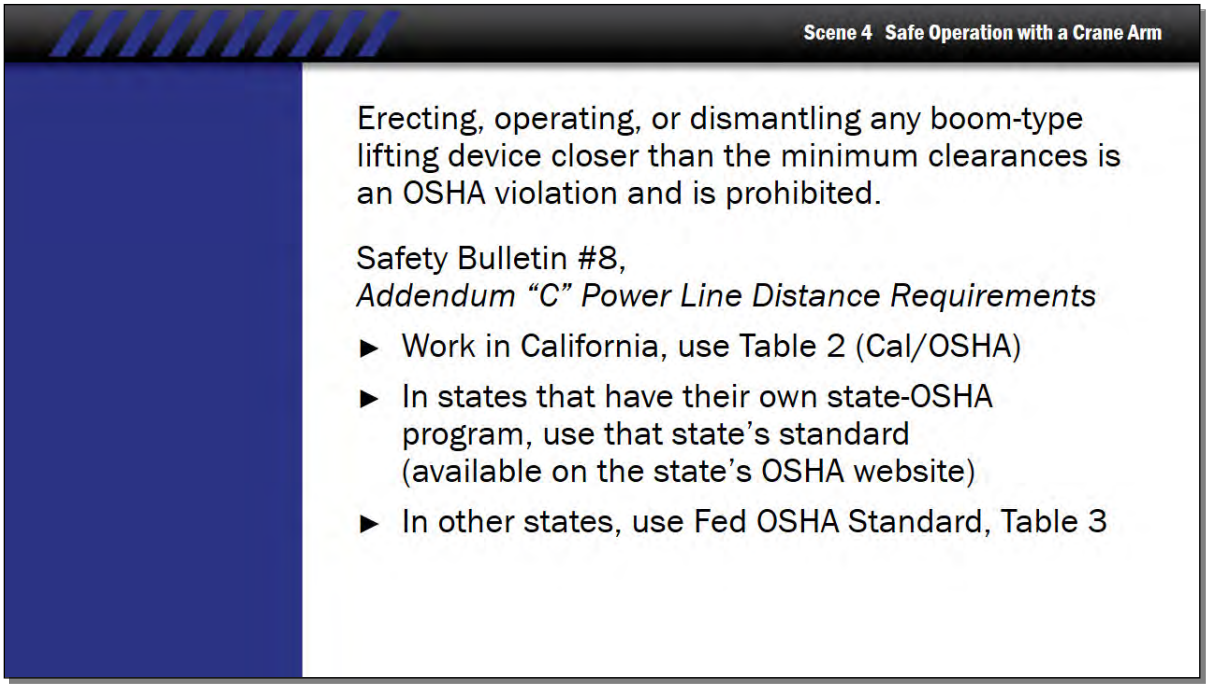
Hitting the crane arm while the insert car is traveling can cause great bodily harm to the crane operator and anyone else riding on the insert car.

## Slide 114 - Power Lines 1




The minimum clearance requirements for power lines must be observed at all times.

## Slide 115 - Power Lines 2




Placing any part of a camera crane where it is too close to power lines, either when building the crane, operating, or dismantling it, is unsafe.

It is an OSHA violation and is strictly prohibited.

Minimum clearance distances are based on the voltage of the power lines and are given in tables on the next slides.

They can also be found in the industry safety bulletin listed here.

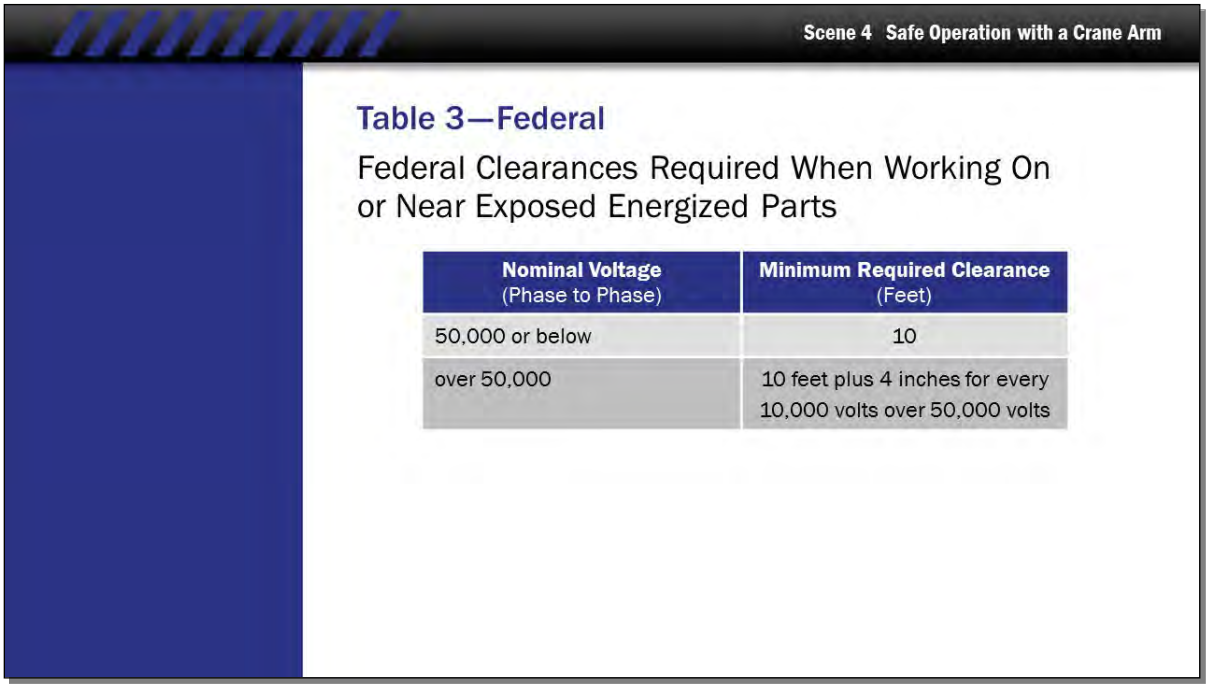
## Slide 116 - Table 2 - California


In California, the minimum clearance for voltages from 600 to 50,000 volts is 10 feet.

A typical residential street pole is in this range.

Transmission lines and sub-transmission lines are much higher voltage and require significantly greater clearance.

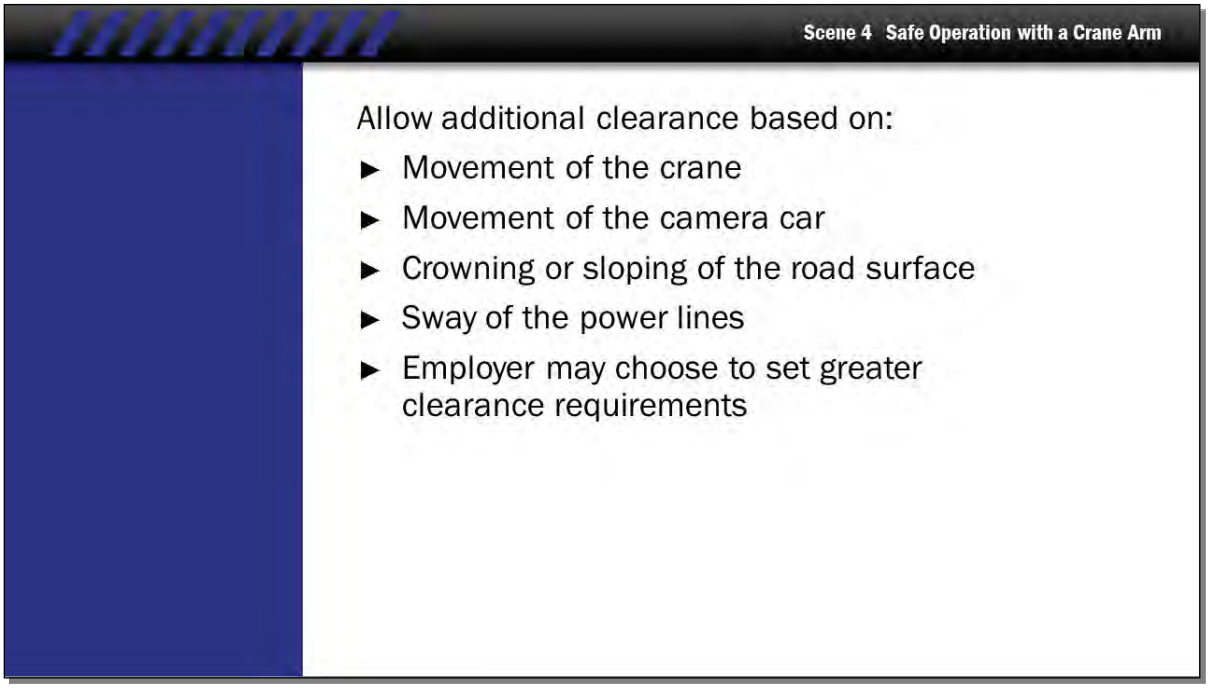
## Slide 117 - Table 3 - Federal




Fed/OSHA clearance requirements are slightly different, as shown here.

The minimum clearance, up to 50,000 volts, is still 10 feet.

## Slide 118 - Power Lines 3




Allow additional clearance based upon movement of the crane, movement of the insert car, crowning or sloping of the road surface, and sway of the power lines.

Your employer may choose to set greater clearance requirements than listed in the safety bulletin.

Contact your studio safety department for more information and guidance.

## Slide 119 - Safety Awareness and Communication


Scene 5, Safety Awareness and Communication.

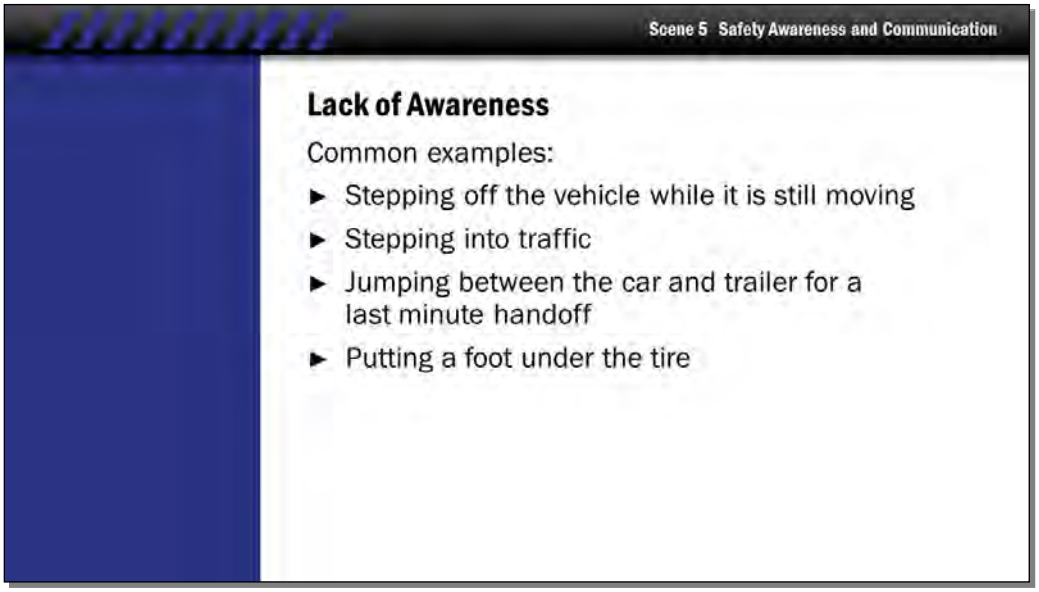
## Slide 120 - Awareness


Working on and around moving vehicles requires a deliberate effort of heightened awareness.

During normal work activity, most people are filtering out the noise and commotion around them.

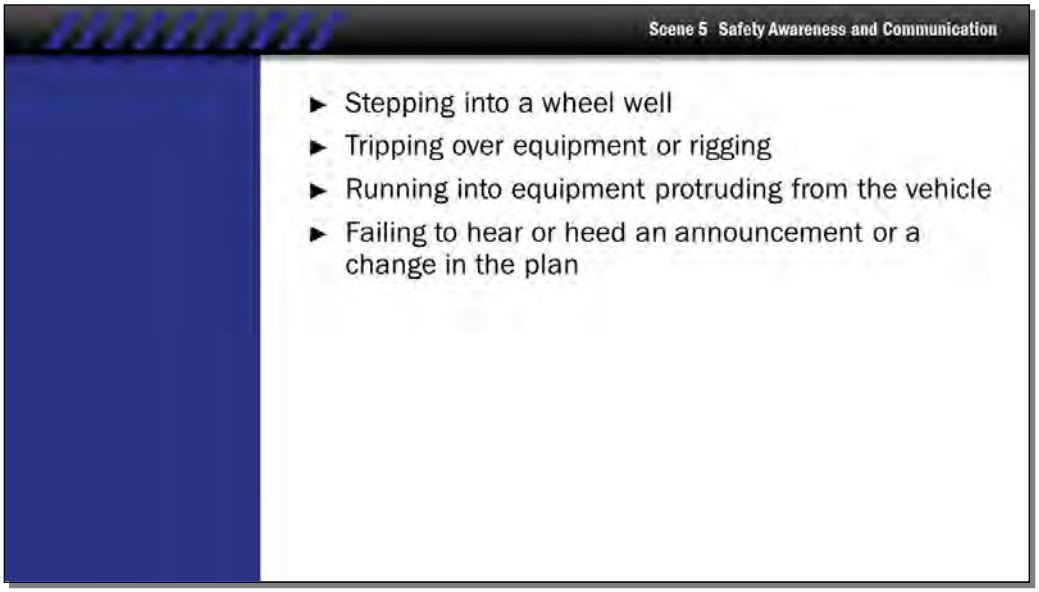
The filtering helps you function, but it also can cause you to become unaware of danger.

## Slide 121 - Lack of Awareness 1



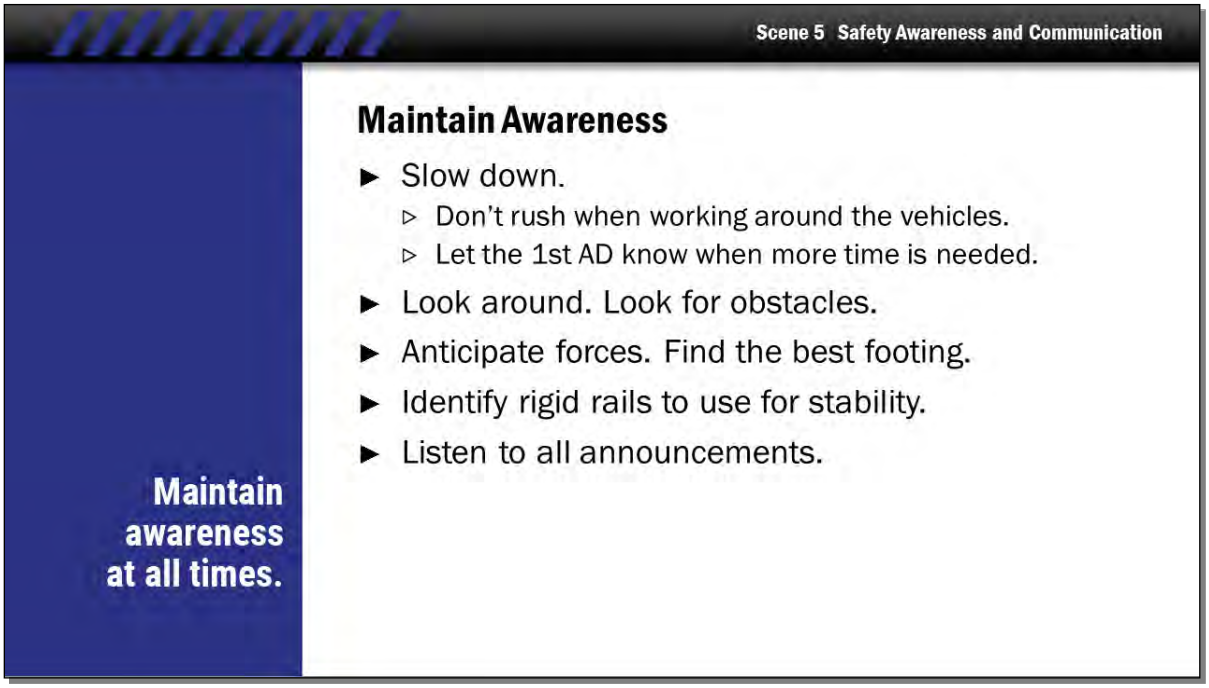

Lack of awareness can cause people to do dangerous things, such as: stepping off the vehicle while it is still moving, stepping into traffic, jumping in between the insert car and process trailer to handoff a last-minute item, or getting a foot run over by a tire.

## Slide 122 - Lack of Awareness 2




Lack of awareness can cause people to: step into the wheel well of the process trailer, trip over cables or run into rigging, run into equipment protruding from the insert car or process trailer, or fail to hear announcements or changes in the plan.

## Slide 123 - Maintain Awareness 1




Take the following precautions to maintain awareness. Slow down.

Don’t rush when working around the vehicles.

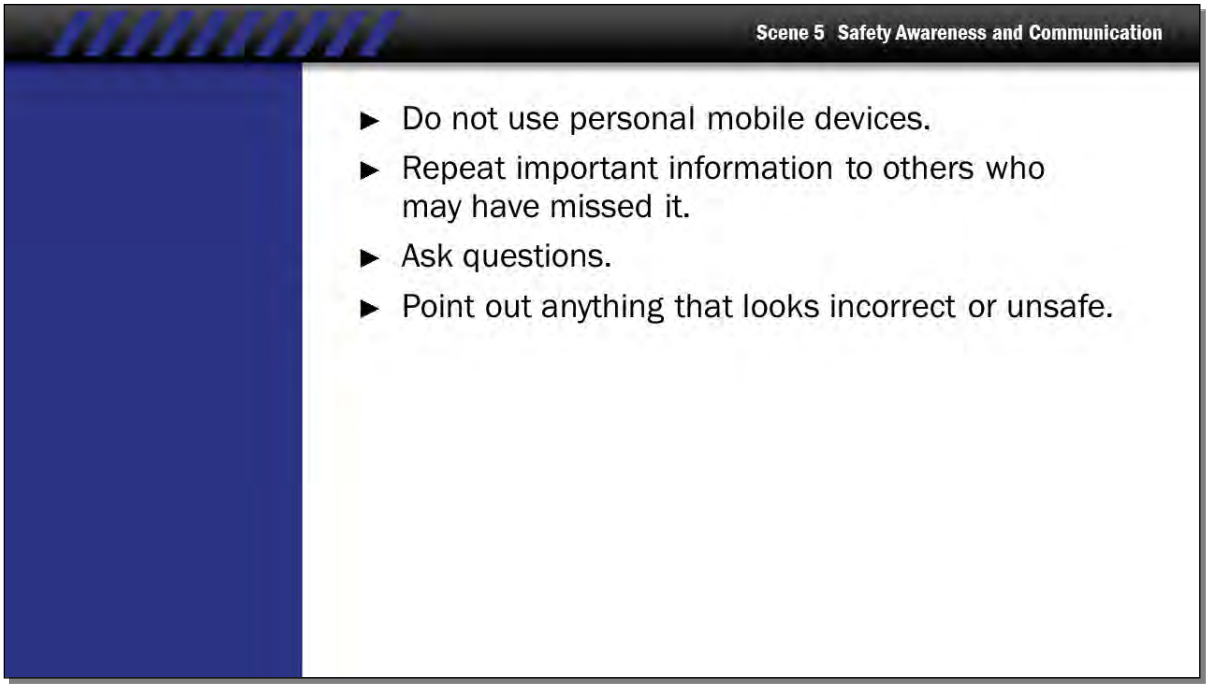
Let the 1st A.D. know when more time is needed. Watch for obstacles.

Anticipate the forces of the vehicle in motion and set yourself up with a safe place to ride and good footing.

Identify rigid rails to use for stability.

When announcements are made, stop your conversation, and listen and pause your work if necessary.

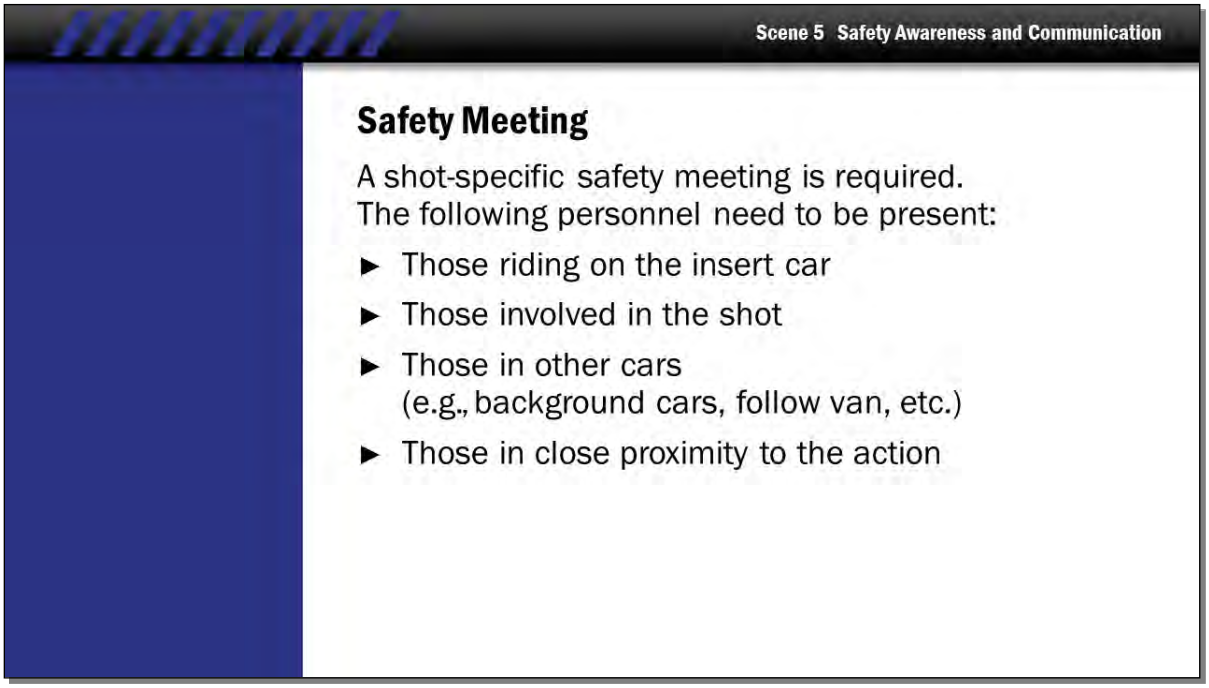
## Slide 124 - Maintain Awareness 2




Do not use personal mobile devices while on the vehicle.

Repeat important information to others who may have missed it, and ask questions and point out anything that looks incorrect or unsafe.

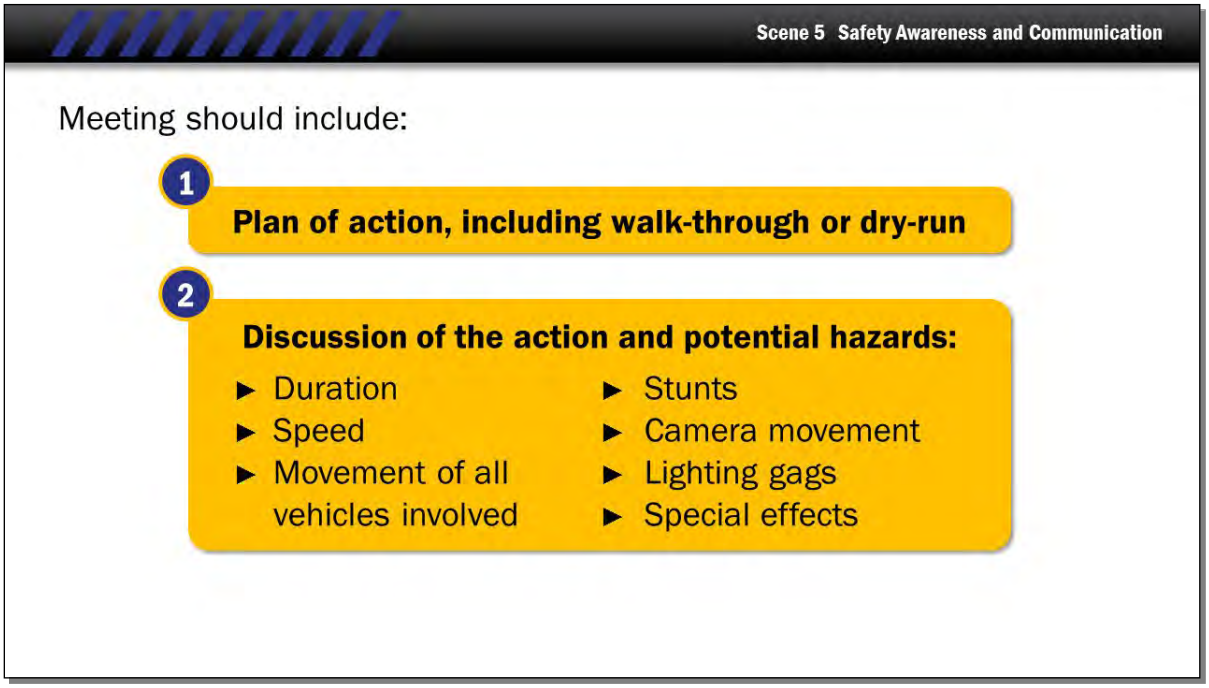
## Slide 125 - Safety Meeting 1




A shot-specific safety meeting is required.

This safety meeting should include all personnel riding on the insert car, involved in the shot, those in other cars (such as background cars, follow vans, etc.), and others who will be in close proximity to the action.

## Slide 126 - Meetings Should Include 1-2




The safety meeting should include (1), the plan of action.

For example, the plan of action may involve the following four steps: first, the line up, second, a half-speed rehearsal, third, the vehicles return to one, and fourth, a full-speed rehearsal.

The safety meeting should also include (2), a discussion of the action and potential hazards.

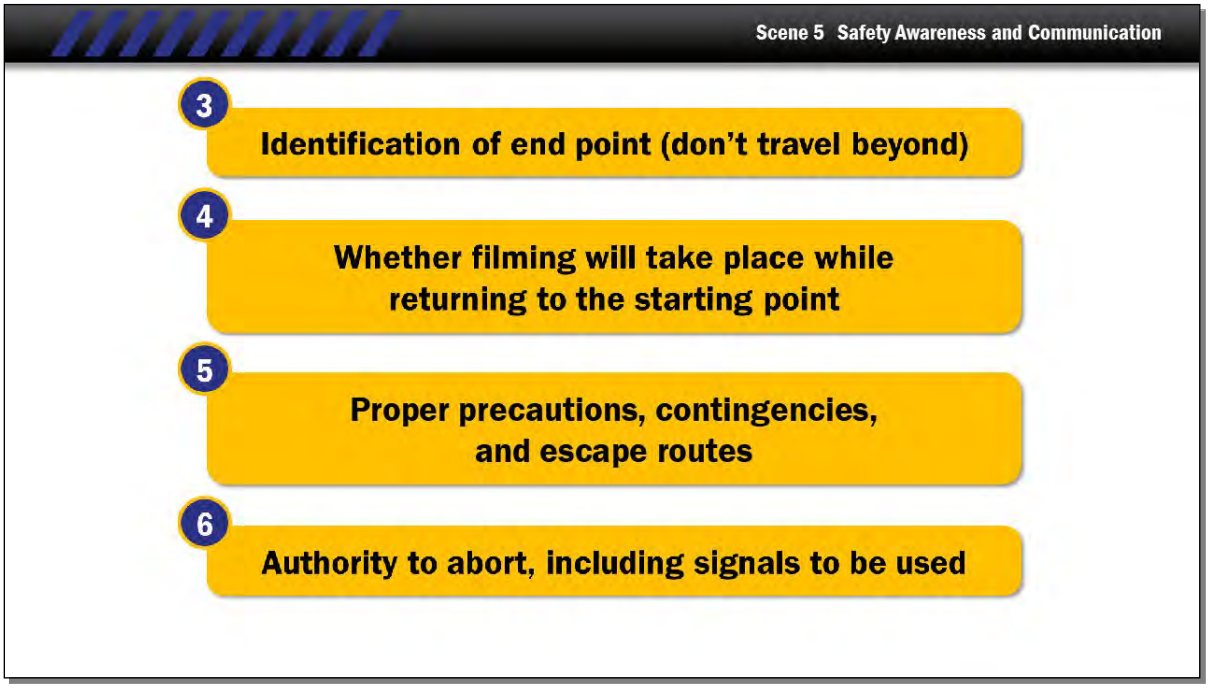
This could include the duration of the run (where it will start and end), the speed, movement of all vehicles involved, discussion of any stunts, any camera movement, lighting gags, and special effects.

Keep in mind that what you do may have unintentional impacts on other departments.

It could affect the driver's visibility, the vehicle's clearance from obstacles, and the handling of the vehicle.

Everyone on the car needs to know what to expect.

## Slide 127 - Meetings Should Include 3-6




(3), the safety meeting should also identify the end point. There may be a point past which it is unsafe to continue.

For example, the action must not go any further than a particular cross street.

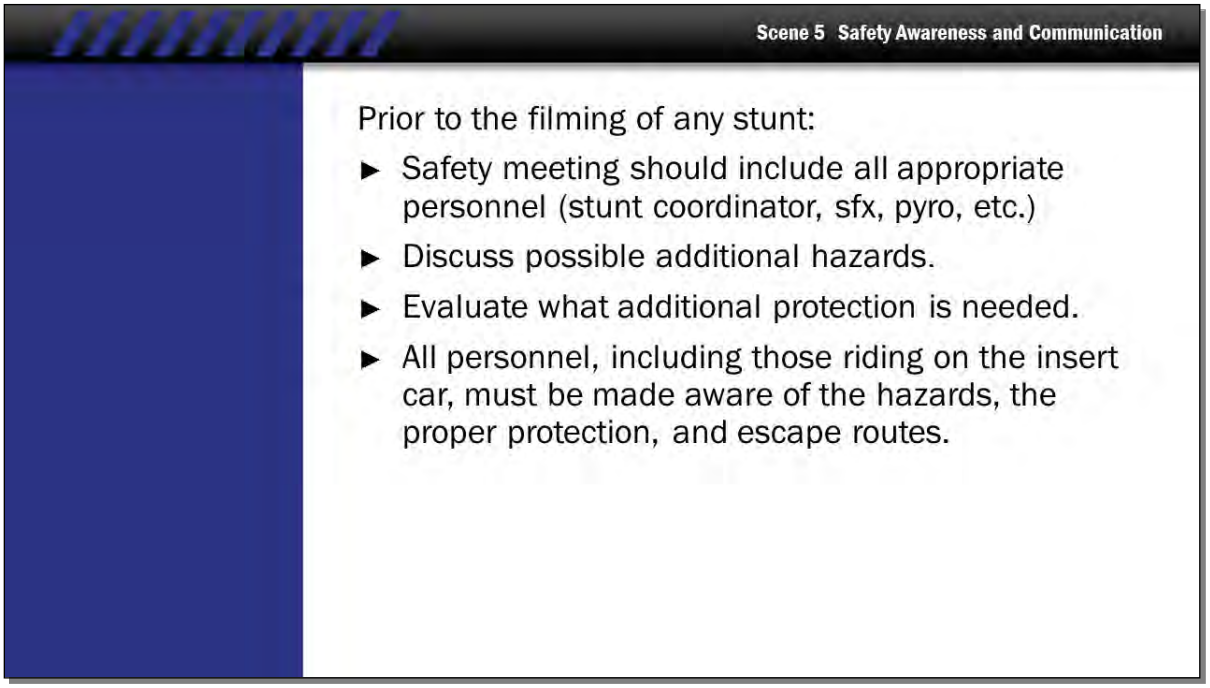
(4), it should be established whether filming will take place while returning to the starting point.

(5), precautions, contingencies, and escape routes should be explained.

For example, it might be established that the crane movement will not start until past a certain landmark in order to ensure clearance. The contingency plan might be that if there is a problem, all vehicles following the insert car should slow to a halt.

(6), it should be established who has the authority to abort, including the signals to be used.

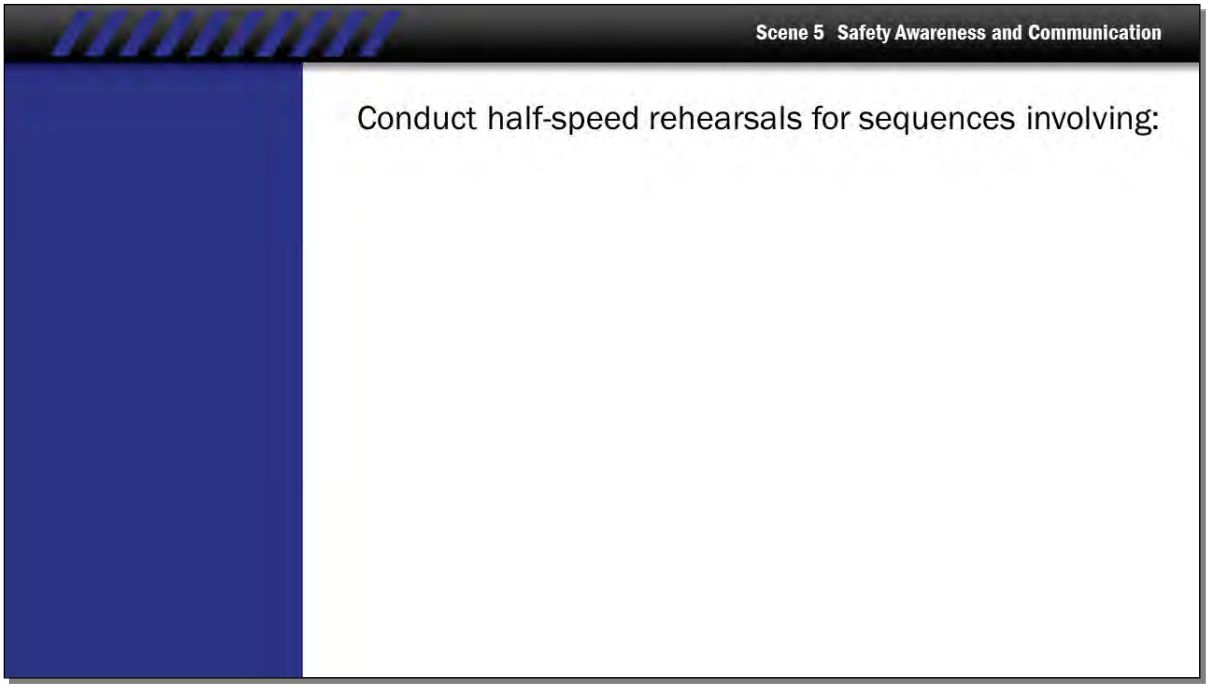
## Slide 128 - Safety Meeting 2




Prior to the filming of any stunt, the safety meeting should include all appropriate personnel, including a stunt coordinator, special effects, pyrotechnician, and fire safety officer.

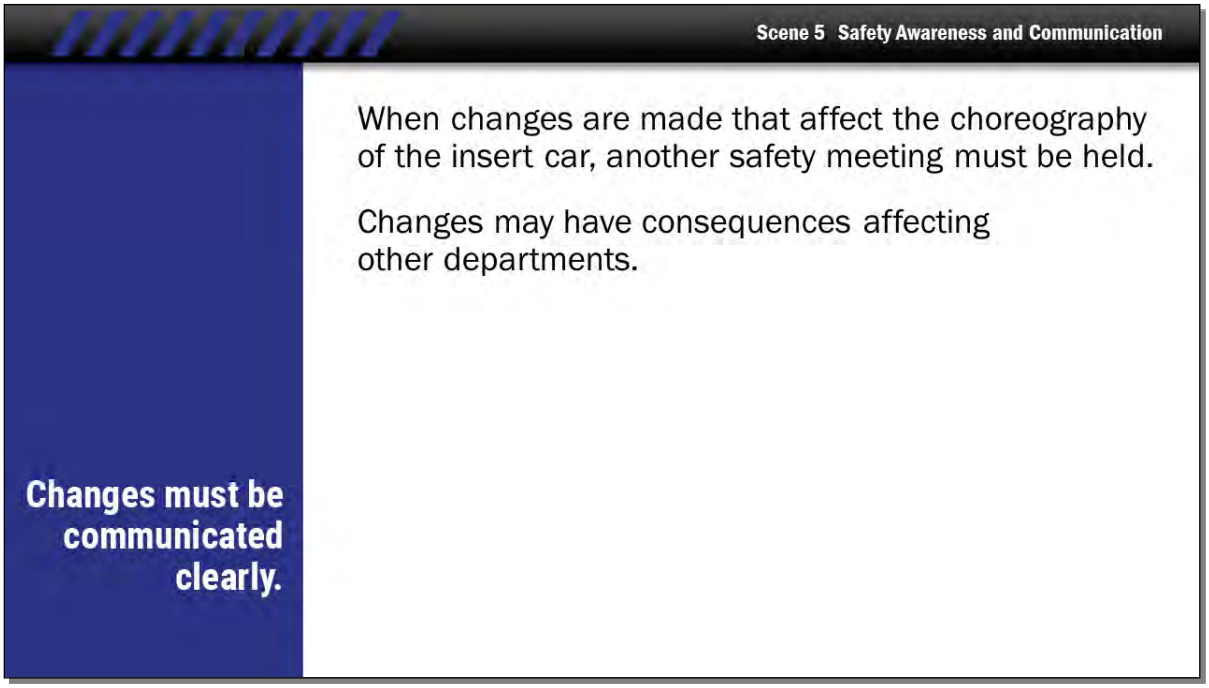
The meeting should address possible additional hazards, evaluate any additional protection needed, and establish escape routes to make everyone aware of the plan, including everyone riding on the insert car.

## Slide 129 - Safety Meeting 3




Before filming, a good practice is to conduct half-speed rehearsals for sequences involving stunts, filming vehicle to vehicle, swerving in and out of traffic, high-speed chases, and any special effects that could impact the crew or the handling of the vehicle.

## Slide 130 - Safety Meeting 4

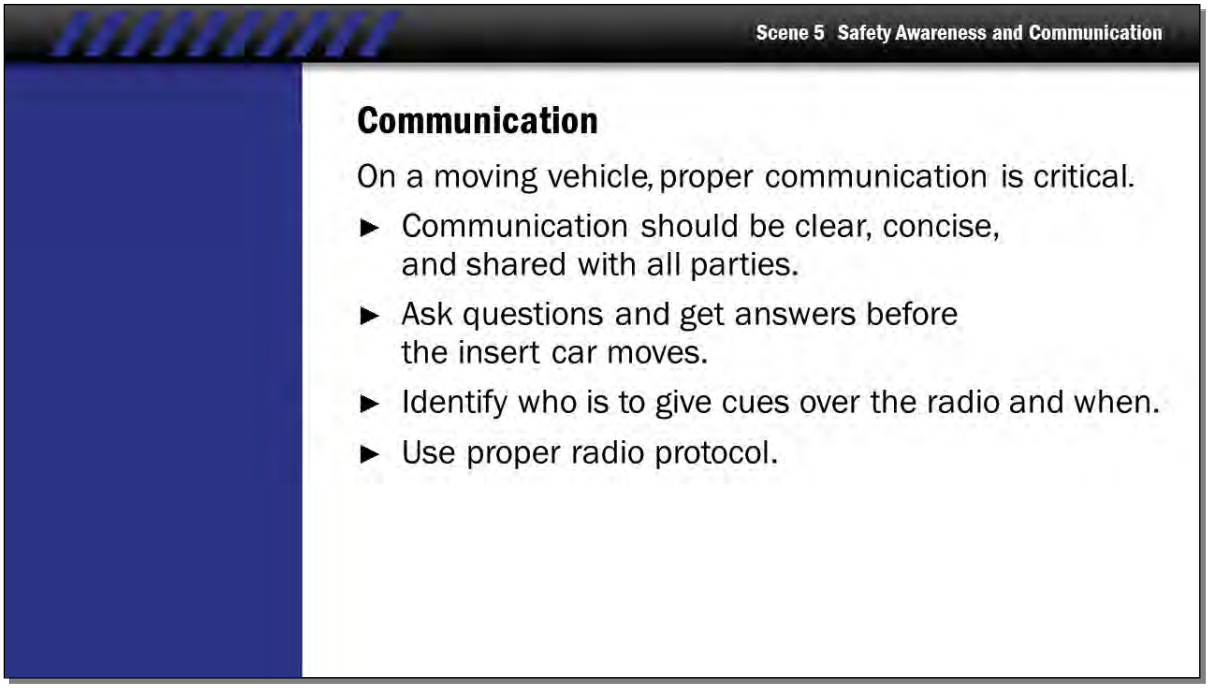



When changes are made that could impact the choreography of the action, another safety meeting must be held.

Changes may have consequences impacting other departments. All changes must be communicated clearly.

“On-the-fly” changes can introduce a high degree of risk into an otherwise well-planned shot.

## Slide 131 - Communication



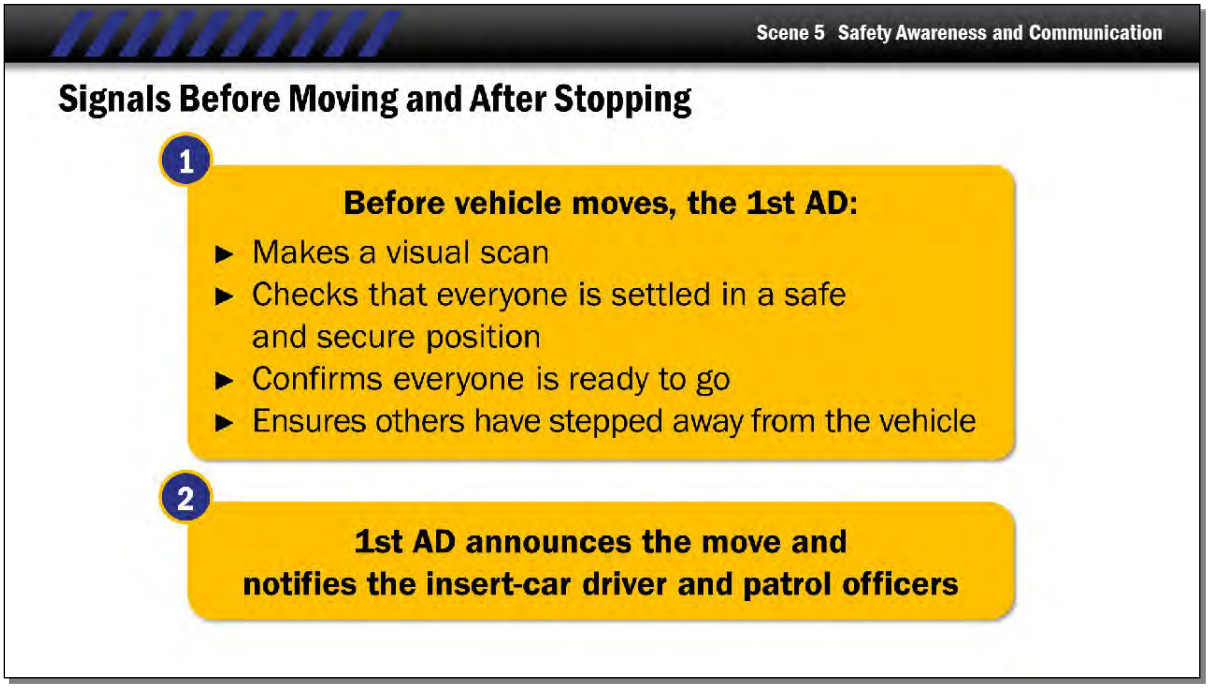

On a moving vehicle, proper communication is critical.

Communication should be clear, concise, and shared with all parties.

Ask questions and get answers before the insert car moves.

Identify who is to give cues over the radio and when, and always use proper radio protocol.

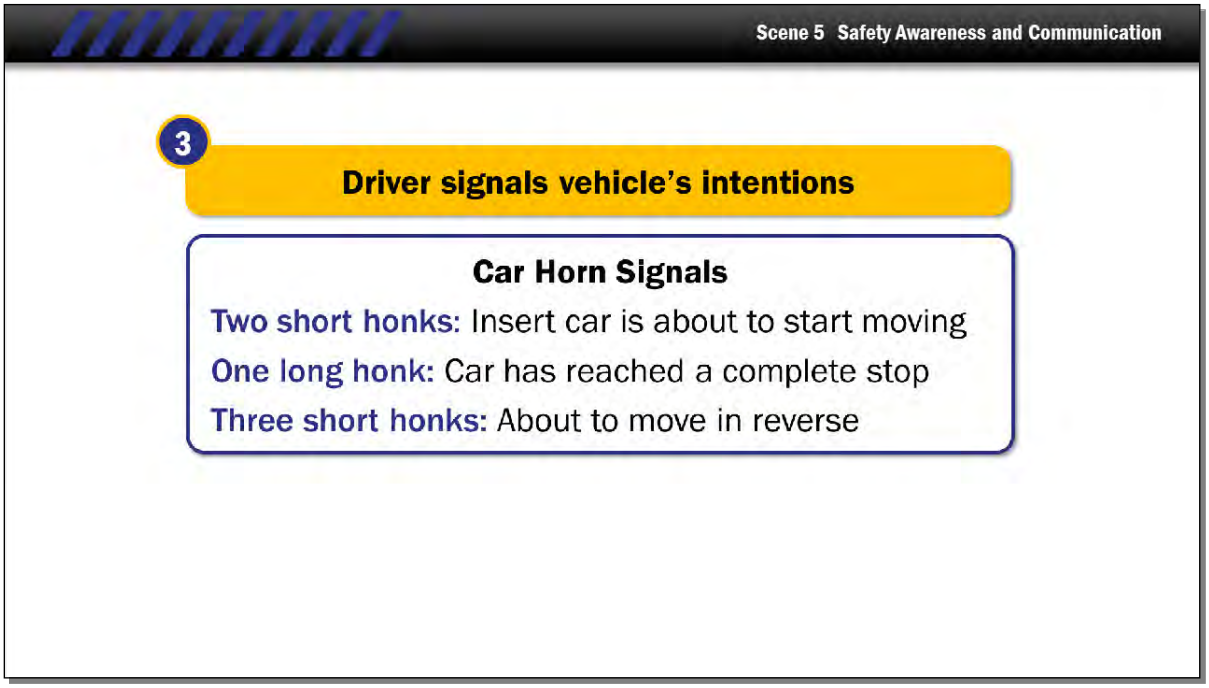
## Slide 132 - Signals Before Moving/After Stopping 1-2




Before the vehicle moves, the 1st A.D. should make a visual scan, check that everyone is settled in a safe and secure position, confirm everyone is ready to go, and ensure that others have stepped away from the vehicle.

Then the 1st A.D. announces the move and notifies the insert-car driver and the patrol officers performing ITC.

## Slide 133 - Signals Before Moving/After Stopping 3




Next, the driver signals the vehicle's intention to move.

This may be via an onboard PA system or, more commonly, using car horn signals.

Two short honks indicate the insert car is about to start moving.

When the insert car comes to a stop, the driver gives one long honk to indicate the car has reached a complete stop and is no longer maneuvering. Some drivers will use three short honks to indicate that the insert car is about to start moving in reverse.

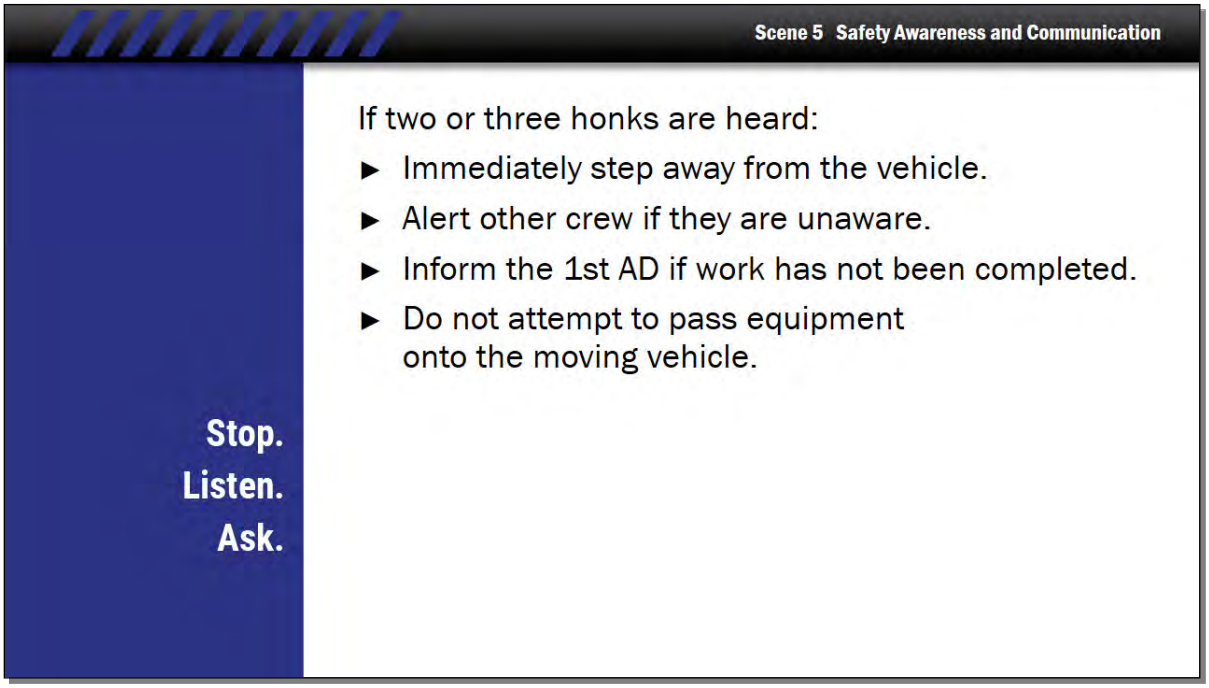
However, the use of this signal is not universal.

Some drivers use two short honks before they move either forward or backwards.

The signal system should be discussed during the safety meeting.

If you are not clear on the system, this is a good question to raise.

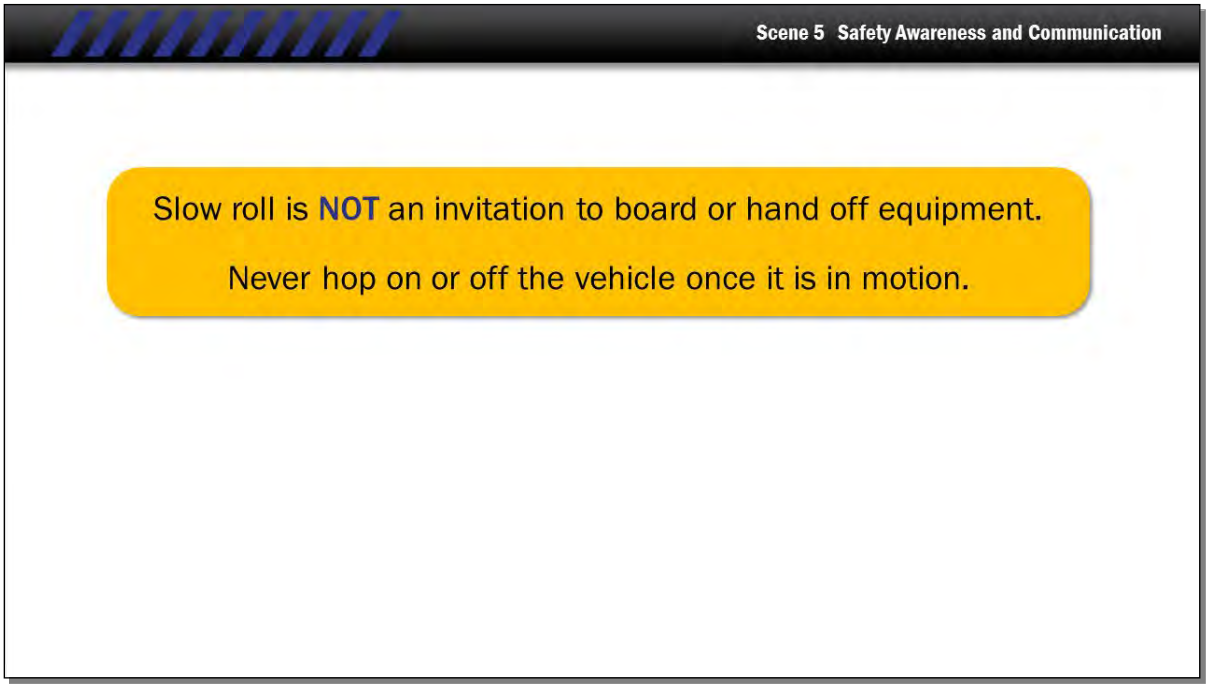
## Slide 134 - Stop, Listen, Ask




If two or three honks are heard, immediately step away from the vehicle, alert other crew if they are unaware.

If your work has not been completed, inform the 1st A.D. Never attempt to pass equipment onto a moving vehicle.

## Slide 135 - Slow Roll

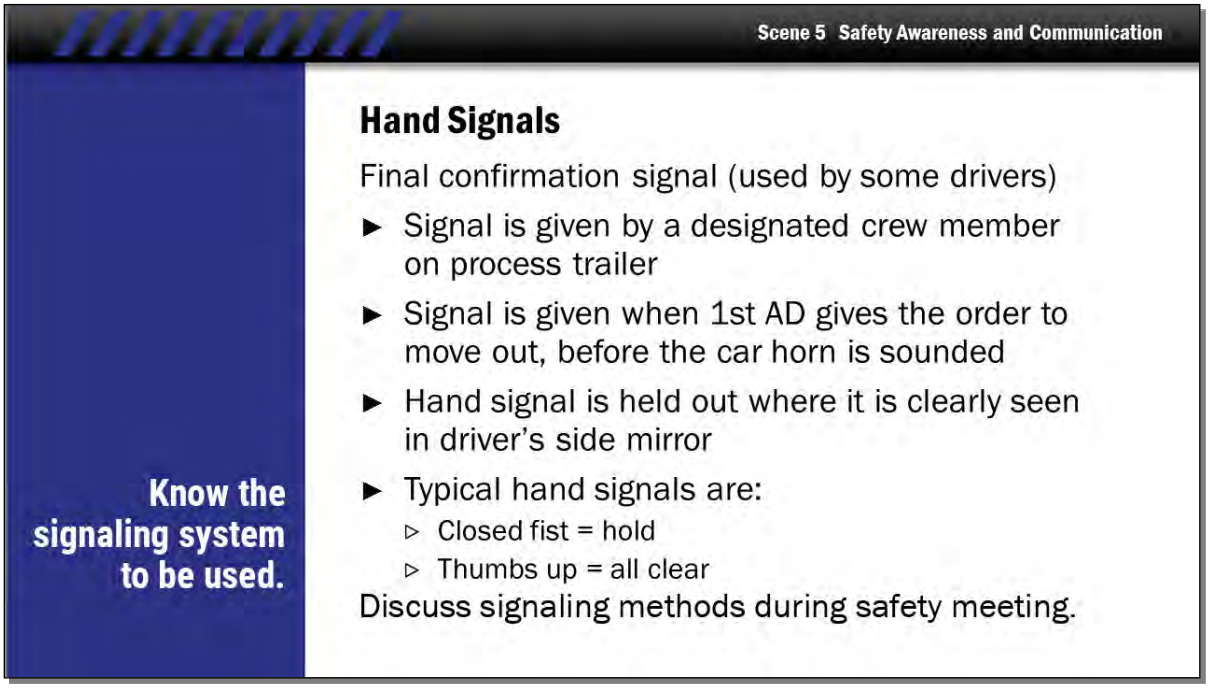



Typically, insert-car drivers will allow the vehicle to slowly roll before picking up speed.

This is not done to give more time for boarding or handing off equipment.

Never hop on or off the vehicle once it is in motion.

## Slide 136 - Hand Signals




A final confirmation signal is used by some insert car drivers.

The signal is given by the designated crew member on the process trailer, typically the key grip.

When the 1st A.D. gives the order to move out, before the car horn is sounded, the designated crew member holds a hand signal out where the driver can clearly see it in the side mirror.

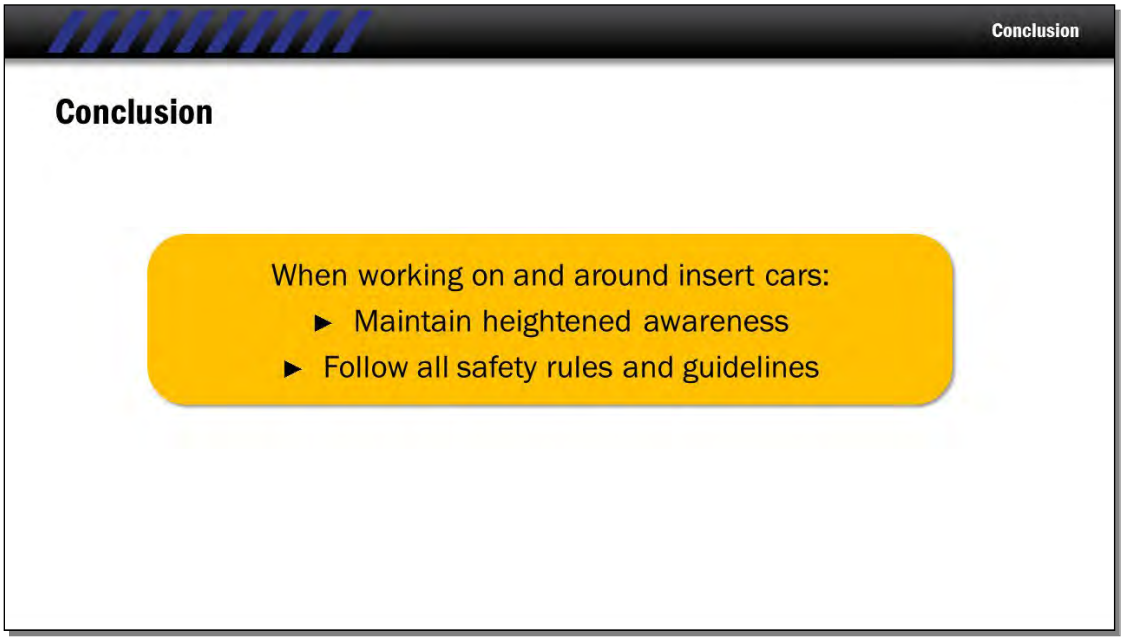
A closed-fist hand signal means hold and don't move. A thumbs up means all clear.

The use of a final confirmation signal should be discussed so it is clear what is expected and what signals will be used.

## Slide 137 - Conclusion 1


This concludes the Insert Car Safety course. Remember . . .

## Slide 138 - Conclusion 2




When working on and around insert cars, remember to maintain a heightened awareness and follow all safety rules and guidelines. If you're not sure, ask.

## Slide 139 - A Safe Attitude


Your safe attitude impacts how you act and react to workplace conditions and challenges.

Speak up about safety issues.

Ask questions.

Look out for your coworkers and for yourself.

Remember, safety starts with you.