

Vehicle Components and Systems



Lesson overview

- Vehicle body and frame
- Suspension systems
- Driveline systems
- Steering system
- Fuel system
- Air intake and exhaust
- Lubrication system
- Coolant system
- Electrical system
- Brake systems
- Tires and wheels
- Trailer coupling systems

Vehicle body and frame

Vehicle body and frame includes the occupant section of the vehicle and the metal infrastructure supports the rest of the vehicle.

Vehicle body and frame

Hood or engine enclosure

- This is the part of the truck body within which the engine is housed.

Cab - vehicle body

- This is the part of the truck that accommodates the driver and the occupants of the vehicle. A vehicle frame, also known as its chassis, is the main supporting structure of a motor vehicle.

Cab design



Cab

Seat

- This is in the interior of the truck for the driver and any co-occupant's comfort.

Seat belt/occupant restraint

- Seat belts save lives, reduce injuries and provide the greatest protection when worn properly in the event of a collision.



Vehicle body and components



Mud flap

- Protects the vehicle and other road users from rocks, spray and debris. Mud flaps are flexible.

Vehicle body and frame



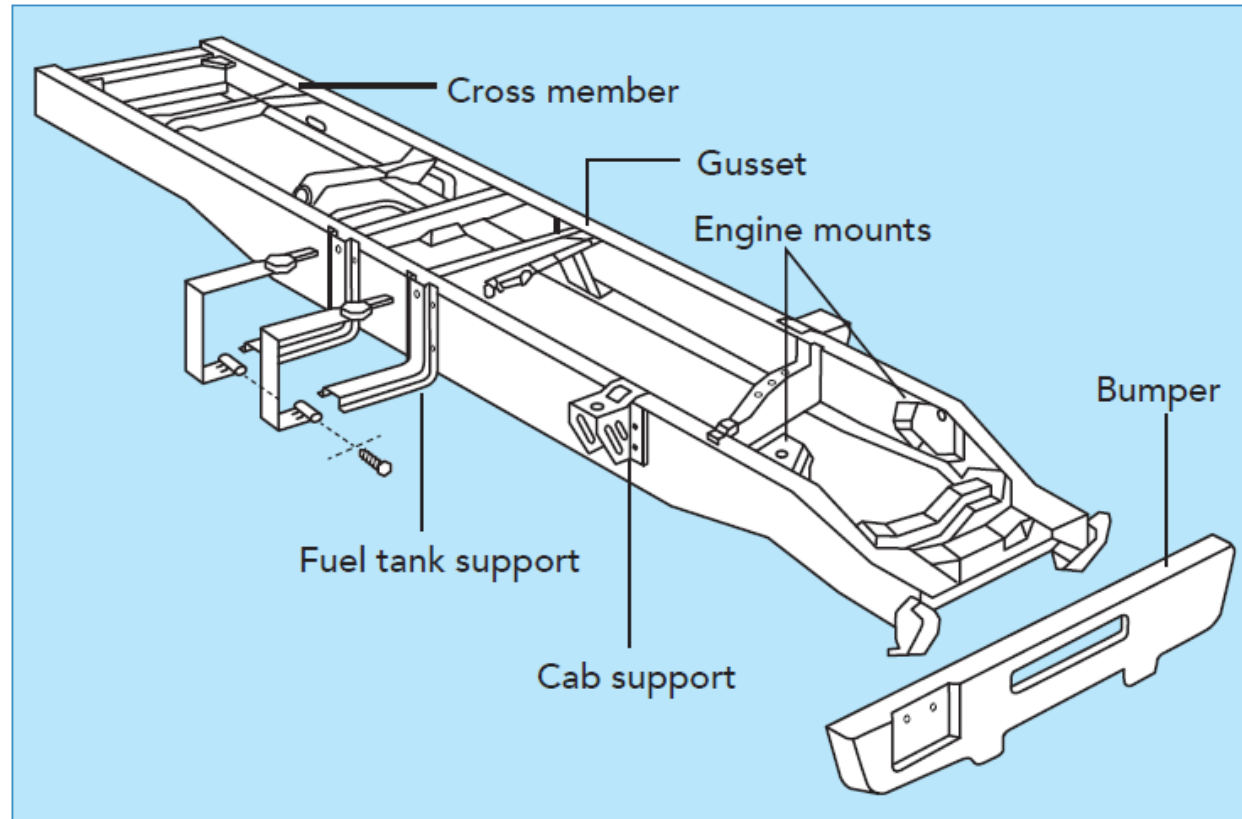
Mirrors

- Flat and convex mirrors must be correctly adjusted to ensure the widest possible field of vision.

Doors

- To enter and exit the cab.

Frame assemblies



Suspension system and axles

The next section includes:

- Axles
- Air ride suspension
- Leaf spring suspension
- Shock absorbers

Suspension systems

Suspension & frame attachments

- The body of the tractor-trailer is connected to and strengthened by the frame. The frame rests on the suspension system.
- The suspension supports carries and distributes the weight of vehicle



Suspension system and axles

Front tractor axle

- The steering axle on a truck.



Rear tractor axle

- Power is transferred from the engine and the powertrain to the wheels by the rear drive axle.



Suspension system and axles

Single drive axle



Tandem drive axles



Tri-drive axles



Drive line system



Drive shaft

- This is a shaft that runs from the transmission to the first drive axle and between the front and the rear axles.

Differential

When a tractor-trailer rig goes around a corner, the outside wheel rotates faster than the inside wheel.

The differential allows the vehicle to have different speeds for each wheel attached to the rear axle.

Interaxle lock

Interaxle differential lock control

- This control splits the power between the rear axles
- Unlocked, the axles turn independently of one another on a dry surface.
- In the locked position, power to the axles is equalized to help provide traction in slippery conditions or on uneven ground.

Suspension system and axles

Steering axles



Suspension system and axles

Sliding axles



Dead axles



Suspension system

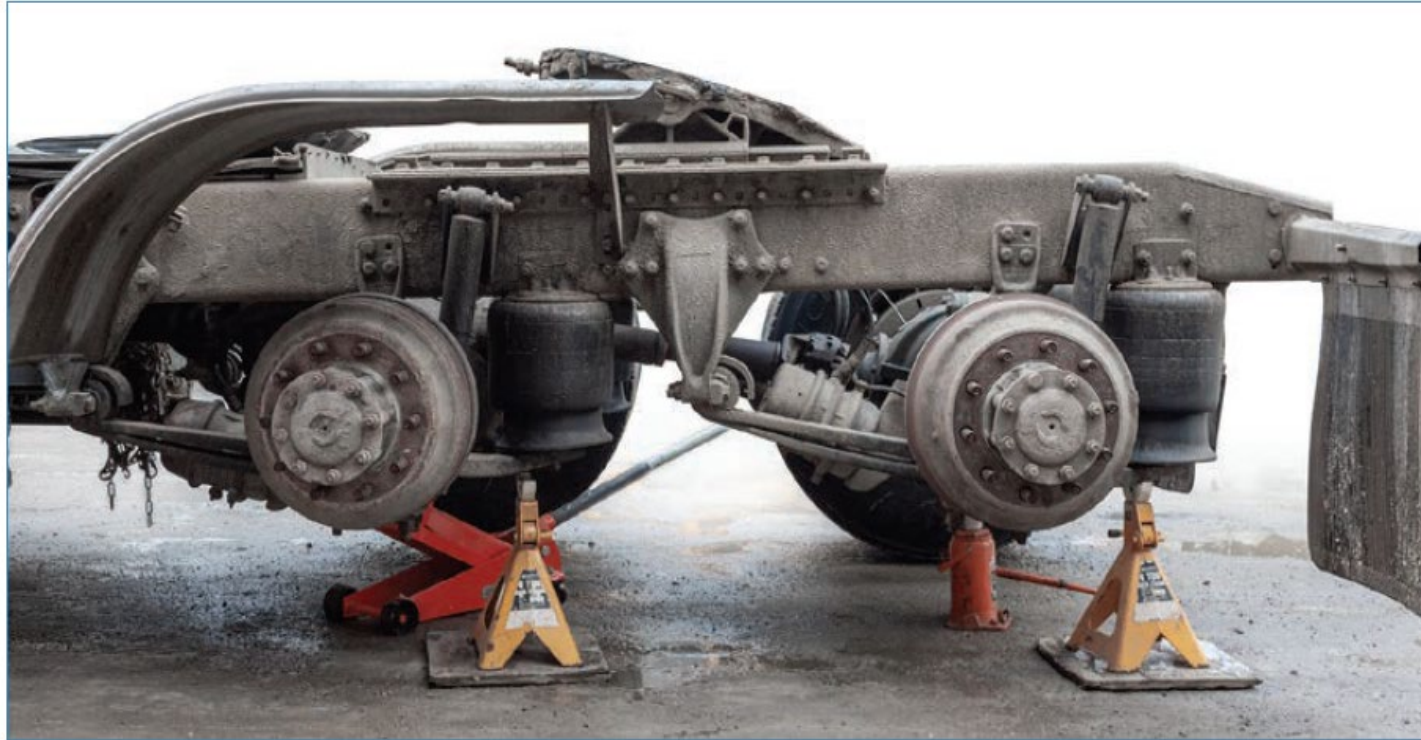


Air ride suspension

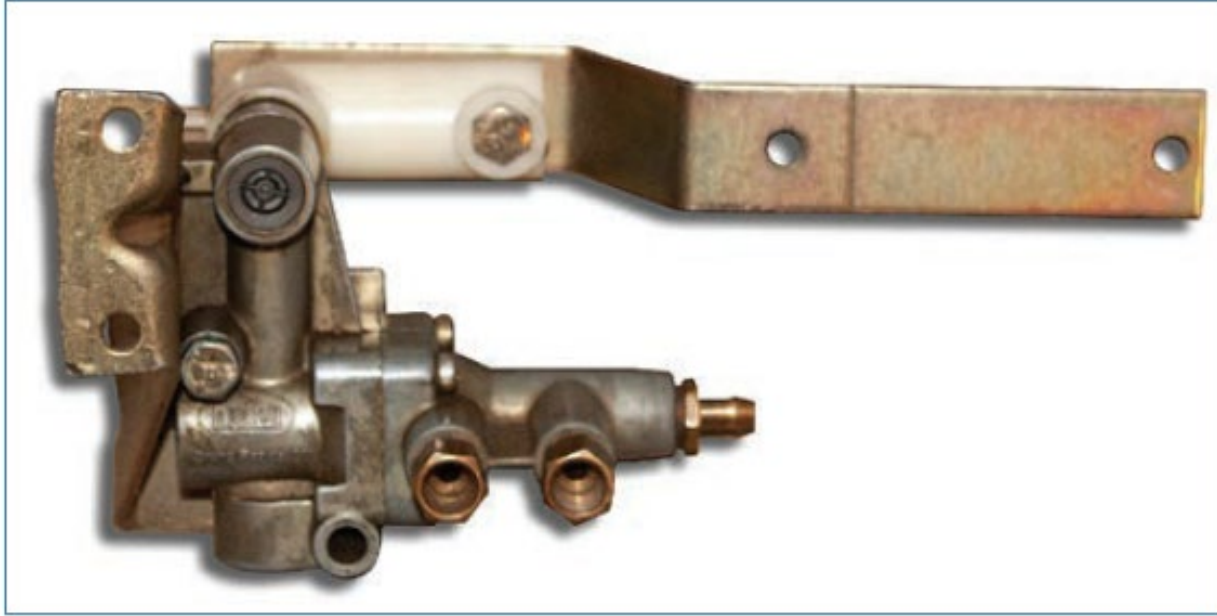
- This type of suspension is filled by the vehicles air system.



Air ride suspension



Suspension system



Leveling valve

Suspension system



**Leaf spring
suspension**

Suspension system and axles



Shock absorber

- This assists in reducing the motion of the vehicle when the wheel moves over an uneven surface.



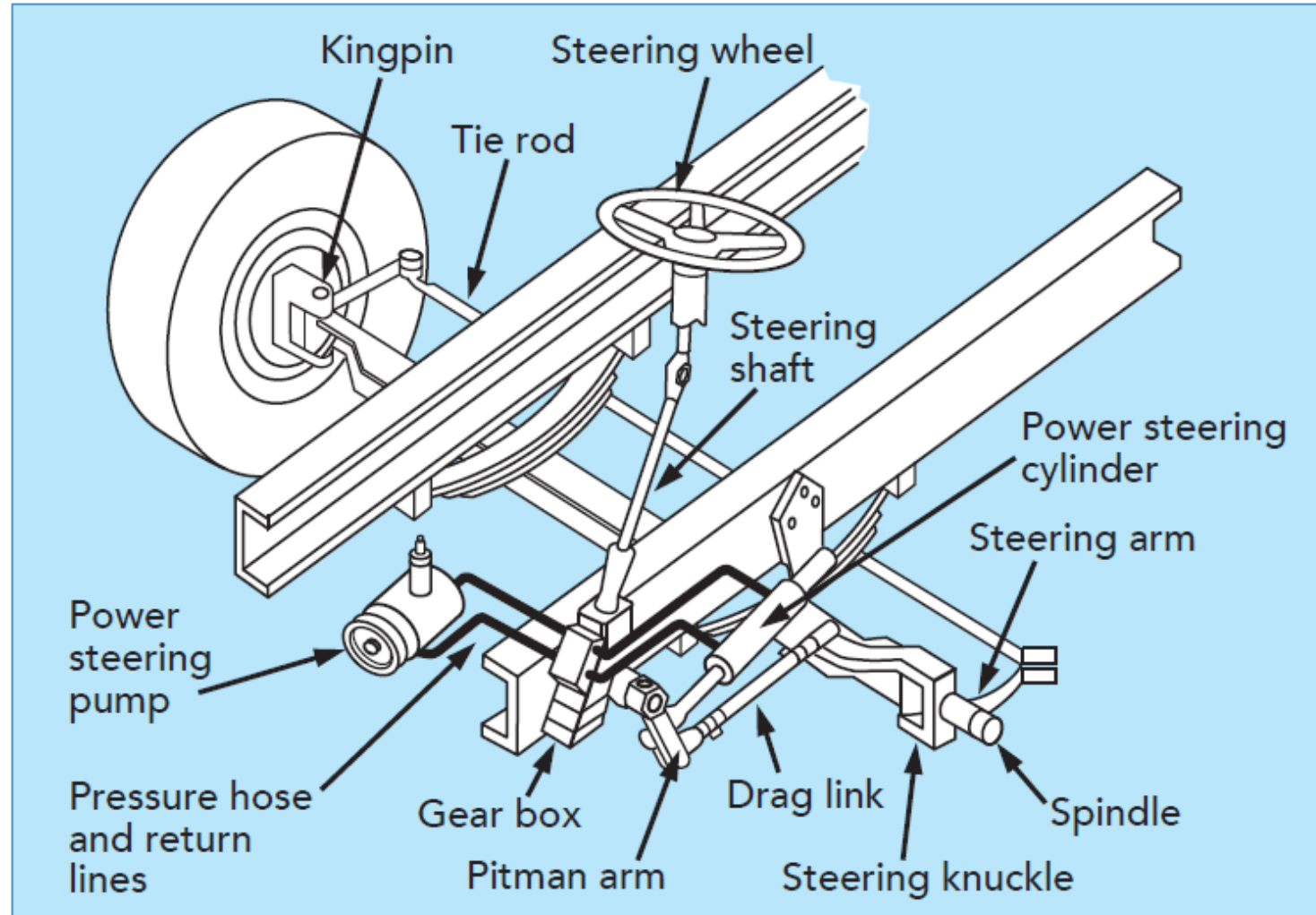
Steering systems

Power steering system

- Comprised of hoses, pump and power steering fluid.
- Assists the driver to turn the wheel with less effort.



Steering system parts



Fuel system

The next section includes:

- Fuel tanks
- Fuel cap
- Fuel injectors
- Fuel filter

Fuel systems

Fuel tank

- Your truck may be equipped with more than one fuel tank. Fuel tanks come in a variety of sizes and shapes.

Fuel cap

- Cover that seals onto the fuel filler neck and allows fuel to be added to the tank.



Fuel systems

Fuel injectors

- Supplies fuel to the cylinders.

Fuel filter

- Keeps contaminants out of the fuel system by cleaning the fuel as it flows from the tank.



Air intake and exhaust system

The next section includes:

- Air intake system
- Air cleaner
- Exhaust system
- Turbocharger
- Aftercooler
- Muffler



Air intake and exhaust systems

Air intake system

- A diesel internal combustion engine is not only powered by fuel but a mixture of fuel and air.
- This system supplies the air that causes combustion in cylinder.
- It is composed of- air cleaner, turbocharger, after cooler, intake manifold, an outside air cleaner may have a rain cover or snorkel.



Air intake and exhaust systems

Exhaust system

- This system removes burned gases and fumes from the engine cylinder.



Vehicle systems

Turbocharger

- Is a turbine-driven forced induction device that increases an internal combustion engine's efficiency and power output by forcing extra compressed air into the combustion chamber.



Air intake and exhaust systems

Muffler

- The muffler is important in reducing the sound of the engine.



Lubrication system

This is a system that distributes oil to various parts of the engine.

- Oil dip stick
- Oil filter

Lubrication system

Oil dip stick

- Is used to indicate the level of oil in the engine.



Lubrication systems

Oil filter

- As the oil circulates to cool the engine and reduce friction between the engine parts, it collects dirt, grime and bits of metals which must be removed before causing damage to the engine
- The oil filter strains out these impurities before they circulate to all the moving components.



Coolant system

The next section includes:

- Thermostat
- Radiator with coolant
- Radiator cap
- Hoses and clamps
- Fan belt

Coolant system

Radiator

- A vehicle cooling system keeps the temperature constant to prevent intense heat from damaging the vehicle engine.



Radiator cap

- This seals the radiator.



Coolant system

Applicable hoses and clamps

- Hose clamps are used to attach a hose to a fitting. Hoses are used to convey fluid or air from one part of the engine to another.



Coolant system

Fan belt and blades

- A belt that drives the fan and the alternator. This must be inspected for tension / wear and replaced as needed.



Electrical system

The next sections includes:

- Battery
- Alternators
- Voltmeter
- Ammeter

Electrical system



Battery and battery cable

- A battery stores energy to supply power to the vehicles electrical system
- Battery cables are connected to the terminals to transport electricity to the starting system

Electrical system



Electrical system

Volt Meter



Amp Meter



Brake system

The next section includes:

- Disc brake
- Drum brake

Brake system

Disc brake

The components of a disc brake system consist of a disc and calliper. When the brakes are applied, the calliper squeezes the disc creating friction and slowing the vehicle.



Brake system

Drum brake

- This is a drum attached to each side of the axle by bolts, to stop or slow down tire rotation when the driver applies pressure on the brake pedal.



Brake system

- Air brakes use pressure from compressed air to increase braking force for both tractor and trailer
- Heavy vehicles require a more complex and powerful braking system than ordinary vehicles
- Detail on air brakes will be covered in the air brakes unit.

Tires and wheels

The next sections includes:

- Wheels
- Tires
- Wheel hub
- Wheel bearing
- Wheel rim
- Wheel fasteners

Tires and wheels



Wheel hub

- The hub is used to connect the wheel to the vehicle.

Wheel bearing

- Is a set of steel balls held together by a metal ring called a race. They help wheels spin with as little friction as possible



Tires and wheels



Wheel rim

- Is a single assembly used for mounting large tires on trucks and trailers.

Wheel fasteners

- A lug nut or wheel nut is a fastener, specifically a nut, used to secure a wheel on a vehicle.

Tires and wheels

Reading the sidewall



Coupling system

The next section includes:

- Fifth wheel
- Kingpin
- Pintle hitch
- Landing gear

Coupling system

Fifth wheel

- Is a coupling device that is mounted on the vehicle chassis and that consists of a skid plate, associated mounting brackets and latching mechanism that couples or connects to a kingpin located on the other vehicle or component, for the purpose of supporting and towing a semi-trailer.



Coupling system

Trailer kingpin

- Is usually a 2-inch high-strengthened steel pin that fits and locks into the jaws of the fifth wheel to couple the tractor to the trailer.



Coupling system

Pintle hitch

- Is a type of tow hitch that uses a ring-to-hook configuration for a more secure mount that's ideal for rougher terrain.



Coupling system



Landing gear

- Provides stationary support for the front of a trailer when it is not coupled to a tractor.