

# Industry Related - Tow Truck

## Tow Truck Classifications

Tow Truck Service, with regards to authorized towing fees, is determined by the type and size of the towed vehicle rather than the type and size of the tow truck performing the service.

Tow Vehicle Classifications are generally used when determining authorized fees. Most U.S. cars have a placard (sticker) with the gross vehicle weight rating (GVWR) to determine classification category.



A gross vehicle weight rating (GVWR) is the maximum allowable total weight of a road vehicle or trailer when loaded - i.e including the weight of the vehicle itself plus fuel, passengers, cargo, and trailer tongue weight.

The difference between gross weight and curb weight is the total passenger and cargo weight capacity of the vehicle. For example, a pickup truck with a curb weight of 4500 pounds might have a cargo capacity of 2000 pounds, meaning it can have a gross weight of 6500 pounds when fully loaded.

The GVWR is located typically either in the driver's side door or doorframe, owner's manual, or also may be present on another sticker immediately under the hood near the radiator, although

that sticker more typically contains information about the size of the motor, various fluid capacities, etc.

Most U.S. commercial trucks (especially semi-trailer trucks and dump trucks) are required by licensing authorities to have this information printed on the outside of the vehicle and for it to be clearly visible from a specified distance. Many do so by painting these numbers in a large font on the driver's side of the truck near or on the door.

For vehicles containing no fuel or driver, the gross weight is the sum of the tare weight (the unladen vehicle weight) and the weight of the load carried. For the measuring of loads picked up at a depot or materials yard (such as gravel or rock, or other bulk goods), the weight of the driver, fuel, and existing loads are assumed to be constant between the weighing of the vehicle upon entrance (tare) and laden (gross) upon exit. Such weights are determined by a specialized scale called a weigh bridge, and such scales will usually have a computing function within the display to compute tare weight.



### GVWR Restrictions

In the United States, two important GVWR limitations are 6,000 pounds and 8,500 pounds. Vehicles over 6,000 pounds are restricted from many city roadways (though there is some dispute about whether this restriction is for actual curb weight or GVWR), and vehicles over the 8,500 pound threshold are required to have insurance under Section 387.303 of the Motor Carrier Act of 1980.

### Classifications

Although Tow vehicle classifications vary, the type and size of the towed vehicle are generally characterized as:

- Light Duty



- Medium Duty
- Heavy Duty

For example, in Moreno Valley, California, "Light Duty" means any towed vehicle with a (GVWR) 10,000 pounds or less, "Medium Duty" means any towed vehicle with a (GVWR) between 10,001 and 26,000 pounds, and "Heavy Duty" means any towed vehicle with a (GVWR) or (GCWR) 26,001 pounds and greater.

## **Tow Truck Capabilities Based on Classifications**

Now that we have classified the vehicles being towed, let's talk about four classes of tow trucks. Once again, the GVWR may vary depending upon the state in which you operate, however the lift capabilities are similar based on the size rating.

1. Light Duty. A tow truck with a manufacturer's gross vehicle weight rating (GVWR) of 10,000 to 19,500 pounds with wheel lift capability, and may have a car carrier. A tow truck company who has a car carrier may be exempted from the wheel lift capability requirements. However, the car carrier must be an additional unit.
2. Medium Duty. A tow truck with a manufacturer's gross vehicle weight rating (GVWR) of 19,501 to 33,000 pounds. The truck is capable of providing air to the towed vehicle's brakes. A tow truck company may also have a car carrier. However, the car carrier must be an additional unit.
3. Heavy Duty. A tow truck with a manufacturer's gross vehicle weight rating (GVWR) of at least 33,000 pounds. The truck is equipped with air brakes and must be capable of providing air to the towed vehicle's brakes.
4. Super Heavy Duty. A tow truck with a manufacturer's gross vehicle weight rating of at least 50,000 pounds. The truck is equipped with air brakes and must be capable of providing air to the towed vehicle's brakes.

## **Vehicle Recovery**

Vehicle recovery is the recovery of any vehicle to another place, generally speaking with a commercial vehicle known as a *recovery vehicle*, tow truck or spectacle lift.

Recovery can take the form of general recovery, normally of broken down vehicles, or a Statutory Recovery at the request of the police using police powers.

## History

Motor vehicles have been breaking down ever since they were invented and if a repair was not possible, then a recovery or tow was usually required. In early days, this was often achieved by attaching a horse to the casualty and pulling it home. Many of the first automobile repair shops had been bicycle repairers or blacksmiths, and they quickly adapted to recovering their customers' disabled vehicles. To do this specialized recovery, vehicles were often built. As automobiles have grown more sophisticated, it has become much harder for the average vehicle owner to diagnose a fault, much less repair it. Fortunately, around the world a huge and specialized vehicle recovery industry has been created to serve and support them.



American recovery operators were created to serve the needs of their own customers. Most purchased or built their equipment to tow work into their auto repair shops. Ernest Holmes, one of the oldest suppliers of recovery equipment, used a line in his advertisements that said "*The big profit jobs don't drive in, they are towed in.*"

## Recovery Equipment

Modern recovery equipment is extremely sophisticated and manufactured in quantity throughout the world. However up until the mid-seventies a large proportion of the equipment in use was homemade, often just consisting of a ridged jib and a simple block and tackle. After both World

Wars, a number of army surplus vehicles were purchased cheaply by operators and converted to civilian use. This was especially true for recovering trucks and other commercial vehicles.

In 1918 Ernest Holmes of Chattanooga patented the first American commercially successful vehicle recovery crane, and its modern descendants have changed little since. Around the same time, recovery cranes were being produced by Weaver Manufacturing and Manley. In Europe Harvey Frost Ltd of Great Portland Street, London, started selling



recovery cranes made by Ernest Lake, from around 1905. The first major change to these crane designs would take another fifty years and came surprisingly from Sweden. Olaf Ekengard designed and marketed under the name EKA, a crane that lifted from underneath the casualty. Nearly all lift and tow vehicles today use variations of his revolutionary idea, and traditional cranes are kept for specialist work.

## **A Typical Assortment of Recovery Vehicles**

A typical modern recovery fleet will operate a great diversity of different types of recovery and support vehicles. This will include basic service vans, mobile workshops, lift and tow vehicles often called tow trucks, transporters and trailers. It is not uncommon for them to also operate mobile cranes, road going forklifts, articulated tractor units and incident support vehicles.

In some locations they may also operate off-road vehicles and even boats. All will have specialized vehicle body styles, to best achieve the job they were designed to do.

The types of recovery they can achieve can be divided into five main areas:

### **Soft Tow**

Used for very short distances where a rope, chain, or a length of webbing is attached to the casualty, which must have a working braking system as it will be used to slow both vehicles. This can be dangerous, unless both drivers are competent enough to do it. Although many people believe this is illegal on motorways it is not in Europe, as long as the relevant trailer laws are complied with, i.e., correctly configured lights and signing, observing trailer speed limits, etc.



### **Ridged (or Bar) Tow**

Used for very short distances where a solid metal bar is attached to the casualty. Used mainly with commercial vehicles, which often have a towing eye in the front bumper. In the case of cars and light vans the towing vehicle can be used for braking, if the bar is kept straight. With commercial vehicles, it is common to connect an air feed to the casualty to allow the tow vehicle's brakes to also operate the casualty's.

### **Lift Tow (Suspend Tow Crane)**

Now rarely used, but for many years the only way to move a disabled vehicle without using a low loader or trailer. Chains were attached, usually around the casualty's suspension, and some form of packing (often a seat squab or tire) was inserted between the lifting frame and the casualty. This frame was lifted by means of a pulley until the casualty's wheels were clear of the ground. An 'A' frame was normally used to keep the casualty from running into the tow vehicle on braking.

### **Lift Tow (Underlift)**

The lift tow is the most common modern method for short distance transportation. The casualty is winched onto a lifting grid and then raised by lifting the grid, with the casualty's tires strapped to the grid. The grid is shaped like a large pair of spectacles, which accounts for the common

name of this type of vehicle, the speclift or spectacle lift. With commercial vehicles, it is more common to use a set of lifting forks to attach to the suspension, axle or chassis of the casualty. In many cases, e.g., with automatics, it is the 'driven' wheels that need to be lifted. This will sometimes result in a rear lift, if the driven wheels are at the rear. In this case the casualty's steering *must be locked* in the straight ahead position.

The image on the right is interesting, in that it shows a 'speclift' that has been modified to do a standard chain lift as well. This is useful when the casualty will not fit into the speclift's frame, as in this case. You may also note that the rear is being lifted, as it clearly will not tow on a front lift (click the image to enlarge it).

### **Transportation (Total Lift)**

Total Lift is the preferred way to travel any distance. Usually the vehicles are purpose-built low-loading 'Transporters' although trailers are still used, especially for the movement of coaches and buses. Some transporter designs are very sophisticated,



with bodies that 'demount' to give a low loading angle. This is especially useful for sports cars, etc., with low ground clearance. There are also transporters with totally enclosed bodies, used for example for the transportation of prestige vehicles, or vehicles involved in crime that are going for forensic analyses. In cities, it is common to see the type of transporter fitted with a cradle to totally suspend a vehicle for loading. These are often used to move illegally parked vehicles.

### **Variations of the Those Previously Mentioned**

For a long while, it was common to use 'dollies' to recover vehicles. These were cranes and underlifts, but mounted on a two-wheeled axle. They were designed to be towed behind a suitable towing vehicle. Another portable device was a crane, which clipped on to an articulated

tractor unit's fifth wheel coupling. Popular in the seventies and eighties, they were cheap to buy (compared with a purpose-built recovery vehicle) and appealed to fleet operators, who could use them to recover their own vehicles. Total lift dollies were carried by some spectacle lifts to place under the wheels at the opposite end to the lifted wheels, thereby converting the half lift into a total lift. These are used, for example, when a vehicle has had an accident and both ends are damaged.

### Other Equipment

Modern recovery vehicles come with a wide range of accessories. These include power units to supply



air for power tools or pumping off vehicle breaking systems, etc. Generators supply 110 or 220 volt mains power for floodlighting, tools, etc. There are different shaped forks for attaching to lift points, or for modifying standard lifting devices to allow them to transport motorbikes. Most vehicles will be equipped with an assortment of lifting strops or chains and webbing to secure loads. A special form of webbing called a snatch strap is sometimes carried to assist with vehicles that are bogged down in mud, etc.

Nearly all vehicles will be fitted with 12 or 24 volt 'jump start' or 'booster' sockets to start other vehicles with discharged batteries. Most will also have power winches to load the casualty, or for dislodging stuck vehicles. Some larger recovery vehicles will have two (or more) winches capable of pulling up to 30 tons per line. These will be used to winch back vehicles that have left the roadway.

Some vehicles are fitted with luxurious multi-seat passenger compartments called crewcabs. These often have DVD players



and even drink machines, for the benefit of the casualty's occupants on their trip home. Different types of rotatable cranes are sometimes fitted for lifting vehicles out of ditches, etc. Heavy lifting

cranes are sometimes fitted and can be used for example to winch overturned vehicles back on their wheels.

Some recovery vehicles are equipped as mobile workshops or service vans. They will carry a large selection of tools, spares and garage equipment, such as jacks and vehicle stands. In recent years many have also been equipped with spectacle lifts that fold away inside the rear doors. The advantage of this system is if the vehicle is not repairable, it can still be recovered without sending a second vehicle.

'Righting' an overturned vehicle, especially one that is not badly damaged, has become a science. When a commercial vehicle ends up on its side there will often be little clearance to slide lifting straps underneath it. Even if this can be done, the use of straps can cause further damage and are often not the right way to start a lift. To solve this problem, recovery operators often use air bags to at least start the lift of the casualty. A number of bags can be used and this spreads the load throughout the length of the vehicle. Only a low pressure is used, which means in the event a bag is punctured, it just gently deflates and does not explode. Once the casualty is above 45 degrees, a normal winch can be used to finish the job.

It is not uncommon to use a second winch from the opposite side, to gently lower the casualty once it has passed the point of balance. It is also quite common for recovery operators to be asked to move 'other' items, such as aircraft or boats.

## **Communications**

In the early days of vehicle recovery, the driver of an automobile would have to contact a local garage in some way when the vehicle failed. Telephones were supplied for this purpose by some motoring organizations, and eventually the agencies responsible for the major roads networks would install them on some hard shoulders.

Most recovery operators have invested in information technology. Most have job logging software and many have installed in-vehicle communication devices and



GPS tracking devices. The distribution of work to the fleet is a very skillful job and the person doing it is often under intense strain. They are known as dispatchers. Because operators are expected to take calls 24 hours a day, some smaller ones pass their telephones to message services after hours.

## **Towing Guidelines**

### **Pintle Hooks**

Operators are responsible to check the condition of the pintle hook before any piece of equipment is towed. If a defect or suspected defect is found, the pintle hook must not be used until inspected by a mechanic, and repaired or replaced as necessary.

Operators are responsible for periodic preventive maintenance of pintle hooks, which includes inspection and proper lubrication. If the hook does not have a grease fitting, it should be lubricated with a commercial lubricant. Road dirt and other buildup of material must be removed routinely.

Rusted, 'frozen', or broken pintle hooks must be repaired by a mechanic. Heat must not be applied to a pintle hook to 'free it up', nor should the pintle hook be struck by a sledge or other tool.

### **Safety Chains**

Safety chains are required on all vehicles used to pull equipment or a trailer. Their condition should be checked carefully each time before use.

Safety chains are intended to keep the towing and towed vehicles together and control the direction of travel of the towed vehicle in the event of a coupling device failure. Safety chains must be short enough to keep the drawbar from contacting the ground, and be



connected in such a manner so that they cross beneath the tongue of the towed vehicle. If the towed vehicle becomes disconnected, the chains will support the tongue and drawbar, and allow for a safe stop.

Safety chains must be no longer than necessary to provide enough slack for turning. They must never drag on the ground. Crossing the safety chains also provides directional control to the towed vehicle.

The attachment points on the towing and towed vehicles should be as close to the frame width as possible. This will cause the safety chain on the right side of the towing vehicle to pull the towed equipment to the right, while the left side will pull the towed equipment to the left. This balance will result in proper tracking and better control of the towed equipment when stopping. Attaching the chains near the center allows considerable off-tracking and severe lateral movement, which can result in safety chain failure or striking oncoming vehicles. There should be a swivel on the pintle hook or on the ring, but never on both.

Utilizing safety chains of proper size and condition are the most important factors in safe vehicle operation. This equipment must have the ultimate strength of the gross weight of the towed vehicle. When attaching safety chains to the towed vehicle, the attaching device (hook) must be as strong as or stronger than the chain.

A hinged tongue is not an integral part of the trailer. Consequently, if the towed vehicle has a hinged tongue drawbar, the safety chain cannot be attached to the drawbar. It must be attached to the frame.

## **Welding Repairs**

Holland pintle hooks, drawbars, and couplers are made from quenched and tempered alloy steel. Welding to either repair a broken part or build up a worn surface is prohibited. Such weld repairs can reduce the strength of the device, cause metal fatigue, and ultimately cause equipment failure.

## **Inspection and Replacement**

All coupling devices and safety chains must be regularly inspected. Additional inspection must be conducted immediately upon binding of the drawbar during backing, jackknifing, or if bottoming of articulation or oscillation occurs.

Immediate replacement is required if cracks or excessive wear is detected.

### **Towing Speed**

Prudent speed must be observed at all times to avoid excessive sway of towed equipment. Operators must adhere to instructions in the operator manual regarding safe towing speeds. Road and weather conditions will also determine safe speed.

### **Weight Distribution**

Negative tongue pressure from the drawbar of the towed equipment will cause undue stress on the top of the pintle hook. Up and down motion of the drawbar could cause the upper portion of the pintle hook to fail or fracture. Weight of the towed equipment must be distributed so that downpressure is applied to the pintle hook. For example, load distribution on a trailer should create slight downpressure of the drawbar on the pintle hook. The balance of towed equipment should not be upset by storing tools or supplies in the rear of the towed object, or on the rear of the trailer.

