

# Workplace Health and Safety Bulletin



## Installation of Vehicle Suspension Lift Ends in Injury to Mechanic

### Vehicle suspension lifts

A vehicle suspension lift is a modification, often done by off-road enthusiasts, to raise the ride height of their vehicle. Suspension lifts allow vehicles to perform steeper ascents, descents and travel over higher breakover angles, provide higher ground clearance and help accommodate larger rims and tires.

The popularity of vehicle suspension lifts is encouraging many tire shops and automotive repair businesses to expand their business for the installation of vehicle suspension lift kits. This presents a potential worker safety issue as many businesses do not have the necessary specialized equipment to hold the body of the vehicle stable as the suspension is being modified. The vehicle body is usually separated from the vehicle's axle assembly while the vehicle is up on a vehicle hoist platform. This presents a potential safety hazard as described in this Bulletin.

### Incident description

Due to increasing requests from customers, the manager of a tire shop decided to expand his business by installing suspension lift kits. One of the shop mechanics had some previous experience installing such kits.

On this particular day, the mechanic had successfully installed a lift kit on the first vehicle and a second vehicle was having a suspension lift kit installed. This vehicle had been driven up onto a hoist platform and the hoist raised approximately 1.2 m. Blocks above the axle and extended shock absorbers had been installed on the rear suspension (see photographs). Disassembly of the vehicle's front suspension and steering assembly was started.

To raise the body of the vehicle high enough, a scissor-lift axle hoist was used. This hoist travels on a track parallel with the length of the vehicle body and in the centre of the platform that holds the tires and frame of the vehicle being modified (see photographs).

The scissor-lift axle hoist did not have enough height capacity to raise the vehicle's body to the desired height so the mechanic improvised by placing two manually operated hydraulic jacks on top of the scissor-lift axle hoist. The vehicle's parking brake was not functioning so the mechanic placed rubber chocks in front of and behind the passenger side front tire.

While the undercarriage components were being disassembled, the vehicle moved backwards on the hoist platform. The scissor-lift axle hoist rolled forward, allowing the two manually operated hydraulic jacks to fall off the scissor-lift axle hoist. The vehicle's body fell down, striking the mechanic who was underneath the vehicle, directly on the head. He was taken by ambulance to a local hospital with undetermined head and spinal injuries.

## Contributing factors

Follow-up by Alberta Employment and Immigration, Workplace Health and Safety Compliance Investigators determined that the following factors contributed to the incident:

- The vehicle was not properly secured while elevated on the vehicle hoist platform – it was able to roll backward or forward. One set of chocks was not adequate and the vehicle's parking brake was not functional.
- The scissor-lift axle hoist was not secured against movement on the tracks and the manually operated hydraulic jacks were not secured to the scissor-lift axle hoist.
- The mechanic was not wearing a mechanic's bump cap for head protection.
- A written hazard assessment had not been completed for the task of installing suspension lift kits.
- The vehicle hoist was not designed to perform a secondary lift in a safe manner i.e. lift and hold the body of the vehicle above the disconnected axle and frame assembly in a secure manner.

## Recommendations

- Before a new work process starts, a hazard assessment must be carried out and the identified hazards eliminated or controlled. (Occupational Health and Safety (OHS) Code, section 7, “Hazard assessment”)
- A worker must not be under a suspended load unless the load is supported by stands or blocks, other than jacks, that are designed, constructed and maintained to support the load and placed on firm foundations. (OHS Code, section 113, “Safe use of vehicle hoists”)
- Vehicles and equipment must not be in a suspended position unless properly immobilized or secured against accidental movement. (OHS Code, section 369, “Immobilizing machinery”)
- Mechanics are required to at least wear a bump cap if there is a chance of their head striking a stationary object. (OHS Code, sections 234 and 238, “Industrial headwear, Bump hat”)
- Proper equipment must be chosen to complete the task in a safe manner. The equipment must perform the function for which it was designed. (OHS Regulation, section 12, “Equipment”)

## Conclusion

Vehicle hoist manufacturers make equipment that is designed to safely lift and secure portions of a vehicle that are raised above a vehicle hoist platform. Employers that intend on installing suspension lift kits must use proper lifting equipment to prevent a similar incident from occurring. Employers should contact the manufacturer of their lift equipment to get the most appropriate, compatible lift accessory.

## Photograph Summary



The rear suspension has the lift kit installed. The body of the vehicle is sitting higher. See Photograph Number 2 for a view of the lift kit components.

This is the vehicle hoist platform

### Photograph Number 1

Shows how the vehicle was situated on the vehicle hoist platform. This vehicle has had the suspension lift kit installed on the rear axle.



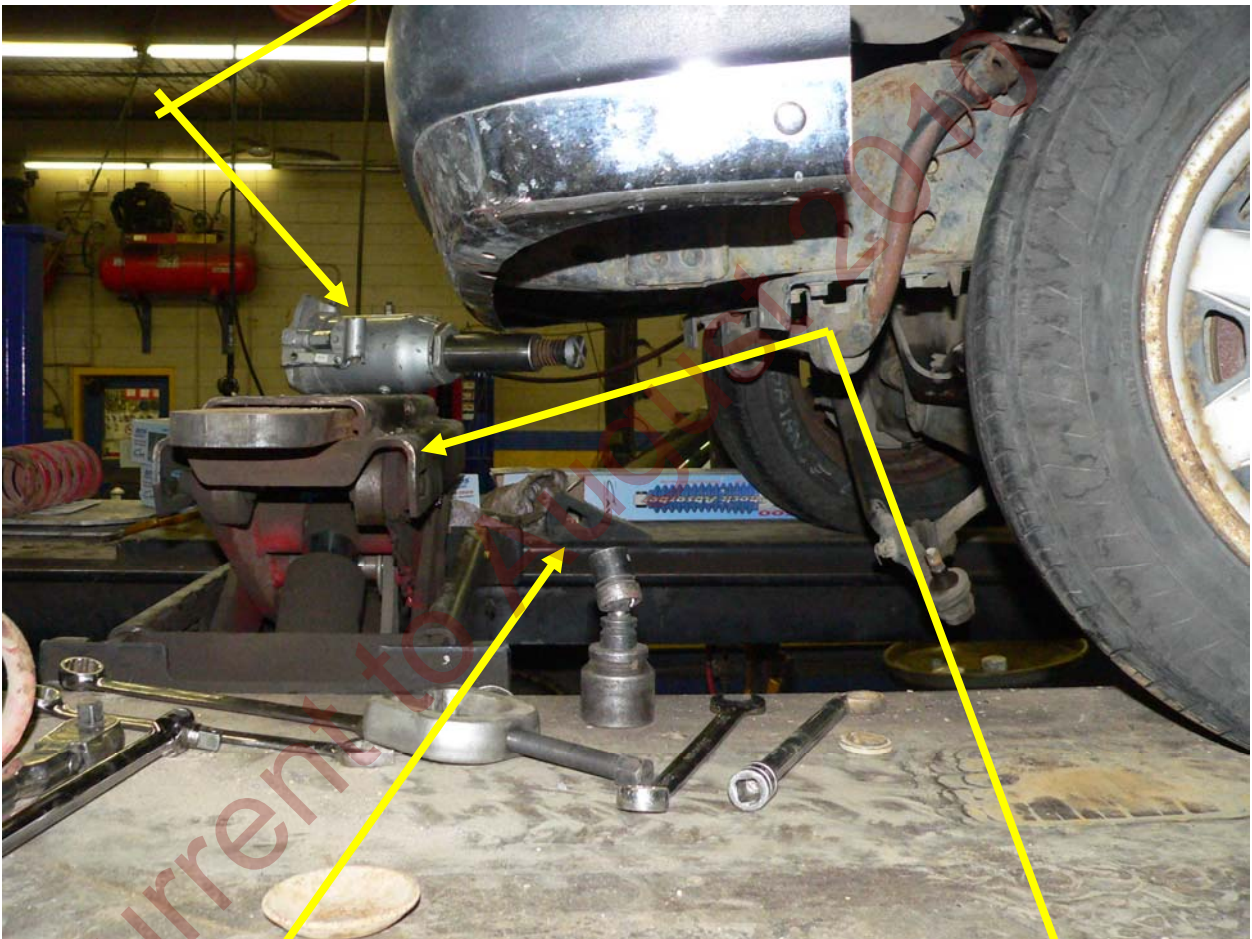
This is a new, longer shock absorber to accommodate the additional vehicle height.

These blocks have been added between the rear leaf springs and the axle assembly to give added height to the body of the vehicle.

**Photograph Number 2**

Shows how the installation of the suspension lift kit appears from a view of the rear of the vehicle while it is in the air.

This is one of the manually operated hydraulic jacks lying on top of the scissor-lift axle hoist. This jack, along with the one on the near side, was standing upright holding the body of the vehicle up in the air. The length of the jack gives some idea of how high the vehicle body was elevated before the fall.



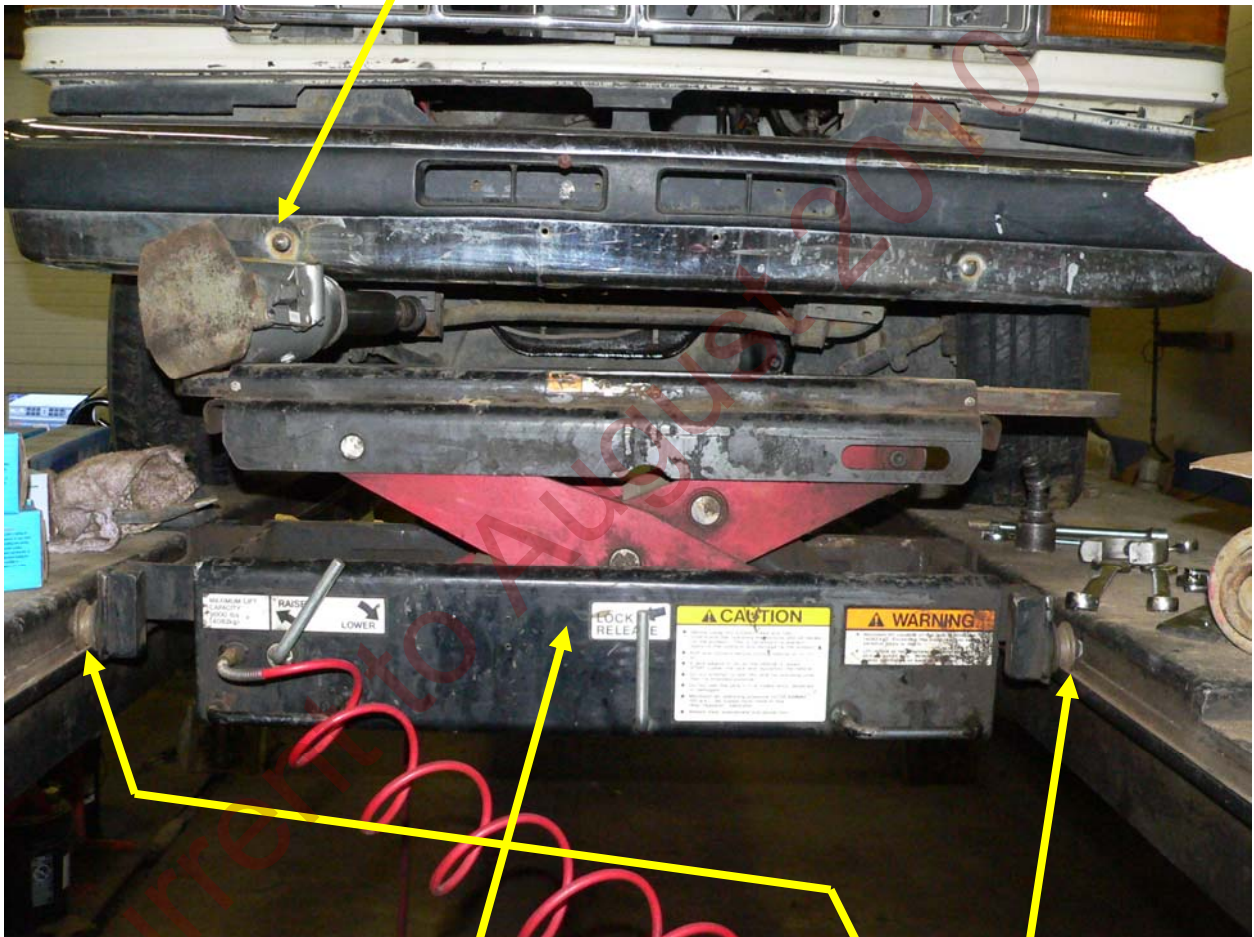
A rubber chock is visible where the front tire of the vehicle was located before it moved backwards.

This is a side view of the scissor-lift axle hoist. See Photograph Number 4 for the front view.

### Photograph Number 3

Shows a driver's-side view of the front of the vehicle as it was after the incident. The body of the vehicle had been raised approximately one third of a metre above the top of the scissor-lift axle jack by the manually operated hydraulic jack that is shown lying on its side. A second jack on the near side of the vehicle frame has fallen to the floor.

This is the manually operated hydraulic jack lying on its side on top of the scissor-lift axle hoist.



This is the scissor-lift axle hoist that travels on a track along the centre of the vehicle hoist platform.


These are the rollers on each side of the scissor-lift axle hoist. There is no locking mechanism to secure this equipment in place.


**Photograph Number 4** Shows a front view of the vehicle receiving the suspension lift kit and a front view of the scissor-lift axle hoist.


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