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## Author & Automotive Expert James D. Halderman

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Where's Jim?

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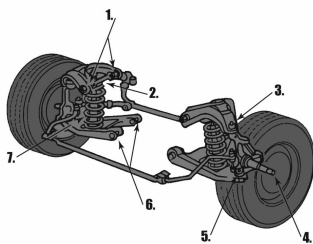
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Name: \_\_\_\_\_

A4 Part ID Worksheet  
Independent Front Suspension - RWD



- |          |          |
|----------|----------|
| 1. _____ | 5. _____ |
| 2. _____ | 6. _____ |
| 3. _____ | 7. _____ |
| 4. _____ |          |

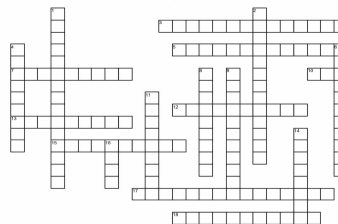
Due to the Coronavirus, all events have been canceled and I have no travel plans planned for the rest of the year.

Keep up with me at:  
[www.jameshalderman.com](http://www.jameshalderman.com)  
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### Puzzle of the month

Find this month's puzzle of the month at this [link](#) and test your students knowledge on suspensions.

Front Suspension And Service  
Chapter 8



**ACROSS**

- A \_\_\_\_\_ suspension uses two control arms as well as a structural steel assembly.
- Defective shock absorbers can cause \_\_\_\_\_.
- To control longitudinal support, a \_\_\_\_\_ is attached to each beam and is anchored to the frame of the truck using rubber bushings.
- The two main types of a \_\_\_\_\_ suspension use the upper control arm and the lower control arm.
- Leading the \_\_\_\_\_ on the lower control arm is the most common SLA-type suspension configuration.
- A \_\_\_\_\_ front suspension was used for over 20 years on Ford pickup trucks and vans.
- Many GM front-wheel-drive vehicles use a MacPherson strut with a large diameter spring seat area. This is called a \_\_\_\_\_.
- A \_\_\_\_\_ can be of several types, including a MacPherson \_\_\_\_\_.
- A \_\_\_\_\_ can also be used to help locate worn or defective suspension components.

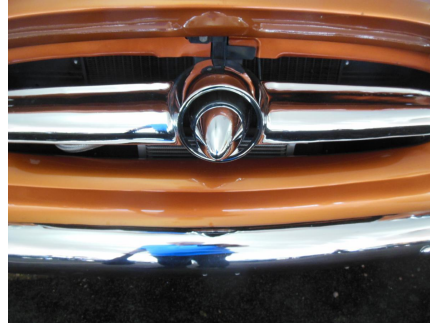
**DOWN**

- Early versions of the twin I-beam systems used "negative" shock absorbers used ball joints to support the \_\_\_\_\_ and axles.
- Many load-carrying ball joints have wear indicators with a raised area around the grease fitting, called a \_\_\_\_\_.
- Some replacement control arm bushings have a higher \_\_\_\_\_ spring than the original.
- Another name for a strut rod is \_\_\_\_\_.
- A \_\_\_\_\_ front suspension is very strong and is still being used in the manufacture of medium and heavy trucks.
- Short-throw arm suspensions use longitudinal \_\_\_\_\_ especially in trucks.
- Some ball joint studs have a slot or groove where a \_\_\_\_\_ is used to hold the ball joint to the steering knuckle.
- At the end of many solid beam or tub axles are \_\_\_\_\_ that allow the front wheels to steer for steering.
- Another name for an SLA suspension is the \_\_\_\_\_ suspension.

information to my assistant, Glen Plants at glen@jameshalderman.com.

## Auto Trivia

- The car shown is a \_\_\_\_\_
- a. 1952 Studebaker
  - b. 1956 Nash Metropolitan
  - c. 1950 Ford
  - d. 1952 Hudson Hornet



*\*Answer at the bottom*

## FAQ

### Why Is a Grease Fitting Sometimes Called a Zerk Fitting?

In 1922, the zerk fitting was developed by Oscar U. Zerk, an employee of the Alemite Corporation, a manufacturer of pressure lubrication equipment. A zerk or grease fitting is also known as an Alemite fitting.

### Sample ASE certification-type question

- A “dry park” test to determine the condition of the steering components and joints should be performed with the vehicle \_\_\_\_\_.
- a. On level ground
  - b. On turn plates that allow the front wheels to move
  - c. On a frame contact lift with the wheels off the ground
  - d. Lifted off the ground about 2 inches (5 cm)

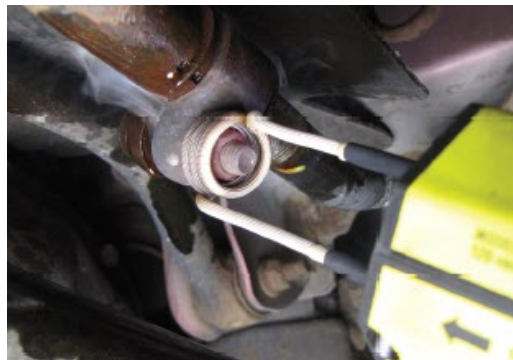
#### Answer/Explanation

**The correct answer is a.** The vehicle must be on level ground when conducting a dry park test; with the vehicle weight on the front wheels, resistance is applied to the steering linkage. Answers b, c, and d are not correct because these methods will allow the front wheels to move and not apply a load on the steering linkage.

## Tech Tip

### Inductive Heating Tool

Fasteners are often rusted and difficult to remove especially those that are part of the steering system where they are exposed to road moisture, dirt, and debris. A heating tool, such as the Mini-Ductor, which uses electrical induction to heat a coil at the tip, is the tool that many experts recommend to use when heating of a fastener is needed. Using this tool allows a technician to heat a part quickly without the hazard of using an open flame.



## Case Study

### The Vibrating Ford Van

A technician was asked to solve a vibration problem on a rear-wheel-drive Ford van. During a test-drive, the vibration was felt everywhere—the dash, the steering wheel, the front seat, the shoulder belts; everything was vibrating! The technician balanced all four tires on a computer balancer. Even though wheel weights were put on all four wheels and tires, the vibration was even worse than before. The technician rebalanced all four wheels time after time, but the vibration was still present. The shop supervisor took over the job of solving the mystery of the vibrating van. The supervisor balanced one wheel/tire assembly and tested it again after installing the weights. The balance was way off! The supervisor broke the tire down and found about 1 quart (1 liter) of liquid in each tire! No wonder the tires could not be balanced! Every time the tire stopped, the liquid would settle in another location. The customer later admitted to using a tire stop-leak liquid in all four tires. Besides stop leak, another common source of liquid in tires is water that accumulates in the storage tank of air compressors, which often gets pumped into tires when air is being added. All air compressor storage tanks should be drained of water regularly to prevent this from happening.



#### Summary:

- **Complaint**—Customer complained of a vibration.
- **Cause**—The technician found stop leak liquid in all four tires.
- **Correction**—The stop leak was removed from all the tires and they were rebalanced. The vibration issue was corrected.

**CAUTION:** Stop leak should never be used in a tire that is equipped with the TPMS sensor because the sensor can be damaged.

## Straight Talk

### Reader Asks About High-Performance Tuners

*From the March 27 Wheels Section of the Dayton Daily News*

#### Wheels:

*Jeff T. writes via email:*

*“Regarding performance chips. Do they actually improve mpg and performance? Do they void the warranty? For \$50 to \$300.... are they worth it? A plug-in module for less than \$100 that claims 10-15% gain in hp seems attractive.”*

#### Halderman:

There are many aftermarket programmers or “tuners” available in the marketplace today. Some like the lower cost units, simply plug into the engine coolant temperature (ECT) sensor to change the signal back to the engine controller to indicate that engine is colder than it is. When the engine is cold, the powertrain control module (PCM) commands a richer air-fuel mixture.



This richer mixture usually results in an increase in power at the expense of reduced fuel economy.

Another “trick” used by some lower cost devices is to “fool” the electronic throttle control (ETC) system by changing the curve of the accelerator pedal position (APP) sensor to make the engine more sensitive. This makes the engine appear to have more power and greater responsiveness.

Most commercially available tuners are used to reprogram the parameters inside the PCM to make the engine more responsive and often do increase power and torque and maybe, although seldom, in my opinion, improve fuel economy. I attended a plant tour and afterwards this question was brought up to the engineers at the engine plant. They said that yes, the tuners do and can increase torque and power but that they take the engine “out of compliance”. They said they wish they could do what the tuners are doing and then repeated many times that the changes made take the engine out of compliance. These programs do not meet the EPA/CARB requirements and are therefore illegal for on- or off-road use.

*Have an automotive question? Get a straight answer by writing to Jim at [jim@jameshalderman.com](mailto:jim@jameshalderman.com)*



**Answer To This Month's Trivia:  
B. 1956 Nash Metropolitan**

Contact Us

