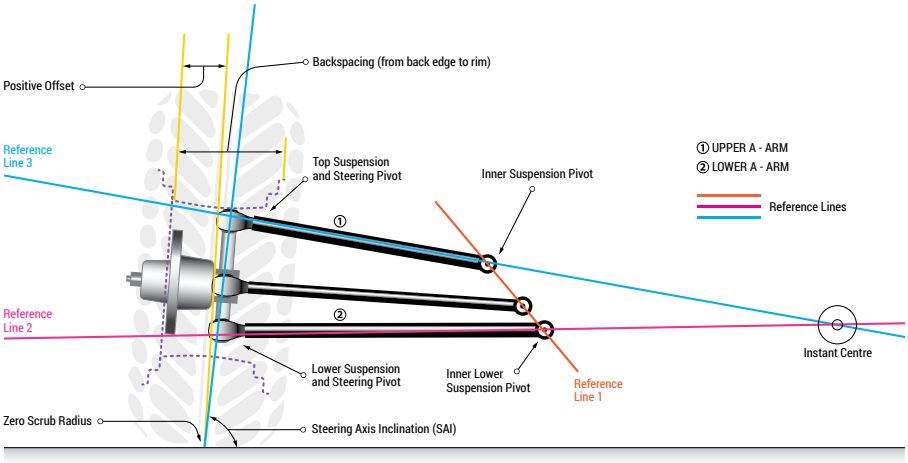
WHAT YOU NEED TO KNOW:
THE IMPACTS OF AGED, OVERLOADED AND MODIFIED SUSPENSIONS

The vehicle that comes into your shop is not in the same condition as when it rolled off the assembly line. Here is what you need to know for a successful inspection and repair.

SUSPENSION GEOMETRY

- Suspension geometry refers to the geometric arrangement of the parts of a suspension system and the value of the lengths and angles within it.
- Correct suspension geometry values are set during vehicle design, to ensure that pivot points such as ball joints and bushings are properly positioned.
- Changes to these pivot points can both alter a vehicle's road performance and put extra unwanted loading forces on components, reducing service life.



THE IMPORTANCE OF RIDE HEIGHT

- Ride or curb height is one of the key indicators of correct suspension geometry and is often overlooked during inspections, repairs and while performing an alignment.
- Suspension components must be replaced at a vehicle's correct preloaded ride height to prevent premature failure.
- A vehicle must be at the correct ride height before performing an alignment, to ensure correct camber and toe values.
- Always reference a vehicle's factory service manual to determine the proper method of measuring ride height.

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AGED VEHICLES

Typically, an aged vehicle is older (7+ years) with higher mileage. Aged vehicles with low mileage also exist and should be inspected just as thoroughly, since suspension components are impacted by seasonal temperature changes, road debris and normal material degradation.

WHAT TO LOOK FOR:

- ☐ Sagging or broken springs
- ☐ Worn, seized, leaking shock absorbers/ struts/strut mounts
- ☐ Degraded, torn, leaking bushings
- ☐ Degraded, torn, leaking boots (ball joint, CV)
- ☐ Uneven tire wear and/or improperly (under/over) inflated tires
- ☐ Warped, damaged, out of spec components (subframe, control arms, knuckles, wheel rims)

OVERLOADED VEHICLES

Generally, an overloaded vehicle is one where loads are consistently at or exceed a vehicle's GVWR. Usually these are working vehicles (tow, trailer, delivery). Overloaded vehicles may present a challenge for diagnosis, as issues may not be readily apparent in the shop in an unloaded condition.

WHAT TO LOOK FOR:

- ☐ A warped frame or chassis due to excessive overloading
- ☐ Sagging and or broken springs/shackles
- ☐ Worn, seized, leaking shock absorbers/struts/ strut mounts
- ☐ Degraded, torn, leaking bushings
- ☐ Uneven tire wear. Excessive rear loads can alter caster, camber and toe (squat)
- ☐ Early and/or premature failure of brake, drive-train, powertrain and suspension components due to operating above design spec and under constant additional stress forces

MODIFIED SUSPENSIONS

A suspension may be considered modified if a vehicle's ride height has been lowered or increased from the original factory specification. This may be done for performance or appearance reasons.

WHAT TO LOOK FOR:

- ☐ Damage to components with low ground clearance (control arms, exhaust, oil pan)
- ☐ Worn, broken springs
- ☐ Worn, seized, leaking shock absorbers/ struts/strut mounts
- ☐ Degraded, torn, leaking bushings
- ☐ Degraded, torn, leaking boots (ball joint, CV)
- ☐ Uneven tire wear
- ☐ Difficult to hold alignment
- ☐ Rapid wear of wheel bearings and steering components

The above conditions impact a vehicle's suspension dynamics. When suspension geometry and ride height are altered, additional stress and loading forces are put onto suspension components. Premature and frequent failure of replacement parts may occur, and achieving and maintaining correct alignment may be difficult. It is important to comprehensively assess for these conditions when inspecting, repairing or aligning a vehicle.

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