Vehicle Servicing and Repairing Level II

Learning Guide-#10

Unit of Competence: - Carry out Wheel Alignment

Module Title: Carrying out Wheel Alignment

LG Code: EIS VSR2 M07 LO2-LG-36

TTLM Code: EIS VSR2 M10 TTLM 0919v1

LO2: Perform vehicle wheel alignment

Instruction Sheet 2	Perform vehicle wheel alignment

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

2.1 **Access and interpret correct information**

2.2 **Wheel alignment measuring equipment**

2.2.1 2D-Wheel alignment

2.2.2 3D-Wheel alignment

2.2.3 Structure of device

2.2.4 Computer

2.3 **Complete wheel alignment**

2.4 **Carry out corrective adjustment/repairs**

2.5 **Test vehicle/equipment**

2.6 **Carry out wheel alignment test and adjustment**

2.7 **Notify customer major problem(s) prior to rework being**

2.8 **Complete workplace documentation**

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon** completion of this Learning Guide, you will be able to:

- **Carry out wheel alignment pre-checks**
- **Perform vehicle wheel alignment**
- **Complete documentation an1d service history documents**
- **Clean-up work area and maintain equipment**

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3 Sheet 4,sheet 5,sheet,6 sheet,7 and 8,sheet . and
4. Accomplish the "Self-check 1, Self-check t 2, Self-check 3 and Self-check 4,self check 5,self check 6,self check 7,self check 8,self check **in page -4, 18, 22,26, 31, 35,37 and 14** respectively.
5. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1, Operation Sheet 2 and Operation Sheet 4 **in page55**
6. Do the "LAP test" **in page – 55** (if you are ready).

Information Sheet-1	Access and interpret correct information

2.1. Accessing and interpreting Information

Wheel alignment technology advances continuously with the introduction of new makes and models of vehicles, engines, transmissions/ transaxles, steering and electronic suspensions.
An alignment essentially requires squaring a car's wheels and axles with each other so that they're moving in the same direction. The mechanic adjusts the various suspension angles -- known as toe, thrust, camber and caster -- that influence tire movement and position
Does Coverage is for 36 months or 36,000 miles, whichever occurs first, with the exception of wheel alignment and wheel balancing, which are covered for 12 months or 12,000 miles, whichever occurs first.

Two wheel alignments are quickly becoming obsolete and four wheel alignments are rapidly being incorporated on many of the new models.

With the technology being incorporated in the newer vehicles, it's not just the front tires which steer the vehicle. Many manufacturers now use four wheel steering and complex electronic suspensions.

Specific procedures must be followed to ensure proper wheel alignment. On these newer, more sophisticated vehicles, an alignment technician can easily end up misaligning the wheels by not following the proper procedures.

With today's computerized vehicle systems, improperly aligned wheels can effect engine performance, ride, tire wear, steering and premature component failure. Wheel alignment is the proper adjustment of ALL the interrelated suspension angles. In alignment terminology, these adjustment angles are called caster, camber, toe-in, steering axis inclination (SAI), vehicle ride height and toe out on turns.

The method of checking wheel alignment will vary with the type of equipment being used.

Although the outcome of the alignment must be the same, it is important to follow the instructions furnished by the manufacturer. On most new vehicles, only camber and toe angles are mechanically adjustable.

Some technicians may encounter a vehicle that will not be able to achieve the specified angles. On these vehicles, a more thorough inspection of all the interrelated components must be done. Most of the time, replacing worn or even marginally worn parts will correct the out-of-specification vehicle.

Wheel alignment should never be performed on a vehicle with worn or defective chassis/suspension components.

The technician should consult with the vehicle owner on any particular problem before an attempt at wheel alignment is made. Talking with the owner first will help diagnose the problem area.

A thorough visual inspection of the vehicle should then be performed. Record visual signs of tire wear and any ride height imperfections to ensure these areas are corrected prior to alignment adjustments.

Test driving the vehicle as part of the diagnostic process is essential. Some vehicles may not need an alignment. Instead, the steering wheel may need to be centered or the suspension may need repaired. A test drive will be helpful in diagnosing a vehicle problem. Follow the pre-alignment procedure as a guide to ensure all areas are inspected before actual adjustments are made.

Self-Check 1	Written Test

1. What is the first tire repair procedure?

2. Explain the use of wheel alignment machine?

3. **Why is balancing my wheels important to my vehicle's performance?**

4 The mechanic adjusts the various suspension angles known as ------,-------,-----,AND---- that influence tire movement and position

Information Sheet-2	Wheel alignment measuring equipment

2.1 Wheel alignment measuring equipment

The ways car alignment is measured There are several ways that alignment (sometimes called 'tracking') is measured and corrected. These calculations are known as the caster, camber, toe and thrust: Caster: compares the steering axis to the vertical axis, when the car is viewed from the side. The system of measurement selected will depend on the type of equipment available. An incorrect toe setting is one of the main alignment factors that cause excessive tire wear. Front and rear toe are the same in definition, with the adjustment capabilities and procedures being the only actual difference. 2-wheel alignment is also known as a front-end alignment. As suggested in its name, the technician performs alignment on only the front wheels. This may include a camber, toe, and caster adjustment. ... Your car will typically require a 4-wheel alignment if it's an all-wheel-drive model with independent suspensions.

Toe is the difference between the leading edge (or front) and trailing edge (or rear) of the tires. Toe-in is the measurement in fractions of an inch, millimeters or decimal of degrees that the tires are closer together in the front than they are in the back. Toe-out is the same measurement, except the tires are further apart in the front than in the rear.

Some manufacturers measure the angular change from straight-ahead in degrees. Slight toe-in is preferred to toe-out on most vehicles because steering is aligned while the vehicle is stationary. When the vehicle is moving, linkage components flex causing a change in alignment angles. This is classified as “Running Toe.” Running toe should be zero to maximize tire life and achieve the least rolling resistance

- **2D-Wheel alignment**

  2D: the entry-level solution

  • Economical access to wheel alignment: also with CCD kits

  • Flexible: wheel alignment based on a mobile trolley – an option that can serve multiple measuring stations

  • Saves space: an especially good fit for small workshops

- **3D-Wheel alignment**

  wheel alignment with a functional plus: practical, quick, expandable

Fast and efficient wheel alignment thanks to 3D technology with 12 cameras:

• fully automatic testing procedure with Smart Test

• new intuitive user interface

• great repeatability of results – safety and competence when repeating measurements •

3D wheel alignment

3D wheel alignment

Shorter setup times as measurement panels and sensor heads can be more easily attached – no recalibration

• Rolling run out compensation without lifting the vehicle

• High mobility thanks to WLAN

• Existing hardware can be used (PC, tablet)

• working area in front of the vehicle cleared – use of headlight-adjustment devices and calibration sets for adjusting driver assistance systems possible

• designed for convenience in day-to-day workshop handling down to the smallest detail

New software with a functional plus: Simple and quick operation thanks to the new intuitive guided user interface (GUI) and automatic testing procedures (Smart Test

3D: the all-round solution

• Cost-effective: increases service quality, customer satisfaction and revenue

• Expandable: space for the adjustment of advanced driver assistance systems (ADAS) and headlight testing

• Practical: fixed installation at the wheel alignment station

• Mobile: wireless operation

• Efficient: fully automatic measuring process Quick measurement in just 90 seconds

Structure of device

Computer Alignment refers to an adjustment of a vehicle's suspension – the system that connects a vehicle to its wheels. It is not an adjustment of the tires or wheels themselves. The key to proper alignment is adjusting the angles of the tires which affect how they make contact with the road.

Reading recorder

- The single hole to the left represents the hole on the back of the recorder. When reading a fingering chart, you will find the holes are white, black or a combination of black and white. If the hole is black, your finger should press down and cover that hole. Also, in general, ensembles are quartets that perform with the four types of recorders; soprano, alto, tenor and bass.
- Why a recorder is called a recorder? The word "recorder" comes from the Latin "recorder," which combines "re" (again) and "cor" (heart). The meaning was to record something by going over it in the mind, in the sense of learning "by heart.. A recorder actually goes partially in your mouth, while

  transverse flute is held in a manner which requires you to blow air across the mouthpiece.

While it's often as an "alignment" or "wheel alignment," it's really complex suspension angles that are being measured and a variety of suspension components that are being adjusted. This makes an alignment an important suspension-tuning tool that greatly influences the operation of the vehicle's tires.

Out-of-alignment conditions occur when the suspension and steering systems are not operating at their desired angles.

Therefore, alignment should be checked whenever new tires or suspension components are installed, and any time unusual tire wear patterns appear. Alignment should also be checked after the vehicle has encountered a major road hazard or curb. Alignment is an important suspension-tuning tool that greatly influences the operation of the vehicle's tires...Incorrect alignment settings will usually result in more rapid tire wear."

Front-End, Thrust Angle and Four-Wheel Alignment

The different types of alignments offered today are front-end, thrust angle, and four-wheel. During a front-end alignment, only the front axle's angles are measured and adjusted. Front-end alignments are fine for some vehicles featuring a solid rear axle, but confirming that the front tires are positioned directly in front of the rear tires is also important.

Thrust angle alignments also identify vehicles that would "dog track" going down the road with the rear end offset from the front. If the thrust angle isn't zero on many solid rear axle vehicles, a trip to a frame straightening shop is required to return the rear axle to its original location.

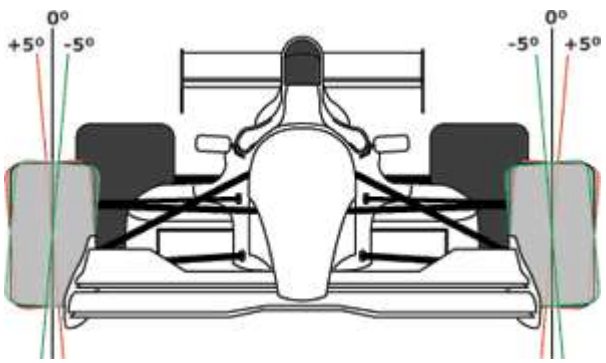
On all vehicles with four-wheel independent suspensions, or front-wheel drive vehicles with adjustable rear suspensions, the appropriate alignment is a four-wheel alignment. This procedure "squares" the vehicle like a thrust angle alignment, and also includes measuring and adjusting the rear axle angles as well as the front.

When aligning a vehicle, it's appropriate for the vehicle to be carrying its "typical" load. This is important for drivers who continuously carry loads in their vehicles, such as sales representatives with samples or literature in the trunk. Additionally, when a vehicle is used for autocross or track events, some racers will sit in their car, or have the alignment shop "ballast" their vehicle to include the influence of the driver's weight on the suspension angles.

The primary static suspension angles that need to be measured and adjusted are caster, camber, toe and thrust angle. Here's a definition of each angle and its influence on a vehicle and its tires.

Camber

The camber angle identifies how far the tire slants away from vertical when viewed directly from the front or back of the vehicle. Camber is expressed in degrees, and is said to be negative when the top of the tire tilts inward toward the center of the vehicle and positive when the top leans away from the center of the vehicle.



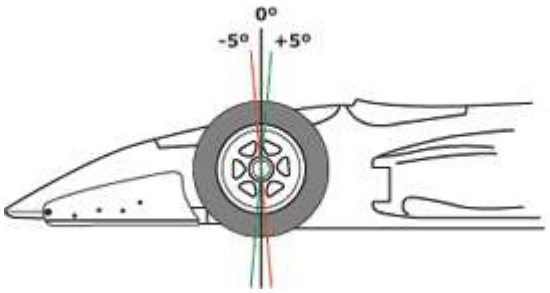
Since street suspensions cannot completely compensate for the outer tire tipping towards the outside when the vehicle leans in a corner, there isn't a magical camber setting that will allow the tires to remain vertical when traveling straight down the road (for more even wear), and remain perpendicular to the road during hard cornering (for more generous grip).

Different driving styles can also influence the desired camber angle as well. An enthusiastic driver who corners faster than a reserved driver will receive more cornering grip and longer tire life from a tire aligned with more negative camber.

Negative camber leans both tires on the axle towards the center of the vehicle. Each tire develops an equal and offsetting "camber thrust" force (the same principle that causes a motorcycle to turn when it leans) even when the vehicle is driven straight ahead. The vehicle may feel more "nervous" and become more susceptible to tram lining. Excessive camber will also reduce the available straight-line grip required for rapid acceleration and hard stops.

Caster

The caster angle identifies the forward or backward slope of a line drawn through the upper and lower steering pivot points when viewed directly from the side of the vehicle. Caster is expressed in degrees and is measured by comparing a line running through the steering system's upper and lower pivot points (typically the upper and lower ball joints of an A-arm or wishbone suspension design, or the lower ball joint and the strut tower mount of a McPherson strut design) to a line drawn perpendicular to the ground. Caster is said to be positive if the line slopes towards the rear of the vehicle at the top, and negative if the line slopes towards the front.



A very visual example of positive caster is a motorcycle's front steering forks. The forks point forward at the bottom and slope backward at the top. This rear ward slope causes the front tire to remain stable when riding straight ahead and tilt towards the inside of the corner when turned.

Caster angle settings allow the vehicle manufacturer to balance steering effort, high speed stability and front end cornering effectiveness.

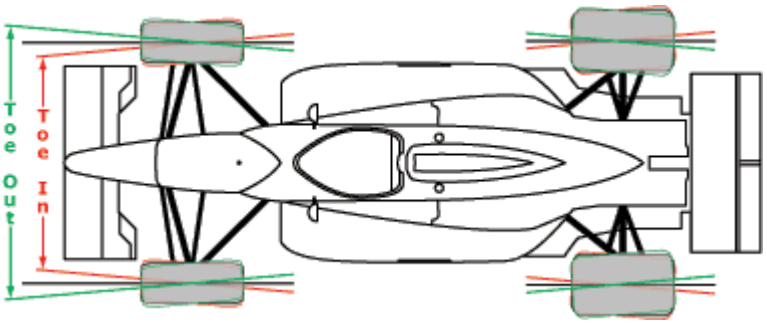
Increasing the amount of positive caster will increase steering effort and straight line tracking, as well as improve high speed stability and cornering effectiveness. Positive caster also increases tire lean when cornering (almost like having more negative camber) as the steering angle is increased.

Cross-Camber and Cross-Caster

Most street car alignments call for the front camber and caster settings to be adjusted to slightly different specifications on the right side of the vehicle compared to the left side. These slight side-to-side differences are called cross-camber and cross-caster.

For vehicles set up to drive on the "right" side of the road, the right side is aligned with a little more negative camber (about 1/4-degree) and a little more positive caster (again, about 1/4-degree) to help the vehicle resist the influence of crowned roads that would cause it to drift "downhill" to the right gutter. Since most roads are crowned, cross-camber and cross-caster are helpful the majority of the time, however they will cause a vehicle to drift to the left on a perfectly flat road or a road that leads to the left.

Using cross-camber and cross-caster is not necessary for track-only cars. The toe angle identifies the exact direction the tires are pointed compared to the centerline of the vehicle when viewed from directly above. Toe is expressed in either degrees or fractions-of-an-inch, and an axle is said to have positive toe-in when imaginary lines running through the centerlines of the tires intersect in front of the vehicle and have negative toe-out when they diverge. Toe can also be used to adjust vehicle handling.



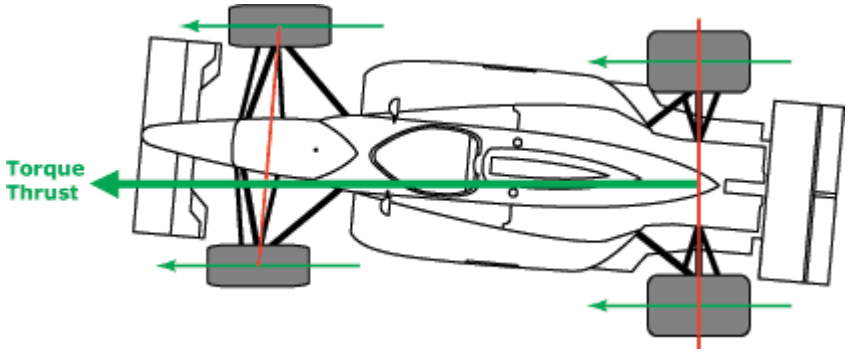
A rear-wheel drive vehicle "pushes" the front axle's tires as they roll along the road. Tire rolling resistance causes a little drag resulting in rearward movement of the suspension arms against their bushings. Because of this, most rear-wheel drive vehicles use some positive toe-in to compensate for the movement, enabling the tires to run parallel to each other at speed.

Toe can also be used to alter a vehicle's handling traits. Increased toe-in will typically result in reduced overseer, help steady the car and enhance high-speed stability. Increased toe-out will typically result in reduced under steer, helping free up the car, especially during initial turn-in while entering a corner.

A toe setting that is just a little off its appropriate setting can make a huge difference in their wear. Consider that if the toe setting is just **1/16-inch** off of its appropriate setting, each tire on that axle will scrub almost seven feet sideways every mile! Extend it out and you'll discover that rather than running parallel to each other, the front tires will scrub over **1/4-mile** sideways during every 100 miles of driving! Incorrect toe will rob you of tire life.

Thrust Angle

The thrust angle is an imaginary line drawn perpendicular to the rear axles centerline. It compares the direction that the rear axle is aimed with the centerline of the vehicle. It also confirms if the rear axle is parallel to its front axle and that the wheel base on both sides of the vehicle is the same.



If the thrust angle is not correct on a vehicle with a solid rear axle, it often requires a trip to the frame straightening shop to correctly reposition the rear axle.

An incorrect thrust angle is often caused by an out-of-position axle or incorrect toe settings. So in addition to the handling quirks that are the result of incorrect toe settings, thrust angles can also cause the vehicle to handle differently when turning one direction vs. the other.

Alignment Ranges

The vehicle manufacturers' alignment specifications usually identify a "preferred" angle for camber, caster and toe (with preferred thrust angle always being zero).. The minimum and maximum camber and caster specifications typically result in a range that remains within plus or minus 1-degree of the preferred angle.

A performance alignment consists of using the vehicle manufacturer's range of alignment specifications to maximize the tires' performance. A performance alignment calls for the manufacturer's maximum negative camber, maximum positive caster, and preferred toe settings.

Many of today's alignment machines are equipped with printouts that compare the "before" and "after" alignment angles with the manufacturers' specifications.

Tensioning device

Tensioning device, a device to detect thick spots or subs in the yarn & a stop motion which causes the winding to stop in the case of a yarn break or the depletion of a supply package. The yarn is directed into this zone by a guide.

Tensioning device
Functionsining device

- To allow the maintenance of proper tension in the yarn in order to achieve a uniform package density.
- The tensioning device also serves as a detector for excessively weak spots in the yarn which break under the added tension induced by the tension device.

Effects of Tension Variation:

- Too high tension may damage the yarn whereas too low tension can lead a unstable packages which will not unwind cleanly.
- In case of manmade fiber high tension can cause molecular change which affects the dye ability, so that variations in tension ultimately show as apparently random variation in color shading.
- In case of winding staple yarns, yarn tension may break thin place of yarn.

Requirements Which Influence the Choice of Tensioning Device:

1. The device must be reliable.
2. It must be easily threaded.
3. It must neither introduce nor magnify tension variations.
4. It must not introduce difference in twist.
5. It must not be affected by wear.
6. types of tensioning device

Tensioning device can be classified in 2 ways as follows-

1. Depending on the type of the working member acting on the yarn.
2. According to the working principle.

Depending on the type of the working member acting on the yarn the tensioning devices are the following types:

- Ball type.
- Washer type.
- Disc type.
- Roller type.
- Comb type.
- Two zone type.

According to the working principle the tensioning devices are the following types:

- Capstan (multiplicative) pensioner.
- Additive pensioner.
- Combined pensioner.
- Automatic pensioner.

- **Rotary and sliding plates**

The purpose of tire rotation is to minimize irregular or uneven wear caused by maintaining a tire in one rotation direction and one position over an extended period. Rotate tires as recommended by the vehicle manufacturer or every 5,000 miles. Individual tire pressures must be checked after rotation and adjusted to the vehicle manufacturer's recommendation for the

tire's new location on the vehicle. Vehicle alignment should be checked if irregular wear is evident.

For vehicles with a "temporary use" spare tire, follow the vehicle manufacturer's recommended pattern for rotation, or, if not provided, the following may be used:

If your spare is the same size, load rating, and type of tire as your road tires, it should be included in the tire rotation process. For vehicles with a "full-size" spare, the following rotations patterns may be used never include a "temporary use" spare tire in the rotation.

• Tires with directional tread patterns must be rotated so the direction of revolution does not change; this may require demounting/mounting the tires.

• Special attention should be given if your vehicle is equipped with a Tire Pressure Monitoring System (TPMS).

- **Brake tightened**

Is the brake properly set up V-brakes have a quick release so that the wheel can be removed and refitted easily. The 'noodle', which is a J-shaped metal guide tube, can be disengaged from its cradle. In this state, the brake will not work. Side pull brakes often have a small quick release lever on the caliper, enabling it to open wider (as shown). Ensure this lever is closed, otherwise the brake pads will be too far from the rim.

Examine the brake pads. There should be a good thickness of braking surface remaining. (If your brakes make grinding noises in use, there's no pad material left: you're applying metal to metal!) Time for new pads Head to the bike shop.

Adjust cable tension

All cable-operated brakes should have a barrel adjuster – a hollow knurled bolt where the cable exits the lever or enters the caliper. Some bikes use 'inline' adjusters part way along the cable outer instead.

To increase cable tension, turn the barrel adjuster anti-clockwise. Try one full turn initially, then half turns, repeating the brake test periodically. If the barrel adjuster has a threaded locking or locknut, unscrew this to enable the barrel to turn, then screw it flush to the lever or caliper to keep the barrel firmly in its new position.

Use one hand to squeeze the brake mechanism together. This is easy with side pull brakes and V-brakes: simply hold the brake blocks against the rim. With a cable disc brake, push the caliper's brake arm up to engage the brake. Then with your other hand, pull more cable through the cable clamp, until the cable is just taut. Let go of the cable now and tighten the clamp bolt.

- **Steering fixing**

Expect to pay between $100 – $250 or so for labor costs on this job. The parts are where you will really have to pay out though. You will pay anywhere from $150-$600 for most power steering pumps and the other parts needed to replace an old pump. Common reasons for this to happen:
Worn Tie Rods: Tie rods serve as the driver's connection between the steering unit and the tires. ... If tie rod ends become worn, they may cause the steering wheel to feel loose. A vehicle with worn tie rods may also squeak as the steering wheel is turned and be out of alignment. When the steering wheel is hard to turn, the problem is often with the power steering system. ... Power steering uses pressurized hydraulic fluid against one side of the piston, which forces the wheels turn and makes steering far easier. Here are some of the common causes of a malfunctioning steering system. A loose steering wheel can spell trouble for any driver since it makes it difficult to determine the accurate position of the front wheels.
All the tires of your vehicle should have been inflated according to the manufacturer's recommended PSI.

1. Uneven tire pressure could cause this problem.
2. Damaged serpentine belt is another reason.
3. Change the power steering fluid when it becomes too thick.

Solutions for steering wheel hard to turn. There is about five-eighths of an inch of play in the 15-inch steering wheel, and it is the same regardless of speed. Typically, poor steering return ability
is caused by steering gear that is too tight or improperly adjusted. ... Sticking or binding components, such as a king pin, ball joint, bell crank or even the steering column can prevent the steering wheel from returning to center after a turn After you have inflated the tires back to their specifications, drive the vehicle to verify the pull is now gone

August 20th, 2015

In most cases the only way to end the ordeal is to bring the vehicle to a complete standstill, and can leave some drivers so traumatized that they refuse to ever drive the vehicle again. Resulting in the ominous craigslist post that reads:

Common Steering & Suspension Repairs

Proper steering function is reliant on the quality and performance of your suspension components. Inspections, routine maintenance and front end alignment services will keep your ride smooth and help your vehicle operate in top condition.

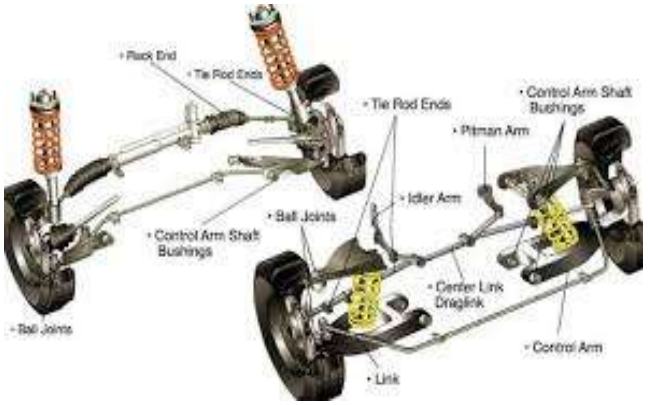
Steering Service & Maintenance

Turning the steering wheel of your car seems simple, but a lot happens between your steering wheel and your car's tires. This complex system relies on a number of processes in order to function properly. Nearly all vehicles today come with power steering, but if this system fails, it quickly becomes a safety issue. Typical steering and suspension services include wheel alignments, shock and strut repair and front and/or rear suspension repair.

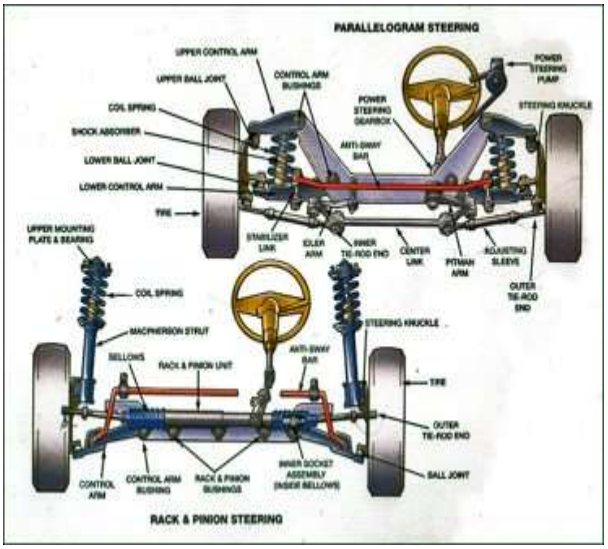
Stabilizer Bar Service & Maintenance

Also known as a sway bar, the stabilizer bar is an important component responsible for keeping your car from rolling over while turning. Whereas the shock absorber keeps the ride smooth, the stabilizer bar keeps the car upright when it is turning by spreading weight equally over the tires.

The steering and suspension system is very intricate, so it's important to have work done by a trusted technician. It contributes to the overall quality of your ride, but it is also integral to your vehicle's safety. Keep up with regular maintenance and inspections, and make sure to address any problems right away.



Steering Suspension FAQs



Front Steering and Suspension Kit ...
cjponyparts.com

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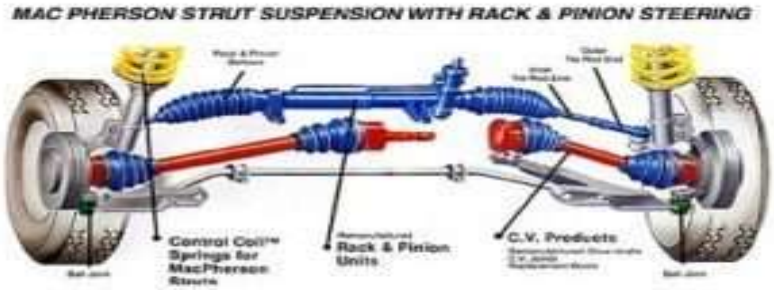


Related searches

Self-Check 2	Written Test

1 How often do you need to change power steering fluid?

2: What are the different types of power steering component disassemble?

2 How can steering fixing wheel alignment system ?

4 Is the brake properly set up V-brakes has a quick release so that the wheel can be _____ and _____ easily.

Operation sheet 2	Obtain procedures and information

Operation Title: Obtain procedures and information

Wheel and tire Purpose: to check the condition of the wheel hub and brake system components **Equipment,** Wheel Alignment Tools and Equipment The most basic types of equipment for wheel alignment are the turning radius gauge, the caster-camber gauge, and the tram gauge Tools and Materials: safety stand, hydraulic jack, cross wrench, chalk, and vehicle with wheel

Procedures for using a tram gauge for measuring toe are as follows:

1. Raise the front wheels of the vehicle & rub a chalk line all the way around the center rib on each tire.
2. With a scribing tool, rotate each tire and scribe a fine line on the chalk line. This will give you a very thin reference line for measuring the distance between the tires.
3. Lower the vehicle back on the turning radius gauges.
4. Position the tram gauge at the back of the tires. Move the pointers until they line up with the scribe marks on the tires.
5. Without bumping the tram gauge pointers, reposition the gauge to the front of the tires. The difference between the lines on the front and rear of the tires shows toe.

LAP Test 2	Practical Demonstration

Name: _____ Date: _____
Time started: _____ Time finished: _____
Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 2:00 hour.

Task1. Checking the wheel alignment measurement tool functional or not functional (0.30 mi)

Information Sheet-3	Complete wheel alignment

Complete wheel alignment

Awheel alignment, also known as a front-end alignment, means the technician performs the service on only the front wheels, which may include a camber, toe, and caster adjustment. In some cases, a 'thrust angle adjustment' may be necessary, to ensure that all four wheels are 'square' with one another. When your tire alignment is off, your ability to drive safely is compromised. In some cases, it can be subtle and the driver won't even notice. That's why regular tire alignment checkups are a must-do. The better maintenance you keep, the longer your car will run healthily. If your car alignment feels off – or if it's simply been a while – come see us at Firestone Complete Auto Care and our alignment experts will take a look. When your wheels are aligned, your car handles better. Wheel alignment from Firestone Complete Auto Care means long lasting, optimal performance. Our technicians know how to keep your car running straight and smooth.

CAR ALIGNMENT SERVICES

Firestone Complete Auto Care offers different limited warranties on our wheel alignments to match our customer's unique needs. From a 12-month limited warranty to a lifetime limited warranty, Firestone Complete Auto Care has options to suit you. Just want to check in and make sure your car alignment is balanced? Get peace of mind with our alignment check.

WHEEL ALIGNMENT CHECK

- Inspect vehicle suspension and steering systems, including tire air pressure and tire condition
- Vehicle placed on an alignment rack, where laser sensors are mounted and measure the current alignment settings
- Print initial tire alignment readings

WHEEL ALIGNMENT: STANDARD

- Inspect suspension and steering systems, including air pressure and tire condition
- Vehicle placed on alignment rack, where sensors are mounted and compensated
- Print initial tire alignment readings.
- Camber, caster and toe angles are adjusted according to manufacturer specifications
- Print final tire alignment readings.
- Test drive the vehicle

* See your auto advisor for complete terms and conditions of written limited warranties.

WHEEL ALIGNMENT: LIFETIME

The lifetime wheel alignment comes complete with everything included in the standard alignment, plus:

- A lifetime limited warranty*, meaning Firestone will realign your car whenever you need it, for free, for as long as you own the car

Consult with a Firestone Complete Auto Care manager for complete conditions and terms of the lifetime limited warranty.

A wheel with tyre that rolls over a smooth level surface and at the same time performs longitudinal and lateral slipping motions, will develop horizontal deformations as a result of the presence of frictional forces which attempt to prevent the tyre particles, that have entered the contact area, from sliding over the road. The latter condition will arise when the deflection generated in the range of adhesion would have become too large to be maintained by the available frictional forces.

In the following, a set of partial differential equations will be derived that governs the horizontal tyre deflections in the contact area in connection with possibly occurring velocities of sliding of the tyre particles. Consider a rotationally symmetric elastic body representing a wheel and tyre rolling over a smooth horizontal rigid surface representing the road.

Self-Check 3	Written Test

1.Just want to check in and make sure your car alignment is balanced?

2, how **can adjust Camber, caster and toe angles are adjusted according to manufacturer specifications?**

3 WHAT IS WHEEL ALIGNMENT: LIFETIME?

Operation sheet 3	Complete wheel alignment

Equipment,; Wheel Alignment Tools and Equipment The most basic types of equipment for wheel alignment are the turning radius gauge, the caster-camber gauge, and the tram gauge Tools and Materials: safety stand, hydraulic jack, cross wrench, chalk, and vehicle with wheel. Proper alignment depends several wheel and suspension aspects:

- ✓ Camber: Refers to the angle of a tire. A negative camber means that a tire is tilting inward, while a positive camber means that it's tilting out.
- ✓ Caster: Refers to the angle of the steering pivot. Caster problems are identified by lateral tire marks.
- ✓ Toe: Identifies the directional point of a tire. Toe-in means that it's off center and pointing in, and toe-out means that it's off center and point out.
- ✓ Thrust Angle: Refers to the rear axle's perpendicularity to the front axle. If the thrust angle is not consistent, it needs to be repositioned.

A technician will enter a vehicle's year, make, and model into the alignment system's computer, which will determine the OEM alignment specifications, since different vehicles have different alignments. The vehicle being aligned will then be driven onto the alignment rack, and targets will be mounted onto all four wheels.

Procedure Procedures Vehicle alignment requires bringing a car's suspension into the correct configuration by adjusting components in order for the wheels to be aligned with one another as well as the road. This process is performed by an knowledgeable and experienced mechanic and a special alignment machine.

Machines use devices that clamp on to the wheels of the vehicle (after it has been raised) and provide detailed, precise measurements to a computer or display. The technicians also inspect the suspension for any worn out or broken parts.

Steps completing wheel alignment alignment basically involves adjusting the wheels and axles with one another so every part is moving in the same direction. Technicians re-position various suspension angles – also called camber, caster, toe, and thrust – that affect the tires' movements and position. The mechanic will also adjust the steering wheel, if necessary, to center it.

Car manufacturers specify standard alignment angles by degrees. If you prefer sports or other high performance cars, your technician may even be able to change your alignment to improve vehicle and tire performance but this still could lead to uneven wear on the wheels.

Depending on the type of vehicle you have, you may receive either a four-wheel alignment or a front-end alignment. With an all-wheel drive vehicle or a vehicle with an adjustable rear suspension, it will need to have both axles properly aligned to each other so that all four wheels point in the right direction..

For using a tram gauge for measuring toe are as follows:

1. Raise the front wheels of the vehicle and rub a chalk line all the way around the center rib on each tire.
2. With a scribing tool, rotate each tire and scribe a fine line on the chalk line. This will give you a very thin reference line for measuring the distance between the tires.
3. Lower the vehicle back on the turning radius gauges.
4. Position the tram gauge at the back of the tires. Move the pointers until they line up with the scribe marks on the tires.
5. Without bumping the tram gauge pointers, reposition the gauge to the front of the tires.

LAP Test 3	**Practical Demonstration**

Name: _____ Date: _____
Time started: _____ Time finished: _____
Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 0:40 hour.

Task1. **Checking the wheel alignment good measuring and align? (0; 40m**)
Task2 check the wheel alignment of caster and camber reading?(0;30m)

Information Sheet-4	Carry out corrective adjustment/repairs

Carry out corrective adjustment/repairs.

When performing wheel alignment measurement and/or adjustment, the following steps should be taken:
Preliminary Steps:
1. Verify that the vehicle has a full tank of fuel (compensate as necessary).
2. Inspect the wheels and the tires for damage.
3. Inspect the tires for the proper inflation and irregular tire wear.
4. Inspect the wheel bearings for excessive play.
5. Inspect all suspension and steering parts for looseness, wear, or damage.
6. Inspect the steering wheel for excessive drag or poor return due to stiff or rusted linkage or suspension components.

Satisfactory vehicle operation may occur over a wide range of alignment angles. However, if the wheel alignment angles are not within the range of specifications, adjust the wheel alignment to the specifications. Refer to Wheel Alignment Specifications in SI. Give consideration to excess loads, such as tool boxes, sample cases, etc. Follow the wheel alignment equipment manufacturer's instructions.

Measure/Adjust:

Important: Prior to making any adjustments to wheel alignment on a vehicle, technicians must verify that the wheel alignment specifications loaded into their wheel alignment machine are up-to-date by comparing these to the wheel alignment specifications for the appropriate model and model year in SI. Using incorrect and/or outdated specifications may result in unnecessary adjustments, irregular and/or premature tire wear and repeat customer concerns.

Important: When performing adjustments to vehicles requiring a 4-wheel alignment, set the rear wheel alignment angles first in order to obtain proper front wheel alignment angles.

Perform the following steps in order to measure the front and rear alignment angles:
1. Install the alignment equipment according to the manufacturer's instructions.
2. Jounce the front and the rear bumpers
3 times prior to checking the wheel alignment.
4. Measure the alignment angles and record the readings.

If necessary, adjust the wheel alignment to vehicle specification and record the before and after measurements. Refer to Wheel Alignment Specifications in SI.

Important: Technicians must refer to SI for the correct wheel alignment specifications. SI is the only source of GM wheel alignment specifications that is kept up-to-date throughout the year.

Test drives the vehicle to ensure a proper repair.

Corrective maintenance is a maintenance task performed to identify, isolate, and rectify a fault so that the failed equipment, machine, or system can be restored to an

operational condition within the tolerances or limits established for in-service operations. See more indeed there are more than main three types as the following:

-
- Corrective maintenance.
- Preventive maintenance (scheduled).
- Predictive maintenance.
- Reliability centered maintenance RCM.
- Proactive maintenance. The main difference between the two is the scale of that problem. Corrective maintenance identifies problems as a result of inspections, preventive maintenance (PM) tasks, or work orders. These issues typically do not affect the health or viability of a facility and its employees. Four general types of maintenance philosophies can be identified, namely corrective, preventive, risk-based and condition-based maintenance. Corrective Maintenance Examples and Definition What is corrective maintenance

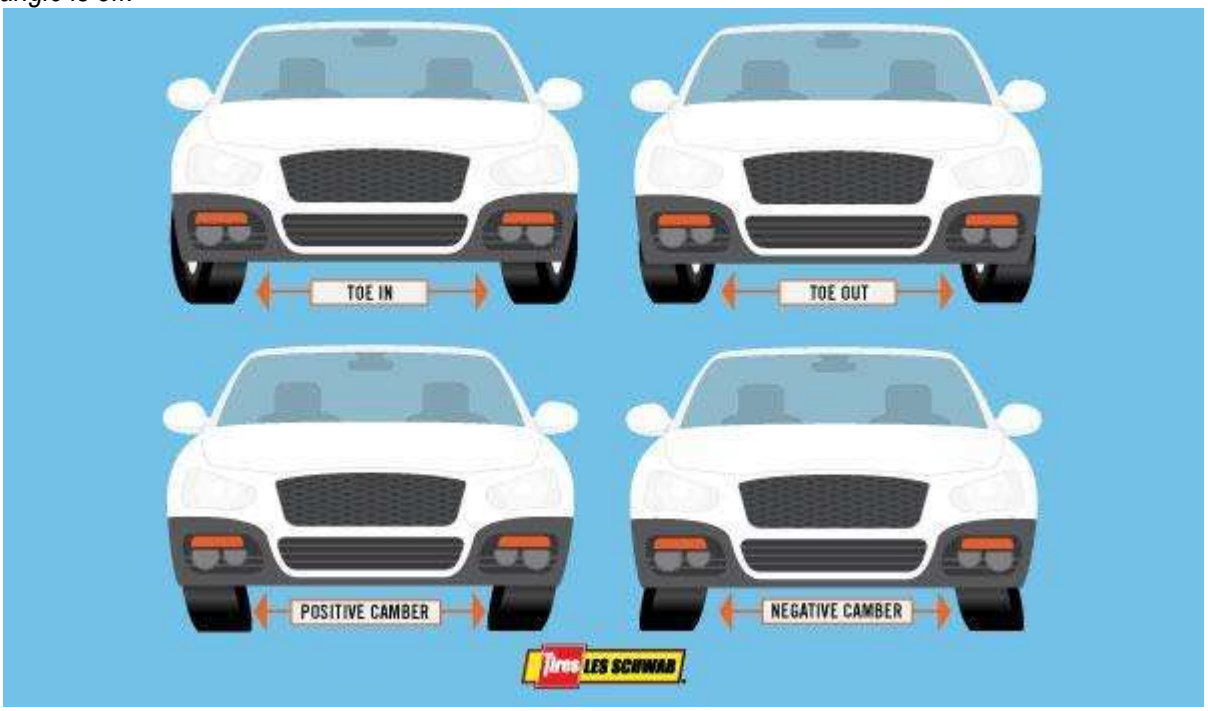
Wheel Alignment

Though it's sometimes so subtle you won't notice, the alignment of your wheels can get out of whack from the jolts and mishaps of everyday driving. This reduces your vehicle's drivability, lowers gas mileage and causes early tire wear. An alignment is the process of adjusting the angles of your vehicle's wheels back to original specifications

An alignment improves driving safety by keeping the right amount of the tire in contact with the road and preventing your vehicle from pulling to the left or right. A properly aligned vehicle has a smoother ride and optimal gas mileage. Keeping the wheels aligned also extends tire life.

Diagnosing misalignment isn't always clear-cut. Because the measurements can be very fine, you may not see it with a quick look at the tires and wheels. You may notice the steering wheel is off-center, feel a pull or drift or notice your handling isn't up to par. The only way to know for sure is to have a trained technician run a check on an alignment machine.

Will It Affect My Tires *Yes. If they show moderate-to-severe edge wear or feathered wear, it likely means they're being dragged along rather than rolling smoothly. This is often an indicator that the toe or the camber angle is off.*



They're done using an alignment machine to measure the wheel angles. These are calculated and compared against your vehicle's original specs. Then the technician makes adjustments as needed. A real-time computer readout shows when the target angles are met. A report will show the incoming and corrected alignment measurements.

Your technician will advise what kind of alignment is best for your vehicle type:

Standard

Known as a front-end alignment, the front wheels are adjusted so they are parallel to the centerline of your vehicle. This is the simplest and most basic alignment BUT it's not recommended for any current model vehicle. It's less accurate. You may not get a centered steering wheel, because front-end alignment doesn't account for rear wheel angles.

Thrust

A thrust alignment is the most accurate alignment for vehicles without adjustable rear suspension. Only the front wheels are adjusted. Here's how: There's no guarantee both rear wheels are pointed straight ahead as they should be. One may be pointed exactly forward and the other slightly off. Or both their angles could be off. Since this can't be adjusted, the front wheels are aligned as closely as possible to the thrust line, which is the average of where the two rear wheels point. This compensates enough to get a centered steering wheel.

Four wheels

this is done on vehicles with adjustable rear suspension, to bring all four corners of your vehicle back in spec. All four wheels are aligned to the center of the vehicle. First, the rear axle angles are measured and

adjusted, then the front. This is the best, most accurate, manufacturer-recommended alignment for vehicles with adjustable rear suspension.

What Other Times Should Alignment Be Checked*?*

- After you hit a curb, collide with an animal, or run over a pothole, bump or debris.
- When tires are wearing unevenly.
- You lower or lift your vehicle.
- Steering or suspension parts that affect the tire angles are replaced.
- You notice your vehicle drifts or pulls to one side.

(Les Schwab does free visual alignment inspections. If we recommend an alignment but find during the course of the work that your alignment is good and can't be improved, there's no charge.)

Regular alignments are part of basic auto maintenance. Catching misalignment early means you can correct your wheel's positions before you have premature tire wear. Cars usually go out of alignment gradually, so it's important to check it at least annually, or twice a year if you travel roads that are washboard, rutted or have lots of potholes. Vibration in the steering wheel, the floorboard or the seat that gets worse at faster speeds is often a sign of out-of-balance tires, not bad alignment.

Rebalancing is done in a tire shop by putting the wheel-tire unit on a tire-balancing machine that takes weight measurements and shows where to make adjustments for any differences. It's most often done during tire rotations and isn't part of an alignment.

Here's what's included with an alignment at Les Schwab Tires: tire inspection, test drive before, steering and suspension inspection, tire pressure check and adjustment, alignment angles measured and adjusted, test drive after, and a printed report showing before and after measurements. (Alignments done at Les Schwab Tires are covered by a 30-day guarantee, which includes labor cost.)

Generally, any noise from misalignment is caused by abnormal tire wear. If tires are the source of road noise, an alignment correction may be needed but won't solve the noise problem.

An off-center steering wheel is one sign of misalignment. Alignment will restore the steering wheel to a centered position if there aren't other undiagnosed problems.

When alignment angles are out of spec, steering can feel slightly loose. This condition can be corrected by an alignment. In this case, the loose parts should be identified in the pre-alignment inspection and repairs should be recommended before aligning. Some parts to suspect are ball joints, tie rods, idler arm, Pitman arm, rack, and pinion or steering box.

Check your vehicle's owner manual for the original warranty. It varies according to vehicle type, shop, region and type of alignment. A quality shop will advise in advance what type is best and what it will cost before performing the work. A great shop only charges for work that is actually needed once the job is underway.

Tire stores and any good mechanic. Les Schwab Tires offers full wheel alignment services — including adjustments and free inspections — usually without an appointment.

Types of Maintenance

1 ***Corrective Maintenance***

Corrective maintenance is used to repair damage that has already occurred. Usually, when this type of maintenance is performed, the manufacturing process is stopped, decreasing production and increasing costs. Therefore, corrective maintenance is applied on assets with low criticality, whose faults do not involve large temporal or economic problems. It is often used for specific equipment where other techniques would be more costly.

.2 ***Preventive Maintenance***

Preventive maintenance is planned in a time horizon and aims to prevent breakdowns. Unlike corrective maintenance, because it is planned, it is not done during production time.

The intention of this type of maintenance is to reduce the number of corrective interventions, performing periodic reviews and replacing worn components.

It is a demanding type of maintenance, as it requires strict supervision and development of a plan to be carried out by qualified personnel..

3 ***Condition-Based Maintenance***

CBM aims to determine the condition of equipment, so that operation remains safe, efficient, and economic. Monitoring techniques are aimed at measuring physical variables that indicate the condition of the machine and comparing these with normal values to determine if the machine is in good condition or deteriorating. CBM assumes there are measurable and observable characteristics that are indicators of the condition of the machine.

CBM consists of three key steps (see Fig. 6.2):

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Figure 6.2. Three steps in condition-based maintenance.

1, Data acquisition (information collecting), to obtain data relevant to system health..

2, Data processing (information handling), to handle and analyze the data or signals collected in step.

1 for better understanding and interpretation of the data. Maintenance decision-making (decision-making), to recommend efficient maintenance policies.

Self-Check 4	Written Test

2- Does Misalignment Affect Gas Mileage?

3- ***2 Is Alignment the Same as Balancing?***

4 Will an Alignment Fix a Crooked Steering Wheel Loose Steering?

Operation sheet 4	**corrective adjustment/repairs**

1. **Equipment;**1 Go plus Transmission Spring Compressor, Automatic Transmission Clutch Removing/ Installing Tool Kit, Strut Spring Compressor.

   2 KIPA Adjustable Magnetic Gauge Tool Camber Castor Strut Wheel Alignment Tool for Truck Car RV…

   3 Granit Adjustable Powerful Magnetic Gauge Tool Camber Castor Strut Wheel Alignment Tool…

   4 Tenhulzen Auto 3300 2-Wheel Alignment System All-in-one Tool (Camber/Caster/Toe…

   5 JEM&JULES Adjustable Magnetic Gauge Tool Camber Castor Strut Wheel Alignment Truck…

   6 MOSTPLUS FWD Front Wheel Drive Bearing Adapters Puller Press Replacement Installer…

   7 KaTur Universal Gauge Tool for Car/Truck Magnetic Camber Castor Strut Wheel Alignment

Procedure;

Check your tire pressure. Your tires should be appropriately and evenly inflated before you proceed

Check your specifications. Look in your car's repair manual for details about the proper alignment settings. You should find numbers describing the car's ideal toe, camber, and possibly caster.

Check the front end suspension. If your suspension is loose or any parts have worn out, this may also be the cause of your problems.

Determine the proper toe. Toe is the amount by which the wheels are closer (toe-in) or further apart (toe-out) at their front edges than at their rear edges, as viewed from above.[2]Depending on your car, your manual will probably recommend either zero toe (equal distance between the front and back) or slight toe-in, which increases stability.

Draw a line. With the car still up on the jack, hold a pocketknife, thin piece of chalk, or white pencil against the center of tire tread. Hold your hand very still and have an assistant turn the tire one full turn, creating a line around the circumference. Do the same on the other side. Lower the car. After you lower the car to the ground, push down on the car above each wheel a few times to allow the car to settle.

Roll the car. Push the car forward at least 10 feet with the steering wheel unlocked to make sure the wheels are straight.

Stretch a string. With an assistant, take a piece of string or wire and stretch it between the lines on the front of the tires, even with the spindle, and measure the distance on the string.

LAP Test 4	**Practical Demonstration**

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 0:40 MI.

Task1. **Checking the wheel alignment good adjustment and repairs to by procedure (0; 45M)**

Information Sheet-5	Test vehicle/equipment

Proper alignment depends several wheel and suspension aspects:

- ✓ Camber: Refers to the angle of a tire. A negative camber means that a tire is tilting inward, while a positive camber means that it's tilting out.
- ✓ Caster: Refers to the angle of the steering pivot. Caster problems are identified by lateral tire marks.
- ✓ Toe: Identifies the directional point of a tire. Toe-in means that it's off center and pointing in, and toe-out means that it's off center and point out.
- ✓ Thrust Angle: Refers to the rear axle's perpendicularity to the front axle. If the thrust angle is not consistent, it needs to be repositioned.

A technician will enter a vehicle's year, make, and model into the alignment system's computer, which will determine the OEM alignment specifications, since different vehicles have different alignments. The vehicle being aligned will then be driven onto the alignment rack, and targets will be mounted onto all four wheels.

The alignment system will then measure the current toe, caster, thrust, and camber angles and provide a diagnostic report, which identifies any inconsistencies. If there's a need for rear alignment adjustments, they should be carried out before moving to the front-end alignments.

Technicians will work through the alignment software to indicate the problems and direct the alignment system to the correct angles. This use of modern technology provides precise readings for automotive technicians and allows for a time-friendly alignment process.

The Need for Alignment

Not only is it important for drivers to have an efficient alignment system for safe control and handling, but it's also important to facilitate longevity for tires and the vehicle. When a vehicle has misaligned toes, cambers, and casters, they're wearing down the tires' tread faster, which will be costly and will reduce the effectiveness of braking. An alignment system will help to maintain a vehicle's longevity.

Operating an alignment system requires automotive technicians to be proficient in modern technology. Because this is a major responsibility, understanding misaligned toes, cambers, castors, and thrust angles is necessary for those trying to enter the automotive industry workforce.

Please refer to the latest version of Corporate Bulletin Number 05-00-89029: General Motors Dealership Critical Equipment Requirements and Recommendations.

Requirements:

- ➢ Computerized four wheel alignment system.

- Computer capable of printing before and after alignment reports.
- Computer capable of time and date stamp printout.
- Racking system must have jacking capability.
- Racking system must be capable of level to 1.6 mm (1/16 in).
- Appropriate wheel stops and safety certification.
- Built-in turn plates and slip plates.
- Wheel clamps capable of attaching to 20" or larger wheels
  - Recommendations:
  - Racking should have front and rear jacking capability.
  - Equipment Maintenance and Calibration:
  - Alignment machines must be regularly calibrated in order to give correct information. Most manufacturers recommend the following:
- Alignment machines with "internal reference" sensors should be checked (and calibrated, if necessary) every six months.
- Alignment machines with "external reference" (image-based camera technology) should be checked (and calibrated, if necessary) once a year.
- Racks must be kept level to within 1.6 mm (1/16 in).
- If any instrument that is part of the alignment machine is dropped or damaged in some way, check the calibration immediately.

  Check with the manufacturer of your specific equipment for their recommended service/calibration schedule.

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Self-Check 5	Written Test

1 What are Wheel alignments must be performed?

2 Wheel clamps capable of attaching to _____ or larger wheels?

Operation Sheet-5	Test vehicle/equipment.

Equipment,; Speedometer Testers Wheel Aligners, Side Slip Tester, Play Detectors, Vehicle Test Lanes, Roller Brake Testers, Suspension tester ,Speedometer Testers ,Computerized four wheel alignment system. Computer capable of printing before and after alignment reports. Computer capable of time and date stamp printout.

Procedure; for using a tram gauge for measuring toe are as follows:

1. Raise the front wheels of the vehicle and rub a chalk line all the way around the center rib on each tire.
2. With a scribing tool, rotate each tire and scribe a fine line on the chalk line. This will give you a very thin reference line for measuring the distance between the tires.
3. Lower the vehicle back on the turning radius gauges.
4. Position the tram gauge at the back of the tires. Move the pointers until they line up with the scribe marks on the tires.
5. Without bumping the tram gauge pointers, reposition the gauge to the front of the tires.

LAP Test 4	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

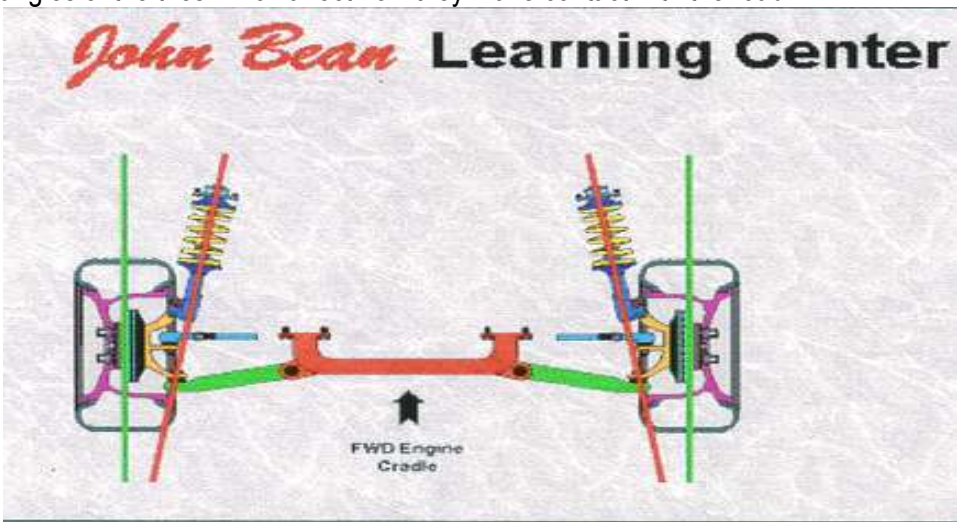
Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 0:40 MI.

Task1. Checking the wheel **alignment good adjustment and repairs to by procedure (0; 45M)**

Information Sheet-6	Carry out wheel alignment test and adjustment

Carry out wheel alignment test and adjustment

Alignment refers to an adjustment of a vehicle's suspension – the system that connects a vehicle to its wheels. It is not an adjustment of the tires or wheels them. The key to proper alignment is adjusting the angles of the tires which affect how they make contact with the road.



An alignment essentially requires squaring a car's wheels and axles with each other so that they're moving in the same direction. The mechanic adjusts the various suspension angles -- known as toe, thrust, camber and caster -- that influence tire movement and position Caster: Refers to the angle of the steering pivot. Caster problems are identified by lateral tire.

Taking a few minutes to check your alignment will make your tires last longer and your vehicle handle better. So here is a step-by-step process on how to check your alignment at home.

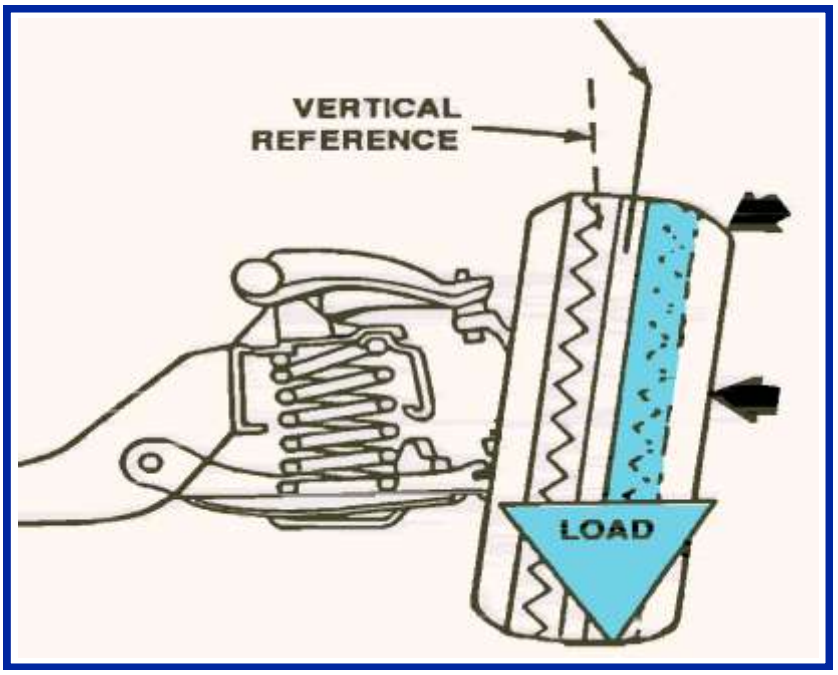
- To check the toe, park the vehicle on level ground with the tires straight ahead and the steering wheel centered. Jack up one of the front tires, secure the vehicle on jack stands, then spray-paint a stripe on the tread while spinning the tire. Try to keep your hand as steady as possible so your line can be even on both tires.

Measure from line to line with the tape level with the floor.

Measure again on the back sides of the tires. Make sure that the tape is level and the same distance above the ground as it was for the front reading. Compare the two measurements to reveal the toe, accounting for measurements taken lower than at the tires' center for actual toe.

Torque the adjuster-sleeve nuts to factory specs to complete the adjustment.

- Camber measures tire lean. Camber isn't adjustable on many front-wheel-drive cars, and an out-of-spec measurement usually indicates bent or worn part(s) on these vehicles. T
- he more camber you have, the more the load is placed on the outside of the tire.
- Excessive positive or negative camber can cause tire wear



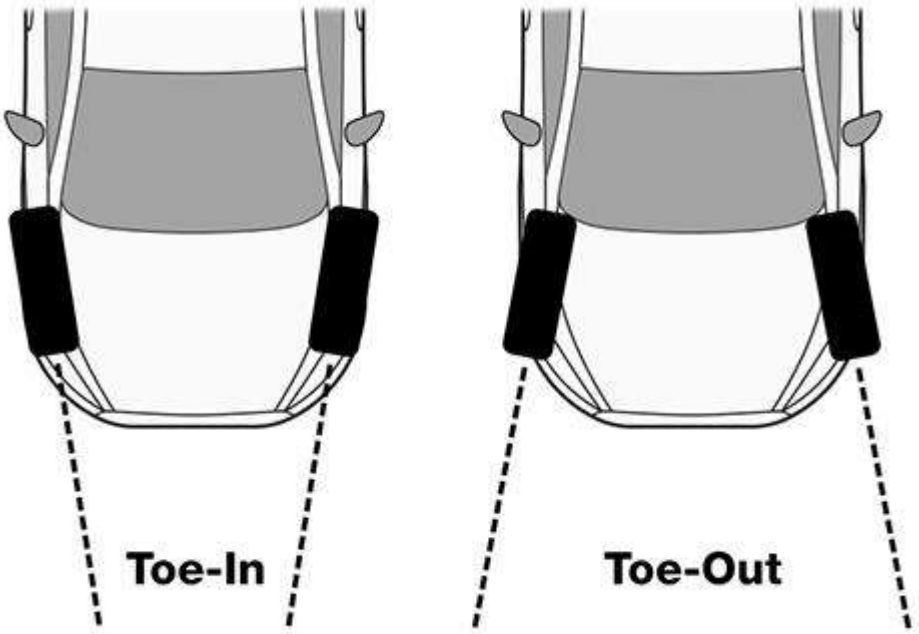
To check camber, make sure the vehicle is parked on level ground. If not, factor the ground slope into the camber reading. Then place a straight edge across the wheel (use the inner lip if the outer is nicked or uneven) and use an angle finder to reveal camber.

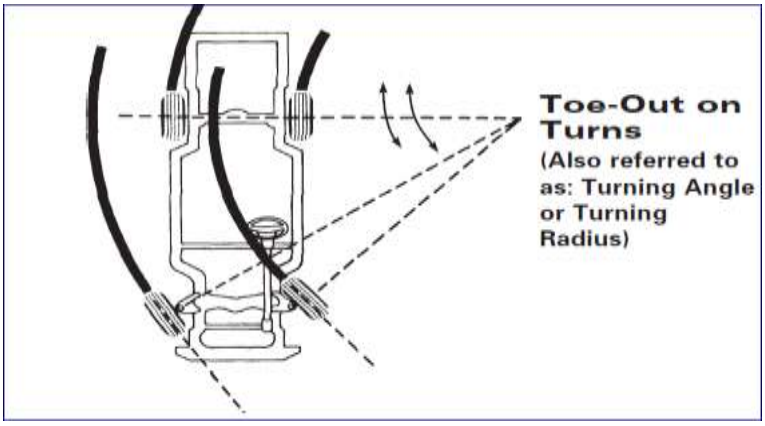
Types of Wheel Alignment and Procedure

Two of the reasons why modern cars are as comfortable as they are have to do with not only the way the suspension systems are configured, but also with how suspension systems on modern cars are attached to the vehicle. While these factors provide a smooth ride, this smooth ride comes at the cost of increased complexity that can make the process of aligning all the wheels properly, a difficult one at times.

As a practical matter, a comprehensive wheel alignment procedure on a modern vehicle consists of several distinctly separate operations, these being-

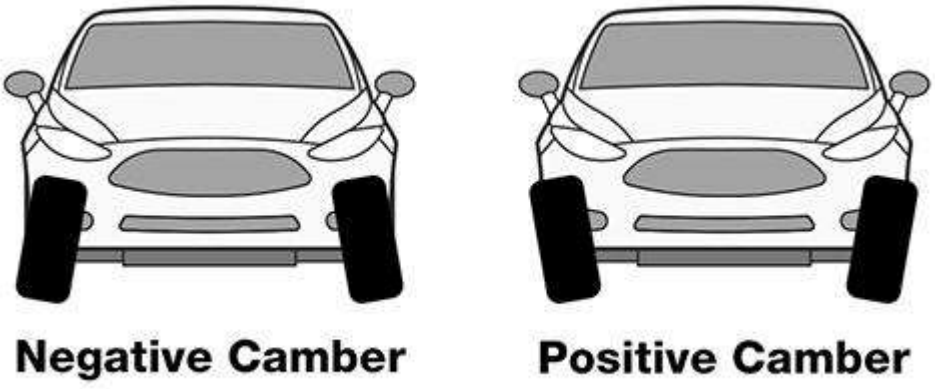
Toe- in / Toe-out adjustment





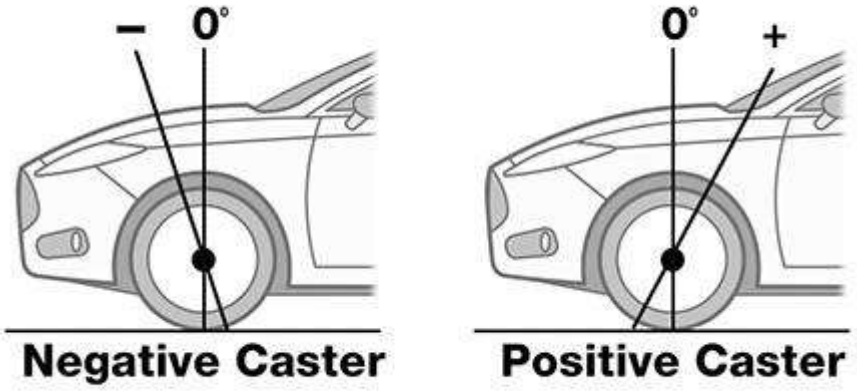
On passenger vehicles, these conditions are typically caused by word or damaged steering components, worn or damaged control arm bushing, or the over-, or under adjustment of tie rod ends. On vehicles that use steering boxes instead of steering racks, these conditions can also be caused by the above, in addition to damaged, worn, or bent drag links and/or worn idler arm bushings.

Camber adjustment



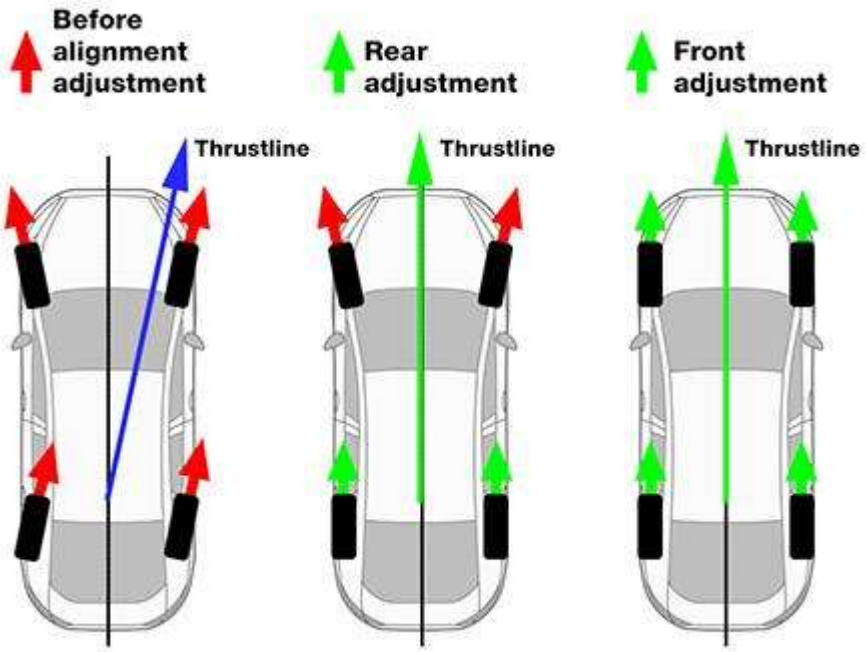
These conditions are typically caused by worn, damaged, or broken McPherson strut mountings, worn, damaged, or broken control arm bushings, or by lateral contact with obstacles.

Caster adjustment



Note that while this setting is critical for good straight-line tracking, it is generally not possible to adjust this angle. However, deformation of the body caused by an accident can disturb this setting, which can sometimes be corrected by a body repair shop that can “pull” the chassis back into shape with computerised equipment.

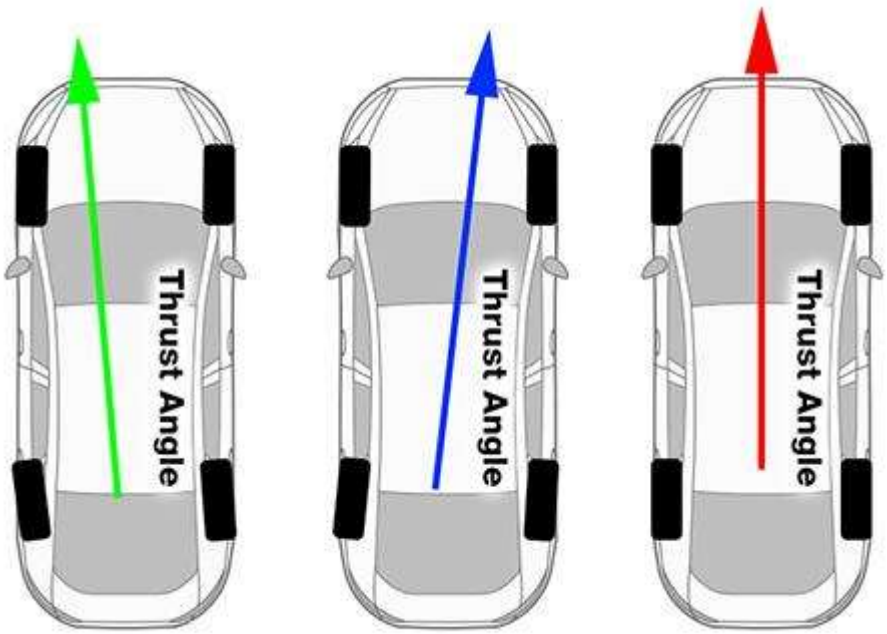
Four wheel adjustment



The image above shows all the adjustments required to ensure that all the wheels on a vehicle are properly aligned to each other, as well as to the centreline of the vehicle, which is commonly referred to as the “thrust line”.

Although this type of procedure is most commonly performed on powerful high-end sports cars to ensure that the car’s handling characteristics are not compromised, many “ordinary” cars can benefit greatly from this procedure as well. If the procedure is performed by a suitably qualified technician, this procedure produces the best results in terms of alignment accuracy.

Thrust line adjustment



In the panel above, the red line represents the thrust angle, which should run at a right angle through the length of the car relative to the centreline of the rear axle, and if this setting is correct, the front wheels are aligned to this line.

However, if the centreline of the rear axle is not at right angles with the thrust line, the misaligned rear axle (as shown by the green and blue lines) will force the rear wheels not to follow the front wheels, and continual counter steering is required to keep the vehicle moving in a straight line. Thrust line adjustment therefore involves realigning the rear axle with the thrust line to ensure that the rear wheels run in the same line as the front wheels without the need to apply a corrective steering input.

What is an alignment?

An alignment is a procedure performed by your mechanic to get your vehicle's suspension back into proper form. By making adjustments to the vehicle's tires and axles, the wheels are once again aligned with each other and can make solid contact with the road.

Wheel alignment VS end alignment

wheel alignment 4 reason cardinlophazashell.com

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Self check 6	Written

1, **How To Check Wheel Alignment At Home What do they adjust during an alignment?**

2 What is an alignment?

Operation Sheet-6	Carry out wheel alignment test and adjustment

Operation sheet Title; wheel alignment test and adjustment

Equipment, Speedometer Testers Wheel Aligners, Side Slip Tester, Play Detectors, Vehicle Test Lanes, Roller Brake Testers, Suspension tester, Speedometer Testers, Computerized four wheel alignment system. Computer capable of printing before and after alignment reports. Computer capable of time and date stamp printout.

Procedure, Poor using a tram gauge for measuring toe are as follows:

1. Raise the front wheels of the vehicle and rub a chalk line all the way around the center rib on each tire.
2. With a scribing tool, rotate each tire and scribe a fine line on the chalk line. This will give you a very thin reference line for measuring the distance between the tires.
3. Lower the vehicle back on the turning radius gauges.
4. Position the tram gauge at the back of the tires.

LAP Test 4	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 0:40 MI.

Task1. Checking the wheel **alignment good adjustment and repairs to by procedure (0; 45M)**

Task 2 Perform A Vehicle Front End Alignment Using String and a Ruler - Front End Replacement Part 3(0; 40mi)

Information Sheet-7	Notify customer major problem(s) prior to rework being

Notify customer major problem(s) prior to rework being

Instead of forcing their loyal customers to foot the bill, a car or truck maker will issue a recall. ... Myth: warm up your car for several minutes before driving. It is important to be alert and recognize the danger signs of brake problems. an alignment adjusts your vehicle's steering and suspension so that it's in line with your. Does your machine do “strange things” or exhibit intermittent problems before replacing circuit boards, verify that the main power supply operates. Notify all affected employees that a lockout or tag out system is going to be utilized.

The customer has **4** different options of the types of wheel clamps being used.

aug 16, 2016 - Toyota summarized the prior recall attempt in this statement: “in the earlier. of this problem and angry about the costs to keep our car running and safe. out to the district manager and Toyota customer service and we continue to .

This marks the third attempt by the automaker to resolve a tricky problem it has struggled with related to the vehicle’s suspension.

The components have failed according to reports and can cause loss of control of the vehicle. recalls are a part of modern vehicle ownership, but what makes this one unusual is that this is the third attempt by Toyota to try to resolve the issue.

Toyota summarized the prior recall attempt in this statement: “in the earlier action, if the nuts for adjusting rear wheel alignment were improperly tightened when an alignment was performed, rust could form on suspension arm threads.

The new fix will be to replace both rear suspension arm assemblies with new ones. Toyota will also add an epoxy to prevent future arm adjustment during vehicle service complete workplace documentation

Messages, memorandums, minutes and agendas are usually workplace documents that are prepared for internal use. ... a memorandum (or memo) sends information to people in your organization about a work related topic.

policies, procedures, the employee handbook, and performance development plans are also forms of documentation that record expected employee behavior and workplace requirements to maintain an orderly, fair workplace in which employees know what is expected from them. the workplace documents assessment

Government, law, and politics: application, brief, certificate, commission, constitutional document, form, gazette, identity document, license, summons, and white paper. Documentation is a set of documents provided on paper, or online, or on digital or analog media, such as audio tape or cads. It is becoming less common to see paper (hard-copy) documentation..

to implement effective policies and procedures at your workplace, follow these steps to get the best results.

1: Consultation. ...

2: Tailor the policy to your business. ...

3: Define obligations clearly – be specific! ...

4: Make the policy realistic. ...

5: Publicize the policies and procedures.

1. Why proper documentation is so important the purpose of complete and accurate patient record documentation is to foster quality and continuity of care. It creates a means of communication between providers and between providers and members about health status, preventive health services, treatment, planning, and delivery of care.

(Jeep compass SUV AWD /NHTSA)

Self-Check 7	Written Test

1 what are workplace documents?

2 how important is documentation in the workplace?

3 Types of Wheel Alignment and Procedure

3 To implement effective policies and procedures at your workplace follow these steps to get the best result

Information Sheet 8	Complete workplace documentation

Complete workplace documentation

Complete workplace documentation Policies, procedures, the employee handbook, and performance development plans are also forms of documentation that record expected employee behavior and workplace requirements to maintain an orderly, fair workplace in which employees know what is expected from them. he Workplace Documents Assessment

Employees must be able to understand written text to do a job. The Workplace Documents assessment measures skills that individuals use when they read real workplace documents and use that information to make job-related decisions and solve problems. Messages, memorandums, minutes and agendas are usually workplace documents that are prepared for internal use. ... A memorandum (or memo) sends information to people in your organization about a work related topic.

Preparing a Workplace Document

When you sit down to write a document at work, you'll need to consider who the audience is and what the purpose of your message is (to inform, persuade, or entertain). With that information you can decide which document type (channel) to use.

A good approach is to outline the document first, marking out where each element belongs. For example, if you have chosen to write a letter, you might first identify the location of each address, the date, the salutation, the signature, and so on. This will help you to create the structure of your document and make the writing process (and, further, the editing process) much easier.

When you are writing a workplace document, you will choose whether to approach your topic directly or indirectly. A direct message gets to the point immediately within the document, whereas an indirect message sandwiches the key point (often bad news) between other information (positive or neutral detail) so as to "soften the blow" of an undesirable communication.

Types of documentation include:

- Requirements – Statements that identify attributes, capabilities, characteristics, or qualities of a system. ...
- Architecture/Design – Overview of software. ...

Technical – Documentation of code, algorithms, interfaces, and APIs. How do you implement a workplace policy?

To implement effective policies and procedures at your workplace, follow these steps to get the best results.

Documentation in the Workplace

Quick Navigation

- What is documentation?
- Reasons documentation is important
- Formal vs. informal documentation
- Documentation examples beyond HR
- Consequences of improper documentation

Maintaining a system of organized, accurate and consistent documentation in the workplace is both necessary and beneficial. Making documentation a priority, especially when it comes to the company's HR department, can help mitigate disputes, offer resources when they are needed and answer important questions about the company. In this article, we will discuss why documentation is important and ways you might consider improving your documentation process.

What is documentation?

Documentation refers to a set of records that exist online, on paper or on hard drives. It is material that provides evidence or information to serve as a record. In the workplace, documentation is retained records of employment and company actions and events as required by legal mandates and company policy.

The best human resource practices involve maintaining both formal and informal records about employment events. This can include items such as:

- Actions

- Contributions
- Disciplinary actions
- Disputes
- Investigations
- Performance evaluations
- Policy violations

Maintaining extensive records allows the human resources department to preserve a written history of events. Documentation can guide managerial staff on employee promotions, disciplinary actions, pay raises and terminations. Documentation should always be factual, supporting insights without relying on the opinions of others.

Reasons documentation is important

While there are many reasons maintaining a consistent, organized system for documentation can help you and your organization be successful, here are three main categories to consider:

1. It demonstrates professionalism

   Documentation shows both employees and customers that you are committed to safeguarding critical information and are dedicated to providing stakeholders with factual information as needed. The practice of maintaining accurate documentation alone provides an accessible, manageable framework for addressing issues that benefits everyone.

2. It provides helpful guidance for performance
   Documenting your processes ensures consistency, efficiency and standardization for everyone following them to perform at their best and be clear on your expectations. Taking the time to document each of your procedures in a step-by-step format will save time and money in the long run. This should also include the company's mission and vision, roles and responsibilities for every position, and any other expectations people who join your company.

   Once you outline what's important for the business and how to achieve goals, your overall group effort will be more direct and focused. As a result, your employees can reach goals sooner and with more ease.
3. The business can be more profitable

   Documenting information and processes saves important and costly employee time by offering answers to questions in an accessible way. When businesses document procedures, they will run more efficiently.

Formal vs. informal documentation

While certain documentation such as records of employment should be formal, it is appropriate for others to be informal. For example, a manager might keep a casual record of discussions she's had with employees throughout the year to address during one-on-one check-ins with them about their goals, projects or level of morale.

Informal documentation can even consist of notes or letters saved in an employee's personnel file. If an employee writes down a suggestion and gives it to management, they can file it away for future reference. Email and online interoffice communications can also serve as informal documentation when the need arises.

By contrast, formal documentation adheres to certain standards and conventions as determined by the company and official HR procedures.

How to properly maintain employee documentation

Maintaining employee personnel files is one of HR's most important responsibilities. While your company's requirements might vary, a strong employee personnel file should include, but is not limited to, the employee's:

- Job application
- Resume and cover letter
- Employment and education verification
- Position job description
- Emergency contact information
- Job offer letter, employment contrast or rejection letter
- Signed employee handbook acknowledgment form
- Relocation documents and agreements
- Employee orientation checklist
- Disciplinary action reports
- Self-assessments
- Recognition
- Suggestions and company responses
- Requests for training
- Co-worker complaints
- Training expense reports

If an employee is terminated or leaves the company for another reason, HR should continue documentation with the employee's:

- Resignation or termination letter

- Exit interview
- Insurance information
- Remaining paycheck information

Documentation examples beyond HR

Documentation isn't just for employee records and management practices. It also can also include items such as tech specifications, requirements, business logic and company manuals. Here are a few industry-specific documentation examples:

1. Software development

Software development is one industry where the importance of documentation is apparent. Whether you're talking about a small team or a large corporation, many people are often involved in software development projects. Therefore, proper technical documentation is important to complete tasks in a quality way.

Project documentation in software development can:

- Define the project
- Describe how the product should look
- Set coding standards
- Outline style guides and design patterns
- Formulate testing standards
- Define the subject of testing
- Document test results
- Provide instructions for product installation, usage and maintenance

Documentation must be comprehensive in an industry like software development because any errors create gaps between those having access to the information. For example, if stakeholders don't fully grasp the product, they may have different expectations for it than what the engineers are trying to deliver. Not only does documentation clearly outline relevant information, but it also prevents mishaps and misunderstandings.

2. Computer system management

System documentation refers to a solution that serves as a reference for future software and hardware update or maintenance efforts. In other words, it describes the capabilities and requirements of software and informs readers about the software's functionality. System documentation is more technical than other forms of documentation because it includes aspects like:

- Testing documentation
- Source code documentation
- API documentation

- Software architecture documentation
- Solution instructions for advanced users

User documentation within the realm of system documentation refers to information a non-IT user can more readily digest. Types of user documentation include user manuals, training manuals, installation guides and release notes.

3. Research

Performing research and writing up findings requires you to build and support an argument. Documenting your studies and giving credit to those whose ideas you've built upon is crucial. Reasons for documenting your research might include:

- Providing credit or attribution to the original creator or author
- Making the sources you used in your research accessible
- Enabling your readers to follow up on the research
- Enabling others to verify the completeness and accuracy of your research
- Communicating transparency, integrity and trust to avoid plagiarism

Part of being a professional researcher is keeping written, audio and visual documentation about your research. This includes recording their hypotheses, findings, questions and conclusions. Scientists must also collect data in order to analyze it—a form of documentation. Additionally, scientists may want to replicate an experiment to see if the test results vary based on a certain variable. In order to repeat the experiment precisely as before, they need documentation from the previous experiment or original scientist.

Those who perform scientific research need an accurate set of instructions to test hypotheses, repeat experiments, produce results and publish their findings. Without proper documentation in research, we wouldn't have the advanced technology, medications and agricultural methods we enjoy today.

Consequences of improper documentation

Many industries require thorough documentation performed in a specific way. If organizations fail to maintain organized records, some of the consequences may include:

- Ongoing audits
- Improper billing
- Inefficiencies for employee growth
- Lost revenue
- Compromised safety

Documentation is used in all organizations to record a variety of information. No matter your career path, it's important to understand the role documentation plays in the workforce and how you can benefit from keeping organized records for your own career.

Self-Check 8	Written Test

1 How important is documentation in the workplace?

2 Why should you ensure that you fully understand the workplace documents?

3 What are the business documents?

4 What are the types of documentation?

5 What is the main purpose of documentation?

List of Reference Materials

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