

STEERING & SUSPENSION PARTS

TROUBLE TRACER CHART

DUST BOOT SEALING ISSUE



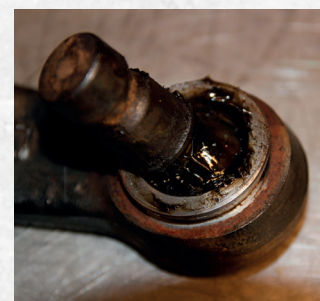
Appearance:
Small cuts on rubber boot or obvious lack of sealing around ball pin, often evident through the appearance of grease.

Most probable causes:
– High speed projection of sharp element from the road
– Misuse of sharp tools during installation
– Poor sealing performance around ball pin
– Rubber boot defect



Effect:
Water intrusion causes reduced lubrication power as grease is progressive lost from the housing.
→ Excessive play in the ball pin, knocking noise.

How to fix it:
→ No repair possible. Part must be replaced.



Prevention:
– At installation, check dust boot for defects and ensure a secure retention of the boot around the housing and ball pin (Moog's advanced quality control is designed to eliminate these issues)
– When fitting, use correct tools and take care not to cut the boot
– Correctly fit fixing strips around the steering rack gaiters

DUST BOOT DAMAGES



Appearance:
Large rip or split on the rubber boot, having a 'exploded' like appearance. Severe water/dust contamination can be observed inside the housing.

Most probable causes:
– Small cut that has enlarged over time
– Rubber boot turning with the ball pin during operation (repetitive twisting of the dust boot will eventually cause it to split)



Effect:
Grease becomes 'paste' like due to water and dust intrusion, quickly damaging ball pin plastic socket.
→ Excessive ball pin play and loud knocking noise.

How to fix it:
→ Play and knocking noise will quickly worsen, potentially to a safety-critical level. No repair possible. Part must be replaced as soon as possible.



Prevention:
– At installation, check dust boot for defects
– Ensure that the ball pin can freely rotate within its dust boot (Moog's advanced design follows OE specifications to avoid this issue)
– In the case of a link stabilizer, ensure that dust boot is not twisted after installation

DUST BOOT INCORRECT POSITION



Appearance:
The dust boot top opening stands around ball pin neck, i.e. under the stopper usually present on lower area of a ball pin.

Most probable causes:
– The dust boot has unintentionally been pushed down too far the ball pin neck during installation



Effect:
– Whilst the dust boot may not look damaged, its incorrect position allows an open entry for contaminants such as water and dust
– Grease becomes 'paste' like due to water and dust intrusion, quickly damaging ball pin plastic socket
→ Excessive ball pin play and loud knocking noise.

How to fix it:
→ Play and knocking noise will quickly worsen, potentially to a safety-critical level. No repair possible. Part must be replaced as soon as possible.



Prevention:
Take care while introducing the ball pin within the wheel knuckle. The dust boot shouldn't be handled during this operation, it will naturally take its correct position when the part is fitted (Moog parts are designed for optimum sealing performance once inserted in the wheel knuckle)

BUSHING RADIAL SPLIT



Appearance:
Rubber cracks on the radial direction of the bush, typically in the void area.

Most probable causes:
– Bush/void design issue
– Bush is defective or too rigid for the application
– Incorrect orientation of the bush during installation



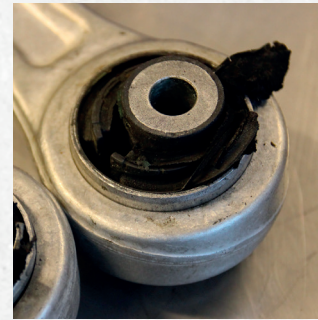
Effect:
Regardless of size, the crack will progressively increase over time.
→ Abnormal vehicle behaviour. During braking and acceleration, forces are not reverberated at the right locations. In extreme cases the vehicle could be hard to control, risking driver safety.

How to fix it:
→ No repair possible. Bush or control arm must be replaced as soon as possible.



Prevention:
– At installation, check the bush is free of any defect (Moog's advanced quality control ensures that parts match OE specifications for every application)
– When fitting, take care to correctly orient the bush

BUSHING AXIAL SPLIT



Appearance:
Bush rubber is split in axial direction, appearing as if 'over-twisted'.

Most probable causes:
– Bush is defective or too rigid for the application
– Control arm has been fully tightened on the vehicle sub-frame without the wheels being on the ground, causing abnormal pre-stress once the vehicle recovers its neutral position



Effect:
This will quickly lead to damage of all rubber around the bush inner tube, resulting in a knocking noise.
→ Abnormal vehicle behaviour. During braking and acceleration, forces are not reverberated at the right locations. In extreme cases the vehicle could be hard to control, risking driver safety.

How to fix it:
→ No repair possible. Bush or control arm must be replaced as soon as possible.

Prevention:
– At installation, check the bush is free of any defect (Moog's advanced quality control ensures that parts match OE specifications for every application)
– Limit first torque to a value allowing the bush inner tube to rotate within its seat while the vehicle is progressively recovering its neutral position. Apply the final torque value once the vehicle is grounded

BUSHING STICKY RUBBER



Appearance:
Rubber is deformed and sticky.

Most probable causes:
– Contamination from contact with oil or other chemicals has altered the properties of the rubber causing it to become pasty and sticky
– Non-conform curing parameter during rubber vulcanization



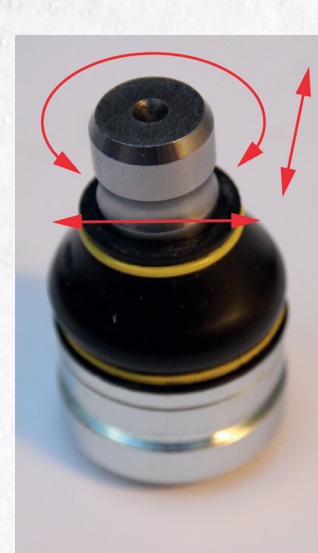
Effect:
The bush rubber will progressively lose its elasticity and rigidity, altering its damping features.
→ Abnormal vehicle behaviour during braking and acceleration. In extreme cases the vehicle could be hard to control, risking driver safety.

How to fix it:
→ Bush or control arm must be replaced as soon as possible.



Prevention:
– Ensure bush conformity prior to fitting. The rubber must not feel sticky. (Moog has strict quality control measures for the vulcanization process to avoid any curing issues)
– Ensure the parts are stored away from any chemicals
– Check and repair any fluid leakage which could contaminate the bushes

LOOSE BALL PIN



Appearance:
Whilst no visible trace of damage and contaminant intrusion on housing area is evident, by hand the ball pin is very easy to move (rotation torque < 1-2Nm) or a small clearance can be felt.

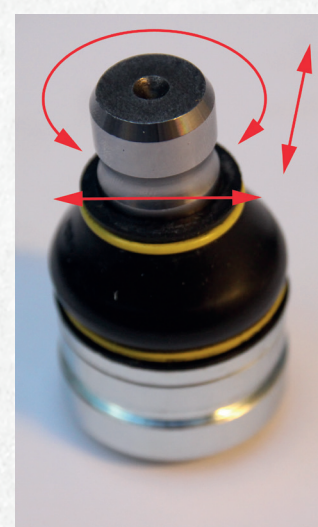
Most probable causes:
– Product defect
– Internal damage caused by hard driving or impact, especially at roundabouts (kerb, pothole, speed hump etc.)
– Normal wear in case of extensive service life

Effect:
The ball pin will loosen more over time.
→ Excessive play in the ball pin, knocking noise.

How to fix it:
→ No repair possible. Part must be replaced.

Prevention:
– Check, by hand for the correct articulation of the ball pin within its housing (Moog's advanced quality control only validates each assembly when the correct torque is achieved)
– Avoid hard driving and impacts
– Fit high quality, durable parts. Moog design features ensure best service life

SEIZED BALL PIN



Appearance:
– Ball pin is very hard to move by hand (rotation torque >30-40 Nm) and/or has a jerk effect (high breakaway torque).
– No visible trace of damage, nor any contaminant intrusion on housing area.

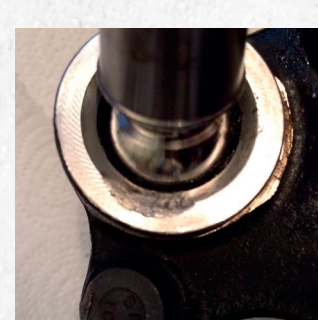
Most probable causes:
– Product defect
– Oversized housing diameter of a pressed ball joint, seizing after being pressed on its arm body bore

Effect:
Potentially a safety-critical issue. A reduction of power steering efficiency is evident and in extreme cases the driver cannot recover steering to the neutral position after cornering.

How to fix it:
→ Replace the seized ball joint and/or full assembled control arm as applicable.

Prevention:
– Check the housing diameter of a pressed ball joint is compatible with arm body hole diameter
– Check, by hand for the correct articulation of the ball pin within its housing (Moog's advanced quality control only validates each assembly when the correct torque is achieved)

IMPACTS ON HOUSING FLANGES



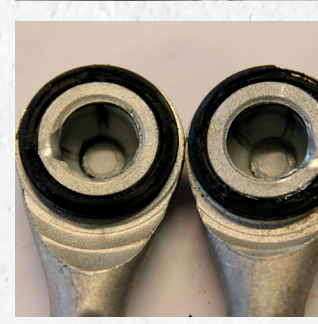
Appearance:
Obvious traces of impact on the housing flange.

Most probable causes:
– Damage caused by hard driving or impact, especially at roundabouts (kerb, pothole, speed hump etc.)
– Insufficient ball pin articulation angle (each Moog ball joint is carefully designed to follow OE specifications to ensure the correct articulation angle for each vehicle application)
– Inversion L/R during installation (especially valid for link stabilizers where ball pins are shifted by 150°)



Effect:
Any high impact is likely to deform the plastic bearing through the reverberation of force on the ball pin. The result is a knocking noise due to development of excessive ball pin clearance.

How to fix it:
→ Such impact can potentially weaken other steering and suspension parts. As a safety measure, as well as replacing the damaged part, the full system should be checked.



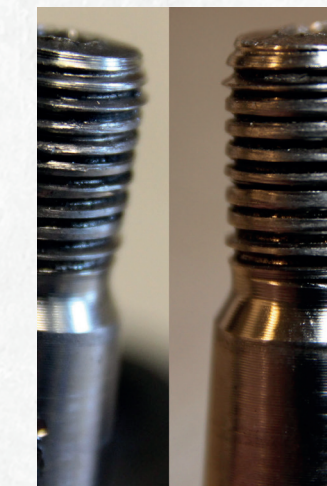
Prevention:
– Avoid hard driving and impacts
– Double check that any handed part is fitted on the correct position

STUD, NUT OR BOLT DAMAGE



Appearance:
– Stud or bolt broken by torsion.
– Thread damaged.

Most probable causes:
– Product defect
– Incompatibility of thread size/pitch between bolt/stud and nut
– Incorrect tightening torque applied
– Wrong tooling used



Effect:
Safety critical risk. Compromised mechanical integrity.

How to fix it:
In the case of even the slightest suspicion of damage. Dismantle immediately and replace with new part.

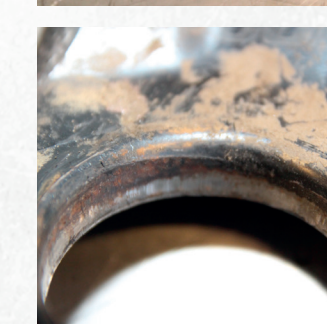
Prevention:
– Use new and correctly specified fixings (Moog makes this easy by providing the required fitting accessories which meet the required specifications)
– Always tighten bolts/nuts using the vehicle manufacturer's recommended torque value
– Never use a torque gun or impact wrench. Use a standard manual torque wrench or other dedicated tool

BALL JOINT LOOSE ON CONTROL ARM BODY



Appearance:
– Ball joint housing is turning loose within its arm body bore.
– Both ball joint housing and arm body bore flanges are rusty.

Most probable causes:
– Arm body bore flange not cleaned before pressing operation
– Incompatibility [housing - hole] diameters. Potentially multiple ball joint replacements have enlarged / ovalized the arm body hole
– Ball joint was not fully pressed or not pressed in straight



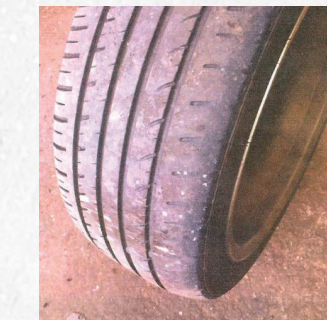
Effect:
Knocking noise. Progressive 'machining' of the arm body hole will cause a reduction of ball joint pull out force and the housing could 'pop out' of the arm body hole if not secured with a snap ring.

How to fix it:
→ No repair possible. Part must be replaced.



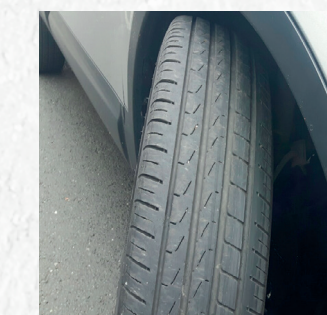
Prevention:
– Always press ball joints with dedicated equipment and appropriate tooling. (Moog servo-pressed and enhanced fixtures ensure a 100% conforming pressing operation)
– For driver safety, MOOG recommends that a 'press-in' ball joint is only replaced on one occasion and that any subsequent repair should use a fully assembled wishbone arm

ABNORMAL TIRE WEAR



Appearance:
Tyres display abnormal or uneven wear from the outer to inner edges.

Most probable causes:
Wheels are not correctly aligned (particularly toe and camber alignment) after impact, a change of steering/suspension parts or for an extended period of time



Effect:
Vehicle may pull to one side or steering may be difficult or erratic.

How to fix it:
– Replace excessively worn tyres, as well as any potentially damaged part of the steering and suspension system
– Carry out a wheel alignment on the vehicle

Prevention:
Always carry out a wheel alignment:
– After an impact
– After any change of steering and suspension part
– At regular service intervals

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www.drivparts.com/en-eu/garagegurus.html



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