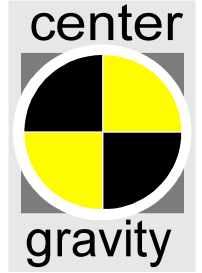


Road Report



Name: Mr Bump
Car: Porsche 996 C4S
Year: 2003 / WPOZZZ3s6*****
Date: 4th August 2009

Road Test 1 No changes to suspension

Initial drive on A-road and dual-carriageway

- Wallowy, bogged-down steering and direction change compared to typical C4
- Steering wheel offset to left driving straight-ahead
- Feeling of a pendulous motion at low speed apparently from wheels
- Whole car low frequency vibration builds at speeds above 50mph through 70mph
- Vibration is a low frequency (like thrum from engine/propeller felt on a ferry)
- Vibration worsens when under load travelling up mild inclines in any gear
- Vibration frequency doesn't change if de-clutch
- Noise/creak/clunk on low speed parking manoeuvre from near side front wheel/suspension
- Rear suspension handling of high speed bump (manhole covers etc) very crashy tending to worsen after car engine thoroughly warm
- Plastic/metallic clap/noise from engine compartment when hitting severe bumps at low speed
- Thump from rear suspension when negotiating speed bumps at 5-10mph combined with plastic/metallic noise
- Feeling of a misfire if blip throttle at idle as car vibrates unevenly
- Geometry (cambers/toes) generally symmetrical car chassis not greatly upset

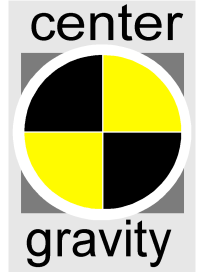
Road Test 2 Wheels changed for Boxster S wheels with Continental Contisport contact 2 tyres

Same route as road test 1

- Vibration from front wheels accompany all other symptoms described in road test 1

Underside investigation

- Wheel axial and radial runouts investigated. Rear runouts are especially high in region of 1.1mm (could be due to thickness of paint on rims – see below)
- 3 x original wheels (OEM Turbo twist look-alike) have too much paint applied from previous refurbishment. Paint and high build primer as thick as 0.75mm on wheel hub contact points. This has subsequently been removed. Due to the amount of material removed it would be wise to have 3xwheel tyres rebalanced
- All 4 x track control arm bushes are in good condition
- Anti-roll bar bushes are in good condition
- Engine can be moved circa 10mm on engine mounts by hand pressure applied to exhaust manifolds. Suspect the offside mount to be faulty (could be associated with the osr tailpipe being lower than nearside)
- On start-up, engine rocks significantly on engine mounts
- Transmission mount investigated. The polyurethane bump stops are ill/loose fitting allowing transaxle to move side to side
- Wheel bearings and driveshaft joints were not investigated
- Nearside front under bumper cover /radiator duct/spoiler missing
- Nearside transmission cover plastic damaged around rear jack point
- Both front top mounts are worn showing initial signs of delamination (rubber peeling off inner sleeve)
- Nearside front strut/top mount bearing/top mount creak under full droop doing lock check. No thrust/play has been detected though (observation not critical)
- Correct OEM springs/dampers fitted for car 996 C4S blue/white rear springs and pink/blue/orange front springs
- Damper exterior condition is good and show no signs of leakage



Geometry Investigation

- It was decided to conduct geometry check before swapping rear dampers/springs (as these would alter the ride heights and geometry)
- Full four wheel measurement done. Both front and rear toe measurements were over twice that of the Porsche specification.
- There are no contra-indicators of any major kerb/accident damage (KPI/setback/Castor)
- The adjustment points were all free and operated correctly within their ranges
- Adjustment was made on the justification that excessive toe angles can be associated with driving vibrations as well as accelerated tyre wear. In the case the toe would have caused understeer, wholly turn initiation, dead and stiff steering and turn-in
- Cambers were corrected and synchronised front and rear. Cambers were between than expected for the model year.
- The car has had geometry adjustment previously (professional indicators suggested from markings found on rear adjusters)
- Car ride heights were measured and are correct to model specification

Road Test 3 After geometry adjustment and paint removal from wheels

- Road test on same route as tests 1 and 2 and additionally on bump B road
- Steering wheel correctly aligned and level
- Steering now eager to change direction, turn-in crisp and reflective of 996 steering feel
- Car rolls easier. Car steering and change of direction more fluid
- Car stable over bumpy roads at speed, suspension is correctly functioning
- Vibrations still present as per road tests 1 and 2 in all the same conditions
- Crash/thump from rear present still over high speed bump and road speed bumps

Conclusions and further action suggested

It has been shown that the wheels are not the main contributor to the vibration, by swapping them for a known good set of wheels.

Further a geometry check, specifically the toe angles which are known to cause vibrations at speed intervals whilst they were massively out of specification still didn't resolve the vibration issue, albeit have improved the cars feel and handling performance.

Faulty dampers and worn/faulty engine/transmission mounts are the only factors likely to contribute to driving vibrations when all other wheels/hubs/geometry have been investigated and addressed.

Investigation suggests that the one or both rear dampers may be at faulty (high speed bump crash). Investigation also suggests that the one/both of the motor mounts may be faulty.

The next course of action would be to substitute the dampers/springs with a known good set of dampers. Because of the relatively low cost and ease it would be wise to replace motor mounts.