
TECHNICAL BULLETIN No. 3

BRAKE NOISE – CAUSES AND SOLUTIONS

All garage mechanics are occasionally asked to cure brake noise problems affecting customer's vehicles. Sometimes the noise has 'appeared' or become worse over a period of time, or perhaps the noise started after a service during which brake or suspension components have been replaced.

Quite often the decision is taken to replace the brake pads, these being the cheapest and quickest component to replace in the braking system. If changing the pads eliminates the noise, it is easy to conclude that the pads were the cause of the problem. However, is this assumption always correct?

ARE THE BRAKE PADS ALWAYS TO BLAME FOR BRAKE NOISE?

The short answer is that brake noise is not usually caused by the pads alone.

A characteristic of any friction brake system is that all the components of the braking system vibrate together when the brakes are applied. This vibration creates noise all the time but, fortunately, the noise is usually at low volume, and / or the frequency of the noise is outside the range of human hearing, and therefore inaudible.

However, occasionally, a brake system will vibrate at a frequency that coincides with a natural vibration frequency of the brake system. This causes the phenomenon known as resonance. The effect of resonance is to amplify the noise considerably and, if the frequency is within the human hearing range, the noise will now be audible to the driver. The frequency of the noise will determine whether it is heard as a groan, squeal or squeak.

Good brake system design minimises the chance of resonance, and in the majority of cases this is achieved successfully - at least when all the components are new. However, as vehicle mileage increases and components start to wear, the vibration characteristics may begin to alter, potentially making the system more likely to resonant. This is why a brake system can sometimes become noisy after twenty or thirty thousand miles.

As the mileage increases further, and components are replaced, the brake system becomes a mixture of new and part worn components. This may alter the vibration characteristics of the system and increase the risk that the brake system will suddenly become 'noisy' after maintenance work has been done and components have been replaced.



WHAT ARE THE CHANCES OF BRAKE NOISE OCCURRING?

Surprisingly low is the answer. Out of every 400 sets of Brakeworld brake pads sold, only one set will be subject to a warranty claim related to brake noise.

However, it is well documented that the incidence of noise for individual vehicles, or vehicle types, can be higher. Some of the factors that increase the risk of noise following brake pad replacement are as follows:-

- Poor brake system design – leading to a greater tendency to noise problems as mileage increases.
- Failure to replace badly worn brake discs, calipers etc.
- Failure to adequately clean calipers and correct faults such as seized pistons and slide pins.
- Omitting to refit pad fitting hardware or re-using worn fitting hardware.
- Incorrect fitting of pads – eg. failure to ensure that inner and outer pads are fitted in the correct positions and, where applicable, not ensuring piston clips are orientated correctly with respect to the direction of disc rotation.
- Attempting to modify incorrectly supplied pads not designed for the vehicle.

CONCLUSIONS

- The key conclusion is that brake noise is a result of a complex interaction between all the brake system components, and is not caused by the pads alone.
- Ensuring that all components of the braking and suspension system are in good condition and well maintained will reduce the risk of brake noise occurring.
- Replacing brake pads to cure brake noise should only be undertaken following careful inspection of all other braking and suspension components, to eliminate the possibility that faults or excessive wear in these components is the underlying cause of the brake noise.
- A small number of vehicles will suffer brake noise problems as the vehicle ages or after braking components have been replaced. This is irrespective of the type or brand of brake pads that are fitted.