BRAKE SHUDDER – RECOMMENDED SERVICE PROCEDURES FOR DISC MACHINING & INSTALLATION

VT

(GROUP 5)

Update

*This Service Techline item further enhances ADL 88/98 on the same subject. Please note additions to **ADL 88/98** are in italic text. The dial indicator mounting plate dimensions have also been revised (Figure10).*

1. UNDERSTANDING BRAKE SHUDDER & IT'S CAUSES

1a. Symptoms

Typically, shudder occurs under light/medium braking from vehicle speeds of around 70 - 100 km/h.
The symptom of **front** brake shudder is a pulsation felt in the brake pedal which is usually accompanied by an oscillation of the steering wheel.
The symptom of **rear** brake shudder is pedal pulsation as well as a vibration that is felt through the seat.

1b. Diagnosis

When a vibration/shudder condition is reported, a road test should be done to confirm that the condition is actually brake shudder. Brakes should be tested while driving on a dry, clean and reasonably smooth road surface. Perform at least two, light/medium braking applications from 80 – 100 km/h down to 40 km/h whilst observing for shudder symptoms.

1c. Cause of Brake Shudder

Brake shudder primarily occurs as a result of variation in the thickness of the brake disc. This in turn causes variations in brake surface pressure as the varying thickness disc passes between the pads during braking.
The variation in thickness of the disc can be measured with a micrometer as shown in Fig 1.
NOTE. A disc that varies in thickness by more than .015mm (15 micron) will cause brake shudder.

New discs develop Disc Thickness Variation (DTV) as a result of excessive lateral runout in the disc combined with caliper drag during non-braking running time. On each revolution of the disc a portion of the disc comes into contact with the pad. Eventually the disc wears at the point of contact thus creating thickness variation.

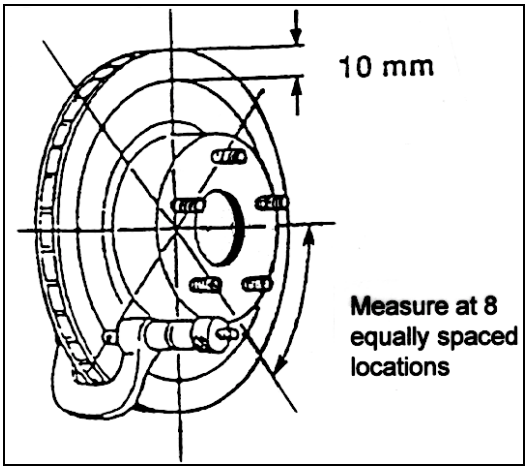

FIGURE 1 Measuring Disc Thickness Variation
[DTV = Maximum thickness – Minimum thickness]

What is Assembled "Lateral Runout"

The term "lateral" literally means "sideways". Assembled lateral runout is measured with a dial indicator whilst rotating the disc on the vehicle.

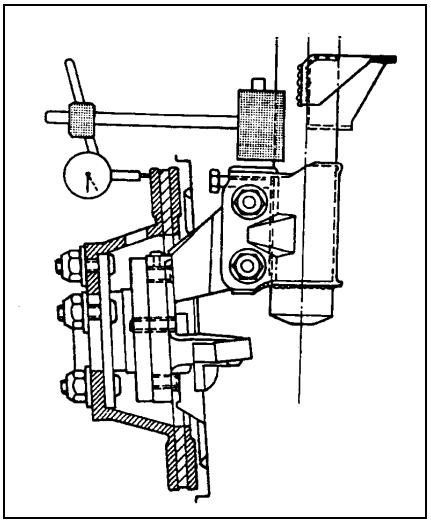

FIGURE 2. Measuring disc lateral runout

Apart from accident damage, excessive assembled lateral runout of discs may result from one or more of the following:

1. Disc not machined to specification

Defective machining may result in lateral runout and/or DTV above specification.

2. "Tolerance Stackup"

This term is best described by the following example.
A front hub/bearing unit may show a runout of 0.030 mm near the outer edge of the mounting face. The brake disc itself may have lateral runout of 0.030 mm near its outer diameter. These runouts taken separately are within allowable tolerances. However, if the disc is placed on the hub so that the high point on the disc is aligned with the high point on the hub then the combined result is an excessive lateral runout (at the disc outer diameter) of about 0.090 mm.
To minimise the effect of "tolerance stackup" refer to the Disc & Hub Indexing Procedures on pages 5 and 8.

3. Incorrectly Tightened Wheel Nuts

Over-tightened wheel nuts or those tightened in the wrong sequence will cause distortion of the disc and result in excessive lateral runout.

To prevent distortion of the disc and hub assembly, wheel nuts must be tightened to the specified torque in two steps, using a suitable torque wrench. Follow the nut tightening sequence as shown in Figure 3.

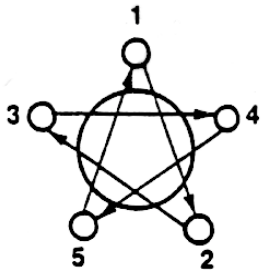

FIG. 3 Wheel nut tightening sequence

Road Wheel attaching nut tightening torque	**110 – 140 Nm**

IMPORTANT!

DO NOT USE AN AIR IMPACT GUN TO TIGHTEN WHEEL NUTS UNLESS IT IS FITTED WITH A TORQUE LIMITER BAR.

Failure to observe this may result in warped discs which lead to development of brake shudder.

Torque limiter bars can be obtained from most automotive tool suppliers.

4. Foreign Material at disc to hub interface

Foreign material between the disc and hub mounting faces will contribute to assembled runout.. It is vital that any foreign material such as corrosion, dirt, burrs on hole edges etc are removed.