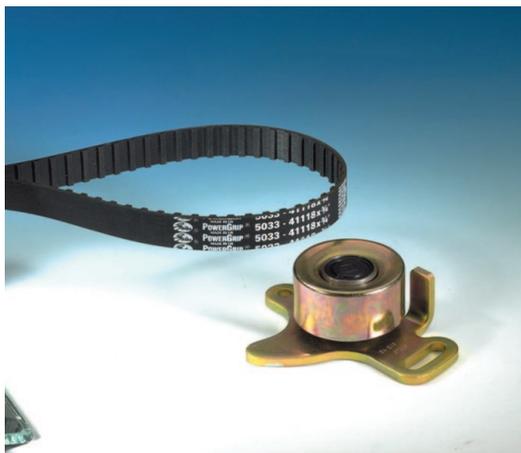




THE BEARI

Certain issues should always be considered when replacing timing belts. Gates reports on the causes of premature failure.



CASE STUDY

Manufacturer: Nissan
Model: Micra K10
Engine: 1.0 litre
Year: 1990

It was one of those occasions when the major problem arose as a result of repairing something else. The outcome helps explain the diagnostic routine whenever a timing belt fails prematurely, as well as raising several issues that repairers should always consider when carrying out similar repairs on older vehicles.

The 13 year-old Nissan Micra was actually booked-in because the water pump was leaking. It was a problem that would be quickly resolved with a replacement unit that was readily available from the local motor factor. However, as part of the water pump replacement procedure the old timing belt should always be discarded and replaced with a new one. It's here that critical errors can be made.

Many technicians fail to appreciate

that the refitting of a belt that apparently has 'plenty of life left in it' can be a serious error of judgement. That's because a pretension element is built into a timing belt's manufacturing process.

In the case of this Nissan Micra, the garage technician correctly recognised that, in accordance with good workshop practice, the existing timing belt (however recently it might have been installed) could under no circumstances be reinstalled. So, a new belt was fitted, but unfortunately, something was overlooked.

METAL PART WEAR

Unfortunately in this case, wear of the metal parts that make up the remaining components of the drive system went undetected. Later investigation would reveal that there was lateral movement to the belt tensioner. The leaking water pump should have indicated significant wear to the water pump. This should also have suggested significant wear among the remaining components of the drive belt system — in this case, the tensioner. However, as the wear was not detected at the time, the tensioner was not replaced when the new belt was installed.

No wonder the timing belt failed prematurely. The engine suffered significant damage and the motorist returned the vehicle to the garage for rectification. The garage called in the motor factor and a warranty claim was initiated.

WARRANTY INSPECTION

As part of its product support and customer care procedures, Gates delivers technical training. This covers everything from basic handling errors (such as crimping the belt) to actual installation techniques. It also provides the expertise to diagnose the reasons why a timing belt has failed prematurely.

The diagnostic routine begins with an initial examination of the belt. This might reveal the true cause of the problem. For instance, root cracks to the teeth of the belt might indicate that the problem was associated with



tension of the belt. Damage to the belt itself could indicate a misalignment issue. A foreign body (stone-chips, for example) could be a cause. In the case of the Nissan Micra, the belt had been shredded. If

NG STRAITS

shredding occurs on the inside-edge, evidence of scouring or scuffs on the engine block is likely. On this occasion, the damage had been caused on the outside-edge and the evidence was visible on the timing belt cover.

MISALIGNMENT

The picture below shows the arc created by the belt as it ran against the timing belt cover. This usually occurs because the belt has tracked in the drive system and is running out of alignment. In this case, the belt came into contact with the timing belt cover, causing wear on the belt and created a hole, which can be clearly seen. The belt was eventually destroyed, with devastating consequences for the engine.



In order to determine the cause of the misalignment, all of the related components were examined. As the oldest component in the drive system, the tensioner was a prime suspect. Sure enough, there was evidence of 'play'. The bearing could be moved with very little effort from side to side.

A leaking water pump would normally suggest significant wear to the pump's bearing. It also suggests that other components in the drive system are also worn (ie tensioners and pulleys). There was no doubt that the tensioner was the cause

of the misalignment. The worn tensioner should have been replaced when the new belt was fitted. This belt had very little chance of completing a full duty-cycle.

GOOD PRACTICE

Timing belts are vital components in today's technologically laden engines. The metal parts of the drive system should be replaced every time the belt is changed. That's because the technician — and indeed the garage proprietor — can have no reasonable expectation about the future performance and longevity of the metal parts that are in-situ.

In the case of the Nissan Micra K10, the recommended duty-cycle is 60,000 miles on earlier models (up to 1992) and was later reduced to 54,000 miles (1992 onwards). It makes sense to change the metal parts, otherwise the performance of the belt could be compromised.

From the customer's point of view, the only incremental cost involved — in this case a single tensioner — is supplied as part of a timing belt kit. Very little extra labour was required.

REPORT AND CONCLUSION

The evidence from the broken belt and the damage to the timing belt cover proved beyond question that the premature failure of the timing belt was a direct consequence of the presence of a worn tensioner in the drive system. This should have been detected and replaced at the same time as the new timing belt.

CONSEQUENT ISSUES

Although the Nissan Micra was booked in for a water pump problem,



the garage accepted responsibility for the consequential engine damage because, in accordance with good workshop practice (and as highlighted in various manuals associated with timing belt replacement procedures), the worn tensioner had not been identified when the timing belt was changed.

The technician will regret trying to save the customer money by only replacing the timing belt to keep the old Nissan Micra on the road when the original belt failed. The garage had to bear the consequential expensive and additional repair bill. In future, even if a vehicle coming in has a low book value, no doubt this technician will replace all metal parts along with the timing belt.

need to know more?

- For more information on Gates timing belts and tensioning equipment circle readerlink 297