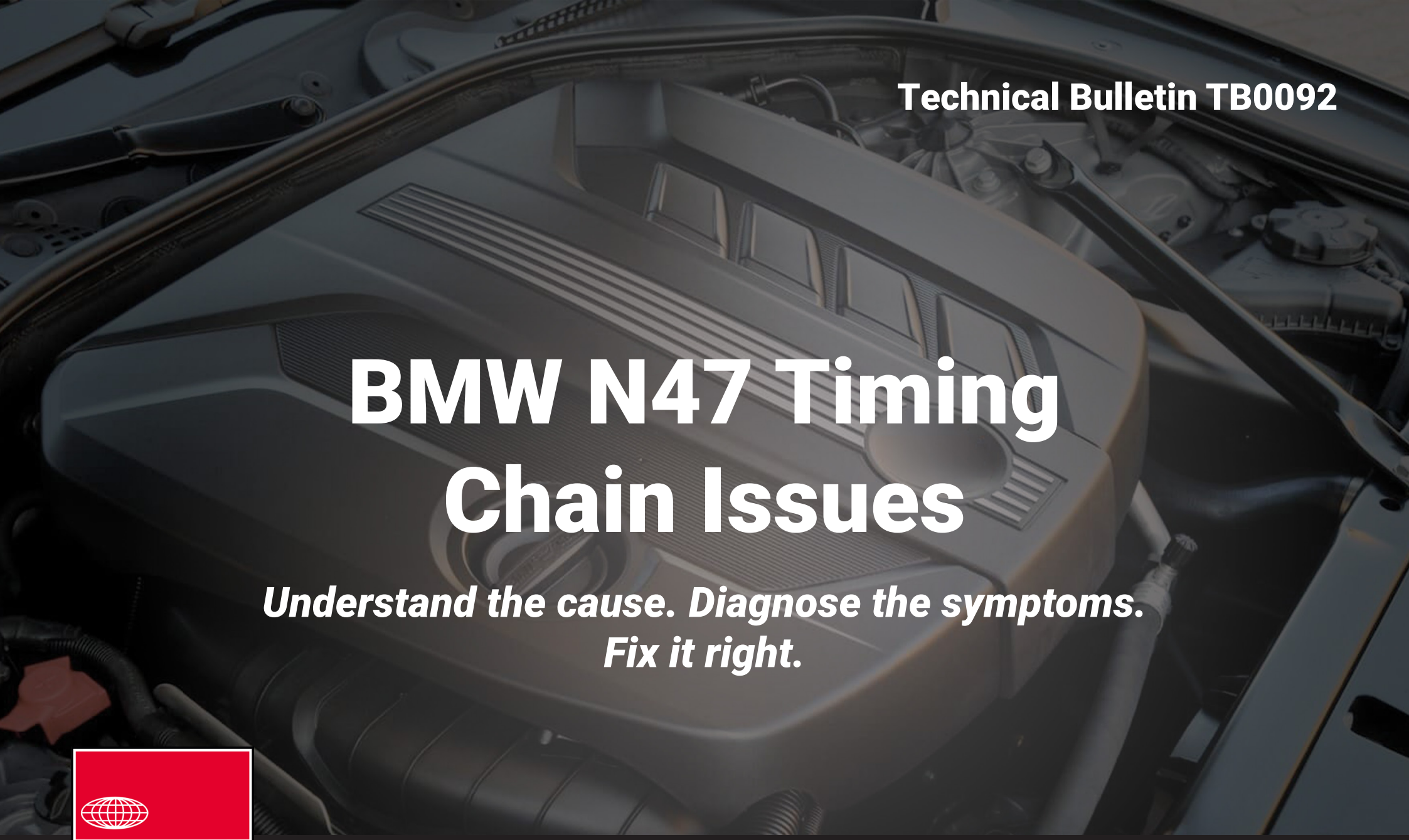


Technical Bulletin TB0092

BMW N47 Timing Chain Issues

Understand the cause. Diagnose the symptoms. Fix it right.

FAI Auto Parts

faiauto.com

WHY THIS GUIDE MATTERS?

The BMW N47 engine is known for serious timing chain issues that can lead to catastrophic failure if left unresolved. This guide provides technicians and fitters with the tools to identify common symptoms, understand the engineering flaws, and follow best-practice replacement procedures using FAI's upgraded TCK solution.

ABOUT THE N47 ENGINE

2.0L Turbocharged 4-cylinder Diesel Engine.

Used from 2007 - 2015

Found in:

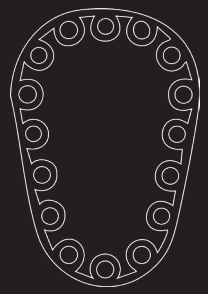
- 1 Series **(E81, E82, E87, E88)**
- 3 Series **(E90, E91, E92, E93)**
- 5 Series **(E60, E61)**
- X1, X3, and others
- Mini diesels
- Also used in various Toyota models

Multiple variants exist, including the **N47D20A, N47D20C,** and **N47D20D;** however, the earlier iterations, particularly the **N47D20A,** are known to exhibit significantly more reliability and performance issues compared to later revisions.

USED IN OVER 1 MILLION VEHICLES GLOBALLY. A CRITICAL ENGINE PLATFORM FOR BMW DIESELS.

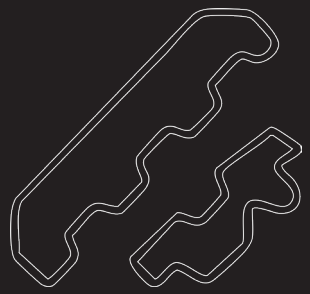
MAIN FAILURES OF THE N47 ENGINE

TIMING CHAIN STRETCH



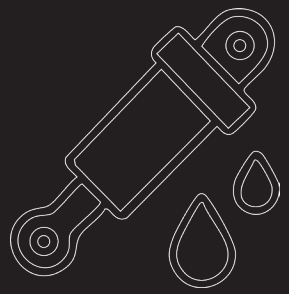
Chain elongates under stress, causing timing to drift. Usually starts at 40,000 - 60,000 miles.

CHAIN GUIDE DISINTEGRATION



Plastic guide crumbles or break, sending debries into sump and clog the pickup strainer.

WEAK HYDRAULIC TENSIONER



Tensioner can't maintain pressure - especially bad on cold starts and with Stop/Start system.

OVER 60% OF FAILURES OCCUR BEFORE 75,000 MILES. MOST GO UNDIAGNOSED UNTIL IT IS TOO LATE.

WHY THE N47 IS CHALLENGING

The N47's timing chain is located at the rear of the engine, positioned between the engine block and gearbox. This design requires engine removal or transmission separation for access, making even routine chain replacement a labour-intensive and costly procedure.

Exacerbating the issue, BMW originally recommended extended oil service intervals **(15,000–20,000 miles)**, which contributed to accelerated chain wear. Early versions also suffered from inferior chain materials and fragile guide designs, making premature failure far more likely than in conventional layouts.

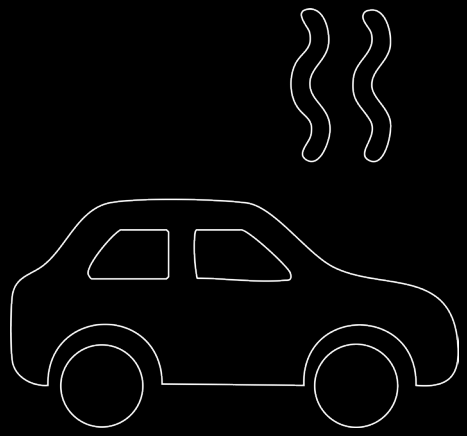
£1800–£3500 TO REPAIR.

COMMON SYPTOMS

COLD START RATTLE

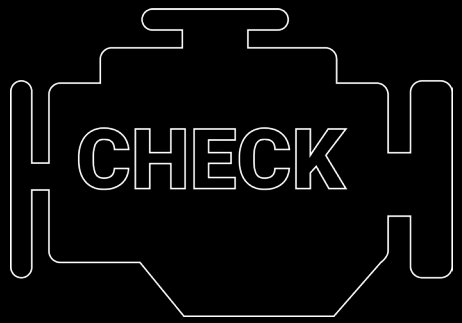
Metallic noise for 1–2 seconds at cold start is the most common early warning sign.

IDLE RATTLE



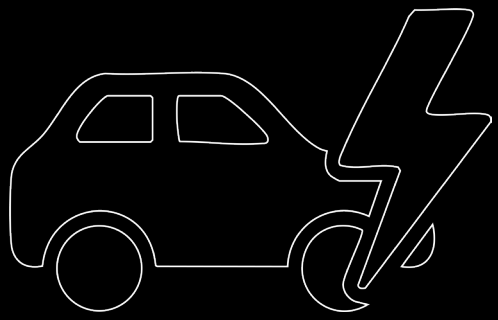
Ongoing rattling at idle may suggest chain slack or guide failure.

CHECK ENGINE LIGHT



Often shows timing-related error codes (e.g., P0016, P0017).

LOSS OF POWER



Chain wear can cause rough running, reduced performance, and misfires.

CATASTROPHIC RISK

If the chain jumps or snaps, it causes severe internal engine damage — often requiring a complete rebuild or replacement.

Worst Years: 2007 - 2011
Biggest Issue: Cold start rattle
Engine-out Repair: Yes
Fix Cost (UK): £1800 - £3500
Fix Cost (US): $2500 - $4500
Early Warning: Have a mechanic listen at cold start

SOLUTIONS

If caught early:

Timing chain kit replacement (chain, guides, tensioners)

If caught late:

Full engine replacement or rebuild is often necessary.

If the damage is extensive, the vehicle may be deemed economically unviable to repair.

SUMMARY OF THE BMW SERVICE INFORMATION FOR N47 TIMING CHAIN ISSUES

Bulletin Titles:

SI B11 09 07

Technical Campaign for timing chains — focused on early N47D20A engines

SI B11 03 13

Updates to chain and guide parts — post-2011 engines

Service Measures known as:

- "Kettenproblem" (Chain Problem, German internal Nickname)
- Sometimes listed under Quality Enhancement Programs (QEP) in Europe

Key Points from the Bulletins:

1. Symptom Descriptions

- Abnormal "rattling noise" when starting a cold engine
- Warning lights related to timing issues (DTCs like 3F00, 4B10, P0016, P0017)
- 4B10- Fuel injector control
- P0016 – Correlation error between crankshaft and camshaft position sensor
- P0017 – misalignment between crankshaft and camshaft
- Engine roughness or misfires after cold start

2. Diagnostic Instructions

- Listen for metallic noise from rear of engine
- Check with stethoscope or vibration meter
- Run diagnostic test for cam/crank synchronization faults
- Oil filter inspection: check for plastic debris from timing guides

3. Repair Procedure

Replace:

- Timing chain (main, oil pump chain if needed)
- Chain guides (switch to updated stronger versions)
- Chain tensioner (updated design with stronger spring/hydraulic unit)

IMPORTANT:

Due to the engine configuration, BMW has specified the complete removal of the engine assembly to allow unobstructed access to the timing chain components. (Engine removal is explicitly required per official documentation.)

4. Updated Parts

BMW introduced revised part numbers:
- Timing chain kit
- Chain guides (stronger plastic/nylon)
- New hydraulic tensioners
- New crank sprockets in some cases. Crankshaft sprockets on early engines known to be faulty. BMW revised the sprocket from 2011 onwards. FAI kits include new sprocket to modified spec

5. BMW Warranty/Goodwill

- Early on, BMW covered many failures under warranty (usually under 5 years or 100,000 km)
- Later, goodwill repairs were case-by-case, based on service history (e.g., proof of regular oil changes)
- Some territories (like Germany and the UK) had extended repair campaigns quietly offered to customers

EXTRA TECHNICIAN NOTES

Never reuse crankshaft bolts — they are single-use stretch bolts. Replace the vacuum pump chain if contamination is suspected.

Inspect the crankcase pressure system for leaks. Faulty PCV systems can cause oil misting instead of proper lubrication, leading to accelerated timing chain wear and inconsistent tensioner pressure, which promotes chain oscillation.

LATER IMPROVEMENTS

Beginning around 2012–2013, BMW introduced revised components, including higher-strength timing chains, redesigned guide rails, and improved tensioners.

However, even these updated parts remain susceptible to premature wear. Adopting shorter oil service intervals (every 5,000–10,000 miles on earlier engines) significantly enhances component longevity.

ADDITIONAL RECOMMENDATIONS

For vehicles equipped with this engine series, disabling the automatic stop/start function can help reduce mechanical load on the timing chain and tensioner assembly.

SUMMARY

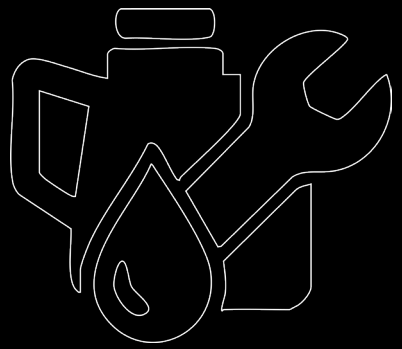
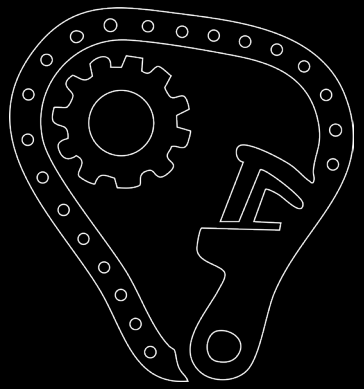
BMW acknowledged internal concerns regarding a design flaw in early N47 engines and gradually introduced revised components between 2011 and 2013.

Service bulletins emphasized early detection, comprehensive timing chain system replacement, and technician training to ensure prompt and accurate diagnosis.

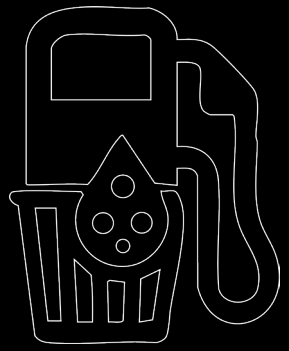
BMW PART IMPROVEMENTS (POST-2011)

COMPONENT	OLD PART NO.	UPDATED PART NO.	NOTES
TIMING CHAIN	11317797760	11318513813	STRONGER MATERIAL
TENSIONER	11317793064	11318510014	STRONGER SPRING
GUIDE RAIL (LONG)	11317796361	11318507649	IMPROVED NYLON
GUIDE RAIL (SHORT)	11317796362	11318507650	
OIL PUMP CHAIN	11417791485	11418511226	OPTIONAL
CRANK SPROCKET	11217800558	11218511215	REVISED PROFILE

BMW N47 ENGINE - RECCOMMENDED SERVICING & PREVENTATIVE MEASURES

	BMW ORIGINAL SCHEDULE	BEST PRACTICE
OIL CHANGES 	Every 18,000 miles/30,000 km or 2 years.	Every 5,000–10,000 miles depending on the mileage of the engine (8000 – 16,000 km). Use BMW LL-04 approved oils only (5W30 typically, C3 spec). Why? Fresh oil maintains chain lubrication, reduces soot buildup, and protects hydraulic tensioners.
TIMING CHAIN INSPECTION 	No regular inspection unless noise appears.	Listen carefully at every oil change (especially cold starts). Remove oil filter housing and inspect for plastic debris around filters (sign of guide wear).

FUEL FILTER CHANGES

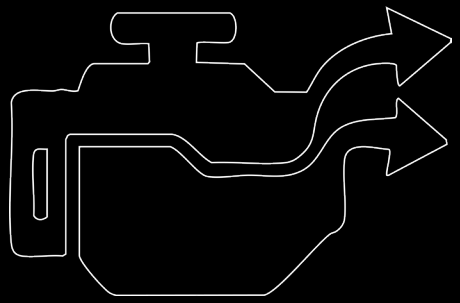


Every 36,000 miles/60,000 km.

Change fuel filter every 25,000–30,000 miles (especially on heavily used cars or poor quality diesel fuel).

Clean fuel system reduces injector strain and improves combustion.

CRANKCASE BREATHER (PCV)

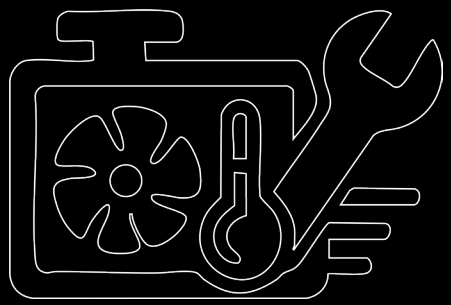


Lifetime part.

Replace or clean crankcase breather every 40,000–50,000 miles.

(Blocked breathers cause high crankcase pressure, oil leaks, and can worsen timing chain wear.)

COOLING SYSTEM MAINTENANCE



Recommended to change every 48 months.

Change coolant every 4-5 years.

OTHER IMPORTANT ITEMS

EGR Valve / Cooler:

Inspect or clean every 30,000–40,000 miles, especially if the car does lots of short trips.

Intake Manifold:

Clean manifold + swirl flaps around 70,000–90,000 miles (carbon buildup common on all BMW diesels).

Turbocharger Oil Feed Line:

Check for blockages around 100,000 miles — oil starvation kills turbos.

Signs to Watch for (Early Warning of Problems)

- Cold start rattling, if when the engine starts it rattles for 1–2 seconds take it as early warning and get the engine checked but if the rattling noise carries on any longer you have a potential catastrophic engine failure just waiting to happen
- Slow crank/rough idle after starting
- Oil consumption increase (chain tensioner relies on consistent oil pressure)

SUMMARY

If you more than halve BMW's original long service intervals and listen carefully for early chain noise, the N47 can actually live a fairly long life.

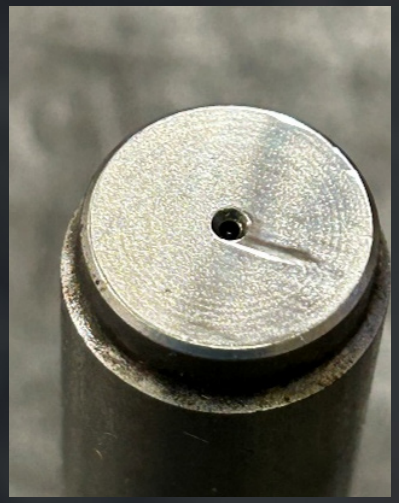
Frequent oil changes are the most important thing you can do to save the timing chain!

FAI TIMING CHAIN KIT

- All critical parts replaced in one kit
- Engine-out job: replace everything while accessible
- FAI kits include upgraded crank sprocket (BMW's early sprocket spec was flawed)
- Plated chains to resist oil contimination

COMMON DAMAGE FOUND ON FAI WARRANTY CLAIMS AND THEIR CAUSE

Heavy carbon build up and debris on returned parts. This is caused by many factors from age to malfunctioning breather systems and EGR. Long service intervals allows carbon to build up within the engine which can be accelerated by many other factors. Carbon build up is the number 1 cause of replacement chain failure



The Carbon blocks the oil pathways in the tensioners. This restricts the tensionsers performing correctly which allows for inconsistant chain tension. The chain can then flail and forces the guides to hit against the tensioners and creates wear patterns on the tensioner crown and rear of the guides.

The chain flails from inconsistent tension and cracks are formed in the chain links from heavy forces pulling the chain incorrectly. The links crack outward from the chain pin hole until the link fails.

BEST PRACTICE WHEN REPLACING A TIMING CHAIN IN THE N47

1

It is vital that the reason for the OE chain failure is identified before replacement. A well maintained timing chain kit will outlive the vehicle. Identification of what has caused the issue and rectification of the issue before replacing the kit will reduce the risk of future failures.

2

FAI highly recommend thoroughly cleaning the oil system of the vehicle before chain replacement. Carbon particles dislodged by removal of the parts will be forced into the new tensioners as oil pressure rises. The complete oil system needs to be as free from deposits as possible before the chain kit is replaced.

3

FAI recommend ensuring that the kit is fitted with care and sealants/RTV are used in conjunction with informed knowledge and workshop instructions only. RTV is often overused and breaks off in the engine causing blockages and pressure issues within the tight tolerances of the kit.

4

A complete kit must be fitted at the same time and not mixed with old and new sprockets. Sprockets wear with the chain so old sprockets will likely cause misalignment issues of the chain putting undue stress on parts of the chain. The replaced kit must be inspected thoroughly for any misalignment before the engine is started even when using new sprockets. It is common for dirt or debris to be caught under sprockets or guides when fitted and cause the chains to run slightly twisted. This causes uneven stress to parts of the chain.

CONCLUSION

A chain failure always has a cause that is not just age. The N47 engine has many well documented reasons for chain issues from new. As these engines have aged and service intervals may have become longer or skipped, more issues have become apparent that may not have affected new engines.

It is VITAL that the reason the chain requires replacement is identified and rectified before replacing the chain. A new chain fitted into an engine will quickly fail if other issues are not corrected as they amplify the extreme conditions the chain must already work.

TECHNICAL BULLETIN: TB0092

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