

## Cam belts and the cost implications

To continue my look at engines, today we will look at cam belts. Camshaft drive belts are extensively used today on the modern motorcar engine. Why?

The most common statements I get from customers are:

1. Why do they use something, which they know will fail?
2. It must have jumped a tooth, coz' it's running real bad!

### Question 1

Reasons are many, but the most obvious are the most simple. Firstly engines have to be "clean", this results in 'over square' engine designs (bore bigger than the stroke) and valves opening, closing and over lapping closer than with the older standard type engine. This results in a squatter, (for a given cc. and output) and a freer revving engine that burns better and gives more power, yet less emissions. (If it is in good condition)

To run such an engine via a chain or by gear wheels is, to say the least, difficult in the confined space of the modern engine bay. The chain would have to run in such small space and go through so many turns that it would not last very long due to stress. Gear wheels would have half the driven items turning the wrong way (although you could make the driven items account for that) and gears are noisy.

They also take up space, space that is already at a premium under that bonnet. Plus building it bigger to accommodate gears would defeat the object. Belts are also cheaper.

Today's motorist wants to get in the car and go? They want it quiet (except for the music) they want 'air con', power steering etc. 'to get all that under the bonnet of an aerodynamic shape is asking a lot. So the belt drive has come to the fore.

More items can be run from the engine, in smaller confines and quietly. And to finish the question, they don't normally fail. It is more often than not, due to other reasons. That is to say, the belt breaks due to something else breaking it, not the other way round. The main reason for belt failure is. 'lack of maintenance'.

If the bonnet is hardly ever lifted, if the M.O.T. is the only time your car sees the inside of a workshop, and if it has run for 80,000 miles without anything being done to it, - then your car is most probably next?

An M.O.T. is not a service, and a service is not a waste of time and money. It is 'preventative maintenance'. Belt. failure is normally due to 'slack' in the belt, due to poor adjustment or lack of replacing at the correct mileage, or it is due to the failure of a component. This component is usually the water pump, but can be idler wheel or even the crankshaft itself. I have been out to a man who knew his belt had gone, but the reason the belt had failed was that the engine gave up. It had run out of oil and the thing had seized?

### Question 2

The fact that some people think the belt has jumped a tooth is just plain silly. Why do they jump to that conclusion? (no pun intended) Yes I have known belts to jump, but normally this is enough to

destroy the engine, the only cases I know of where 'jump' has been a factor was on a small low compression engine of small output and single camshaft, and the valves missed the pistons by design, but again it was due to the belt having run for over a hundred thousand miles and frankly, it was, what in certain areas called, 'knackered'! (tech phrase there). The teeth were sharp and the back face cracked, due purely to age and neglect; not due to it being a belt that 'they know will fail'!

The other 'jump' was when I was an apprentice (a long time ago now) I installed the belt and turned the engine over by hand. Never turn it over on the key, if something is wrong, you will destroy the engine before you have chance to see it. I turned it forward to the timing marks (not always T.D.C. by the way) and found the marks two teeth out on the cam belt.

I cursed myself and reset the marks, re-installed the belt and turned it again, only to find the same result. The problem was the belt. I had the wrong belt for the car, and counting the teeth found two teeth short on the new one. Obtaining the correct belt I found all to be well and the car ran fine. If that had been a modern twin cam, I doubt the engine would have turned all the way to the marks without making a piston to valve contact. In any event, if I had started the engine up I would have destroyed it as the wheels were running constantly out of sync'. I have never had that problem again, but it has made me count the teeth. every time I change a belt to this day!

Normally when customers say the belt has jumped or slipped it is a case of cracked distributor cap, leads or plugs, and nothing to do with the belt at all. All I can say is, keep to a service pattern and have the belt replaced at the correct time, even if the car is low mileage, time can age a belt. to the point of replacement, so ask the garage what they think. They may change it just for the money they make, but on the whole I think they would be honest about it. Put it this way, if you have the belt changed it could add up to £80 if you don't it could cost £1000 plus depending on the engine!

Just before Christmas I did such a job on an 89 Vauxhall and the bill was £80. This was mostly parts and machine work as all valves and valve slides were broken and the cylinder head damaged due to over heating (water pump failure due to lack of coolant broke the belt). If the man in question had been to a garage he would have saved himself a lot of money at an expensive time of year!

The other thing that breaks belts, and which would/should be picked up in a service is contamination! Water and/or oil will destroy the belt very quickly.

So to sum up, the belt is here been seen we all want a nice clean planet to live on, and aerodynamic cars that are fast, quiet etc. It is also cheaper to make an engine with belt drive than with chain or gears. The latter requires lubrication and the former does not.

It isn't only the belt and design of engine that brings cleaner air and economy, there are the computers and fuel injection, but the belt is a part of the package.

What is my second most asked question?

"What was so wrong with a simple carb. and points set up eh?"

Bring back the Morris Minor I say!

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