TANIA THE TOOLWOMAN

YOU AND YOUR CAR - PART 1

Hi! And welcome to my page. This is "Tania the Toolwoman" here, presenting an ever-changing variety of information for women who want to "get down and get dirty" and do all the things that have been traditionally left to the blokes.

There are many of us out there who would like to have a bash at doing some of the things that are generally relegated to the "men's business" category in the scheme of things. Things like: making stuff with power tools, using hand tools, woodworking, electronics and mechanical stuff, fixing things that break down etc.

The first series of articles written for women who want to get down and get dirty are about YOU AND YOUR CAR.

- How many of us drive? Lots. Probably 80% of women aged over 18 drive a car.
- How many of us have to get our car fixed from time to time?
- How many of us get totally peeved at the way mechanics treat us?
- Don't they always seem to treat us as utter morons, and don't they always seem to act as though we are totally incapable of understanding the workings of an internal combustion engine?
- And, how the hell do we know if they are being honest when they tell us that this or that needed replacement - how many times have we been ripped off by a mechanic doing unnecessary repairs?
- And, how many of us, after having the car serviced or repaired, are confronted by our male partner asking all sorts of questions about, " did they do this", "did you ask them to do this …." "Why didn't you say this or that to them.."? Things that we have absolutely no idea about.

Well, girls, this is your chance to learn a little about how your car works - so that you can baffle the blokes, speak up with confidence to mechanics and even, get down and get dirty and do some maintenance on your own car.

What I am mainly going to try to do is give you some vocabulary - so that at least you will know the names of the bits and pieces.

Really, the only way to know about a car engine is to literally pull one to pieces and put it back together again. Nothing like a bit of practical experience to learn about the different parts.

Basically, there are a number of elementary things that you need to know about your car.

There are a number of systems that, when working cooperatively, makes the car go smoothly.

The first is the ***engine*** - which of course powers the car. The engine, of course can be divided up into a number of different systems, but, for the sake of simplicity. We'll just treat it as one thing at the moment.

Second is the ***transmission*** - which literally makes the car go forward or backward through the gearbox, either manual or automatic. The gearbox can be mounted behind the engine in a rear wheel drive vehicle or beside the engine in a front wheel drive car with a traverse engine (I'll explain later about front and rear wheel drive cars).

Thirdly, the ***suspension*** - which makes the occupants more comfortable and it smoothes out the bumps of the road. This system is made up of shock absorbers, springs and torsion bars.

Next, the ***wheels, tyres and brakes*** - essential for safety. They stop the car!

Also, important is the ***electrical system.*** Without it the car won't start in the first place. The battery provides the primary source of power to start the engine. The system also includes lights, heaters, air conditioners, windscreen

wipers and, most importantly, your stereo system.

Next is the ***Steering system***. Without this you would just have to go in a straight line. Modern cars these days have power assisted steering which is just great.

You'll know what I mean after driving a new car around then suddenly having to drive someone's old bomb without power steering.

It's better than an aerobic workout and your biceps come out in great shape!

Lastly is the ***bodywork*** of your car. This is the part that holds everything together. This is the part we think about first when buying a new car. What colour to pick, what shape do we like, what is the inside trim like, does it fit our image, is it sporty enough, does it look cool, will it impress the friends, is it modern and classy enough for us!. Stop! This is just the superficial part. It is often more important to think about how the car runs than how it looks.

The bodywork, no matter how good it looks, does provide a buffer between us and that 10 ton truck that is bearing down on us looking like it will not stop in time, but remember, it is only a thin cover of metal and will crumple up like a concertina with even the smallest bump.

So, girls, please DRIVE WITHIN THE SPEED LIMIT and DON'T DRINK AND DRIVE!

OK, now that the preliminary bits and pieces are out of the way - how does the car work?

Basically it goes like this.

You put your key in the ignition - which is a good word because it literally ignites a spark in the battery which turns the flywheel which starts the engine moving.

Almost all cars currently use what is called a four-stroke combustion cycle to convert petrol into motion.

The four strokes are:

- Intake
- Compression
- Combustion
- Exhaust

Let's first get some vocabulary to identify the different parts of a simple 4-stroke engine.

CYLINDER

The core of the engine is the cylinder. It is literally a hole in the solid metal "block".

Most cars have 4, 6 or 8 cylinders. You will sometimes hear cars referred to as a V6 or V8. Most modern cars have the cylinders arranged either inline or a V shape.

SPARK PLUGS

The spark plug supplies the spark that ignites the air/fuel mixture so that combustion can occur.

VALVES

There are two different valves in each cylinder. One is for letting the fuel/air mixture into the cylinder to be burned; the other is for letting the burnt gases escape through the exhaust system.

PISTON

The piston is a cylindrical piece of metal (much like a tin can) that moves up and down inside the cylinder.

PISTON RINGS

Piston rings provide a sliding seal between the outer edge of the piston and the inner edge of the cylinder. They are used to prevent the air/fuel mixture or exhaust gases from leaking into the sump area and, they prevent oil from the sump from leaking into the combustion area. You may have an old car that "burns oil" that is, bluish smoke comes from the exhaust pipe when driving the car. This usually means that the rings are not sealing properly through wear and that oil is being burned along with petrol in the combustion chamber.

COMBUSTION CHAMBER

This is the area between the piston and the "head" of the engine where the burning of fuel/air occurs.

CONNECTING ROD

This rod connects the piston to the crankshaft. It can rotate at both ends so that its angle can change as the piston moves and the crankshaft rotates.

CRANKSHAFT

The crank shaft turns the pistons up and down motion into a circular motion which literally makes the car go forward, through the gearbox.

SUMP

The sump surrounds the crankshaft. It contains some amount of oil which collects in the bottom of the sump.

BLOCK

This is the piece of metal (connected above the sump) that contains the cylinders and pistons (forming the combustion chamber). Usually the holes where the spark plugs go into the combustion chamber through the block.

HEAD

This is the piece that goes on top of the block that contains the valves, plus the rockers which open and close the valves. On top of this is the rocker cover.

HEAD GASKET

This is a thin piece of metal and other material that seals the head and the block together.

One common breakdown in old cars is for the head gasket to go. This means that small holes or splits have developed in the gasket allowing water and/or oil to leak into the cylinders. This requires the head to be removed, everything cleaned down and a new gasket to be replaced.

This is not a very difficult job to do, but it is time consuming, so will usually cost from between $AU400 - $AU600 in a repair shop. The parts for this job will only cost around $AU100 - $AU150 (including replacement of oil, oil filters and other bits) so you can see how much the garages charge in labour. The job, however, will probably take a home mechanic about 6 - 7 hours to do.

OK, now that you know the parts names, let's look at how things happen.

The piston starts its cycle at the top of the cylinder.

The intake valve opens and the piston moves down to let the engine take in a cylinder full of air and fuel. (It only takes just a tiny drop of petrol each time this happens).

The piston moves back up to "compress" this fuel/air mixture.

When the piston reaches the top of its stroke, the spark plug emits a spark to ignite the petrol. The petrol in the cylinder "explodes", driving the piston down.

Once the piston reaches the bottom of the stroke, the exhaust valve opens and the exhaust gases leave the cylinder to go out through the exhaust pipe. Now the engine is ready for the next cycle.

Each piston is exploded at a different time thus causing a continuous movement of pistons turning the crankshaft. As you can imagine, this all happens pretty fast.

Just a short explanation (mentioned earlier) as to what is a front wheel drive car as opposed to a rear wheel car.

In a front wheel drive car, the gearing is connected to the front wheels. Thus the car is "pulled" along from the front end.

In a rear wheel drive car, the gearing is connected, through a tail shaft to the differential, which is another gearing mechanism between the two rear wheels. The car is "pushed" along from the rear.

That's about all we'll do at this stage. But - more to come.

Next time I'll go into a bit more detail about other parts on the engine.

The fuel system, the carburettor, the timing, the oil and fuel filters and pumps, the gear box.

So, stay tuned for some more information

Bye now, Tania

I hope you have enjoyed these articles on YOU AND YOUR CAR.