DOWNLOAD PDF MANUAL TRANSMISSION PARTS AND FUNCTION

Chapter 1 : How a Manual Transmission Works | YourMechanic Advice

The function of any transmission is transferring engine power to the driveshaft and rear wheels (or axle halfshafts and front wheels in a front-wheel-drive vehicle).

While most modern cars contain computerized systems that are beyond the understanding of all but the most specialized technicians, knowing the basic parts of a car and how they function makes it easier to spot problems, perform basic repairs and drive more responsibly. The Engine Every car is powered by an engine, and most cars use an internal combustion engine that runs on gasoline. Gas, along with air, is drawn into a combustion chamber where it is compressed and ignited by a spark. The resulting combustion provides a power stroke that, when repeated rapidly, powers the car. Engines are often referred to by the number of cylinders they have, and each cylinder contains its own combustion chamber. The Drive Line The drive line is a series of components that connect the motion produced by the engine to the wheels of the car to provide forward or backward motion. The engine is connected to a drive shaft a rigid metal shaft via the transmission. Whether a car uses an automatic or manual transmission, the function is the same: Additional gears transmit power from the drive shaft to the wheels themselves. The battery is used to start the car, providing the initial motion of the engine and powering items such as the fuel pump and starter. Most cars also have additional uses for the electrical system such as power automatic windows or door locks. All of these electrical items are wired to the battery with a series of fuses ensuring that the electrical system can continue to function even if one part fails. Brakes and Wheels Various types of wheels and tires are useful for driving under specific conditions. All-season tires, for example, have the versatility of being used throughout the year, even if severe conditions occur. Disc brakes use a spinning disc, which is pinched between brake pads mounted on calipers to slow the motion of the car. Drum brakes use shoes that push outward to contact the inside of a spinning cylinder, or drum. Some cars contain both types of brakes one type for the front wheels, another for the rear wheels to take advantage of the best each type of braking system has to offer. Dashboard Instruments One of the most visible parts of a car is its instrumentation. Most drivers are aware of the speedometer and fuel gauge, but other dashboard instruments are equally important. A tachometer, which displays engine speed in rotations per minute RPM , indicates how hard the engine is working. An oil pressure gauge or engine temperature gauge can be useful in diagnosing common problems, such as a leak of oil or engine coolant respectively. Stopping a car when oil pressure begins to drop or temperature begins to rise can avoid catastrophic engine failure. References Auto Parts Warehouse About the Author This article was written by the It Still Runs team, copy edited and fact checked through a multi-point auditing system, in efforts to ensure our readers only receive the best information. To submit your questions or ideas, or to simply learn more about It Still Runs, contact us.

Chapter 2 : Replacement Transmission Parts & Clutch Components at racedaydvl.com

A manual transmission uses a series of different-sized gears to multiply and transmit power from the engine to the wheels of the vehicle. It does this by using gear ratios.

It works like this: This disengages the clutch within the transmission, allowing the driver to shift into a higher or lower gear. The reverse gear represents another option utilized when the vehicle is not in motion. Connected at the engine through the clutch, the transmission turns at the same amount of RPMs as the engine, due mainly to the flywheel. The pressure plate pushes the clutch plate against the flywheel, locking the engine to the transmission, ensuring that they remain at the same speed. So what about the benefits? A few of the benefits of a manual transmission over an automatic version include improved fuel economy, durability, and cost. Some of the drawbacks include a more complex learning curve, slower shifting speeds, and more focus needed to drive, especially when operating the vehicle in hilly terrain. So just how does the transmission accomplish this? It controls the speed of the vehicle through the use of gears in relation to each other. Called gear ratios, each gear on the shift lever has a corresponding gear ratio, as well as an RPM range. Think about it this way: Using the example of a five-speed transmission, the engine revs higher as the vehicle picks up speed. Once the RPMs hit a certain level, drivers then press in the clutch pedal while releasing the gas, shifting the gear shift as the clutch disengages. This, in turn, slips the transmission into the next higher gear, reducing the RPMs produced, and starting the process again as the engine winds up to the next gear. Most often drivers accomplish downshifting by pressing the clutch pedal and shifting to the desired gear, which does not have to be in exact reverse order. For example, a driver can shift from third to first if desired with not too many undesired effects, though they should avoid doing so. The Gears and RPMs The gears in most manual transmission vehicles include first, second, third, fourth, and reverse, with some high-performance vehicles going all the way up to fifth or sixth gear. When in Neutral, the clutch is not engaged, requiring the driver to put the parking brake on to keep the vehicle from rolling while parked. As the driver shifts through the gears, the engine puts out an increasing amount of RPMs, also known as Revolutions Per Minute. The RPMs in a vehicle engine represent the number of times a crankshaft turns in the span of one minute. The higher the RPMs, the faster the vehicle goes and the harder the engine works. If the engine ran at the maximum RPMs for any great length of time, the engine would soon wear out due to the heat and stress produced. The gears in the transmission along with the clutch slow the RPMs down upon each upshift so that the engine does not constantly run at high RPMs. Drivers must to shift each gear as it reaches the upper RPMs of its range. After driving for a while, drivers can usually tell when they need to shift. The shifter lever controls the three rods that push the three forks that engage the various gears. As the driver moves the shifter left and right, the forks moves the collars that engage each gear. While in between gears, the shifter lever remains in neutral and the clutch remains disengaged within the transmission. The Idler Gear and Synchronizers Certain basic driving maneuvers, like shifting the vehicle into reverse, require vehicles with a manual transmissions to use a small gear called the idler gear. When shifted into reverse the fork pushes the collar, moving a larger gear into contact with the gear for the upper gear and the idler gear, allowing the car to back up. To prevent the vehicle from going into reverse while the car is moving forward, the reverse gear turns in the opposite direction of the other gears. This ensures that the dog teeth do not engage when doing so, eliminating the possibility of damaging the transmission. In the past, vehicle drivers followed a practice called double clutching. This maneuver included placing the transmission into neutral and using the engine brake to match the speed of the engine. The driver then engaged the clutch again to shift into the desired gear. Modern vehicles use synchronizers to eliminate the need for this practice. The synchronizer allows the collar to make frictional contact with the dog teeth on the gear. The collar and gear become synchronized in this way. This gives a smoother shift without having to put the transmission into neutral beforehand. The Crankshaft and Clutch The effective operation of a manual transmission includes parts like the crankshaft and clutch. The crankshaft sits within the engine of a vehicle and turns according to the firing of the chambers. The more chambers, or cylinders, a vehicle engine contains, the more power in the form of torque it produces. The crankshaft

transfers this torque, or rotational force, to the transmission, which connects to the engine at the bell housing. The transmission, in turn, transfers this torque to the drive shaft and on to the differential. The differential contains a simple planetary gear train, which helps to gradually apply the power generated by the engine to the wheels, giving the vehicle forward motion. The clutch plays an important role in this whole process. When the driver places the vehicle in gear and lifts their foot off of the clutch pedal, the vehicle begins to move forward. When drivers need to stop, they push the clutch pedal along with the brake, while letting off the gas. This disengages the clutch and stops the transmission from spinning, allowing the vehicle to come to a stop. The gears turn in time with the engine. The clutch pad working in sync with the flywheel, make sure that the engine and transmission remain locked together to prevent the gears from slipping. The gears used depend primarily on the particular gear the vehicle is currently in. Gears range from first through fourth and fifth, and sometimes sixth gear on high-performance cars. The gears in the transmission matchup to produce the amount of RPMs they need for that particular gear and speed. The gear ratio is the difference in the size of the various gears to each other and the number of teeth each gear contains. While many smaller vehicles contain a synchromesh transmission, heavy-duty trucks and other machinery do not. Instead they contain a non-synchromesh transmission. A synchromesh transmission uses synchronizers to match the speed of the gear to that of the engine by rubbing the collar against a small brass clutch on the gear. An unsynchronized transmission does not have this ability, requiring drivers to double clutch to bring the engine down in speed to match that of the higher gear drivers are shifting into. Non-synchromesh transmissions do not suffer from as much wear as the synchromesh versions, and the shifting action of the non-synchromesh versions work a lot faster. Taking care of a manual transmission, including changing out the fluid according to the maintenance schedule ensures that it remains in good repair for many years. Over time, a clutch normally suffers wear and tear and eventually needs to be replaced. When this happens, have a mechanic perform the necessary repairs and maintenance, and get back on the road as soon as possible. Common Issues and Symptoms of Manual Transmission Problems When determining problems with a manual transmission, keep these common issues and symptoms in mind: A dragging clutch signifies a clutch plate that does not disengage from the flywheel. When this happens, the transmission and clutch continue to rotate at the same speed, making it difficult or impossible to change gears. A mechanic will inspect and make recommendations to fix the transmission in this case. Slipping gears means the transmission slips in and out of gear. You can attribute this to worn or broken linkage that holds the gear in place. A vehicle that grinds and shakes may have a faulty transmission. The cause ranges from a bad clutch to worn or damaged gears and synchronizers. A lit Check Engine Light can also indicate a problem with a manual transmission. Have a mechanic run a diagnostic to first determine the problem; then have them fix it if necessary.

Chapter 3 : What is Transmission Fluid and What Does it Do? | YourMechanic Advice

walking through a manual transmission and its functions.

Overview[edit] Manual transmissions often feature a driver -operated clutch and a movable gear stick. Most automobile manual transmissions allow the driver to select any forward gear ratio "gear" at any time, but some, such as those commonly mounted on motorcycles and some types of racing cars, only allow the driver to select the next-higher or next-lower gear. This type of transmission is sometimes called a sequential manual transmission. The clutch disc is in between the pressure plate and the flywheel, and is held against the flywheel under pressure from the pressure plate. When the engine is running and the clutch is engaged i. As the clutch pedal is depressed, the throw out bearing is activated, which causes the pressure plate to stop applying pressure to the clutch disk. This makes the clutch plate stop receiving power from the engine, so that the gear can be shifted without damaging the transmission. When the clutch pedal is released, the throw out bearing is deactivated, and the clutch disk is again held against the flywheel, allowing it to start receiving power from the engine. Manual transmissions are characterized by gear ratios that are selectable by locking selected gear pairs to the output shaft inside the transmission. Automatic transmissions that allow the driver to manually select the current gear are called manumatics. A manual-style transmission operated by computer is often called an automated transmission rather than an automatic, even though no distinction between the two terms need be made. Contemporary automobile manual transmissions typically use four to six forward gear ratios and one reverse gear, although consumer automobile manual transmissions have been built with as few as two and as many as seven gears. Transmissions for heavy trucks and other heavy equipment usually have 8 to 25 gears so the transmission can offer both a wide range of gears and close gear ratios to keep the engine running in the power band. Operating aforementioned transmissions often use the same pattern of shifter movement with a single or multiple switches to engage the next sequence of gear selection. Non-synchronous transmission Cherrier two speed gear, circa [1] French inventors Louis-Rene Panhard and Emile Levassor are credited with the development of the first modern manual transmission. They demonstrated their three-speed transmission in and the basic design is still the starting point for most contemporary manual transmissions. This type of transmission offered multiple gear ratios and, in most cases, reverse. The gears were typically engaged by sliding them on their shafts hence the phrase shifting gears , which required careful timing and throttle manipulation when shifting, so the gears would be spinning at roughly the same speed when engaged; otherwise, the teeth would refuse to mesh. These transmissions are called sliding mesh transmissions or sometimes crash boxes , because of the difficulty in changing gears and the loud grinding sound that often accompanied. In both types, a particular gear combination can only be engaged when the two parts to engage either gears or clutches are at the same speed. To shift to a higher gear, the transmission is put in neutral and the engine allowed to slow down until the transmission parts for the next gear are at a proper speed to engage. The vehicle also slows while in neutral and that slows other transmission parts, so the time in neutral depends on the grade, wind, and other such factors. To shift to a lower gear, the transmission is put in neutral and the throttle is used to speed up the engine and thus the relevant transmission parts, to match speeds for engaging the next lower gear. For both upshifts and downshifts, the clutch is released engaged while in neutral. Some drivers use the clutch only for starting from a stop, and shifts are done without the clutch. Other drivers will depress disengage the clutch, shift to neutral, then engage the clutch momentarily to force transmission parts to match the engine speed, then depress the clutch again to shift to the next gear, a process called double clutching. Double clutching is easier to get smooth, as speeds that are close but not quite matched need to speed up or slow down only transmission parts, whereas with the clutch engaged to the engine, mismatched speeds are fighting the rotational inertia and power of the engine. Even though automobile and light truck transmissions are now almost universally synchronized, transmissions for heavy trucks and machinery, motorcycles, and for dedicated racing are usually not. Non-synchronized transmission designs are used for several reasons. The friction material, such as brass , in synchronizers is more prone to wear and breakage than gears, which are forged steel, and the simplicity of the mechanism improves reliability and reduces cost. In

addition, the process of shifting a non-synchromesh transmission is slower than that of shifting a synchromesh transmission. For racing of production-based transmissions, sometimes half the teeth on the dog clutches are removed to speed the shifting process, at the expense of greater wear. Heavy duty trucks often use unsynchronized transmissions, though military trucks usually have synchronized transmissions, allowing untrained personnel to operate them in emergencies. In the United States, traffic safety rules refer to non-synchronous transmissions in classes of larger commercial motor vehicles. In Europe, heavy duty trucks use synchronized gearboxes as standard. Similarly, most modern motorcycles use unsynchronized transmissions: On bikes with a 1-N-2 Synchronized transmission[edit] Top and side view of a typical manual transmission, in this case a Ford Toploader , used in vehicles with external floor shifters. Most modern manual-transmission vehicles are fitted with a synchronized gear box. Transmission gears are always in mesh and rotating, but gears on one shaft can freely rotate or be locked to the shaft. The locking mechanism for a gear consists of a collar or dog collar on the shaft which is able to slide sideways so that teeth or dogs on its inner surface bridge two circular rings with teeth on their outer circumference: When the rings are bridged by the collar, that particular gear is rotationally locked to the shaft and determines the output speed of the transmission. The gearshift lever manipulates the collars using a set of linkages , so arranged so that one collar may be permitted to lock only one gear at any one time; when "shifting gears", the locking collar from one gear is disengaged before that of another is engaged. One collar often serves for two gears; sliding in one direction selects one transmission speed, in the other direction selects another. In a synchromesh gearbox, to correctly match the speed of the gear to that of the shaft as the gear is engaged the collar initially applies a force to a cone-shaped brass clutch attached to the gear, which brings the speeds to match prior to the collar locking into place. The collar is prevented from bridging the locking rings when the speeds are mismatched by synchro rings also called blocker rings or baulk rings. The synchro ring rotates slightly due to the frictional torque from the cone clutch. In this position, the dog clutch is prevented from engaging. The brass clutch ring gradually causes parts to spin at the same speed. When they do spin the same speed, there is no more torque from the cone clutch and the dog clutch is allowed to fall into engagement. In a modern gearbox, the action of all of these components is so smooth and fast it is hardly noticed. The modern cone system was developed by Porsche and introduced in the Porsche ; cone synchronisers were called Porsche-type for many years after this. With continuing sophistication of mechanical development, fully synchromesh transmissions with three speeds, then four, and then five, became universal by the s. Many modern manual-transmission vehicles, especially sports cars, now offer six speeds. The Porsche offers a seven-speed manual transmission, with the seventh gear intended for cruisingâ€”the top speed being attained on sixth. Reverse gear is usually not synchromesh, as there is only one reverse gear in the normal automotive transmission and changing gears into reverse while moving is not requiredâ€”and often highly undesirable, particularly at high forward speed. Additionally, the usual method of providing reverse, with an idler gear sliding into place to bridge what would otherwise be two mismatched forward gears, is necessarily similar to the operation of a crash box. Typically, a rear-wheel-drive transmission has three shafts: The countershaft is sometimes called a layshaft. In a rear-wheel-drive transmission, the input and output shaft lie along the same line, and may in fact be combined into a single shaft within the transmission. This single shaft is called a mainshaft. The input and output ends of this combined shaft rotate independently, at different speeds, which is possible because one piece slides into a hollow bore in the other piece, where it is supported by a bearing. Sometimes the term mainshaft refers to just the input shaft or just the output shaft, rather than the entire assembly. In many transmissions the input and output components of the mainshaft can be locked together to create a 1: The mainshaft then behaves like a single, solid shaft: Along the countershaft are mounted gears of various sizes, which rotate when the input shaft rotates. These gears correspond to the forward speeds and reverse. Each of the forward gears on the countershaft is permanently meshed with a corresponding gear on the output shaft. However, these driven gears are not rigidly attached to the output shaft: Reverse is typically implemented differently; see the section on Reverse. Most front-wheel-drive transmissions for transverse engine mounting are designed differently. For one thing, they have an integral final drive and differential. For another, they usually have only two shafts; input and countershaft, sometimes called input and output. The input shaft runs the whole length of the

gearbox, and there is no separate input pinion. Front-wheel and rear-wheel-drive transmissions operate similarly. When the transmission is put in neutral and the clutch is disengaged, the input shaft, clutch disk and countershaft can continue to rotate under their own inertia. In this state, the engine, the input shaft and clutch, and the output shaft all rotate independently. Dog clutch[edit] Dog clutches. The gear-like teeth "dogs", right-side images engage and disengage with each other. Among many different types of clutches, a dog clutch provides non-slip coupling of two rotating members. It is not at all suited to intentional slipping, in contrast with the foot-operated friction clutch of a manual-transmission vehicle. The gear selector does not engage or disengage the actual gear teeth which are permanently meshed. Rather, the action of the gear selector is to lock one of the freely spinning gears to the shaft that runs through its hub. The shaft then spins together with that gear. Locking the output shaft with a gear is achieved by means of a dog clutch selector. The dog clutch is a sliding selector mechanism which is splined to the output shaft, meaning that its hub has teeth that fit into slots splines on the shaft, forcing that shaft to rotate with it. However, the splines allow the selector to move back and forth on the shaft, which happens when it is pushed by a selector fork that is linked to the gear lever. The fork does not rotate, so it is attached to a collar bearing on the selector. The selector is typically symmetric: Synchromesh[edit] Synchronizer rings Synchromesh transmission was introduced by Cadillac in For this reason, a modern dog clutch in an automobile has a synchronizer mechanism or synchromesh, which consists of a cone clutch and blocking ring. Before the teeth can engage, the cone clutch engages first, which brings the selector and gear to the same speed using friction. Until synchronization occurs, the teeth are prevented from making contact, because further motion of the selector is prevented by a blocker or baulk ring. When synchronization occurs, friction on the blocker ring is relieved and it twists slightly, bringing into alignment certain grooves or notches that allow further passage of the selector which brings the teeth together. The exact design of the synchronizer varies among manufacturers. The synchronizer [4] has to overcome the momentum of the entire input shaft and clutch disk when it is changing shaft rpm to match the new gear ratio. It can be abused by exposure to the momentum and power of the engine, which is what happens when attempts are made to select a gear without fully disengaging the clutch. This causes extra wear on the rings and sleeves, reducing their service life. When an experimenting driver tries to "match the revs" on a synchronized transmission and force it into gear without using the clutch, the synchronizer will make up for any discrepancy in RPM.

Chapter 4 : Introduction to manual transmission technologies

Manual Transmissions Parts. We stock a wide variety of replacement and upgrade truck parts to help you maintain to condition of your transmission and keep that power flowing to the wheels.

A few of these advantages are the following: Improved efficiency and reduced drive train weight Improved traction on slippery surfaces because of increased weight on the drive wheels Increased passenger compartment space no hump in floorboard for rear drive shaft Less unsprung weight weight that must move with suspension action , thereby providing a smoother ride Quieter operation since engine and drive train noise is centrally located in the engine compartment Improved safety because of the increased mass in front of the passengers Most transaxles are designed so that the engine can be transverse sideways mounted in the engine compartment. The transaxle bolts to the rear of the engine. This produces a very compact unit. Engine torque enters the transaxle transmission. The transmission transfers power to the differential. Then the differential turns the drive axles that rotate the front wheels. Both manual and automatic transaxles are available. Manual transaxle uses a friction clutch and a standard transmission-type gearbox. An automatic transaxle uses a torque converter and a hydraulic system to control gear engagement. A foot-operated clutch engages and disengages the engine and transaxle. A hand-operated shift lever allows the operator to charge gear ratios. The basic parts relating to a manual transaxle are as follows: Transaxle Input Shaft - main shaft splined to the clutch disc turns the gear in the transaxle. Transaxle Input Gears - either freewheeling or fixed gears on the input shaft and meshes with the output gears. Transaxle Output Gears - either fixed or free-wheeling gears driven by the input gears. Transaxle Output Shaft - transfers torque to the ring gear, pinion gears, and differential. Transaxle Synchronizers - splined hub assemblies that can lock freewheeling gears to their shafts for engagement. Transaxle Differential - transfers gearbox torque to the driving axle and allows the axles to turn at different speeds. Transaxle Case - aluminum housing that encloses and supports parts of the transaxle. The manual transaxle can be broken up into two separate units - a manual transaxle transmission and a transaxle differential. A manual transaxle transmission provides several usually four or five forward gears and reverse. You will find that the names of shafts, gears , and other parts in the transaxle vary, depending on the location and function of the components. For example, the input shaft may also be called the main shaft, and the output shaft is called the pinion shaft because it drives the ring and pinion gear in the differential. The output, or pinion, shaft has a gear or sprocket for driving the differential ring gear. The clutch used on the manual transaxle transmission is almost identical to the manual transmission clutch for rear-wheel drive vehicles. It uses a friction disc and spring-loaded pressure plate bolted to the flywheel. Some transaxles used a conventional clutch release mechanism release bearing and fork ; others use a long pushrod passing through the input shaft. The transaxle differential, like a rear axle differential, transfers power to the axles and wheels while allowing one wheel to turn at a different speed than the other. A small pinion gear on the gearbox output shaft or countershaft turns the differential ring gear. The ring gear is fastened to the differential case. The case holds the spider gears pinion gears and axle side gears and a pinion shaft. The axle shafts are splined to the differential side gears. The basic parts of an automatic transaxle are as follows: Transaxle Torque Converter - fluid-type clutch that slips at low speed but locks up and transfers engine power at a predetermined speed; couples and uncouples engine crankshaft to transmission input shaft and gear train.

Chapter 5 : Manual transmission - Wikipedia

The power generated by the engine flows through the transmission before it reaches the drive racedaydvl.com basic function of the transmission is to control the speed and torque available to the drive wheels for different driving conditions.

Romain Nicolas Transmissions type overview We can define 2 main types of transmissions, the manual transmission MT and automatic transmission AT. The automatic transmission type is then divided in 4 sub-groups: Transmissions market shares Considering all types of transmissions, we can say that the trend for transmission volumes is the same than for vehicles volumes. The following graph shows worldwide volume trends over the years including expectations until A big volume drop is observed around , due to the automotive industry first crisis. In , passenger cars transmissions world market is estimated around 60 million units with an equal repartition between AT and MT. The split between AT and MT is also varying a lot between those regions mainly for historical and cultural reasons: For example, the split in and expected split in are compared in Western Europe in the following graph: This is explained by the fact that DCT technology is today mature and can bring some fuel saving compared to MT. The main MT manufacturers can be divided into two categories, the historical ones based on historical markets and the new comers that are appearing in emerging markets. In Europe, car manufacturers used to manufacture their own manual transmissions even if some suppliers like ZF or Getrag are more and more present on the market. Definition and function of a transmission device The gearbox is a power transfer device whatever it is a MT or AT. It allows the take-off of the vehicle, the transfer of the engine power to the driving wheels, in forward and reverse direction, in accordance to the driver demand and it achieves an adequate distribution of the torques and rotation speeds between the right and left driving wheels. To execute those functions, the device is composed of: Manual transmission functional requests The functional requests are divided into 5 areas: Fuel consumption and driving performances Vehicle assembly and layout Shift quality Reliability This article only deals with fuel consumption and driving performances. However other topics will be tackled in an upcoming dedicated article. Fuel consumption and driving performances Vehicles are generally equipped with an internal combustion engine which delivers its maximum torque or power on a limited range of rotational speed. Hence, with only one reduction ratio between engine and wheels, the driver would reach the limits of the engine on a limited range of vehicle speed. Moreover, it is necessary to reach maximum engine output in a wide range of vehicle speed: Take-off, hill climbing High speeds: This variation of speeds allows a rational use of the engine thanks to suitably staged gears inside the transmission. The methodology for designing the reduction ratios according to vehicle and engine specifications will be soon available in the article Methodology for designing manual transmission gear ratios. The criteria for assessing the design of gear ratios are: Cx and vehicle speed at rpm on the 2 highest ratios Performances: The classical values for a 1st gear ratio are from 18 to 12 meaning that vehicle is approximately between 6. For designing the final gear ratio, the maximum speed, fuel consumption and emissions on cycles are considered. Classical values for the final gear ratio are from 3 to 2. For the choice of intermediate ratios, engineers take into account the driveability and mid-range accelerations but also the fuel consumption on cycle. When all the gear ratios are chosen, the ratio range indicator is computed as the 1st gear ratio divided by the final gear ratio. This indicator expresses the type of design of the manual transmission. Classical values are generally between 4 performance design to 7 fuel economy design. An example of gear ratios values for the Renault PK4 gearbox is shown in the table below: Besides the ratios design, two other factors influence the fuel consumption of the vehicle, the gearbox mass and its efficiency. Regarding the mass, it is more or less proportional to the torque that the gearbox can transmit. The efficiency of the gearbox depends on the losses due to gears and bearings friction, churning lossesâ€¦ The evaluation of those losses allows to compute the fuel consumption of the vehicle which is due to MT. It can be said that the drag torque proportionally increases with the torque capacity. Conclusion Manual transmission technology is known since 18th century and now mastered by car makers. It is a cheap and efficient way to ensure transmission functions. For a correct design several parameters are taken into account as fuel economy,

performances, acoustics or packaging. The gear ratio design is the way to reach wanted fuel consumption and performances. Indeed, first and last gears are of great importance for maximum speed, take-off and fuel economy. And finally, the efficiency of the gearbox is assessed and lowered as it is also a contributor to complete powertrain fuel efficiency. Renault Romain Nicolas opinion: I mean that this is maybe not the most comfortable, maybe not the most fuel efficient neither the most packageable, but it is the best trade-off between those parameters and the cost and manufacturability. Of course, this clearly depends on the market and customers habits as for the US market MT is not acceptable even if it is more fuel efficient than an AT. I think that even if the MT is getting an old technology, it still has some potential growth in cost driven markets like India or China and will ever be a part of the transmission mix. How do you think final customer influences this mix?

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Manual transmission technology is known since 18th century and now mastered by car makers. It is a cheap and efficient way to ensure transmission functions. For a correct design several parameters are taken into account as fuel economy, performances, acoustics or packaging.

LuK dual-mass flywheels absorb engine vibrations before they are transmitted to the driveline where they can create gear rattle. These units feature a built-in damper designed to isolate engine torque spikes Designed utilizing the latest technology, this product by ACDelco features premium quality and will perform better than advertised. Perfect for your vehicle The release bearing is the connective element between the rotating clutch pressure plate on the engine side and the solid release mechanism on the transmission side. To transfer release force to the This product is made of high-quality materials to serve you for years to come. Designed using state-of-the-art technology and with customers in mind. It will meet your needs and deliver great Designed utilizing the latest technology, this product by EXEDY features premium quality and will perform better than advertised. Perfect for your vehicle and lifestyle, it is manufactured to meet or Perfect for your vehicle and Engineered from reinforced nylon, cast iron or aluminum, all The SR Series product is targeted for both utility and passenger car markets, specifically for trucks, SUV, and sport model cars. This product is engineered specifically for applications with ATP flex plates are made of high quality steel and contain the correct bolt hole spacing and ring gear teeth just like the original part to ATP flex plates are made of high quality steel and contain the correct bolt hole spacing and ring ATP flex plates are made of high quality steel and contain the correct bolt hole spacing and ring gear teeth just ATP flex plates are made of high quality steel and contain the correct bolt hole spacing and ring gear teeth just like the original part to ensure long ATP flex plates are made of high quality steel and contain the correct bolt hole spacing and ring gear teeth just like the original

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Chapter 8 : Parts of a Car & Their Functions | It Still Runs

Learning Objectives z Describe gear operating principles. z Identify & define all the major parts of a transmission. z Explain the fundamental operation of a manual.

Chapter 9 : Manual Transaxle

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