Competency 2

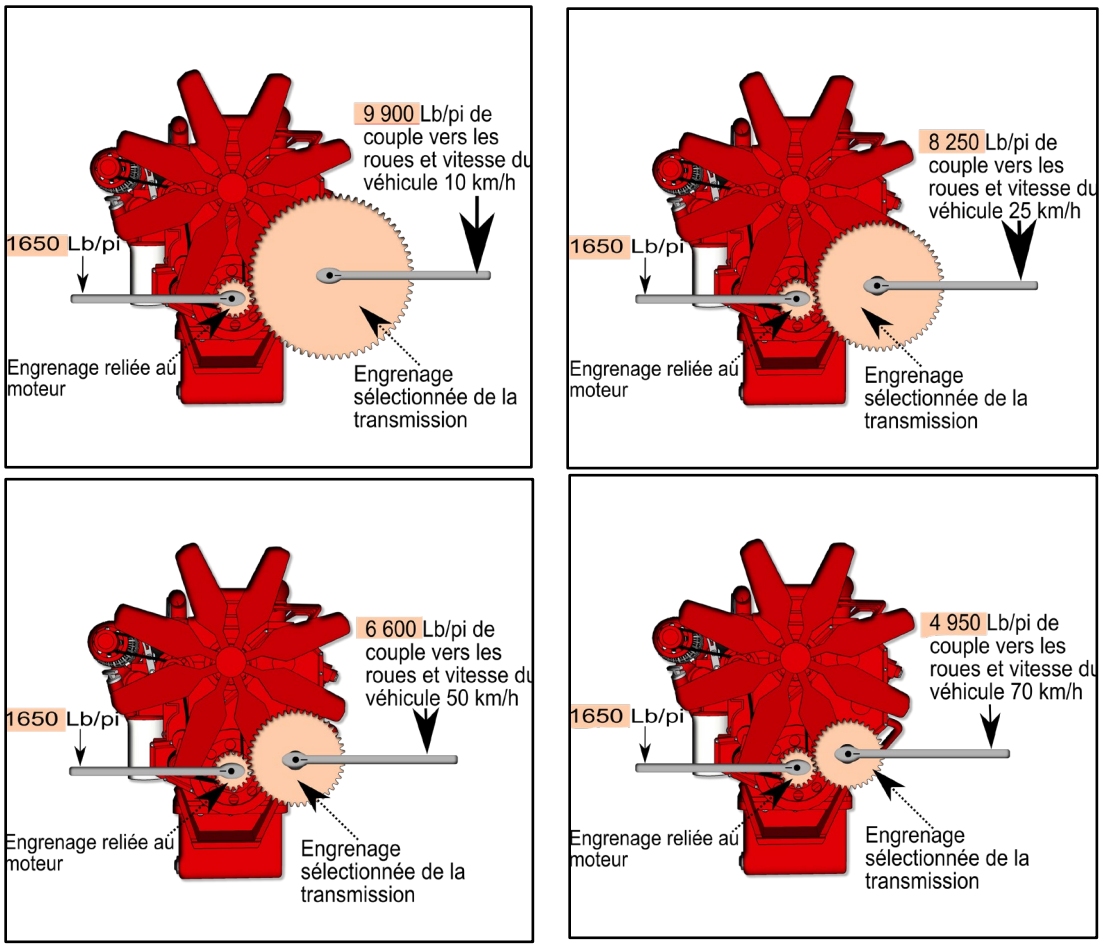
Transmission of Mouvement

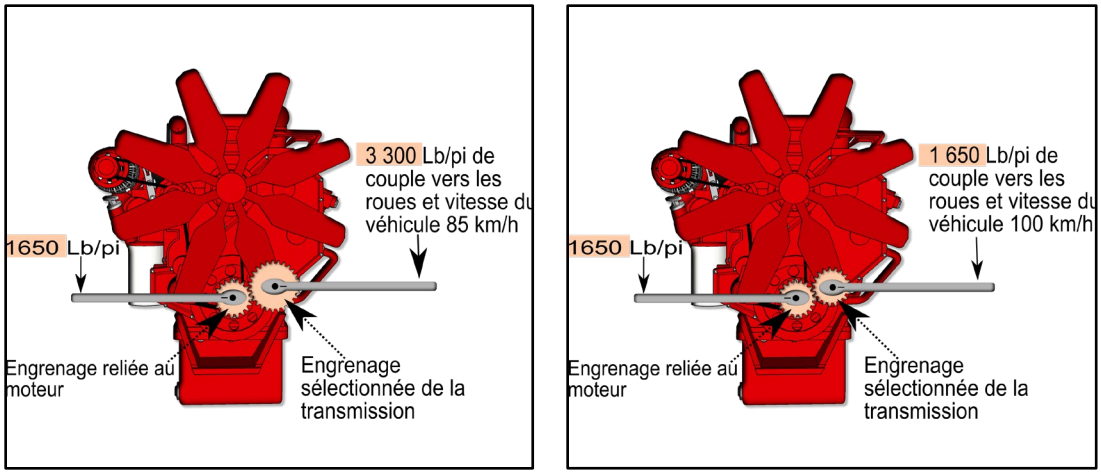
(Manual Transmissions)

Objective (s) of the Lesson: To determine the types of manual transmissions, their capabilities and potential according to the application in use.
Determine means of synchronization.

Role of the transmission:
The transmission adapts the speed of rotation and the engine torque according to the conditions imposed on the truck (starting, uphills, load, speed). It does this by multiplying, as needed, the torque strength.

The multiplication of the torque strength provided by the transmission





Description of the multiplication of the engine torque by the transmission

As seen in the images on the previous page, from the _____ image to the _____, the selected gearing of the transmission becomes more _____.

The force applied on the lever _____ more and more. The first image represents a visual example of the _____ ratio of a transmission. The gear is _____, so the torque force of the motor on a lever plus _____ multiplies the torque to the wheels of the vehicle.

The engine always develops the same torque. It is therefore the transmission that has the power of _____ the engine torque.

As a result, as
_____
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_____ It is therefore impossible to have more than _____ and _____ from the transmission.

It is therefore the _____ of the driver of the vehicle (ie you) to know
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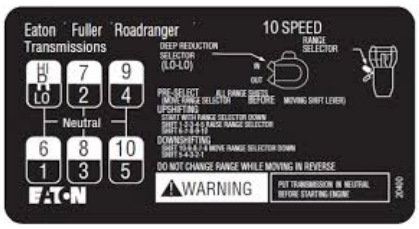
Simple example:
Initially with a tractor and a _____ semi-trailer you will probably need to select the _____ report.
On the same start but this time with a tractor that is not coupled with a semi-trailer (so _____ to shoot), you can select the second or _____ report.

In the light of the knowledge of the possibilities offered by the transmission, this explains why, the more one increases the _____ of a vehicle, the more one owes _____ the torque capacities of the _____. Where does the _____ technique come from in association with a progressively increased diet.

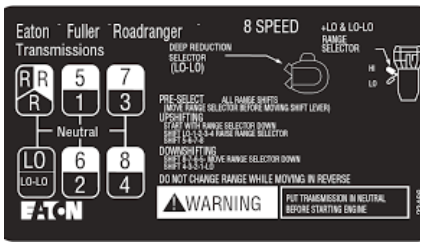
Notes:

Auxiliary knobs and selectors of manual transmissions associated with their operating diagrams

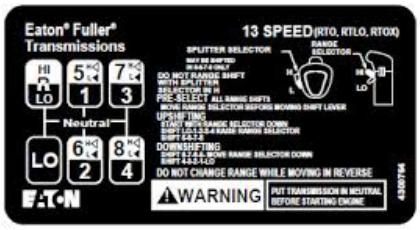
10 gears



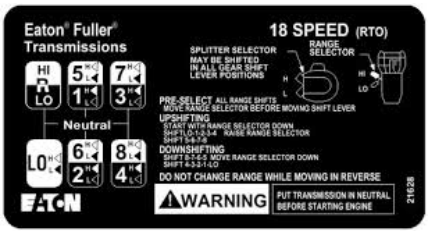
8 gears (LO and LO-LO)



13 gears



18 gears



Families of models and vocations of gearboxes

Manufacturer's table Eaton-Fuller

Family Models	Forward speed	distance	transport Heavy transport							Construction	Picking and delivery
				Journaling	Mining Mining	Oil fields	Waste collection	Agricultural application	Off-road		
Series FR	10										
Long-8LL	8 + 2 stockings										
Super 13	13										
Super 18	18										

In the table below above, the main _____ (vocations) dedicated by the manufacturer of the Eaton-Fuller transmission were revealed.

For example, the _____ (FR model) is more suitable for long distance transport, waste collection, agricultural applications, construction and pick-ups and deliveries.

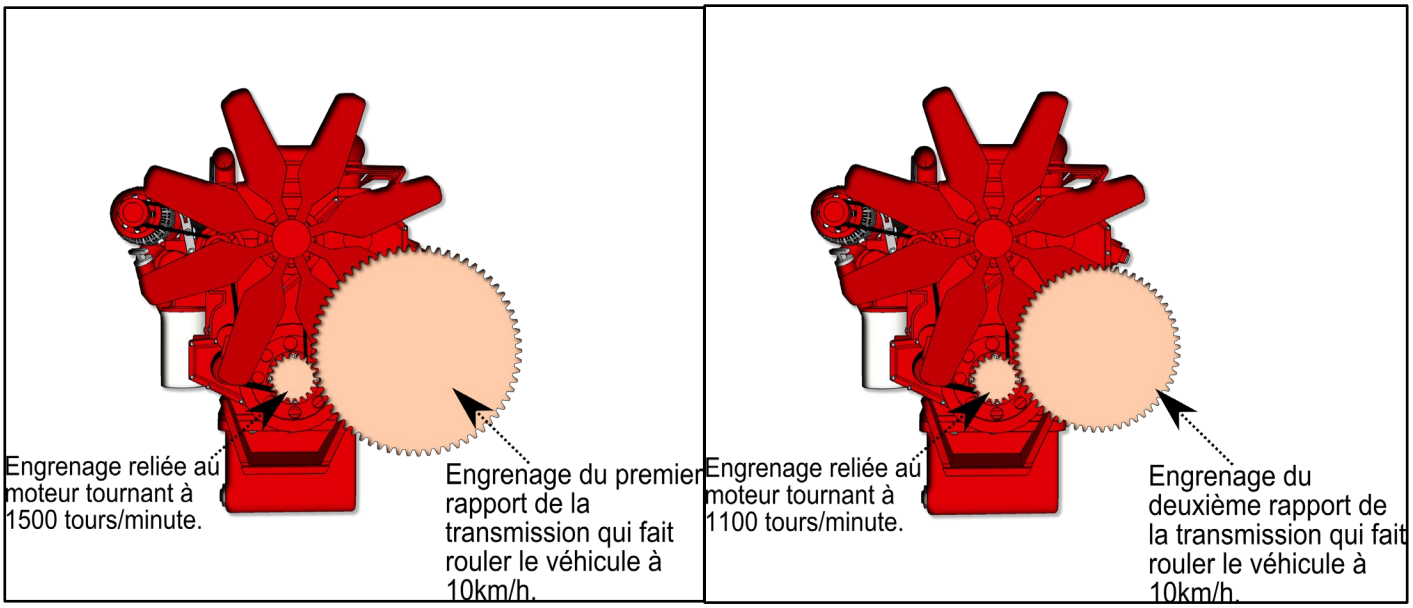
It is also seen, for example, that ___ and _____ are not appropriate (depending on the manufacturer) to constantly pick up and deliver.

This is _____ from the manufacturer to the truck buyers. When they plan to buy a vehicle, this is what is suggested to them.
_____ to implement the transmission model still remains the ____ of the buyer.

As a driver, you will have to know the _____ that the transmission models offer in order to exploit the maximum performance according to _____.

When the model of _____ that you operate will not be perfectly _____ to the type of transport that you will carry out, you will still recognize the limits.

The principle and method of synchronization **gradation**



Example to go from **first** to **second** gear:

First step, press and _____ a first time the clutch to better be able to move the _____ speed in neutral (_____) simultaneously releasing the accelerator.
Second step, it takes _____ on the clutch and simultaneously also enter the gear lever in the second gear.

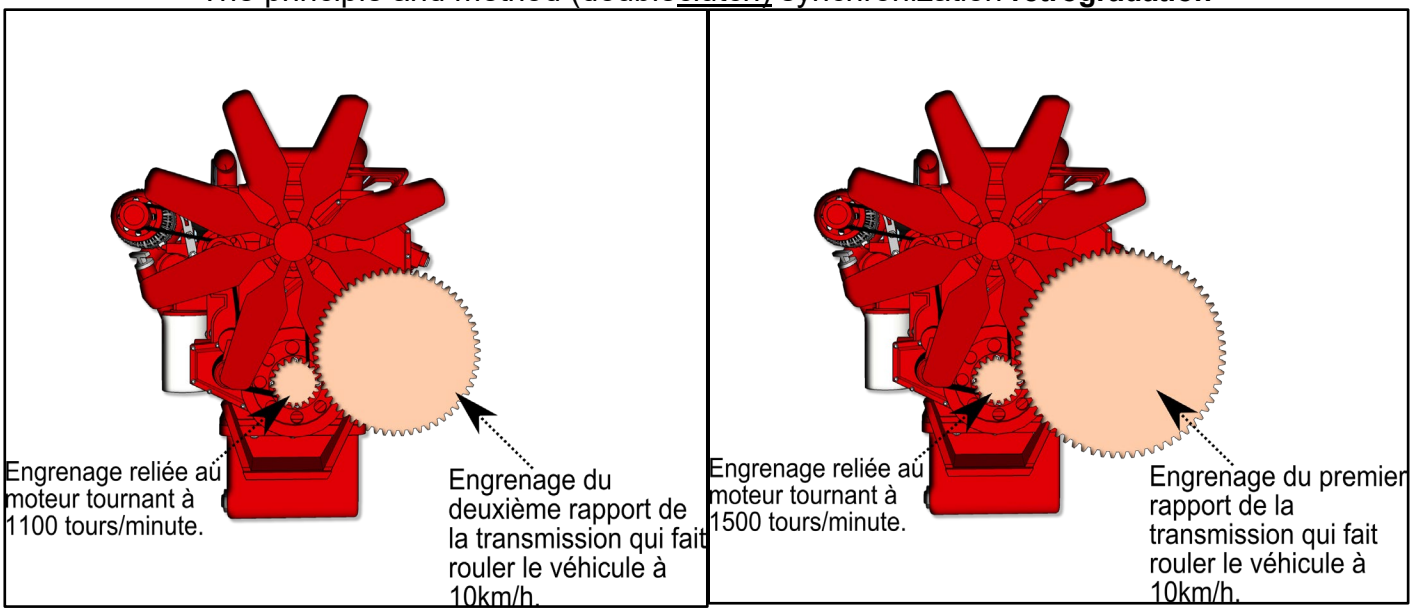
It's the moment between the _____ and the _____ clutch where everything is played out.

It is at this point that the engine _____ of diet and which consequently lowers the diet of _____ too. The smaller transmission ratio gear can then be _____ in the motor gear as it runs 400 fewer revolutions in this case.

In summary, for the same vehicle _____, the engine must rotate 400 less turns in a _____ higher transmission in our example.

Notes:

The principle and method (doubleclutch) synchronization **rétrogradation**



Example from said **second** to **first** ratio (the inverse of the gradation):

First step is to support and _____ a first clutch to better ability to shift the _____ into neutral (_____) simultaneously by releasing the throttle slightly.

Second step, it is necessary _____ on the accelerator to raise the speed of rotation of the _____ (thus the _____) of 400 turns for the present example. It is necessary to _____ this engine speed.

It is the ability to control the accelerator that largely determines the success of a downgrade.

Therefore, once the speed is reached and _____, at the same time it is necessary to press a _____ once on the clutch and at the same moment to enter the speed lever in the report _____ to that of the beginning of the downshift.

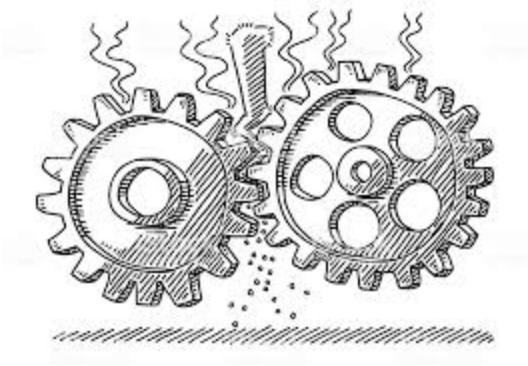
In summary, if one observes well, for the same _____ of vehicle, the engine must turn 400 revolutions of _____ in a _____ of lower transmission in the present example.

Note:

_____

_____

Potential problems due to misuse



Of course, everyone can imagine that when there is poor synchronization gear during gear changes, this causes premature wear of the gear in the transmission.

Making a squeak a few times during a working day is considered acceptable and will not cause a great reduction in the life of a transmission.

On the other hand on a  regular basis, this greatly reduces its life and will result in additional maintenance costs for the company. So it is on the driver that a reduction of these costs is based. Be careful / thorough in your maneuvers.

Note:

Instructions and advice from the Eaton-Fuller manufacturer to avoid other potential problems due to improper use

• Always select an _____starting gear that provides sufficient reduction for the load and terrain.

• Always _____ normal double-clutching procedures when making lever shifts.

• Never _____ the shift lever to complete gear engagements.

• Never coast with the shift lever in _____position.

• Never move the shift lever to the _____ gear position while operating in HI range.

• Never move the range lever with the shift lever _____ while the vehicle is moving.

• Never make a range shift or splitter shift while moving in _____.

• Never _____ at too high of a road speed.

• In most cases, depending on the engine and axle ratios, you can save valuable fuel by driving the vehicle at _____ than governed RPM while cruising in 8th.

• Do not leave your _____ hand on the shift lever when gear changes are not necessary. This causes a premature _____ of the selection ranges of the transmission.

• Transmissions should not be used at _____ above 120 ° C (250 ° F).

Operation at temperatures above 120 ° C (250 ° F) causes fouling of the gear.

Temperatures in excess of 177 ° C (350 ° F) will eventually result in heat treatment of the gears.

The following _____ may _____ operating temperatures above 250 ° F (121 ° C).

• _____ operation at low speeds;
• high ambient temperatures;
• restricted airflow around the transmission;
• constant use of the maximum engine power (HP);
• Overuse of the engine.

Apprenticeship Assistance Questionnaire

1. You find yourself stuck on an uphill slope with a truck and a semi-trailer loaded to full capacity. You must make a start in this slope. Which of the following transmission ratio choices will you choose and which would be most appropriate to make this hill start?

   A) 3rd report;
   B) The 10th report;
   C) The first report;
   D) The 8th report.

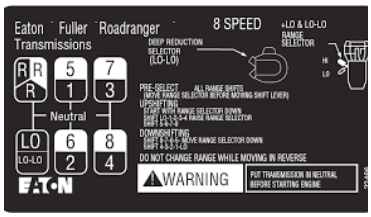
2. You drive at high speed (100 km / hr for example) your transmission multiplies the torque from the engine.

True ___
False __X__

3. You have to start with a tractor without a semi-trailer on a flat spot. Which report would be most appropriate to select among the following choices to make this departure?

A) The 3rd report
B) The first report
C) The LO report
D) The 10th report

4. What is the exact model of this transmission?



A) 8-speed
B) 8-speed LO
C) 8-speed LO and LO-LO
D) 13-speed

5. When during the double clutch in a ratio gradation does synchronization occur?

A) When first supported;
B) When pressed a second time;
C) Between the first and the second clutch;
D) When releasing the second clutch.

6. What to do after pressing and releasing the clutch a first time to demote?

A) Repress a second time;
B) Immediately enter the gearshift lever in the lower gear;
C) Depress the accelerator to indirectly increase the rotational speed of the transmission;
D) Depress the throttle to increase engine rotational speed only.

7. What is the wear of this gear?

A) Normal operation within a short time of a manual transmission by the driver;
B) Improper operation in a short time of a manual transmission by the driver;
C) Poor maintenance of the manual transmission;
D) There is no wear on this gear.

8. What is a manufacturer's statement that is true?

A) It is not necessary to double clutch during downshifts;
B) You can drive with the truck in neutral all the time;
C) Always use normal double clutch procedures when using the shift lever to make changes.
D) At 90 km / hr you can select the bearing selector at the lower position and shift to neutral with the gear lever.