THE REDUCTION OF FUEL CONSUMPTION OF THERMAL ENGINES THROUGH CORRECT USING OF REVOLUTION REGIME AND OF ENGINE INTEGRAL POWER

REDUCEREA CONSUMULUI DE CARBURANȚI LA MOTOARELE TERMICE PRIN UTILIZAREA CORECTĂ A REGIMULUI REVOLUȚIONAR ŞI PRIN PUTEREA INTEGRALĂ A MOTOARELOR

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Summary: *Increasing Diesel fuel price, used as fuel for the functioning of the agricultural machines engines, obliges to take an action to reduce the quantities of consummated fuel respective the reduction of the price of the agricultural works. Without of the thermal engines that lead to reducing fuel consumption or of the possibilities of using boil fuel in this chemical engines functioning he easiest, efficient and everyone to do it is the method of using the correct revolution regime of the engine and using the full power of it, in the zone in that the fuel consumption is minimum or almost minimum.*

Rezumat: *Creşterea preţului motorinei ne obligă să acţionăm în vederea reducerii cantităţii de combustibil consumat pe unitatea de suprafaţă, respectiv reducerea preţului de cost a lucrărilor agricole. În afara metodelor tehnice, care conduc la reducerea consumului de combustibil sau a posibilităţilor de folosire a biocombustibililor ca înlocuitori ai motorinei, se poate spune că cea mai simplă, eficientă şi la îndemâna oricărui utilizator este metoda folosirii corecte a regimului de turaţie a motorului şi folosirea completă a puterii acestuia, în zona în care consumul de combustibil este minim sau aproape de minim.*

Key words: *engine reducing revolution regime*
Cuvinte cheie: *motor, reducere, regim de turaţie*

INTRODUCTION

In this paper work the author wants to show the worker, those values of the thermal engine revolution regime and using mode of the engine power that the used power to be almost in today (85-90%) from the full power.

The characteristically curves that were down in figure 1 are possibly only geometrical. In reality, the engine doesn't work normal at revolutions smaller then (0.6-0.8/nm) or bigger than (1.1-1.2/nm). The paper power curve and the moment are determined experimental between the two limited devalues [1].

Some, it must to be known that between the two values, the specific fuel consumption decreases to a minimum value after it starts to grow again.

Therefore the specialists must to recommend to the workers that use thermal engines that equip the motor vehicle, to use revolution regime that leads to values determining, in the same time with the obtaining of the full power of the engine and using more of it.

It was taken in study two situations of using (in our case) thermal engines that equip agricultural machines.

a) Stationing work, when the engine power is used to action the work equipment, hydraulic installation, wheels of a the most frequent thing power price;
b) Work during moving, when is made traction work and traction work combined with the action of the equipment of work (figure 1 and figure 4).

In the first situation the thermal engine power is divided in two high tides: a smaller one of 1.2-2.5 kw is taken by the auxiliary consumers, the other one through the mechanical

transmission to the final shaft of the power plug, cardanic transmission or respective agricultural machine for action at stationing.

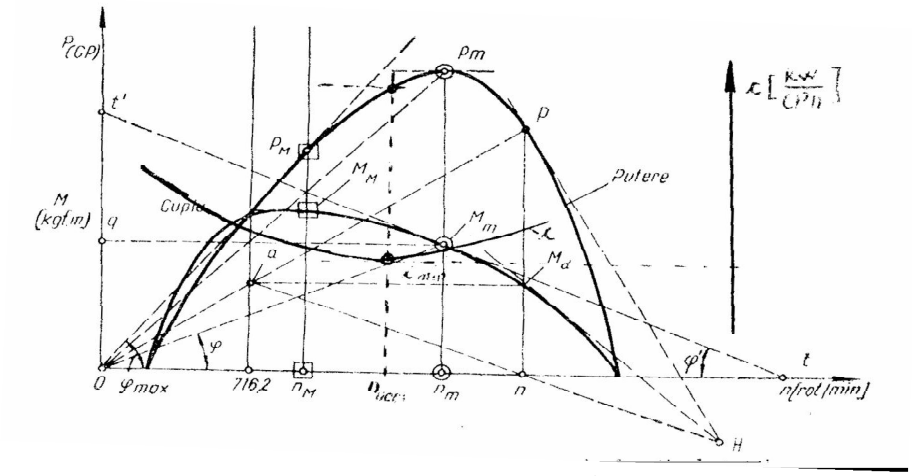

Figure 1. Curves power, moment and consumption for the thermal engines

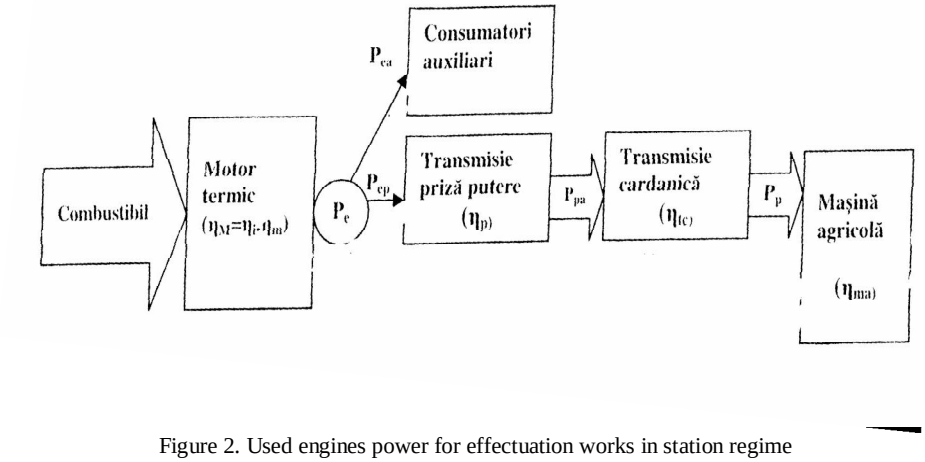

Figure 2. Used engines power for effectuation works in station regime

Here it can say that almost all the engine power can be used and can be respected the revolution regime that the fuel consumption is minim.

There are other factors that don't allow the using of the thermal engine for action at stationing. The first one is the loaded degree of the engine that can't be covered only in few cases and the second one is the temperature growing of functioning of the engine to the limit of the temperature that leads to abnormal functioning respective fuel consumption growing and decreasing of the effective power. Working in the first regime of maximum revolution, at a loaded of 90-95% of the engine. The specific fuel consumption has a minimum value.

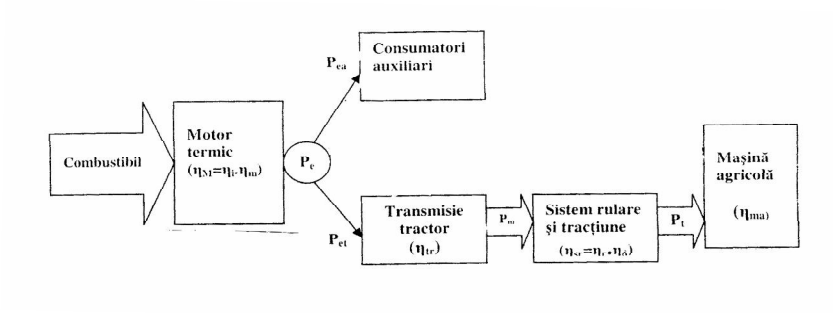

Figure 3. .Used engines power for effectuation works in force regime

At smaller load the fuel consumption is increasing. For example: using 55-60% of engine power leads to an increasing of the fuel consumption with 8-12 % then the minimum specific consumption.

Therefore is recommended for land works of the stationing the use of the selective machines.

In the second case when is used of the engine power for doing the traction works, then the engine is loaded with auxiliary consumers, traction force.

Traction force depends of the soil, of the settle degree, of the humidity but also of the moving speed that influence the traction force revolution of the engine and the motor moment.

At high speed of moving the fuel consumption is decreasing motor moment is getting bigger values as 1100-1200 (____).

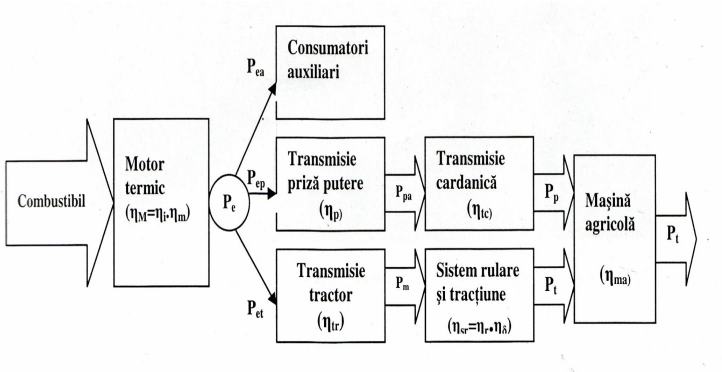

Figure 4. .Used engines power for effectuation works in station regime and force regime

At small speeds the fuel consumption is increasing the traction force is growing because of the adherence absence. At small and very small speeds must compensate through a few work properties, big width of work, complex aggregates for obtaining a full load of the engine and his using in the regime of maximum revolutions but heaping the limit of skidding.

Through the using during the work of the traction force and also the action from the power plug or hydraulic action can be used also the small and very small speeds, the load of the engine is maximal, the revolution regime of the minimum specific consumption of fuel.

This thing imposes to form complex agricultural aggregates that in the same time with a few work capacities lead to the decrease of the agricultural work period, at the decrease of shifts number on soil and also the decrease of fuel consumption.

When it can't realised a maximum load of the engine, the engine must be exploited at 60% from the maximum revolution in the minimum specific consumption zones.

MATERIAL AND METHOD:

The experiments were made on tractor in the experimental field of S.D.E.B.M. on plan soil. For measuring the motor moment at the power plug it was used a voltage meter with moment motor. For revolution measuring were used a intensity translator.

For determining, traction force were used a double.

The same results were made in field are populated in table no. 1. Depending on the efficiency of traction $\eta = 0.7...0.75$ and of the transmission mechanical efficiency of the final shaft of the power plug $\eta_p = 0.91 \div 0.95$, the real power sent for auto moving is approximate 25% from the engine power respective approximate 18 kw, staying free for the work percent approximate 60 kw , that means a big capacity of work. (Table 2)

Table 1

The same results

Measurement	U.M.	Engines power	
		No load	In load
Engine revolution	Rot/min	1850	1800
Revolution p.p	Rot/min	545	544
Moment p.p	Dan.m	7.02	47.3
Force	Dan.m	-	775
Power consumption	Kw	5.2	26
Speed	Km/h	-	6.56
Specific consumption	Kg/kw.h	1.95	1.85

Table 2

Work percent

Engines power for:	Power consumption [KW]
Autotravel	8.5
Auxiliary consumption	5.5
Work process	59.5

CONCLUSIONS:

It is recommend too the workers that use thermal engines that equip the motor vehicle, to use revolution regime that leads to values determining , in the same time with the obtaining of the full power of the engine and using more of it.

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