THE DETERMINATION OF THE INJECTIONS DURATION

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Abstract

In this paperwork is presented the fuel charging scheme for both the multipoint injection system design by authors. The software outputs are the 3-dimensional variations between angular speed and outside temperature respectively angular speed. It was effectuated a engines with spark lighting program for the calculation of parameters with the gasoline injection with the under- program: the calculation program of engines with spark lighting parameters (depending on n and λ at t_o=-35...+45ºC and $p_o=1\cdot10^2$ kPa);- the calculation program of engines with spark lighting parameters (depending on n and t_o at $\lambda=1$ and $p_o=1\cdot10^2$ kPa).

Key words*: debit meter, electronic injection, lambda, electric pump, revolution.*

1. INTRODUCTION

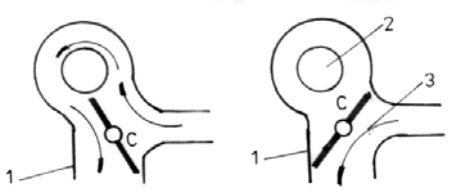
In this presence working itself contribute at modelling injection from gasoline at spark ignition engines; the model of fuel pump from gasoline, the model of regulator from pressure and injector.

For model of system proposed from author was proposed one system from injection of gasoline Bosch Motronic who power for air with ultrasonor wave. It be used plate from acquisition from trial, program from acquisition from date, electrical sounder from temperature, electrical sounder from pressure, electrical sounder from revolution and position angular, analyzer from gas. It be to achieve a experimental equipment for try the propose model by the author, gifted with device and electrical sounders necessary of modelling and drawing cycle spark ignition engines with electronic injection from gasoline for propose model by the author. It by raise experimental diagram indication a engines

2.The comparative study look carburetion and gasoline injection

In perfect to improve of carburetor

The carburetor with more parts; carburetor's with double part, with 4 part, multiple carburetor, one for one cylinder or group for cylinders. The heating mixture air + gasoline before from his admission in cylinder from to evacuation gas (figure 1.a.). This device placed at going out from carburetor has a blade from adjustment commanding from one rheostat. The heating is stopping again blade C is forbidden and gas for escapement when for work temperature is to touched (figure 1.b.). [5]



a) b)

Fig.1. The heating mixture; 1-from evacuation pipes; 2 –from admission pipes; 3 –gas from evacuation; C –the blade.

For injection's equipment for gasoline make by Bosch, specialized in building for injection equipment in engines with compression kindling no differ essential that this from the last. The delicate problem of this equipment constitute to smear couple from piece in rub from high direction pressure, who have got in seeing quality antilubricating those gasoline to need ensuring in one alone smear circuit.

Ulterior the equipment for gasoline injection in engines with spark lighting was to adapt to necessity for lubricating the couple from piece in rub, the place where itself injection of gasoline and injection duration. As follows, was developed equipment from injection to who gasoline not come in contact with part of equipment who achieve to put pressure upon high from injection, the equipment who permit to introduce gasoline in the room burning or in a received of motor, as and the equipment's who allow the continue injection or discontinuous to gasoline.[5]

The expert to estimate that at the finished 2006 year about 99 % from touring car who are be make, to make in electronic system for injection from gasoline. Making one comparative study between carburetion and electronic injection from gasoline, upon last year's, take as to start foundation 1986 year when weight of carburetion at car was from 80 %, and after the estimation in 2006 year is 1 % result replacement near in totality of carburetion with injection from gasoline.

Introduction from gasoline injection at engines with spark lighting has been pursuit with priority improvement performances from power and consumption, performances to limited from modulus from forming of mixture and to fill in cylinder's 'ore little efficient at engines with spark lighting with carburetor.

Subsequent restriction's examination of medium pollution to ward gas that burn of engines with spark lighting header of gasoline injection discovery a new virtue: to reduce of pollution emission out of evacuation gas. To appear equipment's who to permit introduction of gasoline in chamber from burn or in gallery from admission has engine, again injection from gasoline to be possible continue or discontinuous.

Advantage and disadvantage carburetor's

Carburetor's with electronic command to present advantage considerable in comparison with traditional carburetor: simplification mechanics structural has system; economy from carburant; reduction relation pollution out of in gas from evacuation; automation system from acting; stability working conditions from ralanti.

The modern carburetor's to take device corrector or perfect system, they are deliver one air mixture / gasoline homogeneous and with precision dosing at all working conditions. The acceleration's to obtain are appreciable and consumption for combustible in general is acceptable. The same time, carburetor's that are correspondent for high working of engine, oneself to adapt difficult at low working to that:

-to contain circuit's or corrective elements or complementary more much or little complex and trough following delicate or fragile;

-is associate at much other carburetor's from to assure one correct dosage of mixture for all the characteristic phases of working condition engine. Between other, carburetors are at the same time, signal perturbation phenomena. The vaporization oneself to produce for warm time. The gasoline is possible oneself to evaporate and to pas in canalize at vaporization State in forming from gauze bulge, who liquid gasoline obstacle from has free circulate, to lead at stopping engine. For restarted must to let to oneself cooling (and to chill with one gauze moist for example) sewerage system as to place near from driving. One manner from ice who are state one claque obturator and loudspeaker again jet stopped that by retail. When the engine and carburetor are not warm, the gasoline that are come can to enter jet under form from steam in the received tube where she to lay down through condense, under form from drop, who provoke a rich abnormal and not controllable to mixture, ruling at stop driving. The advantage injection from gasoline can to be sum up at:

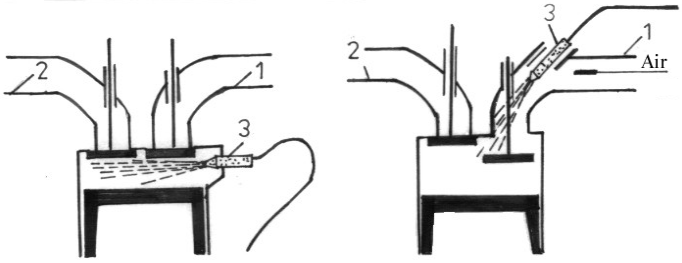
reduce the drawback carburetor for all the working conditions; to enlarge the power and conducts at reduce the full consumption by combustible; to reduce pollution.

Until present oneself apply:

- the internal carburetion or direct injection when gasoline is spray each room from combustion, figure 2.a.
- carburetion quasi internal or direct injection, when gasoline is spray in admission pipes, in admission gallery, near from admission valve, or in collector, figure 2.b. [5]

When gasoline injection are place in the admission time from air, with one so very small pressure (0,1- 0,5 MPa) to light is to set going by one spark that is give us by one sparking plug command from one system electronic light.

If in case from compression relation ε and temperature t_a [°C] of air or mixture air +combustible, at end of compress can to be exist for example:



a) b)

Fig. 2. The gasoline injection scheme: a- in burning valve; b- in admission gallery; 1- admission gallery; 2- evacuation gallery; 3-injector.

3. PLANE FROM REALIZATION OF PROJECT

Elaboration programmes from calculate for modeling of the electronic injection gasoline from Volkswagen engine;programme from calculation;publication source code;experimental stall for control and to draw a parallel between the date to gate with the help's of programme.

3.1.The date about project

Through project we must to pressent:a-growth of the dynamical parameters of motor vehicle; growth economicals parameters;reduction of pollution gase of escapement. The project itself to refer to at modeling electronic injection of gasoline of spark ignition engines, going from the general aspect of modeling, the general model at the spark ignition engines with electronic injection, the model of system proposed from author through execution one programe on the computer for calculate variabil parameter spark ignition engines with electronic injection, to simulate on the computer to functionally of propose system, the experimental try the propose system, the comparative study between obtained value through modeling and the same experimental to gate.In this presence working itself contribute at modeling injection from gasoline at spark ignition engines; the model of fuel pump from gasoline, the model of regulator from pressure and injector. For model of system proposed from author was proposed one system from injection of gasoline Bosch Motronic who power for air with ultrasonor wave. It be used plate from acquisition from trial, program from acquisition from date,electrical sounder from temperature, electrical sounder from pressure, electrical sounder from revolution and position angular, analyzer from gas.

It is be make one study for select excess coefficient from air λ=1 (electronic dosage).
It will be present the model from calculation for pressure p_{ga} and admission pressure p_a in two first variant when density is constant and the two almost near from reality of driving running with injection of the gasoline when the density of gasoline is variable.
The author suggest a personal model for calculation from pressure regulator, a electromagnetic injector, a combustible mass injected on the cycle and a time's injection with revolution at total load. This model can be used at modeling of system's electronic injection from gasoline with one point or more point's.
To bring into being of the model is necessary modeling cycle spark ignition engines with electronic injection from gasoline on a model from cycle helping propose from the author.
It is calculating the parameters for optimum for to run cycle at spark ignition engines with electronic injection from gasoline and to simulate on the computer.
The theory from calculation:

A delicate problem from point of program on the computer, adiabatic coefficient is it starting calculation, temperature in different point are unknown and the adiabatic exponents not can be determinable. For solution of this problem has been used at impose to some value, found initial more correct, who permit a cycle crossing and determination more precise temperature.

The temperature at the finished admission T_a was to consider known as initial date and she's expression calculation it be used at the finished as equation from verify at finished the cycle. It is to determine the expression temperature's in succession from route of cycle T_c,T_z,T_u,T_d,T_{d1},T_r and T_{r1}, as well as expression of gas temperature from evacuation T_e and the expression temperature thermodynamics medium to process from burning T_{med}. It is calculating the expression coefficient gas burnt residual γ_r.

Must to remark that all the expression that was used at mathematical modeling cycle spark ignition engines with electronic injection from gasoline proposed from the author it is correlation betwenas to can be introduce on the computer. This expression is correlation only in function from temperature's from characteristic point of cycle; pressuring suice this point it is substitute with pressure's exponent's and coefficient from initial date.
Through calculate again of adiabatic exponent on amount foundation temperature's to get from the new cycle. In this mode, through some cycle the error can be reduce uptside a calculate estimate admit in a thermic calculus very pretentious. Must be introductory simplify hypothesis that one with starting burning at finished corresponding thermic agent composition it is instantaneous beconuing that finished corresponding the excess coefficient from air λ with who are place burning combustible.
It be make calculus mechanical this theoretically proposed L_{tp}, theoretical medium pressure proposed p_{tp} and of theoretical output propose η_{tp}.
It be calculate effective pressure p_e, effective output η_e and mechanical output engine η_m, theoretic power propose P_{tp}, effective moment M_e, from combustible mass that have been on cycle engine m_{cb}, the stole theoretic Ch_t, the stole theoretic specific from combustible c_e and drawing cycle spark ignition engines with electronic injection from gasoline for propose model by the author; the models by calculus for pressure-volume and pressure-angle motor shaft diagram.

The molding of engine with spark lighting cycles with gasoline injection supposed by the authors is carried out by the 3-D dimensional and by dimensional parameters in two cases in figure 3 .

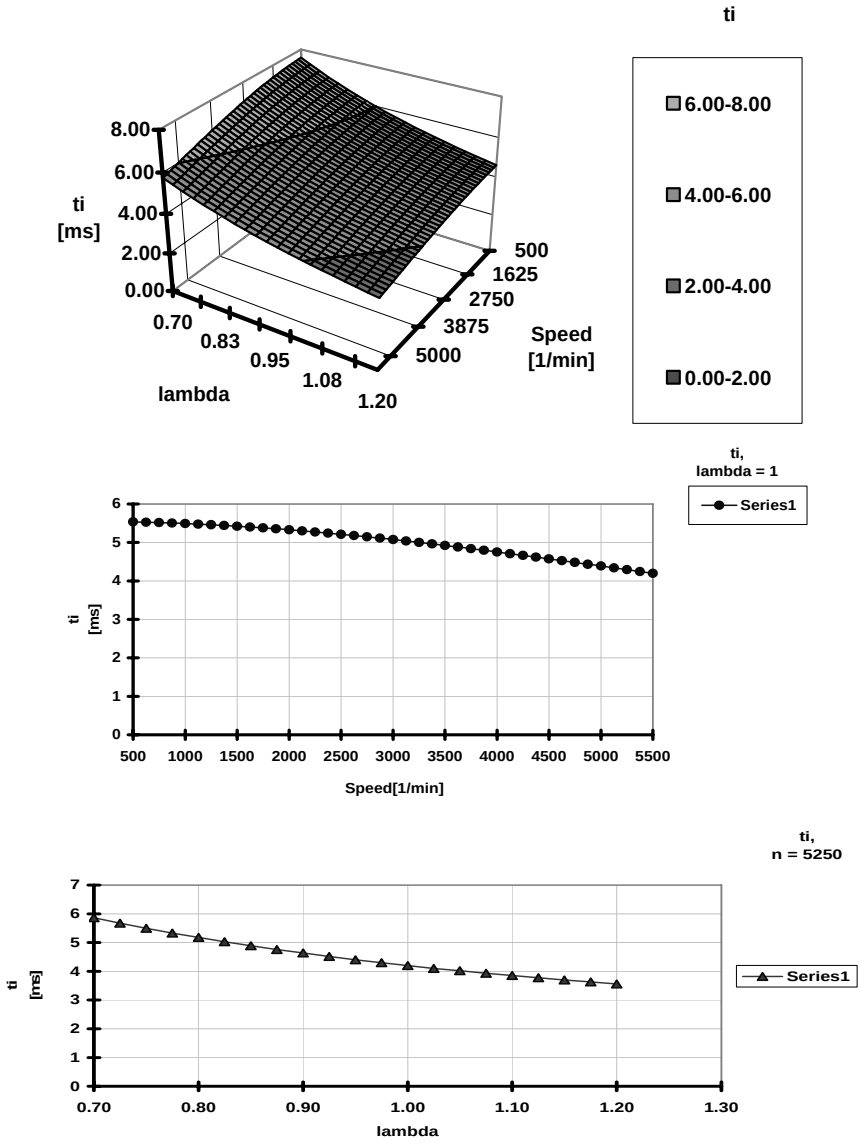


Fig.3 The dependence on the engines rotation and the airs excess co-efficient of the injections duration for the model suggested by the authors.

4. THE THEORY FROM CALCULATION

A delicate problem from point of program on the computer, adiabatic coefficient is it starting calculation, temperature in different point is unknown and the adiabatic exponents not can be determinable. For solution of this problem has been used at impose to some value, found initial more correct, who permit a cycle crossing and determination more precise temperature.[Delanette, 1989]; [Blaga,2000]. The temperature at the finished admission T_a was to consider known as initial date and she's expression calculation it be used at the finished as equation from verify at finished the cycle. Through calculate again of adiabatic exponent on amount foundation temperatures to get from the new cycle.[

Grünwald,1980]. In this mode, through some cycle the error can be reduce upside a calculate estimate admit in a thermal calculus very pretentious. Must be introductory simplify hypothesis that one with starting burning at finished corresponding thermal agent composition it is instantaneous beckoning that finished corresponding the excess coefficient from air λ with who are place burning combustible. It be to achieve a experimental equipment for try the propose model by the author, gifted with device and electrical sounders necessary of modeling

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5. THE PROPOSE CONTRIBUTIONS

It be realize a program from calculate parameter spark ignition engines with electronic injection from gasoline with subrogates:

- the program from calculate to parameter spark ignition engines with electronic injection from gasoline (dependence after revolution *n* and excess coefficient of air λ at temperature ambient medium t_o=-35...+45ºC and pressure ambient medium $p_o=1\cdot10^2$ kPa);
- the program from calculate to parameter spark ignition engines with electronic injection from gasoline (dependence after revolution *n* and temperature ambient medium t_o at excess coefficient of air λ=1 and pressure ambient medium $p_o=1\cdot10^2$ kPa); [Blaga,2000]
- debit meter point of cycle, coefficient from fill, dosage, measure thermal combustion of unity cylinder engine, rapport from grow of pressure in isochors combustion, rapport growth volume in post burning, the technical-economical of driving and duration injection. [Blaga,2005].

It be representation 3-D variation of parameter technical-economic of model proposed with revolution engine and temperature ambient medium. It be to achieve a comparation between the calculate and measured of duration injection and angle injection with revolution growth from at 500 at 6500 rot/min, of engine with electronic injection gasoline type Bosch Motronic. It be realization one comparation between diagram theoretic from cycle proposed by the author and diagram of engine with electronic injection of gasoline, that was obtain one the experimental installation.

It is to effect calculation error and the correction factor face atmospheric condition from reference, on the engine electronic injection of gasoline system. For engines fitting out with propose from author it well be raise on engine stall, from foundation diagram 3-D for duration injection, angle from kindling at total load and partial load and enrichment coefficients at total load.

Investigation realized to be continue for determine mechanical loss at electronic injection of gasoline, in domain little revolution. [Negrea, & Sandu ,2000].

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