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# Secondary Wind Energy Device in Automobile Operation

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**ABSTRACT.** This paper provides designing methodical recommendations and using there results to improve traffic safety in transport.

**KEYWORDS:** *car, traffic safety, traffic, traffic signs, dangerous site*

## I. INTRODUCTION

Cars are a unique high-tech product, which requires high-level specialists to purchase, operate and maintain a service that provides constant maintenance.

When considering the technological processes of maintenance and repair of vehicles, the main focus is on modern design solutions and modern methods of their maintenance.

The main purpose of this work is to generate electricity in a non-traditional way with the participation of vehicles and to save fuel and protect the environment through the use of secondary wind energy during self-sufficiency and operation.

Under normal natural conditions, the air molecules that a living organism breathes are in a chaotic motion, oriented in a direction opposite to the direction of motion of the moving body. Depending on the speed of the moving body, a secondary wind (generated by the speed of movement) is generated.

The emergence of ecological hazards in the relevant area is caused by the deviation of the parameters of the environment in which people live and work.

Environmental security is defined as the ability of an individual, society, state, natural resources and the environment to withstand a hidden threat posed by anthropogenic, man-made or natural disasters.

Sustainable and effective environmental security of any state is achieved by ensuring the global sustainability of the biosphere, taking into account regional characteristics.

Environmental hazards of man-made nature caused by ATC occur in the following situations:

- 1) the threat to the relevant ecosystem, mainly the ecotope, exceeds the permissible limit;
- 2) in the course of unsustainable development of the society;
- 3) when the condition, quality and balance of the environment are disturbed.

The system of environmental regulation and standardization is each advanced  
In the Republic of Uzbekistan, as in other countries, it is carried out on a scientific basis.

The purpose of environmental quality standardization is to establish marginal permissible standards of any impact on the environment and natural resources. These standards should ensure the safety of the population and the preservation of the genetic fund and ensure the rational use of natural resources.

Environmental impact regulation develops requirements for sources of environmental hazards. Environmental regulation takes into account the allowable pressure on ecotism.



The following are taken into account in the normative and methodological documents on prevention of environmental hazards related to ATS.

- 1) Permissible standards of toxic substances (REM) in the exhaust gases emitted during the operation of ATS;
- 2) The quality of water used for technical needs in the activities of ATS.
- 3) Permissible level of physical impact on the environment (noise, vibration, electron magnetic field, etc.).
- 4) Permissible norms of loads arising from the negative impact of ATS constituents on the environment.

Stable sources operating in the ATS and releasing toxic substances into the atmosphere include:

- 1) motor transport enterprises; car and tire repair companies; road maintenance, construction and repair companies;
- 2) all ancillary buildings, engineering and treatment facilities on the balance of the transport enterprise.

Sources of atmospheric air pollution are divided into two: devices that expel toxins into the atmosphere and direct them. Drive devices include process equipment, units, boilers, stoves, furnaces, mixing baths, test stands, etc. Contaminants are discharged into the environment using reference devices, such as pipes, ventilation shafts, aeration lanterns, and more.

The main harmful substances and chemical compounds emitted into the environment from ATC stationary facilities include:

- inorganic dusts;
- carbon monoxide;
- nitrogen oxides;
- oltingugurt anhidridi4
- hydrocarbons;
- lead compounds;
- copper dust;
- alkaline vapors;
- hydrogen;
- welding aerosols;
- solutions and others

It is well known that during operation, the supply of exhaust gases from the vehicle supply system to the environment provides environmental degradation, which requires the study of the properties of fuels for internal combustion engines.

The physical thermodynamic parameters of many motor fuels are given in Table 1. [4]

**Table-1.Comparative performance of motor fuels**

No	Parameters	Gasoline (average content)	Dieselfuel (average content)	Propane, butane	Gas condensate - average	Hydrogen	Natural gas	Methanol
1	Molecular mass	100-120	210-240	51	110-130	2,015	16	32
2	C/H content,%	85/15	86/14	82/18	85,5/14,5	-	75/25	87,5/12,5
3	Density in the liquid state, кг/м <sup>3</sup>	0,731	0,835	0,55	0,756	0,071	0,415	0,792
4	Density in vapor state, kg / m <sup>3</sup>	-	-	2,1	-	0,080	0,67	-
5	Lower combustion heat: kkal / m <sup>3</sup>	7700	8700	5900	8070	2443	8900	3800
	kkal / kg	10425	10150	10800	10350	28660	11890	4800
6	Octanenumber	88	-	95-108	50-55	45-90	110-120	87-106



7	The theoretical amount of air required for complete combustion of the fuel is $m^3 / m^3$	56,6	55	2,7	55	2,4	9,52	-
		14,9	14,3	15,6	14,5	34,9	17,9	6,4
8	(kkal / kg)	840	830	830	830	740	795	825
	(kkal /m3	659	666	650	651	787	645	848

**II. RESEARCH METHODOLOGY**

It is necessary to calculate the amount of toxic substances based on experimental results. In a city of 225,000 people, it was found that there are 8344 cars of different groups. It is the total amount of harmful substances emitted from moving cars.

All other data required for the calculation are included in Table 2 after statistical analysis. [5]

Table-2. Appropriate statistical and normative data for the calculation of harmful substances.

VehicleGroup	PerformanceIndicators			CO		C <sub>n</sub> H <sub>m</sub>		NO <sub>x</sub>	
	$N_{jk}$ unit	$L_{jk}$ км	$\alpha_6$	$m_{iljk}$ г/км	$K_{Tcjk}$	$m_{iljk}$ г/км	$K_{Tcjk}$	$m_{iljk}$ г/км	$K_{Tcjk}$
Freight and special cargo vehicleslari (petrol engine)	357	14680	0,82	49,6	1,7	10,7	1,6	6,3	0,9
Freight and special cargo vehicles (petrol engine)	685	12240	0,8	10,5	1,5	6,2	1,4	6,4	0,93
Truck (gascylinder)	340	15860	0,84	22,3	1,5	7,9	1,4	6,0	0,93
Buses (petrolengine)	114	16400	0,87	45,6	1,7	8,5	1,6	6,2	0,9
Buses (dieselengine)	68	13700	0,83	10,8	1,5	6,2	1,4	6,4	0,93
Buses (gascylinder)	1275	17400	0,88	22,3	1,5	7,9	1,4	6,0	0,93
Cars (petrolengine)	4432	18200	0,85	14,9	1,5	1,3	1,4	1,8	0,93
Cars (dieselengine)	97	14720	0,82	10,5	1,5	6,2	1,4	6,4	0,93
Cars (gasballs)	976	15640	0,91	11,6	1,4	0,52	1,3	0,67	0,91
Total	8344	-	-	-	-	-	-	-	-

In the process of exploitation, individuals or legal entities provide high technical readiness of vehicles, but in all cases this work is not sufficiently organized. As a result, the deterioration of the atmosphere in the movement of vehicles and the operation of technically faulty vehicles cause problems with harmful gas emissions. [6]

**III. ANALYSIS AND RESULTS**

The concept of ecosystems consists of a set of different organisms that interact with each other and with the environment in which they operate, taking into account the long-term coexistence of this organic collection.

There are two major constituents of any natural ecosystem:

- various organisms, plants, animals, microbes, etc. related to living nature are called biota;
- All chemical and physical products of non-living nature are called abiotic factors.

Abiotic factors of the natural environment include: Sunlight, atmospheric pressure and temperature, water, wind, fire, salts, acids, alkalis and other chemical elements, the earth's magnetic field, gravity, gravity, electromagnetic waves, vibrations and earthquakes, vibration and noise, radiation, etc. These factors affect the biota simultaneously,





individually or in combination. The life cycle or vital activity of a biota depends on the degree of exposure and concentration of abiotic factors.

It should be noted that the mechanism and form of action of abiotic factors on organisms in the ecosystem is very complex and, at the same time, takes place on the basis of certain laws. For example, crop yields can be maximized due to the combined effects of sunlight, soil fertility, and moisture.

Thus, the functioning of a natural ecosystem, that is, its viability, is governed by the following principles:

- In the natural ecosystem, the consumption of resources and the loss of waste occurs in the mutual exchange of all substances, ie the law of conservation of mass applies;

- All ecosystems have an absolutely inexhaustible source of energy that does not harm the environment and is an inexhaustible source of energy.

Within the natural ecosystem, the human ecosystem has gradually emerged, and it is mainly closely related to the emergence of agriculture on earth. Due to tillage and the cultivation of various cultivated plants, the limiting factors that have a devastating effect on the biosphere are also beginning to have a negative impact on the human ecosystem. However, the following measures have been developed against these factors:

- food production;
- water supply management;
- pest control;
- construction of warm shelters;
- Arming with technical means.

It is the active development of the human ecosystem that has a strong negative impact on the self-management mechanism of the natural ecosystem, namely:

- the balance in the movement of biogens in human society is lost, ie the law of metabolism and circulation is violated;

- Natural resources are declining due to human activities and environmental pollution is increasing, mainly due to the oxidation process; under these conditions, natural ecosystems survive only at the expense of solar energy and the unpolluted part of the biosphere;

- Biomass shortages are expected at the end of the food chain.

Due to the human ecosystem, a separate technosphere is formed in the biosphere.

The concept of technosphere refers to the part of the biosphere that has undergone anthropogenic and man-made changes using the technical means created by it.

The road transport complex (ATM) is one of the man-made factors that fall within the technosphere and actively affect the environment. As a result, both anthropogenic and man-made factors begin to attack the natural ecosystem.

Anthropogenic factors are the artificial effects of human activities on the environment, which increase due to the polluting products of technological processes that lead to changes in the composition and regimes of all ecotope constituents and disruption of the composition and structure of natural ecosystems.

The ability of an individual ecosystem to withstand the sharp fluctuations of the environment caused by anthropogenic loads assesses the viability of that ecosystem.

Today, one of the most pressing issues remains the creation of conditions for the vital activity and viability of natural ecosystems by ensuring the sustainable development of human society.

In particular, to study the functional relationship between the consumption of natural resources and recycled raw materials, the energy changes in the necessary internal combustion engines and the distribution of waste to the environment after useful work, and to model the mathematical relationship between them and its optimal solutions. the search has both theoretical and practical significance.

The number of vehicles with internal combustion engines is increasing day by day around the world. A very dangerous situation is emerging for a living being. One of the most effective ways to prevent this is to find ways to achieve greater use of renewable natural resources by reducing the use of fuel in industry and transportation.

In accordance with the Decree of the President of the Republic of Uzbekistan dated March 1, 2013 No. PD-4512 "On measures to further develop alternative energy sources", measures for the use of alternative energy resources are being developed and implemented in the country.

The environmental problem is one of the most acute, urgent and global problems of the 21st century.



The present and future of civilization largely depends on how the environmental problems that exist in the biosphere are solved. For this reason, the whole world, as well as the Republic, urgently needs a scientific and practical solution to environmental problems.

We will address this issue in the course of vehicle operation.

The main operational features of the car are:

- traction and braking dynamics;
- fuel saving;
- management;
- stability;
- Passage through road barriers;
- smoothness of walking;
- Traffic safety.

One of the main requirements for the automotive industry is to increase supply and demand for it by reducing fuel consumption during operation.

Scientists and inventors from all over the world are puzzled by this demand. This proposed technology is to create an efficient use of natural wind energy in traffic by curbing the generation of cars.

Indicators that assess the use of secondary wind energy in vehicle operation are the most important indicators and serve to reduce fuel consumption.

At the same time, solutions to environmental problems are being addressed through the development of environmentally friendly electric vehicles around the world in order to prevent air pollution during road traffic.

In our proposed research work, the task is to generate electricity in a non-traditional way with the participation of motor vehicles and to save fuel products and protect the environment based on self-sufficiency and the use of secondary wind energy during operation.

Its function is to provide unconventional energy by curbing the gusts of wind that occur during the rapid movement of cars, and from it by creating a device for obtaining energy that charges the battery that drives the electric motor.

The use of wind energy, which depends on the speed of the car, serves to preserve the environment by providing a non-conventional energy supply by creating a mechanism to control it.

Of course, in this research paper, the technological process is simple and easy to operate, with theoretical recommendations based on the fact that the car engine should run in two stages (fuel and electricity).

For example, when the speed of a car reaches 70 km / h, the wind speed approaches 20 m / s. At this point, the windshield vents are automatically opened, the wind turbine is activated and the motion is transmitted to the electric generator using a belt. It is sent to the accumulator produced by the generator, and the movement of the car continues at the expense of the generated energy.

As the speed of movement increases, so does the energy. The operation of the car on the basis of this technology is 60-70% of the distance between cities.

Of course, in this work, the necessary recommendations have been developed by studying the physical and mathematical laws for the calculation of fuel economy, engine performance and traction speed characteristics of internal combustion engines (gasoline, diesel, gas).

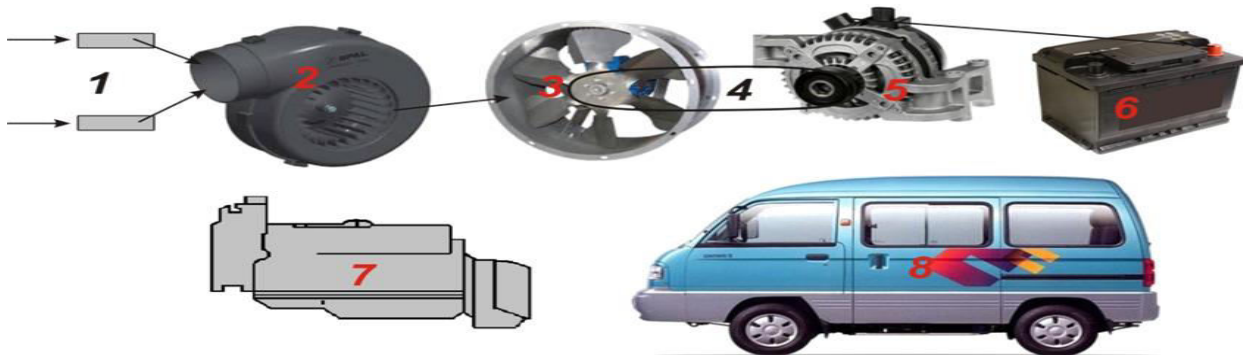
Also, the invention was developed on the theoretical basis of the laws of change of electric motor performance and traction speed characteristics during the operation of cars, the laws of change of the traffic process.

The functional capabilities of the invention include:

- existence of physical and mathematical laws on the conversion of wind energy into electricity generated during the operation of cars;
- Possibility to calculate traffic solutions based on all technological factors included in the development;
- Scientific research is being carried out on the design work on the calculation of fuel consumption and the possibility of saving it in the operation of the traction speed, which has a definite value, and the elimination of environmental problems.



Construction drawing using wind energy in Automobile exploitation



1-wind flow control pipes, 2-wind accelerator, 3-wind vane, 4-belt, 5-generator, 6-battery, 7-engine, 8-car, 9 - wind flow direction

As can be seen from the picture above, it mainly helps to start the generator due to the direction of wind flow while the car is moving. As a result, the generator will be able to provide all consumers with the required energy.

Expected results of this research:

- to achieve economic efficiency by reducing fuel consumption in the operation of vehicles, to prevent air pollution;
- There is a need for passenger cars, regardless of the form of ownership;
- to impart knowledge to students through the introduction of this invention project in the course work, graduation theses on the subject of internal combustion engines.

Sequence of work:

The use of a secondary wind that occurs during the rapid movement of the vehicle, initially using an internal combustion engine when driving the vehicle.

- The wind flow caused by the rapid movement of the car (after the speed exceeds 70 km / h) is controlled by 2 pipes and transmitted to the accelerator;- the current is obtained by directing the amplified wind current in the accelerator to the blade, directing the curved wind to the blade and moving it, and transmitting the motion to the electric generator by means of a belt;

- due to the generated electric energy the batteries are charged, due to which the car continues to move.

For example, if a car travels on the road between two cities (Tashkent-Samarkand) for 2 hours at an initial speed of 70 km / h and a final speed of 90 km / h, during this time the car is 78 .10-5 m / cek2 accelerates and travels a distance of 134.3km.

This means that according to the technology we offer, the car will cover a distance of 144.3 km, saving an average of 14 liters of fuel (gasoline).

In this regard, 14 tons of fuel (gasoline) can be saved during the operation of 1,000 cars, as well as the prevention of environmental degradation due to the savings of internal combustion products.

Taking into account the above, the calculation of electricity in the traditional way is initially based on data. The small speed of vehicles, the number of cars, the number of annual working days are also taken into account.

In the car, the wind, the energy is converted into electricity, the conditions for the continuation of the movement:

$$E_{u.э} \longrightarrow E_{э.э} \longrightarrow V_{AB.X.T} \quad (1)$$

$$F_{m.κ} > F_{u.κ} \quad (2)$$



$E_{\text{ин.э}}$  - wind energy,  $E_{\text{э.э}}$  - electricity,  $V_{\text{ав.х.т}}$  Vehicle speed (more than 70 km / h)  $F_{\text{о.т}}$  - traction of the car;  $F_{\text{ин.к}}$  - wind resistance;

In certain areas of the road (when approaching traffic lights, crossing populated areas and mountain roads) the car is driven by internal combustion engine fuel (gasoline, gas), because in such areas the device automatically converts to internal combustion engine. The rest of the time we will move on to the technology we offer.

As a result of experimental studies, the car traveled a two-hour distance on a flat road between two cities at an initial speed of 70 km / h and a final speed of 90 km / h. found to be moderately fuel efficient.

$$V_0 = 70 \text{ km/h} = 19.4 \text{ m/s}$$

$$V_t = 90 \text{ km/h} = 25 \text{ m/s}$$

$$t = 2 \text{ h} = 7200 \text{ s}$$

$$a = ? \quad s = ?$$

$$a = \frac{V_t - V_0}{t} = \frac{25 - 19.4}{7200} = 8 \cdot 10^{-4} \text{ m/s}^2 \quad (3)$$

$$s = v_0 \cdot t + \frac{a \cdot t^2}{2} = 19.4 \cdot 7200 + \frac{8 \cdot 10^{-4} \cdot 5.2 \cdot 10^7}{2} = 170 \text{ km} \quad (4)$$

#### IV. CONCLUSIONS AND SUGGESTIONS

According to the results of the calculation, during the experiment it was found that the car covered a distance of 170 km. During the movement, the car was found to save an average of 14 liters of fuel (gasoline).

**Operational Safety:** Operational safety requires quality and service in regular management to ensure operational safety. Of course, in the process of operation, the technical safety of such vehicles is ensured on the basis of their operational characteristics.

**Consumer protection:** Typically, routine management relies on a number of technical requirements. Its purpose is to provide a constant speed in exploitation. Providing a means of protection for energy consumers while ensuring the technical characteristics of the car is a requirement of the times.

**Opportunity:** The demand for such a time-saving hybrid car will also change. Ecosystem disturbances will be prevented, savings will be achieved.

**Quality:** The quality of this vehicle is a factor related to public transport safety. Given the ecosystem disturbances, it will motivate consumers to choose other, i.e., the vehicles we recommend.

The recommended device meets the technical and labor safety requirements. It also has the ability to operate completely safely. The device is simple, inexpensive and easy to maintain, easy to operate. By applying the proposed device to production, it is possible to save fuel consumption of manufactured vehicles.

Also, as a result of the use of this invention, students will gain skills and knowledge on the efficiency of rational use of alternative energy resources in the conduct of experiments and course work.

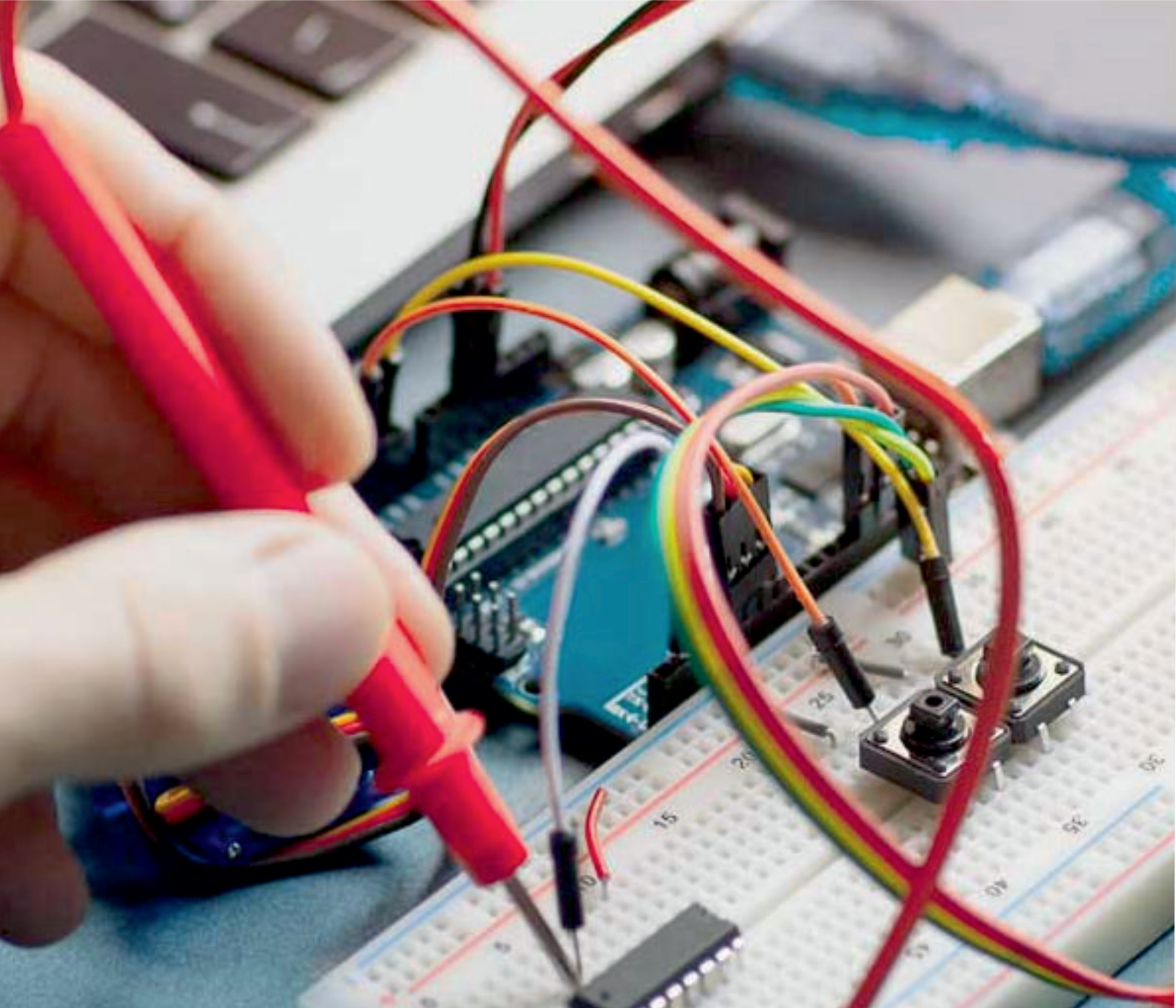
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