HIGH POWER WIND TURBINES OPERATING IN THE URBAN ENVIRONMENT AND GREEN HOUSE MEMBRANE OVER THE GEOTHERMAL INSTALLATION

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Abstract: *High power wind turbines have a common axis with the main building structure. Vibration of wind turbines can be extinguished using light nanomaterials for the wind turbine rotor. It rests on bearings insulated with rubber pads of the primary concrete structure of the building. Membrane of greenhouse warming geothermal installation ends with a wind turbine, powered by an warm air rising over greenhouse.*

ВЯТЪРНИ ТУРБИНИ С ГОЛЯМА МОЩНОСТ, РАБОТЕЩИ В ГРАДСКА СРЕДА И ОРАНЖЕРИИ, РАБОТЕЩИ С ГЕОТЕРМАЛНИ ИНСТАЛАЦИИ

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Ключови думи: *Вятърни турбини, Урбанизирана среда, Оранжерии, Геотермални инсталации.*

Резюме: *В в доклада се разглеждат вятърни турбини с голяма мощност и ос съвпадаща с остта на основната конструкция на сградата. Вибрациите на вятърните турбини може да се погасят с помощта на наноматериали от които е изработен ротора на вятърна турбина. Турбината е върху лагери, изолирани с гумени тампони върху основната на стоманобетонната конструкция на сградата. Мембрана на ораоранжерия (затопляна от геотермална инсталация) завършва с вятърна турбина. Тя се задвижва от топлия въздух, издигащ се към върха на съоръжението.*

Introduction. The dynamic behavior of the common mechanical structures can model by the theory, presented in the several publications [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]. The dynamics of the wind turbine structures have similar behavior.

Exposition. In the fig.1 is presented the scheme of high power wind turbine. It is applicable to operating in urban environments. High power of the wind turbine is determined by balancing the generator axis and the axis of the building structure. Generator stator is mounted on a main building structure. It is made of heavy materials. Rotor package is placed in the parapet of the main building structure. It is made of light materials. This combination of materials isolated the high frequency component of the spectrum of the vibrations. Low-frequency part of the spectrum of the vibration is isolated by rubber isolators used in railway transport. The effectiveness of the presented high power wind generator depends on coupling of the building and the turbines axes.

The other wind turbine structure is presented on the figure 2. The structure of green house consists of membrane part and geo thermal installation under it, shown on the figure. This is the structure with continuous operating wind generator. The hot air under the green house structure rises and drives the turbine. The membrane is supported by a ring with helium or light metal central column.

Position A represents a geothermal heat exchanger. Position B represents a triple serpentine drilling. The use of system A or B provides geothermal water with a temperature 13 degrees.
The heat pump 2 increases the water temperature to working values. In case of areas with water with hot geothermal temperature the heat pump may be missing from the scheme 2. Such areas are in southwestern Bulgaria.

The presented scheme further provides heat for the greenhouse and electricity from the wind turbine. This is a scheme and ongoing turbine.

Another scheme of the continuous operating turbine is represented in the fig. 4. Through small nozzles of the car is supplied airflow. These small nozzles do not create a large air resistance. Jet spinning rotor turbine made of lightweight material.

Presented three designs show three examples of effective use of wind to produce electricity.

There are many other schemes of efficient airflow. In buildings heating creates low heat flows, which also can be used to produce electricity. Figure 3 shows detail of rotor package. Figure 4 shows air turbine mounted on the automobile. The electrical part of the generators is not presented in the details. They can be mounted over the working plane of the rotors.

Conclusions. These structures will be the subject of future researches.

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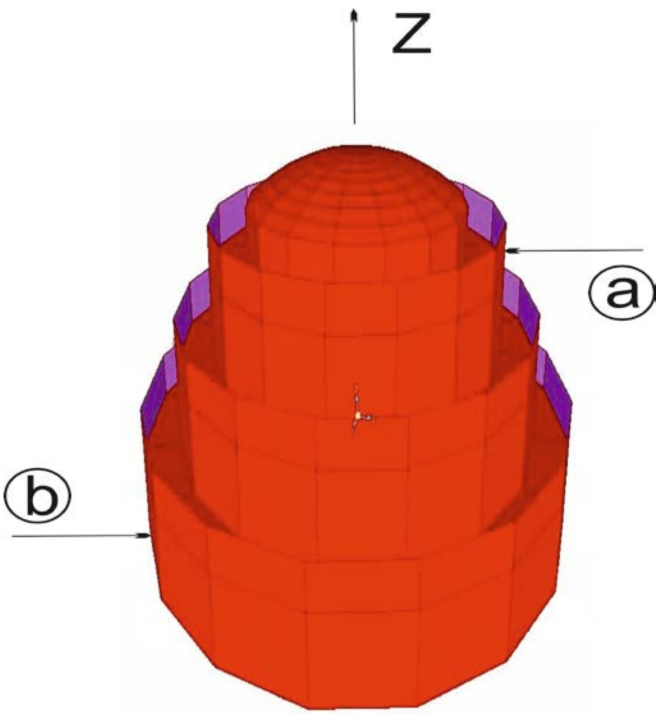

Fig. 1. Coupling of the building Z and the turbines axes

a- Rotor package of the wind turbine; b – Main structure (stator of the wind turbine)

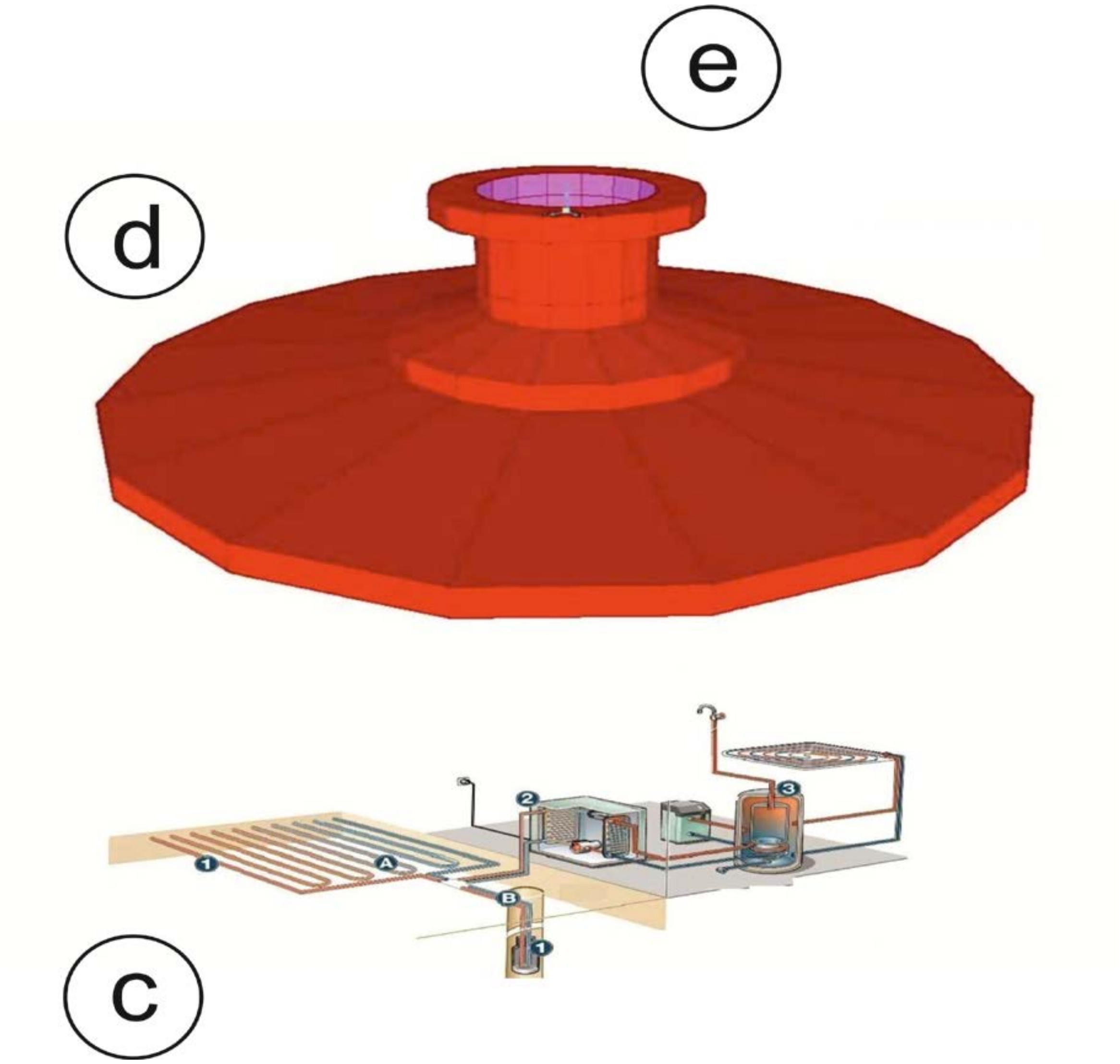

Fig. 2. Green house membrane over the geothermal installation:
c – geothermal installation, d – membrane, e – wind turbine and helium ring or central column

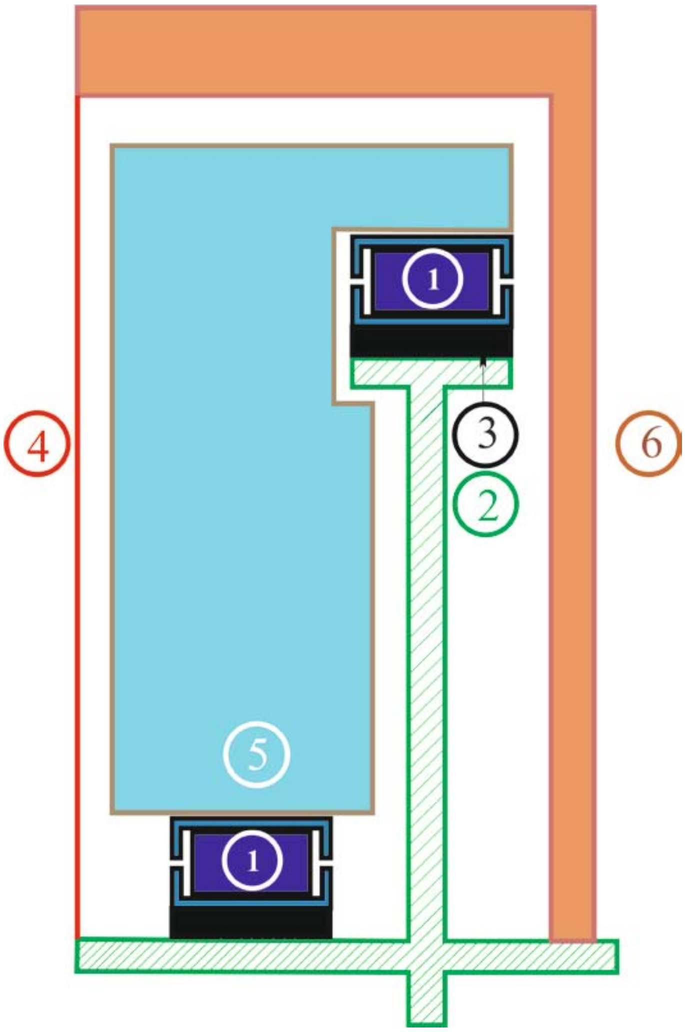

Fig. 3. Detail of rotor package: 1 - Roller bearing diameter of the building;
2 - Roof reinforce concrete plate; 3 - Rubber insulator applied in railway;
4 - Thick steel mesh; 5 - Working plane of the rotor; 6 - Internal housing railing.

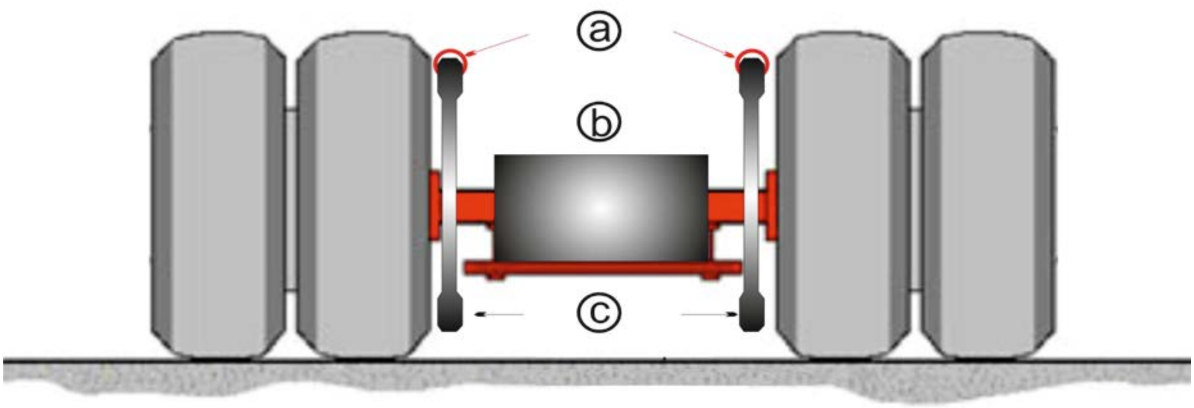

Fig. 4. Air turbine mounted on the automobile:
a – air nozzle; b – electro generator; c – rotor

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