THE VISUAL SOLUTION LAYOUT OF THE TWIN-SEAT ELECTRIC CAR

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Introduction

In this article, the example of a conceptual design of a twin-seat city electric car demonstrates how technological and operational restrictions potentially can affect the external appearance of the vehicle design.

Descriptions of the vehicle design

Thus, initially there are the following requirements:

1. One of the main limitation, high cost and insufficient capacity of power plants which may potentially be installed on the vehicle at the moment.
2. Manufacturability and simplicity of design, light weight and good aerodynamic characteristics.
3. Aesthetic value.
4. The possibility of customization for low-rate productions.
5. Ease of use.

All these requirements have been dealt with one at a time, and the following solutions have been offered:

1. Power electrical installations with high efficiency, namely brushless motors at the moment are manufactured as power sources for these electric motors - lithium-ion batteries with high capacity and good characteristics of the discharge current. The problem with this power plant is the high cost and increasing its value with increasing power, respectively. Therefore the task is to make the mechanism with the minimum possible weight of structure per unit of power. As a result, it is worthwhile to make the vehicle more resistant to both rolling and air friction. At the present moment this power unit allows to accelerate the vehicle with similar characteristics up to 100 km within 7 seconds, the capacity is enough for the distance from 100 to 200 km when driving in city. Charge lithium polymer batteries may be recharged from the public network.
2. Appearance, technology used in the manufacture of construction and some technical solutions are conditioned by the same logic. The body of the vehicle is proposed to be made spindle shaped, placing passengers in tandem (one after another). This scheme will provide an optimal cross section (that will reduce the resistance of the air flow), and load distribution .The body of the electric vehicle is made of composite materials by the vacuum-forming method. An alternative could be 3D printing. Large diameter wheels are located outside the contours of the body. This scheme also allows optimum positioning of the alignment and the power units. It is optimal to produce the upper part of the vehicle (including doors) from a transparent material with a minimum number of structural elements which will provide a good view. The transparency of the glazing is assumed to be variable. It is suggested trying the option of opening the door by moving the upper part of the glass back, or the door can be opened right up or left up as a driver and passenger descends. The shape of the upper part of the vehicle reminds the cockpit of modern fighter aircraft. Car optics and parts of the exterior are inscribed in the contours of the body to reduce air resistance.
3. Visually, the vehicle must express the swiftness, environmentally friendliness, modern shape, combined with ease of perception.
4. In case of manufacturing the body of this electric car on a 3D printer, it is possible to foresee the possibility of the individual changing the size or geometry of certain elements of the body.
5. The usability of this urban transport includes a number of features:

- Small size
- Large doors for driver and passenger
- Good view
- Low noise
- Environmentally friendliness
- Aesthetics
- Low cost of ownership.

Below there is a visual solution of the project:

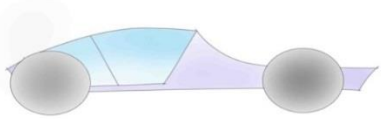

Fig. 1

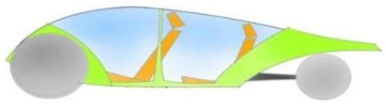

Fig. 2

As an alternative, here is a car with a row-oriented seats (Fig. 1), as well as the variant with the four-wheel chassis (Fig.1, Fig. 2), and the geometry adapted for the installation of solar panels (Fig. 3). There is the final variant on the Fig. 4.

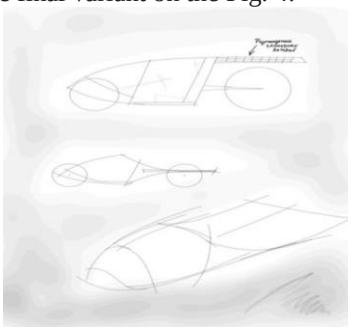

Fig. 3

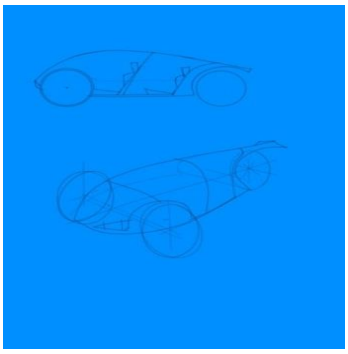

Fig. 4

The variants of electric vehicles, implemented today and most similar to those demonstrated in the project, are shown below:

A cute double electric car on three wheels belongs to a Swiss joint-stock company S. A. M. Group AG and is produced jointly with the Polish company Polska Sam (Fig. 5).[1]

Fig. 5

The American company produces a urban Arcimoto electric car, called YUKO (Fig. 6).[2]

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Fig. 6

Conclusion

It can be noted that amongst the existing solutions in sketches and completed projects the layout of double-seat electric cars, presented in this article, seems quite common. This may indicate that this scheme is in view of the described advantages is optimal, however within this form, it may still be possible to find ways for its improvement.

References

1. Motor.ru [Electronic resource]. – Available from: http://www.motor.ru/, free (date of access: 25.10.2015).

2. Grueneautos.com [Electronic resource]. – Available from: http://www.grueneautos.com//, free (date of access: 25.10.2015).