

Car Design Methodology to Develop Skills of Designers for International Competitions

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ABSTRACT

The research problem in the lack of specialized offices in the field of car design similar to the European, American and Asian offices in spite of the availability of specialized academic institutions in this section of the branches of design which led to a severe shortage of personnel working in this area, the research found the aim is to develop a methodology for the design of cars to guide the contestants in order to be closer to the methods of car design and to guide the contestants in local and international competitions and to the development of Egyptian cadres capabilities of the graduates of Egyptian universities in the field of car design, leading to the creation of a generation of designers can have a place in car designers community, also works on cars industry that may shift from assembly industry to aggregate industry development bearing designed and manufactured in Egypt slogan to increase the added value of the Egyptian car. Clear from previous studies as results that all the contestants participating in Egyptian competition are amateur which shows the lack of professional designers in Egyptians and The research found that the participation of global companies producing cars and design offices in competitions are considered a marketing step and prove worthiness for companies in the global market which supports the competitions that take part in them. As the researcher was able to develop a methodology for the design of cars linked to the ways used globally in the global automotive and large corporations design offices to serve as a guide for the contestants can be guided by. The researcher recommends holding training sessions for the participants in Egyptian competition to raise their capabilities in preparation for the coming competitions. And the researcher recommends increasing the number of competitions held in Egypt to encourage local and global designers. The researcher also recommends inviting car manufacturers to participate in local competitions to support competitions. The research follows Find deductive approach to implement that

Key words: Air tunnels, initial idea, Prototypes, sketch, car Design, simulation models.

Introduction

The annual competitions are held in many countries of the world, which attracts a lot of young designers, both amateur or professionals and even collegians academies specialized design, which is considered one of the best methods in the car designers of capacity development in terms of participation with senior famous auto manufacturers such as Toyota, BMW and other companies mentioned later will come, and is considered the annual US competitions of the most important and most famous car design competitions in the world where participating designers from around the world of professional and amateur and manufacturers of cars and offices specialized design, and is interested in this context the only local competition organized on the sidelines of automatic exhibition, which is sponsored by Al-Ahram Foundation without any international involvement, which provoked the attention of the researcher to find a way of working on the Egyptians contestants capacity development by setting methodology for the design of cars to guide the contestants in order to be closer to the road vehicles that followed the design of the world so as to raise the Egyptians designers also working to raise the technical level of local competition and thus be a Ways to attract international designers.

The research problem in the lack of specialized offices in the field of car design similar to the European, American and Asian offices in spite of the availability of specialized academic institutions in this section of the branches of design which led to a severe shortage of personnel working in this area .

The aim of research is to develop a methodology for the design of cars to guide the contestants in order to be closer to the methods of car design to guide the contestants in local and international competitions and to the development of Egyptian cadres capabilities of the graduates of Egyptian universities in the field of car design, this leading to the creation of a generation of designers can have a place in cars designers community, also works on cars that may shift from assembly industry to aggregate industry development bearing designed and manufactured in Egypt slogan to increase the added value of the car Egyptian, and follows Find deductive approach to implement that.

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Previous studies:

The American competition.

The annual competition is the American (LA Design Challenge) For the design of cars, one of the most famous design around the world competitions, and attracts a lot of young designers, both amateurs or professionals and even students academies design specialist, and was the base case in this year's competition for the design of future vehicles in 2025, and at the same time focus on how easy it is movement and responsiveness to the needs of the driver, where it participated in the contest many large companies, such as car manufacturing BMW And SABIC and Subaru and other internationally renowned .

Section designs in BMW America took part in this competition for design first bore the name Subways, And use the idea of movement in groups such as the exploitation of fish and sea water and the ocean to move easily beneath such as subway tunnels, while the second design of BMW America carried the name SEED It is oddly shaped vehicle was described as a vehicle to be used to navigate on other planets during the exploration process.

Changfeng Company Chinese participated in the competition to design a car LaBrea It is oddly shaped car and appeared like a children's toy many colors, where the company is quoted car design of the type of locusts, which has the ability to jump and run, as well as the rise of the walls and the highlands.

From Japan jac motors Design her made car H.E.F.E.1 and which was designed to be an electric car environmentally friendly as shown in Figure (1), a car based on its progress on the infrastructure electronic system that links between them and the other cars in the city, where the parked cars to grant the amount of power granted to it by this system and directed to pay the other cars are going the city, and that Noah savings of energy at peak times.



Fig. 1: Illustrates the JAC motors Design

Toyota of the leading participants in this contest, and participated design her car e-grus Allocated for long journeys, and carry a non-traditional form of the cockpit single-seat, and the driver flying at a very high level from the ground in a manner such as conventional cranes as shown in Figure (2).



Fig. 2: Shows Toyota motors Design

Mazda Japanese also was one of the participants in this competition to design her car auto adapt And who was one of the earliest designs to form the current regular car between the other designs in the competition, which is characterized by this car as being able to adapt fully with the region that go where also the change of shape and how to drive it automatically as needed as shown in Figure (3).



Fig. 3: Represents a Mazda motors Design

The Egyptian competition

Only Egyptian competition is considered an emerging compared to global competitions are held without any support from the design offices or manufacturers for cars from the world-famous names came this year entitled electric car meet Egyptian family needs of the design, the competition held for the participation of amateur design and that the lack of bureaus to design cars and competition was on the sidelines Annual Motor Show, organized by Al-Ahram Foundation in readiness to receive the artwork participating in the pavilion amateur car Design Expo annual this year framework has been coordinated between the Faculties of Applied Arts, Helwan University and Alexandria University, this year's competition is an economical electric car, versatile and fit the individuals needs of Egyptian family and indulgence in solving the problem of congestion and traffic, to be a convenient way transportation is amateur of Design Suite Forum annually to the owners of talent due to the non-existence of centers for the design of cars in Egypt, whether belonging to the auto companies or working independently except for some design contributions to the sector buses and trucks, so the design of cars is not limited to the full design of the car, but also applies to the design of mechanical parts and accessories.

The organizing committee of the competition and determined that it will be business reception on printed paper area of 100×70 cm and that the institution of Al-Ahram later the first of March no later than 2015, so as to enable the Committee to choose the best elements to participate in the next session of the pavilion amateur of design because allocated to the display does not allowed work space real sizes as shown in Figure (4).



Fig. 4: Illustrates the Egyptian competition in show room

In this study, a researcher for the competition could offer some selected models illustrate the design used methods individually in the competition, as shown in Figure (5), which shows the design by manual skills.

As attempts to restrict international brands through miniature models offered to show the ability to implement presentation models of designs, if any, and explains that Figure appeared (6).

Other attempts to implement miniature models to try to design the model also appeared began and ended it as shown in Figure (7) it has not given up the competition of design.

Attempts by manifestation dimensional computer programs used or 3d-design programs as shown in Figure (8).

The researcher concludes of the study of works submitted for the contest as the Egyptian amateur lack of methodology for design as followed in automotive design offices or companies with global names.

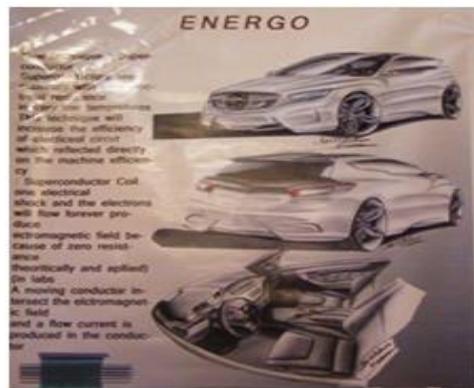


Fig. 5: Shows manual design



Fig. 6: Represents a models of international brands



Fig 7: Shows presentation models



Fig. 8: Illustrates the computer design used design programs

Design methodology of cars to guide competitor.

By studying the competitions became clear that foreign competitions follow the methods linked in ways that cars design used in the global design or followed in car manufacturers offices thus enriching the competition with new ideas and designs can be implemented and put on the market for commercial use, of this logic researcher proposes to develop a methodology for the design of cars to guide the contestants in order to be closer to the methods of car design, and that this methodology is working on reducing the reproduction of universal design and the upgrading of the level of local competition to approach the advanced world levels as follows:

Previous studies.

the designer contestant before thinking of any design found on previous work for global products to learn about the latest business and recent trends in the field of car design by On the other hand lies the importance of the previous studies of designs and other products to avoid repetition or redesign and studies through the research E-business resulting from international companies that have sites on the Internet, and can take advantage of field study of what is available in the rider environment and to identify the components and elements of modern cars that can take advantage of the elements in the proposed designs . (Kaster , 2011)[9].

Drawing an initial idea of the form(sketch)

Usually begin to draw a simple idea or several ideas allowing the designer opportunity to develop the idea, one of them has to Inspired of Nature (bionics) Or composed of geometric shapes or followed for a artistic attitude and trends have been designed to benefit during the development of his ideas from the popular tradition or historical In this context, multiple sources of inspiration for the development of the idea in order to be the idea of the personal stylist has express his imagination and honorable, and thus far on the work of others as that proposed designs may also reflect the environment and the Egyptian identity.

The designer can draw external lines in a manner vertical projection (Muscat front or the sides or from the top) and then Manifesting using colors, and show the external details in preparation for the show to the computer and determine the initial dimensions as shown in Figure (9) as dimensions using lines could be drawing a manner tri perspective preparation also to the computer as shown in Figure (10). (Fenner,2003) [3]

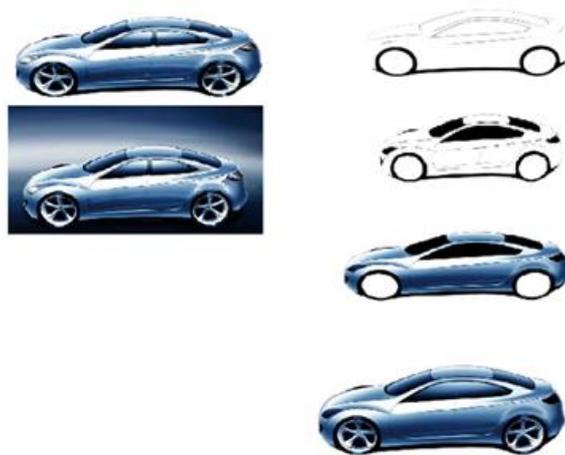


Fig 9: Shows manual sketch

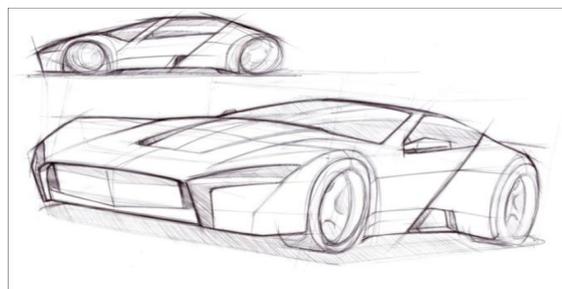


Fig. 10: Illustrates the other method of manual sketch

The development of the initial idea of the form by the computer

The development of the initial idea of the form by the computer can be developed initial ideas by computer applications in the field of three-dimensional design and by shifting manual drawings of cars to a specific three-dimensional drawing are initially using one of the well-known programs such as (3d studio max)and (solid work)And (AutoCAD) And (Rhino) Which facilitates the design view from all possible angles and move items that can be moved, such as doors and hood, as well as storage areas and moving the bishop as illustrated in Figure (11). Gibson *et al.*, 2009).



Fig. 11: Represents a 3D computer design

Determine the initial dimensions of the design:

The process of determining dimensions initially as shown in Figure (12) an important stage make source able to form a preliminary view of the design in terms of form and function and this process helps the designer to build prototypes easy to take shape, whether manually or machined (clay) and are scientifically determine dimensional computer(Dyson,1991) .

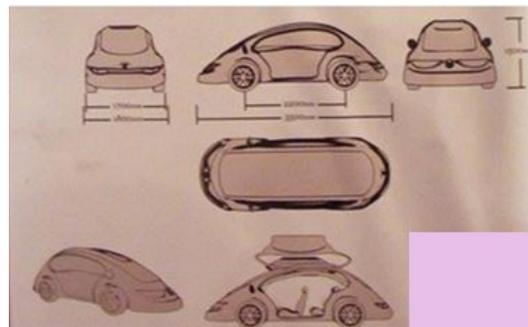


Fig. 12: Shows the process of determining dimensions initially

Working study model by binders (clay)

Study model simple and easy ores in the formation was made of wood or cardboard or clay (mud Aswani) which is shown in Figure (13) also can be built with stucco, and built prototypes always measure Drawing (scale) Which sees the designer, which would bring him an initial vision of form has adopted the real as well as the scale can be built manually or machined prototypes operating system CNC,(Hodges,2003) .



Fig. 13: Represents a clay mode

Simulation models:

Built simulation models for display purposes and solicit the views of all of the views of all of the design in the global design office management and design management major manufacturers of cars as shown in Figure (14) At a later stage conducted the survey to the public, which will make for this design The proposed manufacturing simulation models of ores is a real alternative or check speed in the completion of the exterior so that the only poll being on the shape of the car to the design team realized that the shape of convincing management company or achieve the wishes of the public in the new design in terms of shape (Moraal,2012) .

The first sample models (prototype)

Designer Can build models using the first sample and intermediate materials as clay as shown in the figure of (15). And is formed by machines operating system CNC to convert the three-dimensional design from the computer to the stereo real dimensions and then specify details of the constituent elements of the shape of the doors and lights and handles. Etc. Then take prints of all the elements, as shown in Figure (16).



Fig.14: Shows simulation model



Fig.15: Illustrates the first sample models (prototype) building



Fig. 16: Shows process of taking prints of all the elements

In preparation for the manufacture of the first sample real materials functional and details followed by building the steel structure, which combines After all elements manufactured which in turn mounted on the engine and animated elements and suspension components for the car, so the car will be collected and are ready to test the durability and shock resistance are also tested in the air tunnels as shown in Figure (17). (Liou , 2007).



Fig. 17: Illustrates the prototype model in air tunnel

Executive Technical drawing:

After conducting tests on the first sample design department is working on the design development based on the results that came out of the tests and the manufacture of other sample address past mistakes and from this point of executive engineering drawings can work to begin final production process.

Results

- A – It is clear from previous studies that all the contestants participating Egyptian competition are amateur which shows the lack of professional Egyptians designers.
- B - The research found that the participation of global companies producing cars and design offices in competitions are considered a marketing step and prove worthiness for companies in the global market which supports the competitions that take part in them.
- C - The researcher was able to develop a methodology for the design of cars linked to the ways used globally in the global automotive and large corporations design offices to serve as a guide for the contestants can be guided by.

Recommendations

- A) The researcher recommends holding training sessions for the participants in Egyptian competition to raise their capabilities in preparation for the coming competitions.
- B) The researcher recommends increasing the number of competitions held in Egypt to encourage local and global competition.
- C) The researcher also recommends inviting car manufacturers to participate in local competitions to support competitions and would raise.

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