

Use of modern printing technology in design of fabrics for car covers (interactive)

Prof. Mohamed Ali Hassan Zeinoh

Full Professor at the Faculty of Applied Arts - Helwan University - President of the
Arab Society for Civilization and Arts

zana3r@hotmail.com

Dr. Rania Sami El Gamal

Doctor Lecturer: Faculty of Applied Arts - 6th of October University - Department of
Textile Printing, Drafting and Processing

Introduction

Manufacture of car covers is considered of the important needs nowadays due to fluctuation in temperature and global climate change which affected Egypt and caused unprecedented extreme temperature that causes damage to painting layers in cars or change in color shades, that's why it has become important to work on development of car covers in Egypt and caring about it through applying several aspects in fields of creativity of color. Design and technique in textiles, technological development and information revolution have an important role in modern printing and design. The research is trying to link between modern techniques of textiles and printing technology represented in modern printing ((digital and 3D), in innovation of designs for car covers that help on showing functional and aesthetical appearance without making mistakes regarding the requirements to be realized in car covers that satisfy the aesthetical side of the design and protect from color change and has heat and light reflection to preserve outer appearance of cars.

The research problem:

- Create interactive car covers that aren't affected by heat.
- Benefit from modern printing technology in design and its aesthetical interaction with the surrounding environment.

The research purpose:

Achieving a compatible relationship between car covers and modern printing (digital and 3D) to design and produce covers that are adapted to Egyptian taste and weather.

The research hypotheses:

The research assumes that by depending on previous studies and practical experiments, textiles can be introduced that are fit to make car covers which can be printed with prints that can be appropriate for the actual needs of receivers. In order to achieve the goal of the research and solve its problem, the following study should be followed:

First: technology of modern printing digital and 3D.

Second: smart car covers fabrics- flexible.

Third: design for environmental printed covering with consideration to color studies.

Fourth: results and recommendations.

First: technology of modern printing digital and 3D.

1- Digital printing technology

Computer mass production of printing was a dream that has come true and has been applied in industry.

A developed mechanical form for a printing unit was developed where all its parts are worked and controlled by a group of computer software using the appropriate species of printing dyes

and all types of materials used in textiles. Such system works harmoniously as each part performs its significant role precisely and accurately and display this modern technique by the name digital printing technology. In this technique data of computer can be adjusted according to its field of profession and use of developed influences of Adobe Photoshop, which is a contemporary transfer especially in the art field and creativity of the designer. Any designer with knowledge about computers can create and innovate endless designs in his/her printing works which define the imaginary artistic vision with high technicality of computer to realize artistic formulations in the plastic work that wasn't going to be realized without the availability of such technology.

In this type of printing; various printing tools are replaced by computer mouse and screen, also digital colors and inks instead of regular coloring pastes and traditional printing to find endless formulas when artistic vision and imagination unite with high technicality of computers to achieve artistic creations in the printing work on car covers with infinite influences to reach the stage of unlimited artistic launch that has no limits but the imagination of the designer, executed by Photoshop and transfer of design data directly from database of the computer into data of printing materials within the same machine or system as the case of ink jet printing, or use a medium that carry the design and known as Fenton and Romano from GAFT foundation where digital data is encrypted into chain of net points in production of media that carry the design or through direct cloning on the printing material of the specified fabric to be used in the manufacture of the cover.

Ink jet: it is a method where small drops of liquid are thrown on the material in a specific area to create an image, before the beginning of digital printing process, various preparation steps should be made and different preparation stages than the traditional printing method which are the following:

Uploading: upload the design on computer by traditional means (scanning-cd – digital camera).

Processing: processing the design with required size and measures using various programs such as Adobe illustrator or macro media freehand, Adobe Photoshop and DK & ATrapper.

Of the most important characteristics of continuous flow system of ink spread printing are the following:

- 1- Precision as the pump works continuously with no stop.
- 2- Speed as vibration of the jet is more than a million vibration/ second.
- 3- It doesn't warm up so composition of ink is constant.

3D printers' types:

Means of 3D printing are varied and can be divided to main types regarding use and applications as the following:

Fused deposition modelling FDM (thermoplastic printers)

Application of 3D printing technique on composed fabrics:

In composed fabrics, limits in design can be broken and benefit from its aesthetic formations in order to fit as car covers to give textural and aesthetical solutions. The coming forms clarify some of the fabric samples that fit this purpose and the idea of the design, execution way can be accredited within the applied frame, research samples of composed fabrics were executed on 3D printer which is a type of Fused deposition modelling FDM (thermoplastic printers).

Description: 3D incubic large size printer.

Size of building: depth height, length: 300x400x8 (Mm)

Building material: multiuse, TPU-PLA ABS

And Silkscreen printing manual was used to print research samples.

Design using printing programs: creating a design for 3D model on fabric using CAD, such programs provide scientific information about the nature of the used materials which is allowing rapid progress for such technology.

Some modeling programs were able to be used in making designs and CAD formula is transferred to OBJ STL, which is a type of files and it is the abbreviation for standard tessellation language. Most 3D printers deal with STL files in addition to other files such as ZPR.

Second: smart car covers fabrics- flexible:

Current and future studies about textiles in England (2006) have pointed at the necessity to care about realization of functional and aesthetical appropriation for the textile product. It is of the factors that help on attracting consumers and satisfy their needs, and commercially promote the product, in addition to technological factors and nature of social level and functional requirements and elevate the aesthetical and shape level permanently in any product.

That's how we start thinking about car textiles by asking the question, what is automotive textile?

Automotive textile: it means all types of textile of fibers- hairs- strings- fabrics used in cars, some of these components are visible such as Upholstery, Carpets, Seat belts and Roof liners, others are invisible such as Tire cords, Composites, Bumpers, and Side panels and some other components enhanced with rubber such as Hoses, air billows, and Filters, etc...

Percentage of textiles used in cars are estimated around 2% of the general weight of the car as 20-25 kg of textiles in a car, 3.5 kg in seats covers, 4.5 kg carpets, 6kg other interior parts and tires, 6 kg of glass fibers, it is likely that the amount of textiles in cars will increase in the future using airbags that might count 4 or even more, in addition to car covering which is the subject of the research, where we can add some features such as color intelligence, heat reflection, water and moisture resistance, which will increase the weight of textiles to 4% of the car weight, so paying attention to quality of textile that are used for covering is essential and there are many types and we will mention some of them:

Water and moisture resistant textiles:

They are called breathable fabrics, which means that the fabric doesn't soak with water under certain pressure of water from rain, which causes it to expel water as well, this is a type of high density moisture and water resistant, that rely on the principle of spread of gas molecules from high concentration to low concentration, when the fabric is wet, fibers can be soaked laterally and gaps become smaller to realize the effect of being water resistant, small membrane that is easily penetrated is resistant to water and moisture and achieve permeability of water and moisture through the difference of the radius between rain drop and water steam, impermeable membrane that is water resistant improves the surface of the membrane through polar molecules and the tension create a water resistant effect. Smart textile that is water and moisture resistant means that it can automatically adjust its permeability according to the environment, for example; it has high permeability for moisture at high temperature to realize an excellent effect in sweating and cooling, while at low temperature it has less moisture permeability to improve heating effect.

Car cover made of such textiles is considered of the most important car accessories that preserve the estimated shelf life of the car body especially the painting as moisture dramatically affects the body itself, in particularly cars present under direct sunlight or subjected to heavy rain and humidity at coastal cities.

Design of car cover: design idea and its execution:

Many modern studies in psychology discuss the relation between color and its direct influence on humane behavior through design. Here we must identify the hidden meanings in colors and its reflection on both human and society, and study the psychological effect of design elements that give a sensation of comfort.

Designers faces daily many problems and relations in nature at which they can start the aesthetical experience by interacting with them, as many of these things have aesthetical potentials capable of provoking stimulation and imagination. Forms are being judged when they are supposed to have positive and inspirational energy, in addition to artistic values related to type of its composition and coordination of its parts which is the most significant side of the aesthetical provocation that leads for aesthetical evaluation of the form, which is how distinctive its style, used elements allow the designer to act upon best solutions and ideas for vehicle covers that cope with the surrounding environment.

Aesthetical judgment is according to individual directions in thinking and imagination and purposes of the design whether beneficial or aesthetical in general.

Direct relation between human eye and his nature has a special sense accepted by the artist as being the equivalent form that he is subjected to in his daily life, but the trial to change what is fixed by dealing with a negative version of vocabularies for forms of nature has a different sense and features with what it has of rough or soft textures, that is considered in this case an important factor of activation of the creative process and composition of imagination in addition to its significant to identify concepts of design basics and its terms, also being considered of the most important entrances for the designer relation with modern scientific theories that include artistic analysis, and building composition of the design.

When designer introduces design solutions, he represents an experiment ruled by previous experience, and information culture from various resources, the result is stimulation from the general nature into a private vision. Design thought of car cover depends on coexistence with the surrounding habitat and benefit from its elements in the design to cope with the location and satisfy the demands of the receiver and fits with the climate. Mother nature is full of sources for inspiration in the universe which Allah has ordered us to meditate in and inspire from nature whatever fits the habitat surrounding us to create an artistic design for a printed artwork on car covers that is linked to the place in harmony, which enrich the visual experience and leads to a sense of comfort and beauty and enjoyment of the design in addition to beneficial aspect for preserving the vehicle from thermal variability and weather turbulences.

Artwork in the design which is the subject of the paper represents a display for a group of visual data, such data isn't composed of points or familiar shapes with specific meanings, but it is a visual regulation for car covers at its location. First was the benefit from the green area next to the car and a first idea from the existed grass was obtained, then the fixed idea was out about tree and clouds elements with contemporary vision that matches the general taste in this region, the third idea was about types of trees with different colors, so these designs were printed on previously prepared fabrics with 3D printing.

Shapes no. 8, A, B, C, are explaining that:-



A) Printed cover made of glass fibers and nylon.



B) A design idea inspired from suitable nature and printing on water and humidity resistant covers (digital printing)



C) Design thought aspired from a collection of colored trees.



Design from nature and use digital printing through phosphoric colors.

Axes that should be considered when designing car covers out of the surrounding environment:

Protection of car cover design from the surrounding environment:

Environment affects and interacts with the cover (weather turbulences-temperature) so when thinking about a design for car cover and printing design on it, car protection during the summer must be considered, a cover should be resistant to burning sun rays as it affects the painting of the vehicle that's why a suitable design with the appropriate color printing should be applied to reflect sun rays and protect car paint and put the mind of the owner at ease as the cover is protecting the vehicle from outside without affecting the external body or the internal components of the car. Also in case of winter during extreme coldness or heavy rain which lead to car scratches or effect on electricity of the vehicle if water leaks into it which causes a mal function in the car. Characteristics of the cover provide appropriate protection for people and save a lot of money is spent on fixing and maintenance.

Protect car from scratch

You paid a lot of money in order to buy a new car, but currently maintain that car is what matters the most, so you don't lose or reduce the value of your car, if you park your car with no cover it can be subjected to scratches from passing by animals or humans, or even other vehicles and bikes that's why you should understand the privilege of owning such car cover for protection and to minimize any possible damage.

Fourth: results and recommendation

- 1- Through previous studies within the research, 3 experiments were conducted for 3D fabrics and printing on them with phosphoric compounds and analysis of these samples to respond to car covering textile of optical glass fibers, and horizontally and vertically woven textiles out of nylon.
- 2- A group of design thoughts inspired by nature and environmentally and decorative active elements that were executed on special fabrics with specific qualities about car coverings specified for each chosen area.
- 3- Confirming the production of a collection of fabrics with special characteristics for protection against dirt, scratch, heat and moisture to protect car from weather factors and theft.
- 4- Benefit from digital and 3D printing and execute some designs through thermoplastic printers (melting printers) to give some embodiment for woven textiles out of cotton, polyester and woven fabrics of glass fibers and nylon.