

Study of design and functional criteria for motorsport clothing

Dr. Shereen Salah Eldin Ali

Lecturer at the Department of Clothing and Fashion Technology - Faculty of Applied Arts - Benha University

shereensalah@hotmail.com

Researcher. Mohamed Alaa Ahmed Mohamed

Bachelor's degree, Faculty of Applied Arts, Department of Clothing and Fashion Technology, Benha University

moalaaselim@yahoo.com

Summary

The basic principle of the clothing industry is to cover the human being and protect his body from natural factors such as wind, hail, rain, sunlight and different natural conditions, so the functional clothing appeared, where the clothes became indicative of the job of the wearer to help him/her for a better performance.

There are sports clothes that also express the type of sports or games that the player plays. These functional and sports clothes must be designed with standard that achieve safety, protection and comfort for the wearer according to the required needs.

In this research, we study the design and functional requirements of motorsport clothing, as Europe is the main center for this sport, which is organized by the International Automobile Federation called (FIA) and its headquarters is located in Paris, France.

The objective of the research is to achieve the design and functional requirements of the racing suit, which is comfort, protection, safety and the required suitable appearance.

The racer's suit should be comfortable during the race and also provide protection against fire hazards, collisions and accidents in the racetrack.

There are also many parts of the motorsports uniform (helmet - face mask - gloves - racing suit - racing shoes) and all of these parts must be made of fire-resistant materials to protect the driver until the flame is extinguished.

Using of Nomex has begun on a large scale in the manufacture of racing suits, which is a fire-resistant aramid fiber manufactured in (DU PONT laboratories). There is also (D3O) material, which is a non-Newtonian liquid substance that was discovered in 2005 in Britain, and this material protects the body from accidents, so it is used as a protective padding in dangerous sports clothing.

The research includes three main themes:

The first: It includes the theoretical framework that was compiled from researches and books, as well as from magazines and the Internet.

The second: It includes the practical framework for the research, where a set of proposed designs were made, which achieve comfort and safety for the driver during the race. A questionnaire was also conducted to select the best designs for their implementation.

The third: It includes the results of the research, where the best proposed designs were implemented with the recommendation to use Nomex and D3O material in drivers' suits to protect them. We also reached to the standards and characteristics that are being required in motorsports clothing.

Key words:

Auto racing, fire resistance, "Nomex" material, functional clothing

Research problem: It can be summarized in the following questions:

- Does the use of "Nomex" material in racing clothing achieve the required safety and protection for the wearer?
- What are the criteria for successful design of motorsport clothing?
- To what extent are motorsports clothing appropriate in functional and aesthetic requirements?
- Do motorsport clothing contribute to achieving comfort during the race?

The research aims:

- Study motorsport clothing with all its parts.
- Achieving safety and protection for the rider in motor sport.
- Finding innovative design solutions to raise the efficiency and functionality of motorsport clothing.
- Employing Nomex material on a larger scale in motor racing clothing to be fire resistant.

Research hypotheses:

- Providing innovative design solutions for motorsports uniforms to improve the rider's performance.
- Providing comfort in the outfit during the race, which positively affects the rider's performance over long periods of sitting inside the car.
- Providing protection and safety in motorsports clothing, which provides safety for the rider and protect him from dangers during the race.

Research Methodology: The research follows the descriptive analytical approach represented in the study of motorsport clothing and its various supplements, and the applied approach in a theoretical and practical framework, where a set of new designs were presented to achieve the comfort, protection and appearance factors required during the race and the implementation of the best ones according to a questionnaire that was made to choose the best of these Suggested designs.

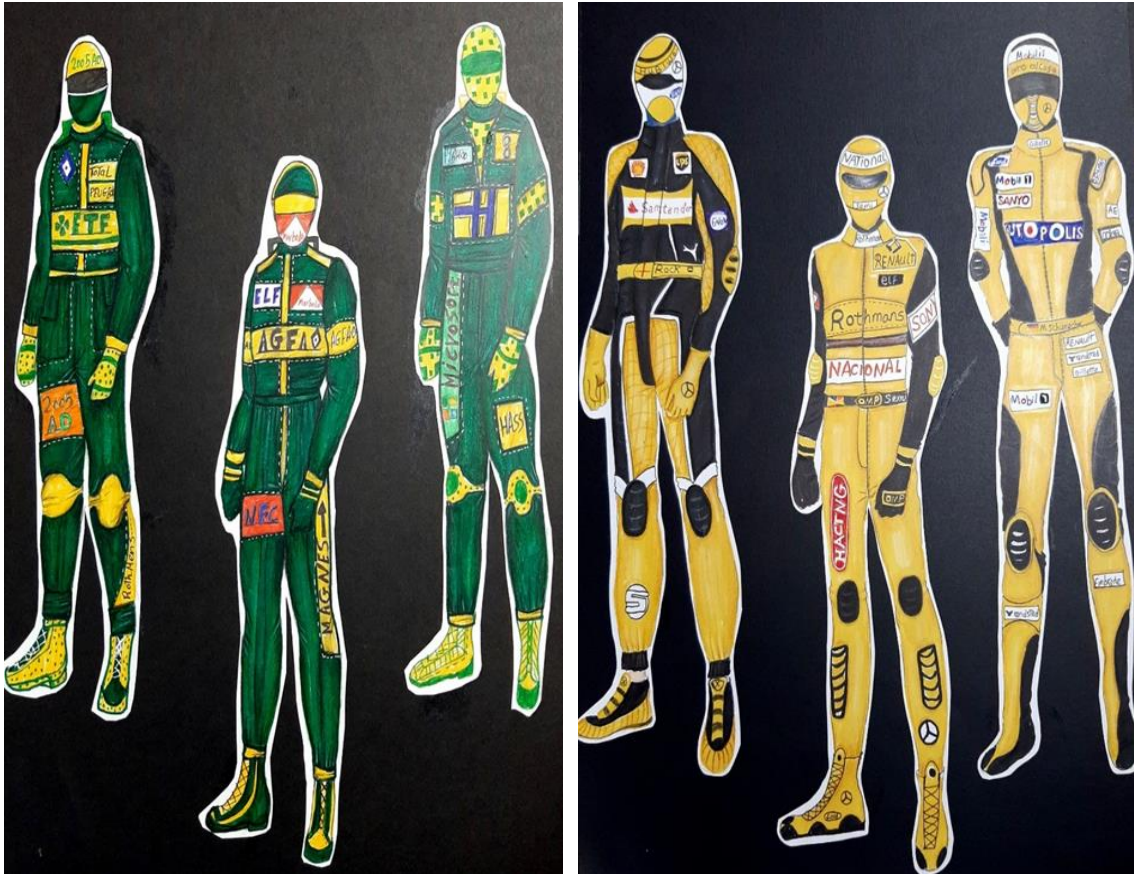
Research limits: Motorsports player clothing - the use of nomex for fire protection.

The search tools:

- Arab and foreign books, magazines and newspapers, websites, observation and conclusion.
- Drawing proposed designs for motorsports clothing according to the problems and difficulties of this sport and its dangers.
- A questionnaire about specialists' evaluation of the efficiency of the performance of these proposed designs through three main axes (protection and safety - functional performance - aesthetic appearance).

Some suggested designs for motorsport clothing:





The design carried out in accordance with the standards of motor racing clothing:

The design		Suggested colors
		<div style="border: 1px solid black; width: 100%; height: 100%; background-color: red;"></div> <div style="border: 1px solid black; width: 100%; height: 100%; background-color: lightgray;"></div>

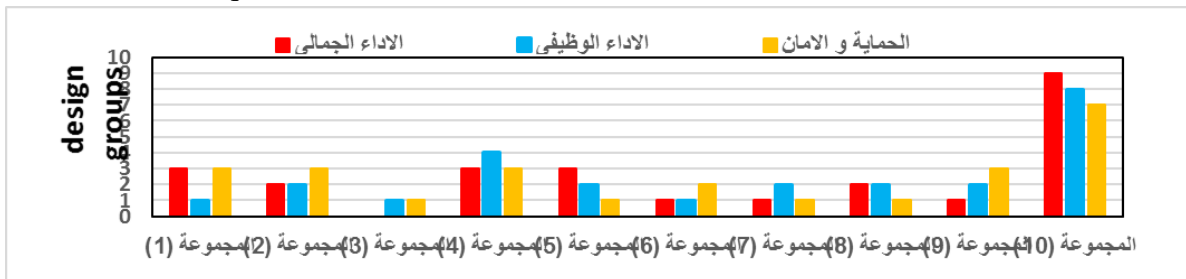


Conclusions: Through the study, the researchers reached the following conclusions:

- The research presented an analytical study of motorsport clothing to provide the best in this field.

The research presented (10) proposed design groups in which some of the current problems were addressed, and the best of these designs were implemented according to a questionnaire that was done with a group of specialists in the clothing and fashion industry to choose the best ten proposed design groups for their implementation, according to three evaluation axes; the main ones are protection and safety, functional performance and aesthetic performance.

The results of the questionnaire were as follows:



It is clear from the previous graph that the tenth design group obtained the best evaluation in terms of protection, safety, functional performance and aesthetic performance. Therefore, one of the designs of the tenth group was implemented.

Reaching the standards and characteristics that are required in motorsports clothing:

- Motorsports clothing is flame retardant.
- Motor racing clothing must provide the necessary protection and safety for the rider during the race.

Motorsports clothing must provide comfort to the rider during the race to maintain his performance during the race.

- Ease of disposal of these clothes in cases of fire.
- Zippers and adhesive tapes must be strong and suitable for functionality and must be fire-resistant.
- All parts and accessories of the rider's suit must be fire-resistant in order to protect the wearer until rescue.
- These clothes must be tight on the rider's body without any excess in order to achieve the required protection and comfort.

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