An innovative Method for the Construction of woven flat flexible Cable (FFC)

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Abstract:
Technical textiles have become an innovative area and these developments are due to the technological improvements and researches that have been undertaken in this field. They have entered our life extensively, though we may not be aware of the extent of their usage; for example, fibres reinforcement for composites, cushioning, fillings, electrical components, insulation, sport equipments, toys, automotive, shoe components, insulations, cleaning wipes, personal and medical disposables furniture industry and PVC coating substrates.

This paper aims to utilize of the special characteristics of weaving fabric structures in the manufacturing of electrical components. The flat flexible cable (FFC) has been chosen for this research, owing to its prevalence and importance in various branches of projects, aerospace and military fields of effort as well as industrial-commercial programs. Generally, cables conduct electricity from the substation where power is taken from the utility-company lines to the point of utilization. The flat cables are commonly used on machinery such as shuttle cars in mining industry that have cable-reeling devices. The flat shape allows increased length on a cable reel and is less susceptible to run-over damage. On the other hand, flat cable often found in high density electronic applications like laptops and cell phones. Cables designed for small signals, e.g. data bus cables carrying digital data, are screened to prevent their signals from being affected by electromagnetic interference. Cables that carry high power and/or high frequencies are also shielded to prevent them being the cause of electromagnetic interference.

The main problem of this research is limited in the difficulty of weaving electrical wires on the weaving machine, and also the choice of the innovative fabric structure. To achieve these aims, the research methodology has to be determined as follows:
1. Study of the characteristics and types electrical cables.
2. Finding the best technical solutions for the weaving procedures.
3. Create an integrated scientific technique beginning of the selection of the materials, fabric structures and preparation of the weaving machine and development of all scientific solutions to overcome the expected operational problems.
4. Weaving process for the experimental samples, as well as the quality control of the weaving process and review the operation program.
5. Discuss the research results, conclusions and recommendations for best weaving method to enhance the characteristics of flexible flat cable (FFC).

Paper received 12th November 2015 - accepted 28th November 2015 - published 1st of January 2016

Keywords
- Textile industry
- Technical textiles,
- Mining industry,
- Flat flexible cable (FFC),
- Round cables,
- Narrow weaving machine,
- Interactive electronic textiles (IET),
- American Society for Testing and Materials (ASTM),
- Cantilever bending length