

## Designing a Specific-Exercises Bag by Recycling the Martial Arts Sports Suit to Achieve Sustainable Development

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### Abstract:

Sports products have a short life cycle, and we must see them in permanent use without turning into waste. The modern design of products aims to give priority to environmental issues, sports product sustainability practices, lower social cost, pollution control, higher environmental protection and better use of resources, and reduced emissions and waste. Instead of practicing self-defense sports, they use sports products that are turned into waste. Therefore, the researchers were interested in recycling the judogi, to design the specialized exercise bag as a tool used to develop the special fitness of the martial arts athlete, which called for the researchers to design the specialized exercise bag for martial arts sports through recycling the martial arts sports suit and some environmental materials, at an economical cost. While protecting the environment from pollution, this design is also a development of the Portuguese bag, which does not have the specialized orientation for performing exercises for martial arts players. **Aim:** This research aimed to achieve sustainable development by designing the specialized exercise bag by recycling environmental materials, and the goal was achieved by answering the questions: 1. What is the design of the padding of the specialized exercise bag to achieve sustainable development? 2. What is the possibility of implementing a specialized exercise bag by recycling a suit for a martial arts sport to achieve sustainable development? 3. What is the proposed vision for designing a specialized exercise bag pattern to achieve sustainable development? 4. How good is the aesthetic and functional design of the Specialized Exercise Bag? **Approach:** The experimental approach was used in designing the specialized exercise bag by recycling a martial arts sports suit and some environmental materials, and the descriptive approach to study the aesthetic and functional aspects in designing the specialized exercise bag, by surveying the opinions of specialists (clothing, textiles, and martial arts). **Sample:** (Waste) (a judogi, a rubber vehicle tire, hay, sand, rope, a clip, and plastic adhesive), and a human sample of (12) experts specializing in clothing and textiles, and (13) experts in martial arts, was used to study the quality of the aesthetic and functional aspects. In designing a specialized exercise bag, and surveying the opinions of specialists in clothing, textiles, and martial arts.

A- **Raw materials, tools and devices:** (1) Judogi waste. (2) A used rubber vehicle tire. (3) Hay or sawdust. (4) Sand. (5) Cotton rope of appropriate length: (the circumference of the rubber vehicle tire used and approximately 40 cm) until it comes out from both ends of this tire. (6) Plastic clips and adhesive. (7) Sewing machine. (8) Pattern design paper. (9) Paper scissors (10) fabric scissors (11). Computer, loaded with the pattern design program (AccuMark Explorer).

#### B- **Data collection forms:**

1. A questionnaire measuring the opinions of (clothing and textile) specialists regarding the aesthetic design quality of the specialized exercise bag. (Prepared by researchers)
2. A questionnaire measuring the opinions of (martial arts) specialists on the functional design quality of the specialized exercise bag. (Preparing researchers).

The researchers achieved scientific validity for applying the research questionnaires in terms of validity and reliability.

**Design of the specialized exercise bag:** **First: Bag padding:** 1. **Bag padding pouch:** The researchers recycled a rubber vehicle tire to make the filling pouch. Because of its safety in use, economical cost, and ease of performing exercises with it. 2. **The weight of the padding:** Sand was used to fill the bag's bag. 3. **Improving the weight of the padding material:** After experimenting with using sand, and noticing the movement of its particles due to the difficulty of padding the entire bag with it to increase the weight of the bag, the researchers used a mixture of hay and sand, and it was suitable. 4. **Padding rope:** A rope is inserted into the stuffing and its two ends are in the form of a loop, and they come out at an appropriate length from the stuffing, to facilitate inserting the stuffing into the bag and performing some exercises. 5. **Closing the padding:** One end of the padding was sealed with (2) plastic clips and plastic adhesive, then the padding was filled from the other end, to create the weight of the padding, then this end was sealed like the first end. **Second: The specialized bag:** It was designed by recycling a judogi jacket. For the sustainability of sports clothing, and the specific grip (sleeve and collar) as in specialized sports for players, this went through two stages: 1. **Designing the specialized bag by directly recycling a judogi jacket:** The researchers used judo jacket waste, and at this stage it appeared that the lack of stability of the padding during exercises was used only for sand. In the weight of the filling, this was overcome by installing an industrial adhesive

to attach the filling to the bag. 2. Design of the specialized bag pattern (1): The padding dimensions were raised in a semi-crescent shape, then the pattern was drawn in harmony with the parts of the judogi jacket, and the external rotation was increased with the rotation of the padding. It was implemented with precise procedural steps and an experiment on the specialized exercise bag. 3. Design of the specialized exercise bag, pattern (2): The researchers aimed for the design to be of higher quality and economy, as it was drawn in accordance with the shape of a judo suit jacket, and to reduce external rotation of the pattern (1), and it was implemented with precise procedural steps on the waste fabric of a judogi.

**Results of the research on bag design:** Through the procedures for designing the specialized exercise bag, the researchers managed to design a padding for the specialized exercise bag from a mixture of sand and hay, and designed the bag by recycling a judo suit jacket, and installing an industrial adhesive to secure the bag's padding. Pattern (1) was designed in compliance with the parts of the judogi jacket, and increasing the external rotation with the rotation of the padding, the design of the specialized exercise bag pattern (2) was developed and the external rotation of the pattern (1) was reduced. With these results, the research achieved its goal of recycling a model of a martial arts suit to design the bag.

**Results of the Aesthetic Design Quality Questionnaire:** It showed the availability of aesthetic design quality according to the opinions of (12) clothing and textile specialists, and the relative weight of the opinions was (97.22%) with an arithmetic mean of (2.92) in the questionnaire dimensions (design quality, quality of pattern measurements, quality of weaving, quality of finishing, and quality of bag design as a whole) and in the dimension (quality of recycling materials) (100.00%) with an arithmetic mean of (3.00).

Results of the functional design quality questionnaire showed the availability of functional design quality according to the opinions of (13) specialists in (martial arts), where the relative weight of their managers was (94.87%) with an arithmetic mean of (2.85) in the questionnaire's dimensions (design safety, design quality, quality Recycling), a relative weight (92.31%) and arithmetic mean (2.77) in (the functional suitability of the specialized exercise package (as a whole), and a relative weight (89.74%) and arithmetic mean (2.69) in the (quality of implementation) dimension. **The researchers concluded that** the design of a specialized exercise bag for martial arts was acceptable by recycling the self-defense sports suit and some environmental waste, and achieving aesthetic and functional quality in the design. The researchers believe that the research provides brainstorming opportunities to design innovative sports tools at an economical and environmentally friendly cost that benefits sports players of various sports.

### **Keywords :**

Sustainable Development – eco-design – recycling – martial arts' uniform – sports waste.

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