

Studying the effect of the structural structures of warp knitted fabrics for treating seawater from oil slicks using polyurethane

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Abstract

One of the most important features of the structural composition of knitted fabrics is that it helps to form porous fabrics with holes, which helps to use them in many purposes and makes them more flexible and elastic than woven fabrics.

Environmental pollution is one of the important problems man in the modern era, where we can define pollution as a qualitative change in the components of the environment, whether living or non-living, so that this change leads to an imbalance in the natural balance of the environment. It represents a major danger to all living things, including humans.

The current research aims to remove oil stains from sea, (7 samples) of warp knitting fabrics of different structures were produced on the Raschel warp knitting machine using multiple rods in the production of 28 needles / inch and using polyester material, a number (44/12, and the use of polyurethane at 100ppm and 400ppm to treat samples produced to absorb oil from sea.

Laboratory tests were, taking advantage of the capabilities of the machine used and specialized to reach the best specification for production. Explosion resistance to reach the best production standard. Tests were conducted on the samples produced by treating them with polyurethane at a concentration of 100 ppm and a concentration of 400 ppm. The extent of the samples' ability to absorb oil slick after treatment was measured. The tests proved that the samples absorb a large percentage that may reach to above 90% of the oil slick.

Keywords:

Warp knitting, structural compositions, polyurethane

Introduction

Marine pollution is a global environmental problem that concerns all countries of the world, because it shares with each other in marine wealth, natural resources, international navigation and tourism, especially the Mediterranean countries, which occupies a strategic position among

countries (5), and oil pollution as a result of the collision of oil tankers or by throwing its liquid waste in the seas (2), the oil slick isolates the heat of the sun and prevents it from reaching the depths, and this affects the coral wealth and sponges. The aquatic life in which they live, such as fish and starfish (7), when oil spills in the sea, it shatters and then scattered and dispersed in the marine environment over time. Therefore, when oil spills occur in the water, it is necessary to contain the spill as soon as possible in order to reduce the damage to marine life and resources Natural by following the different methods used in removal (3), such as the use of the mechanical method

By using absorbent materials that partially obstruct the movement of the oil slick, such as glass wool, these materials are sprayed from small boats and then collected by fine nets and all are transported to where they can be disposed of. To make the withdrawal process easier, it is also based on trapping oil to prevent it from reaching sensitive areas. Skimmers are a tool for withdrawing spilled oil from the surface of the water. It has several forms, some of which are floating, some of which are located on the side of the ship, and others that are carried by a crane or carried by hand and depends on the efficiency Skimmers depend on the weather conditions in terms of wind, wave height, water temperature, and dispersing materials are chemicals that disperse liquids such as oil and turn them into small droplets, thus facilitating their decomposition and natural disintegration before they reach the shores. Its use is dangerous to the environment, as it pollutes the air and causes severe damage to many living organisms. Several factors influence decisions to use in-situ incineration, including water temperature, wind direction and speed, and slick thickness.

Research problem

Despite the technological progress in the field of producing warp knitted fabrics, as well as the great development in methods of purifying sea water from oil falls, most of the methods used in purification are still carried out using traditional methods without taking into account achieving the maximum benefit from the purification method and the extent of its use more than once. Therefore, it was necessary to study the possibility of producing warp knitted fabrics with different designs and compositions that suit the nature of use and check the quality and functionality properties in purifying seawater from oil falls, by using polyurethane at a concentration of 100 ppm and a concentration of 400 ppm. This treatment achieved the absorption of a large amount of stains Oily on the sea

Research Importance

The importance of the research lies in the use of warp knitting machines to produce warp knitting fabrics with different textures of polyastroparticles and access to the best ways to treat them with polyurethane to remove petroleum pollution and contribute to finding unconventional scientific and practical solutions to one of the serious problems facing fisheries in the world and preserving the aquatic environment from pollution.

Research Aims

1. Improving the production and design of warp knitting fabrics with different structures and threads by controlling the machine settings to reach the most detailed executive specification for absorbing oils.

2. Achieving the optimum quality and functional properties of black knitted fabrics to get rid of oily stains with water after treatment.
3. Reaching the best concentration of the treated material for the produced warp knitting fabrics to obtain the best results for removing oily stains on sea water.

Research hypotheses

- Using different compositions and polyester material, number 44/12 denier, to produce samples of warp knitting affects the functional performance properties of this type of fabric.
- The use of polyolefin in treating the produced samples so that it has a great positive effect on removing the oily stain from the sea water.

Research Methodology

This research follows the experimental and analytical method.

Conclusions

1. Polyester is the best material that can be used because of its characteristics and special features such as high durability, resistance to friction, no influence of moisture on its durability, and good resistance to acids and alkalis.
2. The results showed that the structural composition of the warp knitting samples affects the functional properties of the research-produced samples.
3. The results showed that the structural composition of the warp knitting samples affects the absorption rate of the oily slick samples on the seas after being treated with polyurethane.
4. The results showed that the concentration of 100ppm of polyurethane was better than the concentration of 400ppm in the percentage of samples absorbing the oil slick from the seas.

Recommendations

- Using other raw materials in the production of warp knitting samples.
- Using other structures of warp knitting and using them in this experiment.
- Using other concentrations of polyurethane, treating blackened knitted samples with them, and measuring the percentage of the samples' absorption of the oily slick.

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