ABSTRACTS

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OPTIMIZATION AND MATERIAL CHARACTERIZATION OF GROUNDNUT SHELL AND RICE HUSK FOR PRODUCTION OF PARTICLEBOARD

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Keywords: particle board, urea formaldehyde, groundnut shell, rice husk, optimization
Abstract: The aim of this work is to the produce particle board (PB) from groundnut shell and rice husk using optimization approach. This research is tailored towards the quest for economical and eco-friendly materials by converting a waste into wealth. Box Behnken Design was used to optimize the effect of three variables: Groundnut husk (0-100g); Rice husk (0-100g) and resin (1.5-2.5g) respectively. The optimal process levels predicted by the software for the PB were validated. The PB produced was analysed using Scanning Electron Microscope. The best levels from the interactions of the variables were: groundnut husk:50g; rice husk:100g and resin:3.50 with MOR of 3.50 N/mm^2 and MOE of 932.4 N/mm^2 while the predicted optimal levels of 65.99g; 86.34g and 1.69 was validated .The result of the Validation gave MOR of 3.49 N/mm^2 and MOE of 932.10 N/mm^2 . It can be concluded that particle board produced at the optimized conditions satisfied the American National Standard ANSI/A208.1-999 specification for general purpose particle boards.

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DESIGN OF THERMOPLASTIC IMMOBILIZATION FOREARM SPLINTS

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Keywords: thermoplastic, splints, design, forearm, orthoses
Abstract: A retrospective view of orthopaedic devices gives the impression of a missing element. Fully functional custom-made orthoses appear to be prototypes in progress. They lack colour, variety, original motif, uniqueness, additional functionality i.e. design. Nowadays it is possible to choose a colour combination of the whole orthosis and the aim of the submitted study is to find out the interest in incorporating an additional function or original design.

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PROCEDURE FOR THE PRODUCTION OF DYNAMIC PRE-KNEE ORTHOSIS USING THE UNILATERAL SYSTEM

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Keywords: pre-knee brace, dynamic brace, structural design
Abstract: The article deals with the design of an orthotic solution of dynamic knee orthoses for patients after polio. The aim was to design and create an orthopedic device and describe the technological process of its production. The design, testing and production of the orthosis aim to ensure the physiological position of the foot, to perform plantar and dorsal flexion in the ankle and to verticalize the position of the entire lower limb. These parameters have a considerable impact on maintaining posture, balance, walking stability and locomotion as well as elimination of inappropriate pathological movement habits. The results of orthotherapy show that their use corrects the course of the physiological axis in all planes. The corrected lower limb axis significantly affects the supportive, balance, and allocating ability of individuals.

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INVESTIGATING THE RESTRICTIVE EFFECT OF NEIGHBORING PERFORATION CHANNELS WITH COMPUTATIONAL FLUID DYNAMICS SIMULATION

ABSTRACTS

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Keywords: CFD simulation, effect of perforation design, flow in porous media, pressure distribution around perforations
Abstract: The inflow performance relationship of a well establishes the link between the applied pressure drawdown and the inflow rate at the bottom of the well. In a cased and perforated well the perforation parameters have a large effect on the inflow performance relationship. When investigating the effect of the different parameters, the most challenging task is to describe the connection between the phase angle of the perforation design and its performance. One of the authors of this paper published a method, which incorporates the perforation channels' restricting effect on the drainage area of each other, which is the function of the phase angle. The aim of this study to validate the restricting effect with the use of computational fluid dynamics (CFD) simulations.

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THE EFFECT OF MULTI-MATERIAL PRINTING TO FLEXIBILITY

(peges 85-88)

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Keywords: flexibility; materials; bending; 3D printing
Abstract: Currently, 3D printing is one of the popular technological production methods, mainly because it offers various options that affect the resulting properties of prints. The aim of the presented work is to manufacture a prosthetic finger with a PIP and DIP joint using multi-material 3D printing, which will allow to mimic the flexion of a physiological finger. The subject of this research and testing is the design of a combination of solid and flexible material for a monolithic finger model, which will allow the required bending in selected areas of the print.