

The Office of Technology Management

UNIVERSITY OF TEXAS  ARLINGTON

Tech ID: UTA 16-40

Seat Cushion with Variable Stiffness Surface for Ergonomic Comfort

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TECHNOLOGY NEED

Selecting ergonomic products such as seat cushions requires consideration for proper interface pressure distribution and variable firmness which are critical factors in providing comfort, improving posture, and preventing health issues such as back pain. Most seat cushions use urethane foam or other types of compliant materials to reduce and distribute interface pressure. However, foam-based cushions degrade over time and become stiffer which leads to uncomfortable seating and frequent need of replacement. Alternatively, air-filled cell array seat cushions have been used to avoid stiffness change over time but maintaining balanced interface pressure is challenging due to variation in air cell inflation as well as weight, shape, and posture of the user along with the applications (car, airplane, home, etc.). Thus, there is a need to develop long-lasting cushioning that is capable of generating variable stiffness with balanced interface pressure to reduce ergonomic risk factors.

INVENTION DESCRIPTION/SOLUTION

A novel cushion/ergonomic product capable of generating variable stiffness across the surface is presented herein. The variable stiffness across the cushion is achieved by using an array of fluid-filled dual cell structures. Each dual cell structure consists of at least one primary cell which act as an interfacing surface with external object and one secondary cell which determines desired stiffness and internal pressure of the dual cell structure. Using fluid-filled cell structures, this invention can provide variable stiffness and balanced interface pressure across the cushioning surface.

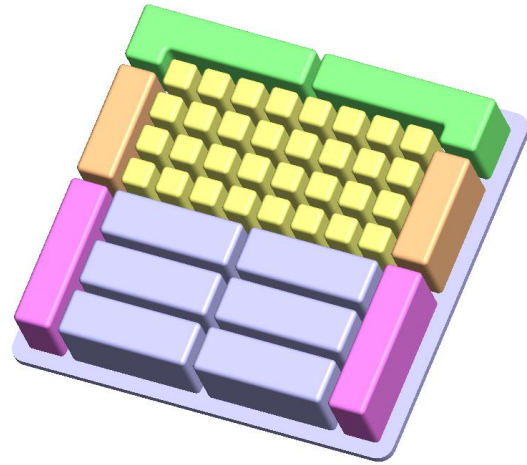


Figure: a conceptual drawing of a possible seat cushion structure

APPLICATIONS

- Ergonomic products
- Seat cushion
- Assistive medical devices
- Injury reduction gears

KEY BENEFITS

- Complete closed system, therefore no inflation or deflation required
- Less reaction and recovery time
- Stiffness change can be easily achieved
- Ability to custom produce based on application requirements: type, condition, weight, etc.

STAGE OF DEVELOPMENT

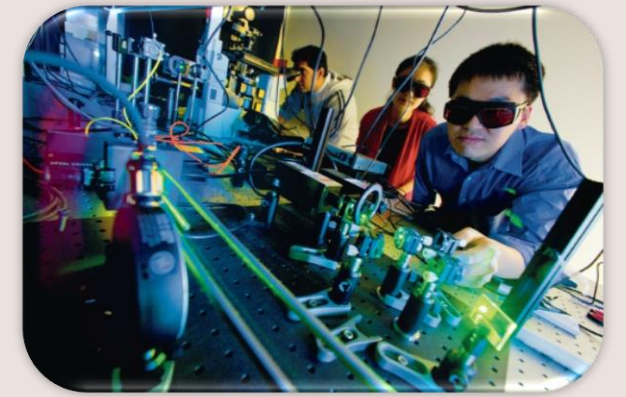
Prototyped and tested

INTELLECTUAL PROPERTY STATUS

PCT/US17/64218

RELATED TECHNOLOGIES

- UTA 17-23 [Pressure Offloading, Pressure Redistribution, Position Manipulation, and Vibration Reduction Surface](#)
- UTA 13-27 [Concussive Gear](#) , [Automotive Seat Cushion](#), [Ergonomic Product](#) & [Prosthetics Liner](#)



About the Inventors

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