JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205

Volume 15 Issue 08, August 2025
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

INNOVATIVE PROTECTION MEANS ENSURING THE SAFETY OF YOUNG CHILDREN IN CARS

"MY SAVED CHILD"

Tukhtasinova Gulsara Abduraimjon kizi
Master's student of Andijan State Technical Institute
Email: gulsara.tuhtasinova@mail.ru
Davydova Dilnoza Tadjibayevna
Andijan State Technical Institute
Assistant of the Department of Economics
E-mail: dilnozatadjibayevna@gmail.com

ANNOTATION: This project is dedicated to the development of an innovative solution aimed at ensuring the safety of children moving in a car. It is known that due to insufficient protection of children from inertia forces during road accidents, serious bodily injuries and even life-threatening consequences often occur. In order to eliminate this problem, a special 3D-modeled protective device based on shock-absorbing materials with an ergonomic shape was created within the framework of the project. The main advantages of the device are: low cost, simple installation, and adaptability to local conditions. In this respect, it is recognized not only as a technological innovation, but also as a practical tool for solving a pressing security problem for the general public.

KEYWORDS: Vehicle safety, child protection, 3D model, biomedicine, ergonomics, innovative device, inertia force, startup, technical safety, technological solution.

Today, children's injuries in road accidents are considered one of the serious safety problems worldwide. Especially in developing countries, the lack of affordable and effective protective equipment suitable for local conditions is exacerbating this problem. This project is aimed at filling this gap and offering a practical solution that serves to save the lives of the younger generation [1].

Within the framework of the project, a special innovative protective device was developed to ensure the safety of children in passenger cars. The device has an ergonomic shape and was created using 3D modeling technologies based on shock-absorbing materials. It serves to protect children from inertia forces during vehicle movement. From practical observations, it is known that children, especially those sitting in the front seat or without a seatbelt, suffer serious injuries in road accidents. In this regard, this protective device is capable of significantly reducing the risk of injury.

Its main advantages are cost-effectiveness, ease of installation, and adaptability to local conditions. The device also has social significance and provides additional guarantees for ensuring the safety of children in our country [2].

This protective device is designed based on a 3D model, the design of which corresponds to ergonomic principles and is developed in the form of a module. As a result of the use of soft, shock-absorbing materials in the device, it is possible to effectively reduce the inertial forces arising during road accidents. The project is scientifically based on the laws of biomechanics,

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achievements in materials science, and safety standards. This approach guarantees that the device will be not only functional, but also safe for human health[3].

It is also planned that the process of production and application of protective equipment will be carried out in stages, and the product will undergo certification and practical tests. These processes serve to confirm its quality indicators, durability, and compliance with international safety requirements. As a result, the created device can be widely implemented as an innovative, economically and socially significant practical solution in ensuring the safety of children.

This project is a solution that meets local capabilities, is economically inexpensive, and useful for the general public. It not only serves to save children's lives, but also has the opportunity to find its place in the domestic and foreign markets as a national product. The main goal of the project is to create and implement an innovative protective device that ensures the safety of children in passenger cars.

The assigned tasks are:

1. Development of an ergonomic construction, taking into account the anatomical features of the child's body.
2. Preparation of a 3D model and functional prototype of the device.
3. Selection and use in production of impact-absorbing, environmentally safe materials.
4. Testing of the device in laboratory conditions and in real practical experience.
5. Development of mechanisms for patenting, standardization, and commercialization of products.

The protective device created as a result of the project will be based on the scientific foundations of biomechanics, materials science, and technical safety. This approach, along with ensuring the safety of children, also serves to form a new direction in our economy through the production of domestic innovative products.

This project is based on the principles of biomechanics, materials science, and transport safety and is aimed at creating an ergonomic and safe means of protection for children. The modular design of the device allows it to be adapted for children of different ages. The product can also be manufactured using CNC technologies and 3D printers. This approach significantly reduces production costs and allows for the widespread popularization of the device.

Due to the fact that the product is mainly made from local raw materials, it serves as an import-substituting solution. Its average price is expected to be several times lower than foreign alternatives. This, along with creating favorable financial opportunities for the population, also creates the basis for the creation of new jobs. There are opportunities to export products not only to the domestic market, but also to neighboring countries.

Unlike analogues, the product is made of soft and durable polypropylene yarn. It has front, middle, side, and bottom parts, the side parts are woven relatively thicker, and the middle part is woven in a mesh shape. The upper part of the device is attached to the headrest, which holds the head of the front seats, and the lower part to the seat frame. This solution ensures its installation in a simple, convenient, and safe way.

The dimensions of the protective device consist of the following parameters: appearance: trapezoidal, height 60 cm, width 35 cm, upper part 20 cm, lower part 20 cm, weight 300-350

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g. The raw material used is polypropylene yarn.

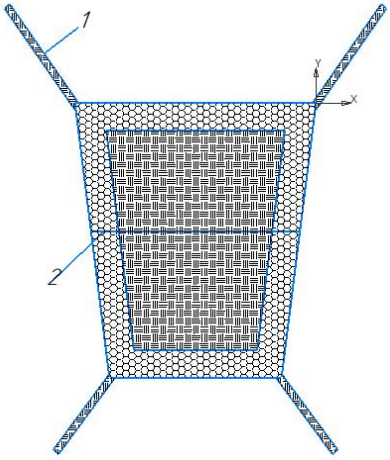

Figure 1. project drawing **Figure 2.** real project image

In conclusion, this project, by its very nature, is an innovative initiative that serves not only to protect the lives of children, but also to strengthen a culture of safety in society. The created device is distinguished by its scientific validity, since it is based on the principles of biomechanics, materials science, and transport safety. At the same time, it is economically feasible, and production based on local raw materials allows for import substitution, creation of new jobs, and competitiveness in the market as a national product.

In practical terms, the device is a convenient solution for the general public due to its simple installation, low cost, and modular structure. Along with ensuring the safety of children, it occupies a special place in the national innovation ecosystem as a startup product. This protective device, created as a result of the project, is not limited to the domestic market, but can also be exported to neighboring countries. Thus, the project is considered as an innovation of scientific and practical significance in protecting children's lives, developing a culture of national security, and contributing to the country's economic potential.

References:

1. European Automobile Safety Standards (ECE R44/04, UN R129).

2. NHTSA (USA) - Child Passenger Safety Guidelines.

3. Miradullaeva G.B. et al. "Innovative solutions to ensure the safety of young children in passenger cars" - Andijan State Technical University, 2025.