MAIN CRITERIA FOR SELECTING MATERIALS FOR THE AUTOMOTIVE INDUSTRY

Arabbaeva F.U. Senior Lecturer, **Sulaymonov M.** Student of group K-06-23 of the "Materials Science and Technology of New Materials" direction
Andijan State Technical Institute

Abstract. The article discusses the main areas of development of the automobile industry of the Republic of Uzbekistan, as well as the criteria for selecting polymeric materials for automobiles, while studying the main materials and their areas of application.

Keywords. Polymer materials, economic problems, environmental problems, automobile industry, aluminum, carbon fiber. polymer materials, polyethylene, polypropylene, polyurethane.

Introduction. The automobile industry has been developing rapidly since 1996. This was due to the opening of a joint automobile plant with the Daewoo corporation. In 1996, a joint Turkish-Uzbek venture, SamKochavto, was formed to produce buses and trucks. In 2008, during the restructuring, General Motors became the legal successor of the Korean share of UzDaewoo Auto, thus the joint Uzbek-American company was called JM Uzbekistan. It should be noted that work is currently underway to produce electric vehicles. In 2018, plans appeared in the country to establish production of electric vehicles. The Uzbek side planned to organize production both on its own and with the participation of foreign companies. It is estimated that every 10% reduction in the weight of a vehicle leads to a decrease in fuel consumption by 5-7%. Current economic and environmental issues make the creation of more fuel-efficient cars a top priority in the automotive industry. The use of modern materials such as aluminum and carbon fiber is useful, but the wise use of plastics is increasingly important. Some other benefits of high-performance plastics used in vehicles include:

- Minimal corrosion, allowing for a longer vehicle life
- Significant design freedom, allowing for greater creativity and innovation

- Flexibility in component integration
- Safety, comfort, and cost-effectiveness
- Recyclability.

Figure 1. Automotive parts made of polymeric materials

Here are the top types of high-performance plastics used in automotive applications. While all thirteen polymers can easily be used in a single vehicle, only three types of plastics account for approximately 66% of the total high-performance plastics used in a vehicle: polypropylene (32%), polyurethane (17%), and PVC (16%).

Methods. Literature review of materials used for the production of automobile parts mainly use polymeric materials. Let's look at some of them:

Result. Polypropylene (PP) is a thermoplastic polymer used in a wide variety of applications. A saturated addition polymer made from the monomer propylene, it is strong and extremely resistant to many chemical solvents, bases, and acids. Applications: automotive bumpers, chemical tanks, cable insulation, gas cylinders, carpet fibers.

Polyurethane (PUR) - Rigid polyurethane is an elastomeric material with exceptional physical properties, including impact strength, flexibility, and resistance to abrasion and temperature. Polyurethane has a wide range of hardness,

from rubber to a solid bowling ball. Other characteristics of polyurethane include extremely high flexural life, high load-bearing capacity, and outstanding resistance to weather, ozone, radiation, oils, gasoline, and most solvents. Applications: Flexible foam seats, foam insulation panels, elastomeric wheels and tires, automotive suspension bushings, cushions, electrical sealants, hard plastic parts.

Polyvinyl chloride (PVC) - has good elasticity, flame retardancy, good heat resistance, high gloss and low lead content. Polyvinyl chloride molding compounds can be extruded, injection molded, compression molded, calendered and blow molded to form a huge variety of products, either rigid or flexible, depending on the amount and type of plasticizers used. Applications: Automotive instrument panels, sheathing of electrical cables, pipes, doors.

Polyamide (PA, Nylon 6/6, Nylon 6) - Nylon 6/6 is a general-purpose nylon that can be molded and pressed. Nylon 6/6 has good mechanical properties and wear resistance. It is often used when low cost, high mechanical strength, rigid and stable material is required. Nylon absorbs water well and will swell in an aqueous environment. Applications: gears, bushings, cams, bearings, weather-resistant coatings.

Polystyrene (PC) has excellent chemical and electrical resistance. This easy-to-manufacture plastic has poor UV resistance. Applications: equipment housings, buttons, automotive fittings, display cases.

Polyethylene (PE) - has high impact resistance, low density and has good impact strength. It can be used in a wide variety of thermoplastic processing applications. Applications: automotive bodies (reinforced glass), electrical insulation.

Discussion. It should be noted that polymeric materials are used to produce various parts for the automotive industry. For example, POM is used as interior and exterior trim, fuel systems, and small gears. Amorphous polycarbonate polymer is a material for car bumpers, all types of helmets, and bulletproof glass

substitutes. Acrylic for windows, displays, and screens. PBT (polybutylene terephthalate) for door handles, bumpers, and others.

Conclusions: Correct use of polymeric materials for the production of parts makes it possible to create a high-quality car that is competitive both in the domestic and foreign markets.

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