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ADVANTAGES OF USING POLYMER MATERIALS IN MECHANICAL ENGINEERING

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Annotation: Mechanical engineering, as one of the important branches of modern industry, relies on the use of various materials. In recent years, polymer materials have been widely used in mechanical engineering. These materials are lightweight, corrosion-resistant, and economical to manufacture, allowing them to partially or completely replace metals. In Uzbekistan, in particular, UzAuto Motors and its suppliers of spare parts are developing the use of polymer materials.

Keywords: mechanical engineering, polymers, thermoplastics, thermosetting polymers, composite polymers, lightness, corrosion resistance.

Polymers are chemical from compounds organization found special materials in mechanical engineering different in forms are used . Their main types the following**:** thermoplastics, thermoreactive polymers, composite polymers, elastomers. This polymer types use sectors according to one by one difference does.

Thermoplastic to polymers polyethylene (PE), polypropylene (PP) and such as polyvinyl chloride (PVC) materials Thermoplastic polymers are temperature under the influence soft to the situation passing and when cooling again hardening polymer materials. These process one how many times recurrence possible Although the polymer main chemical structure unchanged Therefore, thermoplastics again processing to give and form to give for comfortable is considered.

Thermosetting to polymers epoxy resins and phenol resins Thermosetting polymers (also called thermosets) – these one times heated form when given permanent hardening polymer Thermoplastics different as a die, thermosetting polymers from cooling then again They do not soften. chemical reaction as a result network-like or three dimensional structure harvest does and this structure again when heated insoluble or to change does not occur.

Composite to polymers carbon fiber-reinforced (CFRP) and glass- fiber-reinforced (GFRP) plastics. Composite polymers are two or from it more than different of materials (usually polymers and reinforcing fibers) from the combination organization found , whole and improved physical , mechanical or chemical to properties has was materials. Of which use main purpose — main polymer weak sides strengthening (e.g., strength , elasticity , temperature resistance) endurance).

To elastomers and rubber and silicones Elastomeric polymers are high elasticity to the feature has polymer materials they are when stretched (often own 5-10 times its length more) stretched out , outward power take when thrown original to the shape again comes. Simple as in other words, they rubber or rubber such as are substances.

Polymers main Features – lightness, corrosion resistance endurance, electricity not to pass and processing to give These features are them in mechanical engineering use makes it ideal for.

Polymer materials mechanical engineering different in the fields wide applies to:

In the automotive industry polymers the most many used from materials is one . Car working release in the industry them different in parts from polymers is used . For example of the car internal and external parts, engine parts, light in constructions polymer from materials is used.

Cars internal and external parts was bumpers, interior panels and grills made of

polypropylene (PP) or ABS plastic is prepared . Also car engine parts was air filter boxes and manifolds thermosetting from polymers working will be issued. The UzAuto Motors enterprise in Uzbekistan car in parts polymer from parts wide This car uses Reduce weight by 20-30% and save fuel thrift increases.

Polymer materials other to materials than one how much to the advantage has . This thing in mechanical engineering especially cars working in the release clear to the eye thrown away. Polymer materials advantages seen if we are lightness, corrosion resistance durability, economy, design freedom, ecological aspects to bring possible.

Polymer materials relief quality seen if we are: to metals 3-5 times more than lighter . This is especially true for cars . and in aviation important – for example, a car 100 kg weight reduction 0.5 liters /100 km fuel saves. Polymer materials to corrosion endurance to the adjective As for moisture, acid and other chemical to substances resistant into metals than farther service Polymer materials thrift quality injection casting and 3D printing release such as methods with cheap and fast working Polymer materials design freedom quality using complicated shapes easily create possible. Ecological aspects as for some polymers (e.g , biopolymers) decomposable plastics) recycled processed and to the environment damage reduces.

Plastics advantages: construction weight reduces; transport and assembly works size reduces; lifting transport equipment power reduce opportunity gives; metal-free constructions application possible Disadvantages: long for a period of time endurance scarcity , wear and tear ; strength low and deformability high ; heat tolerance low of virginity scarcity[1].

In Uzbekistan mechanical engineering industry mainly automotive industry and village farm machines working to release . polymer materials used. "UzAuto Motors" enterprise working releasing in cars polymer parts wide For example , bumper and 80% of interior details are made of polymers consists of. Village farm in their cars polymers water pipes, filters and other in parts is used because they light and to corrosion resistant. Polymer in materials Also works in Uzbekistan is issued. For example Andijan and In Tashkent polymer working release factories polypropylene (PP) and such as polyethylene (PE) materials delivery gives. But In Uzbekistan high technological polymer produce composites (CFRP, GFRP) release limited . Therefore, many in cases raw material China and Imported from Russia.

Current at the time polymer materials motor transport 30 thousand in the vehicle close part 1/3 share in has. All become car working release for about 39 types kind of main from polymers used[2]. In cars used from 70% of polymers excess four polymers to the extent right comes from: polypropylene, polyurethane, polyamides and polyvinyl chloride[3].

Polymer the materials are also different materials such as in mechanical engineering safe application for special tests will be held condition. Special tests , mechanical tests, temperature tests, chemical tests, fire endurance tests to bring possible.

Polymer materials Mechanical in the tests stretching and pressure tests his/her strength For example, polypropylene for this The indicator is around 20-40 MPa. Their temperature in the tests of the material melting point and deformation temperature Chemical in the tests polymer chemical to substances endurance is measured, this his/her far term stability shows. Fire endurance in the tests and to the UL 94 standard according to , polymer burning features is evaluated.

Conclusion and suggestions: Polymer materials in mechanical engineering lightness, economy and to corrosion endurance such as advantages because of important place Automotive, aviation, energy and robotics such as in the fields polymers traditional materials replacing, efficiency is increasing. In Uzbekistan from polymers use "UzAuto Motors" as enterprises through developing, but composite materials working release and again work infrastructure expansion necessary. In the future nanotechnology, biological decomposable polymers and 3D printing release such as news mechanical engineering further develops and stable does.

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