

IMPROVING THE PHYSICAL AND MECHANICAL CHARACTERISTICS OF Al-Mg ALLOYS FOR VEHICLE COLLISION PROTECTION

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The physical and mechanical properties of Al-Mg alloys employed in shock-absorbing structural components of vehicles were studied. Specimens of AMg6 alloy were studied experimentally according to Standard GOST 1497-84 to determine its ultimate mechanical characteristics attainable by heating and accelerated cooling. To determine the physical and mechanical characteristics of large-size components of shock-proof structures made of this alloy and to develop industrial heat treatment processes, 300 mm × 250 mm × 30 mm specimens were used. The specimens were heated in air-filled SNV electric furnaces and cooled in hardening tanks. The specimens were loaded into a cold furnace. The furnace laboratory temperature was brought to a specified one, and the specimen temperature was measured with chromel-copel thermocouples. The specimens were held at a specified temperature of 450 °C for 90 minutes. The cooling medium was 6 °C to 25 °C running water and 100 °C still boiling water.

The test results showed that this treatment increases the lateral impact strength by (8 – 10) % and reduces the longitudinal impact strength by (2 – 4) % on accelerated cooling in comparison with an annealed alloy. It was shown that accelerated cooling of Al-Mg alloys from 450 °C to a room temperature increases their impact strength by (10 – 15) % and their unit elongation while reducing their yield point by (18 – 23) % and keeping their ultimate strength intact. On heating to 80 °C and air cooling, the impact strength of specimens treated by the accelerated cooling, while decreasing by 5 %, is 12 % higher than the impact strength of annealed specimens and annealed specimens heated as indicated above.

Keywords: *Al-Mg alloy, physical and mechanical properties of a material, heating, cooling, annealing, shockproof structures.*

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