INVESTIGATING THE EFFECT OF STRUCTURAL PARAMETERS OF A TRACK-LAYING VEHICLE SUSPENSION ON ITS ELASTIC RESPONSE

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Abstract

The article deals with a question relevant to designing a torsion bar suspension for a high-speed track-laying vehicle, that is, selecting the optimum ratio of rocker arm length to the road wheel radius. We show that when the rocker arm length changes, the following parameters of the torsion bar suspension change as well: torsion bar diameter, suspension rigidity, specific potential energy of the suspension, period of longitudinal and angular vibrations, and admissible shear stresses. We studied a track-laying vehicle with a fully loaded mass of 12 tons, featuring 12 road wheels each 0.335 m in radius. Rocker arm length varied from 0.24 to 0.4 m. We determined the torsion bar diameter employing the maximum dynamic travel criterion and selected maximum admissible shear stresses in the torsion bar so as to enable the full suspension travel to equal the machine's road clearance. We discovered that the only disadvantage of using short rocker arms is that admissible shear stresses must be high in that case. Consequently, when designing a torsion bar suspension and specifying admissible shear stresses, one should select the shortest rocker arms that the design allows for. Admissible shear stresses will depend on the technology of torsion bar manufacturing. Simultaneously it is necessary to verify that the period of longitudinal and angular vibrations in the machine body remains within normal range.

Keywords

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