SPECIAL STABILITY OF REINFORCED CONCRETE STRUCTURES IN AGGRESSIVE ENVIRONMENTS

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When investigating the spatial stability of frames, it is necessary to take into account not only the action of the compressive longitudinal forces on the structural elements, but also the torques. Problems of loss of stability of the rods under the action of torques, as well as under the combined action of longitudinal forces and torques, were considered earlier, however, only cases of constant cross sections along the length have been considered, i.e. cases with constant bending stiffnesses. When considering the influence of an aggressive medium, it is necessary to consider cases of variable cross sections, what considerably complicates the solution of the problem. One of the methods of solutions is the transition from the study of the stability of a rod with a continuous variable stiffness along the length of the rod to the study of stability under the action of the longitudinal force and the torque of the rod with piecewise constant stiffness (that is, the stepped rod). With the help of this method, the stability of an RC column under the influence of an aggressive medium has been studied.

Goals and problems of research**.** Therefore, there arises the problem of studying the stability of a reinforced concrete rod (column) with variable cross-section under the action of compressive longitudinal force and torque.

Objects and methods of research**.** The stability of a reinforced concrete column with rectangular cross-section, hinged at the ends, is investigated, which is undergoing corrosion of the lower parts of adjacent lateral faces. The column is affected by the vertical compressive force $\boldsymbol{P}$ and the torque M applied to the upper end of the column. It is assumed that there is an additional support in the hinge O, which prevents the rod from rotating about its own axis.

Example**.** The stability of a reinforced concrete column 10 m long is studied, two adjacent faces of which are under the influence of an aggressive medium, with the longitudinal compressive force and torque acting on it. The dimensions of the cross section are: $d_1 = 0.5$ m, $d_2 = 0.4$ m. Reinforcement is 8 rods with a diameter of 0.02 m. Modulus of elasticity of concrete $E_b = 2{,}7 \cdot 10^4$ *MPa*, of armature $E_a = 2 \cdot 10^5$ *MPa.* Characteristics of the impact of an aggressive environment: $h_0 = 0{,}08$ m, $\beta = 7{,}5$, $v_0 = 0{,}1$ *m/year.*

As a result of application of the above algorithm, a series of curves characterizing the relationships between critical forces and torques were constructed at $t = 0$, $t = 25$ years, $t = 50$ years and $t = 75$ years.