4. The maximum depth of penetration of poured asphalt into a plane crack in the rock foundation of an earth dam can be determined reliably by relation (11), and in the case of making the interlayer in the dam foundation from hot poured asphalt grout with composition 90:10:20 with a consistency of 2.6-3.2 sec at 150°C, by the graph in Fig. 3.

5. In the case of making the asphalt interlayer in the dam base from hot poured asphalt grout, all cracks in its rock foundation are inevitably plugged, with the course of time, to a depth of 0.4-0.5 m (depending on the crack width, composition and properties of the asphalt in the interlayer, and compressive forces acting in it).

LITERATURE CITED

HYDRAULIC RESISTANCES AND CAPACITY OF UNIFORM AERATED AND NONAERATED RAPID FLOWS IN CONCRETE CHANNELS

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Problematic in calculations of the average velocity and discharge of uniform flows is a determination of the hydraulic resistance coefficient $\lambda$ figuring in the Darcy–Weisbach equation

$$l = \lambda \frac{1}{(1/R) \left( \frac{v^2}{2g} \right)}.$$  \hspace{1cm} (1)

or the Chezy coefficient figuring in the discharge equation

$$Q = \omega C \sqrt{R l}$$  \hspace{1cm} (2)

and uniquely related to $\lambda$ through

$$C = \sqrt{\frac{v}{8g \lambda}}.$$  \hspace{1cm} (3)

where $l$ is the energy slope; $R$ is the hydraulic radius; $v$ is the average velocity; $\omega$ is the cross-sectional area.

The resistance coefficient $\lambda$, establishing the relation between the hydraulic parameters $R$, $v$ of the flow, bed roughness $\Delta$, fluid viscosity $\nu$, and energy dissipation, is the object of unceasing studies which are far from successful completion. This is explained by the complexity of the processes to be taken into account by this coefficient. The outwardly simple method of taking into account relations unsolved by theory was itself complicated by circumstances issuing from the frameworks of the modern canonized theory of hydraulic resistance presented in hydraulics and fluid mechanics courses. An example is uniform flows in concrete channels, in the calculation of which are used formulas of quadratic hydraulics (Manning, Pavlovskii, etc.), which do not set differences between tranquil and rapid flows.
Our special laboratory and on-site studies showed [1] that uniform nonaerated rapid flows in concrete channels are characterized by an original law of hydraulic resistance established by us for the first time [2] for such flows in smooth-walled and precast reinforced-concrete flumes and described by the formula

\[ \lambda = a + K I^{n R^2} \]  

where \( K < 0, \, w < 0, \, z < 0. \)

We note that (4) is a particular form (for \( \Delta = \text{const}, \, \nu = \text{const} \)) of my more general form

\[ \lambda = a + b (l) \nu (\nu) \nu, \]  

where \( I \) is the dimensionless specific-energy gradient, determined by the expression

\[ I = I_m R^2 / \nu^2, \]  

where \( I_m \) is the specific-energy gradient, equal to

\[ I_m = \frac{de}{dl} = \frac{d}{dl} \left( \frac{g z}{\rho} + \frac{p}{\rho} + \frac{u^2}{2} \right). \]  

The rationality of formulas (4), (5), just as the general functional relation underlying them

\[ \lambda = \lambda (I, \Delta / R), \]  

proposed by me [3] instead of the traditional relation

\[ \lambda = \lambda (Re, \Delta / R), \]