PREFACE TO THE ENGLISH EDITION

The present edition of the *Handbook of Hydraulic Resistance*, translated into English from the second Russian edition of the book (Mashinostroenie Publishing House, Moscow, 1975), differs markedly from its first edition (Gosenergoizdat, Moscow, 1960), translated into English in 1966 (*Handbook of Hydraulic Resistance*, Israel Program for Scientific Translations, Jerusalem, 1966) and into French in 1969 (*Memento des pertes de charge*, Eyrolles Editeur, Paris, 1969).

The second edition of the book has been substantially augmented by incorporating a considerable body of totally new data on hydraulic resistances obtained as a result of research work in recent years. By and large, as compared with the first, the second edition contains more than 40% new and revised data.

When this edition was prepared, all of the misprints and errors discovered in the Russian edition were corrected, and some more precise definitions and changes were made.

The book is based on the utilization, systematization, and classification of the results of a large number of studies carried out and published at different times in different countries. A large portion of the data was obtained by the author as a result of investigations carried out by him.

It is quite clear that the methods of investigation, the models used, and, consequently, the accuracy of the results obtained and reported by various authors differ markedly in many cases. Such differences in the results could also be due to the fact that the majority of local hydraulic resistance coefficients are greatly influenced not only by the regime of flow but also by the prehistory of the flow, that is, conditions of supply to the section considered, nature of the velocity profiles, and degree of turbulence at the inlet and in some cases by the subsequent history of the flow as well; that is, flow removal from the test section.

Many complex elements of pipelines exhibit great instability of flow due to periodic fluid separation from the walls, periodic changes of place and magnitude of separation, and eddy formation resulting in large oscillations of hydraulic resistance.

The author was faced with an enormously difficult task: to discover and, where necessary, discard experimental results of questionable validity in that diverse body

of data compiled on the hydraulic resistance coefficients; to clear up cases where large variations in the resistance coefficients of the sections are regular and correspond to the essence of the hydrodynamic pattern and those cases where they are due to the experimental uncertainty; and to select the most reliable data and find a successful format for presenting the material so that it is accessible and understandable to nonspecialists in aerodynamics and hydraulics. It had to be taken into account that, in practice, the configurations of sections of various impedances in pipelines, their geometric parameters, the conditions of entry and exit of the flow, and its regimes are so diverse that it is not always possible to find the required reported experimental data necessary to calculate the hydraulic resistances. The author has therefore incorporated in this handbook not only results that have been thoroughly verified in laboratories but also those provided by less rigorous experimental investigations and those predicted or obtained by approximate calculations based on separate experimental studies. In some cases, tentative data are shown and are so noted in the text. We think this approach is justified because the facilities used under industrial conditions, and consequently the conditions of flow passages in them, can greatly differ among themselves and differ from laboratory conditions, under which the majority of hydraulic resistance coefficients have been obtained. In many complex elements of pipelines, these coefficients, as shown above, cannot be constant due to the nature of the phenomena occurring in them; thus, they can vary over wide ranges.

The author hopes that the present edition will not only be useful for the further development of engineering science and technology in the English-speaking countries but will also aid in fostering friendly relations between the peoples of these countries and the Soviet people.

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