

基础类成果

水库异重流排沙研究

【创新性】

1959 年在国际上首先提出浑水异重流潜入点的定量判别数（范家骅判别数）；阐明了异重流持续运动的条件，1962 年在国际上首次提出估算每次洪峰期间异重流排沙数量的计算方法；首次提出利用极限水深计算异重流出流含沙量变化关系式；揭示了非连续浑水异重流局部掺混和内部水跃机理；阐明了异重流对工程的影响，在几十座水库中应用，根据浑水异重流运动规律及孔口排沙的试验，1958 年提出降低三门峡大坝 12 个泄洪排沙深孔高程的建议，为三门峡 1964 年后的改建和运用排沙做出了贡献。

【影响力】

异重流阻力系数、异重流孔口出流公式、潜入点判别数已为专著、教科书所引用，如：钱宁《泥沙运动力学》（中英文），武汉水院《河流动力学》等；潜入点判别数被美国、法国等国外专著、手册、论文广泛引用。建立了异重流运动理论，成为泥沙运动的分支学科，居国际领先地位；获得 1978 年全国科学大会奖。

主要完成人：范家骅、钱 宁、吴德一、沈受百、王华丰、

黄 寅、焦恩泽、姜乃森、陈 明

获奖单位：泥沙所



RESEARCH OF SEDIMENT DISCHARGE WITH DENSITY CURRENTS IN RESERVOIRS

【Innovation】

It initially proposed the quantitative discrimination number (Fan Jiahua' s discrimination number) for the plunge point of turbid density currents in the world in 1959; expounded the conditions for the continued movement of density currents, and put forward the calculation method for estimating the quantity of sediment discharge by density currents during every flood peak in the world for the first time; initially proposed the relationship equation used to calculate the change of outflow sediment concentration of density currents through the limiting water depth; revealed the principle of local entrainment and internal hydraulic jump for non-continuous turbid density currents; illustrated the influence of density currents on projects and the application in a few dozen reservoirs; put forward a proposal on lowering the height of 12 flood and sediment discharge deep sluices of the Sanmenxia Dam in 1958 according to the law of turbid density current transport and orifice sediment discharge experiments, making great contributions to the sediment discharge operation and re-construction of the dam after 1964.

【Influence】

The discrimination number, resistance coefficient and orifice outflow formula for the density current have been quoted in monographs and textbooks, such as the Mechanics of Sediment Transport (Chinese and English versions) by Chien Ning, the River Mechanics by Wuhan University of Hydraulic and Electrical Engineering, etc., while the quantitative discrimination number for the plunge point of turbid density currents has been widely quoted in monographs, manuals and papers of foreign countries, such as the U.S. and France. It established the density current transport theory that has become a subdiscipline of sediment transport, holding a leading position in the world, and was awarded by the National Science Conference in 1978.

Main Contributor : Fan Jiahua, Chien Ning, Wu Deyi, Shen Shoubai, Wang Huafeng,

Huang Yan, Jiao Enze, Jiang Naisen, Chen Ming

Award-winning Unit : Department of Sediment Research