

含沙水流中翼型空蚀磨损试验 Experiment on Damage of Cavitation and Silt Abrasion for Hydrofoil in Silt-laden Water Flow

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关键词: 翼型 含沙水流 空蚀 磨损 微观形貌

摘要: 模拟水力机械内部流动环境,在收缩-扩散型试验段中对翼型进行了空蚀、磨损及两者联合作用破坏试验,观测表面破坏微观形貌并测量破坏深度分布规律。空蚀形貌呈较为规则的近圆独立蚀坑,其分布较为随机。根据颗粒对表面作用的不同,磨损形貌表现为冲击、铲削、犁耕及切削等类型。在较高固相质量浓度下,联合作用破坏形貌大多在极端的角度(90° 或 0°)以颗粒磨损形式出现,其尺度特征在翼型表面随位置后移远大于磨损形貌,宏观破坏深度明显比单纯磨损大;而在低固相质量浓度下,微观形貌为空蚀磨损共存。 With the simulation of the flow in hydraulic machinery, experiments of cavitation, silt abrasion and their synergism on hydrofoil in the converging-diverging testing section were performed, and microscopic appearance along the damage surface was observed and depth distribution of damage was measured. The cavitation appearance shows like normal approximate round, and distributes randomly. According to the difference of action parameter on surface, silt abrasion appearance registers as wedging, relieving, ploughing, and cutting, etc. On the high particle content, the appearance of synergism mostly appears as particle wear in extreme angles (90° or 0°), and scale character on hydrofoil surface becomes more and more large than silt abrasion appearance along the position, and the depth of macro-damage is obviously bigger than single wear. On the low particle content, the microstructure probably appears as the coexistence of cavitation and silt abrasion.

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