

## 离心泵空化试验研究 Cavitation Experimental Research on Centrifugal Pump

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关键词: 离心泵 空化模拟 声压曲线 空化监测

摘要: 在离心泵试验平台,对离心泵进行最好运行工况、同转速降流量、同转速同流量下空化模拟试验并采集3种状态水泵进口的水声信号和壳体振动信号。试验结果表明:在模拟100、110、120m<sup>3</sup>/h的3种工况下,试验得到水泵NPSH<sub>3</sub>值随流量增大而升高;泵进口的水声信号和壳体振动信号在模拟空化过程中基本符合声压规律。根据试验数据点分布以及NPSH<sub>3</sub>判别和声压规律曲线,工程上使用的扬程下降3%作为空化初生点接近声能最大的位置。利用试验得到的声压曲线峰值,借助3 $\sigma$ 原则可进行水泵空化的实时监测。A series of tests were conducted in a laboratory to improve cavitation monitoring techniques. The best run condition together with the cavitation at the same rotary speed-dropping flow rate and same rotary speed-flow rate were simulated on this test-bed. Moreover, the inlet water sound and enclosure vibration signal of the pump were acquired. The results of the cavitation experimental study showed that pumps NPSH<sub>3</sub> was increased by flow rate at 100, 110, 120m<sup>3</sup>/h; the inlet water sound and enclosure vibration signal of pump were followed uniformity by sound pressure rule; according to the distribution of experimental data points and NPSH<sub>3</sub> distinguishable curve, as well as sound pressure curve, the range of lift declined 3% which was regarded as inceptive cavitation that used in project was near the pressure energy maximal position; pump cavitation real time monitoring was carried through sound pressure curve peak value and 3 $\sigma$ principle.

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