泵站单机组变速运行优化方法研究 Optimal Methodology of Single-unit Variable Speed Operation in Pumping Station

程吉林 张礼华 张仁田 龚懿 朱红耕 邓东升

扬州大学

关键词： 泵站 单机组 变频变速 优化

摘 要： 考虑峰谷电价与站下水位变幅等因素，提出了以日开机运行总耗电费用最少为目标函数，各时段水泵转速为决策变量，规定时段内抽水总量为约束条件的单机组变速优化运行动态规划模型。对江都四站单机组变速优化运行与恒速运行进行了比较分析，结果表明：满负荷工作时，无论是否考虑峰谷电价，变速带来的效益不足以抵消安装变频装置产生的耗损；考虑峰谷电价、非满负荷工作时，效益明显；不考虑峰谷电价情况下，80%和60%负荷工作时，变速节省的电费偿还相应配套功率的变频装置投资约需15～18年和7～10年。 A dynamic planning model for single-unit pump variable speed optimal operation was developed in which peak-valley electricity prices and variable water levels in down-stream were considered. In this model, the minimum electricity consumption cost in one-day operation was the objective function. The speed of pump was a decision variable and specified pumping water volume was the constraint. A comparison between optimized variable speed and fixed speed operations of a single-unit in Jiangdu No. 4 Pumping Station was made. The results show that within the head amplitude and with full-load operation, regardless of considering peak-valley electricity prices, the benefits of variable speed operation was not enough to compensate for energy losses of the VFD and considering the peak-valley electricity prices and part-load operation, the benefit was excellent while without considering peak-valley electricity prices and single-unit operates at 80% and 60% loads, the saving 15 to 18 years and 7 to 10 years can compensate respectively for the VFD investments.

查看全文（请使用Adobe Acrobat 6.0版本浏览） 返回首页 引用本文