

反应堆工程

不同流道宽度下流体掠过方柱的旋涡脱落特性数值模拟

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摘要 方柱结构的旋涡脱落特性一直是学术研究的热点。流体掠过方柱体时在方柱后产生的旋涡脱落有可能引发方柱的流致振动。文章使用BELIEF程序, 通过模拟在不同流道宽度条件下流体掠过方柱的旋涡脱落情况, 研究流道宽度对流体掠过方柱的旋涡脱落特性的影响。结果表明: 流体旋涡脱落斯特鲁哈数 (St) 随着流道变窄而增大; 当流道宽度 (H) 远大于方柱迎流面特征尺寸 (方柱横截面边长 w) 时, St 随流道宽度变窄变化缓慢, 流道宽度的变化对旋涡脱落特性的影响很小; 随着流道宽度继续变窄, 流道宽度对流体旋涡脱落特性的影响逐渐增大。当流道宽度与方柱特征尺寸之比 B (H/w) 减小至一定值时, 旋涡脱落频率随流道变窄而急剧增大。

关键词 [旋涡脱落](#) [方柱结构](#) [流道宽度](#)

分类号

Numerical Simulation on Vortex Shedding Character of Single Square Cylinder in Flowing Fluid With Different Widths of Channel

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Abstract Study of vortex shedding character on square cylinder is always hot in the academia. Vortex shedding will appear in the case of fluid flow across square cylinder at a certain flow rate, which may induce cylinder vibration. The impactions of channel width to square cylinders' vortex shedding characteristic were computed by the code in the case of cylinders with different channel widths. The results show that Strouhal number (St) increases along with channel width; impaction of channel width on fluid's vortex shedding character becomes stronger gradually; when the ratio of the channel width (H) and barrier size (w) is up to a certain value, slope of line $St-B$ (H/w) will be more gently. It has a tiny contribution to fluid's vortex shedding character when width of channel increases any longer.

Key words [vortex](#) [shedding](#) [square](#) [cylinder](#) [channel](#) [width](#)

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