摘 要

由於建築物表面壓力擾動受環繞於其周圍之近場流場之影響，而近場流場係逼近流與建築物互相作用之結果。因此逼近流之兩種特性：紊流強度u'/U與紊流尺度L_x，乃影響壓力擾動之重要因素。

本文以風洞實驗方式，探討放置於均勻流場中之二維方柱，於不同紊流強度及尺度下，其近場流場及表面壓力場之分佈及特性，以及方柱後尾跡發展之影響。

研究結果顯示紊流強度增加，會增加紊流場與剪力層之混合，剪力層因而變厚，剪力層中心線曲率變大，因而提高模型分離點後之平均壓力係數，降低擾動係數。且發現剪力層曲率變大，於側風面會發生間歇性再附著之現象，渦散形成區在更下游處形成，因而促使模型周圍量測得之速度與側面壓力孔相關性減低。

另外，結果也顯示紊流尺度約略大於二之後，出現有明顯對渦散結構消弱之作用，但渦散形成區並無移動之現象產生。高紊流強度大紊流尺度，可使間歇性再附著之現象，成永久之再附著流。

關鍵詞：均勻紊流場，擾動壓力，渦散

Surface Pressure Fluctuation of a Square Rod in Homogeneous Turbulent Flows

ABSTRACT:

The surface pressure fluctuations of a structure are related to flow field around the structure, and the flow field is a function of the incident flow characteristics. i.e., the turbulence itensity and scale. A systematic wind tunnel study was performed on the measurements of the surface pressure fluctuations on a square cylinder and the velocity fluctuations around the cylinder and in the wake of the cylinder in homogeneous turbulent flows at various turbulence intensities and scales . The turbulence intensity increased the mixing of fluid of the free shear layer and hence increased the thickness and the curvature of the shear layer .Therefore, It raised the coefficient of the mean pressure, but reduced the coefficient of the pressue fluctuation,also reduced the correlations between the velocity fluctuations around the cylinder and the pressure fluctuations on the lateral side. When the turbulence intensity increased , the free shear layers reattached intermittently on the lateral side of the prism , and hence the formation of the vortex occurred further downstream . The turbulence scales reduced the vortex strength significantly as length scales >2 . However , the location of the formation of the vortex remains unchange.It was noted that the shear layer always reattached the side faces for high turbulence inten-

sitiesand large turbulence scales .

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key words : homogenous turbulent flow , fluctuating pressure , vortex shedding