Thesis Title	Mass Transfer in Cross-current Packed Tower
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Candidate	Miss Pastraporn Chatsiriwattana
Supervisor	Asst. Prof. Dr. Wittaya Teppaitoon
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Abstract

Absorption of SO_2 by water was conducted in two packed columns operated in cross-current and counter-current modes at room condition. The columns were the same size ($1' \times 1'$ cross-sectional area) and were packed with $3/4''$ ceramic raschig ring for the height (or length) of 3 feet. The concentration of SO_2 in the air was in the range 1000-1500 ppm and the water rates were varied between 1492-3186 lb/h ft^2.

Experimental results showed that, at equivalent condition the pressure drop per unit packed height in the crossflow column was lower than that in the counter-current. The mass transfer coefficients (K_Ga) at the operating conditions (G=68-238 lb/h ft^2) in counter-current were in the range of 1.33-5.4 lb-mol/h atm ft^3. For cross-current column, the mass transfer cocfficients were calculated by numerical and graphical methods and were in the range of 1.18-4.41 lb-mol/h atm ft^3 which were 10-15 percent less than that in the counter-current.

The column can be operated at a higher gas flow rate (G=290-468 lb/h ft^2) with stability over a wider range of gas flow rate those operated in the counter-current mode. The mass transfer coefficients also increased in the range of 4.67-7.53 lb-mol/h atm ft^3. However at the air flow rate above 468 lb/h ft^2, some water was deflected out of the packing and this situation was somewhat similar to loading and flooding in counter-current column. Furthermore designing of crossflow column was also discussed.

Keywords : Cross-current / Counter-current / Sulfur dioxide-water / Absorption / Mass transfer coefficient