Chapter VI

DISCUSSION

The test results of small clear specimens showed values slightly differ from those recommended in the research work entitled "Mechanical properties of Thai Timbers" by Mr. Pong Sono. It is because of the variation of timber properties from log to log. The diffence is not significance.

Buckle shape of all solid squared columns can be well expressed by equation (5). The amplitude at mid height is greater as the length is longer.

The spaced column buckle shape is considered to be influenced by the length between spacer blocks at both ends. The inflection point occured between the third point and mid length between end and middle spacer blocks. The two shafts are buckled together for column length of 3.00 meter or shorter. Buckling of column shaft between center and end spacer blocks of 3.50 meter column also occured as shown in Fig. 35.

The Fourth-Power parabolic formula could be applied to estimate the column strength only of slenderness ratio, l/d, below 22 for Takian-Tong timber (as shown in Fig. 30). The best formula for determining solid column strength is the Perry Robertson formula using n = 0.003 l/r. The formula yields the estimated column load values slightly below the tested ones (Fig. 31). The strength of Takian-Tong solid columns having the l/d ratio above 22.35 as shown in Fig. 32 is well expressed by Euler formula. The tangent modulus should be used in Euler formula when l/d ratio is less than 22.35.

Strength of Takian-Tong solid squared columns depends upon the stiffness. It is found from the test that failures occured after the maximum load is well passed. This is certified that maximum stress is reached after the maximum load. On the other hand, stress under maximum load is not maximum stress, crushing strength is not the controlling factor for intermediate and long columns.

The tested strength of spaced columns of both types is lower than that of solid columns of the same cross-sectional areas and lengths. This is due to the higher slenderness ratio of spaced columns than solid columns. The results stated that the stiffness is the controlling factor for strength determination of spaced columns.

Tests also show the strength of spaced column is increased by a closer spacer blocks. The strength of spaced columns type 'b' are greater than of type 'a' by 72 to 115 per cent for column lengths of 2.00 to 3.00 meters. Strength of 1.50 and 3.50 meter spaced columns of type 'b' are greater than type 'a' by only 15 per cent. This is because of the spacing of spacer blocks of both types of 1.50 meter columns are quite closed to each other, while the strength of 3.50 meter spaced columns of both types are controlled by buckling between end and middle spacer blocks.