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BUILT-UP TIMBER COLUMNS

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## บทคัดย่อ

ศึกษากำลังรับน้ำหนักและลักษณะการโก่งทางข้าง เมื่อมีน้ำหนักกดตามแนวแกนของเสาไม้ประกอบไม้ตะเคียนทอง อัตราส่วนความชะลุดของเสาไม้ค้ำกล่าวอยู่ระหว่าง 37.5 ถึง 87.5 มีการยึดที่ปลายเสาและกึ่งกลาง เสาควยแหวนยึดไม้แบบแหวนผาและมีสภาพที่ปลายเสา แบบ "ก" และ แบบ "ข" ตามลำดับ

แสดงการ เปรียบเทียบกำลังรับน้ำหนักที่ได้จากการทดลองของเสาไม้ประกอบกับกำลังรับน้ำหนักของเสาไม้ค้ำสี่เหลี่ยมจัตุรัสซึ่งมีความยาวและเนื้อที่หน้าตัดเท่ากัน และเปรียบเทียบกับค่าที่คำนวณได้จากสูตรสำเร็จด้วย.

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#### ABSTRACT

The investigation of the strength of spaced Takian-Tong timber columns subjected to axial loadings are determined. The shape of the lateral buckling of such columns are also observed. The slenderness ratios of spaced columns are set between 37.5 and 87.5. Split ring are fastened close to both ends and also at the middle of the column heights. The end conditions are classified as type 'a' and type 'b' respectively.

The tested results for the strength of the spaced columns and solid squared columns having the same heights and cross-sectional areas are also compared. Empirical formulae are finally used to determine the strength of spaced columns. The results obtained from the formulae are then compared with the strength of the tested samples.

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## SYMBOLS AND ABBREVIATIONS

A	Cross-sectional area, $\text{cm}^2$ .
a	Amplitude of initial curvature of column
B	Differential equation constant
b	Breadth or width, cm.
c	Distance of the outer most fiber from neutral axis, cm.
d	Thickness or least dimension, cm.
E	Modulus of Elasticity, $\text{kg}/\text{cm}^2$ .
I	Moment of inertia, $\text{cm}^4$ .
l	Unsupported length, cm.
l/d	Slenderness ratio
$l_1/d_1$	Slenderness ratio at stress equal two-thirds of maximum stress
M	Bending moment, kg-cm.
M.C.	Moisture content
n	Effect of eccentricity and initial curvature = $a^2c/r^2$ .
P	Axial force, allowable safe load, kg.
$P_e$	Euler load, kg.
P.L.	Proportional limit
r	Radius of gyration = $\sqrt{I/A}$ , cm.
X, Y	Coordinate axes
$\sigma$	Compressive stress, maximum crushing strength of column, $\text{kg}/\text{cm}^2$ .
$\sigma_e$	Euler stress, $\text{kg}/\text{cm}^2$ .
$\sigma_o$	= $P/A$ , stress due to axial load only, $\text{kg}/\text{cm}^2$ .

- $\sigma_1$  Compressive stress at elastic limit,  $\text{kg/cm}^2$ .  
 $\tau$  Shearing stress (Parallel to grain),  $\text{kg/cm}^2$ .  
 $\delta$  Lateral deflection at mid height of tested  
columns, mm.
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