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The critical condition is in compressio

ENGINEERING REPORT 4042

ANALYSIS OF BEECH TRUSS ASSEMBLY PART NUMBER

404-184200, TUBE NO. 35 SERIAL NO. AJ86 (FOR

AIRCRAFT 1416) (Expenitor 3T)

APPROVED BY Charichen DATE NEW 15/56

PREPARED BY CHECKED BY .....

APPROVED BY.....

BRISTOL AIRCRAFT (WESTERN) LIMITED

WINNIPEG .

CANADA

PAGE. 1 .... OF.....

REPORT. 4042

DATE. Nov. 14/56

ANALYSIS OF BEECH TRUSS ASSEMBLY PART NO. 404-184200

This truss has tube number 35 with a bow of 0.068"/' at the lower end.

The maximum allowable by Beech is .065.

The critical condition is in compression.

The following data is from Beech Structural Analysis 37 Report 700 page 2.

Max. Comp. Load 2407#

Tube Size l" x .065"

Area

.1909"2

L'/p

60.22

From ANC-5 of March, 1955 Table 2.21 the column is short and the expression for allowable load in 4130 steel is:

$$F_c = 79500-51.9 (L^*/p)^{1.5}$$

To allow for eccentricity this expression is modified to:

$$F_c = 79500-51.9 \left(\frac{L^{\bullet}}{\rho}\right)^{1.5} - \frac{Pec}{I}$$

where P = load

e = eccentricity

c = distance from the neutral axis to the most compressed fibre.

I = second moment of area of the section

L' = effective length

p = radius of gyration of the section

. . For the case under consideration:

$$F_c = 79500-51.9 (60.22)^{1.5} - 2407 \times .068 \times .5$$

= 51360 psi

For a short column, to determine the actual stress we use the expression:

where 5 = compressive stress

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ANALYSIS OF BEECH TRUSS ASSEMBLY

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Cont'd ....

A = sectional area and the other symbols are as before.

. . For the case under consideration,

$$G = \frac{2407}{.1909} \neq \frac{2407 \times .068 \times .5}{.021}$$

S = 16500 psi

... MS = 
$$\frac{51360}{16500}$$
 -1

= 2.11

= 211%

Hence the tube is satisfactory.

Reference: Extract from Beech Telegram of 9 Nov. 1956 5:08 p.m. "Truss assembly considered satisfactory for use".

CISTOL AIRCRAFT WHATER PLOE.

MALYSIS OF MECH TRUSS ASSEMBLY

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. . For the case under consideration,

2 = 8407 × 860 × 808 = 5

S = 16500 pel

1- 08818 = 8M . .

II.S =

z silý

Hence the tube is estimiactory.

telerence: Extract from Beech Telegram of 9 Nov. 1956 5:08 p.m.