

AMC LIFTBOATS Inc

LIFTBOAT "MR. ALAN"

STRUCTURAL DESIGN
OF
NEW HULL SPONSONS

MARCH 2001



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Houston, Texas

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MR ALAN - SPONSONS

PWN 3-20-01

(1)

INTRODUCTION

SPONSONS ARE TO BE ADDED TO THE MR. ALAN
THE FOLLOWING CALCULATIONS DEMONSTRATE THAT
THE PROPOSED SCANTLING MEET THE STRUCTURAL
REQUIREMENTS OF ABS

REFERENCE

DWG LINES PLAN - TEMPLETON AND ASSOCIATES.

LINES PLAN - DWG 104

ABS Rules FOR BUILDING AND CLASSIFICATION
OF STEEL VESSELS UNDER 200 FT - ABS 1983

(2)

Both TRANSV

S.M.
REQ'D

$$= \frac{S \times h \times C \times e^2}{400}$$

$$h = 8 \text{ FT}$$

$$C = 4.33$$

$$e = 1.5$$

$$S = 5 \text{ FT}$$

$$S.M. = 3.51 \text{ IN}^3$$

USE GC 8.2 ✓

$$S.M. PROVIDED = 4.38 \text{ IN}^3$$

Both STIFF

$$\frac{S \times h \times C \times e^2}{240}$$

$$= 1.86 \text{ IN}^3$$

$$= S = 1.67 \text{ FT}$$

$$h = 10 \text{ FT}$$

$$C = 1.34$$

$$e = 5 \text{ FT}$$

$$\nabla 3 \times 2 + 1/4 \text{ W} / 40^+ = \underline{2.0 \text{ IN}^3} \quad \text{O.K.}$$

Both R.
TANK.

$$t = \frac{S \sqrt{h}}{460} + 0.1$$

$$= \underline{0.25 \text{ ''}}$$

$$S = 20 \text{ ''}$$

$$h = 9.5 \text{ FT}$$

MR. KAN - SPONSORS.

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DECK TRANSV.

S

$$\begin{aligned} h &= \frac{400 \text{ PSF}}{45} \\ &= 8.9 \text{ FT} \end{aligned}$$

(3)

$$\frac{S \times h \times c \times l^2}{400}$$

$$\frac{5 \times 8.9 \times 1 \times 5^2}{400} = 2.78 \text{ IN}^3$$

$$\text{S.M. } \underline{6 \text{ L } 8.2} = 4.38 \text{ IN}^3$$

DECK LONG'NAL

$$s = 1.67 \text{ A.}$$

$$h = 8.9$$

$$c = 0.7$$

$$e = 5$$

$$\text{S.M. REQ'D} = \frac{S \times h \times c \times l^2}{240}$$

$$= \frac{1.67 \times 8.9 \times .7 \times 5^2}{240}$$

$$= 1.08 \text{ IN}^3$$

$$43 \times 2 \times 1/4 \text{ w/ } 40' \times 1/4 \text{ IR} = \underline{2.0 \text{ IN}^3}$$

0.16

(4)

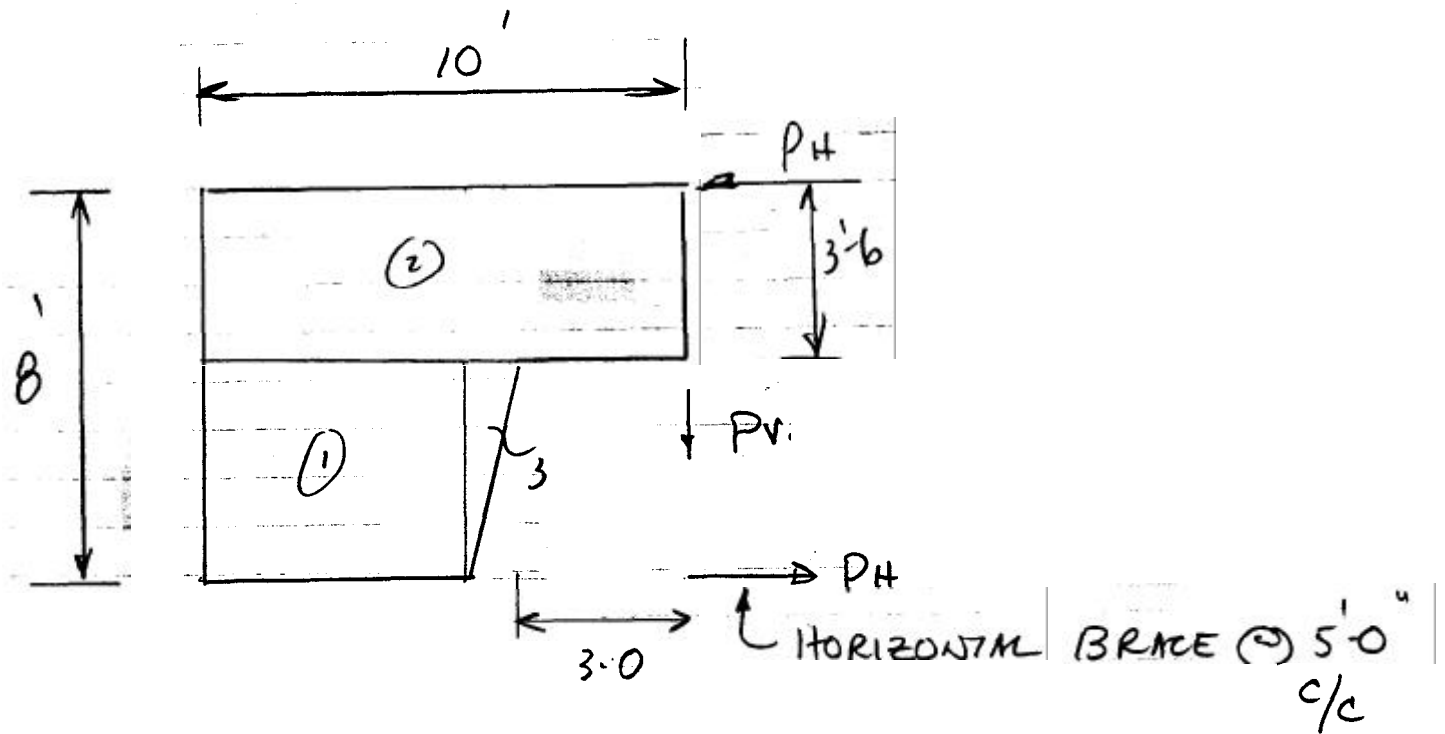
SIDE TRANSVERSE

$$\begin{aligned} \text{S.M. REQ'D} &= \frac{S + h \times C \times l^2}{400} \\ &= 3.04 \text{ IN}^3 \end{aligned}$$

$$\begin{aligned} S &= 5 \\ h &= 4 \\ C &= 1.5 \\ l &= 6.5 \end{aligned}$$

$$\text{S.M. } [6 \times 8.2] = 4138 \text{ IN}^3 \longrightarrow 0.16$$

(5)



BUOYANCY OF SPANSON - TO DECK

<u>ITEM</u>		<u>A</u>	<u>d</u>
(2)	3.5 x 10	35	5
(3)	1/2 x 5.5 x 1	2.75	4.17
(1)	4.5 x 6.0	27.00	7.00
		<u>64.75</u>	<u>5.8</u>

BUOYANCY = 64.75 x 5 x .064 = 20.7 KIPS

Moment about Side Shell = 20.7 x 5.8 = 120 FT-KIPS

MR. MAN - SCHELVINGS.

PWN 3-20-01

(6)

$$PH = \frac{120}{8} = \underline{15.0} \text{ KIPS.}$$

LOWER STRUT = ST 4x4x1/4.

$$AUA = 3.59 \text{ IN}^2$$

$$fa = \frac{15.0}{3.59} = \underline{4.2} \text{ KSI} \quad \text{O.K.} < \frac{0.6 \times 46}{27.641}$$

$$\text{CHILL BRACKET.} \quad \frac{15}{6 \times 3.75} = \underline{6.7} \text{ KSI.} \quad \text{O.K.}$$

SHEAR STRESS AT SIDE SHELL.

$$\text{Shear} \quad \frac{20.7}{36 \times .25} = 2.30 \text{ KSI} < 0.4 \times 36 \text{ KSI}$$

O.K.