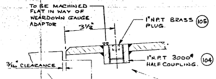
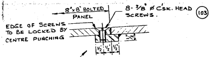
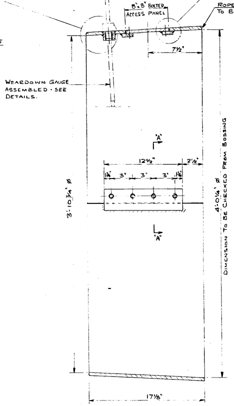
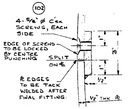

To be machined flat in way of weardown gauge adaptor
3½"
1"N.P.T brass plug. (105)
1"N.P.T 3000# half coupling. (104)
3/16" clearance

WEARDOWN GAUGE CONNECTION
SCALE :- HALF FULL SIZE


8"x8" BOLTED PANEL
8- 3/8" ø C'SK. HEAD SCREWS. (103)
EDGE OF SCREWS TO BE LOCKED BY CENTRE PUNCHING
½"
½"
½"
½"

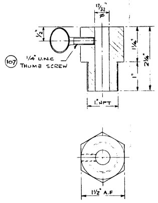

8"x8" BOLTED ACCESS PANEL
ROPE GUARD TO BE WELDED, ALL AROUND, TO BOSSING AFTER FINAL FITTING.
7½"
WEARDOWN GAUGE ASSEMBLED - SEE DETAILS.
"A"
12½"
2½"
1¾"
3"
3"
3"
1¾"
"A"
3'-10¾" ø
4'-0¼" ø
DIMENSION TO BE CHECKED FROM BOSSING
17⅛"

DETAIL OF ROPE GUARD (101)
(IN HALVES)

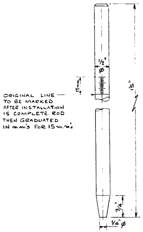

(102)
4- 5/8" ø C'SK SCREWS, EACH SIDE
EDGE OF SCREWS TO BE LOCKED BY CENTRE PUNCHING
SPLIT ON ℄
1"
3"
1"
℘ EDGES TO BE TACK WELDED AFTER FINAL FITTING.
½"
½" THK ℘

SECTION THRO' "A"-"A"
SCALE :- HALF FULL SIZE

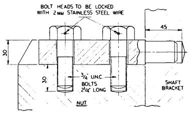
(109)
18 - 11/16" ø HOLES FOR 5/8" HEX. HEAD CAP SCREWS, EQUALLY SPACED. TO BE LOCKED WITH


17/32" ø
½"
(107) ¼" U.N.C THUMB SCREW
1¼"
2¼"
1"
1"NPT
1½" A.F

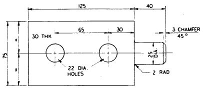
ADAPTER FOR WEARDOWN GAUGE (106)
SCALE :- FULL SIZE


½" ø
15mm
15"
ORIGINAL LINE TO BE MARKED AFTER INSTALLATION IS COMPLETE. ROD THEN GRADUATED IN mm's FOR 15mm's
¾"
¼" ø

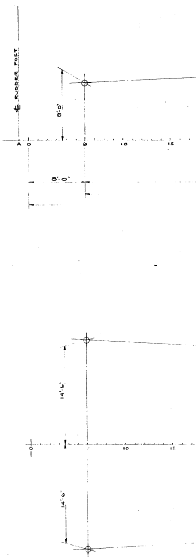
WEARDOWN GAUGE (108)
SCALE :- FULL SIZE


BOLT HEADS TO BE LOCKED WITH 2MM STAINLESS STEEL WIRE
45
30
30
¾" U.N.C. BOLTS 2¼" LONG
SHAFT BRACKET
NUT

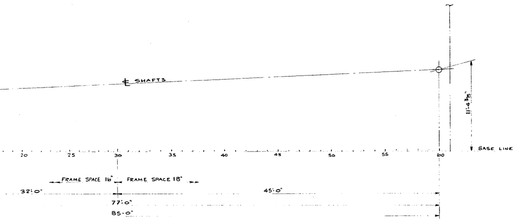
ARRGT OF LOCKING PLATE
NOTE: LOCKING ℘S FITTED OPPOSITE EACH OTHER


125
40
30 THK
65
30
3 CHAMFER 45°
75
25 DIA.
22 DIA. HOLES
2 RAD

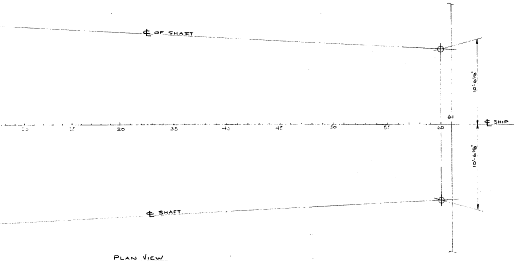
DETAIL OF LOCKING PLATE (112)


℄ RUDDER POST
8'-0"
A
0
6
10
15
8'-0"
14'-6"
0
10
15
14'-6"

0 1 2 3 4 ₵ 6 7 8 9 10


₵ SHAFTS
11'-4⅜"
BASE LINE
20
25
30
35
40
45
50
55
60
FRAME SPACE 16"
FRAME SPACE 18"
32'-0"
45'-0"
77'-0"
85-0"

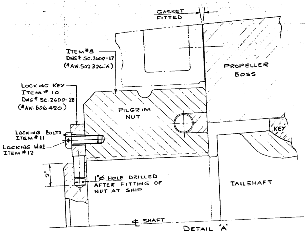
ELEVATION


₵ OF SHAFT
30
35
40
45
50
55
60
61
₵ SHIP
10'-6⅛"
10'-6⅛"
₵ SHAFT

PLAN VIEW

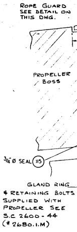
## SHAFT CENTRE CALCULATIONS

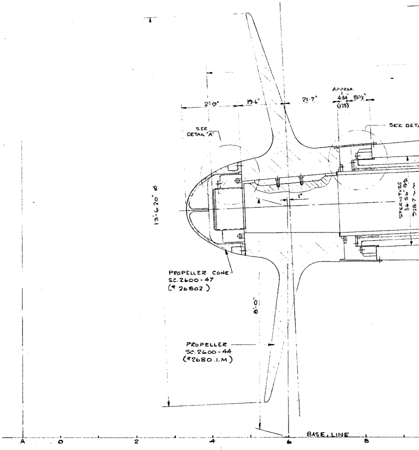
SCALE:- ¼" = 1'-0"


GASKET FITTED
ITEM #8
DWG # Sc.2600-17
(#AW.502326.'A')
PROPELLER BOSS
LOCKING KEY
ITEM # 10
DWG # Sc.2600-28
(#AW.606420)
PILGRIM NUT
LOCKING BOLTS ITEM # 11
LOCKING WIRE ITEM # 12
KEY
2"
1"Ø HOLE DRILLED AFTER FITTING OF NUT AT SHIP
TAILSHAFT
₵ SHAFT

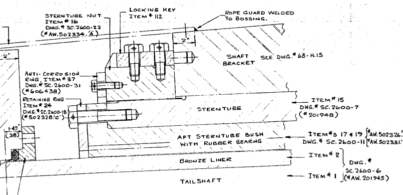
DETAIL 'A'

FOR ALL OTHER INFORMATION REFER TO DETAIL 'A' ON DWG.# 68-Sc.2600-4 SHT. 2 (# AW.201941 SHT. 2 REV.'B')


ROPE GUARD SEE DETAIL ON THIS DWG.
PROPELLER BOSS
¾" Ø SEAL (115)
GLAND RING & RETAINING BOLTS SUPPLIED WITH PROPELLER SEE S.C 2600-44 (# 2680.1.M)

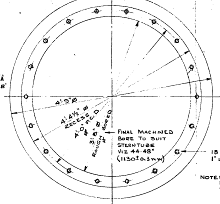

2'-0"
19.6"
21.7"
APPROX.
4.84"
(123)
8½"
SEE DETAIL 'A'
SEE DETA
13'-6.20" Ø
1"
STERNTUBE 36.56" Ø/D 928.7 mm
PROPELLER CONE SC.2600-47 (# 26802)
8'-0"
PROPELLER Sc.2600-44 (#2680.1.M)
BASE LINE
A
0
2
4
6
8

₵


STERNTUBE NUT
ITEM # 16
DWG.# SC.2600-22
(#AW.502334.'A')
LOCKING KEY
ITEM # 112
ROPE GUARD WELDED
TO BOSSING.
2"
2"
SHAFT
BRACKET
SEE DWG.# 68-H.15
ANTI-CORROSION
RING, ITEM # 37
DWG.# SC.2600-31
(#606438)
RETAINING RING
ITEM # 24
DWG.# SC.2600-18
(#502328.'C')
1.49"
(38)
STERNTUBE
ITEM # 15
DWG.# SC.2600-7
(#201948)
AFT STERNTUBE BUSH
WITH RUBBER BEARING
ITEM#S 17 & 19
DWG.# SC.2600-11
#AW.502326.'A'
#AW.502331.'B'
BRONZE LINER
ITEM # 2
ITEM # 1
DWG.#
SC.2600-6
(#AW.201945)
TAILSHAFT
℄ SHAFT

DETAIL 'B'

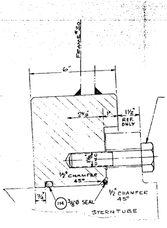
FOR ALL OTHER INFORMATION REFER TO
DETAIL 'B' ON DWG.# SC.2600-4 SHT.#1
(#AW.201941 SHT #1 REV.'A')


4'-9"Ø
4'-4½"Ø
RECESS
4'-0" P.C.D ✗
3'-8"Ø
ROUGH
BORED
FINAL MACHINED
BORE TO SUIT
STERNTUBE
VIZ 44.48"
(1130±0.3mm)
18 HOLES TAPPED
1" U.N.C ON 4'-0" P.C.D ✗

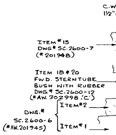
SCALE :- 1½" = 1'-0"

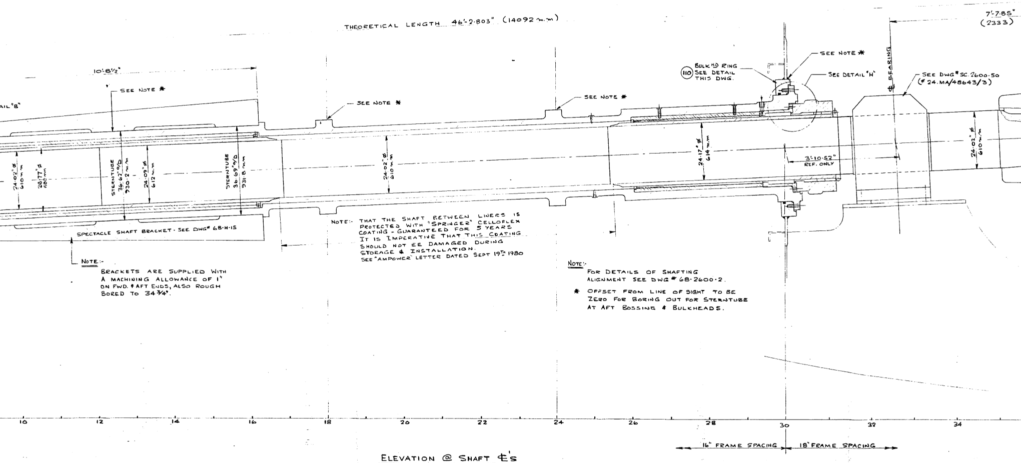
NOTE:-
DIMENSION MARKED
THUS ✗ TO BE CHECKED
FROM STERNTUBE

BULKHEAD RING (110)


FRAME #30
6"
111
18-1⅛" U.N.C HEX.
HD. BOLTS 4¾" LONG
2½"
1"
1½"
REF.
ONLY
1⅛" U.N.C
½" CHAMFER
45°
½" CHAMFER
45°
¾"
114
⅜"Ø SEAL
STERNTUBE

SCALE :- HALF FULL SIZE


C.W
1½"
ITEM # 15
DWG # SC.2600-7
(#201948)
ITEM 18 & 20
FWD. STERNTUBE
BUSH WITH RUBBER
DWG.# SC.2600-12
(#AW.302998.'C')
ITEM#2
DWG.#
SC.2600-6
(#AW.201945)
ITEM#1


THEORETICAL LENGTH 46'-2.803" (14092 m.m)
7'-7.85"
(2333)
10'-8½"
SEE NOTE ✱
SEE NOTE ✱
SEE NOTE ✱
SEE NOTE ✱
AIL "B"
BULK HD RING
(110) SEE DETAIL
THIS DWG.
SEE DETAIL "H"
℄ BEARING
SEE DWG # SC.2600-50
(# 24.MA/48643/3)
24.02"Ø
610 m.m
26.77"Ø
680 mm
STERNTUBE
36.62" O/D
930.2 m.m
24.09"Ø
612 m.m
STERNTUBE
36.69" O/D
931.8 m.m
24.02"Ø
610 m.m
24.17"Ø
614 m.m
3'-10.52"
REF. ONLY
24.02"Ø
610 m.m
SPECTACLE SHAFT BRACKET - SEE DWG # 68-H-15
10
12
14
16
18
20
22
24
26
28
30
32
34
16" FRAME SPACING
18" FRAME SPACING

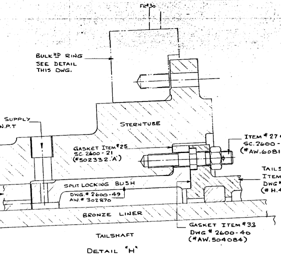
NOTE:-
BRACKETS ARE SUPPLIED WITH
A MACHINING ALLOWANCE OF 1"
ON FWD. & AFT ENDS, ALSO ROUGH
BORED TO 34¾".

NOTE:- THAT THE SHAFT BETWEEN LINERS IS
PROTECTED WITH "SPRINGER" CELLOFLEX
COATING - GUARANTEED FOR 5 YEARS
IT IS IMPERATIVE THAT THIS COATING
SHOULD NOT BE DAMAGED DURING
STORAGE & INSTALLATION.
SEE "AMPOWER" LETTER DATED SEPT 19TH 1980

NOTE:-
FOR DETAILS OF SHAFTING
ALIGNMENT SEE DWG # 68-2600-2.

✱ OFFSET FROM LINE OF SIGHT TO BE
ZERO FOR BORING OUT FOR STERNTUBE
AT AFT BOSSING & BULKHEADS.

ELEVATION @ SHAFT ℄'S
SCALE :- 1" = 1'-0"

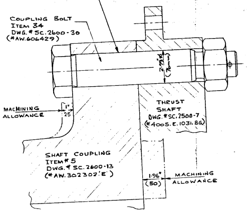

FR#30
BULKHD RING SEE DETAIL THIS DWG.
SUPPLY
N.P.T
STERNTUBE
GASKET ITEM #25 SC. 2600 - 21 (#502332.'A')
ITEM #27 & 46 SC. 2600 - 39 (#AW.608198)
TAILSHAFT SEAL ITEM #31 DWG # SC.2600-38 (# H.44046)
SPLIT LOCKING BUSH
DWG.# 2600-49 AW.# 302870
BRONZE LINER
GASKET ITEM #33 DWG # 2600-40 (#AW.504084)
TAILSHAFT

## DETAIL "H"

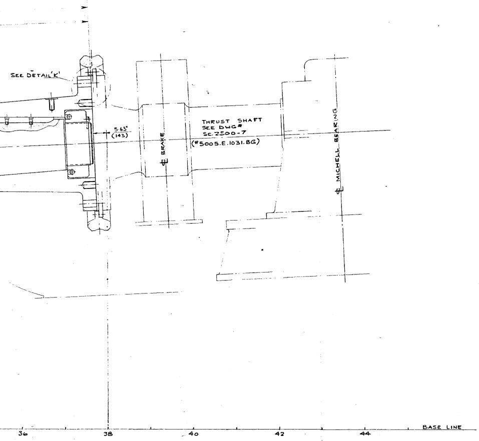
FOR ALL OTHER INFORMATION REFER TO DETAIL 'H' ON DWG. # SC.2600-4 SHT. # 2 (#AW. 201941 SHT. 2 REV. 'B')

**NOTE:-**

BOLT HOLES IN SHAFT COUPLING TO BE PRE-DRILLED BY MAKERS, 2·91"⌀ (74 m.m).
FINAL DRILLING & REAMING TO BE DONE BY P.W.D.D TO SUIT THRUST SHAFT.
COUPLING BOLTS SUPPLIED PRE-MACHINED & FINISH MACHINED BY P.W.D.D


COUPLING BOLT ITEM 34 DWG. # SC.2600-30 (#AW.606429)
2·93"⌀ (76mm)
MACHINING ALLOWANCE
1"
25
THRUST SHAFT DWG. # SC.2500-7 (#4005.E.1031.BG)
SHAFT COUPLING ITEM # 5 DWG. # SC.2600-13 (#AW.302302.'E')
1·96" (50)
MACHINING ALLOWANCE

## DETAIL 'K'


SEE DETAIL 'K'
5·63" (143)
℄ BRAKE
THRUST SHAFT SEE DWG # SC.2500-7 (#5005.E.1031.BG)
℄ MICHELL BEARING
36
38
40
42
44
BASE LINE

## LIST OF PARTS

QUANTITIES GIVEN ARE FOR 2 SHAFT ASSEMBLIES.

FOR ITEM NOS 1 TO 64 SEE MAKERS PARTS LIST DWG.# A.W 608197, P.W.D.D # 68.SC.2600-43 THESE ITEMS ARE SHOWN ON MAKERS DWG.# AW.201941 (2 SHEETS), P.W.D.D DWG.# 68.SC 2600-4

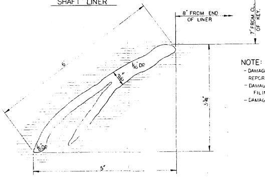
SHAFTING ASSEMBLY SUPPLIED THRO' "AMPOWER CANADA LTD." - P.O # B.32367

PROPELLER ASSEMBLY SUPPLIED BY "CANADIAN STONE MARINE LTD." - P.O # B.32565 - SEE DWG. # SC.2600-44 (#26801.M) & SC.2600-47 (# 26802)

NOTE:- ONLY THE FOLLOWING ITEMS, SHOWN IN CIRCLES ON THIS DWG., ARE TO BE SUPPLIED BY P.W.D.D TO COMPLETE THE SHAFTING ARRGT

| ITEM Nº | QTY. | DESCRIPTION | MATERIAL | SUPPLIER | REMARKS | P.O Nº | S.C DWG. REF. |
|---|---|---|---|---|---|---|---|
| 101 | 2 | ROPE GUARD (IN HALVES) | STEEL | P.W.D.D | | | |
| 102 | 16 | 5/8" U.N.C x 1" LG. CSK. HD SCREWS FOR (101) | STAINLESS STEEL | " | | B35565 | |
| 103 | 16 | 3/8" U.N.C x 1" LG. " " " " " | " | " | | " | |
| 104 | 2 | 1" N.P.T 3000# HALF COUPLING " " | FORGED STEEL | " | | | |
| 105 | 2 | 1" N.P.T PLUG FOR (104) | BRASS | " | | | |
| 106 | 2 | ADAPTER FOR WEARDOWN GAUGE | STEEL | " | | | |
| 107 | 2 | 1/4" U.N.C x 1" LG. THUMB SCREWS FOR (106) | " | " | | | |
| 108 | 2 | WEARDOWN GAUGE 1/2"⌀ x 15" LG. | " | " | | | |
| 109 | 36 | 5/8" U.N.C x 1 1/2" LG. HEX. HEAD BOLTS FOR (101) | STAINLESS STEEL | " | | B35565 | |
| 110 | 2 | BULKHEAD RING | STEEL | " | MATL O.O RINGS CUT BY P.W.D.D | B.34706 | |
| 111 | 36 | 1 1/8" U.N.C x 4 3/8" LG. HEX. HEAD BOLTS FOR (110) | " | " | | B35565 | |
| 112 | 4 | LOCKING PLATE | " | " | | | |
| 113 | 8 | 3/4" U.N.C. HEX. HD BOLTS 2 1/4" LONG | STAINLESS STEEL | " | | B35700 | |
| 114 | 2 | 3/8" Ø SEAL | NEOPRENE | " | | B.35732 | |
| 115 | 1 | 3/4" Ø SEAL | " | " | | B.35868 | |

## LOCATION & DETAILS OF DAMAGE TO PORT SHAFT LINER


6
8" FROM END OF LINER
7" FROM CL. OF KEY.
1/16" DP.
7/16"
1/8" DP.
3 1/4"
5"

NOTE:
- DAMAGE TO PORT SHAFT LINER REPORTED JAN. 12, 82.
- DAMAGED AREA DRESSED UP BY FILING AND HONING.
- DAMAGE INSPECTED BY: D. DUNBAR
  D. ARMSTRONG-AMPOWER
  D. COCRAN "
  L. KRYGSMAN
  C. STEVENSON
  A. URQUHART
  J. SPENCE

## LLOYD'S PART 5, CHAPTER 6, SECTION 3

**INTERMEDIATE SHAFT**

$d = 100\sqrt[3]{\frac{P\,(560)}{R\,(\sigma_u + 160)}}$ mm

$= 100\sqrt[3]{\frac{5578\,(560)}{141\,(442 + 160)}}$

$= 100\sqrt[3]{39.56 \times 0.93}$

$= 100\sqrt[3]{36.8}$

$= 100 \times 3.326$

= 332.6 mm = 13.0944"

ICE CLASS 1* + 12 %
= 372.5 mm = 14.6653"

**BOLLARD CONDITION**

P = 5578 kw
R = 141 PM
$\sigma_u$ = 45-55 kgf/mm$^2$
= 442-540 N/mm$^2$

## LLOYD'S PART 5, CHAPTER 6, SECTION 3,6 (C)

**SCREW SHAFT**

= 1.26 × 332.6 mm
= 419.076 mm = 16.4990"

ICE CLASS 1* + 20%
= 502.89 mm = 19.7988"

## ARCTIC POLLUTION REQUIREMENTS

**SCREW SHAFT**

Diam $= 1.15\sqrt[3]{\frac{SU \times WT^2}{SY}}$

$= 1.15\sqrt[3]{\frac{70.11 \times 29{,}509}{27}}$

$= 1.15\sqrt[3]{76625}$

= 1.15 × 42.474

= 48.845 cm = 19.23 inch

SU = 100,000 lbs/sq in
(70.11 kg/mm$^2$)

SY = 38,403 lbs/sq in
(27 kgf/mm$^2$)

WT$^2$ = 1807 inch$^3$
(29,509 cm$^3$)

**THRUST SHAFT**

Diam at collar
= 1.1 × intermediate diam.
= 1.1 × 372.5
= 409.75 mm = 16.13"

Diam Thrust Shaft
(1 Thrust Shaft diam
clear of collar)
= 372.5 mm = 14.6653"

**BRONZE LINER**

$t = \frac{D + 230}{32}$ mm

$= \frac{612 + 230}{32}$

= 26.3125 MM = 1.0359 INCH (AFT)

D = Diam of Screw Shaft (PROPOSED)
Under Liner

$= \frac{614 + 230}{32}$

= 26.375 MM = 1.0384 INCH (FWD)

**M.O.T. REQUIREMENTS**

Screw Shaft + 65% Over Strength

$d_b$ = 502.89 MM = 19.7988"

$I/y = 0.098\,d_b^3$

$= 0.098 \times 19.7988^3$

= 760.58 INCH$^3$

+65 % = 1254.95 INCH$^3$

$d_b$ = 23.735 INCH

Thrust and Motor Shaft + 10% in Diam over Diam of Propeller Shaft
Screw Shaft = 23.395" + 2.3395"
= 25.735 INCH

**BRONZE LINER**

Lloyd's + 1/8"

= 1.0359 + 0.125
= 1.1609" (AFT)

= 1.0384 + 0.125
= 1.1634" (FWD)

MATERIALS TO LLOYDS TESTING AND REQUIREMENTS
ANTI-ROTATION SECURING ARRGT FOR BEARING TO
SURVEYORS SATISFACTION

## ALTERATIONS

| REV. | ZONE | DESCRIPTION | DATE | APP. | OWNER DATE | OWNER APP. |
|---|---|---|---|---|---|---|
| A | | OWNERS EXAMINED - LETTER<br>DATED 24/11/81 | 25/11/81 | | | |
| B | | AS FITTED | 16-9-82 | | | |

## REFERENCES

| No. | TITLE |
|---|---|
| | |

## RESERVATIONS

| No. | RESERVATIONS |
|---|---|
| | |

## PRINT ISSUE

| GROUP | REVISION O | O | O | A | A |
|---|---|---|---|---|---|
| OWNERS | 3 | | 4 | 4 | |
| LLOYDS | | | | | 4 |
| A.B.S. | | | | | |
| C.S.I. | | | | | 4 |
| DWG. OFFICE (STEEL) | | | | | |
| DWG. OFFICE (OUTFIT) | | | | | |
| DWG. OFFICE (ENG.) | | | | 1 | |
| PROD. MGR. | | | | 1 | |
| ASST. PROD. MGR. | | | | 1 | |
| STEEL SUPT. | | | | | |
| OUTFIT SUPT. | | | | 1 | |
| ENG. SUPT. | | | | 1 | |
| PROD. PLANNING | | | 1 | 1 | |
| LOFT | 1 | | | 1 | |
| MACHINE SHOP | | | | 1 | |
| ENG. FITTER | | | | | |
| CARPENTER | | | | | |
| PAINTER | | | | | |
| RIGGER | | | | | |
| PREFAB | | | | 3 | |
| WELDER | | | | | |
| STEEL ERECTION | | | | 2 | |
| PIPEFITTER | | | | | |
| ELECT. SUB CONT. | | | | | |
| SHT. MET. SUB CONT. | | | | | |
| PIPE SUB CONT. | | | | | |
| CANAL E (P.W.D.D.) | | | | | |
| INSUL. SUB CONT. | | | | | |
| QUALITY CONTROL | | | | | |
| PIPE SUPT. | | | | | |
| DET NORSKE VERITAS | | 1 | | | |
| R MILNE | | | | 1 | |
| J CARR | | | | 1 | |
| TOTAL | 4 | 1 | 5 | 19 | 8 |
| DATE OF ISSUE | 18/9/81 | 24/9/81 | 13/10/81 | 25/11/81 | 7/12/81 |

## APPROVALS

| OWNER | LLOYDS | A.B.S. | C |
|---|---|---|---|
| LETTER<br>24/11/81 | 30/12/81 | | 11/1 |

DRG. No. 68-2600-1

ARRGT. OF SHAFTIN
& DETAILS - ROPEGUAF
BHD RING & WEARD
GAUGE

SCALE: 1"=1'0" & AS SHOWN | A/C #: 260

HULL No. 68

DRAWN BY: A. GRAHAM
DAT
APPROVED BY: J. CAMERON

PORT WELLER DRY DOCKS
AS FITTED DRAWING

PORT WELLER
A
UPPER LAK
ES ONT