

MIL-STD-771C(SHIPS)

1 June 1972

SUPERSEDING

MIL-STD-771B(SHIPS)

30 November 1966

(See 10.2)

MILITARY STANDARD

DAMAGE CONTROL BOOKS

FOR

AUXILIARY AND MISCELLANEOUS SHIPS,

PREPARATION OF



FSC TMSS

MIL-STD-771C (SHIPS)
1 June 1972

DEPARTMENT OF THE NAVY
NAVAL SHIP ENGINEERING CENTER
HYATTSVILLE, MARYLAND 20782

Damage Control Books For Auxiliary
and Miscellaneous Ships,
Preparation of

MIL-STD-771C (SHIPS)

1. This Military standard is approved for use by all activities under the cognizance of the Naval Ship Systems Command.
2. Recommended corrections, additions or deletions should be addressed to the Commander, Naval Ship Engineering Center, Department of the Navy, Center Building, Prince George's Center, Hyattsville, Maryland 20782.

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1. SCOPE

1.1 This standard covers the requirements for preparation and distribution of damage control books (diagrams, text and tables) for auxiliary and miscellaneous ships over 220 feet in length, in addition to certain fleet operated surface ships under 220 feet in length, that require halftone reproduction.

2. REFERENCED DOCUMENTS

2.1 The issue of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

GOVERNMENTAL

SPECIFICATION

L-F-340 - Film, Sensitized, Wash-Off Process; Diazotype, Moist and Dry Process; Brownprint; Roll and Sheet.

STANDARD

MIL-STD-784 - Damage Control Books for Surface Ships, Revision of.

PUBLICATIONS

0901-290-0002 - Naval Ships Technical Manual, Weight, Stability and Integrity (Seaworthiness).
0901-881-0002 - Naval Ships Technical Manual, Section I, Damage Control.
0901-882-0002 - Naval Ships Technical Manual, Section II, Damage Control.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

U.S. POSTAL SERVICE

Postal Manual Regulations.

(Application for copies should be addressed to the U. S. Postal Service, Washington, D.C. 20360.)

3. DEFINITIONS

3.1 Composite halftone plastic negative sheet. A combination of clear and dotted images with a black background on a plastic sheet that was exposed by contact with a composite halftone plastic positive. The material is used for reproducing the final halftone prints.

3.2 Composite halftone plastic positive sheet. A sensitized plastic sheet exposed by contact with two or more negatives prior to developing.

3.3 Direct reading. Direct reading applies to reading from left to right on the emulsion side of a plastic positive. Plastic positives shall always be direct reading.

3.4 Drafting plastic sheet. An unsensitized translucent plastic sheet with a toothed surface which is receptive to ink. This material is used for drafting and overlays.

3.5 Group master copy. A set of individual contact plastic positives from the master copy for each ship at a building yard.

3.6 Halftone prints. Damage control diagrams reproduced by contact from a composite plastic negative. The two or three shades of gray are obtained from the negative which is composed of vignettted dots.

3.7 Klirtype. A special name adopted for material having names, numbers, and symbols printed on a Mylar or acetate sheet. The sheet shall be backed by an adhesive that will not be affected by heat, will not deteriorate with age, and will permit easy removal of the images.

3.8 Master copy. A set of individual black line plastic positives for the first ship to be delivered that is intended to be used for the class at a building yard.

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3.9 Nonreproducible. An image on plastic that will not reproduce. Nonreproducible plastics of ship's structure provide guide lines for preparation of systems, shadings, and liquid loading. When a negative is made, only the inked lines and applied Klrtype will reproduce.

3.10 Plastic negative sheet. A sensitized plastic sheet which is exposed by contact with a positive. This material is used for making all duplicate positives. The image on the emulsion side is reversed reading.

3.11 Plastic positive sheet. A black or blue image of the original matter with a clear background on a sheet that was exposed by contact with a negative. The image on the emulsion side is direct reading. The material is used for the following:

- (a) For nonreproducible images (blue line)
 - (1) For shading and liquid loading patterns.
- (b) For reproducible images (black line)
 - (1) For all final diagrams.

3.12 Reverse reading. Reverse reading applies to reading from right to left, as observed in a mirror, on the emulsion of a plastic negative. Plastic negatives shall always be reverse reading.

3.13 Screen. A plastic positive composed of vignettted dots. This is used for preparing composite system base and bulkhead shading positives only.

3.14 Sensitized plastic sheet. A plastic sheet which is coated with an emulsion sensitive to light.

3.15 Set of plastic diagrams. A set of plastics for all required diagrams.

3.16 Ship's master copy plastics. A plastic positives of the damage control diagrams for an individual ship.

3.17 Supervisor of Shipbuilding. The term "Supervisor of Shipbuilding" as used in this standard shall be understood to apply to the Government activity responsible for the building of the ship, such as the Supervisor of Shipbuilding, Conversion and Repair, USN or Commander of a Naval Shipyard.

3.18 Type book. The "Type book" is a damage control book for use as guidance in preparing damage control diagrams and associated text. It consists of a composite of various examples of conditions which can arise during the preparation of the original damage control diagram plastics and associated text.

4. GENERAL REQUIREMENTS

4.1 Building yard. Each building yard is responsible for providing its own group master copy plastics and text.

4.2 Damage control book. The requirements for the damage control book apply only to the systems, components, and circuits contained herein that are part of the ship's installations or specifications.

4.2.1 Damage control book components. A set of damage control book components shall consist of the following:

- (a) Damage control diagram plastic positives (ship's master copy).
- (b) Composite halftone plastic negatives.
- (c) Contact prints of diagrams (16 inches by 28-1/2 inches bound and unbound) (25 inches by 38 inches unbound).
- (d) Laminated diagrams.
- (e) Binders for diagrams (16 inches by 28-1/2 inches only).
- (f) Text.
- (g) Binders for text and liquid loading diagram.

(Type damage control book may be obtained from the Supervisor of Shipbuilding of the building yard.)

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4.2.2 Plastics composing a set of diagrams. A set of diagram plastics shall consist of the following:

- (a) Liquid loading:
 - (1) One plastic positive for base (ship's structure).
 - (2) One plastic positive for the patterns.
 - (3) One composite plastic negative.
- (b) Subdivision:
 - (1) One or more plastic positives for base (ship's structure).
 - (2) One or more plastic positives, for bulkhead shading, to suit the bases.
 - (3) One or more composite plastic negatives.
- (c) Systems:
 - (1) One plastic positive (ship's structure) for use with all system diagrams.
 - (2) One plastic positive (bulkhead shading).
 - (3) One plastic positive (for each system or group of systems).
 - (4) A composite plastic negative of each diagram (this includes ship's structure, bulkhead shading, and system or group of systems).

4.3 Diagrams and text distribution. Diagrams and text shall be furnished to the Supervisor of Shipbuilding of the building yard for distribution. Diagrams distribution shall be in accordance with figure 1. Text distribution shall be in accordance with figure 2.

4.4 Diagrams.

4.4.1 Plastic material sheets. Diagrams shall be prepared on plastic sheets. All of the material, for the positives and negatives, for any one job shall be from the same manufacturer and shall be in accordance with the following:

- (a) Sensitized plastic sheet type I, subtype A or B, class 2, style 1A, 0.007 inch thick of L-F-340. For making all single exposure positives and negatives.
- (b) Sensitized plastic sheet type I, subtype D, class 2, style 1A, 0.004 +0.001 inch thick of L-F-340. For making all composite (two or more exposures) positives and negatives.
- (c) Screen (plastic positive) (133 lines per inch - 20 percent). For bulkhead shading on subdivision and system plates.
- (d) Screen (plastic positive) (133 lines per inch - 50 percent). For system base structure plate.

4.4.2 Format and content. Format and content of diagrams shall be as specified in 4.4.2.1 through 4.4.2.3.

4.4.2.1 Plan layout. A plan layout indicating final size of diagrams, with arrangements of decks for subdivision and piping systems, shall be submitted to the Supervisor of Shipbuilding of the building yard for review. The liquid loading diagram, cross curves of stability, and draft diagram and functions of form, require review and acceptance by the Naval Ship Engineering Center (NAVSEC).

4.4.2.2 Isometric drawing. All diagrams, except liquid loading diagrams, shall be three-dimensional isometric projections. Diagrams of the ship shall be drawn with the bow to the right using a horizontal line to represent the longitudinal base line or other longitudinal line. A transverse line shall be represented by a line at 60 degrees and a vertical line shall be represented by a line at 120 degrees, measuring counterclockwise from the horizontal. To simplify drafting, camber may be neglected but sheer shall be shown.

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| STEP | BUILDING YARD | FORWARD TO | STEP | OUTFITTING ACTIVITY | FORWARD TO |
|------|---|--|------|--|------------------------|
| | All material to be delivered 2 months prior to commissioning except for marked-up prints. | | | All material to be delivered prior to departure of ship. | |
| 1 | <u>PLASTIC POSITIVES</u> Prepared in accordance with this standard for the first ship of the class at the building yard. These are the working positives. | (See note 1) | 1-A | <u>COMPOSITE HALFTONE PLASTIC NEGATIVES</u> Received from building yard. Use for additional prints if required. | P.S.A. |
| 2 | <u>PLASTIC NEGATIVES</u> Produced from working positives step 1. Use for making ship's master copy plastic positives and composite halftone plastic positives for the first ship, and group master copy plastic positive for all following ships of the class, at the building yard. | (See note 1) | 2-A | <u>MARKED-UP COPIES</u> 2 sets received from building yard. Add changes made during outfitting period. Distribute: 1 Set to Commanding officer 1 Set to post shakedown activity | C.O. P.S.A. |
| 3 | <u>SHIP'S MASTER COPY PLASTIC POSITIVES</u> The plastic positives prepared for an individual ship. Processed from step 2 negatives. | P.S.A. | | <u>POST SHAKEDOWN ACTIVITY</u> All material to be delivered prior departure of ship. | |
| 4 | <u>COMPOSITE HALFTONE PLASTIC NEGATIVES</u> Produced from ship master copy composite halftone plastic positives processed from step 2 negatives for an individual ship. | O.A. | 1-B | <u>COMPOSITE HALFTONE PLASTIC NEGATIVES</u> Received from outfitting activity. Use for additional prints if required. | P.S.A. (See note 1) |
| 5 | <u>GROUP MASTER COPY POSITIVES</u> The plastic positives prepared for all following ships of the class at the building yard. Processed from step 2 negatives. | B.Y. | 2-B | <u>SHIP MASTER COPY PLASTIC POSITIVES</u> Received from building yard. Correct to suit building yard, outfitting and post shakedown changes plus changes made by the ship's force on marked-up prints. These are working positives. Continue as noted in steps 2, 3, 4, and 6 with the following exceptions: a. Step 2. Group master copy plastic positives not required. b. Step 3. Forward final ship's master copy plastic positives without Klrttype to planning yard. c. Step 4. Forward final composite halftone plastic negative to planning yard. d. Step 6. Mark-up prints are not required. | B.Y. (See note 1) |
| 6 | <u>COMPOSITE PRINTS</u> Prints required for each diagram. Process from step 4 composite halftone plastic negatives. * Commanding Officer 1 Naval Ship Engineering Center 1 Planning yard ** Laminated prints 3 Mark-up prints | (See note 2) C.O. NAVSEC P.Y. C.O. B.Y. | | | P.Y. P.Y. |
| 7 | <u>MARKED-UP COPIES</u> Add changes, made between completion of diagrams and delivery of ship, to the 3 mark-up prints from step 6. Forward with delivery of ship. 1 Set to Commanding Officer 2 Sets to outfitting activity | C.O. O.A. | | | |
| 8 | <u>FOLLOWING SHIPS</u> Group master copy plastic positives as provided by step 5 are the working plastics for each following ship of the class at the building yard. Make all changes required to suit the individual ship. Proceed as noted in steps 2, 3, 4, 6, and 7 above. | B.Y. (See note 1) | | | |

*5 sets for C.O. of ships over 220 feet in length and 3 sets for ships under 220 feet in length.

** Copies for lamination shall be as follows: 1 set for each repair station, 1 set for damage control central and 1 set for each unit patrol station.

NOTES: 1. Hold until revised plastics have been received then destroy.

2. Diagrams 16 inches by 28-1/2 inches require binders except for lamination and mark-up sets.

Abbreviations: C.O. - Commanding Officer; NAVSEC - Naval Ship Engineering Center; P.Y. - Planning yard;
O.A. - Outfitting Activity; B.Y. Building Yard; P.S.A. - Post Shakedown Activity.

Figure 1 - Flow chart for damage control diagram, plastics and prints.

| <u>STEP</u> | <u>BUILDING YARD</u> (See note 1) All material to be delivered 2 months prior to commissioning except for revised material | <u>FORWARD TO</u> | <u>STEP</u> | <u>OUTFITTING ACTIVITY</u> All material to be delivered prior to departure of ship | <u>FORWARD TO</u> |
|-------------|---|--|-------------|---|--------------------|
| 1 | <u>TYPEWRITTEN MASTER COPY CLASS TEXT</u> Prepared in accordance with this standard for all ships of the class at the building yard. Reproduce as required and make the following distribution for each ship: * Bound for Commanding Officer 1 Bound for Naval Ship Engineering Center 1 Bound for planning yard 1 Unbound for outfitting activity 1 Unbound mark-up copy | B.Y. C.O. NAVSEC P.Y. O.A. B.Y. | 1-A | <u>SHIP'S MASTER COPY TEXT - OUTFITTING CHANGES</u> Obtain ship's master copy text marked-up by ship's force. Incorporate changes into outfitting activity's copy of master text received from building yard. Mark outfitting changes in both copies and forward prior to departure of ship. 1 Marked-up copy (ship's) to Commanding Officer 1 Marked-up copy to post shakedown activity | C.O. P.S.A. |
| 2 | <u>MARKED-UP COPY</u> Add changes made between completion of class text and delivery of individual ship to mark-up copy provided by step 1. | B.Y. | | <u>POST SHAKEDOWN ACTIVITY</u> All material to be delivered prior to departure of ship | |
| 3 | <u>SHIP'S MASTER COPY TEXT</u> Retype all pages in the marked-up copy from step 2 containing changes. Reproduce and distribute as noted in step 1 for insertion into bound and unbound texts issued for the individual ship prior to departure | | 1-B | <u>SHIP'S MASTER COPY TEXT - POST SHAKEDOWN CHANGES</u> Obtain ship's master copy text marked-up by ship's force. Incorporate all changes into post shakedown activity's copy of master text received from outfitting activity. Add post shakedown changes to master copy. | |
| 4 | <u>FOLLOWING SHIPS</u> Repeat the procedure noted in steps 2 and 3 above. | | 2-B | <u>FINAL MASTER COPY TEXT</u> Retype all pages in the marked-up master copy from step 1-B containing changes. Reproduce and distribute as noted in step 1 (less outfitting activity) for insertion into the texts previously issued for the individual ship. This is the final ship's master copy text. | (See note 2) |

* 5 sets for C.O. of ships over 220 feet in length and 3 sets for ships under 220 feet in length.

- NOTES: 1. The above procedure applies to each building yard.
2. The post shakedown activity may dispose of all preliminary text material after ascertaining that revised material has been delivered.

Abbreviations: C.O. - Commanding Officer; NAVSEC - Naval Ship Engineering Center; P.Y. - Planning Yard; O.A. - Outfitting Activity; B.Y. - Building Yard; P.S.A. - Post Shakedown Activity.

Figure 2 - Flow chart for damage control text.

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- 4.4.2.3 Scale. A scale, similar to figure 3, shall be shown in the lower right hand corner of the plastic below the date. It shall be the same as the scale used in preparing the diagram.

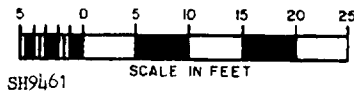
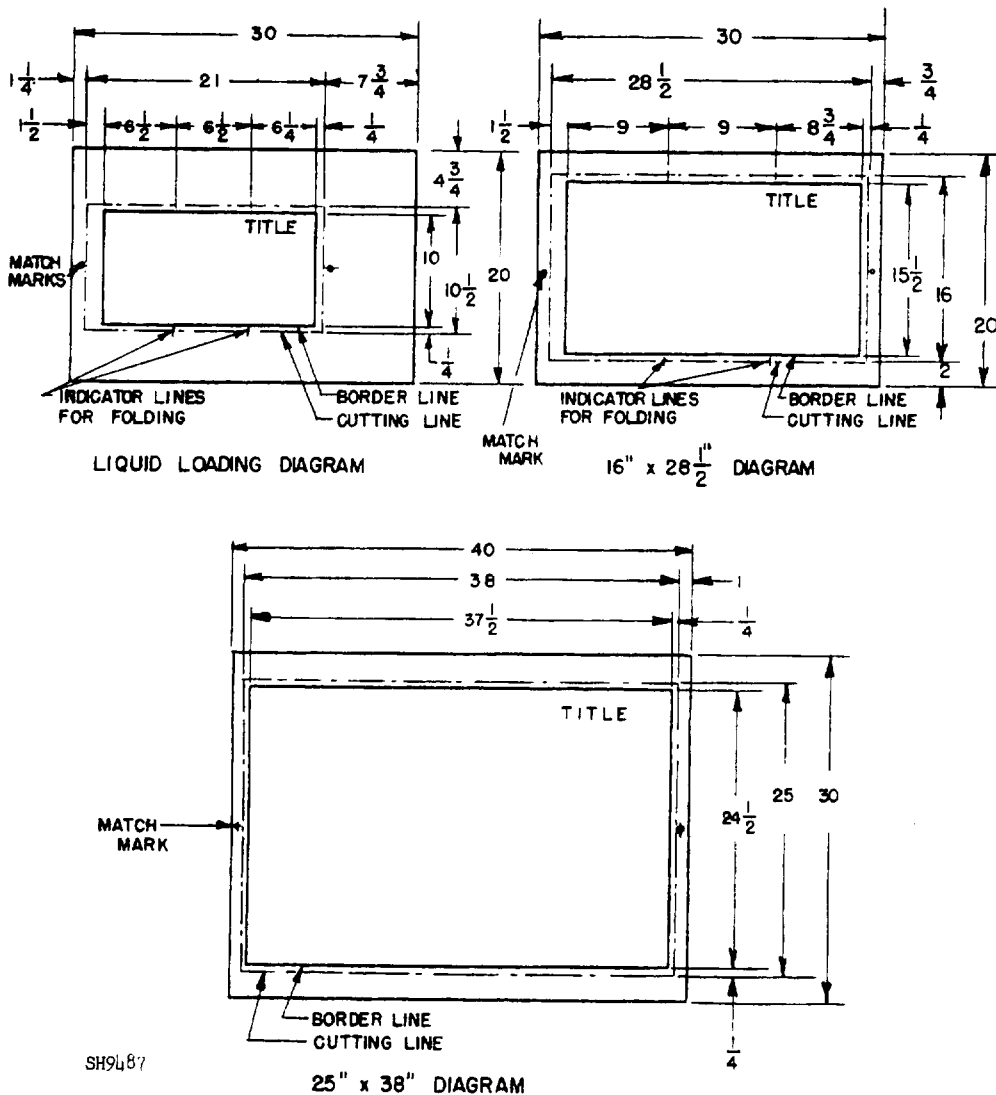


Figure 3 - Scale.

- 4.4.2.4 Size. Overall sizes of diagrams shall be as follows:

- (a) Liquid loading diagram:
(1) 10-1/2 by 21 inches and may be increased in multiples of 6-1/2 inches but shall not exceed 34 inches.
- (b) Subdivision and system diagrams:
(1) Normally 16 by 28-1/2 inches.
(2) 25 by 38 inches if information would be congested on 16 by 28-1/2 inch size.

- 4.4.2.5 Match marks. For proper registration of plastics, match marks shall be provided on all plastics as shown on figure 4.



NOTES:

1. Border lines should be No. 2, cutting lines should be No. 00.
2. One-quarter inch match marks are to be centered 1/2 inch from cutting line, as indicated.

Figure 4 - Plastic layout and match marks.

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4.4.2.6 Preparing plastic for drafting. Before drawing on plastic, the surface shall be cleaned with freon TF or other solvent, and then rubbed with pounce. The entire plastic shall be covered with a sheet of clear cellophane to keep the surface clean. The cellophane shall remain on the plastic when delivered to the Supervisor of Shipbuilding of the building yard.

4.4.2.7 Overhaul record block and NAVSHIPS No. Provide in Klrtype on the plastics as shown on figure 5 and as follows:

- (a) Overhaul record block and NAVSHIPS No.
(1) On the liquid loading diagram base, subdivision diagram base, and each system, locate in upper right hand corner, above title block, close to border line.

| |
|-----------------|
| REVISED BY |
| FOR OVERHAUL OF |
| 0988-000-0000 |

Figure 5 - Overhaul record block and NAVSHIPS No.

4.4.2.8 Ink. Only black ink, that will adhere to the plastic, will not flake off, and will reproduce a good image shall be used.

4.4.2.9 Weight of lines. The weight of lines shall be as shown in table I.

Table I - Weight of line.

| Line width number ^{1/} | Applicable to |
|---------------------------------|--|
| 3 | Watertight and oiltight boundaries. Airtight, fumetight and nontight boundaries. Intersection of horizontal level with vertical bulkhead and enlarged view structures. (These shall be dot-dash lines.) |
| 1 | |
| 0 | |
| 4 | Main line or loop piping for drainage, firemain, fuel oil and JP-5 transfer systems. |
| 4 | Connecting lines between pumps and main loops. |
| 4 | Watertight ventilation ducts. |
| 2 | Miscellaneous piping and nontight ventilation ducts. |
| 0 | Connecting lines between decks and leader lines (except for main loop connections). |
| 1 | Bottom of bulkhead or shell at deck. |

| ^{1/} Line width number | Width, inches |
|---------------------------------|---------------|
| 0 | 0.015 |
| 1 | .019 |
| 2 | .023 |
| 3 | .029 |
| 4 | .036 |

4.4.2.10 Klrtype (letters and numbers) (by printing process). All letters, words and numbers shall be Klrtype. The size and style of the Klrtype shall be as follows and as shown in table II.

- (a) NG - News gothic.
(b) MG - Monotone gothic.
(c) LG - Lining gothic.

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Table II - Lettering, size and style.

| Legend | Size and style | Legend | Size and style |
|--|----------------|---|----------------|
| Upper title block: "CONFIDENTIAL" (Omit if unclassified) | 10MG | Miscellaneous: | |
| Ship number | 24LG | Frame numbers | 8NG |
| Ship class | 10MG | Compartment names | 6NG |
| "DAMAGE CONTROL DIAGRAM" | 10MG | Compartment numbers | 6NG |
| Diagram number | 36LG | Fitting numbers | 6NG |
| Diagram name | 14MG | Small deck titles (at upper and lower deck edge levels) | 10MG |
| Lower title block: "PREPARED BY" | 8NG | Titles-deck, enlarged view | 18MG |
| Activity | 12MG | "KEY" | 12MG |
| "FOR" | 8NG | Description (key) | 6NG |
| "NAVAL SHIP ENGINEERING CENTER" | 12MG | "NOTE" | 12MG |
| Date | 8NG | Description (note) | 6NG |
| Scale | 6NG | Notes (miscellaneous and references) | 6NG |
| "OVERHAUL ACTIVITY CORRECT MASTER PLASTICS" | 8NG | Capacities (list and trim figures) | 8NG |
| | | NAVSHIPS NO. | 6NG |

4.4.2.11 Klrtype (alternate to printing process). The following varityper fonts and headliner typemasters may be used for the corresponding size and style of printing process:

- (a) 6NG - Varityper font - 2000-6C - Copper plate Gothic.
- (b) 8NG - Varityper font - 660-8C - Sans Serif medium.
- (c) 10MG - Varityper font - 670-12A - Sans Serif bold.
- (d) 12MG - Headliner typemaster - V12-121 - News Gothic.
- (e) 14MG - Headliner typemaster - V14-121 - News Gothic.
- (f) 18MG - Headliner typemaster - V18-121 - News Gothic.
- (g) 24LG - Headliner typemaster - V24-121 - News Gothic.
- (h) 36LG - Headliner typemaster - V36-121 - News Gothic.

4.4.2.11.1 Equipment required. The equipment required shall be as follows:

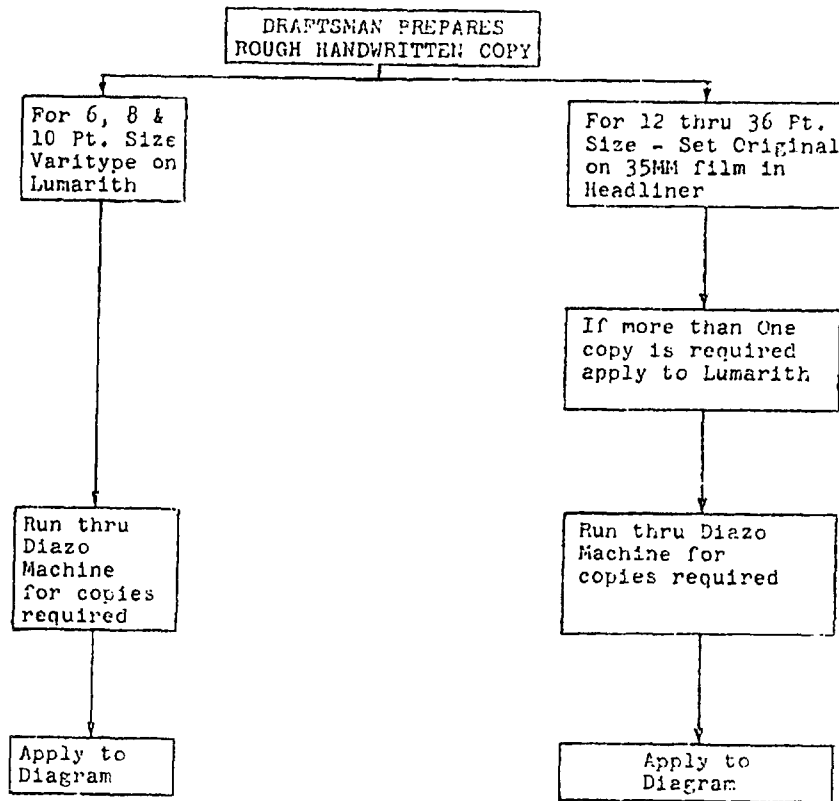
- (a) Varityper model 704, or equivalent.
- (b) Headliner model 860, or equivalent.
- (c) Diazo machine - Most yards have dry type ammonia developing machines in their blue print rooms.

4.4.2.11.2 Material required. The material required shall be as follows:

- (a) Cellulose acetate film, 1.5 mil (Lumarith P912A78).
- (b) Diazo sensitized adhesive backed dri-print film .002 matte surface (Mylar) Dietzgen GF247-E-8-1/2 by 11 inches.
- (c) 35 mm printing film, plain.
- (d) Varityper ribbon number 1900.
- (e) Fonts for varityper.
- (f) Typemasters for headliner.
- (g) Headliner developing powder and hypo fixer.
- (h) Backing sheet Varityper paper 1111 or 1202.

4.4.2.11.3 Processing. Figure 6 is the flow chart for preparation of Klrtype by Varityper or Headliner methods.

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Figure 6 - Flow chart for preparation of Klrtype.

4.4.2.12 Klrtype (shading). Klrtype for bulkhead shading shall be solid red.

4.4.2.13 Klrtype (liquid loading diagram). Klrtype for liquid loading diagram shall be 85 lines per inch - 20 percent or 65 lines per inch - 40 percent halftone solid area or striped, as required. The stripes shall be approximately 1/16 inch wide with approximately 1/16 inch spaces in between.

4.4.2.14 Klrtype (symbols). Symbols for all diagrams shall be Klrtype. Symbols shown in table III shall be used on damage control diagrams. The Commander, Philadelphia Naval Shipyard, will furnish a sample sheet of all symbols upon request.

4.4.2.15 Title and key. Title block, key, symbols and other identification shall be provided on the right hand side of the diagrams. They shall be similar in location, format and layout to those in the type book.

4.4.3 Final "Ship's Master Copy Plastics". Upon completion of the work on the "Ship's Master Copy Plastics", a new set of "Ship's Master Copy Plastics" without Klrtype shall be prepared. Upon completion, the original plastics with Klrtype shall be destroyed. The "Ship's Master Copy Plastics" shall be legible and the weight of lines, the symbols, letters and numbers shall conform to this standard.

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Table III - Symbols

| Symbol | Symbol key | Symbol | Symbol key |
|--------|---|--------|--|
| | Air escape return bend | | Eductor (jet pump)--flow is in direction of apex |
| | Arch or opening | | Fan having controller in another compartment |
| | Bilge or drainage suction | | Fan having controller in the same compartment |
| | Bulkhead penetration | | Filter |
| | Ballast connection (on Liquid Loading Diagram) | | Foam proportioner (shaded portion is outlet) |
| | Coolers and coils | | Foam proportioner turbine pump (shaded portion is discharge) |
| | Compressor, air | | Hatch |
| | Cylinder or tank, air | | Hatch (operable from above and below) |
| | Deck drain | | Hatchway |
| | Deck drain valve | | Hatch with scuttle |
| | Door, fumetight or nontight | | Hose connection or drain pipe with cap |
| | Door, quick-acting fume-tight or nontight | | Hose valve or fire plug |
| | Door, quick-acting water-tight or airtight (weight of bulkhead line indicates type of door) | | Jackbox (figure indicates number of jacks) |
| | Door, watertight or airtight (weight of bulkhead line indicates type of door) | | Manhole |
| | | | Valves in manifold |

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





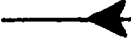


Table III - Symbols (Cont'd)

| Symbol | Symbol key | Symbol | Symbol key |
|---|--|---|--|
|  | Valves (interlocking) in manifold |  | Sounding tube with valve (figure indicates compartment sounded and valve number) |
|  | Meter |  | Spectacle flange |
|  | Overboard discharge connection for portable pump |  | Valve check (includes all check valves not having external means of positioning the disk). Shaded portion is outlet. |
|  | Pump (shaded portion is discharge) (function and number should be indicated on diagram as follows: F & B #1 (adjacent to pump) F & B = Fire and Bilge (in key) |  | Valves, mechanically interlocked (Valve not in system being shown on plate is to be numbered without prefix letter but shall have a referred to key note giving its system and function) |
|  | Remote control station (figures indicate valve, fan, or fitting operated) |  | Valve, pressure reducing. The change in pressure between the intake and discharge sides shall be noted at the valve. (Shaded portion is outlet) |
|  | Scupper or overflow discharge connection |  | Valve regulator |
|  | Scuttle, dogged type |  | Valve, pressure relief or spring loaded check valve (shaded portion is outlet) |
|  | Scuttle, passing, in door |  | Valve, remotely operated |
|  | Scuttle, passing, (P. S. with scuttle number) |  | Valve, remotely operated and change of system |
|  | Scuttle, quick-acting | | |
|  | Sea Chest | | |
|  | Sounding tube with cap or sounding tube deck plate (figure indicates compartment sounded) | | |

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Table III - Symbols (Cont'd)

| Symbol | Symbol key | Symbol | Symbol key |
|---|--|--|--|
|  | Valve, spring loaded lift check (shaded portion is outlet) |  | Ventilation damper (mechanically operated) |
|  | Valve - denotes change from one system to another |  | Ventilation damper (operated from adjoining compartment on same deck level) |
|  | Valve (see text for size and type) |  | Washdown spray nozzle. Flow is in direction of apex. |
|  | Ventilation closure fitting (flow is in direction of apex) |  | Direction of flow shall be indicated in a line, adjacent to valve, when check feature is included with valve. It shall also be indicated in a line when no valve exists and flow is only in one direction. |
|  | Ventilation closure fitting, remotely operated from station on another deck or separated by one or more compartments | | |
|  | Ventilation closure fitting remotely operated from adjoining compartment on same deck level | | |

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5. DETAIL REQUIREMENTS FOR DIAGRAMS

5.1 Liquid loading diagram.

5.1.1 General requirements. Liquid loading diagram shall be prepared in accordance with figure 7. It shall consist of a composite plan view of the ship showing all tanks and voids in which liquids are carried or which are fitted for carrying liquids. Upper levels, on which only a few minor tanks exist, may be omitted. Where the composite view would not indicate clearly the full extent or the boundary of a tank, more than one view will be necessary. In addition, the tanks which are on upper levels shall be shown off to one side. No subdivision, other than tank boundaries and main transverse bulkheads in way of tanks, is required.

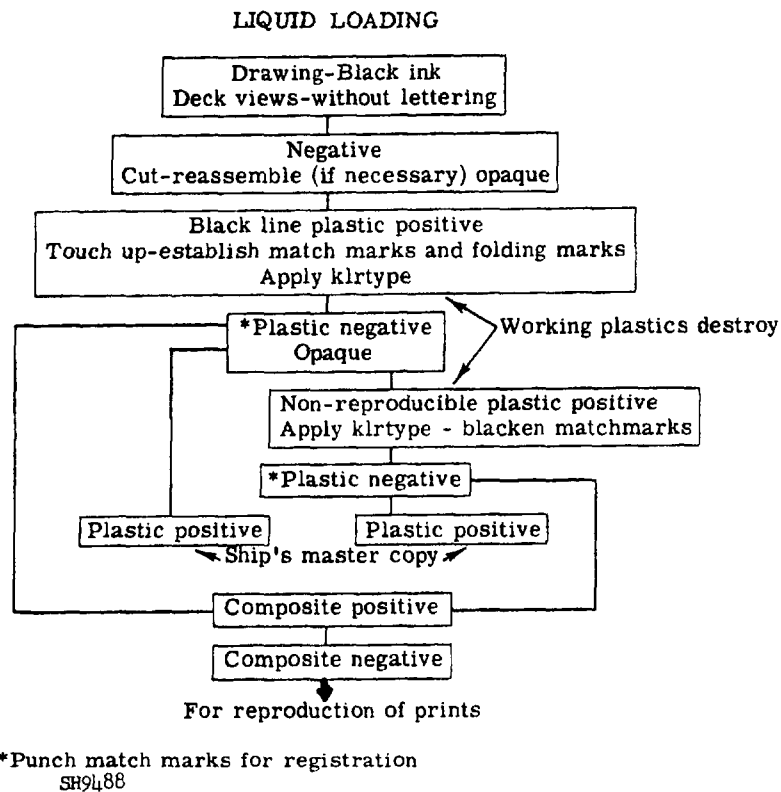


Figure 7 - Flow chart for preparation of liquid loading diagram on plastic.

5.1.1.1 Frame numbers. Frame numbers shall be shown horizontally at bottom of all transverse bulkheads.

5.1.1.2 Compartment numbers. Compartment numbers shall be indicated in the center of the compartment. If necessary, the number may be placed outside with an indicating line.

5.1.2 Compartment information. A figure shall be shown in each of the four corners of the tank as follows:

- (a) Upper left. Capacity of tank in tons. This capacity shall be 95 percent full for oil tanks, and 100 percent full for fresh water tanks. For ballast tanks or voids fitted for ballasting, the weight of sea water, 100 percent full shall be shown except that when ballasting of voids with fresh water is specified, the weight of fresh water shall be used. Figures for lube oil tanks for ship's own use, and day tanks, shall not be shown. Gravity filled tanks shall be filled to the normal operating water line.

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- (b) Upper right. Change in list, caused by filling tank to above capacity, to nearest 0.1 degree.
- (c) Lower left. Change in draft, aft, to nearest inch, caused by filling tank to capacity.
- (d) Lower right. Change in draft forward, to nearest inch, caused by filling tank to capacity.













5.1.3 List and trim figures. Figures for change of list and trim shall be based on figures of moment to trim, moment to heel, tons per inch immersion, and position of longitudinal center to flotation as furnished by NAVSEC.

5.1.4 Liquid loading instructions. Liquid loading instructions, as furnished by NAVSEC, shall appear on the liquid loading diagram.

5.1.5 Key. A key shall be provided on the diagram to indicate the significance of the patterns used; the symbol for tanks having ballasting connections, and convention used for showing capacity, change in list, and change in drafts.

5.1.6 Patterns for various tanks. patterns to be used for various tanks shall be as shown in table IV. The patterns for the "Key" shall be on the same plastic as the patterns in the tanks. The Commander, Philadelphia Naval Shipyard (Code 243) will furnish sample sheet upon request.

Table IV - Klrtype patterns.

| Description | Pattern | For | Description | Pattern | For |
|--|---|---|--|---|---------------------------------------|
| 40 percent half-tone |  | Fuel oil tanks to be ballasted | 20 percent striped half-tone |  | Fresh water |
| 20 percent half-tone 40 percent half-tone |  | JP-5 tanks to be ballasted | 20 percent striped half-tone |  | Reserve feed water |
| 40 percent half-tone 20 percent striped half-tone |  | Ballast tanks not required to be ballasted | 20 percent striped half-tone |  | Fuel oil not required to be ballasted |
| 40 percent half-tone 20 percent striped half-tone |  | Ballast tanks to be ballasted when operating under limiting draft | 20 percent half-tone 40 percent half-tone |  | JP-5 not required to be ballasted |
| 20 percent striped half-tone 20 percent striped half-tone |  | Spare for special uses | 20 percent striped half-tone 20 percent half-tone |  | Gasoline |
| 20 percent half-tone 20 percent striped half-tone |  | Spare for special uses | 20 percent striped half-tone 20 percent half-tone |  | Void or peak tanks |

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5.1.6.1 Additional patterns. Additional patterns may be required when the liquid loading instructions specify the sequence for draining tanks or ballasting, in which case the spares shown in table IV shall be used.

5.1.7 Compartment names. The compartment names shall be shown outside of the ship's structure for fuel oil, and JP-5 overflows, contaminated oil, and service tanks, in addition to the required patterns.

5.1.8 Compartments with ballast connections. Compartments with ballast connections shall be designated by a small solid black triangle within the compartment.

5.2 Cross curves of stability. The original drawing shall be as follows:

- (a) On form 9881-1 (see table IX). If additional space is necessary, due to variation in scale of righting arm, and the form sheet is not long enough, the drawing may be prepared on tracing cloth. In this case, the length may be increased overall by increments of 6-1/2 inches.

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- (b) Margins shall be 1-1/2 inches on left side for binding, 1/4 inch at top and right side, 1 inch at bottom.
- (c) Prepare from NAVSEC cross curves and abbreviate to cover range of operating displacements.
- (d) Scale of righting arms shall be 1 inch equals 1 foot, if practicable.
- (e) The axis assumed, in preparing the cross curves, shall appear on the drawing.

5.3 Draft diagram and function of form. The original drawing shall be as follows:

- (a) On form 9881-1 (see table IX). If additional space is necessary, and the form is not long enough, the drawing may be prepared on tracing cloth. In this case the length may be increased overall by increments of 6-1/2 inches.
- (b) Margins shall be 1-1/2 inches on left side for binding, 1/4 inch at top and right side, 1 inch at bottom.
- (c) Any convenient scale may be used both horizontally and vertically.

5.3.1 Draft marks and locus of longitudinal center of flotation. Draft marks and locus of longitudinal center of flotation shall be as follows:

- (a) All draft marks and locus of longitudinal center of flotation shall be shown for even keel drafts in their proper relative positions on a contracted longitudinal scale, together with scales for the following functions:
 - (1) Displacement in sea water.
 - (2) Transverse metacenter above keel.
 - (3) Moment to trim 1-inch.
 - (4) Tons per inch immersion.
 - (5) Longitudinal center of buoyancy.
- (b) Arabic or Roman numerals shall be used for draft marks, to correspond to figures on the ship. Draft scales shall be subdivided at half-foot intervals. Forward draft marks shall be shown at the right of the diagram and after draft marks at the left. Midship draft marks may be omitted if they conflict with other scales.

5.3.2 Displacement scales. Displacement scales shall be located along left side of longitudinal center of flotation, and scale for transverse metacenter along right side. Scale for moment to trim 1-inch shall be plotted along a vertical line between displacement and after draft marks. Scales for tons per inch immersion shall be plotted along a vertical line to the right of the transverse metacenter scale. The longitudinal center of buoyancy shall be plotted to the left of the forward draft marks. Curve representing longitudinal center of flotation shall be so labeled and a scale provided at the bottom of the diagram to indicate its distance from the midship perpendicular. Each scale shall be plotted so that values of functions, read on a horizontal line at any draft, will correspond to values shown on the ship's curves of form (or displacement and other curves) for that draft. Scales for all functions shall be plotted for range of operating drafts. Scales for forward and after drafts shall extend 3-feet above and below scales of the functions to allow for trim. Light horizontal lines shall be drawn connecting forward and after draft marks at each foot of draft within range of the other scales.

5.3.3 Notes. The following note shall appear on the diagram: "Displacement and transverse metacenter are read directly at point where a straight line connecting drafts forward and aft crosses these scales. Other functions are read on a horizontal line through this point."

5.4 Subdivision and system diagrams.

5.4.1 General requirements. All compartments (including trunks, hoists and elevators) shall be shown, labeled and numbered. Intersections of main transverse watertight and airtight bulkheads with shell shall be shown by solid lines. Hidden boundaries shall be shown, only to clarify location of access, by a dotted line.

5.4.1.1 Fittings. All fittings shall be shown in their true location. They shall be shown solid where visible and dotted where hidden.

5.4.1.2 Frame numbers. Frame numbers shall be shown horizontally at the upper edge of all transverse watertight and oiltight bulkheads below the main deck. Frame numbers shall be shown, at approximately every 10 frames or closer, on and above the main deck.

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5.4.1.3 Fire-zone bulkheads. The letters FZ shall be shown horizontally at the upper edge of all transverse fire-zone bulkheads.

5.4.1.4 Damage control deck. The fore and aft extent of the damage control deck shall be shown below the deck title on the applicable subdivision diagram.

5.4.1.5 Lines, lettering and symbols. Lines, lettering and symbols shall be not closer than 1/16 inch to the item.

5.4.1.6 Deck labeling. Each deck shall be labeled at forward end only. Each intersection of deck or platform shall be labeled at the forward and after ends. A line with an arrow head shall point to the intersection.

5.4.1.7 Security classification. Damage control diagrams are either "Unclassified" or "Confidential". For damage control diagrams that are classified "Confidential", the word "CONFIDENTIAL" shall be shown as follows:

- (a) For all diagrams:
- (1) In the upper right hand corner, inside of border line, to the right of the overhaul block.
 - (2) In the lower left hand corner, inside of border line.
 - (3) On each damage control plastic and print, outside of the cutting line.

5.4.2 Subdivision diagrams.

5.4.2.1 General requirements. Subdivision diagrams shall be prepared in accordance with figure 8.

5.4.2.1.1 Deck level layouts. One layout of all levels is preferable. In any case, the number shall be kept to a minimum. For each level, all bulkheads, doors, hatches, manholes, scuttles, arches and ladders shall be shown.

5.4.2.1.2 Grating levels. Grating levels shall be indicated by a dot-dash line.

5.4.2.1.3 Decks and platforms. Each deck or platform shall be shown and labeled as a separate level. Compartments extending for two or more decks in height shall be shown as one compartment extending from the lowest level.

5.4.2.1.4 Fitting numbers. All access fittings, except nontight fittings and bolted plate manholes, shall be numbered on the diagram.

5.4.2.1.5 Miscellaneous features. Prominent topside features, such as smoke pipes, stacks, catapults, and masts shall be shown, but not in detail. Gun mounts, directors, missile launches, torpedo tubes, and cranes shall be indicated only by a center line mark. The type and number of the piece of equipment shall be indicated.

5.4.2.1.6 Tightness level. The extent for the tightness level for bulkheads shall be noted on the subdivision diagram, e.g., W.T. 5 feet above deck - A.T. over.

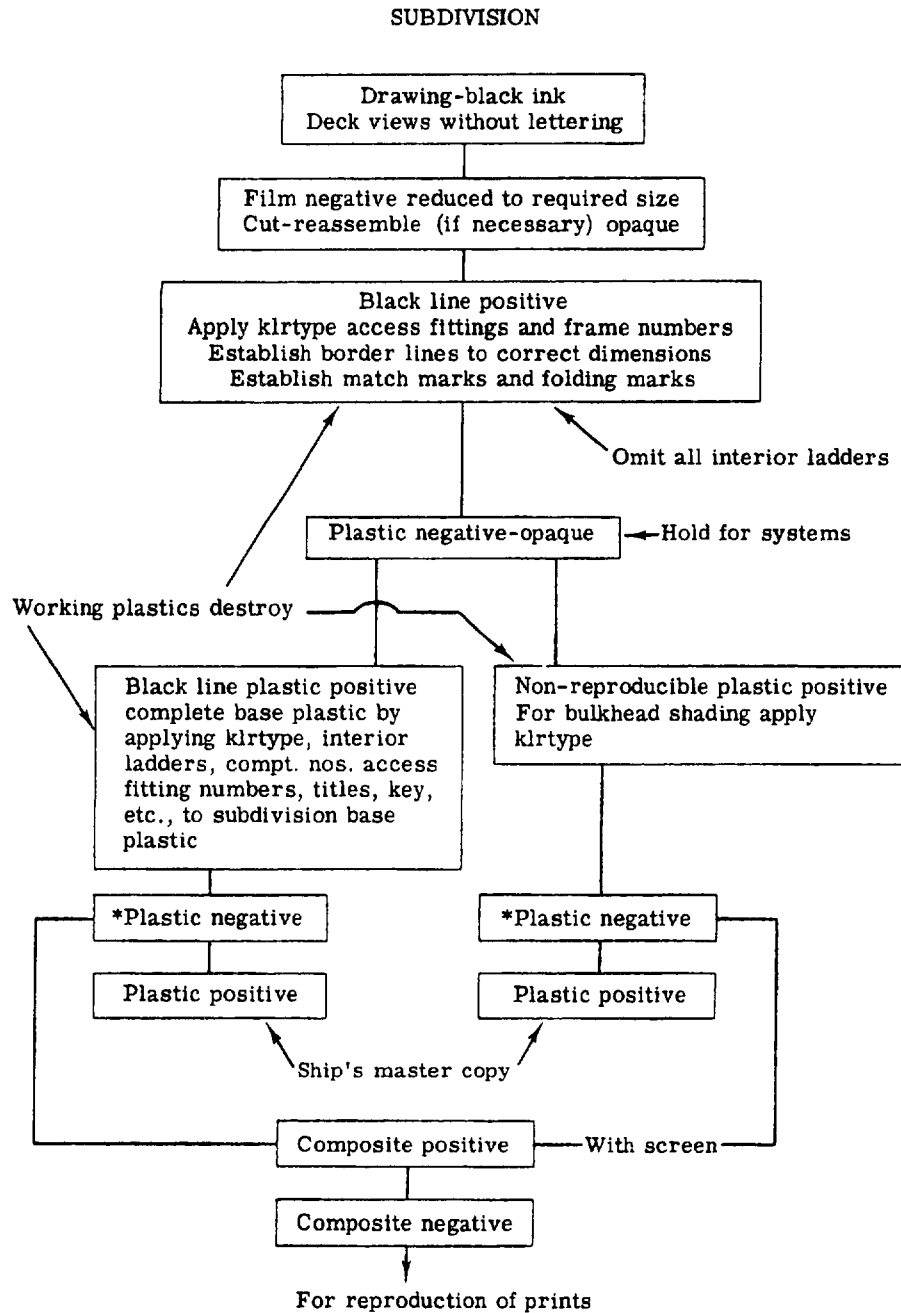
5.4.2.1.7 Compartment numbers. Compartment numbers shall be placed inside the compartment, on the plane of the compartment overhead, at the center and parallel to the transverse bulkhead. Where the compartment is too narrow, the number shall be placed parallel to longitudinal bulkhead. If the compartment is too small, the number shall be shown outside.

5.4.2.1.8 Compartment names. All compartment names shall be placed outside the shell of the ship, at the same angle as transverse bulkheads, with a line and arrow pointing to the outboard bulkhead of the particular compartment.

5.4.2.1.9 Shading. Prepare transverse bulkhead shading plastic. None is required for deck shading. Shading shall be as follows:

- (a) Klrtype shall fit the base.
- (b) Omit Klrtype from doors and arches.

5.4.2.1.10 Titles (underscoring). Titles for damage control, secondary damage control station and repair stations shall be underscored.



*Punch match marks for registration
SH1 0418

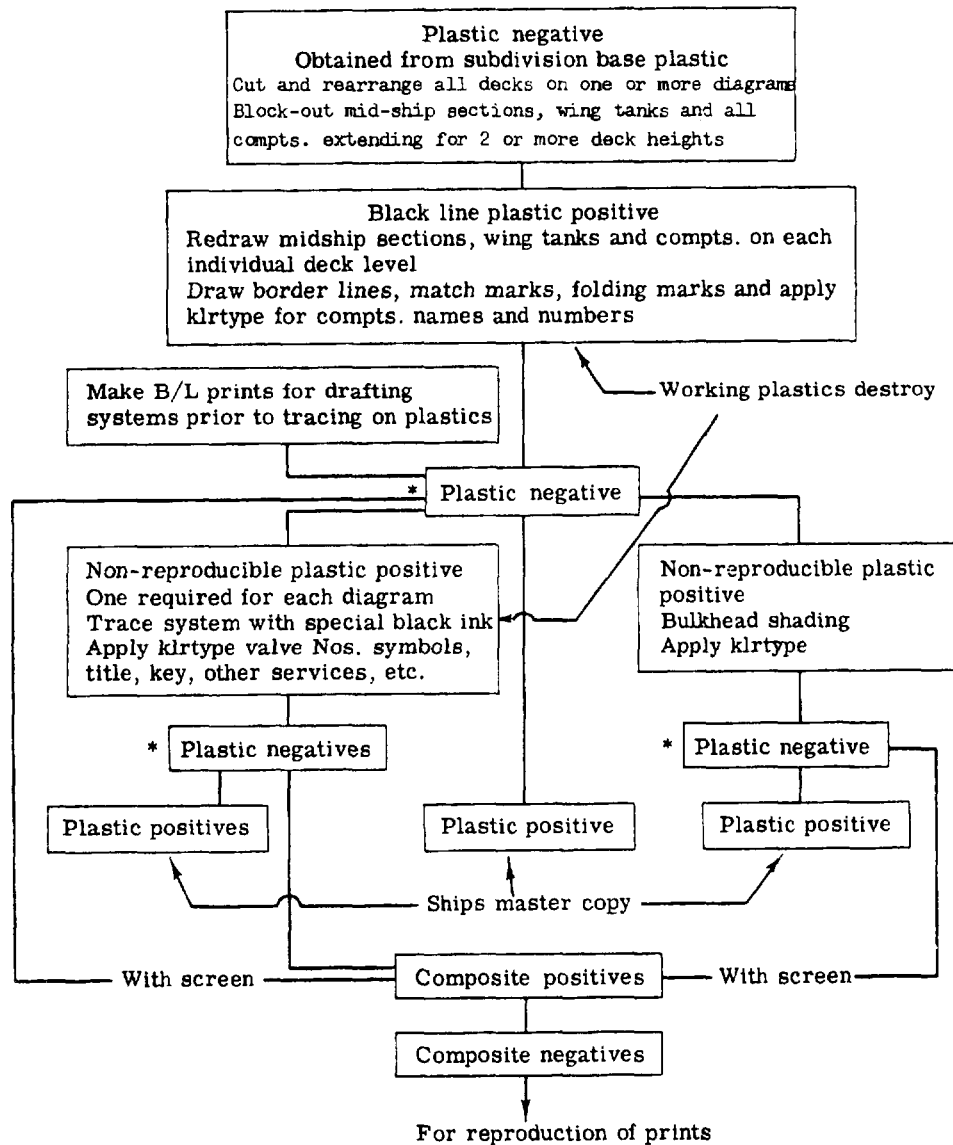
Figure 8 - Flow chart for preparation of subdivision damage control diagrams on plastic.

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5.4.3 System diagrams.

- 5.4.3.1 General requirements. System diagrams shall be prepared in accordance with figure 9. If more than one diagram is required due to congestion, add the letter A, B, C etc. to the diagram number beginning with the lowest level.

PIPING AND VENTILATION SYSTEMS



*Punch match marks for registration
SH9493

Figure 9 - Flow chart for preparation of piping and ventilation systems damage control diagrams on plastic.

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5.4.3.1.1 System base. The system base shall be developed from the subdivision diagram base and shall be used for all systems. It shall contain information that is common to all system diagrams.

5.4.3.1.2 Intermediate levels (no decks). Compartments extending two or more decks in height shall be shown on each deck level. A wavy line shall be shown on each deck level where bulkhead or shell is broken.

5.4.3.1.3 Gratings and partial platforms. Compartments extending two or more decks in height and having gratings and partial platforms, the gratings and platforms shall be shown, by a dot-dash line, with the deck level corresponding to the horizontal level for compartment numbering.

5.4.3.1.4 Enlarged views. Enlarged views shall be shown on the system plastic. No scale or shading is required.

5.4.3.1.5 Compartment names and numbers. All compartment names and numbers shall be placed horizontal and outside the shell. The compartment numbers shall be adjacent to the names and the names shall be listed first. Titles for damage control, secondary damage control station and repair stations shall be underscored.

5.4.3.1.6 Shading. Prepare transverse bulkhead shading plastic. Shading shall be as follows:

- (a) Klrtype shall fit the base.
- (b) Include Klrtype on doors and arches.

5.4.3.1.7 Ducts and piping. Ducts and piping shall be as follows:

- (a) All ducts and piping shall be shown in their true location. Ducts and piping shall be shown solid where visible and dotted where hidden. A jumper shall be shown where ducts and piping cross and are not connected.
- (b) Pierce points where piping and ducts pierce bulkheads.

5.4.3.1.8 Numbers for valves, fittings and notes. Numbers for valves, fittings, and notes shall be as follows:

- (a) All numbers for valves, fittings, and notes pertinent to particular parts of systems, shall be shown. The notes shall be placed as close as possible to the points to which they apply and an indicating line shall connect the note with the point.
- (b) All valve numbers for a particular system shall have a prefix letter on diagram and shall be identified in key as follows:

| | |
|-------------------|-------------------------|
| D Drainage | E Exhaust |
| B Ballasting | R Recirculating |
| F Firemain | F Fuel oil |
| S Sprinkler | T Tank stripping |
| W Washdown | J JP-5 and JP-5 service |
| FM Foam | H Healing and trim |
| H High pressure | G Gasoline |
| M Medium pressure | S Salt water |
| L Low pressure | I Inert gas |
| S Supply | |

These prefix letters (except FPL for fireplugs) are only for identification of the system on the diagram and do not appear on the label plate for the fittings. A note explaining this procedure shall be added to the diagrams. Only one type of valve symbol shall be used for all operated valves.

5.4.3.1.9 Spurs and branches. All spurs and branches, for systems not shown on the individual diagram, shall be shown as far as the first cut-out valve. These spurs and branches shall have a number referring to the key note. The key note shall indicate the applicable system diagram referred to; for example:

1. See firemain system diagram.
2. See fuel system diagram.

These first cut-out valves shall be shown solid as a change in system. No prefix letter is required.

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5.4.3.1.10 Fittings to be omitted. Take-offs to gages, pet cock drains, bleeders, strainers and separators shall not be shown.

5.4.3.1.11 Remote control stations. All remote control stations shall be shown for the systems on the individual diagrams only.

5.4.3.1.12 Continuation line numbers. All continuation line identification numbers shall be preceded by the letter "C"; for example, C1, C2.

5.5 Drainage, ballasting and list control systems.

5.5.1 Main and secondary drainage systems. The diagram shall show the following:

- (a) Piping, pumps, eductors and attached piping, valves and fittings.
- (b) Piping, valves and fittings to which portable pumps or hose may be connected.
- (c) Semi-permanently installed pumps, piping and valves.
- (d) Firemain cut-out valves to eductors shall be shown.

5.5.1.1 Deck drains. Deck drains with valves that empty into tanks or bilge wells that are in turn drained by a pumping system shall be shown. Drains with or without closures in decks and bulkheads from ammunition spaces, handling rooms, cofferdams and miscellaneous spaces (including plumbing deck drains) shall be shown.

5.5.1.2 Overboard discharge connections. Overboard discharge connections shall be shown and numbered.

5.5.1.3 Scuppers. Spaces drained by scuppers shall be indicated by a marginal note at each scupper only when no cut-out valve is provided for the scupper. Complete leads of piping to scuppers shall not be shown.

5.5.1.4 Sounding tube deck plates and sounding tubes with valves. Sounding tube deck plates and sounding tubes with valves for voids, water tanks, and miscellaneous spaces shall be shown.

5.5.1.5 Air escape piping. Air escape piping shall be shown only if it is fitted with operable valves.

5.5.1.6 Plumbing vent valves. Plumbing vent valves shall not be shown, but shall be included in the valve list. The following note shall appear on the diagram:

"For plumbing vent closure fittings, see text."

5.5.2 Ballasting and list control systems. All ballasting and list control systems that are installed primarily for stability control, ballasting or torpedo protection shall be shown, from the sea chest or firemain, where flooding supply is taken to the overboard discharge connection. Piping, valves, fittings, and pumps shall be indicated.

5.6 Tank stripping system. When required a tank stripping system diagram shall be prepared. The diagram shall show all piping, valves, and pumps. This shall include portions of fuel and drainage, if necessary, in order to show a complete system. If, however, the tank stripping system is comprised of 75 percent or more of the fuel or drainage system then the remaining portion of the tank stripping system should be included on those diagrams.

5.7 Firemain, sprinkling, foam and washdown systems.

5.7.1 Firemain systems. The firemain systems diagram shall show the following:

- (a) Firemain piping, valves, fittings, and pumps used for supplying water to sprinkler, foam and washdown systems.
- (b) Branches from firemain system for miscellaneous services, such as flushing system and machinery cooling, shall be shown as far as cut-out valves. The diagram shall specify the exact use of these branches.

5.7.2 Sprinkling systems. Sprinkling systems shall be shown as far as the cut-out valve within the compartment. Where large spaces, such as hanger spaces, are served by several controls, the piping for the areas sprinkled by each valve shall be shown.

5.7.3 Fixed fog nozzle system. The sea water fixed fog nozzle system shall show the piping and valves.

5.7.4 Foam system. The foam system shall show the piping, stations, pumps, proportioners, valves and foam service outlets.

5.7.5 Washdown system. The washdown system shall show the fixed and portable piping, washdown spray nozzles, valves and hose connections. The fixed piping shall be indicated by straight line; the portable piping by wavy line.

5.8 Fuel (Navy special fuel oil/Navy distillate fuel (NSFO/NDF)) filling, transfer and overflow systems.

5.8.1 General requirements. The fuel filling, transfer and overflow systems diagram shall show the following:

- (a) Fuel filling, transfer and overflow piping, valves, fittings and pumps.
- (b) Sounding tube deck plates and sounding tubes with valves.
- (c) Air escapes and vents.

5.9 JP-5 filling, transfer and overflow systems.

5.9.1 General requirements. The JP-5 filling, transfer and overflow systems diagram shall show the following:

- (a) JP-5 filling, transfer, including aviation fuel and de-fueling stations, auxiliary service, and overflow piping, valves, fittings and pumps.
- (b) Sounding tube deck plates and sounding tubes with valves.
- (c) Air escapes and vents.

5.10 Aviation and automotive gasoline systems.

5.10.1 General requirements. The aviation and automotive gasoline systems diagram shall show the following:

- (a) All gasoline stowage tank piping, valves, fittings, pumps, overflows, and sounding tube deck plates, used for fueling and de-fueling. The inert gas system shall be shown from the cofferdam, pipe casing, and purging to first cut-off valve from producer and properly labeled. In the event that the inert gas system is not extensive, the diagram shall be included in with the text.
- (b) Gage cut-out valves.
- (c) Complete sea-water systems and sources of compensating water (firemain or special pumps) and valves. Firemain valves shall be identified.
- (d) Sea water hose connections and the location numbers of the nearest fire plugs to which they may be connected.

5.11 Ventilation systems.

5.11.1 General requirements. The ventilation systems shall be shown on two separate diagrams; one for supply and recirculating systems; the other for exhaust systems. The diagrams shall show the following:

- (a) All ducts within the ship through which water, gas, smoke, or fire may enter the ship or pass from one compartment to another. This includes all ducts installed between the weather and watertight compartments, and all ducts of recirculating systems, that pierce bulkheads. Only one spur shall be shown in a compartment even though two or more terminals are provided.
- (b) All ventilation closure fittings, fans, and distant operation stations.
- (c) All mechanically operated fire zone dampers.
- (d) Remote operations of ventilation closures, and fan controllers.
- (e) Fans without any ductwork piercing bulkheads shall not be shown.

5.12 Chilled water system.

5.12.1 General requirements. The chilled water system diagram shall show the following:

- (a) Piping, valves, fittings and pumps used for supplying chilled water to unit coolers and coils.
- (b) Branches from the unit coolers and coils shall be shown into the compartments served. A triangular symbol shall be used to represent the coolers and coils.

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5.13 Compressed air systems.

5.13.1 General requirements. The compressed air systems diagram shall show the following:

(a) Compressors, air cylinders, piping, valves and fittings.

5.13.2 Branches.

5.13.2.1 Branches (off main). Branches shall be shown up to the service outlet and properly labeled. Strainers, separators, and gages shall not be shown.

5.13.2.2 Branches (starting air). Branches that are used for starting air on diesel-electric or diesel-driven ships, shall be shown up to the engines.

5.13.3 Pressure indication. Pressures shall be indicated as follows on the compressed air systems diagram:

- (a) High pressure (over 1000 p.s.i.).
- (b) Medium pressure (150 p.s.i. to 1000 p.s.i.).
- (c) Low pressure (below 150 p.s.i.).

5.14 Oxygen and nitrogen systems.

5.14.1 General requirements. The oxygen and nitrogen systems diagram shall show the following:

(a) All oxygen and nitrogen stowage tanks, piping, valves, fittings, compressors, and pumps used for producing and supplying oxygen and nitrogen.

5.15 Voice and pneumatic tubes and message passing facilities. The diagrams for voice and pneumatic tubes, and message passing facilities, shall be prepared on form 9881-1 (see table IX). The diagrams shall show runs of the tubes between terminals of voice tubes, pneumatic tubes, and the location of message passing scuttles.

6. REQUIREMENTS FOR TEXT AND TABLES

6.1 General requirements. The text and tables shall be prepared to supplement the diagrams and shall be in complete agreement with the diagrams. Text and tables shall include the following:

- (a) A list of valves shall follow the text for each system. Valves shall be listed beginning with the lowest deck, reading forward to aft, and ending on the highest deck. Remote control valves for piping systems shall be identified by a symbol outside the left-hand border line. The type of operation for remote control valves shall be included in the "Size and Type" column; for example "3 Gate-Elect."
- (b) Remote control location for ventilation fans and closure fittings shall be included in the "Location" column, for example, "controlled from 3-18-1-A."
- (c) Where compartments are mentioned in the valve lists, the number shall be listed first and the name below it.
- (d) Closure classification letters, as finally accepted, shall be included in the tables. The column headed "Division Responsible" shall be left blank.

6.2 Text and table contents.

6.2.1 Principal characteristics. Ship characteristics shall be listed, such as length overall, length between perpendiculars, extreme breadth, molded depth at side to main deck, frame spacing, main engines, propeller and armament data.

6.2.2 Shoring. This section shall be similar to that in the type book.

6.2.3 Steering gear. A brief description of steering gear and a list of locations of steering stations shall be included in this section.

6.2.4 Towing. The text shall contain a brief description of towing equipment onboard ship.

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6.2.5 Ammunition and missile handling. The text shall contain a brief description of ammunition and missile handling.

6.2.6 Medical. Text shall contain a brief description of the facilities, including number and location of medical storerooms, battle dressing stations, and surgical spaces. The total quantity of first-aid boxes, portable medical lockers, and medical supply lockers shall be stated. Locations are not required.

6.2.7 Personnel protection. The text shall contain a brief description of decontamination stations, including equipment available, such as protective clothing and gas masks. Only the equipment stowed shall be listed.

6.2.8 Aircraft launching and handling. The text shall contain a brief description of aircraft launching and handling gear including nonmanned craft such as "DASH."

6.3 Stability and loading section. Part II(a) of the text shall be based on the latest weight estimates or inclining experiment data and conform to these requirements.

6.3.1 Introduction. The introduction shall recommend the study of "Damage Control", as set forth in Chapter 9880, Section I, of Naval Ships Technical Manual (NAVSHIPS 0901-881-0002). Information on stability and loading in the damage control book is intended to show the specific application of information in that publication to the particular ship or class of ships. A general discussion of the stability characteristics shall be included and, if possible, broad statements shall be made to define conditions under which stability will not be critical or conditions under which stability will not be adequate. Any outstanding or unusual conditions applicable to the ship shall be noted.

6.3.2 Stability provided.

6.3.2.1 Factors affecting required stability. Under this heading, the considerations upon which "required stability" is based shall be outlined. Only those hazards which are significant for the ship under discussion shall be included. Possible hazards are flooding, wind, high speed turning, lifting weights, heel due to passengers, and icing of topsides.

6.3.2.2 Curves of statical stability (intact). A sketch shall be included showing the curves of statical stability for the Light Condition, Full Load Condition and Minimum Operating or Optimum Battle Condition. Curves for other conditions shall be added if they are of particular importance for the ship under consideration. A brief discussion of the significance of these curves shall be given.

6.3.2.3 Heeling effect of beam winds, turning, etc. The heeling effect of beam winds shall be illustrated by a sketch showing the statical stability curve for the least favorable loaded condition, together with the heeling arms produced by a beam wind as specified by tables V and VI. This sketch may be omitted if the heeling effect is so small, in relation to the righting arms, that beam winds are not important, in which case a statement to this effect shall be made. The area between the righting arm curve and the heeling arm curve for the specified wind shall be cross hatched and a statement included to indicate that this area is a measure of the residual dynamic stability for the specified beam wind. If the effect of this beam wind is considered to be dangerous in the least favorable condition of load, the curve of wind heeling arms shall be drawn for the maximum beam wind velocity which the ship can safely withstand, and the limitations of the ship with respect to beam winds shall be discussed with particular reference to the possibility of higher acceptable beam wind velocity in the more favorable conditions of load. Additional sketches shall be shown as necessary to illustrate the discussion. If there are other influences which might produce a relatively large heeling arm for the ship under consideration, such as high speed turning, lifting weights, or movement of passengers, each shall be discussed in a separate paragraph. The discussion shall be generally similar to that described for beam winds, illustrated by statical stability and heeling arm curves.

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Table V - Wind velocities.

| Service | Minimum wind velocity for design purposes, knots | Minimum acceptable wind velocity in service, knots |
|---|--|--|
| <u>Ocean</u> | | |
| (a) Ships which must be expected to weather full force of tropical cyclones. This includes all ships which will move with the amphibious and striking forces. | 100 | 90 |
| (b) Ships which will be expected to avoid centers of tropical disturbances. | 80 | 70 |
| <u>Coastwise</u> | | |
| (a) Ships which will be expected to weather full force of tropical cyclones. | 100 | 90 |
| (b) Ships which will be expected to avoid centers of tropical disturbances but to stay at sea under all other circumstances of weather. | 80 | 70 |
| (c) Ships which will be recalled to protected anchorages if winds over force 8 are expected. | 60 | 50 |
| <u>Harbor</u> | 60 | 50 |

Table VI - Heeling moments (foot-tons) per square foot for a nominal 100-knot-wind.

| Height above WL, ft. | Center of lateral resistance below waterline, foot | | | | | | | | | | | | | | | | | | |
|----------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
| 0- 5 | 0.04 | 0.05 | 0.06 | 0.07 | 0.07 | 0.08 | 0.09 | 0.10 | 0.11 | 0.11 | 0.12 | 0.13 | 0.14 | 0.15 | 0.16 | 0.17 | 0.18 | 0.19 | |
| 5- 10 | 0.11 | 0.12 | 0.14 | 0.15 | 0.16 | 0.18 | 0.19 | 0.20 | 0.20 | 0.22 | 0.23 | 0.24 | 0.26 | 0.27 | 0.28 | 0.29 | 0.31 | 0.32 | |
| 10- 15 | 0.20 | 0.21 | 0.23 | 0.24 | 0.26 | 0.27 | 0.29 | 0.30 | 0.32 | 0.33 | 0.34 | 0.35 | 0.37 | 0.38 | 0.40 | 0.41 | 0.43 | 0.44 | |
| 15- 20 | 0.30 | 0.32 | 0.33 | 0.34 | 0.36 | 0.37 | 0.39 | 0.41 | 0.42 | 0.44 | 0.45 | 0.46 | 0.48 | 0.49 | 0.51 | 0.53 | 0.54 | 0.56 | |
| 20- 25 | 0.40 | 0.41 | 0.43 | 0.45 | 0.46 | 0.47 | 0.49 | 0.51 | 0.53 | 0.54 | 0.56 | 0.58 | 0.60 | 0.60 | 0.62 | 0.64 | 0.66 | 0.67 | |
| 25- 30 | 0.50 | 0.52 | 0.54 | 0.55 | 0.57 | 0.59 | 0.60 | 0.62 | 0.64 | 0.65 | 0.67 | 0.69 | 0.71 | 0.73 | 0.74 | 0.75 | 0.77 | 0.79 | |
| 30- 35 | 0.61 | 0.62 | 0.64 | 0.66 | 0.68 | 0.70 | 0.72 | 0.73 | 0.75 | 0.77 | 0.79 | 0.80 | 0.82 | 0.84 | 0.86 | 0.87 | 0.89 | 0.91 | |
| 35- 40 | 0.72 | 0.73 | 0.75 | 0.77 | 0.79 | 0.81 | 0.83 | 0.85 | 0.86 | 0.88 | 0.90 | 0.92 | 0.94 | 0.96 | 0.98 | 1.00 | 1.01 | 1.03 | |
| 40- 45 | 0.83 | 0.85 | 0.86 | 0.88 | 0.90 | 0.92 | 0.94 | 0.96 | 0.98 | 0.99 | 1.01 | 1.03 | 1.05 | 1.07 | 1.09 | 1.11 | 1.13 | 1.15 | |
| 45- 50 | 0.95 | 0.97 | 0.98 | 1.00 | 1.02 | 1.04 | 1.06 | 1.08 | 1.10 | 1.12 | 1.13 | 1.15 | 1.18 | 1.20 | 1.22 | 1.24 | 1.26 | 1.27 | |
| 50- 55 | 1.06 | 1.08 | 1.10 | 1.12 | 1.14 | 1.16 | 1.18 | 1.20 | 1.22 | 1.24 | 1.26 | 1.27 | 1.30 | 1.31 | 1.34 | 1.36 | 1.38 | 1.40 | |
| 55- 60 | 1.18 | 1.20 | 1.22 | 1.24 | 1.26 | 1.27 | 1.30 | 1.32 | 1.34 | 1.36 | 1.38 | 1.39 | 1.41 | 1.43 | 1.46 | 1.48 | 1.50 | 1.52 | |
| 60- 65 | 1.30 | 1.32 | 1.34 | 1.36 | 1.38 | 1.39 | 1.41 | 1.44 | 1.46 | 1.48 | 1.50 | 1.52 | 1.53 | 1.56 | 1.58 | 1.60 | 1.62 | 1.64 | |
| 65- 70 | 1.41 | 1.44 | 1.46 | 1.48 | 1.50 | 1.52 | 1.54 | 1.56 | 1.58 | 1.60 | 1.62 | 1.65 | 1.66 | 1.68 | 1.70 | 1.72 | 1.75 | 1.77 | |
| 70- 75 | 1.54 | 1.56 | 1.58 | 1.60 | 1.62 | 1.65 | 1.66 | 1.68 | 1.70 | 1.73 | 1.75 | 1.77 | 1.79 | 1.80 | 1.83 | 1.85 | 1.87 | 1.89 | |
| 75- 80 | 1.66 | 1.67 | 1.70 | 1.72 | 1.74 | 1.76 | 1.79 | 1.80 | 1.82 | 1.84 | 1.87 | 1.89 | 1.91 | 1.93 | 1.95 | 1.97 | 1.99 | 2.01 | |
| 80- 85 | 1.79 | 1.80 | 1.82 | 1.84 | 1.87 | 1.89 | 1.91 | 1.93 | 1.95 | 1.97 | 1.99 | 2.02 | 2.04 | 2.06 | 2.07 | 2.10 | 2.12 | 2.14 | |
| 85- 90 | 1.91 | 1.92 | 1.94 | 1.96 | 1.99 | 2.01 | 2.03 | 2.06 | 2.07 | 2.09 | 2.11 | 2.14 | 2.16 | 2.18 | 2.20 | 2.22 | 2.24 | 2.26 | |
| 90- 95 | 2.02 | 2.05 | 2.06 | 2.08 | 2.11 | 2.13 | 2.15 | 2.18 | 2.19 | 2.21 | 2.23 | 2.26 | 2.28 | 2.30 | 2.32 | 2.34 | 2.36 | 2.39 | |
| 95-100 | 2.14 | 2.17 | 2.18 | 2.20 | 2.23 | 2.25 | 2.27 | 2.29 | 2.32 | 2.33 | 2.35 | 2.38 | 2.40 | 2.42 | 2.45 | 2.46 | 2.48 | 2.51 | |

NOTE: To obtain the total heeling moment from this table, procedure is as follows:

- Divide sail area into 5-foot layers, starting from waterline.
- Determine number of square feet in each layer.
- Multiply area of each layer by appropriate figure from table and add products. This is heeling moment for a 100-knot wind.
- For wind velocities other than 100 knots, multiply moment by $(V/100)^2$.

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6.3.2.4 Curves of statical stability after extensive damage. A statement shall be included to indicate the approximate extent of damage and flooding which the ship may be expected to survive provided instructions regarding ballasting and limiting drafts are followed. Statical stability curves shall be provided to illustrate the righting arms after such damage for the critical flooding case in the Minimum Operating Condition or Optimum Battle Condition and the Full Load Condition, together with the corresponding curves for the intact ship. Similar curves for other conditions of loading shall be included if they are of particular significance. Curves of righting arms in the damaged conditions shall be as realistic as possible, including such factors as probable unsymmetrical flooding. This information will be furnished by NAVSEC as soon as requested.

6.3.3 Measures to safeguard stability.

6.3.3.1 Liquid loading instructions. The liquid loading instructions for the ship under consideration shall be given in detail together with the reasons for the specified procedure, or reference shall be made to the liquid loading instructions given on the liquid loading diagram.

6.3.3.2 Precautions to be taken against cross-connection of tanks. A warning against cross-connecting tanks on opposite sides of the ship, either by connecting port and starboard tanks to the same system at the same time or through open sluice valves, shall be included. The danger of such cross-connection, i.e., the aggravation of any list which may develop, and the difficulty of detecting this condition shall be brought out.

6.3.3.3 Watertight integrity. It shall be pointed out that the proper maintenance of watertight integrity, as provided in the design of the ship, is essential in developing full resistance to underwater damage, and is the responsibility of the Commanding Officer. Reference shall be made to the Naval Ships Technical Manual, NAVSHIPS 0901-290-0002 for information on the established procedure for maintenance of watertight integrity. An inboard profile with plan views, if necessary, shall be included in the text, indicating by heavy lines the main transverse subdivision of the ship, with particular attention to stepped bulkheads and the level to which the bulkheads are watertight. An appropriate discussion of this sketch shall be included, stressing the importance of keeping these bulkheads tight.

6.3.4 Minimum acceptable stability. The type of hazard, such as underwater damage, wind, etc. which governs the minimum acceptable stability in normal operation shall be discussed. Where applicable, a curve shall be included to indicate the maximum allowable height of the ship's center of gravity (which will be furnished by NAVSEC on request) for displacement within the normal operating range, at which the ship will have acceptable stability characteristics with respect to the most critical hazards. This shall be followed by a discussion of limitations in loading imposed by less critical but more prevalent hazards in order to permit the Commanding Officer to use sound judgment in exceeding the allowable height of center of gravity under conditions where the desirability of carrying unusual loads may justify accepting the risk of the more critical hazards.

6.3.4.1 Procedure after damage. It shall be pointed out that strict adherence to the liquid loading instructions prior to damage will be of great value after damage. Reference shall be made to the general instructions on this subject in Naval Ships Technical Manual, Section I, NAVSHIPS 0901-881-0002 and these instructions expanded to apply to the individual ship. Complete and detailed instructions shall be included, covering the action to be taken after damage and methods of evaluating the situation. The following aspects of the problem shall be included in the discussion:

- (a) Establishing flooding boundaries.
- (b) Preventing progressive flooding through nontight structure, if possible, by heeling the ship to bring such structure above the waterline.
- (c) Evaluating residual stability by observation of nature and extent of flooding, condition of loading at time of damage, nature of roll and tendency to list to either side.
- (d) Available methods of improving stability.
- (e) Action to be avoided.
- (f) Procedure for reducing list, with particular reference to danger of over compensating for unsymmetrical weight when the possibility of negative metacentric height exists.

This material shall be arranged in the most logical manner possible with separate discussions covering critical stability and noncritical stability. Procedures shall be given in the optimum chronological order.

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6.3.5 Limiting drafts.

6.3.5.1 Limiting values assigned. The limiting draft values and locations shall be quoted and a statement included to the effect that the installation of a distinctive mark (or marks) on the ship has been authorized as a guide against overloading.

6.3.5.2 Basis of assignment. The factors which entered into the establishment of the limiting draft shall be enumerated.

6.3.5.3 Danger of overloading. The adverse effects of exceeding the limiting drafts shall be discussed. The effects shall be listed under two headings, (a) those affecting safety and power of survival (reserve buoyancy, stability and strength), and (b) those affecting performance (speed, radius and dryness), as applicable to the particular ship.

6.3.6 Standard conditions of loading. For each of the standard conditions of loading (as defined in Naval Ships Technical Manual, NAVSHIPS 0901-290-0002) which are significant for the particular ship, the following data shall be included:

- (a) A brief description of the condition of loading.
- (b) A summary of the weight and longitudinal moments of the light ship displacement and the items of load.
- (c) The draft, the vertical positions of the transverse metacenter and center of gravity, metacentric height, trim and drafts fore and aft.
- (d) The details of each item of load included under (b) above (weight, vertical center of gravity, vertical moment, and longitudinal centers of gravity and moments).

6.3.6.1 Tank capacity data. A tabulation shall be prepared, including each of the ship's tanks and the following data:

- (a) Capacity in gallons and tons and height of center of gravity above keel when 95 percent full for each oil tank.
- (b) Capacity in gallons and tons and height of center of gravity above keel when 100 percent full for each fresh water tank, ballast tank and fuel oil tank which is fitted for ballasting.
- (c) Longitudinal distance of the center of gravity of each tank from amidships.

6.3.7 Discussion of diagrams. A discussion of each of the following diagrams shall be included, where applicable:

- (a) Flooding effect diagram.
- (b) Liquid loading diagram.
- (c) Cross curves of stability.
- (d) Draft diagram and functions of form.

The discussion shall explain the application of the diagrams, and their use shall be illustrated by examples when necessary.

6.3.8 Submission and acceptance. This section (stability and loading) shall be delivered to the Supervisor of Shipbuilding for forwarding to NAVSEC. Time of submission shall be such as to enable a minimum of 4 weeks time for review and acceptance by NAVSEC. The accepted section will then be returned by NAVSEC to the supplier for typing and inclusion in the master copy class text of the Damage Control Book as shown on figure 2. Changes necessitated to this section due to the inclining experiment should be forwarded to NAVSEC prior to delivery of revised (by building yard) Damage Control Book to the outfitting activity.

6.4 Subdivision and access. Reference shall be made to the applicable damage control diagram. The text shall contain a description of the principles of subdivision, access, watertight integrity, nomenclature of decks, description of access openings and material conditions of readiness. A paragraph shall be included stating that compartments that are normally closed, such as voids and trunks that contain piping (as firemain), should be periodically checked for leaks in systems.

6.4.1 Access fittings. The following watertight, airtight, oiltight, and fumetight access fittings shall be listed:

- (a) Doors.
- (b) Hatches.

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- (c) Manholes.
- (d) Scuttles, dog type.
- (e) Scuttles, passing.
- (f) Scuttles, quick acting.
- (g) Miscellaneous (such as windows and airport lens frames and covers).

6.5 Drainage, ballasting and list control systems.

6.5.1 General requirements. The text for drainage, and ballasting and list control systems shall contain methods of operation to obtain efficiency in damage control.

6.5.2 Main and secondary drainage systems. The text for the main and secondary drainage systems shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of the system.
- (c) Segregation of the system under battle conditions.
- (d) Size of main line or loop piping.
- (e) Table indicating pump number, type, capacity and location of each pump; also suction and discharge valves.
- (f) Clogging of pump suction.
- (g) Additional table indicating individual pumping capacity (including capacities for each pump and eductor) and capacity of main circulating pumps available for damage control. (This table shall not include portable pumps.)
- (h) List of valves.

6.5.3 Gravity and miscellaneous drain systems. The text for the gravity and miscellaneous drain systems shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of piping.
- (c) Description of scuppers.
- (d) Description of cofferdam drainage.
- (e) List of deck drain valves (except plumbing).
- (f) Plumbing drain valves (at the scuppers, in decks and piping lines).
- (g) Miscellaneous drain valves including scupper valves not listed with plumbing.

6.5.4 Portable pumps. The text for portable pumps shall contain the following:

- (a) Description of the engine driven fire pumps and electrical submersible pumps.
- (b) List of number of each type of pump and stowage locations.

6.5.5 Sounding tube deck plates and sounding tubes with valves. The text for sounding tube deck plates and sounding tubes with valves shall contain the following:

- (a) Description of sounding tube piping.
- (b) List of valves and fittings.

6.5.6 Air escapes. The text for air escapes shall contain the following:

- (a) Description of piping.
- (b) List of valves.

6.5.7 Plumbing vents. The text for plumbing vents shall contain the following:

- (a) Description of plumbing vents.
- (b) List of plumbing vents, that terminate on or below the damage control deck, that are fitted with gate valves.
- (c) A note that the valves are not shown on the diagram.

6.5.8 Ballasting and list control systems.

6.5.8.1 Ballasting systems. The text for the ballasting system shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of arrangements for ballasting voids and fuel tanks.

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- (c) Table showing time required to ballast the damage control voids.
- (d) List of fuel oil ballasting valves.
- (e) List of void tank ballasting valves.

6.5.8.2 List control system. The list control system text shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of the system.
- (c) Table showing time required to ballast the list control tanks.
- (d) List of valves.

6.6 Tank stripping system. The tank stripping system text shall contain the following:

- (a) Reference to applicable damage control diagram, if required.
- (b) Description of the system.
- (c) List of valves, only if diagram is required.

6.7 Firemain, sprinkling, foam, washdown and chemical fire systems.

6.7.1 General requirements. The text for the firemain, sprinkling, foam, washdown and chemical fire systems shall contain methods of operation to obtain efficiency in damage control.

6.7.2 Firemain system. The text for the firemain system shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of the system.
- (c) Segregation of the system under battle conditions.
- (d) Size of main line or loop piping.
- (e) Table indicating pump number, type, capacity and location of each pump; also suction and discharge valves.
- (f) Location of remote and automatic controls for pump.
- (g) List of firemain system valves (including cut-out to ammunition spaces, sprinkling, eductor, flushing and miscellaneous sea water service).
- (h) Fireplugs.

6.7.2.1 Firemain segregation diagrams.

6.7.2.1.1 General requirements. Firemain segregation diagrams, for conditions X-RAY, YOKE and ZEBRA, shall be prepared and shall be in complete agreement with the firemain system diagram and text. The diagrams shall be on plastic with Klrtype symbols, letters, and numbers. The line width shall be number 3 (see 4.4.2.9).

6.7.2.1.2 Required information. The diagram shall be a composite view showing the following:

- (a) Main line loop.
- (b) Cross connections.
- (c) Take-offs for hangar sprinkling control valves.
- (d) Branches from two or more sections of the segregated main for sprinkling.
- (e) Pumps (type, operation and the pump number).

6.7.2.1.3 Format. The diagram format for the title, key, lists of pumps on each segregation, and X-RAY, YOKE and ZEBRA valves, shall be similar to those in the type book.

6.7.2.1.4 Size and page numbering. The size of the diagrams shall be the same as the text pages and shall be assigned text page numbers. A space of 1-1/2 inches shall be left clear for binding in the book.

6.7.2.1.5 Firemain segregation; single line (no loop). The diagrams, consisting of a single line (no loop), shall be indicated as follows:

- (a) Firemain segregation in two parts - forward section a dotted line; aft section a solid line.
- (b) Firemain segregation in three parts - forward section a dotted line; mid section a solid line; aft section a dot-dash line.

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6.7.2.1.6 Firemain segregation; loop. The diagrams consisting of a loop shall be indicated as follows:

- (a) Firemain segregation in two parts - port section a dotted line; starboard section a solid line.
- (b) Firemain segregation in four parts - forward port section a solid line; forward starboard section a dotted line; aft port section a dotted line; aft starboard section a solid line.

6.7.3 Sprinkling systems. The text for sprinkling systems shall contain the following:

- (a) Reference to the applicable damage control diagram.
- (b) Description of the systems for ammunition spaces, hangar, and miscellaneous spaces (including drain cocks).
- (c) Table of firemain cut-out valves indicating grouping of ammunition spaces, the identifying numbers of firemain cut-out valves, group control valves, and ammunition spaces cut-out valves.
- (d) List of valves.

6.7.4 Fixed fog nozzle system. The text for sea water fixed fog nozzle systems shall contain the following:

- (a) Reference to the applicable damage control diagram.
- (b) Description of the system.
- (c) List of fixed fog nozzle fittings.

6.7.5 Foam system. The text for the foam system shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of the system, including stations, pumps and proportioners.
- (c) Description of system for helicopter hangar.
- (d) List of foam valves.
- (e) List of foam service outlets.

6.7.6 Washdown system. The text for washdown system shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of system.
- (c) List of group control valves and the area washed down.
- (d) List of valves.

6.7.7 Chemical fire systems. The text for chemical fire systems shall contain the following:

- (a) Description of the CO₂ systems.
- (b) Total number of fixed CO₂ fire extinguishers and a list of locations.
- (c) Total number of portable CO₂ fire extinguishers, without listing their locations.
- (d) Total number of portable dry powder fire extinguishers without listing their locations.

6.8 Fuel (NSFO/NDF) filling, transfer and overflow systems.

6.8.1 General requirements. The text for the fuel filling, transfer and overflow systems shall contain methods of operation to obtain efficiency in damage control.

6.8.2 Fuel (NSFO/NDF) filling and transfer systems. The text shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of all arrangements and valves for filling and transfer.
- (c) Segregation of the system under battle conditions.
- (d) Size of main line or loop piping.
- (e) Methods of operation of the systems.
- (f) Table indicating pump number, type, capacity and location of each pump; also suction and discharge valves.
- (g) List of valves.

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- 6.8.3 Overflows. The text for overflows shall contain the following:
- (a) Reference to applicable damage control diagram.
 - (b) Description of overflows.
 - (c) List of valves.
- 6.8.4 Air escapes. The text for air escapes shall contain the following:
- (a) Description of air escapes.
 - (b) List of valves.
- 6.8.5 Sounding tube deck plates and sounding tubes with valves. The text for sounding tube deck plates and sounding tubes with valves shall contain the following:
- (a) Description of the piping.
 - (b) List of sounding tube valves and fittings.
- 6.9 JP-5 filling, transfer and overflow systems.
- 6.9.1 General requirements. The JP-5 systems text shall contain methods of operation to obtain efficiency in damage control.
- 6.9.2 JP-5 filling and transfer systems. The text shall contain the following:
- (a) Reference to applicable damage control diagram.
 - (b) Description of all arrangements and valves for filling, transfer and auxiliary service.
 - (c) Segregation of the system under battle conditions.
 - (d) Size of main line or loop piping.
 - (e) Methods of operation of the systems.
 - (f) Table indicating pump number, type, capacity and location of each pump; also suction and discharge valves.
 - (g) List of valves.
- 6.9.3 Overflows. The text for overflows shall contain the following:
- (a) Reference to applicable damage control diagram.
 - (b) Description of overflows.
 - (c) List of valves.
- 6.9.4 Air escapes. The text for air escapes shall contain the following:
- (a) Reference to applicable damage control diagram.
 - (b) Description of air escapes.
 - (c) List of valves.
- 6.9.5 Sounding tube deck plates and sounding tubes with valves. The text for sounding tube deck plates and sounding tubes with valves shall contain the following:
- (a) Description of the piping.
 - (b) List of sounding tube valves and fittings.
- 6.10 Aviation and automotive gasoline systems.
- 6.10.1 General requirements. The text for the aviation and automotive gasoline, sea water and inert gas systems shall contain methods of operation to obtain efficiency in damage control.
- 6.10.2 Gasoline systems. The text shall contain the following:
- (a) Reference to applicable damage control diagram.
 - (b) Description of fueling, de-fueling and sea water systems.
 - (c) Segregation of the system under battle conditions.
 - (d) Size of main line piping.
 - (e) Table indicating pump number, type, capacity and location of each pump; also suction and discharge valves.
 - (f) List of aviation gasoline system valves.
 - (g) List of automotive gasoline system valves.
 - (h) List of sea water system valves.

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6.10.3 Overflows. The text for overflows shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of overflows.
- (c) List of valves.

6.10.4 Sounding tube deck plates and sounding tubes with valves. The text for sounding tube deck plates and sounding tubes with valves shall contain the following:

- (a) Description of the piping.
- (b) List of sounding tube valves and fittings.

6.10.5 Inert gas system. The text for inert gas system shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Size of piping.
- (c) Source of supply.
- (d) List of valves.

6.11 Ventilation systems.

6.11.1 General requirements. The text for ventilation systems shall contain the following:

- (a) Reference to applicable damage control diagrams.
- (b) Description of systems.
- (c) Methods of operation to obtain efficiency in damage control.

6.11.2 Ventilation systems. The text for the systems shall contain the following:

- (a) Reference to applicable damage control diagrams.
- (b) Description of all arrangements, including number and type of supply, exhaust and recirculating fans.
- (c) Description of ventilation arrangement for spaces fitted with CO₂ system.
- (d) Discussion of recirculating systems that pierce bulkheads.
- (e) Discussion of ventilation in relation to watertight integrity, stressing hazard to watertight integrity and spread of noxious gases, smoke, and flame.
- (f) Discussion of proper setting in material conditions, remote control operations of system including location of power panels and their sources of power.
- (g) Discussion of the importance of maintenance and keeping systems free of dirt and debris which may be attracted.
- (h) A listing of the following:
 - (1) Fans.
 - (2) Fans (without any duct work piercing bulkhead or decks).
 - (3) Controllers and power panels for fans.
 - (4) Closure fittings of ventilation and recirculating systems including mechanical fire zone dampers.

6.12 Chilled water system. The text for the chilled water system shall contain the following:

- (a) Reference to manuals.
- (b) Description of system.
- (c) List of valves which are numbered and assigned closure classification in operating manual.
- (d) Size of main line or loop piping.
- (e) Table indicating pumps and chillers, type, capacity and location.
- (f) List of chilled water system valves (including cut-out valves to miscellaneous service). Form 9881-3 should be used for this listing (see table IX).

6.13 Compressed air systems.

6.13.1 General requirements. The text for compressed air systems shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of systems.
- (c) Methods of operation to obtain efficiency in damage control.

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6.13.2 Compressed air systems. The text shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of high, medium, and low and ship service systems.
- (c) Number, location and capacity of compressors.
- (d) Methods of operation, and segregation of systems under battle conditions.
- (e) List of valves:
 - (1) High pressure.
 - (2) Medium pressure.
 - (3) Low pressure.

6.14 Oxygen and nitrogen systems.

6.14.1 General requirements. The text for the oxygen and nitrogen systems shall contain the following:

- (a) Reference to the applicable damage control diagram.
- (b) Description of the systems.
- (c) Methods of operation to obtain efficiency in damage control.

6.14.2 Oxygen and nitrogen systems. The text shall contain the following:

- (a) Reference to applicable damage control diagram.
- (b) Description of the systems.
- (c) Number, location and capacity of compressors.
- (d) Methods of operation and segregation of system under battle conditions.
- (e) List of valves:
 - (1) Oxygen.
 - (2) Nitrogen.

6.15 Fresh water system. The text for the fresh water system shall contain the following:

- (a) Description of system.
- (b) Method of operation of system.
- (c) Number, location, and capacity of pumps, hot water heaters and tanks.
- (d) List of root valves and their closure classification.

6.16 Flushing system. The text for the flushing system shall contain the following:

- (a) Brief description of system.
- (b) Brief description of method of operation of system.
- (c) Reference to firemain flushing cut-out valves.
- (d) Reference to flushing pumps.

6.17 Voice and pneumatic tubes and message passing facilities. The text for voice and pneumatic tubes and message passing scuttles shall describe the following:

- (a) Method of operation.
- (b) Size of tubing.

6.18 Lubricating oil system. The text for all lubricating oil systems shall contain the following:

- (a) Description of system.
- (b) Method of operation.
- (c) Number, location and capacity of pumps.
- (d) Location of filling station.
- (e) List for those damage control valves only where the system penetrates watertight bulkhead or deck.

6.19 Power and lighting. The text shall contain information which provides a general knowledge of the ship's electrical systems. It shall contain the following:

- (a) Reference to "Ship's Information Book" for description of systems.
- (b) A brief description of systems to indicate that they have been designed with a high degree of flexibility, reliability, and inherent damage control features to obtain a continuity of power supply under casualty conditions.

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6.19.1 Design arrangements. The text for design arrangements shall contain a discussion of design features of electric system that provide inherent damage control features, such as provision made in distribution system to cope with derangements and casualty conditions. Typical examples are, steering gear, which is provided with at least two sources of electric power arranged through different parts of the ship and in some cases with emergency electrohydraulic pumps; power supply to ordnance equipment; bus ties provided to interconnect switchboards; and separation between generator plants.

6.19.2 Generating plant (including ship service and emergency switchgear). The text for the generating plant shall contain data on plant, number, rating, location of generators and associated switchgear.

6.19.3 Power distribution system. The text for power distribution shall contain the following:

- (a) Description of specific design features of system provided for inherent damage control functions, such as selective tripping of protective devices.
- (b) Table giving a list of auxiliaries that have more than one power supply feeder and indicate the source of the normal, alternate, and emergency supplies.
- (c) Outline of switchgear bus tie arrangements, sources of power supply, method of transferring load from one power supply to another, and general location of various cable runs.
- (d) Schematic wiring diagrams illustrating typical methods used for transferring loads from one power source to another, and switchgear interconnections.
- (e) Information on the following power circuits:
 - (1) Damage control valves.
 - (2) Electronic systems.
 - (3) Elevators (all electric operated ones).
 - (4) Generator and bus ties.
 - (5) Guns and launchers.
 - (6) Hoists.
 - (7) Pumps (all electric operated ones).
 - (8) Multi-purpose outlets.
 - (9) Steering gear.

6.19.4 Lighting distribution system. The text for the lighting distribution system shall contain the following:

- (a) Design arrangement features that provide for instantaneous emergency supply to lights in vital areas. Generally, circuit arrangement for such normal, alternate, and emergency supplies shall be indicated.
- (b) Function of relay operated and manually operated hand lanterns.
- (c) Information in regard to low level (red light) illumination.

6.19.5 Cableway arrangements. The text for cableway arrangements shall contain the following:

- (a) Brief description of main cableway runs throughout the ship.
- (b) Brief description of selection of runs to provide maximum separation between normal, alternate, and emergency supplies both horizontally and vertically.

6.19.6 Cable marking and identification. The text for cable marking and identification shall contain the following:

- (a) Brief description of cable marking and identification.
- (b) Examples showing how the cable description indicates location of course and destination of cable in addition to its voltage and service application.

6.19.7 Electrical equipment. The text for electrical equipment shall contain the following:

- (a) List of electrical equipment available for damage control purposes.
- (b) Functions of equipment except for casualty power system for which reference should be made to applicable section describing purpose and scope of that system.
- (c) List of the following equipment:
 - (1) Flood lanterns.
 - (2) Portable submersible pumps.
 - (3) Welding facilities.

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6.20 Casualty power supply system. The text for the casualty power supply system shall contain the following:

- (a) Description of system including specific arrangements.
- (b) List of casualty power supply panels, including location number.
- (c) List of casualty power supply bulkhead and deck terminals, including location number.
- (d) List of casualty power portable cable racks, location and number.
- (e) List of portable cable (by cable rack number) and lengths of cable stowed thereon. This listing shall be in sequence starting with the lowest deck, reading forward to aft, and ending at the highest deck.
- (f) List of multi-purpose outlets, including location number and power source.

6.21 Interior communication circuits. The text for the interior communication circuits shall contain the following:

- (a) Essential information regarding the function, operation and use of interior communication circuits that are used for damage control.
- (b) Location of the outlets for the circuits listed in tables VII and VIII.
- (c) Location and damage control number of the permanently installed sound powered telephone jackboxes.
- (d) Permanent cable runs of the X40J system.
- (e) Type and length of casualty communication portable cables and stowage locations.

Table VII - Interior communication circuits.

| Circuit | System | Circuit | System |
|---------|--------------------------------------|----------|--|
| DG | Remote draft indicator | 3MB | Engine control order |
| F | High temperature alarm | 1MC | General announcing |
| 9F | High temperature alarm ASROC | 3MC | Aviator's announcing |
| FD | Flooding alarm | 4MC | Damage control announcing |
| FH | Sprinkling alarm | 21MC | Captain's command announcing |
| FR | CO ₂ release alarm | 26MC | Machinery operations control announcing |
| FZ | Security alarm | 30MC | Special weapons control |
| G | General and chemical attack alarm | N(1N-4N) | Rudder angle indicator |
| J | Dial telephone | 5N-6N | Emergency rudder angle indicator |
| L | Rudder order | QD | Gasoline compartment exhaust ventilation alarm system |
| LB | Steering emergency signal | QX | Oxygen nitrogen plant ventilation exhaust alarm |
| LC | Gyro compass | VS | Valve position indicator |
| MB | Engine order or motor order | | |

Table VIII - Circuits of sound powered telephone systems.

| Circuit | System | Circuit | System |
|---------|------------------------------|---------|--|
| JA | Captain's battle | 7JZ | Engineer's repair |
| 1JG | Aircraft control | 8JZ | Crash and salvage repair team |
| 3JG | Aircraft service | 9JZ | Ammunition spaces sprinkling and ordnance repair, forward |
| 4JG | Aviation fuel control | 10JZ | Ammunition spaces sprinkling and ordnance repair, aft |
| 1JV | Maneuvering and docking | 11JZ | Gallery deck and island |
| 2JV | Engineer (engines) | X6J1 | Electronic service |
| 3JV | Engineer (boilers) | X40J | Casualty communication |
| 4JV | Engineer (fuel) | X50J | Fog foam |
| 5JV | Engineer (electrical) | XJA | Auxiliary captain's battle |
| 6JV | Ballast control | X1JG | Auxiliary aircraft control |
| 2JZ | Damage and stability control | X1JV | Auxiliary maneuvering and docking. |
| 3JZ | Main deck repair | X2JZ | Auxiliary damage and stability control |
| 4JZ | Forward repair | | |
| 5JZ | Aft repair | | |
| 6JZ | Amidship repair | | |

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7. BOOK FORMAT REQUIREMENTS

7.1 General requirements for text and tables. The typewritten manuscript of the damage control book text and tables shall be prepared on standard forms specified in table IX.

Table IX - Text and table forms.

| Title | NAVSHIPS NO. | | Title | NAVSHIPS NO. | |
|----------------------------|--------------|---------|-------------------------|--------------|---------|
| | UNCLASS. | CONF. | | UNCLASS. | CONF. |
| Blank form | 9881-1 | 9881-10 | Ventilation closure | | |
| Connecting spaces. | 9881-2 | 9881-11 | fittings | 9881-6 | 9881-15 |
| Valve list | 9881-3 | 9881-12 | Fixed fog nozzle | | |
| Ventilation fans | 9881-4 | 9881-13 | fittings | 9881-7 | 9881-16 |
| Controllers and power | | | Fire plugs. | 9881-8 | 9881-17 |
| panels for ventila- | | | Record of page revision | | |
| tion fans | 9881-5 | 9881-14 | dates | 9881-9 | 9881-9 |

7.2 Availability of forms. The text and table forms are obtainable from the Navy Supply Center at Oakland, California and Norfolk, Virginia, via the Supervisor of Shipbuilding.

7.3 Page size. The size shall be 8 inches by 10-1/2 inches.

7.4 Handling and distribution. Handling and distribution shall be in accordance with figure 2.

7.5 Format for text and tables.

7.5.1 Type required. A typewriter with pica size type only shall be used for typing the text and tables.

7.5.2 Format. The format for the text and tables shall be as follows:

- (a) Title typed above the border line.
- (b) Texts and list of fittings typed between the border line on all forms.
- (c) Space between lower margin and guide line left blank.
- (d) When footnotes, such as "manifold," are required, the symbol referring to the footnote shall be typed outside the left hand bind margin immediately adjacent to the vertical line. The footnote shall be typed below the lower margin.
- (e) Tables shall have a double space between a description of each closure, valve, or fitting.
- (f) The "class" ship number, such as AO 102 class, shall be typed in the block by the building yard.
- (g) All pages with changes shall be retyped.
- (h) All pages, retyped due to changes, shall have the individual ship number typed in the block. The month and year will be typed below the ship number by the post-shakedown activity.
- (i) When pages are being retyped, due to the addition of one or two line items, typing within the 1-1/2 inch space is permissible to eliminate the addition of a new page with a suffix letter, such as II(e)6A, which would contain only a few lines.
- (j) When new items are added, the page or pages shall be typed so that the items are in numerical order. This may necessitate additional pages which shall have the same page number as the original plus a letter subscript.

7.6 Miscellaneous pages. The miscellaneous pages shall be similar to those in the type book and as specified in 7.6.1 through 7.6.8.

7.6.1 Title page. The title page shall contain the following:

- (a) The words "Damage Control Book".
- (b) Ship number.
- (c) Ship type.
- (d) Command identification.

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- (e) Year date.
- (f) NAVSHIPS No. Place in upper right hand corner above margin.

7.6.2 Security classification. Each damage control book, as it applies to a ship or group of ships, is considered as a unit for "classification" purposes. Damage control books are either unclassified or confidential. For the damage control books that are classified "Confidential" the following shall apply:

- # (a) Text and tables typed on "Confidential" forms.
- (b) The following note shall be typed on the "title page" of the text and shall appear no where else on the diagrams and text: "GROUP 3, DOWNGRADED AT 12 YEAR INTERVALS, NOT AUTOMATICALLY DECLASSIFIED, DOD DIR 5200.10".
- (c) On "Classified" material add the following "NOTE" on the "List of Damage Control Diagrams" page (see 7.6.8) "This Damage Control Text and all of the above lithographic copies of the damage control diagrams, regardless of whether they are removed from the book, are classified 'Confidential' and shall be safeguarded in accordance with the provisions of the United States Security Manual for Classified Matter. However, the 'Confidential' laminated plastic copies of the Damage Control Diagrams shall be downgraded to 'Unclassified' only after these diagrams are received onboard ship. These laminated copies shall be treated as being in a "FOR OFFICIAL USE ONLY" category."
- (d) The record of page revision and dates and firemain segregation diagrams shall be unclassified.

7.6.3 Table of contents. The table shall contain the title and the page numbers of all sections.

7.6.4 Record of page revision dates. The page shall be as follows:

- (a) When prepared for a class of ships at a building yard.
 - (1) First column headed "Page No." Below this heading type each page number on an individual line.
 - (2) Second column headed by the word "Class". Below this heading type "Original Undated."
 - (3) The building yard will complete the third column for the first and any subsequent ships of the class by adding the month and year in the heading and the letters "N", "R" and "V" as noted on the form, below the heading and opposite the page numbers corresponding to the pages that have changes.
 - (4) The "post-shakedown activity" will complete the third column for all ships in similar manner as above.
- (b) When prepared for an individual ship.
 - (1) First column headed "Page No.". Below this heading type each page number on an individual line.
 - (2) Second column head by year only; the year to coincide with the year in the lower right hand corner of the diagrams. Below this heading, type "original".
 - (3) The building yard will complete the third column by adding the month and year in the heading, and the letters "N", "R" and "V" as noted on the form, below the heading and opposite the page numbers corresponding to the pages that have changes.
 - (4) The "post-shadedown activity" will complete the fourth column in a similar manner as above.

7.6.5 Procedure for revising and handling damage control diagrams and text. The page in the book shall read as follows: "Damage Control diagrams and text shall be revised and handled in accordance with Naval Ships Technical Manual, Section II, NAVSHIPS 0901-882-0002 and MIL-STD-784 Damage Control Books for Surface Ships, Revision of."

7.6.6 Preface. The text shall contain a brief history of the ship and shall be similar to the one in the type book.

7.6.7 References. Reference all publications, pertaining to damage control, which are available to the ship.

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7.6.8 List of damage control diagrams. The page shall contain the following:

- (a) List of diagram titles.
- (b) List of diagram numbers.
- (c) A column headed "Overhaul Date."
- (d) Information below the "Overhaul Date" column shall correspond to that in the "Record of Page Revision Dates."

7.7 Page numbering. Pages shall be numbered as follows and shall be typed in the block on the forms.

7.7.1 Guide for "part" and "section" page numbering.

(a) "Part" and "section" page numbering shall be as follows:

| | | |
|-----------------------------------|---|---|
| A to - (see special requirements) | } | Table of contents. |
| | | Record of page revision dates. |
| 1 | | Procedure for revising and handling damage control diagrams and text. |
| 2 | | Preface. |
| 3 | | References. |
| 4 | | List of damage control diagrams. |

PART I - GENERAL INFORMATION

- (a) Principal characteristics.
- (b) Shoring.
- (c) Steering gear.
- (d) Towing.
- (e) Ammunition handling.
- (f) Medical.
- (g) Personnel protection.
- (h) Aircraft launching and handling.

PART II - DAMAGE CONTROL SYSTEMS

- (a) Stability and loading.
- (b) Subdivision and access.
- (c) Drainage, ballasting and list control systems.
- (d) Tank stripping system.
- (e) Firemain, sprinkling, foam, washdown and chemical fire systems.
- (f) Fuel oil filling, transfer and overflow systems.
- (g) JP-5 filling, transfer and overflow systems.
- (h) Aviation and automotive gasoline systems.
- (i) Ventilation systems.
- (j) Chilled water system.
- (k) Compressed air systems.
- (l) Oxygen and nitrogen systems.

PART III - MISCELLANEOUS SYSTEMS

- (a) Fresh water system (potable).
- (b) Flushing system.
- (c) Voice and pneumatic tubes, and message passing facilities.
- (d) Lubricating oil system.

PART IV - ELECTRICAL SYSTEMS

- (a) Power and lighting.
- (b) Interior communication circuits and fire control systems.

7.7.1.1 Sections not required. The section letters shall be maintained regardless of whether or not a particular system is required. For example, on ships that do not have a gasoline system a page shall be provided and numbered II(h)1. The page shall be headed by "part II(h) gasoline system (not applicable to this ship)." The page shall be included in the table of contents.

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7.7.2 Component parts of page number.

7.7.2.1 General requirements for page numbering. A page number consists of the following three components; for example, II(c)1:

- (a) First component: Roman number corresponding to the "part" number; for example, "II" as required by the guide above.
- (b) Second component: In parenthesis, a letter corresponding to the "section" of the "part"; for example "(c)".
- (c) Third component: Arabic numbers in sequence for all pages in the section; for example "1".

7.7.3 Specific requirements for page numbering within sections. Page numbering within sections shall be as follows:

- (a) Each section, for example "II(e) Firemain, sprinkling, foam, washdown, and chemical fire systems" shall be subdivided into individual subsections; one for the firemain system; one for the sprinkling system; one for the foam system; one for the fixed nozzle system; one for the washdown system; one for the chemical fire systems.
- (b) The subsections shall be further divided into separate units; one for the text and one for the tables.
- (c) New pages added, due to changes or additions, shall be assigned the same number as the previous page, but shall bear a suffix letter "A", "B", etc.
- (d) When a new page is added at the end of a section, it shall be assigned the next consecutive number.

7.7.4 Special page numbering. The "Table of Contents" shall be assigned capital letters as page numbers. The "Record of Page Revision Dates" shall be assigned capital letters and these letters shall be a continuation of the last letter of the "Table of Contents" page.

7.8 Processing the plastics. All plastic positives and negatives shall be made by contact in a vacuum frame. In preparing composite positives, the following shall apply:

- (a) Expose subdivision and system bulkhead shading negatives through a 20 percent screen.
- (b) Expose system base negative through a 133 line - 50 percent screen.
- (c) Each screen should cover the entire area of the diagram.

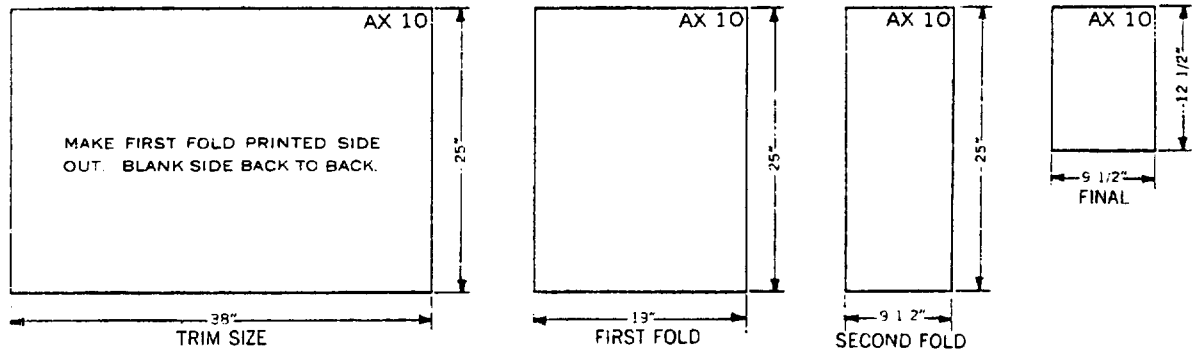
7.9 Reproduction. Reproduction shall be as follows:

- (a) Diagrams on contact photographic semi-matte surface paper 0.005 inch thick (fast speed) or any other method giving comparable results. The quality of the half-tone prints shall be such that the ship's structure is in a light gray compared to the black line system lines. This is accomplished during the exposure so that the vignettted dots are visible.
- (b) A crisp, clear and clean dot pattern, and solid line work, shall be achieved in order to obtain the required high quality paper prints, suitable for use by operating personnel and for lamination.
- (c) Text on 100 pound white offset book paper.
- (d) Reproduce text pages on one side only as right hand sheets.

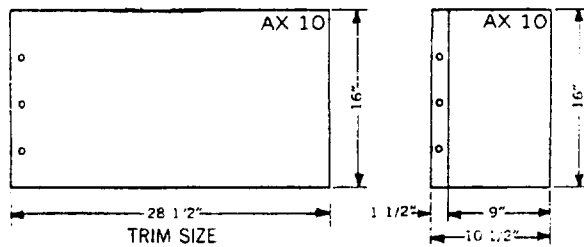
7.10 Folding and punching. Diagrams and text shall be folded and punched in accordance with figure 10 and the following:

- (a) Diagrams:
 - (1) Liquid loading - Trim, fold and punch with holes to fit the binder (including copy for NAVSEC).
 - (2) 16 by 28-1/2 inch size - Trim, fold and punch with holes to fit the binder (including copy for NAVSEC.)
 - (3) Larger than 16 by 28-1/2 inch size - Trim and fold (including copy for NAVSEC).
 - (4) Copies for lamination shall be trimmed and unfolded to avoid creases.
- (b) Text:
 - (1) Provide holes to fit binders (including copy for NAVSEC).

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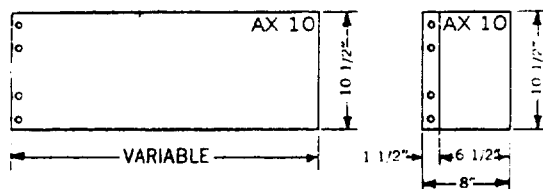


THIS SIZE DIAGRAM IS UNBOUND



THE FOLDING SHALL BE OF THE ACCORDIAN TYPE. THIS TYPE DIAGRAM SHALL HAVE THREE 5/16" DIAMETER HOLES PUNCHED 3/8" CENTER FROM LEFT HAND BIND MARGIN AND 5" CENTER TO CENTER.

THIS SIZE DIAGRAM IS INSERTED IN BINDERS



THE FOLDING SHALL BE OF THE ACCORDIAN TYPE. THIS TYPE DIAGRAM SHALL HAVE FOUR 5/16" DIAMETER HOLES PUNCHED 3/8" CENTER FROM LEFT HAND BIND MARGIN, TWO HOLES 1 1/2" CENTER TO CENTER FROM CENTER AND TWO HOLES 3 1/2" CENTER TO CENTER FROM CENTER.

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LIQUID LOADING DIAGRAM TO BE INSERTED IN TEXT BINDER

Figure 10 - Guide for folding and punching damage control diagram prints.

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7.11 Lamination. The diagrams shall be laminated on both sides with 0.010 inch thick of rigid vinyl plastic. The front surface shall be smooth. The finished laminated diagrams shall be such that there shall be no appreciable change in color of paper and image. The smooth surface shall not reflect images or compartment lighting. The surface shall also be receptive to china marking crayons, which can readily be removed with a dry cloth, without the crayon colors becoming imbedded in the surface. All items shall be laminated with a quarter inch overlap all around to fit the hinged leaf units provided.

7.12 Binders.

7.12.1 General requirements. The building yard shall furnish all necessary binders, imprinted for each individual ship. The amount and distribution shall be in accordance with figures 1 and 2.

7.12.2 Binders for text and liquid loading diagram. Binders shall be "black for unclassified and green for confidential" impregnated buckram binding, stiff cover, side opening, with separable angle iron backs 3/4 to 1-1/4 inches capacity suitable for 8 by 10-1/2 inch text sheets. Inner posts shall be spaced on 3 inch centers, outer posts on 7 inch centers (2-3-2). It shall have a sleeve and screw combination device at end of binding bar.

7.12.3 Binders for 16 by 28-1/2 inch diagrams. The binders shall be "black for unclassified and green for confidential" imitation leather, stiff cover, open back, equipped with three semi-permanent posts 1/2 inch long spaced 5-5 to center.

7.12.4 Binders for 25 by 38 inch diagrams. None required.

7.12.5 Identification on binders. Binders shall be imprinted in accordance with table X. Metal foil for imprinting shall not be used.

Table X - Binders.

| Location | Inscription ^{1/} | Size and type |
|--|--|------------------------|
| Upper right hand corner | CONFIDENTIAL (if classified) | 24 pt. LG |
| Center | DAMAGE CONTROL BOOK TEXT AX 102 ^{2/} or | 36 pt. LG 36 pt. LG |
| | DAMAGE CONTROL BOOK DIAGRAMS AX 102 ^{2/} | 36 pt. LG 36 pt. LG |
| Bottom centered End (for text only) | NAVSEC AX 102 ^{2/} DAMAGE CONTROL BOOK TEXT | 24 pt. LG 36 pt. LG |

^{1/} If classified the word "CONFIDENTIAL" shall also be embossed on inside of cover and both sides of back.

^{2/} Ship classification and number.

7.13 Final diagrams and text (insertion into binders). The following shall apply:

- (a) Outfitting and post shakedown activity deliver the superseding diagrams and text to the Commanding Officer for insertion in his copies prior to departure, and also forward the new diagrams and text to the planning yard and NAVSEC.
- (b) Insert the liquid loading diagram into the text.

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7.14 Distribution. The damage control diagrams and text shall be distributed in accordance with figures 1 and 2. In addition, one reproduced set of the liquid loading diagram and of part II(a) stability and loading text shall be forwarded to each Naval shipyard, and 3 sets to NAVSEC.

8. QUALITY ASSURANCE PROVISIONS

8.1 Responsibility for preparation and revision. The responsibility for preparation and revision shall be as follows:

(a) The building yard is responsible for the preparation of the ship's damage control book "text and diagrams" in conformance with this standard and to reproduce and distribute this material in accordance with figures 1 and 2. Further, it is required that:

(1) The building yard mark-up two halftone copies of the diagrams, and retype pages of the text that reflect changes in the ship as delivered. Distribute in accordance with figures 1 and 2.

8.2 Responsibility for accuracy. The building yard shall be responsible for the accuracy of the damage control diagrams and associated text submitted to NAVSEC. The material for the individual ship shall be examined by the supplier for completeness, technical accuracy, legibility, reproducibility and for conformance to all requirements specified herein. This includes the touching up of lines, lettering or symbols as required to eliminate any evidence of weakness.

8.3 Certification. The supplier shall furnish to the Supervisor of Shipbuilding a certified statement with the forwarding letter stating that the damage control book "text and diagrams" conform to the requirements of this standard.

8.4 In-process inspection. The Government reserves the right of inspection which may be made at any point or during any phase of the development process to determine whether the information as shown in the damage control book is in agreement with the approved installation drawings for systems and label plates. Failure to meet any applicable requirements specified herein shall be cause for rejection.

9. PREPARATION FOR DELIVERY

9.1 Packaging. Damage control diagram plastics may be rolled or packaged flat. Lithographed copies of diagram may be folded or rolled. Damage control book text shall be packaged flat. Material shall be packaged in accordance with the supplier's commercial practice.

9.2 Packing. Material shall be packed in containers of the type, size and kind commonly used for the purpose and in a manner which will insure acceptance by common carrier and safe delivery at destination. Shipping containers shall comply with the carrier rules and regulations applicable to the mode of transportation.

9.3 Classified material. Classified material shall be packed in totally enclosed shipping containers. All boxes or cartons containing classified material shall be sealed in such a manner that the contents of the container cannot be inspected without evidence of forcible opening. All containers, except registered mail packages, shall be strapped perpendicular and parallel to the length of the container. The intersection of the strapping shall be joined with sealed strapping seals so constructed and located that tampering would cause mutilation, readily detected by inspection.

9.3.1 Registered mail. Registered mail packages containing classified material shall be limited to size and weight and securely bound in accordance with the U. S. Postal Service Regulations.

9.3.2 Shipping security regulations. In addition, classified materials shall be shipped in accordance with the Departmental Security Regulations which are available in the Government Inspection Office.

9.4 Marking.

9.4.1 Classified material. When classified material is being shipped, marking shall be as specified by the cognizant activity concerned. Except for any markings indicating the nature of the classified material, its confidential classification shall not appear on the outside of the container.

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9.4.2 Unclassified material. Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the supplier's commercial practice including the following:

- (a) Nomenclature.
- (b) Supplier's name.

10. NOTES

10.1 Ordering data. Procurement documents should include "Title, number and date of this standard" and the following:

"The supplier is responsible for the delivery of the 'Ship's Master Copy' plastics and text in good condition at its destination. If damaged, it shall be replaced by the supplier at no cost to the Government. In this connection, the plastic negatives, used in making the 'Ship's Master Copy' positives, shall be retained until information is received from the consignee that the material has been received in satisfactory condition."

10.2 THE MARGINS OF THIS DOCUMENT ARE MARKED "*" TO INDICATE WHERE CHANGES (ADDITIONS, MODIFICATIONS, CORRECTIONS, DELETIONS) FROM THE PREVIOUS ISSUE WERE MADE. THIS WAS DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

Preparing activity:
Navy - SH
(Project TMSS-N059)

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Center Building
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