ANNEX F

MANUAL

FOR THE JOINT PRODUCTION OF COMMON DATUM CHARTS OF THE STRAITS OF MALACCA AND SINGAPORE

1978

CONTENTS

SECTION III — DRAWING

SECTION IV — EDITING AND INSPECTION OF ORIGINAL DRAWINGS

APPENDICES

MANUAL FOR THE JOINT PRODUCTION OF COMMON DATUM CHARTS OF THE STRAITS OF MALACCA AND SINGAPORE

INTRODUCTION

1. This Manual is drawn up for the Joint Production of Common Datum Charts of the Straits of Malacca and Singapore in accordance with the Memorandum of Procedure signed in Singapore in May 1977.

It is based on the Compilation Manual of Nautical Charts and Publications and the Application Standards of Chart Symbols and Abbreviations currently used by the Hydrographic Deaprtment of Japan.

2. The following points should be borne in mind when using this manual.

2.1. Generally, charts are classified into nautical charts for navigation and miscellaneous charts for referencial purposes of navigation. According to the scale, the former can be further classified into general charts, sailing charts, general charts of coast, coast charts and harbour charts.

2.2. In preparation of a nautical chart, firstly it is necessary to work out a publication planning which demands thorough investigation of the requirement of safety of navigation. After publication planning is decided upon, hydrographic surveys and collection of data and other materials are carried out for compilation planning. However, explanation on publication planning is omitted and the matters related to compilation planning and various processes thereafter are dealt with.

2.3. Compilation work may vary according to the type and purpose of a chart. Explanation of such work is focused on the preparation of the Common Datum Charts which are classified as general chart of coast or coast chart. Therefore, detailed explanation is not given for compilation of a harbour chart. Nevertheless, this Manual could be utilized for chart production in general.

SECTION I – COMPILATION PLANNING

3. 'Compilation planning' of a new chart commences as soon as publication planning is finalised. In the process of this compilation planning, relevant planning manuscripts, i.e. planning sheet, planning note, name's guide sheet, etc. are first produced. These manuscripts are handed to the chart compilation officer after checking. The chart compilation officer then makes a detail study of these planning manuscripts. In the compilation section, a 'drawing guide' containing instructions on the detailed items for drawing is prepared. This process is called 'compilation'.

The drawing guide is sent to the drawing section after being thoroughly edited and inspected. An original drawing, or chart original, is then drawn in accordance with the drawing guide. This process is called 'drawing'. The original drawing is first sent to the chart editing section before it is forwarded to the printing section for editing.

4. These processes are explained in the following paragraphs.

4.1. Planning Sheet

Firstly, a sketch covering all the necessary source materials is prepared. The chart compilation officer studies the sketch and prepares a drawing guide of the chart to be produced. This sketch which shows the format and representation of the chart is called a 'planning sheet'. It is also called a design drawing of a chart, and the relevant items are simply and clearly drawn in carmine ink on a white imitation Japanese vellum.

4.2 Contents of a Planning Sheet

4.2.1. Indication of the Chart Coverage

In determining the exact limit of the chart coverage, the topography falling on or close to the borders and the four corners of the chart coverage is examined. Should there be any useful objects suitable for navigation, such as capes, points, heads, islands, lighthouses, mountains, light buoys, and well-known harbours, etc. appearing outside of the sheet limit, the layout of the sheet should be adjusted in such a way to include these objects within the chart coverage as far as possible. In order to accomplish this, the size of the chart may have to be extended to the maximum possible limit, or that particular part of the chart border may have to be partically extended.

4.2.2. Value of Projection Interval and Graticule Interval

These elements are indicated according to the specifications on the standard pattern. (See Fig. 3, 4 and 5.)

4.2.3. Linear Metre Scale

The position and format of the metre scale shall be shown. (See Fig. 6 and 7.)

On a Mercator chart, the border graduation of latitude and longitude is accurately made to obviate the necessity of having to indicate the scales of latitude and longitude again. Only

the metre scales are indicated by utilizing the spaces at the borders of the chart.

Depending on the scale of the chart, metre scales are inserted on both the opposite sides borders of a full-size sheet, one or two on a broadwise sheet and two or three on a lengthwise sheet. (See Fig. 1.)

4.2.4. Computation of Chart Coverage, Graduation of Longitude and Latitude and Metre Scales

In the case of a Mercator chart, the following data are given on the planning note and the planning sheet:

a) Scale.
b) Standard parallel.
c) Chart coverage (sheet limit).
d) Value of projection interval and graticule interval.
e) Position and the number of metre scale to be inserted.

At present, computations for the above items can be made all at once by using an electronic computer, so that the projection intervals are not established. However, in manual calculation, the projection intervals are established. An example of manual calculation is given below (based on the Bessel's constants):

(A) Example of Computation of Graduation of Latitudes and Longitudes.

Data for the computation are as follows:

1.	Scale:	1/200,000.
2.	Standard parallel:	Lat. 35°.
3.	Coverage:	Lat. 43°43'N — Lat. 45°16'N, Long. 140°32'12"E — Long. 142°0'E.
4.	Value of projection interval:	Every 10'.
5.	Grid:	Every 20'.
6.	Metre scale:	Two scales, each for the distance of 60km, one centred at Lat. 44°8'N and the other at Lat. 44° 52'N.

The computation starts with obtaining the actual length, L_0, of 1' of Longitude at Lat. 35°. From the table already computed, L_0 = 1521.29m is obtained. Then, the length of Long. 1' on the chart, ℓ_0 is obtained as follows:

$$\ell_0 = L_0 \cdot s \quad (s = 1/200{,}000)$$
$$\ell_0 = 152129 \times 1/200{,}000 = 0.76065\text{cm}.$$

Since this chart is constructed on the projection intervals of every 10', computations are made from the difference of meridional parts at every 10' from the lowest parallel of latitude and the corresponding scale of latitude according to the table computed. The table shows differences of meridional parts at every 5', so that in this case the meridional parts at every 10' of latitude are obtained and then the differences are calculated.

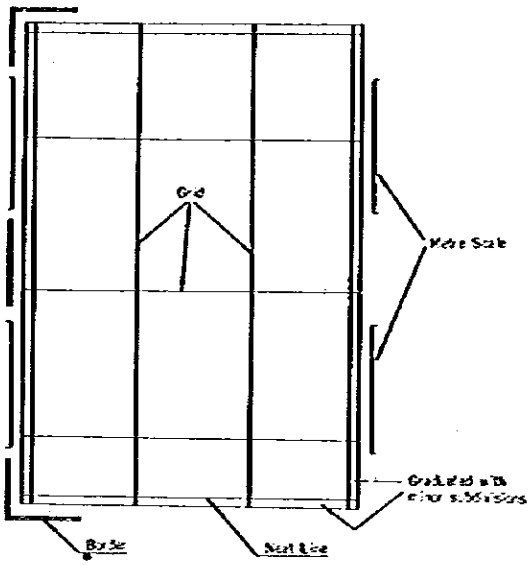


Fig. 1. Example of inserting metre scales.

Lat.	Difference of meridional parts at every 10′ (Di)	Long. 1′(ℓ_o)	Length of projection interval (Yi)
43°43′			
50′ =	13.795	x 0.76065 x 0.7	= 7.345cm
44° 0′ =	13.834	x 0.76065	= 10.523
10′ =	13.873	x 0.76065	= 10.552
20′ =	13.913	x 0.76065	= 10.583
30′ =	13.953	x 0.76065	= 10.613
40′ =	13.992	x 0.76065	= 10.643
50′ =	14.033	x 0.76065	= 10.674
45° 0′ =	14.075	x 0.76065	= 10.706
10′ =	14.115	x 0.76065	= 10.737
16′ =	14.157	x 0.76065 x 0.6	= 6.461 (+
	Total length of Lat. to be charted,		Y = 98.837cm

To calculate the total length of longitude, the difference in longitude to be covered (in this case, 87.8′) is multiplied by the length of 1′ of longitude on the chart, namely

Long.	Difference in Long. (λ)	Long. 1′ (ℓ_o)	
140°32′12″			
40′	= 7.8′	x 0.76065	= 5.933cm
141° 0′			
⋮	@ 20′ = 15.213cm		
142° 0′	= 80′	x 0.76065	= 60.852 (+
	Total length of Long. to be charted,		X = 66.785cm

From the calculations above, the chart coverage is calculated at the same time.

(B) Example of Calculation of Metre Scale

Firstly, the unit length (1km) of metre scale is obtained. According to the specification, two metre scales for the total distance of 60km are to be inserted, one centred in Lat. 44°8' and one in Lat. 44°52'.

1) Length of Long. 1' at Lat. 44°8', L_0' = 1333.61m (from Table).

$$m_1 = 1000 \times \frac{\ell_0}{L_0'}$$

$$= 100000 \times \frac{0.76065}{133361}$$ (0.76065 is the value of Long. 1', ℓ_0, at Lat. 35°.)

= 0.57037cm

..... Length on the chart of 1000m at Lat. 44°8'.

The length on the chart of 60km is

0.57037cm x 60 = 34.222cm.

2) Length of Long. 1' at Lat. 44°52', L_0'' = 1317.00m (from Table).

$$m_2 = 1000 \times \frac{\ell_0}{L_0''}$$

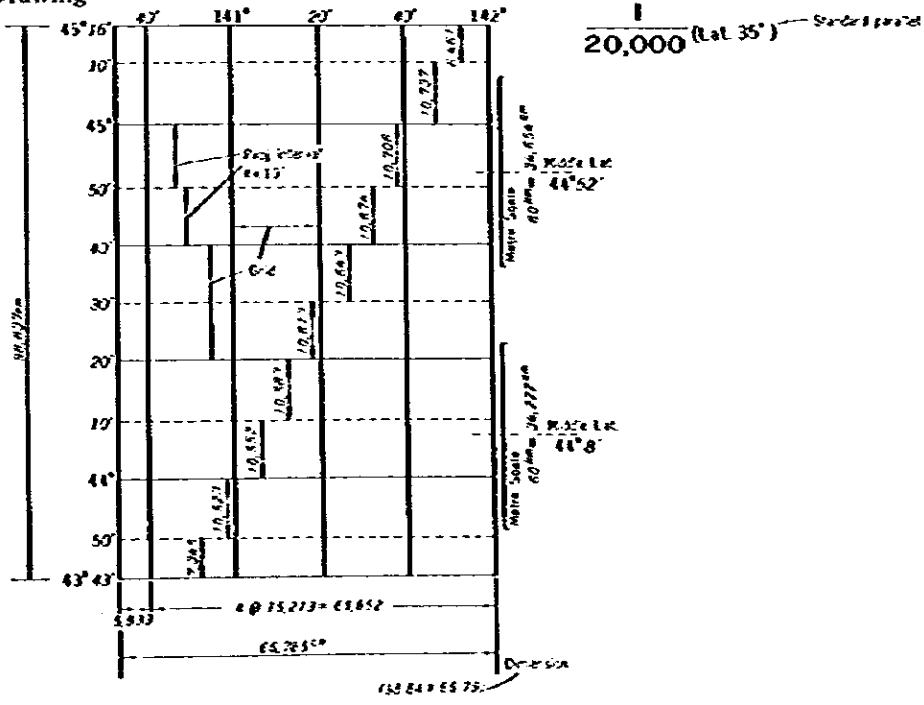
$$= 100000 \times \frac{0.76065}{131700}$$ (0.76065 is the value of Long. 1', ℓ_0, at Lat. 35°.)

= 0.57756cm ..... Length on the chart of 1000m at Lat. 44°52'.

The length on the chart of 60km is

0.57756cm x 60 = 34.654cm.

(C) Example of Drawing



The above figure shows the result of drawing based on the calculations in (A) and (B) above. Here, the parallel lines are obtained by plotting from the calculated values of lengths of projection intervals, from 43°50', 44°0', 44°10', ... 45°10', and 45°16'. On this chart, however, the graticules (grids) are at 20' interval, only those parallel lines at 44°0', 44°20', 44°40'' and 45° are drawn.

The graduation within each projection interval (i.e. from 44°0' to 44°10', or from 44°40' to 44°50', etc.) is made by equal dicing.

To draw the meridians, the length of the meridian on the left from 140°32'12'' to 140°40' is first plotted, and the remaining meridians are equally spaced at 20' interval from 141°0', 141°20' and 142°0'. The meridian at 142°0' should coincide with the right-hand side neat line of the chart.

Subdivision of graduation for meridians are made by equal dicing.

4.2.5. Selection of Source Materials and Indication of Areas where Those Materials are to be used

When planning and compiling a large-scale chart, normally the source materials to be used are few, whereas for a medium-scale or small-scale chart, a considerable amount of materials will be used.

These materials are examined in detail and are indicated on the planning sheet. Different materials are shown in different colours for easy identification to facilitate the compilation work. In the areas thus defined, the kind, number, scale, year, date and/or quantity of source materials are legibly annotated. This serves to collate the names of source materials enumerated on the planning note which is explained in the following paragraph. It also enables the compilation officer to arrange expeditiously the source materials to be used. (See Fig. 2.)

Based on the planning sheet, the chart compilation officer prepares the source charts by enlarging or reducing the necessary source materials to the required scale of the chart to be produced.

4.2.6. Chart Title

The descriptions to be included in the title block are drafted and their layout is positioned.

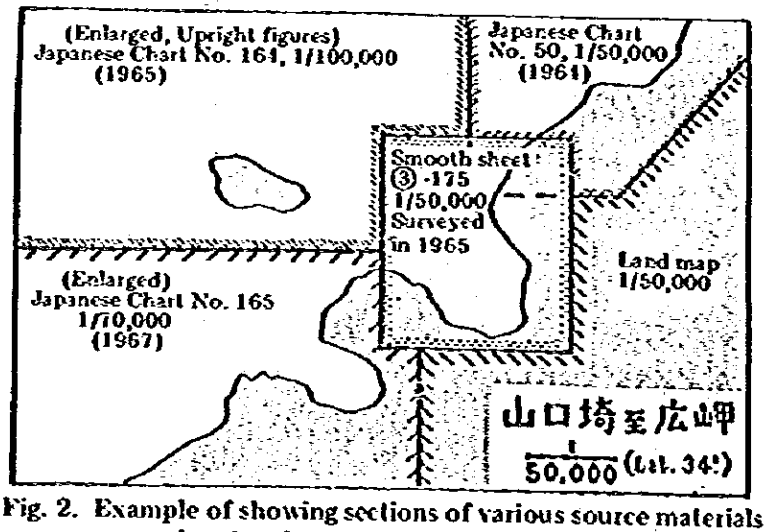


Fig. 2. Example of showing sections of various source materials on a planning sheet.

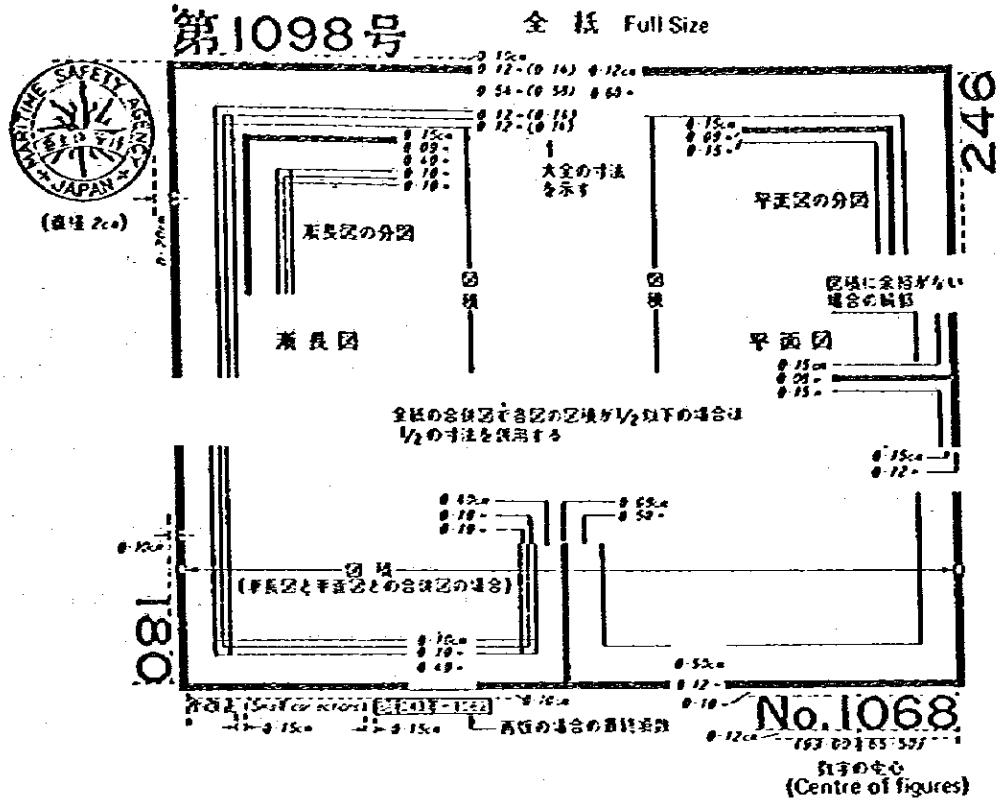


Fig. 3. Border and marginal information of a chart (Example of a Japanese chart).

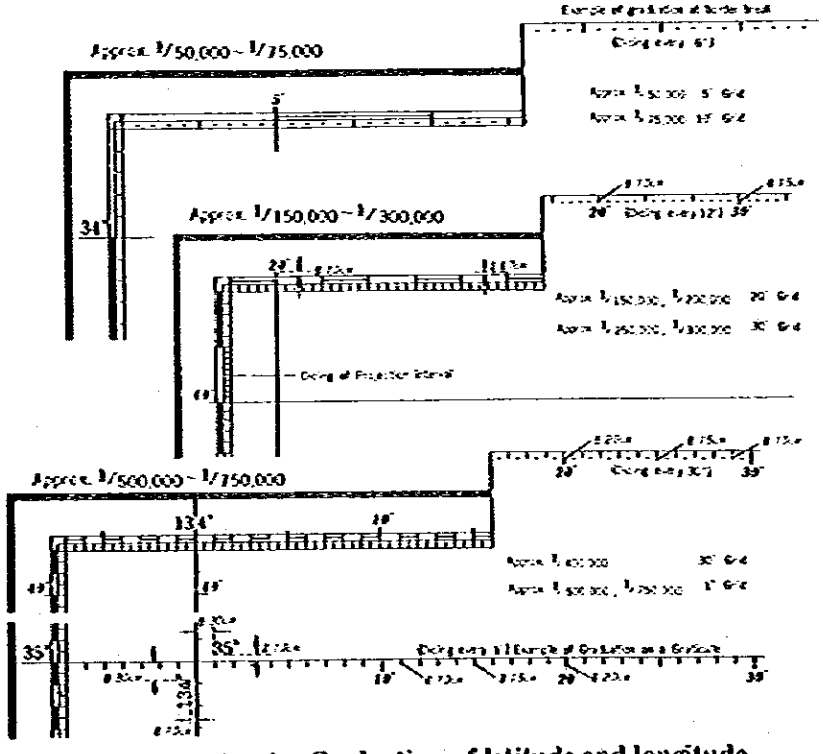
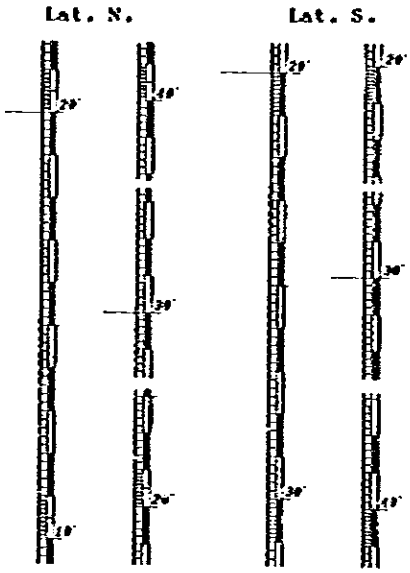


Fig. 4. Graduation of latitude and longitude (Example of a Japanese chart).

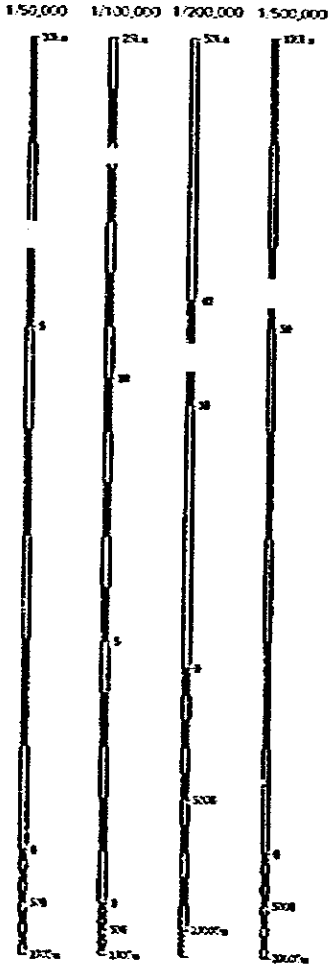


The arrangement of the pattern is as shown in this figure irrespective of Lat. N. or S. or Long. E. or W.

Criteria for graduation of graticules

- The graduation of graticules shall be made as follows on all general charts and sailing charts and on those general charts of coast which are necessary.
- On a lengthwise full size sheet: Two parallels and one meridian.
- On a broadwise full size sheet: One parallel and two meridians.
- The graduation shall be made in the same direction irrespective of Lat. N. or S. or Long. E. or W.

Fig. 5. Subdivision and dicing of projection interval (Example of a Japanese chart).



Criteria for showing metre scales

Scale	Broadwise full (1 scale) Lengthwise 1/2 (1 scale)	Lengthwise full (2 scales) Broadwise 1/2 (1 scale)
Around 1/50,000	16km	11km
" 1/75,000	21	16
" 1/200,000	60	50
" 1/500,000	160	110

Fig. 6. Metre scales and criteria for showing metre scales (Examples of a Japanese chart).

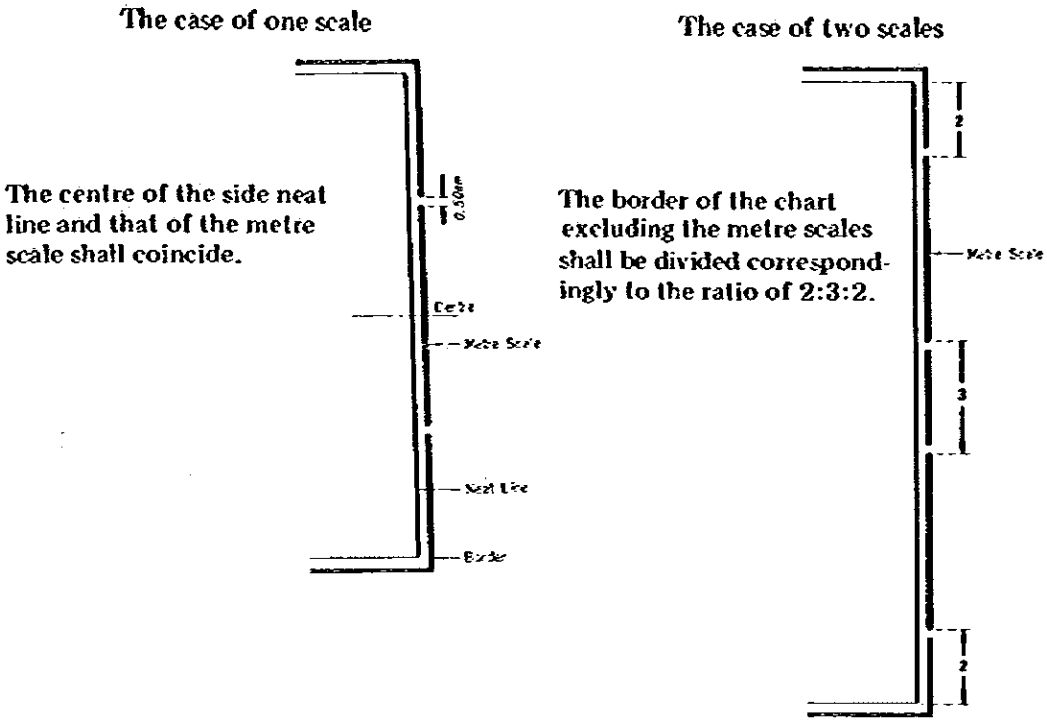


Fig. 7. Location of metre scales. (Example of a Japanese chart)

4.2.7. Compass Rose.

The location and the size of a compass rose are sketched on the planning sheet.

In locating the compass rose, attention should be given to the following points:

i) When a chart requires folding, no part of the compass rose should fall on the folding line.

ii) If a compass rose cannot be placed in the sea area, it should be placed in the nearest land area. If such a case is required on a small scale chart, values of the magnetic variation and the annual change should be calculated for the sea area where the compass rose should be used.

iii) If a compass rose is placed in a land area for the use in the sea areas on either side of it, values of the magnetic variation and the annual change should be the mean values of the sea areas.

iv) The values of the magnetic variation and the annual change should be for the year of publication of the chart.

v) "No Variation" and "nearly stationary" should be used for zero magnetic variation and no annual change, respectively.

vi) Compass roses are not to be placed within conspicuous land features.

vii) Sounding figures are not to overlap with the graduation of the compass rose except for those of special importance. They should be replaced by neighbouring soundings as far as possible. Some overlapping may be permitted as the graduation strokes of the compass rose are quite long. Care should also be taken so that the 'depth

contour' should not be delineated too close to the graduations or the labellings of the compass rose unless required. The 'depth contour' may affect the legibility of the chart.

viii) No 'period' is to be shown for abbreviations.

ix) The sign of degree "°" is to be omitted.

x) The values of variation and annual change should be given to the nearest 5' and 0'. 5, respectively.

eg.:

Variation		Annual change	
For 0 – 2.4	indicated by 0	For 0 – 0.24	indicated by 0
For 2.5 – 7.4	indicated by 5	For 0.25 – 0.74	indicated by 0.5
For 7.5 – 12.4	indicated by 10	For 0.75 – 1.24	indicated by 1

xi) In harbour charts, the values of variation and annual change should be the average values of the sea areas.

4.2.8. Principal Geographical Names.

Names of places and features are shown in approximate sizes of type faces on the planning sheet.

4.2.9. Railways.

The approximate positions of railways and their destinations are shown on the planning sheet.

4.2.10. Submarine Cables.

Submarine cables are to be shown on the planning sheet.

4.2.11. Others.

i) Positions of storm signal stations (S. Sig.) and weather signal stations (We. Sig.).

ii) Position of life saving stations (L.S.S.).

iii) Measured distance.

iv) Direction of flow of tidal streams and currents.

v) Boundaries.

Outlines of national boundaries and administrative boundaries are not shown.

vi) "See Common Datum Chart Sheet ....."

For reference to larger scale charts or continuation charts (on the same scale or slightly smaller but suitable for navigation as a continuation of the present chart), the numbers and limits of such charts are shown appropriately. If it is inadequate to show the limits, only such chart number is indicated between the neat lines and the border of the chart.

vii) Harbour limits, borders of harbour sections and channels, etc.

Harbour limits, borders of harbour sections and channels, etc. may be shown.

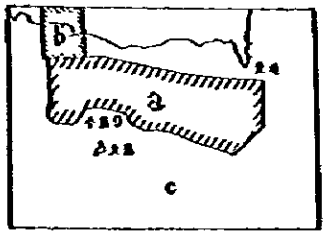
viii) Notes and cautionary notes.

These are described at the bottom of the title block or in the blank space. According

to the situation, they may be charted in the viciniy of the place concerned.

ix) Source data.

A detailed diagram indicating the limits of source materials is to be shown. (See Fig. 8.)



a: Survey in 1962.
b: Survey in 1959.
c: Survey in 1960.

Fig. 8. Source data

4.3. Planning Note.

Items such as the adopted source materials etc. are enumerated on a list. This list should also include materials which can be comprehensively shown on the planning sheet.

Such a list is called a 'planning note' which is equally important as the planning sheet for chart compilation. (See Fig. 9(A) and (B).)

The planning note determines the reliability of the chart to be prepared. If a problem arises after a chart is published, only the planning note can be consulted to solve such a problem. It will also be fully utilized as a 'chart record'.

Accurate description of the following items are to be given in the planning note:

(A) Kind of the planning sheet (for new chart or new edition of existing chart).

(B) Chart number.

(C) Title.

(D) Scale (in a Mercator chart, the standard parallel is to be indicated).

(E) Area (the general area of the chart).

(F) Size of the sheet (full size, half size, etc.).

(G) Units (sounding unit is indicated, e.g. metres).

(H) Source materials.

Main source materials: The number, title, scale, year published or year surveyed.

Auxiliary source materials: Auxiliary materials of information, such as information on reclamation works in a harbour, land features and railways supplemented from land maps, various information adopted from smaller scale charts by enlarging, etc.

(I) Calculation of projection intervals.

(J) Positions and names of control points actually surveyed; unit length of metre scale.

(K) Positions of compass roses as well as calculated values of magnetic variations and annual changes.

(L) Dimensions of the neat line.

The above-mentioned items are described on the front side of the note. On the reverse side, the purpose and principal points of the planning are described.

There is a column to be entered by a chart planning officer or a draughtsman when a need of recording some items during the work of compilation of drawing is recognized.

4.4. Names' Guide Sheet.

This sheet shows the result of investigation made to the geographical names to be charted. The planning sheet may sometimes serve as the names' guide sheet.

4.5. Review and Check of Planning Data.

The planning manuscripts are thoroughly reviewed, checked and corrected before they are sent to the chart compilation section. Special attention should be given to the following points during the reviewing and checking:

(a) Any mistake in the selection of source materials.
(b) Adequate coverage of the chart.
(c) Any error in various calculations.
(d) Complete investigation of geographical names.

4.6. Collation Table of Chart Compilation Planning.

During chart compilation planning a collation table is prepared as a 'check list' for reviewing and checking of the planning sheet. Fig. 10 shows a sample of the collation table.

This check list is disposed after it is fully used, however, planning manuscripts shall be retained at the planning section. The planning manuscripts are the historical record of the chart and will be used for solving any problem of the published chart and its revision in the future.

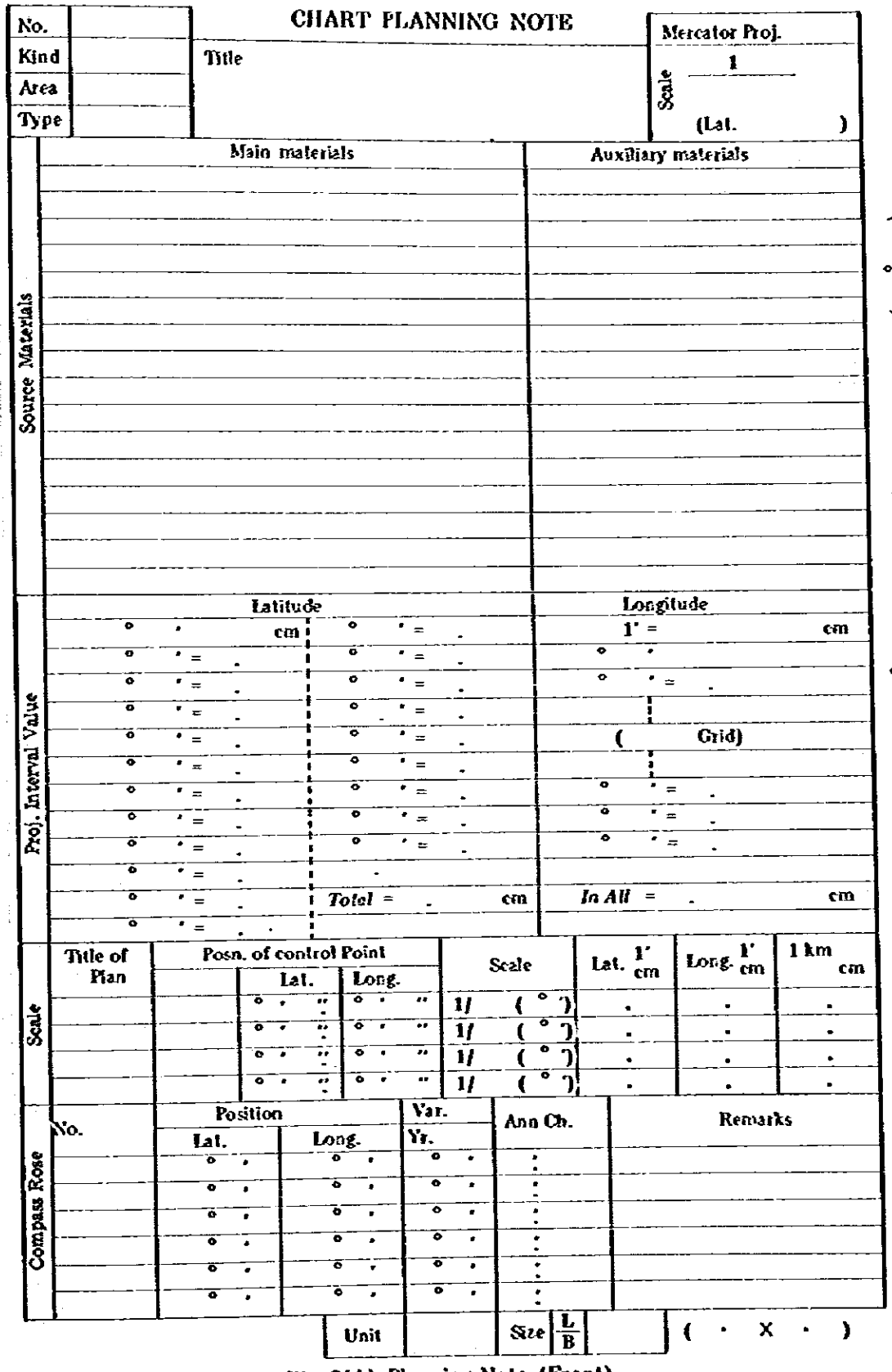


Fig. 9(A) Planning Note (Front).

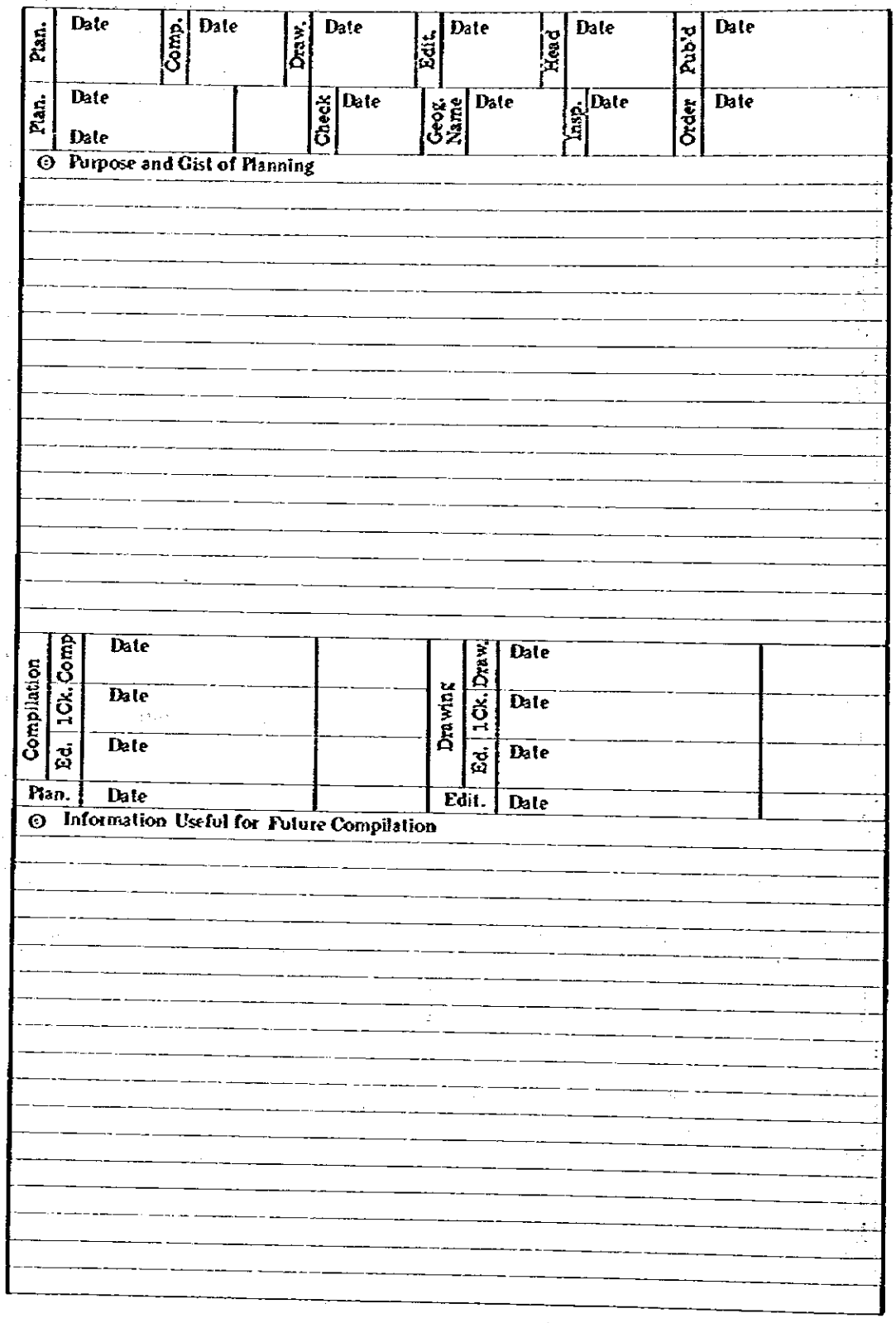


Fig. 9(B) Planning Note (Back).

COLLATION TABLE FOR CHART COMPILATION PLANNING

Note: "X" is marked in the box of the item checked.

Planned by:

Checked by:

No.		Title		Kind		Priority	Ordinary Express Special

PLANNING SHEET

Item to be checked	Plan. Off.	Check Off.
Examination of chart coverage.		
Preparation of basic sheet of planning sheet (Enlarge and reduce).		
Border representation (No. graduation, linear scale, etc.).		
Drawing of topography and insertion of principal geographical names.		
Examination of source materials (Related charts, including foreign charts).		
Delineation of areas where source materials are used.		
Submarine cables, overhead cables, etc. (Maritime offices).		
L.S.S., Cus. Ho., Hr. Off., etc. (Maritime offices).		
Railways.		
Measured distance.		
Harbour sections, passages, quarantine anchorages (Degree of omission considered depending on the chart scale).		
Investigation of designated anchorages in ports, names of wharves and berth numbers.		
Examination of source materials adopted.		
Various cautionary notes.		
Topographic information adopted, investigation of land maps.		
Title of chart.		
Reference to Primary Original Chart (If necessary, NMs).		

Item to be checked	Plan. Off.	Check Off.
Collation with related Sailing Directions.		
Standardization with others in the same series.		
Location of compass roses (position and type).		
Tidal information, information on tidal currents and ocean currents.		
Date of completion of the planning sheet. Signature.		

PLANNING NOTE

No., title, graphic scale, kind, area, dimensions, etc.		
Source materials (Main and auxiliary).		
Calculation, positions of control points (Lat. & Long. scales, metre scale, calculation of projection intervals).		
Position of calculation of magnetic variations (Epoch).		
Purpose and gist of planning.		
Date of planning, investigation of geographical names and source materials. Signature.		

INVESTIGATION OF GEOGRAPHICAL NAMES

Refer to lists of geographical names.		

OTHER INFORMATION

Fig. 10. Collation table for chart compilation planning.

(For information only)

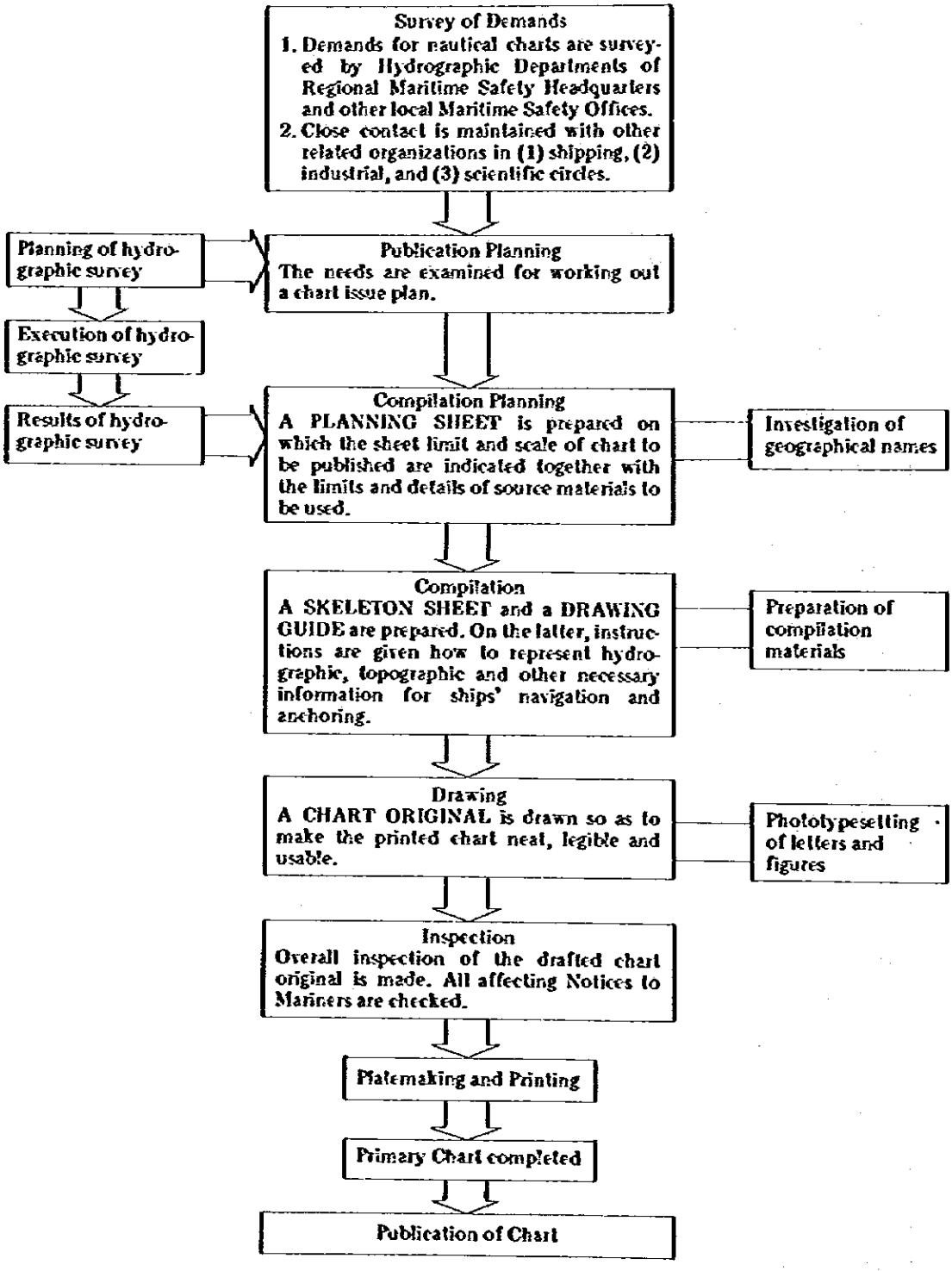


Fig. 11. Process of chart production in the Hydrographic Department of Japan

SECTION II – COMPILATION

5. The chart compilation officer compiles all the source materials required for compilation of the chart, in accordance with the planning manuscripts, i.e. planning sheet, planning note, name's guide sheet, etc. He thoroughly examines those materials used for the production of the chart (as to items enumerated on the planning note) and the information contained in those materials which are suitable for charting in accordance with the area to be used (indicated on the planning sheet).

At the compilation section, a skeleton sheet of the chart is produced and a compilation sheet which gives detailed instructions for drawing is prepared.

5.1. Skeleton Sheet

The skeleton sheet is prepared by accurately plotting the border, neat line of the chart, graduation of latitude and longitude, graticules, graphic scales and control points, etc. The necessary data for computing those items are given in the tables which are prepared by a computer on the planning note.

The plotting is made on an aluminum-kent paper called 'sandwich paper' by using a coordinatograph. The degree of expansion and contraction of the sandwich paper is negligible. The contents of the skeleton sheet are as follows:

5.1.1. Neat line

The neat line corresponding to the dimensions of the chart coverage is delineated by the coordinatograph.

5.1.2. Graduation of Latitude and Longitude

While plotting the neat line, graduation of latitudes and longitudes are also plotted by the coordinatograph. The points plotted are then carefully marked with pencil.

5.1.3. Metre Scale

The metre scales of required length (designated in the planning sheet) are inserted at the border on the left and right side of the chart (the border is drawn outside the neat line). Their positions and graduations of scale are plotted by the coordinatograph, which are then clearly marked by pencil.

5.1.4. Plotting of Control Points

In completion of the above plotting, i.e. neat line, graduation, representation of the border, etc., the control points which serve as supplementary control points are plotted.

The control points should be plotted after selecting them from the list of geographical positions or other source materials. The selection should be made in accordance with the following:

i) Those which serve as important landmarks for navigation (such as a conspicuous summit of a mountain, a top of an island, etc.).

ii) Those located near the border of the chart (if required, outside of the border) as

well as those near the marginal portions of the source materials or near the coastline (so that they will serve as reference points for connecting adjoining materials).

The control points thus plotted should be clearly marked and named, so that they may be easily referred when compared with the source materials. These points should be the reference points, or supplementary control points in commencing the preparation of the compilation sheet.

The skeleton sheet which is prepared should indicate the number and title of the chart, preparation date, and name of the person in charge. The skeleton sheet is utilized as the common media for the preparation of the compilation sheet. During the drawing stage, drawing is done on the myler base placed on this skeleton sheet.

5.2. Adjustment of Source Materials

The source materials to be used are usually not on the same scale with the chart to be produced. Therefore, they should be adjusted according to the following procedures:

5.2.1. Materials on the Same Scale

If the scale of the smooth sheet or the existing chart is the same with that of the chart to be produced, such material would become the source chart.

5.2.2. Where the Scale Ratio is Small

If the scale ratio of the chart to be produced and the source material is small, such material is to be reduced or enlarged to the same scale with the chart. That reduced or enlarged material directly serve as the source chart.

5.2.3. Where the Scale Ratio is Large

If the scale of the source material is larger than the chart to be produced, the details of the information would be illegible for identification even the general pattern is accurately reduced. Therefore, an interim manuscript is prepared on which the details of the original material is enlarged to a size which is suitable for reduction to the scale of the chart to be produced. The contents of the material are selected appropriately, omitting minor unnecessary information. Such interim manuscript is then photographically reduced to the required scale. The interim manuscript is called 'block copy'. Preparation of the block copy requires great skill in compilation work.

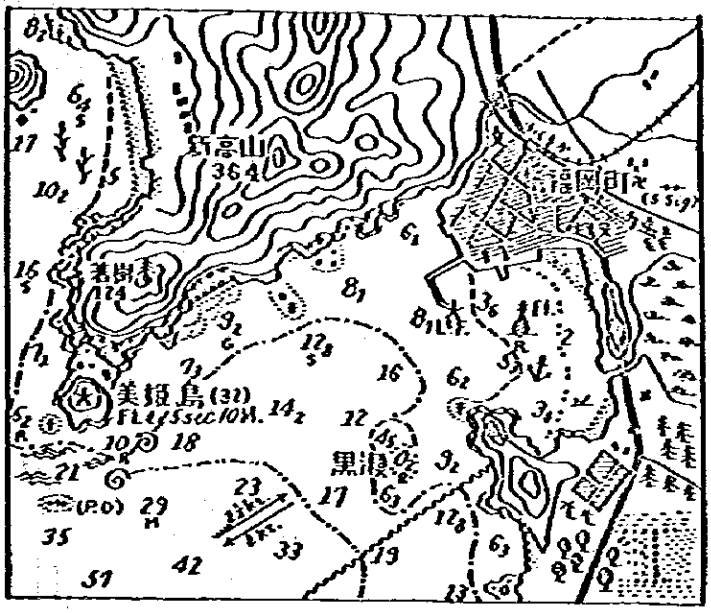


Fig. 12(A). Block copy for reduction.

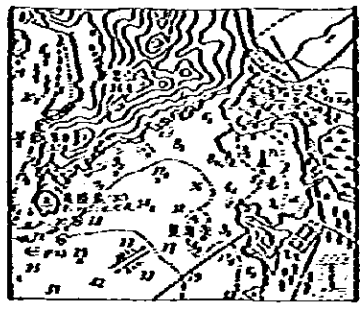


Fig. 12(B). Block copy for reduction — Photographically reduced to 1/2 of the original size.

5.2.4. Reduction (or Enlargement) of Source Materials

The method of reduction or enlargement by means of photography is mostly used, and is most accurate. However, distortion is inevitable during the course of processing (e.g. distortion of the paper during the washing).

5.2.4.1. Limit of Reduction

i) In principle, a block copy is prepared from the source material which is to be reduced to 1/2 or smaller.

ii) As time permits, the block copy should be thoroughly checked before it is sent to the reproduction section.

5.2.4.2. How to determine the Reduction Ratio

There are various methods to determine the reduction ratio for a material according to the degree of distortion of the original material or the difference in projection. Usually one of the following methods is used:

i) The ratio of a line between any two points on the sheet.
This is used for reduction of medium-scale sheets, e.g. 1/10,000 to 1/50,000. The line is selected so that its length is the longest between a pair of control points or of triangulated stations which will become the supplementary control points of the chart; or fixed objects (rocks uncover, points of islands, etc.).

ii) The ratio between the intervals of latitude and longitude, or metre scales.
It is used in preparing manuscripts of small-scale charts.

iii) The ratio of scales.
This is a fractional rate obtaind by simple calculation. It is used for preparation of source charts, but a better accuracy could not be expected.

5.2.4.3. How to depict Topographic and Hydrographic Information

i) The appropriate contents are selected and depicted with omissions or exaggerations so that the reduced pattern may become a suitable size.

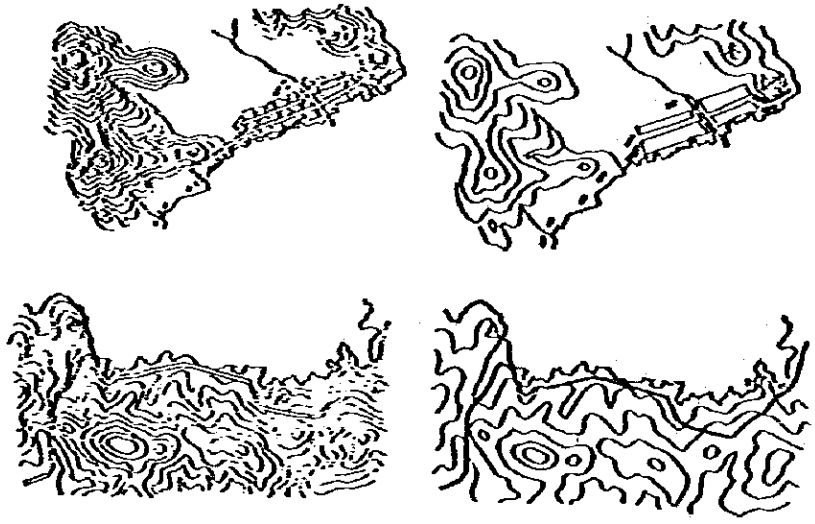
ii) For instance, in reducing an original material to 1/3, it is desirable to draw a sounding figure of about 5mm for the original size which is about 1.7mm. This also applies to the case of letters.

Example.

Reduction ratio:	½	⅓	¼	⅕
Sounding figure:	0_1	1_2	2_3	4_4
Letters:	東	西	南	北

iii) The spaces between land features or between lines are appropriately expanded as far as it allows.

Example.

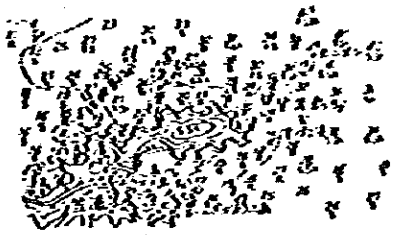


iv) The central position of control points, lighthouses, summits of mountains (triangulation stations), etc. which would become supplementary control points are clearly and exactly plotted in position.

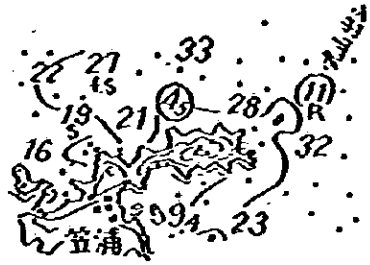
Example.

v) Details as in example (1) below is reduced, the pattern becomes illegible. Therefore, depiction of the items is made in the order of importance. The less important ones are omitted as in example (2).

Example.



Example (1)



Example (2)

5.2.4.4. Depiction in Different Colours

Lines representing coastlines, drying objects (inter-tidal areas), depth contours, etc. are drawn in different colours according to the following criteria. By this method, time can be saved as compared to the case of depicting them strictly in accordance with the chart symbols. Moreover, distinction between the nature of objects such as rocks which do not cover and rocks which covers and uncovers can be distinguished easily than the depiction in black only.

Various colouring are used:

a) Coastlines, soundings, auxiliary points for soundings, geographical names.....Black
b) Drying heights, contours.....Brown
c) Depth contours .....Green
d) Control points, triangulated stations, lighthouses, danger lines ..... Red
e) Roads, urban areas ..... Red

5.2.4.5. Order of Drawing

i) The accurate position of those points that becomes the supplementary control points of the chart are very important, e.g. control points, lighthouses, triangulated stations, etc.
ii) Features in the water area such as coastlines, rocks which do not cover, drying areas, etc.
iii) All hydrographic information such as soundings, bottom characteristics, depth contours, etc.
iv) Topographic features, contours.
v) Scale.
vi) Lettering drawn in a legible size should take the scale into account.

5.2.4.6. How to make Omission

i) Coastline.

When the nature of the coastline is short after the reduction on the compilation sheet, such coastline should be omitted in actual drawing. In case of long sandy

beach intervened by small patches of gravel, the coastline on the whole is represented as a continuous sandy coast. However, for a case where there is a steep cliff which constitutes a good landmark for navigation among the continuous sandy coast, the cliff is drawn with exaggeration to some extent.

In a small scale chart such as a navigational chart, all the coastlines are drawn as a flat coast, unless there is a considerably long coast of a specific type.

ii) Rocks, islands, features which dry at low water.

Those features are normally charted, especially, those of isolated ones should always be shown. When it is difficult to show all of them according to the scale of the chart, those located furthest offshore or isolated should be charted first. Rocks which do not cover or islands which are higher in height or larger in size should be charted first. Features which cover and uncover which are situated close together should be collectively depicted.

iii) Soundings

a) The selection of soundings should be carried out carefully. Each and every sounding figure adopted should represent the depth of the surrounding area.

b) Selection of soundings should also be compared with existing charts whose scales closest to the compilation sheet.

c) Selection of soundings should be made by taking into consideration of the type, scale and the degree of importance of any particular area of the chart. All selected soundings are not necessarily adopted and those not adopted are to be indicated by small dots as auxiliary soundings for convenience in supplementing soundings at a later stage of the work.

d) In selecting soundings, shallower ones should be given priority with deeper ones gradually omitted. Least depth of sunken rocks, shoals and obstructions, etc. is given first priority. Shallow soundings should not be overlooked though consideration would be given to the intervals of soundings according to the scale of the chart.

e) In the case of a river or a narrow channel, deeper soundings are selected to indicate navigable fairways. Any sunken rocks and shoals should not be omitted. However, there are many cases where it is difficult to include all of those objects. In such cases, the omission is made to objects which may be less dangerous to navigation, so that the purpose of clearing dangers may not be lost.

f) The deepest portion of a bay or a trench should always be charted.

g) The soundings of less than 1 metre where the nature of the bottom is rock, they may sometimes be shown as sunken rocks by the symboll ' + '. If sounding figures can be shown, the symbol ' + 'should not be excessively used.

h) The density of soundings should be denser in areas near the coast or the areas where the bottom topography is very irregular. Where the bottom topography is regular, the soundings are sparsely charted. In case where a depth contour is delineated to include a shallow sounding much less than the contour value, such shallow sounding should be selected. Sounding of an isolated shallow depth surrounded by a depth contour should be shown. If a sounding whose bottom

characteristic is different from the surrounding bottom, it should be adopted. Soundings with "R" should be used for rocky bottom.

iv) Quality of the bottom.

a) In principle, when the quality of the bottom is similar and of no variety, it should be shown sparsely.

b) In areas where there are varieties of bottom, different qualities should be selected to give a clear distribution. Rocks and gravels should be shown as far as possible, while sand and mud are firstly omitted.

In the surrounding areas of reefs, basins and anchorages, the qualities of the bottom should be charted as densely as possible.

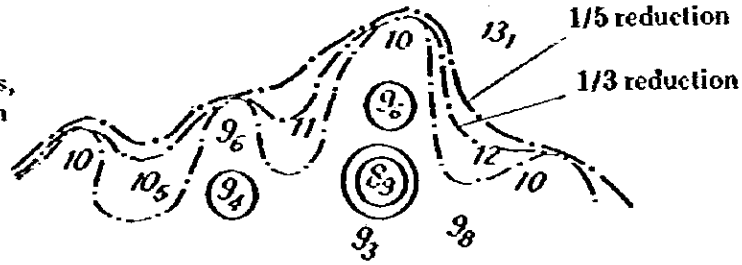
v) Depth contour.

a) The larger the scale of the chart, the finer the depth contour is delineated. When the reduction ratio is small, the depth contour is drawn accurately. In case where the reduction ratio is large, the depth contour requires to be smoothened for drawing.

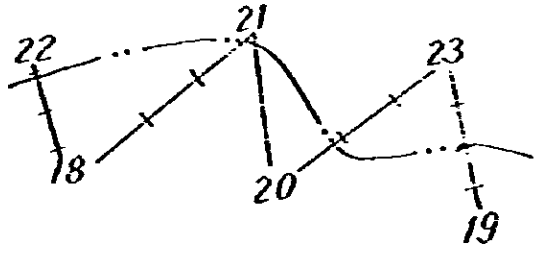
However, the depth contour should not be drawn by shifting it to the shallower portion.

Example.

As for selection of soundings, "8_3" is adopted at first, then followed by "9_4" and "9_6". "10" is not adopted.



b) In order that the position of depth contour is determined based on soundings, the sea bottom between a pair of soundings is assumed to be flat and sloped uniformly. The portion is delineated proportionally between the soundings. It is to be noted that the depth contour should always be shifted slightly towards the deeper area is required but never towards the shallow area.



c) For details, see Symbols and Abbreviations for the Joint Production of Common Datum Charts.

vi) Omission of land features.

For selection of land features, such as conspicuous landmarks from the sea are

preponderantly selected by referring to Sailing Directions related to the locality. Consideration should be given so that the chart would be conveniently used by navigators.

Same rule also applies to hydrographic information in representing the chart for all relevant information. Land features shown on charts whose scales are smaller should be included on the compilation sheet.

a) Elevations; geographical names.

Names and elevations of islands, features which dry at low water and mountains which are visible from the sea should be adopted as much as possible to an extent not to hamper the legibility of the chart. Omission of geographical names should be firstly made from those which are not important from navigational purposes. Names of capes and points should be printed in the water area whenever possible. If the charted information is too crowded in the water area, they may be placed on land. The name of a river should be placed on land so as not to confuse with the hydrographic information. For lettering the names of islands and others which are to be shown in the water area, great care should be exercised so that the importance of sounding figures may not be obliterated.

b) Landmarks.

Aids to navigation such as chimneys, conspicuous trees, etc. which constitute good landmarks which are seen from the sea, should be charted as much as possible by taking into account the purpose of the chart according to the scale.

c) Rivers.

Omission is made to small rivers, the priority of charting being given to larger rivers.

d) Contours (representation of mountain forms).

Although it depends upon the scale of the chart, it is necessary to draw the contour lines so as not to lose the original from of the mountains. This is done by confirming the directions of ridges and valleys as well as their continuities.

As for mountain summits, those visible from the sea should be charted as much as possible.

In particular, care should be exercised so that isolated peaks and small conspicuous tops of points or capes should not be overlooked.

Representation of mountain forms should be made by contour lines on land maps supplemented by form lines. The contour intervals are as follows:

1/10,000 ... Every 20m (approx.)	1/100,000 ... Every 50m (approx.)
1/30,000 ... " 30m (")	1/200,000 ... " 100m (")
1/50,000 ... " 30m (")	1/500,000 ... " 200m (")

Contour intervals may be narrowed by supplementary contours in order to emphasize the features near the coast or the summit of mountains.

5.2.4.7. Preparation of Scale Guide

The scale guide is used to obtain the designated size of the sheet when it is reduced or enlarged by means of a process camera. The required size is indicated on a narrow bold paper,

which is sent to the printing section together with the block copy (or original material).

5.3. Drawing Guide

When all the source materials are adjusted and used to give detailed instructions for drawing, selection of soundings is performed on the source charts. Since considerable amount of soundings are drawn on the smooth sheet in a precise manner, the selection is made to those soundings which are indispensable for navigation, based on the fixed criteria. In this case, the value of the original smooth sheet should not be deteriorated.

The selection of soundings is the most difficult work for chart compilation as it requires a skilful judgement. On the source chart, detailed instructions are given to soundings, various information and supplementary details. In case of transformation of projections, such supplementary control points common to the skeleton sheet as mentioned early and such features common to land maps used for supplementing the land features, are clearly indicated by using symbols, notes, etc.

A drawing guide is prepared on which every item that should be drawn on the chart as a final product is indicated. It is different from drawing an original chart, but it is sufficient for the drawing guide to indicate accurately the positions of various items to be charted.

On the drawing guide, it is sufficient to indicate precisely only the positions of charting such items that the formulated, whose details should be taken from those shown on the planning sheet. Thus, any duplicate work should be avoided.

Take the title block for an example. The position of the title block of the chart is roughly designated on the planning sheet together with the contents to be described therein. The precise position of the title block is then indicated on the drawing guide with various dimensions. The contents, however, should be taken from the planning sheet at the time of final drawing.

5.3.1. Procedure of Preparation of a Drawing Guide

An emphasis on a chart is put on the hydrographic information, and the land information is of a secondary importance. The land features shown are limited to those which only can be seen from the sea or appear on the radar screen, various maritime offices and other facilities related to navigation.

Gist of compilation of hydrography and topography will be explained separately below.

5.3.2. Compilation of Hydrography

The compilation of hydrography concerns the main areas directly related to ships' navigation. It is required to prepare the drawing guide by taking into account the accuracy corresponding to the scale of the chart to be produced, as well as the clarity of the chart.

5.3.2.1. Soundings.

Soundings should be charted so as to provide mariners with sufficient information to enable them to judge adequately the configuration of the sea bottom and select a safe route avoiding dangers for safety navigation.

Smooth sheets of survey show details positions and areas of sunken rocks and shoals which may constitute navigational hazards. It is, therefore, necessary to select soundings at appropriate

intervals so as to facilitate reading and to adjust the chart presentably. The selection of soundings is most important in chart compilation and it requires experience.

The soundings selected should directly be able to represent the configuration of the sea bed so as to show the submarine topography as accurately as on the smooth sheet. As for the sunken rocks and shoals, the shallowest soundings should be charted. In a narrow channel, the soundings should be so charted that they may indicate as a navigable water. Around the limits of a dredged fairway in a harbour, the soundings obtained after dredging should be shown so as to endorse the depth contours.

Soundings in an area of largely configurated sea bed should be densely selected. Soundings should be selected sparsely in a gently-sloping sea bed area. In a deep sea area, soundings are generally utilized in navigation by sounding.

5.3.2.2. Quality of the Bottom

Quality of the bottom is important to indicate the anchor holding in a harbour or a roadstead. Indication of the quality of the bottom should clarify the distribution of different qualities. Places where the qualities are complicated, indication should be made as densely as possible.

In those days when sounding was carried out by hand-lead, it was possible to know the quality of the bottom at each sounding position. When echo sounder is used, the bottom sampling should be conducted separately from sounding operation. In cases where the number of bottom quality is insufficient even if all information on the smooth sheet is adopted, they are to be supplemented data previously collected. This method should not be adopted in dredged harbour or channel where bottom characteristic may have been changed since last survey. This may pose a danger to navigation.

The quality of the bottom is generally indicated by abbreviations below the sounding figure. (See Fig. 13)

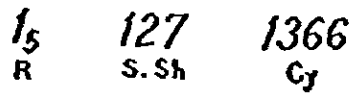


Fig. 13. Indication of quality of the bottom.

The soundings and the quality of the bottom selected in accordance with the above-mentioned procedures are indicated on the drawing guide.

5.3.2.3. Depth Contours

The larger the scale of a chart, the more detailed the depth contours should be indicated. It is impossible to indicate the depth contour as it is whenever the scale ratio is large. The depth contour should never be shifted to the shallower area.

5.3.2.4. Compass Rose

Although the positions and sizes of compass roses are placed approximately on the planning sheet, the accurate positions should be fixed on the drawing guide after adjustment and

judgement being made with neighbouring sounding figures. It either shows the sounding figure or graduation of the compass rose depending on the importance whenever they overlap. Caution should be exercised as far as possible not to omit the graduation. Values of magnetic variation and annual change should be shown on the planning note if the compass rose is adjusted. Those values should be described in accordance with the format. If a compass rose is placed in the land area, the information covered by the rose is usually omitted except those conspicuous objects which useful to navigation.

5.3.2.5. Harbour Limits, Borders of Sections, Channels, etc.

These limits and borders are roughly delineated on the planning sheet and drawn with reference to the relevant Port Regulations using the prescribed chart symbols. Other maritime limits, such as quarantine anchorages, prohibited areas, etc. are drawn by using the corresponding chart symbols in accordance with the scale of the chart.

5.3.2.6. Aids to Navigation.

Aids to navigation include lighthouses, lightstaffs, lightbeacons, light buoys, radiobeacon stations, radio direction-finding stations, radar stations, Loran stations, etc. Aeronautical lights that are useful for surface navigation are also to be charted. These aids are charted at their correct positions. Names and legends are abbreviated or simplified as necessary according to the scale and charted in accordance with the Symbols and Abbreviations for the Joint Production of Common Datum Charts. The legends for lighthouses and light buoys especially are to be described in the abbreviated form according to the scale and other conditions.

5.3.2.7. Wrecks, Swept Areas, Overhead Cables, Submarine Cables, Tidal Current Arrows, etc.

These are drawn on the drawing guide based on the data indicated on the planning sheet.

5.3.2.8. Fishing Nets, Fishing Stakes, etc.

Fixed fishing nets and fishing stakes are drawn as required, and a cautionary note should be included to draw the attention of the mariners.

5.3.3. Compilation of Topography

In order to make the chart more intelligible, the inland topography should not be charted unless it is essential for navigation. The topography near the coast is to be drawn in detail. Features which are sited far inland are to be omitted.

The main items for the compilation of topography are explained in the following paragraphs.

5.3.3.1. Coastline

On a large-scale chart, the coastline should be drawn by chart symbols classified according to the nature of the coast, e.g. flat coast, cliffy coast, rocky coast, sandy coast, etc.

As the scale becomes smaller, the classification of coastline should be made simpler according to the purpose. An example of this is contained in the sailing chart or the general chart where the coastline is represented uniformly by a continuous fine line.

5.3.3.2. Natural Features

For the representation of natural features, contour lines, or a combination of contour lines and form lines are employed. Features which are not visible from seaward or on the radar screen are omitted. The contour interval is determined according to the scale of the chart. Auxiliary contour lines may also be drawn.

5.3.3.3. Rivers

The navigable areas in the river are treated as part of the sea and are charted in detail. The remaining parts of the river as well as small stream flowing into the sea are charted as far as possible.

5.3.3.4. Lakes, Swamps, Woods

On harbour plans, these features are charted in detail for accurate discrimination of the coast. As the scale decreases, they should be omitted.

5.3.3.5. Railways, Roads

These are charted on large-scale charts. As the scale decreases, only principal ones are charted.

Railway bridges are charted as they constitute good landmarks for coastal navigation.

(f) Natural and Artificial Objects Necessary for Navigation

Conpicuous trees, rocks, cliffs, chimneys, tanks, towers, illuminated lights, advertisement lights, buildings, silos, radio towers, etc. are charted according to the scale of the chart.

(g) Buildings

Harbour facilities, maritime offices, factories, schools, hospitals, shrines, temples, etc. are charted as they are so required according to the scale of the chart. These landmarks are selected appropriately (according to the scale of the chart) from the land maps.

5.3.4. Application Standards of Chart Symbols and Abbreviations.

Chart symbols and abbreviations used for portraying hydrography and topography should conform to the brochure entitled 'Symbols and Abbreviations for the Joint Production of Common Datum Charts'.

5.3.5. Legends of Coloured Symbols used on a Drawing Guide.

The drawing guide serves as a manuscript for drawing. It is therefore necessary to make it intelligible to a draughtsman. Accordingly, items of hydrography and topography to be charted are classified by colours to make the drawing guide more legible.

It is advantageous that colour classification are agreed between the chart compilation officer and the draughtsman, as the latter can easily understand the various indication on the drawing guide. For example, it is easier and faster for a compilation officer to draw a long coastline by a simple coloured line rather than by the symbol provided in the 'Symbols and Abbriviations for the Joint Production of Common Datum Charts'.

The legends of the colour classification to be used on the drawing guide are shown in Appendix No. 1.

(Note)

i) The detailed portions to be represented should be carefully and neatly depicted so that the draughtsman can easily make them out.

ii) The colours to be used for the coloured symbols should be tinted by either colour pencils for information covering a wide area or a legible colour. On the other hand, if the colour is illegible, coloured ink or magic ink should be used.

iii) The rules for use of colours and symbols should be strictly observed. (However, different colours may be used where the information on maritime areas, etc. is complicated.)

iv) The border between different colours should be clearly indicated. (For example, the border in a coastline between different natures.)

v) When representation is difficult, the symbol should be explained in pencil.

vi) Others

a) Since orange and red colours are quite resembling, the distinction should be carefully made.

b) In case where there is a sandy or muddy area which dries at low water, the limit of the coloured portion should be clearly indicated in pencil so that the halftone area may be clearly shown. The shallower side of such area should be coloured.

5.3.6. Designation of Notes

When depiction of the chart contents is completed, designation is made to those notes indicated on the drawing guide. The types of type face to the used on the chart are as follows:

The size and spacing of the type face are larger for more conspicuous features with wider extent. In other cases smaller type face is used. The rules for using type face are provided in detail (See Section 3 paragraph 3.)

i) Type face used on Charts

Roman letters (Century School Book (C.S.B.), News Gothic (N.G.), Light Line Gothic (L.L.G.))

Example.	C.S.B.	N.G.	L.L.G.
Upright letter	A b	A b	A b
Italic letter	*A b*	*A b*	*A b*

ii) C.S.B.

This type face is normally used in geographical names, title of chart in the title block, etc.

a) Upright letters

Normally used for the title, administrative names, names of topographical features such as conspicuous points, mountains, rivers, etc.

b) Italic letters

Normally used for names of villages, geographical names of non-conspicuous points, mountains, rivers, etc.

iii) News Gothic (N.G.)

Used for the chart number, descriptions on soundings, heights and elevations in the title block, names of dangerous shoals, names of shipping channels, matters of special caution, etc.

a) Upright type face

Normally most of the items mentioned above are shown by in this type of type face.

b) Italic type face

Used for names of non-important shoals, etc. Less frequently used.

iv) Light Line Gothic (L.L.G.)

Used for cautionary notes, notes on the chart, names of government and public offices, names of factories, stations, etc.

a) Upright type face

Normally used for notes on the chart, names of government offices, public offices, factories, stations, etc.

b) Italic type face

Normally used for cautionary notes.

5.3.7. Type of Type Face for Soundings

i) L.L.G. Italic type face is used for normal soundings.

ii) L.L.G. type face is used for soundings taken from smaller-scale charts (in the area enlarged from a small-scale source material).

5.3.8. Type of Type Face for Notes

See actual examples shown on the chart.

5.3.9. Insertion of Geographical Names

In case of describing geographical names or other notes on the chart, the compilation officer has to select their appropriate places so that they may not hamper the charted information and that they may be most easily read.

Principal geographical names are already positioned approximately on the planning sheet. However, their precise positions as well as those of smaller names should be located one at a time during chart compilation.

In case of inserting a name of an island or a channel, care should be taken so that the name may not obscure nearby important soundings and other information, while the name should exactly indicate the feature to be named.

The rules for inserting geographical names are as follows:

i) It is the principle to display the names horizontally. If unavoidable, the name may be written in an arc from top to bottom or bottom to top and left to right. In any case the name should not be written vertically. In case of writing a name in an arc, see the examples in Fig. 14.

ii) The name of a river should be written in the river along its flowing direction. If it is not possible to insert the name in a narrow channel, it may be shown on the neighbouring land.

iii) In order not to clutter a chart with too much information the geographical name may be abbreviated according to the specifications defined in the Symbols and Abbreviations for the Joint Production of Common Datum Charts. (See Fig. 15.)

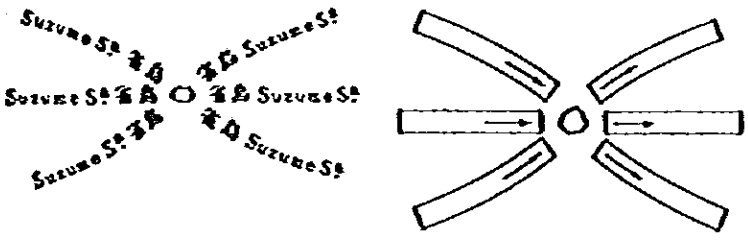


Fig. 14. How to insert geographical name.

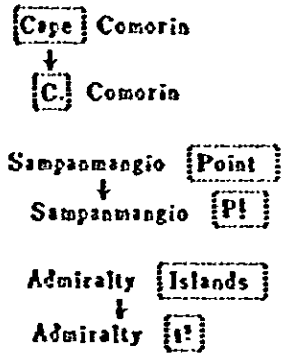


Fig. 15. Example of abbreviations.

5.3.10. Collation Table for Chart Compilation

When all items to be compiled are prepared, those materials for drawing are sent to the drawing section for checking and revising.

To facilitate the work of the compilation officer and the person in charge of revising, a collation table for chart compilation is prepared. (See Fig. 16.)

SECTION III – DRAWING

6. At the drawing section the original drawing of a chart which is a manuscript for platemaking is prepared based on the skeleton sheet and drawing guide.

6.1. Process of Drawing

6.1.1. Fair Drawing of Skeleton Sheet

A myler base is placed on the skeleton sheet which had been prepared during the chart compilation process, and the border of the chart, graticules, control points (datum points) etc. as well as graduations and other chart format as specified are copied carefully and neatly on the myler base.

6.1.2. Preparation of Phototypeset Materials

Geographical names and various type face which are to be shown on the chart are prepared by phototypesetting in a specified sizes and types so that they may be legible. The phototypeset type faces are printed on film positives for stick-up.

As for individual sounding figures, a vast amount of various combinations are constantly stocked so that the figures required are available at any time. This is the same as in the case of abbreviations of bottom characteristics.

COLLATION TABLE FOR CHART COMPILATION

Note: Mark "X" in the box of the item checked.

Compiled by:

Edited by:

Kind of work		No.		Title		Size		Priority	Ordinary / Express / Special

Item	Comp.	Edit.
SKELETON SHEET		
1. Investigation and calculation of control points		
2. Investigation and calculation of light buoys and buoys		
3. Preparation of program for co-ordinate graph		
4. Inspection of skeleton sheet		
ADJUSTMENT OF SOURCE MATERIALS		
1. Reference to same scale charts forthcoming shortly		
2. Omission on smaller scale charts (blank, etc.)		
3. Examination of comparison sheet of new and old surveys		
4. Aerial photographs, land maps		
5. Soundings (in relation to charts concerned), soundings in wharf frontage		
6. Corrections to metre graduation (when reduced)		
7. Bottom characteristics (supplemented from small scale charts and smooth sheets)		
8. Examination of overlapping portions with adjoining charts constituting a series		
9. Comparative examination with related small scale charts		
DRAWING GUIDE		
A. HYDROGRAPHY		
1. Wrecks, fish havens, obst., etc.		
2. Maritime limits (Prohibited areas, reclaimed areas, dumping grounds, etc.)		
3. Mooring buoys		
4. Basins, lumber basins		
5. Swept areas, densely sounded areas		
6. Submarine cables (communications and power cables)		
7. Overhead cables		
8. Leading lines		
9. Measured distance		
10. Various pipelines		
11. Fishing stakes		
12. Tidal current arrow (current arrow)		
13. Recommended track, swept areas		
14. Stone posts, framework towers		
15. Bench marks (stone)		
16. Harbour limits, borders of sections, passages (Refer to Port Regulations)		
17. Signal stations, quarantine anchorages (")		
18. Designated anchorages in ports (") Names of wharves and berth Nos. (Refer to related documents)		
19. Legends of lights, accompanying notes, visible sectors and sectors (Refer to List of Lights)		
B. TOPOGRAPHY		
1. Radio stations, radar stations (Refer to List of Lights)		
2. Coastline, adjustment of contours		
3. Inland rivers		
4. In case of adopting from land maps, adjustment of roads, railways, built-up areas, buildings, etc. near the coast		
5. Collation of mountain elevations between charts and land maps		
6. Conspicuous objects		
7. Selection of geographical names (Refer to maps, Sailing Directions, etc.)		
8. We. Sig., L.S.S.		
C. OTHERS		
1. Type, size and position of photo-typeset letters specially designated		
2. Position of compass roses (Examination of omissions within compass roses)		
3. Positions of title and other descriptions (in relation with topography)		
4. Index chart, source diagram		
5. Numbering of drawing guide and adjustment of joining portions		
6. Indication of additional source materials		
7. Collation with related Sailing Directions		
8. Insertion of the latest paragraph No. of NM affected		
9. Collation with descriptions in title block and contents of chart		
10. Reconfirmation of items described on planning sheet		
11. Notes to draughtsman, date of completion inserted. Signed.		
12. Insertion of list of source materials and list of compilation		

Fig. 16. Collation table for chart compilation.

6.1.3. Handdrawn Fair Drawing

The myler base on which the border of the chart is neatly drawn is overlaid accurately on the drawing guide by utilizing graticules, control points, etc. as the registration mark. The portions which are to be handdrawn are neatly copied on the myler base.

Depth contours, coastlines, islands, rocks, form lines, railways, roads, etc. are manually drawn with a crowquill pen, contour pen, ruling pen, or by using a ruler, etc.

6.1.4. Compass Rose

Various patterns of the compass rose, like sounding figures, are prepared on the stick-up film. They are pasted on the places as indicated on the drawing guide.

6.1.5. Stick-up of Geographical Names, Notes, etc.

Individual geographical names, notes, etc. already prepared on the stick-up films by a photocomposer, are stuck up in the positions designated on the drawing guide.

6.1.6. Stick-up of Sounding Figures and Abbreviations of Bottom Characteristics

The sounding figures designated are cut from the sounding figure film mentioned in (2) above, and are correctly positioned and stuck up in the positions indicated on the drawing guide. On the drawing guide, only those soundings selected from among a number of soundings on the source materials are indicated.

6.1.7. Others

Letterings in the title block, cautionary notes and others are also stuck-up.

The original drawing, which is adequately drawn for plate-making thus completed.

6.2. Special Matters

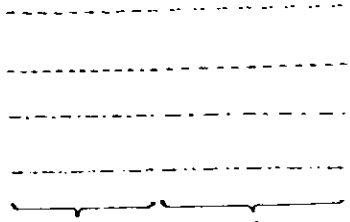
6.2.1. Representation of Buildings and Houses

Those to be shaded: Government offices, public offices concerning maritime affairs, schools, fisheries cooperatives, construction offices, isolated buildings with names shown.

Those not to be shaded: Buildings of companies, factories, etc. near the coast.

Those to be shaded and hutchered inside: Conspicuous buildings which constitute good landmarks for navigation.

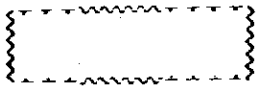
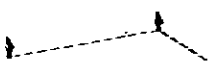
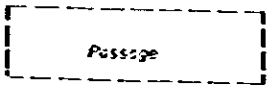
6.2.2. Examples of Depth Contours

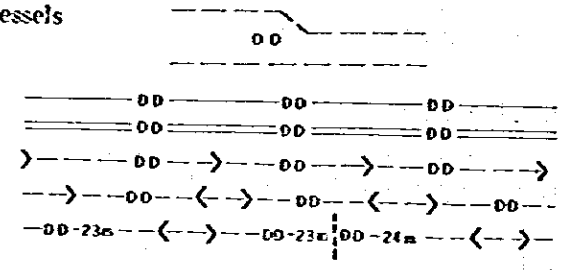


Normal For enlargement

Remarks: Line thickness of the symbol for enlargement 0.1mm.

6.2.3. Symbols to be shown in Magenta

No.	Item	Symbol
1	Submarine cable	
2	Maritime limits of restricted area	
3	Colour and shape of flare of light	
4	Sheet limit and number of other chart	
5	Submarine cable (telephone, telegraph, power)	
6	Abandoned submarine cable	
7	Compass rose	
8	Magnetic variation	
9	Submarine pipeline	
10	Calling-in point for vessel traffic control	
11	Limit of military practice area	
12	Prescribed channel	

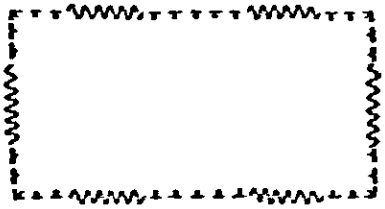
No.	Item	Symbol
13	Routeing: Lane for deep draught vessels	
14	Routeing: Traffic separation scheme	
15	Large circle for radio and radar stations	
16	Radar reflector	
17	Berth No.	
18	Mooring buoy	
19	Designated anchorage	
20	Cautionary note	

6.2.4. Instructions of Stick-up of Phototypeset Letterings

(a) Submarine Cable Area

Alternate combination of a portion of the symbol for submarine cable (with 6 crests) and that for restricted area (about 5 unit symbols). their relative positions are taken into account when sticking up.

Example.



(b) Limits of Restricted Area

The Symbol is so stuck up that the four corners may clearly be represented. This rule should be applied to prohibited areas, prohibited anchorages and areas prohibited from lying at anchor. Such prohibited areas that accompany construction work, etc. should not be represented by this symbol, nor in magenta. In such cases, the kind and duration of the work should be fully examined before charting.

(Note) Care should be taken as this symbol is applied to a restricted area (prohibited area) but not to a quarantine anchorage, dumping ground, etc.

The prohibited area accompanying construction works is shown in black using the symbol for maritime limits in general.

Example.

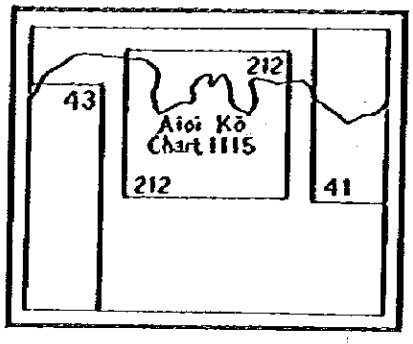
(c) Stick-up of Light Flare

The symbol is so pasted to indicate the position of the light concerned. In principle, it should be stuck up in slant right (45°) or slant left (315°) direction. However, if such a position overlaps the legend of light nearby, sounding figure, rock which covers and uncovers, sunken rock, etc., the symbol should be pasted in a blank space. Except in unavoidable cases, it should not be pasted vertically pointing upward to indicate the position of light.

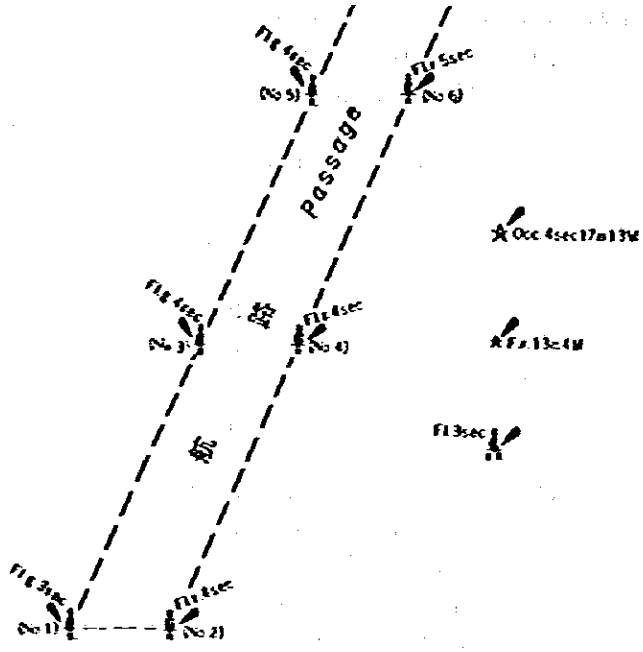
(d) Limits and Numbers of Other Charts

The line showing the limit should be 0.15mm thick. The phototypeset type face of those other charts should be L.G.18. The chart numbers and limits of the adjoining charts in the same series and/or charts of the next larger scale are to be shown. However, for charts whose scales and larger than these only their chart numbers are indicated in L.G. type face thus "chart ...." without parentheses below the name of the place concerned. An example is given below:

Example.



Example for 6.2.4. (c) above.



(e) Submarine Cables and Abandoned Submarine Cables
To be shown in magenta.

(f) Compass Rose
Measures to be taken in case where a part of black line information overlaps the compass rose:
For the land information, the overlapping portion should be deleted. Only contours surrounding a summit may be indicated within the compass rose (one or two contour lines). The name of a mountain should not overlap the compass rose. The land tint should be left blank.
For the hydrographic information, no information should be deleted in principle. However, in cases where letterings and symbols in magenta (e.g. maritime limits, etc.) overlap, such symbols are deleted and letterings shifted.

6.2.5. Standard List Showing Type Face of Phototypeset
See Appendix No. 2.

6.2.6. Examples of Type Face of Phototypeset
See Appendix No. 3.

6.2.7. Caution in determining Phototypeset Type Face

i) For names of straits, channels and islands, a chart on the same scale is referred.

ii) For a quarantine anchorage, the size of type face is adjusted according to the extent of the area.

iii) For the name of a passage, the size of the type face is determined according to the extent of the area.

iv) For the name of a wharf, the size of the type face is determined after examining the extent and shape of the wharf.

v) The size of type face for notes on conspicuous objects in particular (Chy., Tr., etc.) should be graded into two or three classes.

6.2.8. Others

i) Different type face is used to discriminate areas where the charted details are based on source materials enlarged from smaller scale.

Normal type face used	Type face for charted details from enlargements
C.S.B.	S.K.S.C.
C.S.B.I.	S.K.S.C.I.
N.G.	L.L.G.
L.L.G.	L.L.G.
L.L.G.I.	L.L.G.I.

ii) Type face for old names or bynames
Old name (to be expunged in the next revision) is to be inserted within ( ), in L.L.G., 1 class lower.
Byname is to be inserted with [ ], in C.S.B., 1 class lower.

iii) Type face used commonly in all charts

Number figure	L.G.#28
Degree figure	C.S.#13
Min., sec. figure	C.S.I.#10
Metre scale	C.S.#9

iv) Title block
The chart compilation officer draws only the frame indicating the length and width of the title block. The draughtsman sticks the lettering by using the type face specified.

SECTION IV – EDITING AND INSPECTION OF ORIGINAL DRAWING

7. The completed original drawing is forwarded to the editing section. The prepared original is checked for consistency, accuracy and adequacy according to the contents of the drawing guide. The chart representation is also examined.

Items to be checked and inspected are listed as follows:

(1) The format as a nautical chart.

(2) The original drawing is examined to ensure that it does not exceed maximum possible printing size.

(3) Whether the original drawing is drafted in accordance with the Symbols and Abbreviations for the Joint Production of Common Datum Charts as designated on the drawing guide.

(4) Whether the contents are adequately checked to suit the purpose of the chart.

(5) Whether the representation of the chart is comprehensive to users. Charted details should not be ambiguous.

(6) Ensure that it is checked up to the latest Notice to Mariners affecting the chart to be printed.

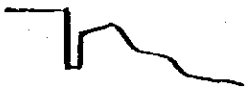
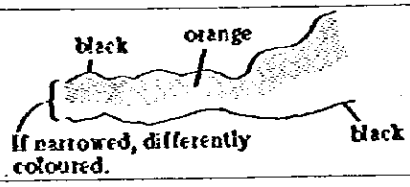
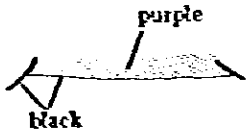
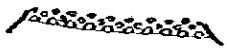
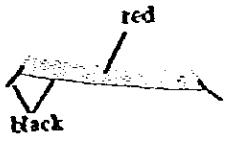
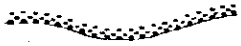
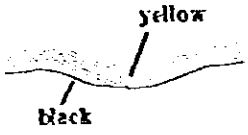
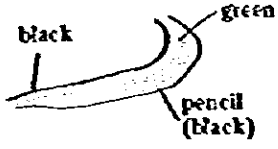
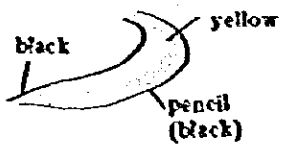
If so required, these items are used as reference to future planning.

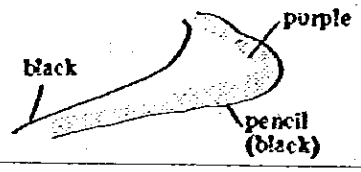
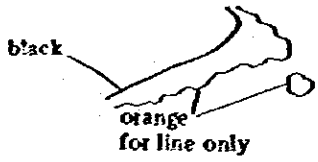
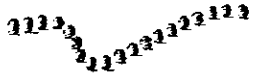
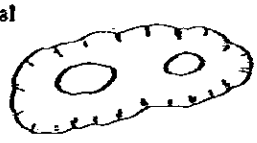
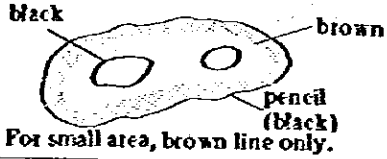
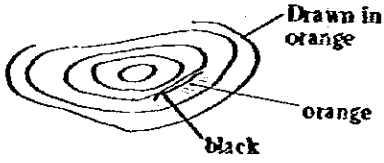
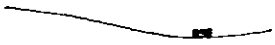
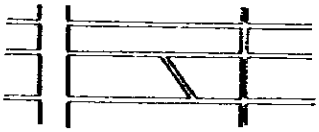
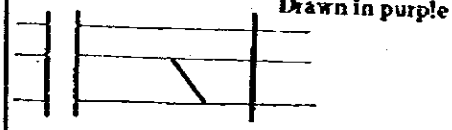
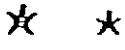
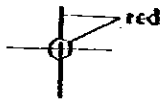
The completed original drawing thus inspected and edited is then forwarded to the printing section.

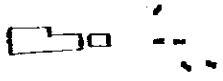
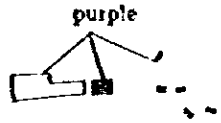
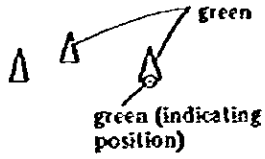
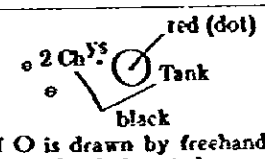
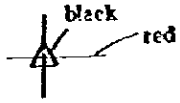
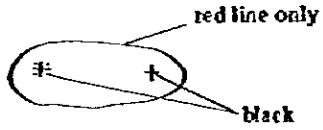
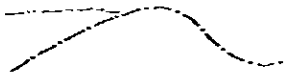
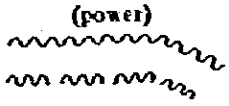
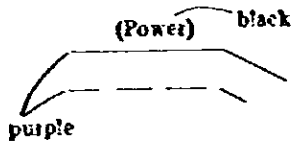
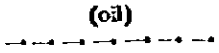
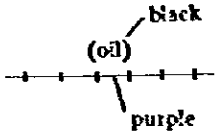
The charted information has to be updated according to additional data and Notices to Mariners. Additions or amendments should be inserted or made on the original drawing up to the time of going to the platemaking process.

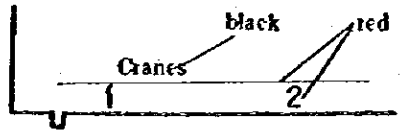
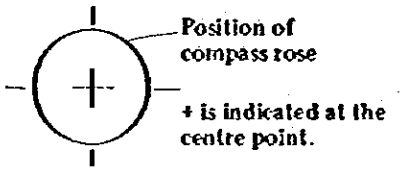
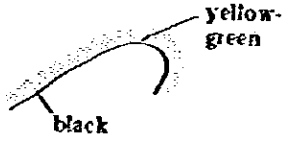
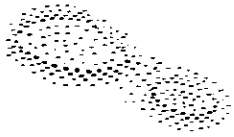
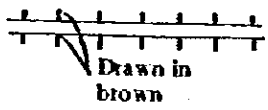
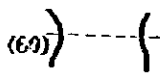
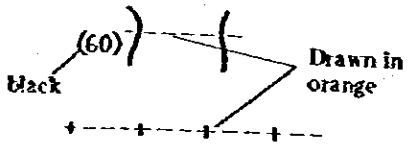
Appendix No. 1

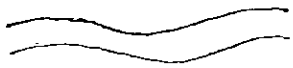
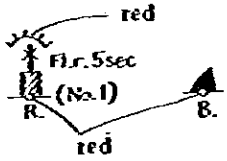
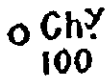
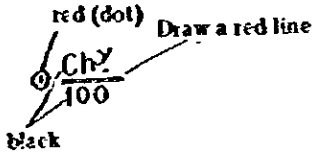
LEGEND OF SYMBOLS IN COLOURS ON DRAWING GUIDE

	Item	Colour	Example
1	Flat coast 	Black	(N.B.) In case of enlargement, drawn in RED.
2	Cliffy coast 	Orange	
3	Rocky coast 	Orange	
4	Boulder 	Purple	
5	Stony or shingly shore 	Red	
6	Sandy shore 	Yellow	
7	Foreshore : mud 	Green	
8	Foreshore: sand 	Yellow	

	Item	Colour	Example
9	Foreshore: stones, shingle or gravel 	Purple	
10	Foreshore : rock 	Orange	
11	Mangroves 	Blue	
12	Foreshore: coral 	Brown	 For small area, brown line only.
13	Contours; cliff 	Orange	
14	Railway; cable car; ropeway 	Green	
15	Road 	Purple	
16	Lights 	Red	
17	Radiobeacon station 	Red	

	Item	Colour	Example
18	Houses; village 	Purple	 Conspic. Ho. coloured red inside.
19	Conspicuous tree 	Green	
20	Indicating position 	Red	 If O is drawn by freehand, a red dot is inserted.
21	Triangulation station; elevation 	Black	
22	Danger circle 	Red	
23	Depth contour 	Green	 Drawn in green
24	Submarine calbe  Abandoned submarine cable	Purple	
25	Submarine pipeline 	Purple	
26	Letters; sounding figures; notes; symbols	Black	In case of enlargement, drawn in red.

	Item	Colour	Example
27	Berth No.; crane; border; grid; figures of deg. & min.	Red	
28	Compass rose; Hr. limits; section border; quarantine anchorage	Orange	
29	Auxiliary lines; visible sector	Pencil	Bearing values of visible sector are drawn in pencil.
30	Frame of title block, notes	Green	Notes in magenta are drawn in red.
31	Grassy coast 	Yellow-green	
32	Sandhills, dunes 	Yellow	
33	Embankment; levee 	Brown	
34	Overhead transporter or teleferic  Power transmission line	Orange	
35	Fishing stakes 	Purple	

	Item	Colour	Example
36	Mooring buoy	Red	(No.3) R.
37	River; brook; lake 	Blue	 Tinted inside (downstream from the first bridge)
38	Buoy; light buoy	Black	
39	Conspicuous object 	Red	
40	Symbol for enlarged material area	Red	In principle, the coastline and soundings on the sheet enlarged are drawn in red. The others are drawn in colours according to the present rules. However, those which can hardly be discriminated, such as danger circle, should be annotated as such in pencil, or drawn according to the Chart Symbol.
41	Passage	Red	
42	Dredged	Orange	
43	Maritime area in general	Brown	
44	Leading line; recommended track; measured distance (mile post)	Red	

	Item	Colour	Example
45	Areas prescribed in the Law (Maritime Traffic Safety Law)	Red	
46	No. and sheet limit of chart referred	Red	
47	Deletion (Photo sheet)	Yellow	

Appendix No. 2

STANDARD LIST SHOWING TYPE FACE OF PHOTOTYPESET

(Used by the Hydrographic Department of Japan)

Note: ( ) applied to quarter size chart

GEOGRAPHICAL NAME	Scale / Type	A	B	C	D	E	F	G	H	I	J
		1/5,000	1/10,000	1/25,000	1/50,000	1/100,000	1/200,000	1/500,000	1/1,200,000	1/2,500,000	1/4,000,000
Name of state	CSB				32	32	28	24	20	20	18
" district	"										
" prefecture	"	32 (24)	32 (24)	28	28	28	24	18	12		
" city	"	24 (20)	24 (20)	20	18	16	15	12	10	9	9
" important city	"							13	12	11	10
" town, village, ward	"	18 (16)	16	14	14	14	13	9	9		
" city town or equivalent	"	16 (14)	13	12	11	11	10	9	9		
" vil. section	"	13	12	11	11	11	10	9			
" island	"	13	12	11	11	11	10	9	9	9	9
" mountain	"	13	12	11	11	11	10	9	9	9	9
" cape, head, point	"	13	12	11	11	11	10	9	9	9	9
" roadstead	LLG		14	13	12						
" ocean, sea	CSB						32	32	28	28	28
" river	"	13	12	11	11	10	10	9	9	9	8
" port	"	16	14	12	12	11	11	10	10		
" bay, cove	"	16	16	14	14	12	11	10	10	10	9
" strait, channel	"	15	14	13	12	12	11	10	10	9	9
" reef, bank (above LLW)	"	13	12	11	11	11	10	9	9	9	8
" reef, bank, shoal (below LLW)	NG	13	12	11	11	11	10	9	9	9	8
NOTES, ETC.											
District No.	NG	12	11	11							
Section border	"	15	15	15	14						
Name of passage, wharf	"										
Prohibited area, anche., reclaim. dumping gd., etc.	LLG	9	9	8	8	8					
Underconstruction, lumber basin, tide station, wharf name, jetty name, fish, reef	"	9	9	9	8	8	8				

NOTES, ETC.	Scale / Type	A	B	C	D	E	F	G	H	I	J
		1/5,000	1/10,000	1/25,000	1/50,000	1/100,000	1/200,000	1/500,000	1/1,200,000	1/2,500,000	1/4,000,000
Rep. conspic. object	LG										
Name of factory, Govt. office harbour limit	LLG	10	9	9	8	8	8				
Station name, illumination, From ... to ..., belt conveyor	"	9	8	8	8	8	8	8			
Quarter name	NG	18	18	18	16	14					
Note	LLG	10	10	9	9	9	9	9	9	9	9
Sub. cable area	"	9	9	9	9	8					
Quarantine anche	"	10 ~ 11									
No. of chart, plan	NGI	10 ~ 11									
Title of chart, plan	LLG	10 ~ 11									
Source diagram, index chart	NG	12 ~ 14									
NUMERICAL FIGURES											
Elev. of Mt. (Height)	CSB	9	9	9	8	8	8	8	8	8	8
Bearing for recom. track	L.Cp.GC	14	13	12	11	10	9				
Height of overhead cable	CSB	9	9	9	8	8	8				
Section No.	L.Cp.G.C	16	16	15	14						
Bearing for leading line	NG	10	10	10	10	10					
Berth No.	"	9	9	8							
Contour label	CSB	8	8	8	7	7	7	7	7	7	7
ROMAN LETTERS											
Lt. legend, radio radar abbrev.	NG	9	9	9	9	8	8	8	8	8	8
Obst. ..... WK	NG NGI	10	9	9	9	8	8	8	8	8	8
We Sig. Sig. St. S. Sig. (in brackets)	LLG LLGI	9	9	9	8	8	8	8			
D., L.C.S., F.S., T., Ch. B., (P.A.), (P.D.), (X.D.), BM	LLG	9	9	8	8	8	8	8			
ABC in source diagram	NG	11 ~ 14									

Appendix No. 3

EXAMPLES OF PHOTOTYPESET LETTER SIZES

Class	C.S.B.	C.S.B.I.	N.G.	N.G.I.	L.L.G.	L.L.G.I.
6	ABCDabcde 10	ABCDabcdefgh 10	ABCDEabcde 10	ABCDEFabcdefg 10	ABCDEabcde 10	ABCDEabcdefhi 10
8	DEQfghijk 10	GHLQabcdefgh 10	BCFLfrtnade 10	PTVXYnsuvxyz 10	HKLNhknop 10	LNQPhinrstuvw 10
10	BCDbdgh 10	GHLQrsvxy 10	PRSZGnoopq 10	LPTFZArtjkn 10	CGMhknop 10	JAPbcghkuvxz 10
12	LOPpqw 10	LOPTcepor 10	GHKehnosuv 10	GHKSvshoop 10	PRSsuvxy 10	SUZnrlocehlu 10
14	QRTsuv 10	EKNHdhkm 10	KNOQfrtcde 10	AMQNSaegf 10	MGCcdeh 10	DEFvocehlbo 10
16	NUVvy 10	PTfijstgk 10	BEFLehnop 10	NRSUrtsuv 10	KSBtrteh 10	PQRbracehk 10
18	BCace 10	ACDknp 10	NOXuvxyz 10	MOPTthkn 10	QOMrsun 10	RPNrecahf 10
20	EFfo 10	GHcegrx 10	PRShnopu 10	RSUxvusn 10	RPNekno 10	NQPtszvuk 10
24	KNrs 10	GHLabu 10	CDabcde 10	LPTkuvbc 10	RThknop 10	MAhktr6f 10
28	HKhk 10	FGabg 10	GHehyzu 10	KNRsabc 10	MOabch 10	HGecasx 10
32	AHn 10	LOdh 10	FLehnop 10	DOfrsuad10	BEehk 10	SAhkusn 10
38	Hux 10	EKns 10	FLPrks 10	GMboac 10	WAEhn10	ABaceh 10
44	Fef 10	Habc 10	HKotk 10	WAsux 10	Hknop 10	HGhcr 10
48	Le 10	Tute 10	Babc 10	SSsk 10	Rsuv 10	LKbno 10
54	Pa 10	Fkh 10	Abcd 10	ADks10	Nsrc 10	BGsk 10
60	Ar 10	Kst 10	Den 10	Sab 10	Aad 10	Ertn 10
72	Ts10	Aa10	Gab10	Ksd10	RSe10	Maf 10