

(4) Method of preparing the scribed sheet.

- 1) Method of printing images of original manuscript on scribing base.

Reversed image of the original manuscript was printed on scribing base by diazo method.

- 2) Method of preparing scribed sheets

In preparing scribed sheets, roads, buildings, boundaries, sheet lines, isobaths, rivers and lakes, reservoirs and other water system margins and contours were scribed on each specific color separation sheet as called for in accordance with the map format, with care taken to avoid misalignments and omissions, and with attention given to line weights. At this stage, in the center areas of the four margins of a sheet, cross registration marks were made; and in the four corners of the sheet lines, L-shaped registration marks were made. Both were used for plate-making and printing.

- 3) Preparation of the mask sheet

Setting a peel coat base on a scribed sheet with punched holes and pins, peeling was carried out using scribed lines as guide. Registration marks were also made for tracing lines on the scribed sheets.

- 4) Preparation of the sheet for marginal information and notations

- a) Original positive for common marginal information was prepared on a polyester base. Its negative was then reproduced by photographic method. The required number of sheets were reproduced. For each map sheet marginal information, notations, symbols for buildings,

grid values and other symbols, etc. were stuck up on the base using photo-composed letters and symbols printed on strip positive film referring to the original manuscript and overlays for notations.

- b) For names of rivers, oceans, lakes, etc., photo-composed letters were stuck up referring to the overlay for the water system.
- c) For elevation values and contour values, photo-composed letters were stuck up referring to the overlay for control points (including spot heights).

5) Method of preparing the base for grid

Master sheet for grid lines was scribed by using a precision coordinategraph on a scribing base; and the positives were photographically reproduced on polyester bases. Each sheet was compiled with its respective original map manuscript to prepare a base for grids.

6) Method of preparing sheets for symbols and zip-a-tone

Photo-composed symbols of vegetation and zip-a-tone of sandy areas were stuck up on polyester sheets.

7) Tying

For tying to the adjacent sheet, scribing was executed carefully and checked for each color separation. Care was also taken to insure correspondency of respective colors of mask base and other positive sheets.

12-1-4 Inspection and proofreading

Color composite of whole color separation was prepared by a photographic method (similar to water coating) for proofreading. Proofreading was done in cooperation with Panamanian counterparts, who visited Japan to correct mistakes in writing and drawing, omissions, deviations from the map format, etc.

12-2 Printing

12-2-1 Outline

From the scribed original, composite positive films and then negative films were made so that one composite film corresponded to one color. Using the composite films, printing plates were prepared. Before printing work, proof prints were made. Inspection of the proof prints was carried out with the cooperation of the IGN counterparts. After checking, 1,000 copies in five colors were printed by offset printing machine. The product was inspected before becoming final.

12-2-2 Specifications

The main specifications for printing are as follows:

- (1) Printing is five color offset printing
- (2) Coloration of the printing is in accordance with color samples provided by IGN.
- (3) 90 g/m² paper is used.
- (4) The dimensions of the final product are 55.0 cm x 67.5 cm.

12-2-3 Plate making

Using presensitized aluminum plates, printing plates were prepared by photo-lithography from composite negative films. There were five printing negative plates, one each of black, red, blue, green and brown.

In the preparation of the composite negative films, for the half tone for the representation of forests, water surfaces, etc., TP-I screen, 150 lines inch, 7%, was used.

12-2-4 Physical and chemical characteristics of printing paper

Characteristics of printing paper were analysed by an authorized laboratory. The results are given in Table 14.

Table 14. Physical and Chemical Characteristics of Printing Paper

Item		Average	Maximum	Minimum	
Folding endurance (time)	Machine direction	2,400	3,200	1,900	
Tension/1 kg (MIT type tester)	Cross direction	3,100	4,000	2,600	
Bursting strength (kgf/cm ²)	Dry	5.53	5.85	5.10	
	Wet	2.81	3.50	2.45	
Tensile breaking strength (kgf)	Dry	Machine direction	11.6	12.1	11.1
		Cross direction	8.93	9.30	8.45
	Wet	Machine direction	3.59	3.80	3.30
		Cross direction	3.31	3.50	3.15
Tearing strength (gf)	Machine direction	92.0	94.0	90.0	
	Cross direction	87.7	90.0	86.0	
Smoothness (sec)	Surface	120	140	100	
	Back	100	120	90	
Expansion (%) (RH 60~80)	Machine direction	0.05	-	-	
	Cross direction	0.10	-	-	
Opacity (%)		90.7	91.0	90.4	
Brightness (%)		89.2	89.3	89.1	
Size condition (see)		71	77	60	
Thickness (mm)		0.101	0.104	0.099	
Surface strength (A)	Surface	26	26	26	
Weight (g/m ²)			90.9		
Water content (%)			7.9		
PH			6.3		

Paper material	Unbreached pulp
Ground pump	Not contained
Flow of fibres	Good
Curling and other defects	None
Texture	Good
Dust	None
Difference in quality between surface and back	Little

NOTE: Wet means the condition in which the specimen has been immersed in water of 20°C and is soaked with superfluous water.

12-3 Problems encountered

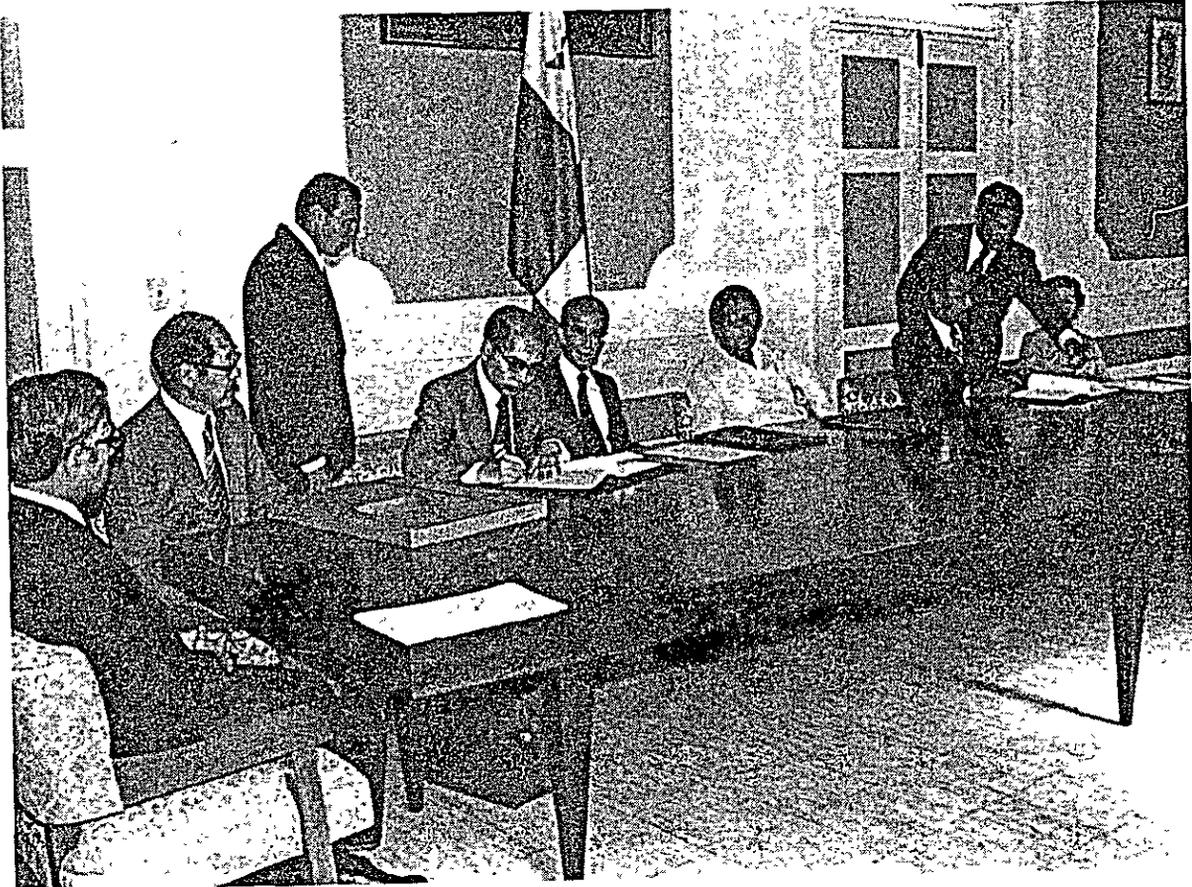
- The density of linear notations for rivers, administrative boundaries, water sheds, etc., was high. In order to avoid overlapping with grid lines, rivers, roads, etc., and achieve a balanced layout for each letter of linear notations, a great deal of care was required.
- Careful attention was paid to the task of avoiding inappropriate positions for notations in order to prevent overlap of notations and elevation values with grid lines, grid values, rivers, roads, other notations, etc.

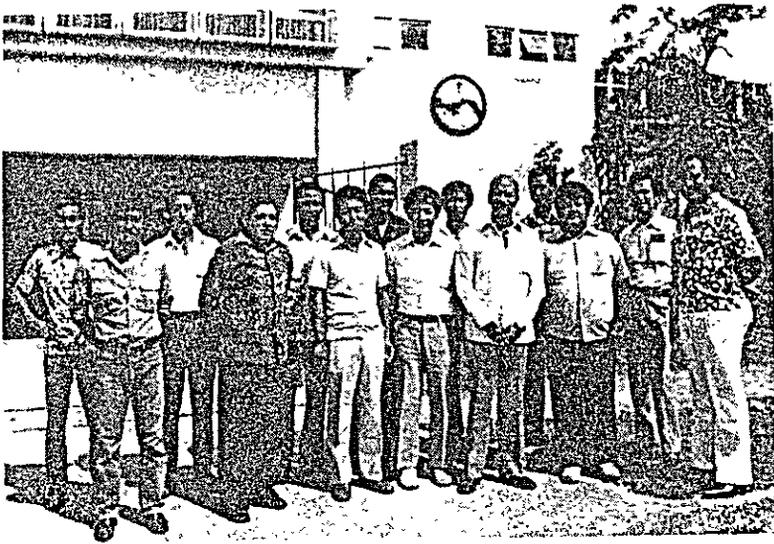
13. Further considerations

At first, the Japanese surveyors were faced with the problem of carrying out their work in the entirely unfamiliar country of Panama and in cooperation with Panamanian surveyors who were quite unknown to them. However, as the work proceeded, mutual understanding developed and this produced maximum results. Thus, the work went more smoothly than anticipated, and excellent results were obtained.

Regarding the project, the Panamanian side made a remark that better cooperation could have been achieved had they been able to participate in the project from the early planning stages. It is felt that such a procedure would have resulted in better transfer of technology, and should therefore be followed in the case of such projects in the future.

S/W Signing Ceremony at Ministry of
Foreign Affairs, Panama

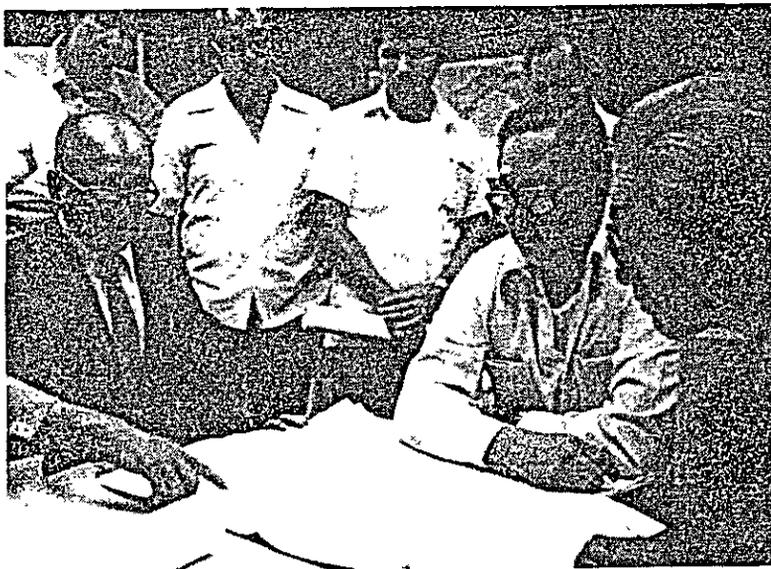




First Japanese Survey Team and Counterparts in Front of the IGN Office.



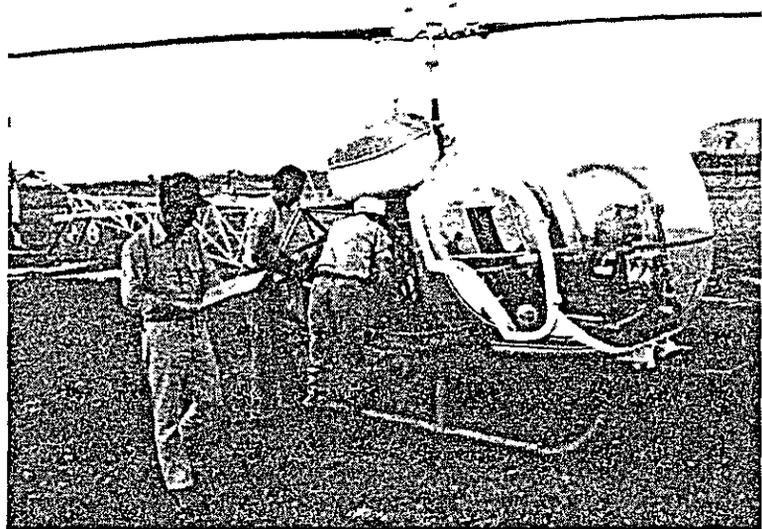
Just After R/D Signing.



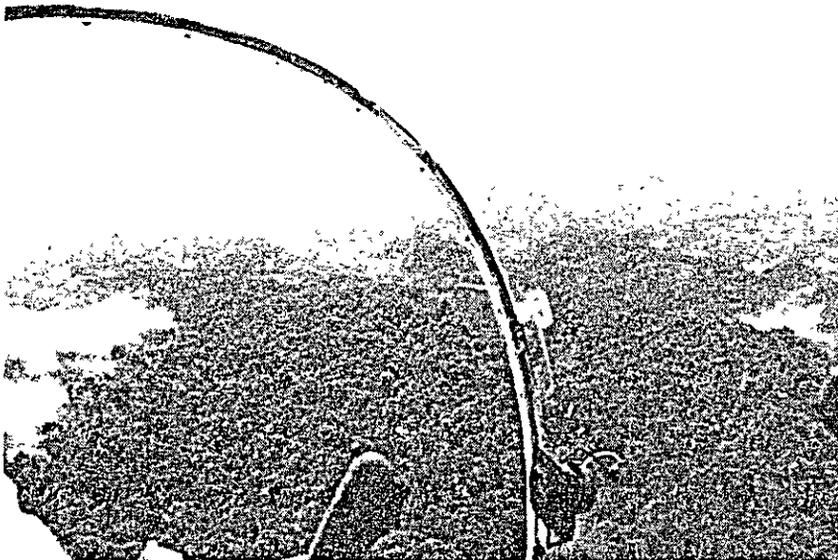
Visit of the Japanese Survey Team to the Minister of Public Works, Panama.



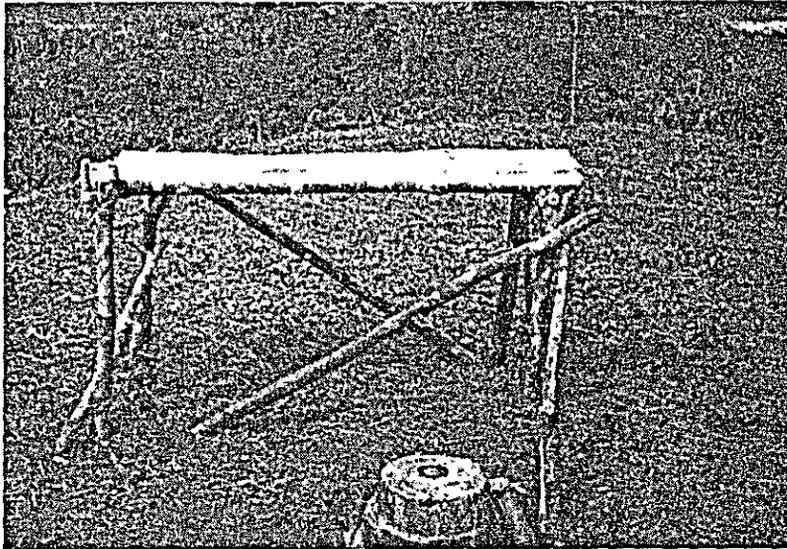
Sub-camp in Penonomé.



Getting the Helicopter
Ready for Take Off.



View from Helicopter
(Caribbean Coast).



Existing Triangulation Point and Air Photo Signal (Built in 1980 using locally available materials for aerial photography.)



Doing Field Reconnaissance along a River from a Large Canoe.



A Land Cruiser Crossing a River at a Fording Point.



JICA