


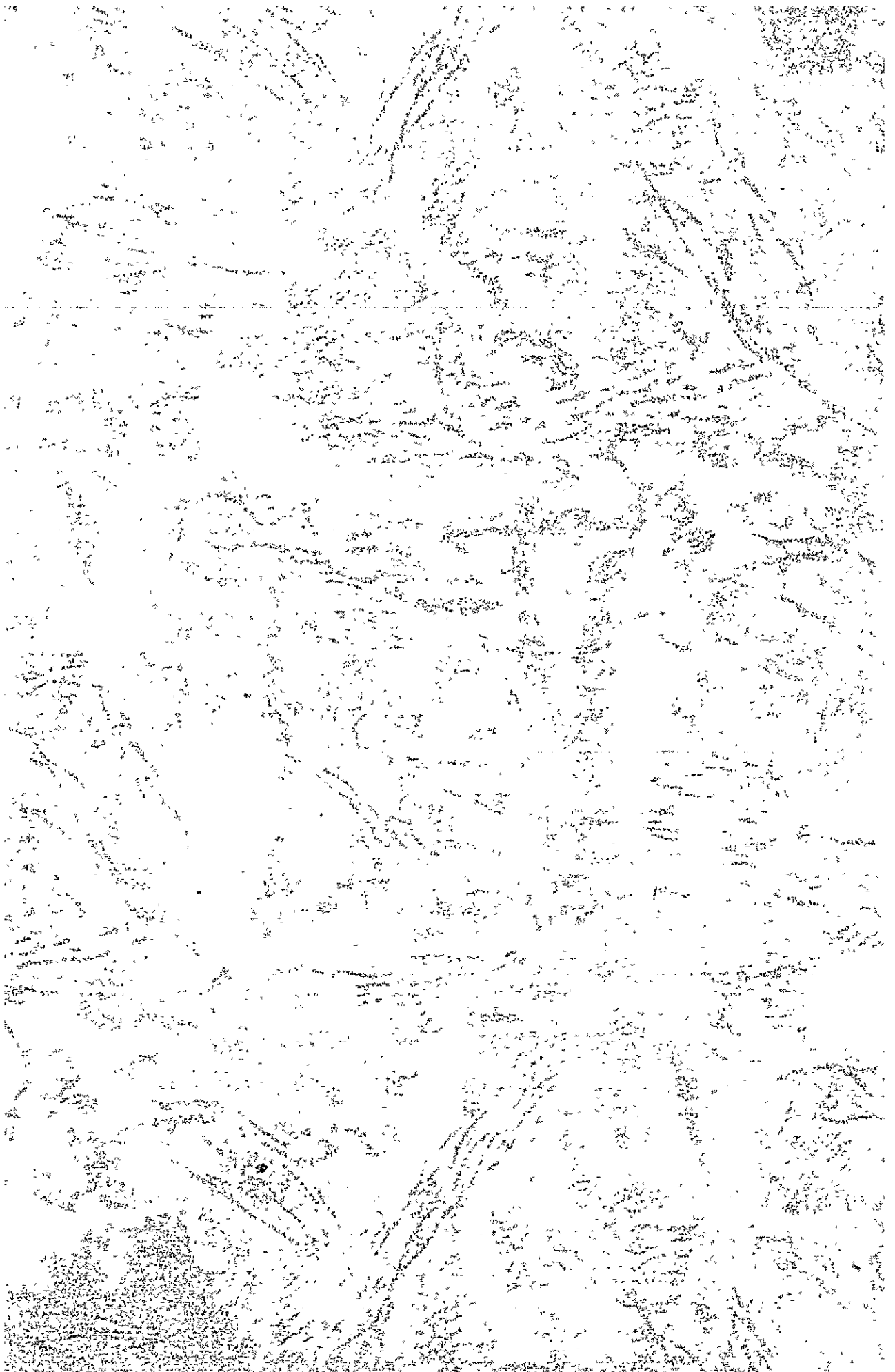
BRUNEI
GOVERNMENT PRINTING DEPARTMENT

THE STUDY
ON
THE IMPROVEMENT OF
BRUNEI GOVERNMENT PRINTING DEPARTMENT

JANUARY 1984

JAPAN INTERNATIONAL COOPERATION AGENCY

SDF

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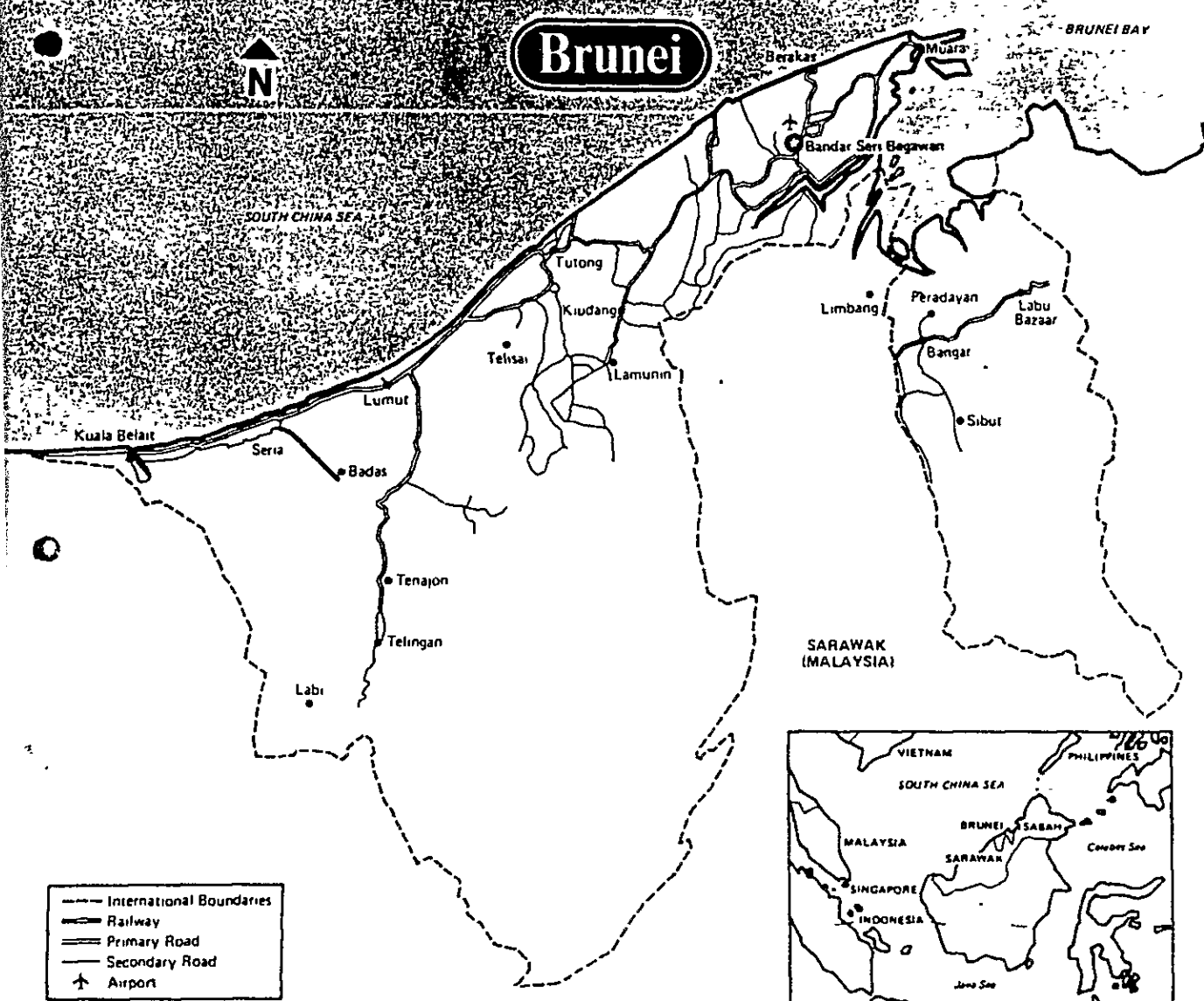
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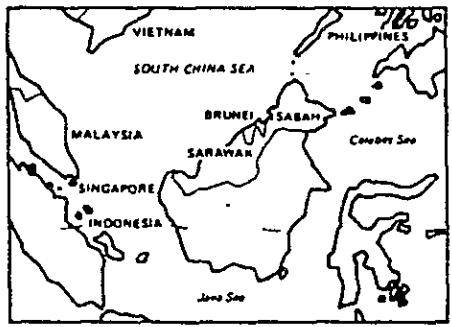
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Brunei



- International Boundaries
- Railway
- == Primary Road
- Secondary Road
- ↑ Airport



PREFACE

In response to the request of the Government of Brunei, the Government of Japan decided to conduct a survey on the improvement of Brunei Printing Department Project and entrusted it to the Japan International Cooperation Agency (JICA). The JICA sent to Brunei a survey team headed by Mr. Katsumichi ICHIKAWA from 24th September of 6th October 1983.

The team had discussions with the officials concerned of the Government of Brunei and conducted a field survey in Bander Seri Begawan, Brunei.

After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the implementation of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Brunei for their close cooperation extended to the team.

January 1984



Keisuke Arita

President

Japan International Cooperation Agency

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SUMMARY

On January 1, 1984 Brunei won complete independence from British protection which lasted 95 years since 1888.

Prior to the independence, Brunei took vigorous measures to strengthen its administrative organization over a number of years. As the measures manifested effect, governmental demand for printing grew accordingly. Such an increase, in turn, has urged the expansion and improvement of the Printing Department responsible for the supply of governmental printed matters.

The Printing Department was established in 1974 to 1) curtail governmental expenditures, 2) satisfy total demands from governmental bureaus and departments in a prompt manner, 3) upgrade printing, and 4) increase employment. Hence the Printing Department, by expanding its printing plant and introducing new equipment over two times since then, has been continuing efforts to increase production capacity so as to meet the entire demand of the government. As a result, production in the Printing Department began to show an upturn in 1978, subsequently growing at an annual average rate of 20%, as estimated from material purchase records.

However, prompt supply to meet total demand is yet to be accomplished. The production by the Printing Department accounts for about 70%. The remaining 30% is dependent on subcontract production by private enterprises including those in Singapore.

In anticipation of increased demand for governmental printed matters after the independence, Brunei requested the Japanese government to conduct a survey for elaborating "The Plan of the Improvement of Brunei Government Printing Department" (hereinafter referred to as "project") centering on 1) technological improvement of production systems and equipment, 2) standardization of governmental printed matters, 3) improvement of management system including distribution, in

order to make a breakthrough out of the present situation and stream-line administration.

In reply to the request from the Brunei government, the Japanese government decided to send a study team to Brunei to conduct the survey from September 26 to October 6, 1983 through the Japan International Cooperation Agency (JICA). The study team conferred with the Brunei representatives and investigated plants of the Printing Department and private enterprises. After returning home, the team analyzed the findings of the survey and data collected so as to draft the improvement plan.

The improvement plan is consisted of the basic plan and the implementation plan.

In the basic plan, future demand of printed matters was estimated and problems from the current conditions of the Printing Department were extracted first of all, and the production target was set at about 2.5 times the department's actual production in 1982. This level will equal the need of the Printing Department in 1987, estimated from the aforementioned production growth rate. If estimated from the total demand of governmental printed matters including those produced by subcontractors, it will be equivalent to the production volume in 1985. Even if the production of now subcontracted products by the Department began in early 1985, the defined production scale would be equal to the scale of producing 80% of total demand by the various departments in 1986. This means that, the percentage of domestic production against total demand will increase by 10%, that is, from 70% to 80%.

In line with this basic plan, the implementation plan was elaborated consisting of two component plans, that is the facility improvement plan for the introduction of new equipment and alteration of layout, and the administrative improvement plan concerning the management system.

In the facility improvement plan, it turned out that it was necessary to change the entire machine layout, except for newspaper offset printer, so as to best suit the process flow line, and add new facilities primarily in the plate making, printing and binding processes.

In the execution of this plan, approximately B\$4,445,000 will be required to increase facilities and B\$49,000 to transfer existing facilities, thereby amounting to some B\$4,494,000 in total.

According to the plan, there should be enough space for new facilities if the two warehouses with total area of 1,500m² under planning to be constructed in 1984, are utilized efficiently. Therefore no need for building new plant for this plan arises.

In the administrative improvement plan, proposals were made to improve production control system for the betterment of efficiency and quality, enhance technical training in the Printing Department, and standardize governmental printed matters. Although the administrative improvement plan may possibly encounter difficulties due to the general customs of Brunei, comprehensive efficiency can be improved only by the integration of technological facility improvement and administrative improvement. Therefore, the implementation of the administrative improvement plan is essential for realizing the general productive improvement.

As for the personnel required for this project, the improvement in terms of personnel efficiency will be 1.43 times the 1983 level, since the number of staff and worker will be increased 1.45 times, to 185 from the present 128, and production capacity will be expanded 2.07 times larger than the 1983 estimation.

This project will make it possible to increase production capacity and efficiency and shorten the time required for

delivery, as well as to meet governmental demand and upgrade technical capability.

To achieve these objectives effectively, it is desired to 1) coordinate with related bureaus and departments, 2) carry out individual plans in parallel and 3) confirm progress periodically.

It is apparent that the improvement of the Printing Department will contribute to Brunei's development after its independence. Thus it can be concluded that, to ensure the full effect of the plans, the project should be carried out as early as possible giving thorough consideration to all points summarized above.

I. PURPOSE OF THE STUDY

The purpose of this study conducted at the request of the Brunei government is to draw up the improvement plan centering on technological improvement of production systems and equipment of the Printing Department, standardization of government printed matters and improvement of management system including distribution. To fulfill this basic purpose, the study team studied the present situation of printing industries in Brunei and collected data on the following:

- ① Problems in the course of entire process from receiving orders to distribution
- ② Problems in existing production facilities and maintenance system
- ③ Introduction of new equipment and reconstruction/addition of the Printing Department buildings
- ④ Problems relating to the standardization of governmental printed matters
- ⑤ Problems of personnel allocation
- ⑥ Other matters required for the improvement of the Printing Department

The study team further classified these investigation items as follows:

- ① Background of the project
Social, economic, educational and other conditions
- ② Present situation of printing- and binding-related industries
 - a. Production of books in general, magazines, newspapers, textbooks and exercise books
 - b. Equipment and technological level (Studied through actual inspection at private printing plants)

- ③ Present situation of the Printing Department
- a. General
History of the Printing Department, position and role of the Printing Department in the entire governmental organization, budget, location, plant layout, organization, staffing and employment conditions
 - b. Orders
Change in orders and production volume, ordering system, types and standards of products, and subcontracting
 - c. Production (Investigated process by process)
Equipment list (mechanical specifications, production capacity and number of operators), layout of equipment and operators, operating condition of equipment (operating rate, percent defective, etc.), and technological level
 - d. Maintenance and control
Maintenance system and method of spare parts procurement
 - e. Production control
Control system, inspection system and work environment
 - f. Materials
Quantities of materials required, standard, cost, purchase method, and inventory control
 - g. Distribution
Type of packing, transportation means, and delivery instructions
- ④ Basic plan
- a. Demand forecast
 - b. Printing Department requests on the improvement plan
(Refer to APPENDIX for members of the study team, investigation schedule and the Record of Discussion with Brunei representatives.)

II. PURPOSE AND HISTORY OF THE PRINTING DEPARTMENT

1. Purpose of Establishment

Before the establishment of the Printing Department, production of governmental printed matters had been ordered to private enterprises.

The Printing Department was established in April 1, 1974 to 1) curtail governmental expenditures, 2) satisfy total demands from governmental bureaus and departments in a prompt manner, 3) upgrade the quality of printed matters and 4) increase employment.

2. Progress After Establishment

The Printing Department was established in 1974 in the old airport terminal building with an area of 700m². Operation of the plant began in 1975.

At that time, the plant was mainly equipped with nine Heidelberg Co.'s offset presses, four letterpresses, offset graphic reproducing machines, Lino type and Inter type composing machines.

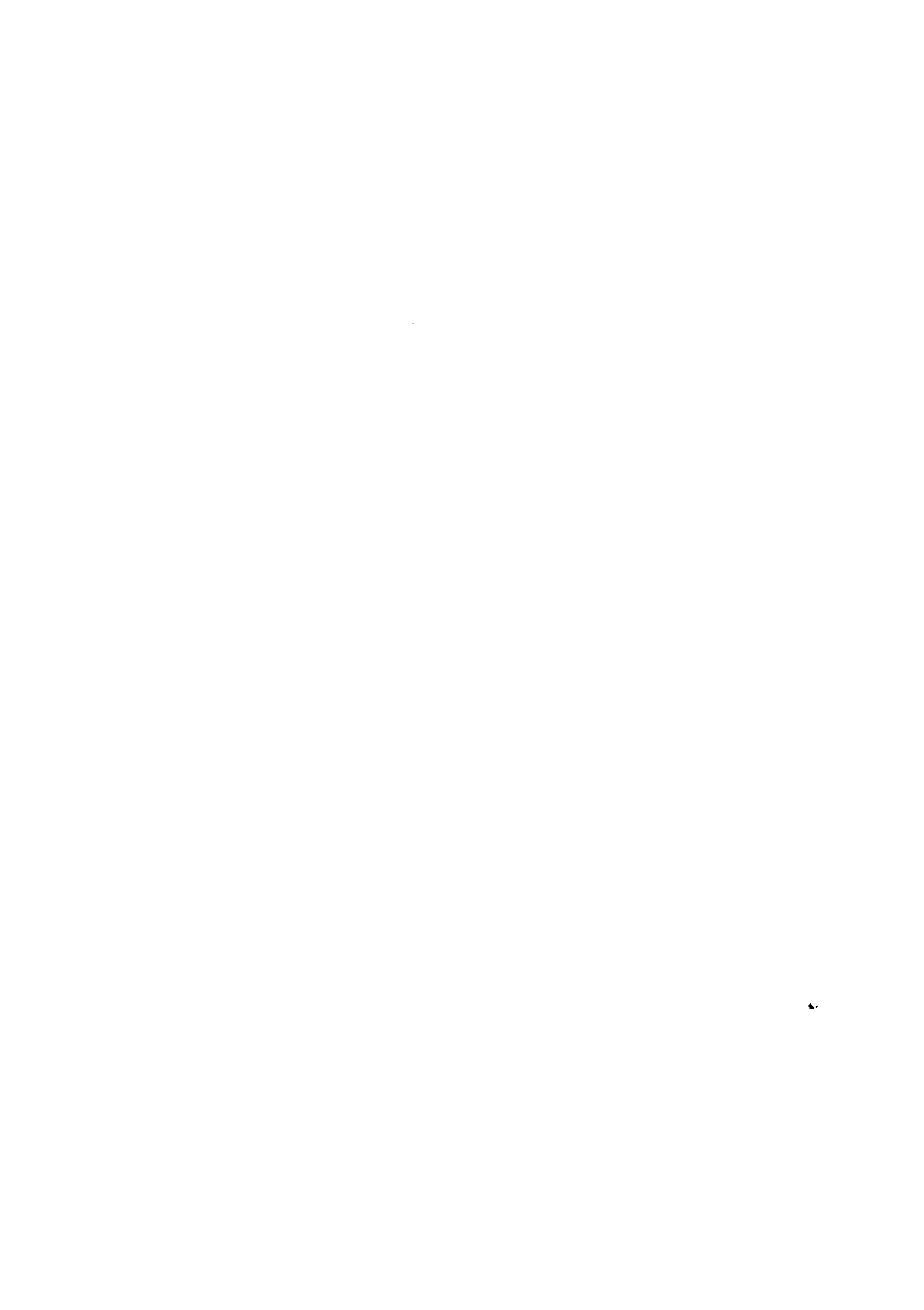
To respond to the increased demand of printed matters in diverse binding forms, the plant was expanded to add 800m² floor space from 1977 to 1978 to introduce binding machines, such as folding machines, wire stitching machines, glue binding machines and thread binding machines. This resulted in extension of the plant scale to about 1,500m², with various binding lines.

In 1980, a new plant (partially second-storied) with the total area of 1,500m² was constructed.

This extension plan was to rationalize the publication of official weekly newspaper "Pelita Brunei", and to introduce computerized phototypesetting machines, offset printers for newspaper printing.

Based on this plan, Harris Co.'s four-color both-sided offset printer was introduced in early 1983.

The computerized phototypesetting system consisting of six keyboards and four photo units is incorporated in the origination process. Three keyboards and one photo unit are scheduled to be added by the end of 1983.



III. PRESENT SITUATION OF THE PRINTING DEPARTMENT

1. General Description of Equipments

(1) Origination and graphic reproduction

Origination of letters for government gazettes and newspaper articles is processed by the computer type-setting system (CTS), which was introduced in 1981. Origination of patterns and photos is processed by graphic reproduction camera. Since the color separation process, which still relies on the conventional color filter system, has quality problems, most of this work is subcontracted to private enterprises in Singapore.

The plant is equipped with two set of PS (presensitized) plate making machines for offset printing, one for sheet-feed press for general printing and the other for rotary offset printer for newspaper printing.

In addition to the above, type graphic reproducing machines for letter press is also made available.

(2) Printing

For printing in general, the plant has nine Heidelberg Co.'s sheetfed offset printers, letter presses and platen presses. Since there is no multi-color (four-color) printer, however, a sheet must be passed through the two-color printer twice, thus causing problems on quality and efficiency. Harris Co.'s four-color web offset printer was introduced in 1983 for printing the weekly newspaper "Pelita Brunei".

(3) Binding

The plant has a series of binding equipment from folding machines, and gatherers to stitching machines, thread binding machines, glue binding machines, twin-wire binding machines and high-grade bookbinding machines to satisfy diversê requirements. However, most machines are of

single-purpose, and their efficiency is low, with many operators required. The layout of the machines also has some problems in processing products, which has reduced the binding efficiency considerably.

(4) Other machines

The plant is equipped with kniff grinding machine, washing machines for printing rollers and lead recycling machine for type graphic reproduction.

2. Ordering System

The printing of all the printed matters, including government gazettes, various statistics published by governmental departments and bureaus, and slips and forms used in governmental departments is requested to the State Secretariat, as necessity arises. The State Secretariat classifies orders by type, quantity and delivery term, and instructs the Printing Department to print the matters. The Printing Department receives orders within its capacity in consideration of the its production conditions.

At present, the Printing Department supplies for about 70% of the total demands. The remaining 30% is ordered to several domestic private enterprises and overseas enterprises, mainly in Singapore.

3. Present Situation of Production

(1) Production items

- ① Bound printed matters
Government gazettes, enactments, books, government printed matters, accounting books and diaries
- ② Slips and forms
Printed forms, duplicating papers, typing papers
- ③ Newspaper (Weekly "Pelita Brunei")

④ Others

File covers, envelopes, calendars, posters, stickers, invitation cards, certificates and leaflets

(2) Production process

Upon orders from the State Secretariat, the Order Section of the Printing Department fills in order ledgers classified by governmental department and bureau, and prepares work instructions. Printed matters are produced in accordance with the work instruction as follows:

1) Origination + 2) Proofreading + 3) Graphic reproduction + 4) Materials + 5) Printing + 6) Binding and finishing + 7) Distribution

Each process supervisor checks quality, quantity and processing method in accordance with the work instruction and instructs to the field workers. Upon completion of each process, products are checked before being sent to the next process. Printed matters for the Royal Household requires high quality and sophisticated binding, necessitating high-grade processing technique.

(3) Work system

The work hours of the Printing Department are seven hours from 7:45 a.m. to 4:30 p.m., excluding 30 minutes of morning tea time and one hour and 15 minutes of lunch time. Fridays and Sundays are holiday. The number of annual work days is about 250. To get their work done, employees overwork till 8 or even 10 o'clock occasionally. Monthly overtime is from 40 to 50 hours, and is mostly devoted to manual binding and finishing work.

4. Maintenance System

The Printing Department has no section specializing in the maintenance of equipment and machines.

One maintenance supervisor under Assistant Director takes charge of simple maintenance of machines, including replacement of defective part. The normal stock of spare parts amounts to B\$400,000.

For defects which cannot be repaired in the Printing Department, a request of repair is sent to the appropriate department through the Public Works Department.

5. Distribution System

No distribution section is organized as an independent section. Distribution is handled by the section in charge of order and material control. Distribution in metropolitan areas is done by two workers and one light van.

As a rule, finished products are distributed from the Printing Department to individual bureaus and departments. However, since one light van is not sufficient to cover entire distribution work, staff of each department and bureau usually visit the Printing Department to receive finished products.

IV. BASIC PLAN OF IMPROVEMENT OF THE PRINTING DEPARTMENT

1. Basic Policy

The Printing Department has been producing about 70% of governmental printed matters. Although production has been increasing at an annual rate of 20%, the Printing Department has not yet established the production system to meet the increased demands, which have been met by extended overtime.

The most important task of the Printing Department is to smoothen the entire processes from order receiving to delivery by streamlining the production system and raising production capacity to quickly satisfy demands from governmental bureaus and departments.

The basic plan on which the improvement implementation plan should be presented is to set a production target by estimating the future demand of which is expected to increase printed matters considerably, and to analyze problems stemming from the present situation of the Printing Department.

2. Estimation of Future Demands

(1) Printing capacity

Table IV-1 shows the capacity of the printing machines owned by the Printing Department, as measured by the size of paper and printing speed.

Table IV-1

Model	Printing Method	Size	Number of Machines	Speed	Capacity
HEIDELBERG GTO	Offset	320 × 460mm	4	3,000 sheet/hour	12,400m ² /day
" KORD	"	460 × 640	2	2,500	10,300
" SORD	"	640 × 915	1	4,000	16,400
" SORDZ	" two-color	640 × 915	1	4,000	16,400 × 2 = 32,800
" SORS	"	710 × 1,020	1	4,000	20,300
" PLATEN	Letter press	10.5 × 14"	3	2,000	4,000
" SBD	"	640 × 900mm	1	2,500	10,000
Total					106,200m ² /day

If production efficiency of the printing machines is 40%, excluding three platen presses mainly used for envelope printing, average production capacity is estimated as follows:

$$(106,200 - 4,000) \times 0.4 = 41,000\text{m}^2/\text{day}.$$

The working conditions are as follows.

Annual work days: 250 days

Daily work hours: 7 hours

{ 7:45 a.m. ~ 12:15 p.m.
 (4.5 hours) including
 0.5 hour of tea time
 1:30 p.m. ~ 4:30 p.m.
 (3 hours) }

(2) Annual consumption of printing paper

The annual consumption of printing paper in 1982 is calculated from Table IV-2:

①	31 × 43"	(787 × 1,092 ^{mm})	0.86 ^m ²	6,441	REAMS	2,770,000 ^m ²
②	25 × 34	(635 × 864)	0.55	365		100,000
③	27 × 34	(686 × 864)	0.59	2,535		750,000
④	26 × 33	(667 × 845)	0.56	2,701		<u>760,000</u>
Total						4,380,000 m ² /year
1 REAM = 500 sheets						

Table IV-2

General Printing Papers

Particulars of Materials	1980	1981	1982
PRINTING PAPERS (IN REAMS OF 500 SHEETS)			
WOODFREE M/F PAPER 31×43"			
60 GSM	1124	2157	2457
80 GSM	1315	1928	2766
100 GSM	150	105	167
120 GSM	95	96	187
ARTPAPER(PLAIN) 31×43"			
105 GSM	237	290	383
128 GSM	109	160	248
157 GSM	5	8	87
ARTPAPER(EGG-SHELL EMBOSSED) 31×43"			
128 GSM	32	18	19
ARTPAPER(MATT) 25×34"			
187 GSM	-	-	36
CROXLEY WHITE OFFSET 25×34"			
100 GSM	28	52	72
BEDFORD ANTIQUE WOVE 25×34"			
100 GSM	56	29	112
LEDGER PAPER, BLUE LAID 31×43"			
128 GSM	97	178	127
ADMIRALTY CHART PAPER 25×34" (MAP PRINTING)			
152 GSM	85	130	145
BOND PAPERS 27×34"/60 GSM			
WHITE	2798	1832	1129
CERISE	-	247	548
YELLOW	-	230	251
GREEN	-	237	175
BLUE	-	250	432
DUPLICATING PAPERS 26¼×33¼"/60 GSM			
WHITE(70 GSM)	1010	950	1152
CERISE	320	420	670
YELLOW	275	340	474
GREEN	175	225	125
BLUE	400	350	280

(3) Printing work load

- ① Single-color printing 70%
 $4,380,000\text{m}^2 \times 0.7 = 3,070,000\text{m}^2$
 - ② Color printing (2 ~ 3 colors) 5%
 $4,380,000\text{m}^2 \times 0.05 \times 2.5 \text{ colors} = 550,000\text{m}^2$
 - ③ Color printing (4 colors) 25%
 $4,380,000\text{m}^2 \times 0.25 \times 4 \text{ colors} = 4,380,000\text{m}^2$
- Total 8,000,000m²/year
In terms of single color

Average printing work load is obtained from the following formula:

$$8,000,000\text{m}^2 / 41,000\text{m}^2 = 195 \text{ days}$$
$$195 / 250 = 0.8$$

Thus the average work load is 80% vs. 100% mechanical capacity.

The capacity of the SORDZ two-color offset printer is as follows, assuming that all four-color printed matters are made by this machine and that production efficiency is 30%.

$$4,380,000 \times 0.25 \times \text{two feeds} = 2,190,000\text{m}^2/\text{year}$$
$$2,190,000 / 16,400 \times 0.3 = 445 \text{ days/year}$$
$$445 / 250 = 1.8$$

Thus the work load is 180%.

(4) Consumption of envelopes

As shown in Table IV-3, the annual consumption of envelopes in 1982 is about 3,120,000 pieces.

Assuming that production efficiency of three platen presses is 40%, the production will be:

$$2,000 \text{ sheets/hour} \times 7 \text{ hours} \times 0.4 \times 250 \text{ days} \times 3 \text{ units}$$
$$= 4,200,000 \text{ sheets/year}$$

Thus the envelope printing capacity meets annual consumption, on the average.

Table IV-3

Envelopes

Particulars of Materials	1980	1981	1982
ENVELOPES			
MANILLA (Plain)			
4× 6"	564,000	830,000	726,000
4× 9"	332,000	699,000	965,000
6× 9"	174,000	193,000	383,700
10×12"	9,000	15,000	101,250
12×16"	20,000	18,000	65,750
MANILLA (Window)			
4×9"	34,000	18,000	65,750
MANILLA (pay envelopes)			
4×6"	390,000	70,000	362,000
GIANT MANILLA (Plain)			
4× 9"	51,000	19,250	57,000
6× 9"	-	20,000	10,000
10×12"	-	3,000	17,500
12×16"	4,000	32,000	33,500
15×18"	10,000	30,000	17,500
CARTIDGE (White)			
5½× 7½"	34,000	21,500	67,000
8½× 11½"	5,000	61,250	56,000
10½× 13½"	12,000	19,750	48,000
AIR MAIL ENVELOPES			
4×6"	29,000	30,000	17,000
4×9"	15,000	40,000	102,000
TELEGRAM ENVELOPES (Blue Bond/60gsm)	20,000	30,000	25,000
Total	1,703,000	2,149,750	3,119,950

(5) Demand forecast

Table IV-4

Annual Expenditures for the Period 1978-1982

Particulars of Expenditures	1978 (B\$)	1979 (B\$)	(±%)	1980 (B\$)	(±%)	1981 (B\$)	(±%)	1982 (B\$)	(±%)
PAPER	496,846.85	599,378.57	20.14	636,379.44	6.18	879,944.85	38.28	1,629,442.44	85.18
NEWSPRINT	145,874.20	184,726.45	26.64	248,727.70	34.65	235,351.50	-5.88	265,891.50	12.77
DUPLICATING PAPER	89,235.45	96,269.16	7.89	140,330.00	45.77	157,480.20	12.28	180,864.40	14.85
ENVELOPES	97,992.88	104,053.29	6.19	107,215.71	3.04	112,490.26	4.92	179,869.91	59.90
BINDING MATERIALS	19,851.12	31,987.20	61.14	23,178.72	-27.54	85,896.95	54.62	48,249.72	20.69
INKS & SUNDRIES	21,462.58	48,556.58	102.95	48,269.70	10.82	83,187.81	72.24	67,919.88	-18.81
OFFSET PLATES	30,023.64	30,053.44	0.10	48,637.00	61.84	50,351.84	3.53	71,461.81	41.93
OFFSET CHEMICALS	27,945.01	33,202.90	18.82	45,443.87	36.87	49,933.45	9.88	66,871.74	33.98
FILM	43,412.28	54,358.08	25.22	69,402.19	27.58	64,761.79	-6.69	77,860.46	20.28
GRAND TOTAL (B\$)	972,644.01	1,177,567.62	21.07	1,367,583.83	16.14	1,669,298.15	22.07	2,582,925.31	54.74

To forecast future demands, the change in material purchase costs from 1978 to 1982 must be analyzed from Table IV-4.

① Growth rate of material purchase costs

$$\left(\frac{2,583,000}{973,000}\right)^{\frac{1}{4}} = 1.276$$

Thus the annual growth rate is 27.6%.

② Consumer prices

(Source: Brunei Statistical Yearbook 1981/1982)

The consumer price index in 1982 is 137.2 on the basis of 1977 figure of 100.

$$(1.372)^{\frac{1}{5}} = 1.065$$

Thus the annual growth rate is 6.5%.

③ Net growth rate

Material purchase costs have been increasing at an annual rate of 27.6%. However, when the growth rates of commodity prices and of consumer prices are taken into account, the net growth comes to:

$$1.276/1.065 = 1.198$$

Thus the growth rate is 19.8 = 20%.

④ Demand forecast

As shown in Table IV-5, if the orders are estimated to grow at a rate of 20% annually, taking the 1982 index as 100, orders will double by 1986, growing 2.5 times by 1987.

The Printing Department has been producing about 70% of the total demands. If the remaining 30%, which is now subcontracted, is produced domestically, demands are expected to triple by 1986.

Table IV-5

	1982	1983	1984	1985	1986	1987
Growth rate of orders	100	120	144	173	207	249
Growth rate of total demands	143	171	206	247	296	356

⑤ Production scale

Based on the above-mentioned demand forecast, the production target should be set at 2.5 times that in 1982.

This target is to meet estimated orders to Printing Department for 1987. If the 30% portion which is currently subcontracted is to be produced domestically, the target will equal the estimated total demands for 1985, or 80% of the estimated total demands for 1986 (10% increase in domestic products).

3. Problems to Be Improved

(1) Production processes and machine installation

The present printing plant was inaugurated in the old airport terminal building. The building has been expanded to line up to introduction of new machine and equipment. The machine layout is therefore inadequate to meet the current demand, with the place jammed with machines and equipment. The narrow

space for materials and semi-finished products and ineffective transportation means largely affect production efficiency.

Therefore, the machine layout should be modified in line with the production processes.

(2) Machines and equipment

Graphic reproduction

At present, 80% of color separation processes are ordered to Singapore, taking up at least 7 days for delivery. It is therefore necessary to introduce a scanner to do color separation in Brunei so as to quicken delivery, to complete production on schedule, and to improve quality.

Printing

The present situation of printing work is as follows: 30% of the total printed matters are color-printed (25% is four-color printed); and only one of the existing 12 printing machines is a two-color printing machine.

In four-color printing, the material paper must be fed twice through the two-color printing machine, deteriorating quality and lowering production efficiency.

Therefore, the introduction of four-color sheetfed offset printer should be considered.

Binding

The plant is equipped with various binding machines. However, since most of them are manually operated, production efficiency is low, and any workers are required.

Introduction of flexible automatic binding machines will contribute to labor saving and increase in production efficiency. Since all of the high-grade books (hard cover books) are produced manually. Full- or semi-automation of sawing, cover gluing, casing-in processes and additional guillotine cutters for finishing is to be introduced promptly with much attention.

(3) Technical training for graphic reproduction, printing and binding workers

At present, there is no vocational education related to printing and bookbinding in Brunei. Only Printing Department is giving technical training to their workers.

For the increase of production with the facility expansion and for the production efficiency improvement, it is very important for Printing Department to have technical engineers or workers who have been highly trained in technical ability and in operational ability.

Therefore, it is important, in the first phase, to enhance technical training in the Printing Department.

(4) Storage of materials and semi-finished products

At present, materials are stored in the old hangar with floor space of about 1,200m², which is located 500m away from the plant, and different areas within the plant occupying about 300m². Insufficient space for material storage and inappropriate storing conditions (as to dampproofing, insect prevention, etc.) hinders the efficient flow of work.

The Printing Department is requesting to the government for a budget of B\$26,000,000, for the construction of two warehouses (15m x 50m x two = 1,500m²) next year. New warehouses will make it possible to gather scattered materials and to improve the machine layout. These warehouses are expected to be organically utilized in the entire plant system.

(5) Distribution of products

Of 55 governmental organizations, 70% are located within 3.5 mile radius from the Printing Department (in Bandar Seri Begawan City) and 30% close to it. Offices located in the regions out of Brunei and Muara, (Brunei is divided into four regions) are requested to visit the Department to receive finished products. Despite the limited distribution areas, distribution is slow due to shortage of personnel and transportation vehicles, insufficient delivery space, and inadequate distribution management.

(6) Standardization of government printed matters

Since governmental bureaus and departments order different printing forms of their own, the production lot inevitably becomes small, and decrease in production efficiency.

The Printing Department plans to abolish the traditional inch system (quarto, foolscap) to adopt A size metric system. It is currently presenting this proposal to respective governmental bureaus and departments for approval. However, the realization seems unlikely to occur for the time being.

V. IMPLEMENTATION PLAN OF THE IMPROVEMENT

Based on the basic plan, which took into considerations several problems confronted by Printing Department and estimated future demand, proposals for addition of facilities and equipment and for improving management and administration will be presented in a specific manner.

1. Machines and Equipments

1-1 Plan for Introduction of New Facilities

Ⓐ Printing machine

Judging from the current production growth rate in the Printing Department, the supply and demand of printing in 1987 is estimated as follows.

	Estimated Production	Installed Capacity
Monocolor Printing	7,675,000m ² /year	7,374,000m ² /year
Color Printing	12,325,000m ² /year	3,485,000m ² /year

Presently, 40- to 50-hours overtime is required per month. Doing away with this overtime work would require installed capacity of about 1.3 times as much as the average printing demand.

Though the supply and demand of monocolor printing is well balanced, additional two monocolor printing machines (printing capacity of approx. 1,400,000m²/year per unit) will be needed to eliminate overtime. For color printing, on the other hand, supply is in short by about 8,840,000m²/year. This means that the addition of one 4-color sheetfed offset printing machine (printing capacity of approx. 8,700,000m²/year) will be needed for 4-color printing which accounts for about 80% of color printing. In addition, one 2-color sheetfed offset

printing machine (printing capacity of approx. 3,500,000 m²/year) will be further needed to absorb the overtime work.

⑧ Binding machine

Binding performance in 1982 (classified by types of binding):

①	Wire stitch binding	46 lots	178,180 copies	(76.3%)
②	Glue binding	21 "	20,225 "	(8.7%)
③	High quality binding (flat back)	91 "	18,012 "	(7.7%)
④	High quality binding (curved back)	11 "	17,135 "	(7.3%)
⑤	Twin-wire binding	1 "	20 "	—
	Total	170 lots	233,572 copies	

For wire stitch binding, one automatic line consisting of stitcher and three-knife trimming cutter, and two single-purpose wire stitching machines are installed. This installed capacity is sufficient to cover ten times as much as the present demand. However, the automatic line is not equipped with a gatherer, and requires a large amount of worker. Therefore, it is necessary to connect an automatic gatherer to the wire stitch binding line.

For glue binding, the existing glue binding machines (hot melt) are capable of covering the estimated demand for 1987. This means that no additional installation is necessary.

High quality binding is partly performed by single-purpose thread binding machine and book back rounding machines, though major portion relies upon manual work. The production of high quality binding accounts for only 15%, though the work load exceeds 50% of total binding work. In consideration of the estimated demand and the anticipated shortage of labor force in 1987, it is necessary to introduce automatic cover processing machines,

automatic binding machines and cover casing-in machines in the high-quality bookbinding section.

③ Graphic reproduction

Since a variety of machines and equipment have been installed for graphic reproduction, increase in production efficiency through modification of production schedule and machine layout and minor improvements would enable the present installed capacity to meet the estimated demand for 1987. However, most of color separation is subcontracted (to firms in Singapore). Introduction of color scanners will be required to upgrade quality and to shorten the delivery.

④ Others

In order to reinforce the distributing capability, construction of a distribution center as well as purchase of vans or trucks for transportation are needed.

⑤ List of machines to be added

To meet the estimated demand for 1987 and to absorb the overtime work, it is necessary to add the following machines:

- | | |
|---|-------|
| ① Sheetfed offset printing machine (4 color)
720 × 1,020mm | 1 |
| ② Sheetfed offset printing machine (2 color)
640 × 915mm | 1 |
| ③ Sheetfed offset printing machine (1 color)
640 × 915mm | 2 |
| ④ Gatherer (for connection to center binder) | 1 set |
| ⑤ High quality binding line | |
| ◦ Compact flow line (rounding, mulling, back-
lining, casing-in) | 1 set |
| ◦ Casemaker | 1 |
| ◦ Embossing machine | 1 |
| ◦ Book-back gluing and drying machine | 1 |
| ◦ Forming machine | 1 |

⑥ Guillotine cutter (Model 115)	1
⑦ Van (or truck) for transportation (1 ton capacity)	2
⑧ Color scanner for graphic reproduction	1

1-2 Layout Plan

In plant, machines and equipment should be located so as not to obstruct the production processes. Space for storing semi-finished-products and passages would also facilitate production activities. In view of these considerations, it is necessary to change the layout of the machines and to transfer workshops in Printing Department.

Material warehouses are scheduled to be built in 1984 at a site to the south of the new building. After their completion, workshops should be relocated as shown in Fig. V-1 so that products flow from the south to the north in the factory. According to the proposed plan, printing workshop will be located on the first floor of the new building to the north of the material warehouse under planning as shown in Fig. V-2, and the printing machines presently installed in the eastern part of the old building will be transferred there. The machines related to graphic reproduction will be concentrated on the second floor and on the first floor in the western part of the new building to permit efficient utilization of machines. Binding workshop will be located in the old building as shown in Fig. V-3 and machines will be rearranged by types of binding. It is also planned that a part of the old building will be used for the storage of finished products and for distribution-related work place.

If future demand exceeds the estimated demand in this project, further additional machines will be needed. In this case as well, basically the first floor of the new building will be used for printing workshop and the old building for binding, finishing and distribution. To compensate the expected shortage of printing capacity, additional printing machines will be installed in that western area in the new building

which is planned, in this project, to be used for office work and the storage of subsidiary material. In this case, it is desirable to build another building as an office building at a site to the northwest of the new building and concentrate administrative departments in the office building. After the execution of the present project, the binding capacity will be sufficient for supplying three to four times as many products as demanded. Therefore, no additional installation of binding machines is required for now. If a need for additional machines arises for a new type of binding, they can be installed at a part of the space reserved for the storage of finished products in the northern part of the old building.

1-3 Personnel Plan

According to the present plan, increases in the capacity of installed machinery and production require additional operators and indirect workers. Increase of person is also required to strengthen staff. Thus, operators and other workers will be increased from the present 128 to about 185. Personnel allocation by section will be as shown below.

	—	Origination	26 workers
	—	Proofreading	12
Director	—	Graphic Reproduction	20
	—	Machine Printing	38
Assistant	—	Binding and Finishing	50
Director	—	Orders, Materials, Distribution	27
—	—	Maintenance Supervisor	2
	°	Staff Members added	8

2. Administrative Improvement

2-1 Improvement of Production Control

To ensure smooth operation of the seven sections grouped by production process and to improve production efficiency, the following are proposed.

① To hold production conference

According to the current production system, work instructions are prepared for each order and passed to sections in the order of production process, with product samples. To smoothen order receipt and to control delivery, it is necessary to know the total work load and the production progress always. To this purpose, it is recommended to hold a production conference at a regular interval (for example, once a week). The chief of each section is supposed to attend the conference and prepare production schedules for new orders by process, based on the understanding of production conditions.

② To establish efficiency improvement committee

It is recommendable to provide an efficiency improvement committee and hold monthly meetings where problems such as material loss and ineffective production process are studied to improve efficiency. Such minor improvements combine to grow technology powerful in the future.

③ To establish quality control committee

It is recommendable to establish quality control committee and regularly hold meetings where quality of materials and finished products will be examined to assure that products of better quality are produced. Further, it is necessary to feed back problems, whenever identified, to responsible sections, so that consideration is given to quality improvement.

④ To reinforce staff

It is essential to reinforce staff for smooth management of the above conference/committees and for substantial production control (including control and supervision of workers). Staff members should be increased and trained as early as possible.

⑤ To integrate origination of enactments and governmental gazettes

For enactments and government gazettes from Legal Department, origination is performed by using Compugraphic's computerized phototypesetting machine. Dummy samples, after

being proofread, are forwarded to Legal Department where the samples are checked and returned to Printing Department. Then, layout, graphic reproduction, printing and binding in this order are performed. While, data control is performed by Legal Department by using Philips' computer.

Under these circumstances, it is desirable to obtain interface between Compugraphic's and Philips' computers so as to integrate origination and proofreading, thus to attain higher efficiency.

⑥ To improve purchasing and storing of materials

Presently at Printing Department, materials are stored without insect control or moisture-proof measures. Furthermore, storage conditions and material control are not well organized, as no first in, first out system is employed.

New warehouses scheduled to be built in 1984 will store only materials from the old storehouse and those which are scattered in the plant building. There is no space available for increased materials due to future demand.

Three- to four-month inventory is the optimum for effective use of the warehouses under the present system. Therefore, it is desirable to purchase material three or four times a year instead of once-a-year purchase on the tender basis.

2-2 Technical Training

Technical improvement of workers in charge of graphic reproduction, printing and binding is one of the major keys to efficient production. It is necessary, therefore, to intensify technical education in Printing Department. For example, it is recommended to provide 1 to 1.5-year education course. Under this system, workers are given basic and field trainings, prepared for actual duty. If production schedules permit, it is also desirable to provide technical courses as required so that workers are better informed of about materials and equipment.

2-3 Standardization of Government Printed Matters

Printing Department has decided to employ the metric system to standardize the size of its printed matters, and are requesting all departments and bureaus to follow this principle. Printing forms for items common to a number of departments and bureaus should also be standardized. This will significantly contribute to improvement of production efficiency due to the reduction of time required for graphic reproduction and setting-up of printing machines (including replacement of ink and plate). The standardization of printing forms is, however, difficult to be achieved only by Printing Department. This task should be pursued as a project with participation of State Secretariat and Establishment Department.

3. Cost Estimation for the Implementation

3-1 Cost for Newly Installed Machines

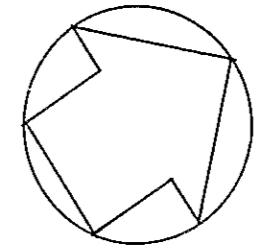
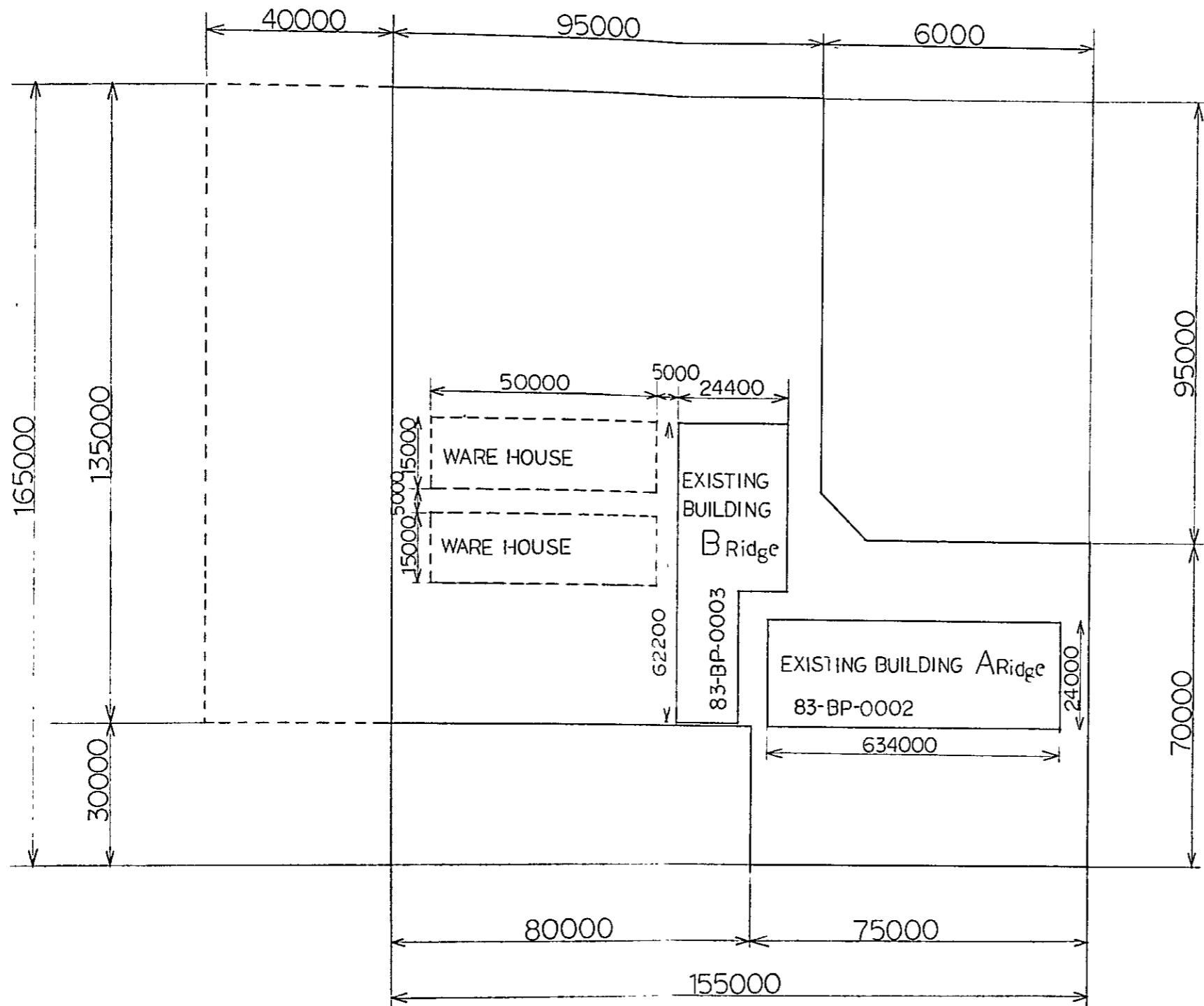
	<u>Item</u>	<u>Q'ty</u>	<u>Cost (unit: B\$1,000)</u>	<u>Yen Equivalent</u>
(A)	Printing machine	4	2,039	(250,000,000)
(B)	Binding machine	7	1,794	(220,000,000)
(C)	Graphic reproduction	1	571	(70,000,000)
(D)	Van for transportation	2	41	(5,000,000)
	Total		4,445	(545,000,000)

The above values have been estimated from the current standard prices in the Japanese market.

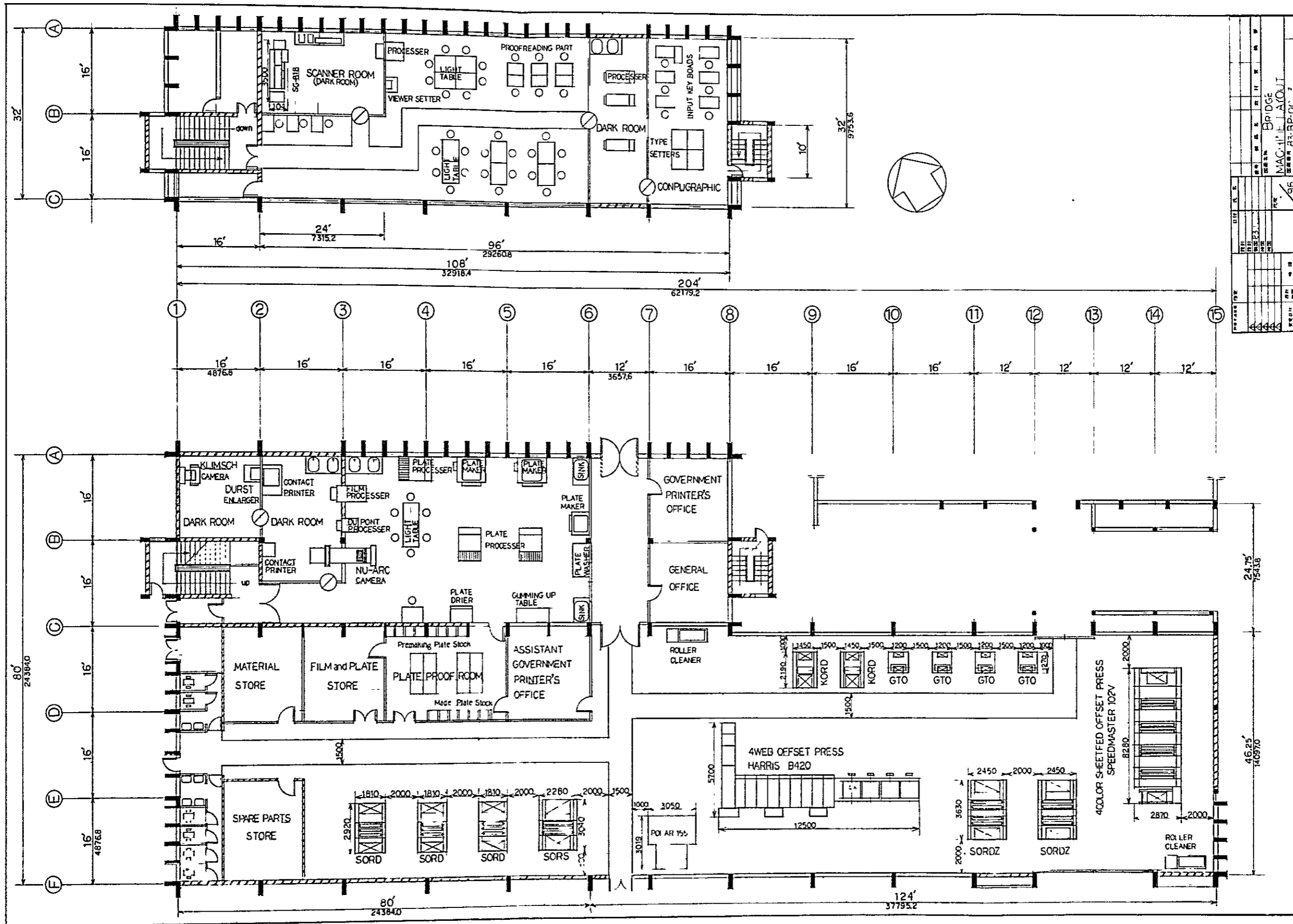
3-2 Other Costs

The cost incurred by transferring the existing machines will be ca. B\$49,000 (ca. 6,000,000 yen) of which ca. B\$26,000 (ca. 3,200,000 yen) is for worker and ca. B\$23,000 (ca. 2,800,000 yen) for miscellaneous items. The renewal of the floor and partitioning the space intended for printing workshop in the new building and that intended for storing finished products in the old building will incur additional expenditure.

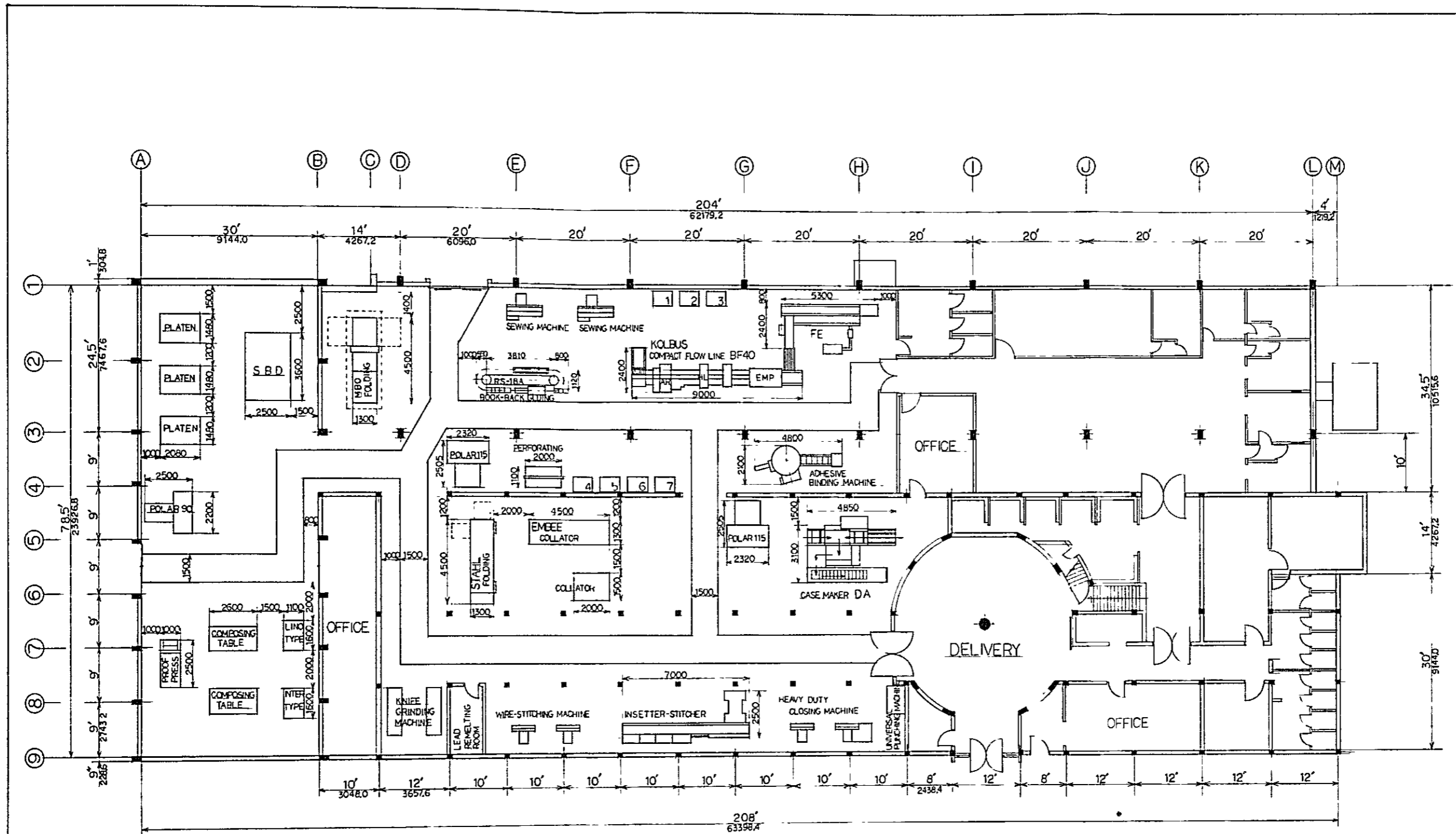
Beside these costs, another B\$2,600,000 (ca. 320,000,000 yen) will be required for two material warehouses scheduled to be built in 1984. The construction of these two warehouses is the prerequisite for additional installation of machines under the present improvement project.



許容法公考	指定	日付	氏名						
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△		設計							
△		製図	83.12.23						
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変更日付	設計	製図	検図	尺度	SITE PLAN				
				1/1000	名称				図番 83-BP-0001



PROJECT NO.	4444
DATE	11/23/66
DESIGNER	BRIDGE
CLIENT	MAC MILL JACOBI
REVISION	83-BP-OC-2
SCALE	1/8" = 1'-0"
DATE	11/23/66
BY	BRIDGE
CHECKED	BRIDGE
DATE	11/23/66
BY	BRIDGE
CHECKED	BRIDGE
DATE	11/23/66



NAME OF EQUIPMENTS	
1	BOOK CASE ROUNDING MACHINE
2	BOOK BACK ROUNDING MACHINE
3	HYDRAULIC STANDING BOOK PRESS
4	GOLD BLOCKING
5	CORNER ROUNDING MACHINE
6	HANG PAPER DRILING MACHINE
7	AYELITE MACHINE

DATE	1/90	SCALE	1/32"	PROJECT	PRINTING PLANT LAYOUT	DESIGNER	ARIDC
APPROVED		DATE		PROJECT		DESIGNER	
REVISION		DATE		PROJECT		DESIGNER	

VI. EVALUATION OF THE PROJECT

In Brunei government, various departments and bureaus are using printed matters in relation to communication, information activities, control and processing of all kinds of data, and other fields. Printing Department is responsible for producing these printed matters. Printing Department is expected to exactly and promptly meet the requirements of departments and bureaus for quality, quantity and delivery. It is also required to be coordinated with respective departments and bureaus. The present program is intended to improve such situation in Printing Department.

The especial benefits obtained from the program are as follows.

① Improved production efficiency

At the end of the project, available staff and worker will be 185 instead of the present 128, 1.45 times higher and the production capacity will be 2.07 times that in 1983. That is, the production efficiency per worker will increase about 43% in total.

② Maneuverable production system

Addition of machines as well as improvement of layout of installed machines and of plant administration will substantially increase production capacity. In addition, the extensive reformation of the binding section will help to reduce the total production time. Further, the improvement of the distribution system and the addition of distributing means will permit quick distribution. These results will realize quicker delivery than before.

③ Technological improvement

Machine operation technique will be hopefully improved through the introduction of new machines under the present project. Particularly, one color scanner for graphic reproduction and various new machines for high-quality binding will bring about dramatic technical improvements in these fields.

The technical ability in printing, binding and graphic reproduction fields will also be cultivated through the intensified technical education and training carried out by Printing Department. This will provide the foundation, on which Printing Department can advance to new fields.

Once the improvement project is executed and the new system begins to function as planned, establishing itself, the effects will be manifest in the improvements of cost-consciousness, and enthusiasm for high efficiency, good quality control system and administrative technique.

VII. CONCLUSION AND PROPOSAL

In response to the request from Brunei Government, our study team visited Brunei and conducted investigation from September 26 to October 6 in 1983 to study the plan for the technological improvement of production system and facilities of Printing Department, and for the improvement of administration system including distribution, and for the standardization of governmental printed matters. During the visit, the study team observed plants of Printing Department and private enterprises to collect data, and exchanged opinions with personnel concerned of Brunei.

After returning home, the team first reviewed the present situation of Printing Department in detail to identify and analyze problems. Then, the team estimated the future demand based on the achievements of Printing Department for the past five years to propose a basic plan for the improvement project.

The basic plan serves to elaborate specific implementation plan for the project. Its core is, as described in Chapter IV, the production target set at about 2.5 times the production achievement of Printing Department in 1982.

This production scale corresponds to the production by Printing Department in 1987 as expected from the current production growth rate. When subcontracted production is included, however, it corresponds to the production in 1985.

The target may possibly be set for a longer term but it is considered reasonable to set it as in the present project because of the following reasons. First, considering that the population of Brunei is 200 thousand, the demand growth will be slow in near future. Second, though the domestic production of printed matters presently subcontracted outside has been one of the objectives of Printing Department since its establishment, it will take some time for necessary adjustment before its realization. Even if the domestication will

be launched at the beginning of 1985, the production capacity set as a target is assumed to possibly satisfy the demand in 1986.

The implementation plan, which has been drawn from the basic plan and described in Chapter V, consists of technological facility improvement plan relating to the additional installation and the layout of machines and administrative improvement plan relating to the management system.

The facility improvement plan involves the total expenditure of ca. B\$4,494,000 of which ca. B\$4,445,000 is for additional introduction of machines and B\$49,000 for transferring the existing facilities.

It seems reasonable from the viewpoint of personnel training to divide the project into two parts one of which is to be started in 1984 and the rest in 1985.

Considering the present situation of Printing Department and the general customs in Brunei, the administrative improvement plan may have some difficulties in its implementation. Since comprehensive efficiency can be improved only by the integration of technological facility improvement and administrative improvement, the implementation of the administrative improvement plan is essential for realizing the general productive improvement which is the core of the request from the Brunei Government.

When this improvement project is executed, staff and worker of ca. 185 will be needed. This means personnel expansion 1.45 times larger than the present 128. The increase in the number of workers is not only the objective of the personnel plan. It is also necessary for the Printing Department to have the number of workers, who have high morale and more skill, and to achieve higher production efficiency than now. Therefore, continuous training of workers in Printing Department is vital for the project.

The implementation of this improvement project will serve to improve productivity and work efficiency of Printing Department and to shorten delivery period, thereby enabling Printing Department to promptly meet the demand of the government. In addition, the progress of industrial technology can be anticipated as a byproduct. In order to reach these goals as quickly as possible, the following should be kept in mind in implementing the present project.

First, close contact and coordination with relevant governmental organizations is required. Especially for effecting standardization of printed matters which involves cooperation of other departments and bureaus, it is necessary to organize a project team with these departments and bureaus participated. Second, mutually relating plans in the present project should be executed not separately but in parallel. Finally, after starting the present project, progress and resulting effects in every field should be confirmed periodically, ideally every three months.

Hoping further development of Brunei after the independence, our study team recommends that the present project for Printing Department will be enforced as soon as possible with the above points in mind.

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APPENDIX

1. The first part of the document is a list of names and titles, including "The Hon. Mr. Justice G. D. C. O'Connell, Chief Justice of the Supreme Court of the State of New South Wales, Australia."

(1)

RECORD OF DISCUSSION
FOR
INCEPTION REPORT
ON
IMPROVEMENT OF THE PRINTING DEPARTMENT
BRUNEI GOVERNMENT

The joint meeting for the above mentioned study was held on the 26th September, 1983 at the Printing Department.

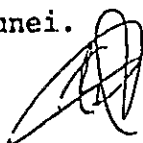
The Brunei side was represented by Awang Haji Mohd Yunos Bin Haji Mohd Hussein, Director of Printing Department and the Japanese side was represented by Mr Katsumichi Ichikawa, the leader of JICA Study team.

JICA Study team submitted ten (10) copies of Inception report on the above mentioned study to the Printing Department and explained the content of the report on the 26th September, 1983. The Inception report from JICA Study team was accepted by the Printing Department.

The following is the Record of Discussion made during the joint meeting:

- 1) The Director of Printing, Awang Haji Mohd Yunos Bin Haji Mohd Hussein, requested JICA Study team to include the following three items into the Inception Report:

- i) To provide advisory services for the establishment of government security printing in Brunei.



K. Ichikawa

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- ii] To provide training opportunities for technical staff in Japan; and
 - iii] To provide advisory services for the establishment of government Printing school.
- 2) JICA Study team made an explanation of their study objectives and the scope of work to the Brunei side referring to item 2 of the Inception Report.
 - 3) The Brunei side understood the objectives and Scope of work of the study team and have requested the JICA study team to convey the above mentioned requests of paragraph [i], [ii], [iii], to the authorities concerned in Japan for their positive considerations.
 - 4) JICA Study team promised the Brunei side that the said requests would be conveyed to the authorities concerned in Japan, however, the said requests should be assumed as unofficial requests at the present stage.
 - 5) JICA Study team informed the Brunei side that it would be appropriate to make an official



K. Ichikawa

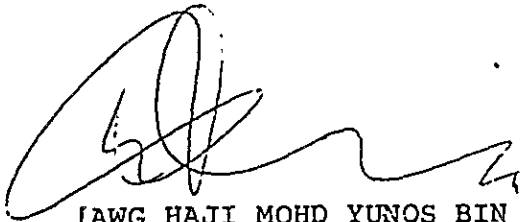
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request to the Government of Japan through
Diplomatic channel for its implementation
so that the said requests could be con-
sidered in due course.

Done in Bandar Seri Begawan on 1st October, 1983.

For the Printing Department

For the Japan
International
Cooperation
Agency



[AWG HAJI MOHD YUNOS BIN
HAJI MOHD HUSSEIN]

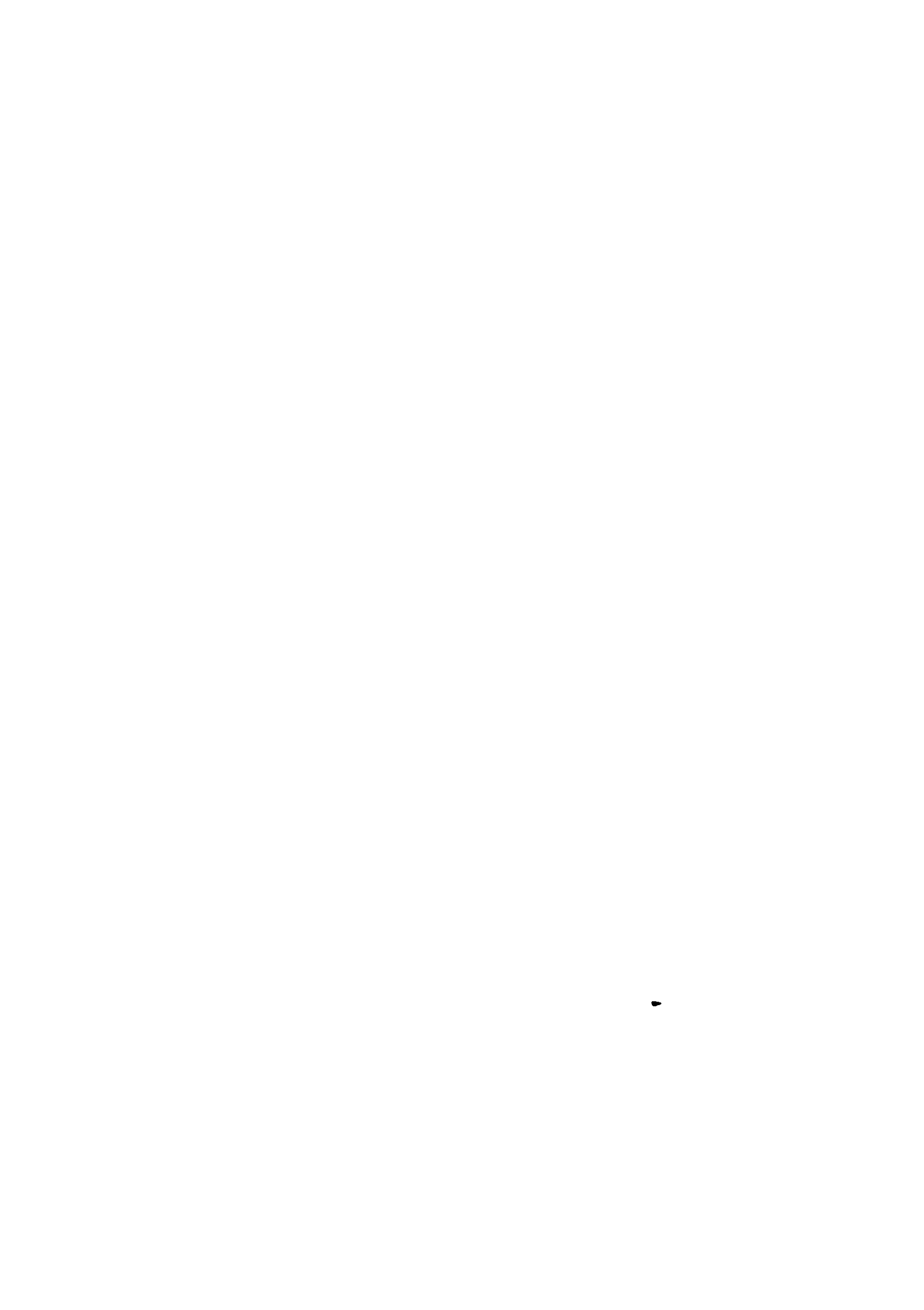
DIRECTOR
PRINTING DEPARTMENT
BRUNEI.



[MR KATSUMICHI ICHIKAWA]
LEADER OF THE STUDY
TEAM JAPAN INTERNATIONAL
COOPERATION AGENCY
JAPAN.

(2) Members of Study Team

Mr. Katsumichi ICHIKAWA	Leader Director of Production Control Department Toranomom Plant Printing Bureau Ministry of Finance
Mr. Hideo EBISAWA	System Management Manager of Printing Division Toranomom Plant Printing Bureau Ministry of Finance
Mr. Toshio HIDA	Coordinator Deputy Head of First Development Survey Division Social Development Cooperation Department JICA
Mr. Fumio NAKAMURA	Improvement of Printing System Director of Engineering Department Kokuyo Co., Ltd.
Mr. Yasumasa IWASE	Printing and Bookbinding Machinery Section Manager of Production Engineering Section No. 1 Kokuyo Co., Ltd.
Mr. Kanjiro TANAKA	Building and Machinery Layout Deputy Section Manager of Production Engineering Section No. 1 Kokuyo Co., Ltd.
Mr. Hiroyasu WATANABE	Facility Section Manager of Export Section Kokuyo Co., Ltd.



(3) Study Schedule

- Sept. 24, 1983 (SAT) Leave New Tokyo International Airport (SQ-005) via Osaka International Airport (Four members from Kokuyo join). Stay in Singapore
- 25 (SUN) Arrive at Bandar Seri Begawan. (SQ-456)
Visit the Office of the Government of Japan. (Mr. Shimomoto)
° To explain study policy and contents
- 26 (MON) Visit Printing Department for the first talk.
° To explain purpose and contents of study
° To adjust study schedule
° To explain questionnaire
Observe plant of Printing Department.
- 27 (TUE) The second talk with Printing Department
° The present situation explained by Printing Department
Questions and answers using questionnaire
- 28 (WED) The third talk with Printing Department
° Problems identified by Printing Department
° Questions and answers using questionnaire
Examine the present situation of the plant of Printing Department, particularly with respect to installed machines and equipment.

- 29 (THU) Examine the present situation of the plant of Printing Department with respect to installed machines and equipment.
- 30 (FRI) Visit Logistic Department of Army.
 ° To study the standards and forms of documents
 Visit plants of private printing companies (located in Bandar Seri Begawan).
 ° Star Trading & Printing Ltd.
 ° Capital Trading & Printers
 ° Borneo Printing & Trading Pte. Ltd.
- Oct. 1 (SAT) Visit Economic Planning Unit.
 Visit State Secretariat.
 ° To hear explanation about budget for Printing Department
 The fourth talk with Printing Department
 The fourth talk with printing Department
 ° To sign on record of discussion
- 2 (SUN) Team leader Ichikawa and team members Ebizawa and Hida return to Japan.
 (SQ-455)
 Market research of printings and publications at supermarkets in Bandar Seri Begawan
- 3 (MON) Visit Establishment Department.
 ° To get information governmental organizations

Visit Language and Literature Bureau.

- To get information education-related publications

Visit plant of Printing Department.

- To study production process
- To study availability of machines

4 (TUE) Visit Information Department.

- To study publication of "Pelita Brunei"

Visit plant of Printing Department.

- To study the situation of graphic reproduction
- To study the situation of newspaper printing

5 (WED) The fifth talk with Printing Department

- Questions and answers

6 (THU) Leave Bandar Seri Begawan (SQ-455).
Stay in Singapore.

7 (FRI) Arrive at Osaka International Airport (SQ-006).

(4) The Offices and Officials Visited by Study Team

STATE SECRETARIAT

Senior Administration Officer

.....Haji Chuchu bin Panglima Asgar Haji
Abdullah

ECONOMIC PLANNING UNIT

Assistant Director...Mr.Chua Pheng Siong

ESTABLISHMENT DEPARTMENT

Director.....Awang Abmad bin Pehin Orang Kaya
Di-Gadong Seri Di-Raja,Dato Laila
Utama Hj.Mohd.Yussof.

The Officer.....Awanku Hj.Yusof bin Pg.Kulla

LANGUAGE AND LITERATURE BUREAU

Acting Director.....Haji Abdul Saman bin Kahar

The Officer.....Awang Zainal Abidin bin Hj.Ibrahim

INFORMATION DEPARTMENT

Director.....Hj.Badaruddin bin Pengalah Hj.Othman

The Officer.....Pg.Hj.Md.Yassin bin Pg.Othman

GOVERNMENT PRINTING DEPARTMENT

Director.....Haji Yunos bin Haji Mohd Hussein

Assistant Director...Awang Ali Haji Hassan

Chief Clerk.....Awang Ibrahim Haji Sabli

Printer's Assistant..Pg.Darussalam bin Pg.Hj.Abbas

" ..Awang Md.Daud Haji Ahmad

" ..Pg.Hj.Zainal Abidin bin Pg.Hj.Ahmad

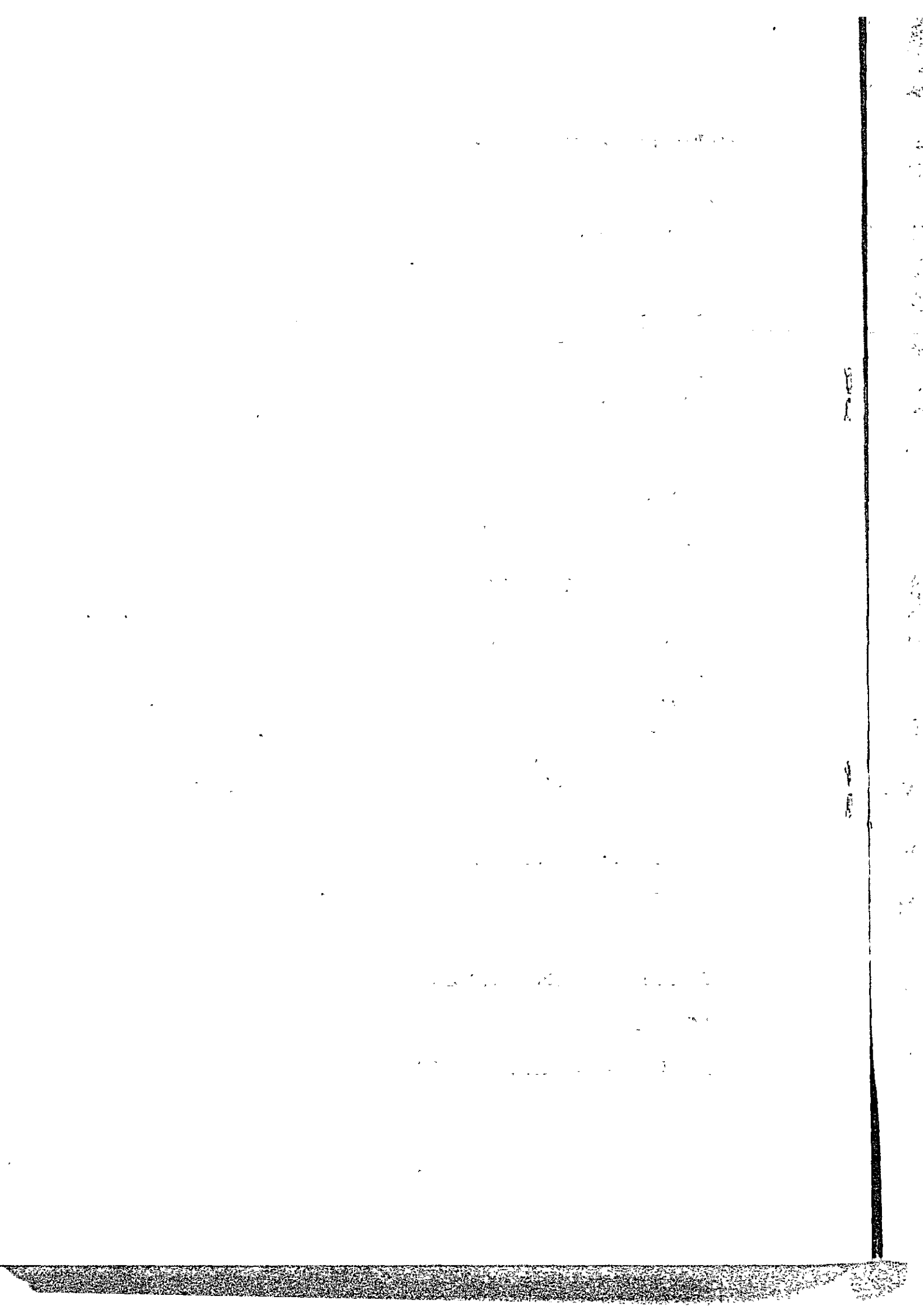
Senior Proofreader...Awang Mohd Moxsin bin Hj.Manggong

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