

**THE STUDY REPORT
ON
THE RENOVATION OF CAMBRIC'S MILL
GKBI MEDARI
IN
THE REPUBLIC OF INDONESIA
(SUMMARY)**

DECEMBER, 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

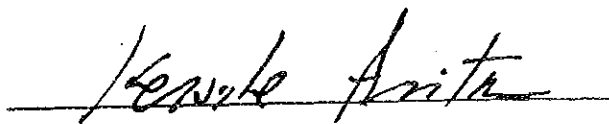
In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to conduct a feasibility study on the Project for Renovation of the Cambria Mill in Indonesia and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Indonesia a survey team headed by Mr. Akira Sugeta (Japan Consulting Institute) from July 2 to July 22, 1986.

The team had discussions with the officials concerned of the Government of Indonesia and conducted a field survey in the Project-related areas, including Yogyakarta. 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 development 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 the Republic of Indonesia for their close cooperation extended to the team.

December, 1986

A handwritten signature in black ink, reading "Keisuke Arita", is written over a horizontal line.

Keisuke Arita

President

JAPAN INTERNATIONAL COOPERATION AGENCY

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1. Background and Purpose of Study

1.1 Background of Study

GKBI Medari Mills in the Republic of Indonesia was founded in 1960 and has been operated as an integral mill for spinning, weaving and finishing for a quarter of a century. When the mill was constructed, all the textile machines were designed and fabricated using modern technology at that time. Due to prolonged usage, machineries and equipment are deteriorated and have become obsolete, causing inefficient productivity, decline of product quality as well as increase of production cost.

In the light of the situation mentioned above, it is important to review the mill by diagnosing existing states of facilities, technical capability and administrative management ability and for the Government of Indonesia to exercise judgment whether the mill shall discontinue its operation for production or restore and enhance the mill by implementing renovation program for the purpose of increasing production volume, improving quality of products and lowering production cost, thus intensifying competitiveness of the products in domestic and international markets. Under these circumstances, the Government of Indonesia has requested the Government of Japan cooperation for diagnosis of, and for planning of renovation program of GKBI integrated textile mill in Medari.

Upon receipt of the official request, the Japanese Government decided to conduct an investigation for the diagnosis and renovation project and Japan International Cooperation Agency made a preliminary survey in February, 1986. This feasibility study report has been prepared in accordance with the Scope of Work signed in February 22, 1986, between the representatives of the Indonesian Government and the leader of the preliminary survey team of JICA.

1.2 Purpose of Study

The purpose of study is to diagnose the current status of existing machineries and equipment, technical level, raw materials, quality and marketability of products, operability and managerial control capability of Medari Mills by conducting field survey and to examine viability of a renovation program which comprehends to increase production volume, to improve productivity and quality, to widen width of products to enhance exportability, to advance technical level, and to rationalize management and operation capability of the Mills.

1.3 Field Survey

JICA despatched the team headed by Mr. Akira Sugeta to the Republic of Indonesia from July 2 to July 22, 1986 for the purpose of conducting field survey.

Upon a series of discussion made with related organizations, Study Team collected necessary data and endeavored to obtain necessary information of the market trend chiefly by hearing from public and Textile-handling organizations and textile enterprises. In the course of making its mill diagnosis, the counterpart were kind enough to extend their every possible cooperation and assistance for attaining its purpose finishing needful data and information.

1.4 Object of Study

Mill to be surveyed: Medari Mills

(on the outskirts of Yogyakarta City).

Products: Cotton fabrics.

Outline of Mills:

Location:

About 14 km north of Medari Village, Yogyakarta,
Central Java.

Establishment:

1960. Mill under GKBI's direct management

Area:

125,113 m².

Building:

46,037 m².

Machinery & equipment:

Spinning: 47,808 spindles

Weaving : 908 sets (No.1 Mill: 512 sets; No.2 Mill: 396 sets)

Finishing: 1 set (scouring; bleaching; pre-shrinking)

Production scale:

Cotton yarn : 15,600 bales/year (40's conversion)

Cotton fabric : 16,000,000 meters/year

Employees:

Spinning 440

Weaving 577

Finishing 163

Utility 121

Administration 121

Total 1,422

2. Policies for Textile Industry

Information regarding the Indonesian Government's policies for the textile industry have been obtained from the Ministry of Industry of Indonesia, the Ministry of Cooperative of Indonesia, Federation of Indonesian Batik Cooperatiion, Association of Textile Manufacturers, JETRO, and textile enterprises there.

It was found that, in the 4th 5-year development plan, the growth rate of textile industry stands at 9.5% which is higher than those of other industries, and that the textile industry is designated as one of preferential groups among the whole industry for the promotion of export with the plan for doubling exports of yarns and fabrics during the period of the aforementioned plan.

As a result of the enforcement of export incentive system as a measure for the promotion of export, exports of textile products had smoothly been on the increase. At the protest made by the U.S.A., however, stating that the above system could be contrary to the GATT Charter, the export incentive system had to be abolished at the end of June, 1986.

In place of that system, "Policy Package of May 6th" was put into effect as from July, 1986.

At that time the survey had been under way, it was too early to grasp effects made by the Policy Package, in which the drawback system was adopted.

Study Team figures out that the amount of the said drawback to be made by the new system could be about one third of that of subsidy hitherto granted by the export incentive system. Although less advantageous than before in case with the export of cotton fabrics, it will be necessary to exert further efforts at

the enterprise's side seeking for the Government's additional measures to be taken for the promotion of exports of textile products.

One of the additional measures is the price decrease of fuel oil for industrial use. Its effects on the production cost of cotton fabrics will assumably be 3% approximately. Coupled with this, as import duty of raw material cotton will be exempted in the future as well, it is anticipated that exports of cotton fabrics will not be affected to a large extent.

While, as the measure for protection of Traditional Batik, indication on Batik products have been in force. And the feasibility of the registered design system is under study. Its effects on the protection for the Traditional Batik will become much fruitful.

GKBI has two joint ventures related to textiles in addition to the mills under its direct management, forming GKBI's group with those enterprises for production and sales.

In reference to GKBI's management organization, it will be essential for GKBI to modernize its management, particularly, for sufficient functioning at each Department of Marketing, Planning and Technology.

3. Market Survey

Study Team paid its visit to GKBI, JETRO, speciality stores, and textile firms for the purpose to investigate the general conditions of domestic and international markets concerning cotton fabrics and Batik.

The demand-supply trend of cotton fabrics, cambric, and Batik for 3 years from 1983 to 1985 is shown in Table 3:

Table 3 Demand-Supply Trend of Cotton Products (from 1983 to 1985)

Unit: 1,000 yds

| | Cotton fabrics | | Batik | | Cambric | |
|-----------------|----------------|-------|--------|-------|---------|-------|
| | Volume | Trend | Volume | Trend | Volume | Trend |
| Domestic demand | 673,700 | → | 47,000 | → | 160,000 | → |
| Imports | 8,500 | → | - | - | - | - |
| Exports | 138,100 | ↗ | 31,000 | ↗ | - | - |

It was traceable that the volume of those domestic demand and imports of cotton fabrics has been levelling off respectively. Exports of cotton fabrics covering the above period amounted to 138,100,000 yds, grey-cloth exports of which occupied 80%. The volume of Batik home-demand reached 47,000,000 yd constantly.

While, exports of Batik products stood at 31,000,000 yd, 70% of which was exported to Asian regions. With two fields of cambric use, that is, for Batik and general textiles, the production of cambric for Batik use amounted to 78,000,000 yd, that of cambric for general textile use being to 82,000,000 yd. The domestic demand for cambric showed levelling off.

Based on those data above, following demand-supply forecast has been estimated:

- The growth rate of cotton-fabric demand:

| | |
|------------------|-----------------------|
| Domestic demand: | +1.0%/yr |
| Imports: | +1.0%/yr |
| Exports: | 1986 +10.0%/yr |
| | from 1987 on +5.0%/yr |

- Thus, the production of cotton fabrics in 2000 will amount assumably to 1,070 mill yd, showing a 33% increase over that of cotton fabrics in 1985.

- The growth rate of cambric demand:

| | |
|---|----------|
| Domestic demand for Batik (Cambric for Batik): | +0.5%/yr |
| Domestic demand for cambric for general textiles: | +1.0%/yr |
| Exports of Batik : | +2.0%/yr |

- The production of cambric in 2000 will assumably reach 1.88 mill yd, corresponding to a 18% rise over that of cambric in 1985.

Based on the aforementioned forecast of demand and supply concerned, Study Team formulated basic situational ideas for working out the renovation scheme of Medari Mills as follows:

- (1) With the renewal of machinery and equipment installed in No.1 Weaving Mill, grey cloth to be earmarked for export will be produced.
- (2) With the existing machinery and equipment in No.2 Weaving Mill left as those are, grey cloth for the cambric use will be turned out continuously.

(3) In parallel with reconditioning Weaving Mill stated above, the reasonable reconditioning of the machinery and equipment installed in both the Spinning Mill and the Finishing Mill will be made.

4. Technical Diagnosis of Medari Mills

4.1 Raw Material

The top management of GKBI informed the Study Team of their basic policy that they had had no plan for the production of any fabrics of synthetic blend, but for the continuous production of pure cotton yarns and fabrics as ever in Medari Mills.

It was understood that American, Australian, and Pakistani cotton were chiefly being in use in Medari up to now. On the assumption that Chinese and Indonesian cotton will be used in the future, Study Team considers it necessary to check those characteristics of each own in any time.

It is proper to use Pakistani cotton for coarse yarn (20's - 36's), although Pakistani cotton has a lot of impurities. Generally, cotton other than Pakistan's will be suitable to be processed for medium and fine yarns (40's - 50's).

Since the upkeep of the constant mixing rate of respective raw cotton as much as possible is favourable for maintaining the quality of yarn, Study Team considers it indispensable to get hold of the total stock of cotton adequate for 3 month consumption so as to facilitate the formation of cotton mixing in Medari Mills.

4.2 Machinery and Equipment

4.2.1 Spinning Division

It was found by Study Team that due to the shortage of raw cotton from May to September, 1985, the production of cotton yarn had continued up to only 10% of the total production capacity of the existing machinery and equipment. Since August, 1985, however, its commission-base spinning requested from P.T.

PRIMATEXCO had necessitated the increase of the number of spinning frames running gradually. Thus, the production of cotton yarn rose to 750 bales/month, recovering up to 60% of its total production capacity, or up to 78% of the operation rate of spinning frames. It is understood that the necessary arrangements were already under way with such the plan for its maximum operation allowable in December, 1986.

It is important to grasp the conditions of yarn-breaks on spinning frames as a checkpoint of mill operation. Seeing that a lot of yarn-breaks were being occurred on spinning frames, amounting to 19.8/400 sps/hr (yarn of 40's), in Medari Mills, it is considered needful to improve such the yarn-break, because of inadequate yarn for cotton cloth earmarked to exports.

Improvement measures for each process in spinning are indicated as below:

Opening and picking frames:

Replacement of a part of unit; reconditioning by exchanging parts will be carried out.

Cards:

Remodelling of cards into semi-high speed cards will be practiced.

Drawing frames:

All sets of the old Model (DF 59) drawing frames will be replaced with the new ones.

Combing frames:

Reconditioning by exchanging parts will be made.

Roving frames:

Remodelling of under-clearer; reconditioning by exchanging

parts; partial replacement with new ones will be carried out.

Spinning frames:

Replacement of Nitto arm (41 sets) with SKF arm; Renewal of creel and running part will be practiced.

Winders:

Replacement with auto winders will be made.

4.2.2 Weaving Division

Howa-made looms of 500 sets, part of the objects for the renovation, installed in No.1 Weaving Mill, which had been left idle, restarted running gradually since April, 1985. It was found that 350 sets of those looms in No.1 Weaving Mill were running, the working rate being 60% low, and that on the contrary, 396 sets of Toyoda-made looms in No.2 Weaving Mill kept running to the full extent, the working rate being 80%. The stoppage of some looms in both mills caused by weft yarn-break was notable phenomenon.

It has been noticed that regarding the quality of grey cloth, A-grade grey cloth in the local inspection standard for cambric stood at 75%; those B/C grades in the same standard: 25%, and that A-grade grey cloth in the inspection standard for export was found almost nil.

It is quite necessary to take off yarn defects, especially, to decrease slub yarn, uneven yarn, and coarse yarn as measures for improving the quality of grey cloth.

Measures for the prevention of grey-cloth defects in the Weaving Division are as under:

(1) Double pick and thin bar:

Replenishment of parts related to picking motion is required.

(2) Double warp yarn:

Replenishment of parts of stop motion in warper is required.

(3) Weft lashing-in:

Replenishment of parts in weft cutter is required.

(4) Reed mark and streaky:

Due to defects seemingly caused by malfunctioning of reeds amounting to 27%, the replacement of reeds is needed.

As indicated above, a lot of grey-cloth defects accounted for the delayed replacement of parts were found.

4.2.3 Finishing Division

It was found that its working rate had been 30% of the production capacity for the span of 1984-1985, but in 1986, the working rate showed its gradual recovery. And yet, it was 50% or so at the time of survey made.

The processing cost in the first quarters of 1986 was on the decrease due to the rise of production. It should be noted the importance to secure sufficient amount of production volume.

Considering that any mechanical malfunction almost caused by the delayed replacement of parts leads to troubles regarding the quality of finished cloth in finishing process, it is imperative to do the prompt replenishment of parts.

It was found that D.C motor of the rope-type J-Box did not work, failing in the adjustment of tension of processing cloth accordingly, and that some of the motors needed were taken off. The replenishment of those motors should necessarily be made for the normal operation.

It was also noted that concerning the rapid-type-J-box, due to the lack of Teflon sheet necessarily to be placed on the bottom of chamber, the smooth moving of cloth was not effected, producing uneven scouring and finishing of cloth.

With regard to the scutcher water mangle, rubber wound onto the surface of mangle was peeled off, lowering the squeezing function of rubber roller.

4.2.4 Utility Equipment

(1) Electric equipment

PLN's network of power transmission has been developing recently, to the extent that the switching to other transmission line at the time of power failure has been feasible. The stoppage of electric power seems to be 6-10 times per year, its each time stoppage lasting approximately 20 minutes. Such an accident tends to be on the decrease year after year.

The fluctuation of voltage is being placed under control in the range from +10% to -5%. It may be possible to make further stabilization with the voltage regulator to be installed within Medari Mills.

It is estimated that in case of generator, the electric cost calculated based on data concerned gathered during field survey could approximately be 82.8 Rp/kWh as against PLN's supplying cost of 66.8 Rp/kWh, the latter showing a 20% reduction of the electric cost.

(2) Building

Study Team considers it preferable for Medari Mills to board a ceiling for the purpose of increasing the insulation effect in the building, and of decreasing the volume of ventilation of air-conditioners for keeping stable temperature and relative humidity in the Spinning Mill and No.1 Weaving Mill.

(3) Air-conditioning

It is recommended that the air-conditioning to be installed in No.1 Weaving Mill should be a combination between central washer type and atomizer type, and that the return duct be of underground type.

(4) Boilers

In the event of the full operation of machinery and equipment in Finishing Mill with the existing boiler apparatus, there will be an insufficient capacity of 4 tons/hr, apparently. It is considered that the additional boilers should be installed.

(5) Water treatment

It seems necessary for Medari Mills to replace the present softener with the new one, because of the high total hardness of water, caused by the reduced function of softener.

It was found that the water-treatment arrangements and its treatment method could be passable, and that due to the inadequate material of sand filter, residue of iron and mangan was visible. So, the replacement of strainer should be made.

(6) Energy-saving measures

It is recommended to install the inverter control system for the air-conditioning in order to save electric power.

4.3 Management and Organization

Rise and fall of any enterprise are determined by the balance between management ability and technical power. It is a matter of course that in the renovation to be made in the enterprise, the renovation of management should be carried out in parallel with the renovation of technology to be supported.

That is, in order to get the renovation schedule to be successful in its practice, of great importance is the establishment of GKBI's management function for supporting the renovation of Medari Mills.

From the viewpoint mentioned above, it is strongly desired to bring the following three matters into practice.

(1) Fulfillment of marketing department

It is very important that GKBI newly starting to open up the new export markets, should conduct marketing activities for the export of cotton fabrics as soon as possible and be ready for the export of cotton fabrics. It is desirable that with the training program for marketing specialists especially, a unique and proper marketing organization and staff should be formulated for GKBI's further progress in the future.

(2) Strengthening of planning staff

It is indispensable to strengthen planning staff for forming GKBI's managerial strategy. The fulfillment of planning function to lead the management forward based on results of marketing will bring GKBI's future into prosperity.

(3) Strengthening of management function

Study Team deems it desirable to strengthen the function of organization control such as technology control, quality control, and operation control other than the above-stated two Department.

(4) Organization of Medari Mills

There are regulations, as the age-limit system, stipulating that any of the employees will retire at his or her age of 55, or after thirty-year service made in Medari Mills.

Accordingly, about 80% of the employees who entered Medari Mills in 1960, the year of its establishment, will reach their age of retirement, 5 years later.

It is apparent that the retirement of too many experienced workers at a time will interfere with its smooth operation. So, it will be preferable for Medari Mills to work out the concrete plan to rectify the labor age structure as prompt as feasible.

At present, the rejuvenation of staff who are in position of, or equivalent to section chiefs is under way, and education and training for key staff is being practiced in Medari Mills.

In order to extend such the rejuvenation to ordinary employees, it is preferable for Medari Mills to make up the comprehensive plan that in putting the renovation plan, young workers required for renovation work will be employed; surplus labor newly coming up will undergo necessary training suitable for operation and maintenance, respective replacement to be made as workers for operation and workers for maintenance will be made.

It is considered that judging from the scale of the present machinery and equipment, the number of administrators or managing staff seems to be insufficient in the operational organization. Because of this, it has been observed not a few cases that the production equipment was under the insufficient control. So, it is indispensable for Medari Mills to set up the new organization placing its emphasis on quality control and on the education and training of employees, because products produced after renovation will mostly be exported and have to compete with products of foreign countries.

5. Renovation Scheme

5.1 Weaving Division

In establishing the renovation scheme, the adoption of shuttle looms is defined as Case 1, and the adoption of air-jet looms rapidly being in use in various countries of late as Case 3. Case 2 is a combination of above two looms. Major reasons for the selection of air-jet looms in the renovation scheme are as follows:

- (1) The technical level of air-jet looms is on the way of its practice now, passing away its developing step.
- (2) Air-jet looms have been brought in private enterprises in Indonesia. So, it is judged by Study Team that workers in Medari Mills will be able to operate those looms satisfactorily.
- (3) A few mechanical troubles; easy in maintenance work.
- (4) Necessity to enhance competitive power by employing revolutionary looms for the future.

Basic ideas in the renovation scheme regarding No.1 Weaving Mill are as follows:

- (1) Reed space of looms will be 75" (190 cm).
- (2) Kinds of woven cloth will be plain, satin, and twill.
- (3) Quantity of grey-cloth production for export will be 60% of the total grey-cloth production.

Quantity of grey-cloth production for domestic demand will be 40% of its total production.

(4) Production by loom-type is as below:

| | | | |
|---------|----------------|----------|------------------|
| Case 1: | Shuttle looms: | 216 sets | 6,600,000 yd/yr |
| Case 2: | Shuttle looms: | 72 sets | |
| | Air-jet looms: | 50 sets | 7,300,000 yd/yr |
| Case 3: | Air-jet looms: | 100 sets | 10,200,000 yd/yr |

The present variety of grey-cloth will continuously be produced in No.2 Weaving Mill in the future.

Preparatory machines for weaving and cloth inspection to be replaced with the renovation are included in each case.

5.1.1 Production Items and Production

All the items to be produced and production after the renovation are as the following:

| | Description | Production (1,000yds/year) | | |
|--------------|---------------|----------------------------|--------|--------|
| | | Case 1 | Case 2 | Case 3 |
| No 1 mill | Biru (1) | 1,406 | 1,385 | 2,556 |
| | Biru (2) | 1,406 | 1,576 | 2,343 |
| | Biru (3) | - | - | - |
| | Prima | - | - | - |
| | Poplin (1) | 1,347 | 1,428 | 1,632 |
| | Poplin (2) | 1,347 | 1,408 | 1,837 |
| | Twill | 580 | 845 | 966 |
| | Satin | 511 | 639 | 852 |
| No 2 mill | Biru (3) | 3,766 | 3,766 | 3,766 |
| | Prima | 2,015 | 2,015 | 2,015 |
| | Primissima | 3,127 | 3,127 | 3,127 |
| | Buffing Cloth | 1,435 | 1,435 | 1,435 |
| Total | 16,940 | 17,624 | 20,530 | |

- Remarks:
1. Operation 343 days/year x 24 hours/day
 2. Biru (1) grey width 63" for export
Biru (2) grey width 56" for domestic use
Biru (3) grey width 46" for cambric use
 3. Poplin (1) grey width 62.5" for export
Poplin (2) grey width 56" for domestic use

5.2 Spinning Division

It is considered that, in any case, the increase of the quality of products is a must for the renovation of the weaving process, and that, accordingly, unless the renovation of the spinning process is executed on larger scale basis, the whole renovation of Medari Mills will not be so fruitful as expected eventually.

(1) Opening and picking process

It is considered that on account of the insufficient cotton opening and cleaning of its impurities, machines chiefly selected from an angle of these workability should be replaced with new machines, and that any usable existing machines be utilized in any respect.

Opening and picking are the entrance of the Spinning Division, and the quality of lap in this process produces an effect on the process after carding. Taking such into consideration, Study Team planned to make an effective arrangement of machines.

(2) Carding process

The existing cards of 108 sets will be remodelled into semi-high speed cards of 50 sets. It was planned that with the new installation of preparatory opening devices, the decrease of nep could be realized as small as possible in the course of remodelling, because nep affects the quality of lap.

(3) Drawing process

Dead weight load type 6-delivery drawing frames will all be scrapped, and replaced with new drawing frames of 4 sets.

D-800F Model drawing frames, however, will effectively be utilized.

(4) Roving process

It was found that owing to incomplete under-clearers, flocks flew in roving yarn, causing the decrease of its quality. Study Team thinks it better to employ Armence clearer in order to do away with such a defect. It was planned to replace 4 sets of obsolete roving frames with 3 sets of new roving frames.

(5) Spinning process

It is quite needful to remodel spinning frames hardly in maintenance or being obsolete, to replenish parts, and to fix up the equipment.

The gist of those plans is as under:

| | |
|---|-----------------|
| Remodelling of Nitto arm roller parts: | 41 sets |
| Remodelling of creel part and tin pulley: | 72 sets |
| Renewal of spindles and rings: | 16,400 spindles |

(6) Winding process

It is considered that since yarn to be fed to air-jet looms should severely be fine in its quality, the existing winders should be replaced with 14 sets of auto winders equipped with electronic yarn clearers.

Study Team thinks it preferable to adopt splicers, because knotless yarn is quite fitted for the efficiency of air-jet looms and the increase of fabric quality.

5.3 Finishing Division

It is considered that any replacement and/or new installation of machines will not be made in the Finishing Division, in principle, and that the replenishment of only defective parts, or small-scale remodelling will be practiced, if any.

5.4 Utility Facilities

(1) Power equipment

It is considered by Study Team that the plan to switch to PLN's utility should be adopted.

(2) Boiler equipment

Study Team found that the thermal efficiency of boilers was decreased due to its wear and tear for ages. It seems necessary to install the boiler of 4 tons per hour capacity additionally so as to meet with the steam demand of the full operation of all the equipment.

(3) Water treatment arrangements

Study Team finds it needful to install one set of sand filter (capacity: 140 m³/H) and one set of softener (capacity: 20 m³/H) additionally.

(4) Air-conditioning

It is considered by Study Team that the existing air-conditioning for the Spinning Mill should be remodelled, and that one set of chiller (capacity: 230 refrigeration tons) shall be installed.

Study Team also finds it indispensable to employ the central-type air-conditioning for No.1 Weaving Mill, and to install one set of chiller (capacity: 370 refrigeration tons) additionally.

It is essential to board a ceiling, in order to increase the efficiency of air-conditioners both in the Spinning Mill and No.1 Weaving Mill.

6. Total Capital Requirement

6.1 Foreign Currency Portion

Cost breakdown of Production machines, auxiliary equipment and technology transfer fees are shown below. These costs are all foreign currency portion.

Unit : ¥1,000

| | Case 1 | Case 2 | Case 3 |
|------------------------------|-----------|-----------|-----------|
| Spinning | 1,210,798 | 1,210,798 | 1,210,798 |
| Weaving | 1,211,244 | 1,092,120 | 1,254,483 |
| Finishing | 48,336 | 48,336 | 48,336 |
| Attached equipment | 570,056 | 559,856 | 559,856 |
| Sub-total | 3,040,434 | 2,911,110 | 3,073,473 |
| Marine freight/Premium | 181,490 | 181,324 | 197,321 |
| Engineering fee | 50,000 | 50,000 | 50,000 |
| Technical guidance fee | 54,000 | 54,000 | 54,000 |
| Acceptance/Training fee | 101,000 | 101,000 | 101,000 |
| Contingency | 84,938 | 82,349 | 85,916 |
| Sub-total | 289,938 | 287,349 | 290,916 |
| Interest during Construction | 65,200 | 62,600 | 66,100 |
| Total | 3,577,062 | 3,442,383 | 3,627,810 |

6.2 Domestic Currency Portion

Costs of domestic currency portion are shown below.

Unit: 1,000 Rp

| | Case 1 | Case 2 | Case 3 |
|----------------------------------|------------------|------------------|------------------|
| Inland transportation cost, etc. | | | |
| Spinning | 170,268 | 170,268 | 170,268 |
| Weaving | 170,331 | 153,579 | 176,412 |
| Finishing | 6,797 | 6,797 | 6,797 |
| Attached equipment | 80,164 | 78,730 | 78,730 |
| Civil/Building cost | 427,603 | 499,059 | 568,247 |
| Erection cost | 1,122,883 | 1,145,568 | 1,162,581 |
| Contingency | 163,000 | 172,653 | 181,727 |
| Total | 2,141,648 | 2,226,651 | 2,344,761 |

7. The Case that Renovation is not implemented

It is anticipated by Study Team that on account of too much obsolete machinery and equipment, the lack of parts necessary to various types of machines, and the dormant maintenance, any recovery toward the normal running condition of machinery and equipment will hardly be made even at the sacrifice of sizable repair cost at this stage. Therefore, in the case the renovation scheme is not implemented, the number of operable machines in both Spinning and Weaving Divisions continuously will be on the decrease, those production tending inevitably to be decreased more and more.

Study Team thinks that regarding the Finishing Division, its operation will possibly be maintained with a small amount of investment required, and that such the investment should preferably be made regardless the renovation scheme is implemented or not.

7.1 Spinning Division

It is anticipated by Study Team that even if the operation could be kept by cannibalizing, the production in Spinning Division will be on the decrease at its annual rate of 20% from 1988 on and that of 5% from 1990 on.

7.2 Weaving Division

350 sets of looms were running in No.1 Weaving Mill during field survey. Study Team anticipates that operation of the looms in No.1 Weaving Mill should be stopped in 1988 with consideration of mechanical conditions of these looms. Therefore, the production in the Weaving Division will result to be only that of No.2 Weaving Mill at that time, and will be on the decrease at its annual rate of 15% from 1988 on and that of 5% from 1990 on.

7.3 Finishing Division

Study Team finds it feasible for Medari Mills to keep the operation with the investment of about Y 20,000,000. The decrease of grey cloth to be supplied from the Weaving Division should be made up for the supply of grey cloth from other enterprises on a commission basis.

As stated above, in parallel with the decrease of production both in Spinning and Weaving Divisions, the number of necessary employees therein will be decreased, but that of employees required in the Finishing Division, will not probably be on the decrease in the future.

8. Financial and Economic Analyses

8.1 Financial Analysis

8.1.1 Method of Financial Analysis

In evaluating financial effects of renovation work of currently operating mills, it is difficult to segregate financial effects of a capital already invested and those of a capital being newly invested for the purpose of renovation work. In this financial analysis, a hypothetical production scheme of the existing mill without renovation work is assumed and financial conditions, which reflect gradual declining of production volume, are estimated year by year basis. Financial conditions of the renovated mill are also estimated on annual basis which reflect increase of production volume, and diversification of product mix. These two cases are financially analyzed. Describing more in precise, difference of cash flows between non-renovation case and renovation case, on yearly basis, is considered as financial benefits brought about by capital investment for renovation and financial Internal Rate of Return has been thus obtained.

Foreign exchange rate adopted for the study is the rate which has been prevailed during field survey of July, 1986, namely,
1.00 US Dollar = 1,125 Indonesian Rupiah = 160 Japanese Yen.

8.1.2 Anticipated Financial Conditions of Non-Renovation Case

As a prerequisite condition of non-renovation case, small scale repair work is to be carried out, which will enable the mill to continue operating for the same project period as renovation case from 1986 to 2003. By the operation of the mill, for a period of 6 years from 1987 to 1992, 20 million Rupiah to 613 million Rupiah will be earned annually after paying tax. Posterior to 1993, due to decrease of production volume and increase of maintenance

cost, production cost will become higher than sales revenue amount, resulting in financial loss.

Until 1995, depreciation for existing mill facilities and for small scale repair work to be carried out in 1988 will contribute for cash flow and surplus cash will be retained and repayment of GKBI loan, which has been financially succeeded from 1985, can be made until 1994. However, shortage of cash will occur after 1995 and loan will be newly necessitated afterwards. As the result of operation for a period of 18 years from 1986 to 2003, 5,790 million Rupiah of 10,177 million Rupiah of GKBI loan amounted in 1986 can be paid to Head Office. However, adding loan of 2,444 million Rupiah which will be newly borrowed because of shortage of fund after 1995, accumulated loan amounting to 6,831 million Rupiah will be remained unpaid in the year 2003.

In conclusion, in case that renovation plan is not implemented, profits will be generated by operation of the mill until 1992 and the year of 1994 and a portion of loan can be paid back. Maximum profit can be achieved in the year 1987, however amount of sales revenue will decrease year by year afterwards and in 1993 and years after 1995 financial loss will be taken place, and afterward amount of loss will increase year after year. It may be possible to restore financial condition of Medari Mills temporarily by gaining profits due to operation of the existing mill without renovation, but it will be impossible to make full repayment of the loan and posterior to 1995 annual loss will be increased by continuing operation year after year.

8.1.3 Financial Analysis of Renovation Case

Three project schemes are defined and financial analysis is carried out for each of these three cases.

It is anticipated that financial losses will be taken place for initial two years of 1989 and 1990 for all project scheme cases 1, 2 and 3 and posterior to 1991 profits will be generated for each of three project cases.

Loan outstanding in 1986 will completely be paid by 1993 for project scheme case-1, by 1992 for project scheme case-2 and by 1991 for project scheme case-3.

After completion of repayment of loan, cash surplus will be accounted every year and by the year of 2003 when project is financially terminated, accumulated surplus cash will be amounted to 29,902 million Rupiah for project case-1, 37,200 million Rupiah for project case-2 and 41,081 million Rupiah for project case-3.

As conclusion of the case that renovation project is implemented, by the operation of the Mills for the period of 18 years, repayment of the loan succeeded from financial year of 1985, including repayment of interest accrued, will be completed at the latest by 1993 and long term loan newly borrowed for executing renovation work will be paid out within ten years as planned, including interest accrued during the above mentioned period.

8.1.4 Financial Internal Rate of Return

In accordance with the method of financial analysis mentioned in 8.1.1, cash flows annually anticipated for non-renovation case are differenced with anticipated cash flows for three cases of renovation project schemes on annual basis and Financial Internal Rate of Return has been computed using these differences for

three project schemes. Results are as shown below.

| Project scheme | | Case-1 | Case-2 | Case-3 |
|------------------|------------------------------|--------|--------|--------|
| ROI (%) | Before tax | 16.60 | 18.93 | 19.80 |
| | After tax | 13.11 | 15.00 | 15.68 |
| <u>Base Case</u> | Before tax | 37.45 | 43.45 | 49.79 |
| | After tax | 30.69 | 36.86 | 42.65 |
| ROE (%) | <u>Reference Case</u> | | | |
| | Before tax | 24.64 | 29.50 | 32.89 |
| | After tax | 16.92 | 22.37 | 25.88 |
| | Interest Rate 6.5 % p.a. | | | |
| | Interest Rate 13.0 % p.a. | | | |

8.1.5 Sensitivity Analysis

Sensitivity analyses for IRR are carried out by changing 30% on the following five(5) financial elements, namely,

- Total capital investment
- Sales price of product
- Price of raw material cotton
- Variable operating cost other than cost of cotton
- Fixed operating cost excluding depreciation and interest.

Of these five elements, variation of product sales prices will be the most influential factor to value of IRR, followed by variation of cost of raw material cotton.

8.1.6 Influence of Change of Foreign Currency Exchange Rate

In September, 1986, the Government of Indonesia announced devaluation of Indonesian Rupiah against foreign currency. Considerable difference has been caused on the foreign exchange rate used throughout the study of this renovation project and costs based on the foreign exchange rate used for the study.

Supplemental financial analysis has been carried out based on a new exchange rate announced on September 12, 1986, that is, 1.00 US Dollar = 1,644 Indonesian Rupiah = 155 Japanese Yen.

Results of calculation show that, even by adopting newly announced foreign currency exchange rate, substantial changes will not be encountered in its financial analyses for all cases of non-renovation case and three renovation cases, in terms of year by year financial conditions, loan repayment situation, and accumulated surplus funds at the end of financial project life. Calculated Internal Rates of Return for new exchange rate are shown below.

| Project scheme | | Case-1 | Case-2 | Case-3 |
|------------------------------|-----------------------|--------|--------|--------|
| ROI (%) | Before tax | 11.76 | 14.75 | 16.29 |
| | After tax | 9.14 | 11.62 | 12.85 |
| <u>Base Case</u> | | | | |
| | Before tax | 24.77 | 34.52 | 43.21 |
| | After tax | 17.29 | 28.75 | 37.90 |
| Interest rate 6.5 % p.a. | | | | |
| ROE (%) | <u>Reference Case</u> | | | |
| | Before tax | 5.20 | 20.26 | 25.64 |
| | After tax | - | 11.61 | 18.38 |
| Interest rate 13.0 % p.a. | | | | |

8.1.7 Conclusion of Financial Analysis

From viewpoint of financial analysis conducted using proprietary computer program exclusively developed for the non-renovation and renovation project for Medari Mills, it is concluded that implementation of renovation project is positively recommended due to the fact that, because the project is renovation work of the existing mill, the project itself does possess inherent financial merits of taking over currently usable mechanical facilities, and off-site facilities including administration building, living quarter for employee, fresh water and waste water treatment facilities, and existence and utilization of those existing facilities make the project financial burden light, thus making financial aspects of the renovation project feasible and viable.

8.2 Economic Analysis

8.2.1 Economic Benefits and Costs

Economic benefits and costs by implementing this renovation project are summarized as follows:

Economic benefits

(Direct benefits)

- Economic value of the products to be produced by the project.

(Indirect benefits)

- Prevention of loss of employment opportunity
- Secondary effects
- Technical transfer

Economic costs

- Initial capital investment
- Raw material cost
- Labour resources
- Other production costs

8.2.2 Economic Internal Rate of Return

Economic benefits and economic costs mentioned in 8.2.1 are evaluated by economic value and Economic Internal Rate of Return (EIRR) are calculated and the results are shown below.

| <u>Project Scheme</u> | <u>EIRR (%)</u> |
|-----------------------|-----------------|
| Case 1 | 17.1 |
| Case 2 | 19.3 |
| Case 3 | 20.3 |

Judging from those figures, it is expected that implementation of the renovation project will certainly contribute to national economy of Indonesia.

8.2.3 Influence on National Treasury Revenue

Effect on national treasury revenue by implementation of the renovation project has been evaluated by the amount of revenue of tax and duty as shown below.

(Unit; million Rp.)

| Project scheme | Without | Case-1 | Case-2 | Case-3 |
|----------------|-------------------|---------------|---------------|---------------|
| | <u>Renovation</u> | | | |
| Income tax | 304 | 18,725 | 21,594 | 23,650 |
| Import duty | 2,080 | 2,710 | 2,758 | 2,877 |
| - Total - | <u>2,384</u> | <u>21,435</u> | <u>24,352</u> | <u>26,526</u> |

By executing this renovation project, the amount of revenue due to tax and duty will be increased by 19,051 million Rupiah to 24,142 million Rupiah, depending upon the case of renovation scheme.

8.2.4 Balance of Foreign Currency

Balance of foreign currency has been reviewed in case that the renovation project is implemented.

| <u>Foreign currency income</u> | <u>Foreign currency expenditure</u> |
|--------------------------------|--|
| - Export amount of products | - Repayment and accrued interest of long term loan |
| | - Foreign currency portion of operating cost |

In case that renovation project is not implemented, outgoing flow of foreign currency will be amounted to 35,701 million Rupiah. In case that renovation project is implemented, outgoing flow of foreign currency will be further increased to the amount of 66,133 million Rupiah to 95,878 million Rupiah, varying with project schemes. The biggest factor of this large amount of outgoing flow of foreign currency is importation of raw material cotton. If 53% to 76% of raw material cotton is converted from imported cotton to domestic cotton, outflow of foreign currency will become zero, in case that the renovation project is implemented. However, in case that the renovation project is not implemented, even if all the imported cotton is converted to domestically harvested cotton, balance of foreign currency during entire project life will be always outflow of foreign currency.

9. Appraisal and Conclusion

GKBI is the Federation of Cooperatives which manufacture, on an integral base, Indonesian Traditional Batik, the name of which is as famous as that of Indonesian Batik in the world.

This organization must make its steady progress, being maintained as long as Indonesians' textile industry lasts forever. In this respect, it is judged that the renovation scheme is a prerequisite for Medari Mills under GKBI's direct management.

9.1 Policies

- (1) In place of the export incentive system hitherto effective, the Policy Package of May 6, that is, the drawback system was adopted for the purpose of refunding import duties paid for raw materials and parts.

It is assumed by Study Team that the refund by the drawback system could decrease to about one third of that of subsidy so far made by the export incentive system on the textile exports.

- (2) It is also estimated by Study Team that the decrease of manufacture cost caused by the price drop of industrial fuel oils will be 3% or so.
- (3) The exemption of cotton import tariff will be kept continuous in the future.
- (4) The indication of Print Batik earmarked to the export, is now in effect as the measure for the promotion of Traditional Batik. And the registered design system is under study, too. Study Team considers it desirous to strengthen those measures further.

9.2 Market

(1) The demand for cotton fabrics is estimated as follows:

| | | |
|-----------------|---|--------------|
| Domestic demand | : | 1% up yearly |
| Imports | : | 1% up yearly |
| Exports | : | 5% up yearly |

(2) The demand for cambric is estimated as below:

| | | |
|--|---|----------------|
| Cambric domestic demand for Batik use | : | 0.5% up yearly |
| Cambric demand for general textiles | : | 1% up yearly |
| Exports of Batik products | : | 2% up yearly |

(3) It is planned by Study Team that the items of production after the renovation is as under:

- Wide-width cotton cloth will be produced in No.1 Weaving Mill in principle.
- Cambric for Batik use and Buffing cloth will be produced in No.2 Weaving Mill as they are.

9.3 Management

(1) It is considered that in order to be able to compete with other private enterprises of the same line, the positive sales activities should be conducted by any means by fostering and strengthening the Marketing Department. For this a prerequisite is the revolution of organization.

- (2) Study Team finds it necessary to provide the sales staff with sufficient education and training to be made by competent leaders well versed and experienced in the sales of textile items in an attempt to strengthen the Marketing Department.
- (3) Such the education and training should be carried out on a long-run basis, that is, should last to meet the requirements for actual sales activities.
- (4) It is considered by Study Team that the age structure of employees largely consisting of the aged should be revised, and that workers required for renovation work must be employed newly at the time the renovation will be effected, taking into consideration the labor age structure in the future.
- (5) Each of the following matters should be put into practice for the education and training of workers in Medari Mills.
 - 1) The organization of technical and routine education and training will be formulated.
 - 2) The increase of working efficiency from the mill manager to the general workers should eagerly be pursued as well as the improvement of product quality, by the adoption of T.Q.C (Total Quality Control).
 - 3) Production cost mindness should be further strengthened among the employees.

9.4 Renovation Scheme

- (1) Study Team examined the feasibility for the renovation of No.1 Weaving Mill with three kinds of Cases as the following:

| | | | | |
|---------|---------------|---|----------|------------------|
| Case 1: | Shuttle looms | : | 216 sets | 6,600,000 yd/yr |
| Case 2: | Shuttle looms | : | 72 sets | |
| | Air-jet looms | : | 50 sets | 7,300,000 yd/yr |
| Case 3: | Air-jet looms | : | 100 sets | 10,200,000 yd/yr |

- (2) It is necessary for Medari Mills to renew the weaving preparatory machines and inspection machines so as to be able to produce wide-width fabrics.
- (3) The present types of grey cloth will continuously be produced in No.2 Weaving Mill in the future.
- (4) It is considered by Study Team that the renovation of all the processes, chiefly the remodelling of the spinning process, in the Spinning Division, should be implemented and that winders be preferably replaced with auto-winders to be required for checking the quality of yarn, particularly.
- (5) It is estimated by Study Team that the total amount of investment cost to be needed for the each of project schemes will be as follows:

| | | |
|----------------|--------|-----------------------|
| Project Scheme | Case-1 | 27,293 million Rupiah |
| Project Scheme | Case-2 | 26,431 million Rupiah |
| Project Scheme | Case-3 | 27,853 million Rupiah |

9.5 Financial and Economic Analyses

- (1) Fosterage and strengthening of textile industry is in line with Indonesian Government's policy to promote exportation of non-oil/gas products and the Government particularly places its strength in this field. Continuation of operation and maintaining the integrated Medari Mills of GKBI by renovation work will quite match with the policy of the Government and economical effects to the region will be great.
- (2) Financial Internal Rate of Return of Medari Mills after renovation work will exceed 10% after tax for all three project schemes.

Upon examining the above percentage together with other financial tables and statements, Case 1 is not better than other two Cases. There is not big difference in each financial analysis between Case 2 and Case 3. Therefore, whether Case 2 or Case 3 should be selected is quite dependent upon other factors such as the marketability of products, the easiness of technical introduction, labour workability and fitness in running the new type of looms in comparison with conventional looms.

- (3) In case of carrying out the renovation work in Medari Mills, its financial conditions will remarkably be improved in each of three Cases.
- (4) Economic Internal Rate of Return shows 17% to 20% being different in each of three Cases, and all of the rates exceed the cut off rate of 8 to 10%, which is generally recognized as a yardstick figure of acceptability for ordinary industrial projects in general. Also in case that the renovation work is implemented, national treasury revenue in form of cooperate

tax and duty for a period of 18 years hereafter will become more than 10 times compared with those revenue of the case that renovation scheme is not implemented.

- (5) In the case that a 46% devaluation of foreign exchange rate is effected, the financial Internal Rate of Return will decrease by 3 to 4%. However, there will be not so much difference in its financial status, repayment of loan and the accumulated surplus cash in hand in any case.
- (6) Accordingly, Study Team consider it will be prerequisite for GKBI to promote for implementing the renovation work in Medari Mills in viewpoint of finance and economics, unless the premises used in financial and economic analysis change greatly in adverse direction.

9.6 Recommendable Renovation Scheme

- (1) As the result of financial and economic analyses, Case 3 is the best scheme.
- (2) It is also appraised that since the results of financial and economic analyses made in the Case 2 are very close to those of the Case 3, Case 2 is one of the preferable Cases in itself.
- (3) In Case 3, 100% air-jet looms are planned to be adopted. Judging from the technical control of looms, however, Study Team considers it more preferable for GKBI to employ certain numbers of air-jet looms, at first, equivalent to 70% of its total production as shown in Case 2 (shuttle looms: 72 sets, air-jet looms: 50 sets, 7,300,000 yd/yr production) than to adopt 100% air-jet looms at one time.

- (4) Seeing that the large-variety small-lot production system tends to be adopted, as required in the market in the future, Study Team thinks that the Case 2 will be preferable as a plan for meeting such a need.
- (5) The selvage of grey cloth woven by air-jet looms is "fringe selvage." There is no problem with "fringe selvage" of grey cloth for the export use or garment use.

Sales of "fringe selvage" piece goods for general consumers have not yet been in practice in the domestic market.

- (6) For the reasons stated above, Study Team considers that the Case 2 is the optimum recommendable renovation scheme from the present status of Medari Mills and the current and future market in general.

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