インドネシア共和国
建材開発技術協力事業
エバリュエーションチーム報告書

1982年8月

国際協力事業団

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はしがき

インドネシア政府は，１９７４年から始まった第２次経済５カ年計画において低価格住宅の建設を重点施策の１つとして掲げ，１９７７年６月，わが国に対し，その開発に関する技術協力を要請してきた。

当事業団はこれを受けて，１９７７年１２月に事前調査団を派遣したのに引続いて１９７８年７月に実施調査団を派遣して本件技術協力の実施に関する討議議事録（Ｒ／Ｄ）に署名した。

同討議議事録では，協力期間は４年間，協力対象はパルプ・セメント・ボード（ＰＣＢ）及び人工軽量骨材（ＡＬＡ）の２分野とし，ＰＣＢに対する協力を先行することとした。

協力の内容は，基礎，製造及び利用に関する技術の移転並びに研究・開発である。

当事業団は，実施計画に基づいて，ＰＣＢ及びＡＬＡの基礎調査のための調査員，１９８０年２月に計画打合せチーム及び１９８１年３月及び１２月には第１次及び第２次巡回指導チームをそれぞれ派遣し，また，研修員の受入れ，技術協力専門家の派遣，機材の供与などの協力を今日まで実施してきた。

当事業団は，本年７月１８日をもって４年間の協力を終了することに伴い，エバリュエーションチームを派遣した。

本報告書は，上記エバリュエーションチームが当初協力目標の達成度等について，インドネシア側の協力受入れ機関と協力し調査した結果をまとめたものである。

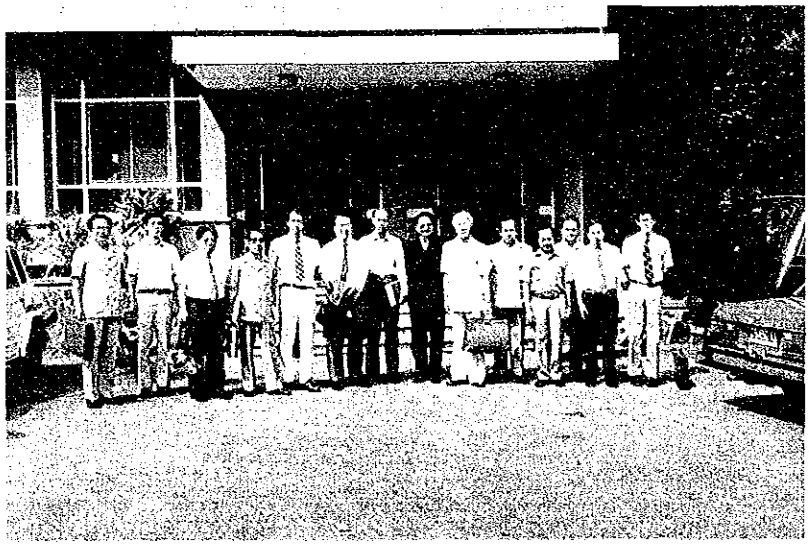
本件協力のために日夜御尽力された専門家各位に対し，この機会を借りて心からのねぎらいと，感謝の意を表する次第である。

また，本件協力遂行に多大の御協力を頂いた外務省，通商産業省，福岡県，日本パルプセメント板工業組合等の関係各位に感謝を申し上げるとともに，現地でご支援頂いた在インドネシア日本国大使館及びインドネシア政府関係機関の方々に深甚なる謝意を表する次第である。

１９８２年８月

国際協力事業団
鉱工業開発協力部
部長　角南　平

R／D延長の署名—左からKarman建築研究所長、中村団長、Garjitoセルローズ研究所長
（6月2日、建築研究所にて）



調査団と関係者—左から黒岩プロジェクトリーダー、奥田専門家、加来団員、川口専門家、宮園団員、中村団長、Garjito所長、Karman所長、宮本JICAジャカルタ事務所長、Ritonga DBR次長、Imam IRDCI部長、Tular DBR部長、上田専門家、中川団員

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Ⅰ　エバリュエーションチーム派遣の経緯と目的

1. 派遣の経緯

「インドネシア共和国建材開発技術協力事業」は第２次経済開発５カ年計画（１９７４年～）において，低価格住宅の建設及びそのための建材開発が施策の重点課題となったので，国内に豊富に存在する農産廃棄物（廃材，バガス等）をパルプ化し，トラスと石灰をセメントの代替ないし補助剤として利用するパルプセメントボード（ＰＣＢ）の製造及び膨張粘土（頁岩）から先ず人工軽量骨材を製造し，これとセメント等を混合して軽量ブロックを製造することとし，前者は主として内装材に，また，後者は住宅建設用のブロックとしていずれも地場資源の有効利用による低価格住宅の供給に寄与することを目的としている。

2. 派遣目的

(1) 当初協力目的に沿って，その具体的項目の達成度についてインドネシア側関係者及び日本人専門家との協議を中心とした実績調査と評価を行うこと。

(2) パイロットプラントの運転状況及びインドネシア側カウンターパートの技術習得度と相手側の技術移転チームの編成等の調査と評価を行うこと。

(3) 今後に残された課題と協力継続の必要性についてインドネシア側と協議すること。

3. チームの構成と日程

(1) チームの構成

氏　　名	担当業務	所　　属　　先
中　村　　信	団長（総括）	国際協力事業団鉱工業開発技術課長
加　来　俊　則	パルプセメントボード	福岡県商工部次長
宮　園　忠　夫	人工軽量骨材	小野田エンジニアリング㈱
中　川　和　夫	業務調整	国際協力事業団鉱工業開発技術課

(2) 日　程

順　日	月日 (曜)	業　務　内　容	
1	5／25 (火)	東京 → ジャカルタ （移動日）	
2	26 (水)	日本大使館及びＪＩＣＡ事務所表敬訪問，打合せ	
3	27 (木)	ジャカルタ → バンドン （移動日）	
4	28 (金)	ＤＢＲ，IRDCIと協議及びエバリューション	
5	29 (土)		
6	30 (日)	内部打合せ	
7	31 (月)	ＤＢＲ，IRDCIと協議及びエバリュエーション	
8	6／ 1 (火)		
9	2 (水)	午前，延長Ｒ／Ｄの署名交換	
		加来団員，中川団員	宮園団員
9	2 (水)	ＤＢＲ，IRDCIと打合せ及びエバリュエーションレポートの作成	バンドン→チラチャップ
10	3 (木)		人工軽量骨材テストプラントの視察
11	4 (金)		
12	5 (土)		チラチャップ → バンドン
13	6 (日)	バンドン → ジャカルタ （移動日）	
14	7 (月)	公共事業省，日本大使館及びＪＩＣＡ事務所に報告	
15	8 (火)	ジャカルタ → 東京	

ＤＢＲ ＝ Directorate of Building Research
（公共事業省建築研究所）

IRDCI＝ Institute for Research & Development of Cellulose Industry
（工業省セルローズ研究所）

Ⅱ　協力期間，相手機関及び協力分野

1. 協力期間

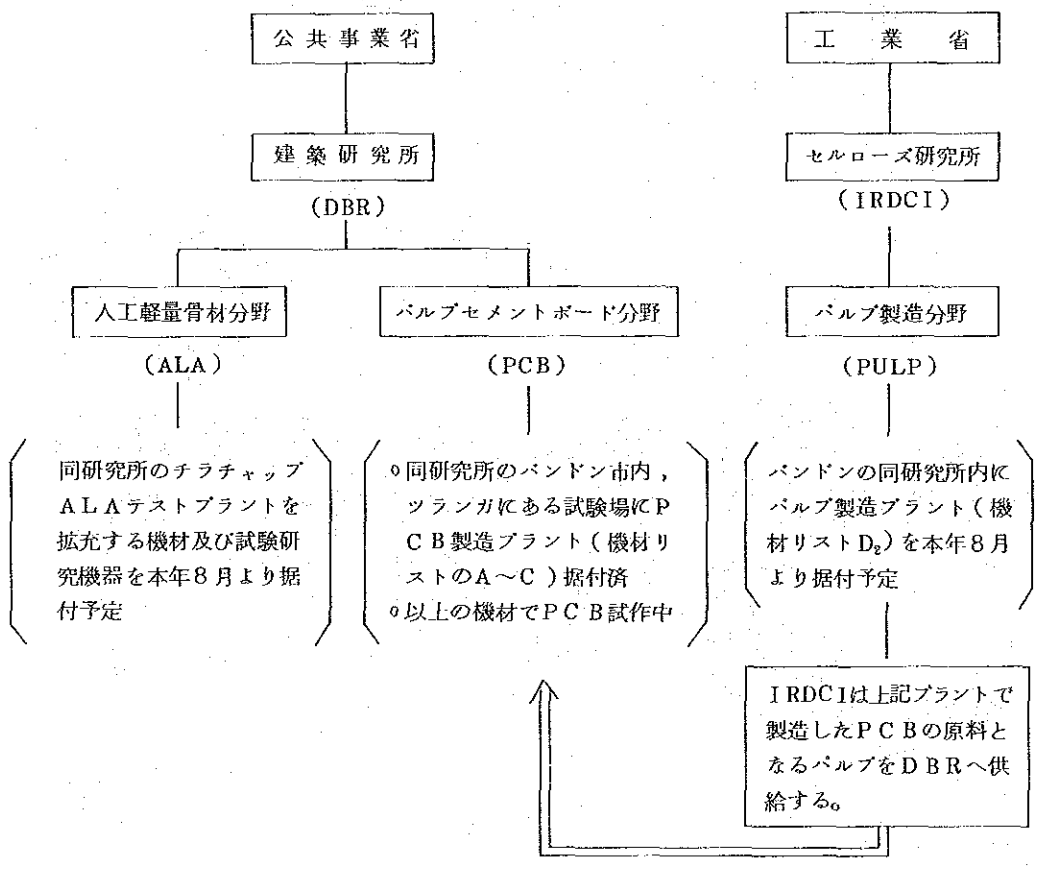
(1)　当初協力期間　　昭和５３（'７８）年７月１９日から
　　昭和５７（'８２）年７月１８日まで　（４年間）

(2)　延長協力期間　　昭和５７（'８２）年７月１９日から　（約１年４カ月間）
　　昭和５８（'８３）年１１月３０日まで

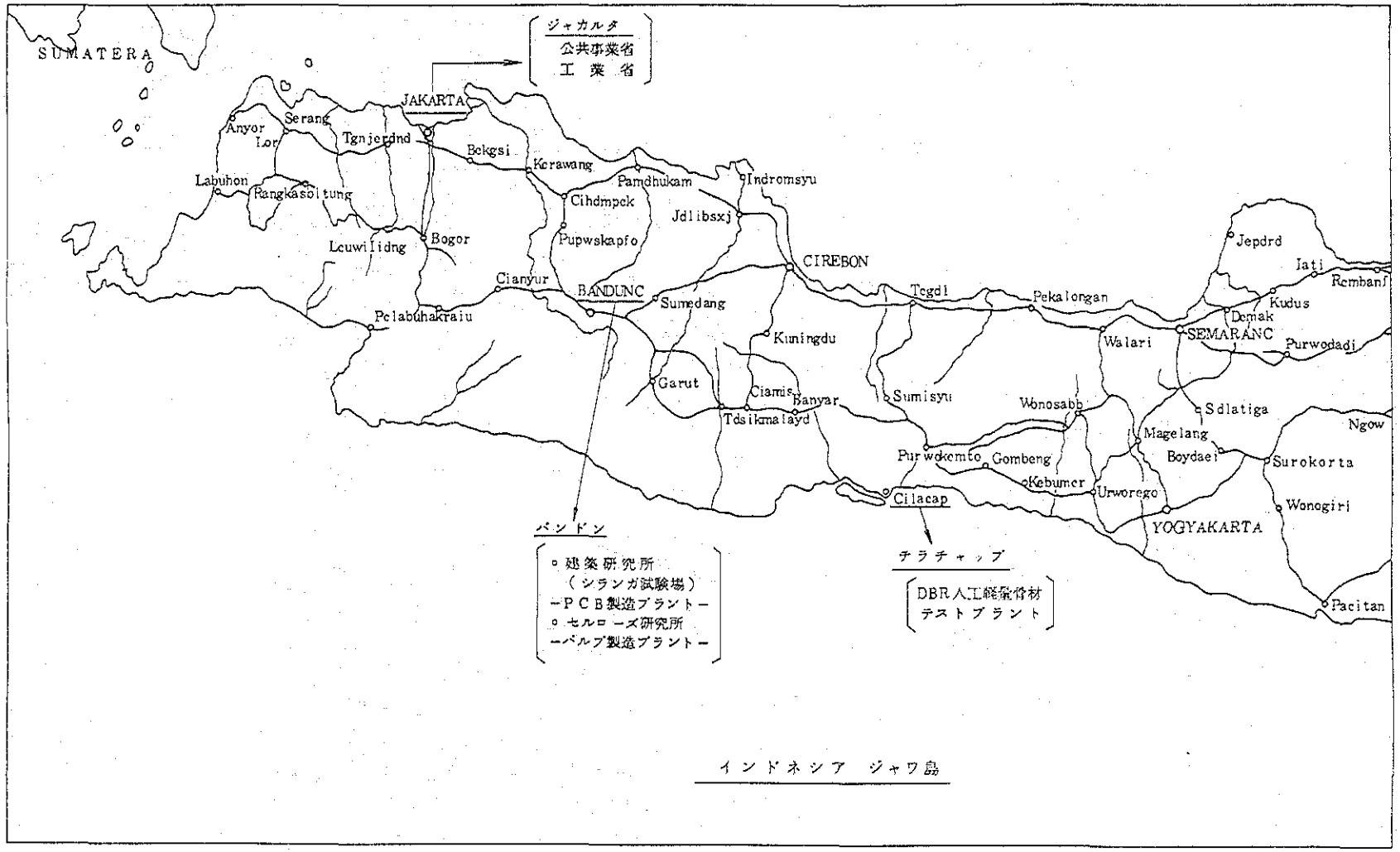
2. 相手機関及び協力分野

協力相手機関及び協力分野の関係及びプラント設置場所については図１及び地図１のとおりである。

図１　相手機関と協力分野関係図



地図１


SUMATERA
ジャカルタ
公共事業省
工業省
JAKARTA
Anyor
Lor
Serang
Tgnjerdnd
Bekgsi
Kerawang
Pamdhukam
Indromsyu
Labuhon
Pangkasoltung
Cihdmpek
Jdlibsxj
Pupwskapfo
Leuwilidng
Bogor
CIREBON
Jepdrd
Jati
Rembanf
Cianyur
BANDUNG
Sumedang
Tegdl
Pekalongan
Kudus
Demak
Pelabuhakraiu
Kuningdu
Walari
SEMARANG
Purwodadi
Garut
Ciamis
Banyar
Tdsikmalayd
Sumisyu
Wonosabb
Sdlatiga
Ngow
Magelang
Purwokemto
Gombeng
Boydaei
Surokorta
Kebumen
Urworego
Cilacap
Wonogiri
YOGYAKARTA
Pacitan
バンドン
◦建築研究所
（シランガ試験場）
－ＰＣＢ製造プラント－
◦セルローズ研究所
－パルプ製造プラント－
チラチャップ
DBR人工経営修材
テストプラント
インドネシア　ジャワ島

Ⅲ エバリュエーション調査結果

1. エバリュエーション関係者

(1) 日本側

- o 黒岩忠春プロジェクトリーダー
- o 奥田泰真専門家（パルプセメントボード）
- o 川口已之作専門家（パルプ製造）
- o 上田純孝専門家（人工軽量骨材）
- o 宮本守也ＪＩＣＡジャカルタ事務所長
- o 後藤洋之助ＪＩＣＡジャカルタ事務所次長
- o ＪＩＣＡエバリュエーションチーム

(2) インドネシア側

ⅰ 建築研究所関係

- o Karman Somawidjaja 所長
- o S. M. Ritonga 次長
- o R. B. Tular 部長他スタッフ

ⅱ セルローズ研究所関係

- o Garjito P. Sudirjo所長
- o Muchji 部長他スタッフ

2. エバリュエーションの方法

(1) 上記１，の関係者による①全体討議，②ＰＣＢパイロットプラントにおけるＰＣＢの試作，③作業グループ（日本側は黒岩リーダー及び中川団員，インドネシア側は上記両研究所スタッフ）による詳細討議，及び④Joint Evaluation Reportの作成作業を通じてエバリュエーションを行った。

(2) 具体的にはエバリュエーションは以下のような手法で行った。

a 時系列的計画達成度（ハード面）の評価

(a) 当初計画と実績上の時間的ズレ

計画＼年度		昭和54('79)年	55('80)年	56('81)年	57('82)年
(A)	計画	←――→			
	実績		<- - - ->		
(B)	計画		←――→		
	実績			<- - - ->	
(C)	計画			←――→	
	実績				<- - - ->

○ Joint Evaluation Report（別添資料Ⅰ）のAnnex L " Implementation Schedule of Technical Cooperation…… "

(b) 上記(a)の計画と実績が時間的にズレた理由

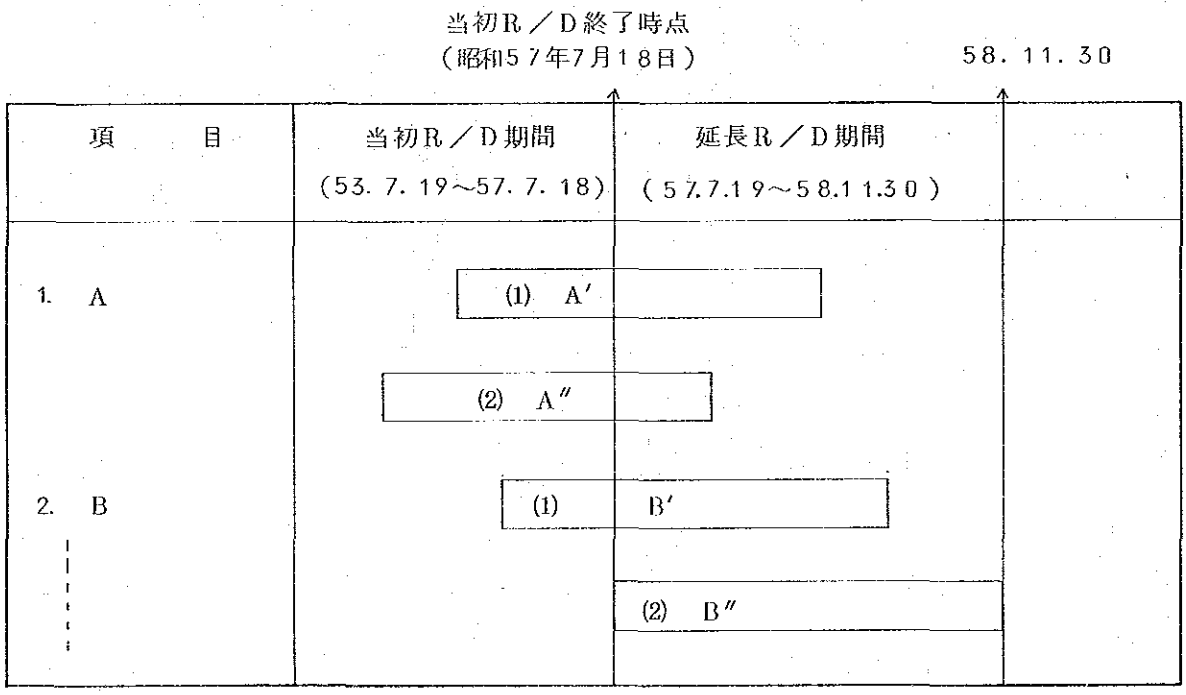
(c) 対処方法とその結果

b. 協力内容の量的達成度（ハード面）の評価

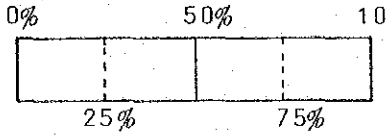
プラントの建屋，予算，パイロットプラント，専門家派遣，研修員の受入れ，その他 " Joint Evalution Report のAnnex A～F "

c. 試験，研究，開発目標における計画達成度（ソフト面）の評価

ソフト面の評価はハード面のように単純に" 時間的ズレ "と" 量的評価 "のみで適確な評価を行うことが困難であるため，下記の方法によった。



"Joint Evaluation Report の Annex M"



＜例＞

(1) A′ の場合は当初R／D終了時点で達成度５０％を示す

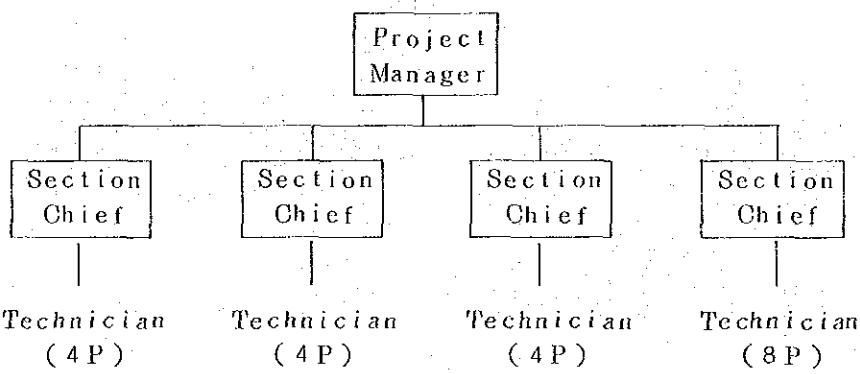
(2) A″ 〃 〃 ７５％ 〃

(1) B′ 〃 〃 ２５％ 〃

(2) B″ 〃 〃 ０％ 〃

3. エバリュエーション結果

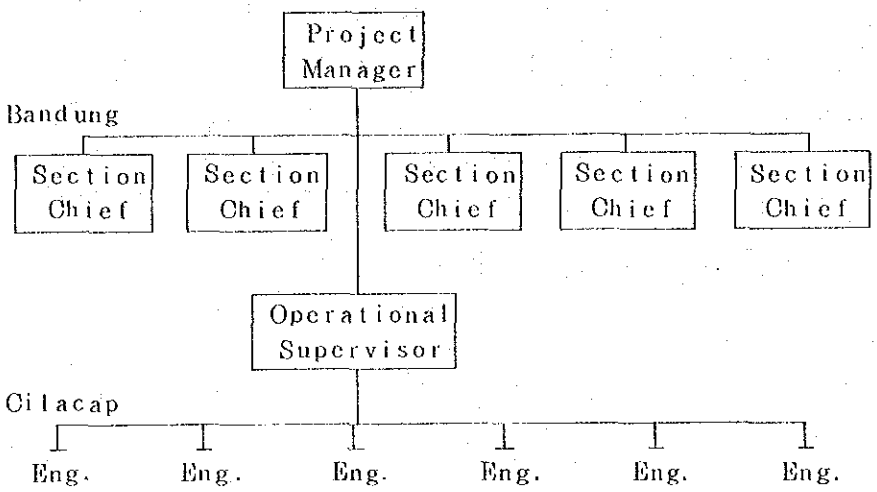
(1) パルプセメントボード（ＰＣＢ）製造分野

内　　容	進　　渉　　状　　況
1. パイロットプラントの基礎，建屋の建設	昭和５６年１２月末までに完了
2. 機材据付	昭和５７年５月末までに完了（最終機材リストD_1 を含む）
3. 技術移転	最終機材を除く機材（リストＡ～Ｃ）を用いてＰＣＢの試作を実施してきた結果，古紙を原料とするＰＣＢ製造の技術移転はほぼ終了した。
4. カウンターパートのはりつけ状況	 ※ ＰＣＢプラントを製造工程別に４部門に分け，計２０名のTechnician を配置している。 ※ この人的配置はほぼ充分なはりつけ状況と評価出来る。

	※ Joint Evaluation Report のAnnex H 参照
5. カウンターパートの技術習得度	上記機材（リストA～C）を用いてのPCB製造の技術はほぼ習得されたと評価出来る。
6. 今後の課題	最終機材（リストD_1）の据付けは終了したものの協力期間内（本年7月18日まで）に本件機材を使用してのプラント一貫運転は実施出来ないため，運転指導専門家及びPCBを市場性のある建材とするための製品開発専門家の派遣が必要である。

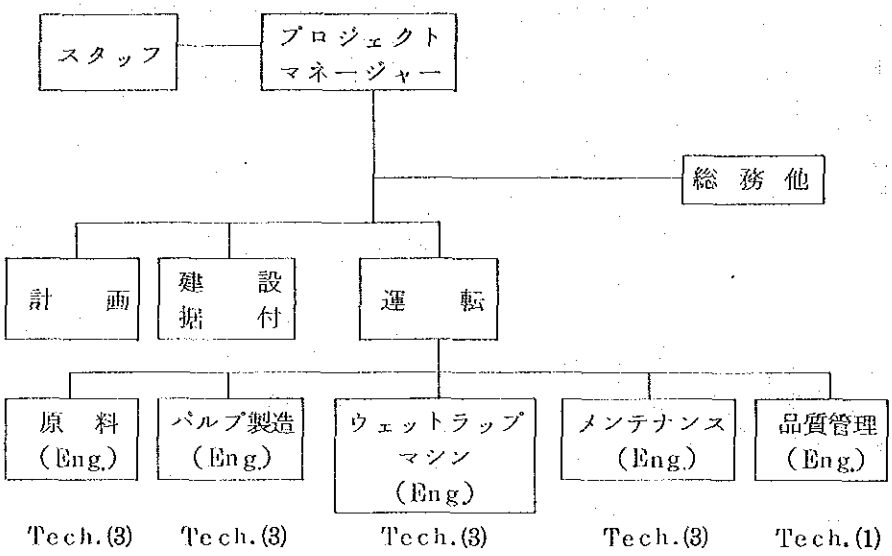
(2) 人工軽量骨材（ALA）分野

内　　容	進　　渉　　状　　況
1. テストプラントの基礎・建屋の建設	昭和57年7月末までに終了予定である。
2. 機材据付	昭和57年8月から開始し，同年10月末完了予定である。
3. 技術移転	昭和56年12月から57年4月まで派遣したALA general (1)専門家及び現在派遣中のALA general (2)専門家によりALAの原料試験及び既設のキルンを使用してのALA製造の技術移転はほぼ目的を達したと評価出来る。 しかし，わが方，供与機材を使用しての技術移転は据付の遅れにより全く実施されていない。

4. カウンターパートのはりつけ状況	 Eng. = Engineer ※ DBR本部内（バンドン）におけるカウンターパートとチラチャップテストプラントにおけるカウンターパートに分かれる。 ※ Joint Evaluation Report の Annex I参照。
5. カウンターパートの技術習得度	上述の通りALAの原料試験等に関してはかなりの技術を習得しているが，わが方供与機材を利用しての技術は習得されていない。
6. 今後の課題	当初予定より約6カ月間遅れており，その遅延した実施計画を延長協力期間中に実施すること。

(3) パルプ製造（PULP）分野

内　　容	進　　渉　　状　　況
1. パイロットプラントの基礎・建屋の建設	現在工事中で最終的竣工は昭和57年10月末の予定であるが，一階部分は7月中に完成の見込みである。 （当初予定より約10カ月遅れ）
2. 機材据付	昭和57年8月より開始し，同年12月末までに完了の予定である。
3. 技術移転	わが方供与機材を使用しての技術移転は全く実施されていない。 （ただし，セルローズ研究所からの研修員の受入れは実施した。）

4. カウンターパートのはりつけ状況	 Eng. = Engineer Tech. = Technician ※ Joint Evaluation Report の Annex K 参照。
5. カウンターパートの技術習得度	わが方供与機材の据付けが遅れている関係上，パイロットプラントの運転，及びパルプ製造の技術は習得されていない。 当初予定より約10カ月遅れており，その遅延した実施計画を延長協力期間中に実施すること。

Ⅳ　協力期間の延長と実施計画

エバリュエーションチームとインドネシア側は以上のエバリュエーション結果より，プロジェクトの当初目標を達成するには，R／D終了後も引き続き協力の継続が必要であるとの合意に達し，協力の延長にかかゆるR／Dの署名交換を行った。

また，協力延長等についてチームとインドネシア側との間で合意した実施計画は次のとおりである。（別添資料Ⅱ参照）

1．協力延長の形態

当初R／Dを延長し協力を継続する（R／Dの延長）。

2．協力延長期間

昭和５８（'８２）年７月１９日から

昭和５８（'８３）年１１月３０日まで（約１年４カ月間）

3．協力分野

「協力分野」については，インドネシア側より，２次加工等も加えてほしい旨の要望が出されたが，わが方としては，協力の延長は「当初計画分野中で達成出来なかった部分」の実施のために行われるものであるとの観点から，上記インドネシア側の要望は取りあげないこととした。

4．実施計画

（別添資料Ⅱ　Tentative Schedule of Implementation参照）

(1)　専門家派遣

ⅰ　プロジェクトリーダー

現在派遣中の黒岩忠春リーダーの派遣期間を延長R／Dの終了時（昭和５８年１１月末）まで延長する。

ⅱ　パルプ製造専門家

現在派遣中の川口己之作専門家の派遣期間を延長R／Dの終了時まで延長する。

ⅲ　ＰＣＢプラント一貫運転専門家

本年７月から１名２カ月間派遣

ⅳ　パルププラント据付専門家

本年７月及び１０月からのべ４名派遣

ⅴ　ＰＣＢ製品開発専門家

本年１０月から１名２カ月間派遣

vi　パルププラント運転等専門家

明年１月から１名６カ月間派遣

vii　ＡＬＡ general 専門家

本年１０月から１名６カ月間派遣

viii　ＡＬＡ block 専門家

本年１０月から１名６カ月間派遣

ix　ＡＬＡプラント据付専門家

本年８月及び９月からそれぞれ１名２カ月間派遣

(2)　研修員受入れ

本年１０月からＰＣＢ，PULP 及びＡＬＡ各分野で１名ずつ計３名受入れ

(3)　機材供与

ＰＣＢ及びPULP 分野では試験機材等またＡＬＡ分野ではペリタイザーユニット（造粒機）を供与予定

V　エバリュエーションチームの提言

当初協力期間中のＰＣＢ製造を除く他分野へのインドネシア側の対応は必ずしも充分ではなかったが，現在は建築研究所（ＤＢＲ）及びセルローズ研究所（ＩＲＤＣＩ）共に基礎工事（ＡＬＡ及びＰＵＬＰプラント用）やカウンターパートのはり付け等に積極的に取り組んでおり，従来のような大幅な遅れはないとの感触を調査団は得た。

インドネシア側関係機関との協議の中で最も問題となったのは，協力延長期間中（本年度分）研修員受入れ人数」と「機材供与」であった。

ＤＢＲはＰＣＢ及びＡＬＡ両分野で各２名ずつ計４名，またＩＲＤＣＩは２名の研修員の受入れを強く要請した。

わが方は本年度の受入れ枠は３名であることを説明し，ＤＢＲ及びＩＲＤＣＩと調整の結果，一応ＰＣＢ，ＡＬＡ及びＰＵＬＰ各１名ずつの受入れとした。

一方，機材の供与についてもＤＢＲ及びＩＲＤＣＩからかなりの額の供与要請が出された。

上記研修員受入れ及び機材の供与について，調査団は一応インドネシア側にわが方の可能な対応ぶりを了承させたもののインドネシア側はわが方の再考を望んでいる。

従って延長協力期間中は技術移転の重要な時期に当っており，わが方としてもインドネシア側の要望に可能な限り応じられるような配慮が必要である。

資　　料

Ⅰ　Joint Evaluation Report

Ⅱ　Record of Discussions

Ⅲ　協力事業実績

Ⅳ　関連写真

資　　料　　I

(Joint Evaluation Report)

JOINT EVALUATION REPORT

BY THE

EVALUATION TEAM OF

THE JAPAN INTERNATIONAL COOPERATION AGENCY,

THE DIRECTORATE OF BUILDING RESEARCH

AND

THE INSTITUTE FOR RESEARCH AND DEVELOPMENT

OF CELLULOSE INDUSTRY

ON THE

TECHNICAL COOPERATION PROJECT FOR THE

DEVELOPMENT OF BUILDING MATERIALS

IN THE REPUBLIC OF INDONESIA

JUNE, 1982

BANDUNG INDONESIA

Discussion paper between the evaluation team of the Japan International Cooperation Agency (JICA), and the Directorate of Building Research (DBR), and the Institute for Research and Development of Cellulose Industry (IRDCI) on the evaluation of the Technical Cooperation Project for the Development of Building Materials, which is terminated on July 18, 1982

Date : May - June 1982

Place : Directorate of Building Research (DBR) and Institute for Research and Development of Cellulose Industry (IRDCI)

Attendance :

JAPANESE PANEL

Japanese Evaluation Team

Mr. Makoto Nakamura (Leader)	Head, Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA
Mr. Toshinori Kaku (Pulp Cement Board)	Deputy Director, Commercial and Industrial Department, Fukuoka Prefecture
Mr. Tadao Miyazono (Artificial Light Weight Aggregate)	Vice-General Manager, Business Department, Onoda Engineering and Consulting Co., Ltd.
Mr. Kazuo Nakagawa (Coordinator)	Technical Cooperation Division, Mining and Industrial Development Cooperation Department, JICA

JICA Jakarta Office

Mr. Moriya Miyamoto	Resident Representative
Mr. Yonosuke Goto	Deputy Resident Representative

DBR Japanese Experts

Dr. Tadaharu Kuroiwa	- Chief Advisor
Mr. Yasumasa Okuda	- Pulp Cement Board
Mr. Sumitaka Ueda	- Artificial Light Weight Aggregate

IRDCI Japanese Experts

Mr. Minosaku Kawaguchi	- Pulping

INDONESIAN PANEL

Directorate of Building Research

ATTENDANCE :

Directorate of Building Research

Ir. Karman Somawidjaja	- Director
Ir. A. Kartahardja	- Senior Advisor, Cipta Karya
Ir. S.M. Ritonga	- Chief, Administration Department
Ir. A. Hariman	- Chief, Sub-Directorate of Documents
Ir. R.B. Tular	- Chief, Sub-Directorate of Building Materials & Construction
Saleh Amiruddin ME.Dpl.Dp.	- Chief, Sub-Directorate of Development
Mr. Suwandoja	- Project Manager, Sub-Directorate of Development
Drs. Z. Aksa	- Project Manager on P.C.B.
Ir. Sutidjan BA	- Project Manager on A.L.A.
Drs. Syarief Hidayat	- Chief, Construction Tools & Machinery Section
Ir. Nasroen R.	- Chief, Building Materials Development Section
Ir. Aim Abdurahim	- Chief, Sub-Division of Technics
Ir. Herlianto	- Sub-Division of Technics
Mrs. Dinny T. Krisna	- Sub-Division of Technics
Ir. Dudung Kusmara	- Researcher
Ir. Rizwan Lutfi	- Researcher
Ir. A. Samsu T	- Researcher
Mrs. Yati Hidayat	- Researcher

EVALUATION REPORT

I. INTRODUCTION

1. Objective

The Japanese Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency, and headed by Mr. Makoto Nakamura, visited the Republic of Indonesia from May 25 to June 7, 1982, for the purpose of identifying past achievements and future prospects of the Japan - Indonesia Technical Cooperation Project on the Development of Building Materials, based on the Record of Discussions signed on July 19, 1978 between the Japanese Implementation Survey Team and the Authorities concerned of the Government of the Republic of Indonesia.

The Team discussed and studied with the Indonesian Counterparts concerned, and the Japanese experts, a number of aspects with respects to the performance of commitments, achievements of the function of the Indonesian authorities concerned, constraints which hampered past activities, and possible causes which may restrain future prospect as well.

After careful studies and discussions, the Team summarized its findings and observations, as described in the following chapters.

2. Background of the Project

In 1977, the Government of the Republic of Indonesia requested the Government of Japan a cooperation on the Development of Building Materials for low-cost housing and its promotion in Indonesia.

Upon this request, the Government of Japan through the JICA, sent a Preliminary Survey Team to Indonesia from December 11, to December 27, 1977.

The Preliminary Survey Team conducted survey, studies and discussions with the concerned organizations of Indonesia.

Based on this report and recommendation of the Preliminary Survey Team, the Japanese Implementation Survey Team organized by JICA visited Indonesia from July 5, to July 21, 1978, for the purpose of working out the details of the Technical Cooperation Program on the " Development of Building Materials by the effective use of locally available raw materials ".

The Team discussed and studied with its Indonesian counterparts a number of points concerning the Project for its effective Implementation and management.

After careful studies and discussions, both parties agreed to recommend to their respective Governments, the immediate implementation of the Project, as described in the Record of Discussions (R/D) signed on July 19, 1978 between the Head of the Japanese Implementation Survey Team, and the Director of DSR, Ministry of Public Works.

This recommendation was accepted in principle by both Governments and as a result, the cooperation program was started.

3. Summary of the Project

The summarized record of implementation of the technical cooperation program is as listed below :

Chronological Review of the Project

Year	Items
1977	1. Despatch of JICA Project Finding Survey Team for South East Asia 2. Acceptance of project proposal 3. Despatch of JICA Preliminary Survey Team
1978	1. Despatch of JICA Implementation Survey Team 2. R/D was signed
1979	1. Despatch of short-term Japanese Experts 2. Counterparts training in Japan 3. Despatch of short-term Japanese Experts 4. Preparation and design of building
1980	1. Despatch of JICA Consultation Team 2. Despatch of long-term Japanese Expert for Pulp Cement Board (P.C.B.) 3. Despatch of Japanese Chief Advisor 4. Despatch of short-term Japanese Expert for installation of P.C.B. plant 5. Provision of P.C.B. pilot plant by JICA 6. Counterparts training in Japan
1981	1. Despatch of short-term Japanese Experts for operation of P.C.B. pilot plant 2. Despatch of JICA 1st Technical Advisory Team 3. Despatch of long-term Japanese Expert for pulping 4. Provision of pulp plant by JICA 5. Counterparts training in Japan 6. Despatch of short-term Japanese Experts for Artificial Light Weight Aggregate (A.L.A.) 7. Despatch of JICA 2nd Technical Advisory Team

1982

1. Counterparts training in Japan
2. Provision of A.L.A. test plant by JICA
3. Despatch of short-term expert for P.C.B. plant installation
4. Despatch of JICA Technical Evaluation Team

Note

Details of the above subjects are shown in Annexes B to E.

II. METHODOLOGY OF EVALUATION

1. Materials used for Reference

In order to evaluate the past performance and achievement quantitatively as well as qualitatively, the following materials are adopted as references :

(1) The R/D

(2) The official request made by the Indonesian Government with respect to expert services, training of counterparts in Japan and donation of equipment by means of Colombo Plan Form A-1, A-2, A-3 and A-4, respectively.

(3) The minutes of meeting and the Annual Work Plan agreed or accepted in the course of implementation of the Project.

(4) The status report on the Project by DBR and IRDCI.

And the Team also conducted inspection on building, facilities, utilities in cooperation with the DBR and IRDCI staff, Japanese experts.

Discussion were also held with the DBR and IRDCI counterparts previously trained in Japan on the effeciency of training.

III. RESULT OF EVALUATION

1. Building and facilities
   (Plans and Performance)

   (1) Building and facilities, Rp. 58.000.000 worth for the Pulp Cement Board pilot plant in DBR, were constructed by DBR. Building and facilities Rp. 132.920.000,- worth for the Pulp pilot plant in IRDCI, are being constructed by IRDCI.

   (2) With a view to making good use of the new A.L.A. test plant and related equipments, the DBR has expanded the site of Cilacap Experimental Station by 4.000 M2 totalizing nearly 8.000 M2 in flat area ; and there has been constructed access road to the pilot plant, the storage for raw materials as well as finished products, including drive-way and fence.

   (3) For the construction of the Pulp pilot plant mentioned and also for the expansion of IRDCI itself, the IRDCI has bought a price of land neighbouring the existing site.
   The area of the bought land is 10.000 M2 which costs Rp. 192.000.000,-

(Comments)

Some delays were encountered in the construction of buildings and infrastructures due mainly to budgetary considerations and land procurements.
It did affect the implementation of the Project except the installation of P.C.B. pilot plant in DBR.

2. Staffing

(Plan and Performance)

(1) At present, there are 25 regular personnel for the P.C.B. pilot plant, 29 regular personnel for the Pulp pilot plant, and 22 regular personnel for the A.L.A. test plants and related equipment of the Project.
Refer to Annex H, I and K.

(2) One (1) out of fourteen (14) personnel trained in Japan transfered in the middle of May this year to other agency.
However, this did not affect project implementations.

(3) Technology transfer through lectures and seminars has been conducted by the counterparts to complement those of the experts to upgrade skills of DBR and IRDCI personnel, especially those concerned with the erection of the pilot plant.

(Comments)

(1) All the work done is carried out by both Institutes staff and personnel.

(2) To operate the Pulp pilot plant, in middle 1982 has organized a full staff including 17 (seventeen) technicians. Besides, in Cilacap the DBR has a new project team containing station-grouped engineers and Turangga-laboratories. These efforts of Indonesian side towards filling up the project personnel are greatly appreciated.

3. Management and Administration

(Plan and Performance)

(1) The DBR is enthusiastically making effort to initiate the advanced use of Pulp Cement Boards and Artificial Light Weight Aggregate for low-cost housing, under the close support of its super authorities Directorate General of CIPTA KARYA as well as Government - owned urban housing corporation PERUMNAS.

(2) For the working training course organized by the Information Centre for Development Technics (CIPTA KARYA) in Jogyakarta, Central Java, the P.C.B. and A.L.A. technologies have been extracted as new locally available building materials, and the counterparts of DBR gave lectures to the trainee from the whole country, containing instructors, constructors and consumers for housing.

(3) The site of IRDCI has been expanded with the neighbouring site, and the construction of Pulp pilot plant has started since April 1982 in the new site, where the IRDCI plans to establish advanced research and development area.

(4) Refer to Annex G and J.

(Comments)

(1) These project managers in P.C.B., Pulp and A.L.A. areas are both senior and well-experienced staff researchers in each Indonesian Institutes.

(2) Moreover, the administrative support of Central Government Authorities as well as both institutes to this Project is steady as ever. There is nothing to worry about this matter.

4. Equipment

(Plan and Performance)

(1) From 1978 to 1981, Japanese provision of equipment Rp. 783.209.150,- worth including shipping cost, had been received by DBR and IRDCI.
Cost breakdown is shown on Annex B.

(2) P.C.B. equipment has already been installed at DBR. Other equipment will be installed at DBR and IRDCI.

(3) DBR also purchased vechicle accessories, office equipment etc. that is necessary for the convinience of Japanese Experts.

(4) Proper control, maintenance and repair of equipment are being enforced at the pilot plant by counterpart personnel with the cooperation of Japanese Experts.

(Comments)

(1) The competence of experts sent to DBR forthe supervision of installation, repair, maintenance and production technology in highly recognized and commended.

(2) Some difficulty in the installation of equipment was due to the trouble of obtaining special constructing machines from local condition.

5. Japanese Experts

(Plan and Performance)

(1) JICA has sent three (3) long-term experts and fiveteen (16) short-term experts.
In addition, seven (7) teams were also despatched in connection with the Project.

(2) Privileges specified in the Colombo Plan including lodging are being granted.

(Comments)

(1) In general, all the experts worked very closely with counterparts in all lines of activity.

(2) It has been noted that all assigned experts showed genuine interest and exerted all effort for the eventual self reliant operation of the pilot plant.

6. Training in Japan

(Plan and Performance)

(1) Since 1978, fourteen (14) personnel have been sent to Japan. These include ten (10) trainees who studied various aspect of P.C.B. , Pulp and A.L.A. technologies; one (1) Project Leader for application of P.C.B. and A.L.A., two (2) Directors of DBR and the Ceramic Research Institute and one (1) Chief Coordinator of DBR for observation studies and consultation.
Annex E is a list of these Indonesian counterparts and their respective field of specialization.

(2) Despite language difficulties, Indonesian counterparts have gained invaluable knowledge during their training.

(Comments)

(1) The individual training courses at the Fukushima-Kohshi of Fukuoka Prefectural Government and in some research institutions have been satisfactory with the efficient coordination of JICA and cooperation of said agencies.

(2) Training of personnel in practical affairs has almost reached its fullest achievement on the job-training in factories. It is now necessary to continue counterpart training in Japan emphasizing on advanced training in each area of P.C.B., Pulp and A.L.A. technologies.

7. Budget

(Plan and Performance)

(1) During the past years of cooperation, three plants have received funding from various sources with the ultimate aim of promoting of P.C.B. and A.L.A. industries. A summary of the budgetary appropriation and expenditures that have contributed to the implementation of the Project is shown in Annex F.

(Comments)

(1) The Indonesian Government has provided sufficient counterpart fund for the Project.
There has no serious financial problems.

8. Work Plans and Accomplishment

(1) The targets are indicated by solid lines.
The Project accomplishment based on the Annual Work Plan is shown by broken line in Annex L.

(2) The following explain the percentage accomplishment of the study program that are graphically illustrated in Annex M with 0 %, 25 %, 50 % and 100 % ratings.
Full implementation by the 18th of July, 1982 is considered 100 %.

i. Pulp Cement Boards

i.1. Operation with Existing Plant

In line with the trial operation of main parts of existing plant we checked to readjust the machinery and production system in contrast with properties of trial products.
By the 18th of July, 1982, we would have completed test 100 %.

i.2. R & D Study, Installation

The plan is study the possiblity for transfer of Japanese technology in manufacturing the Pulp Cement Boards by use of indigenous raw materials.
We have completed the studies of (1) and (2) 100 % respectively.
But the study of (3) is not yet done, because of the shortage of such materials to be supplied.

i.3. Production Technology

(1) - (2) In the test and quality control throughout the continous production of Pulp Cement Boards, there have been considerably progressed.
However, the delay in construction of the pulp preparation unit (D1) brought about some inconvenience for their full work.
(3) The processing for finished products had been planned to upgrade the market value of P.C.B.
This working process seems to be very costly.
However, on account of sharp increase in the price of decorating wall paper.
Accordingly, we stopped getting into this study work.
(4) - (5) The cost study and the operation manual on the basic of actual data of production test have been worked out at present, the more improvement must be introduced for them in favor of the coming result of products development work.

ii. Pulp

ii.1. Study of Raw Materials

(1) - (2) The basic design and layout of pulp experiments were conducted in accordance with the available local raw materials.
The work was done by the counterparts together with the Japanese experts, some materials have been studied and tried operation test is done using the existing Pulp Cement Board pilot plant.

ii-2. Installation

(1) - (2) The installation work will start in July, 1982, by for behind The Schedule, due to the land problem extending over a long period time.

ii-3. Production Technology

(1) - (4) All of them will be realised after the construction of pulp unit has been accomplished.

iii. A.L.A.

iii-1. Study of Raw Materials

(1) - (5) These works have been conducted throughly during the stay of Japanese expert for A.L.A. technology in Indonesia. The HT-21, was found out to be the most prospective bloating shale as raw material for A.L.A. production with test plant. The other kinds were tested in laboratory as well as with the small rotary kiln at DBR.
As a result of these tests, we could find out the possibility of making some stronger A.L.A. from the HT-21, only under very-restricted heating conditions.
However, through granulation process and the use of appropriate additives, there is still room for improvement in bloatabily of the shale.

iii-2. A.L.A. Production with Test Plant

This will be implemented when the construction of test plant is completed.

iii-3. Production Technology

This is also not implemented yet, until complete construction of Test Plant including the laboratory equipment and block making unit, at the end of July, 1982.

iv. Block

All of three main areas is not yet conducted.
It contains optimizing the mixing proportion is the key work for the block making, the trial production with the test plant and establishment of operational guidance on block technology for suitable housing constructions.
This will be implemented after complete construction of the plant.

IV. CONCLUSION AND RECOMMENDATION

1. Most activities programmed in the R/D and other pertinent papers are reaching their final targets.
   These are largely due to the effort of the Indonesian counterparts with the cooperation of the Japanese experts, DBR, IRDCI and JICA officials.
   However, some activities are behind schedule.
   These are mainly due to the following factors :

   I. Delay in construction of building of the Pulp pilot plant in IRDCI, due to procurement process of land and long bidding procedure.

   II. Delay in construction of A.L.A. pilot plant facilities and provision of equipment.

2. It can be conducted that the Pulp pilot plant is now under construction, and is expected to finish in October 1982.
   Therefore, the continous production research and development of the pulp fitting to P.C.B. manufacturing will inevitably start in November 1982.
   Besides, the A.L.A. test plant is at present nearly ready for continuous production operation for research, including main power development and training of plant operators.

3. In accordance with the above observations, it is deemed that further cooperation between both countries is still needed for about sixteen (16) months in order to attain the project objectives as stated below :

   (1) To formulate process and product standards for the most available type of P.C.B. and various types of pulp for P.C.B. manufacturing, from different local raw materials through continuous production and quality control studies using the pilot plant.

(2) To formulate process and product standards for some types of A.L.A. from indigenous bloatable clay and shale, through continous aggregate production and quality control studies using the test plant.

(3) To search for product standards for the block-unit, typed A.L.A. - structural concrete having an effect on low-cost housing, using the block making plant and laboratory equipment.

(4) To develop and promote A.L.A. and P.C.B. utilization for low-cost housing and other related uses; thus, provid e more employment for qualified personnel.

(5) To upgrade technical ability of Indonesian personnel through training in Japan.

(6) To render technical assistance including product testing, plant productivity improvement, and manpower training in the field of P.C.B. and A.L.A., and related industries.

(7) To promote mutual understanding and cooperation between the Indonesian Government and the Japanese Government.

MUTUALLY ATTESTED AND SUBMITTED

TO ALL CONCERNED

June 1, 1982

M. Nakamura

MR. MAKOTO NAKAMURA
Leader
Evaluation Team
Japan International Cooperation
Agency

IR. KARMAN SOMAWIDJAJA
Director
Directorate of Building Research
Ministry of Public Works

IR. GARJITO PRINGGO SUDIRJO
Director
Institute for Research & Development of Cellulose Industry
Ministry of Industry

Annex A.

STATUS REPORT ON THE RI-JAPAN BUILDING MATERIAL DEVELOPMENT PROJECT

This report summerized the accomplishment and on going activities of the RI-Japan project entitled "Technical Cooperation on the Development of Building Materials by Effective Use of Locally Available Raw Materials."

I. ACCOMPLISHMENT FROM 1978 TO DATE

1. Capital Outlay (see page 32)

The following constructions were partly completed :

For P.C.B. (in DBR)	For Pulp (in IRDCI)	For A.L.A. (in DBR)

2. Machinery Installation

The pilot plants (P.C.B., Pulp) and a test plant and related (A.L.A.) were donated by the Japanese Government Rp. 225 million, Rp. 210 million and Rp. 255 million worth respectively.
And the P.C.B. plant among them was already installed :

(1) Phase 1	A,B,C Unit foundation	Rp. 36.500.000,-
(2) Phase 2	D1 Unit foundation	Rp. 16.000.000,-

The foundations for Pulp pilot plant and A.L.A. test plant are under construction, and their cost estimated of Rp. 52.800.000,- and Rp. 42.000.000,-

3. Procurement of Equipment

The following supplementary equipments were provided and installed :

		Cost
(1) Jeep car	1	Rp. 5.5 million
(2) Generator	2 (250KVA)	Rp. 55.1 million
	Total	Rp. 60.6 million

4. Project Personnel

The Indonesian counterpart for the project include the following :

(1) 48 regular personnel of DBR (P.C.B., A.L.A.) whose total salaries involves : Rp. 24.000.000,-

(2) 29 regular personnel of IRDCI (Pulp) whose total salaries involves : Rp. 9.000.000,-

5. Research Accomplishment

The following works were concucted for P.C.B. technology :

(1) LABORATORY STUDIES

i. Production of P.C.B. from various indigenous materials.
ii. Pulping test of some kinds of organic fibres.
iii. Product testing by JIS standard.

(i) Bending strength
(ii) Water adsorption
(iii) Water content
(iv) Bulk density
(v) Change in length swelling
(vi) Shrinking

(2) TECHNICAL ASSISTANCE

i. Production of JIS-standard P.C.B.
ii. Production of pulp cement-pozolana boards.
iii. Comparative study of pulp SPK (Pozolana Lime Cement) boards with normal Pulp Cement Boards.
iv. Comparative study of P.C.B. with different asbestos. One kind is the imported normal and the other the domestic (Central Java) one.
v. Production test of slate-typed P.C.B.

6. Personnel Development

(1) In-house training of plant operators were conducted.

(2) Four counterpart personnel (two Directors of DBR and IRDCI, P.C.B.-Project Leader, Chief Coordinator of DBR) observed and studied in Japan modern facilities and techniques applied to P.C.B. and A.L.A. industries.

(3) Counterpart personnel attended conferences on A.L.A. industry with JICA experts.

(4) Operation standards for the pilot plant machine were drafted.

7. Evaluation and Information

(1) A Technical Note and a brochure were published.

(2) The Pulp Cement Board participated in exhibits as well as trial use for public constructions.

8. JICA Missions

DBR and IRDCI have received a total of JICA missions, including the follow-up team, for project programming, mutual consultations and evaluation.
(Please refer to Annex C).

9. JICA Experts

A total of 19 Japanese experts, including 3 long-term experts, have been received for the supervision of machine, installation and transfer of production technology.
(Please refer to Annex D).

10. Counterpart Training

Fourteen (14) counterpart personnel of DBR and IRDCI were trained in Japan on various field of project operation and management, machinery installation, production process, marketing and product development.
(Please refer to Annex E).

11. Important Visitors to Project

Among the important foreign visitors attended to are the following :

(1) Japanese Embassy officials.

(2) JICA Vice-President T. SHIKIDA.

(3) JETRO-Organized Tour of Indonesian journalists and officials in authorities concerned with technical aid.

(4) Other Japanese mission.

(5) Sri Lanka Prime Minister M.R. Premadasa.

(6) Minister of Housing from Malaysia.

(7) Minister of Housing from The State of Sabah, Malaysia.

(8) National Housing Authority Officials of Thailand.

Among local officials, the following have also observed the pilot plant observation :

(1) Director General of Cipta Karya, Ministry of Public Works

(2) Director of Housing, CIPTA KARYA

(3) Provinsial Directors of PERUMNAS

(4) Officials of Bank Rakyat Indonesia

(5) Professors and student of various Universities in Indonesia

12. Additional Significant Information

Please refer to the following :

(1) Annex (B) - a. Significant Events
b. Equipment Received from JICA

(2) Annex (F) - Summary of Indonesian Counterpart Budget.

II. ON-GOING ACTIVITIES

1. Infrastructures

The followings are being constructed :

(1) Installation of pulp pilot plant in IRDCI

(2) Installation of A.L.A. Test Plant in DBR-Cilacap

(3) Installation of A.L.A.-black pilot plant in DBR-Cilacap

(4) Installation of A.L.A. laboratory equipment in DBR-Cilacap

Note

All the cost of above works have been included in the counterpart budget 1981/1982.

2. Research Activities

With the guidance of Japanese experts, the following studies are being conducted :

(1) P.C.B.

i. PILOT-PLANT-SCALE STUDIES

Production of Pulp Cement Board from local asbestos, pozolana, pulp and limestone with the object of management in plant operation.

ii. Production cost studies.

(2) Pulp

i. INSTALLATION OF PULP PILOT PLANT

ii. LABORATORY STUDIES

(i) Raw material assessment

(ii) Pre-processing and preparation of materials

(iii) Pulping process

(iv) Basic technic-economical evaluation

(3) A.L.A.

i. INSTALLATION OF A.L.A. TEST PLANT AND EQUIPMENT CONCERED

ii. LABORATORY STUDIES

a. Raw material assessment
b. Method and technical effects of pelletizing
c. Basic control of heat regim
d. Application of A.L.A. for light weight concretes
e. Techno-economical analysis of A.L.A. concretes

3. Personnel Development

(1) Plant operators are continously being trained and developed.

(2) Counterpart personnel participate in technical seminars conducted by Japanese experts.

4. Education and Information

(1) Various plant operation manual are being drafted on raw material acceptance, board production, product testing, storage and plant maintenance.

(2) Other technical notes on the use and market potential of Pulp Cement Board and Artificial Light weight Aggregate have been prepared.

5. Project Personnel

The name of project personnel and their positions in the present organization are shown in Annex H,I and K.

6. Proposal for Integration

It is earnestly requested that existing project personnel be integrated into the DBR and IRDCI with a permanent status for the following reasons :

(1) To assure continous operation of the P.C.B., Pulp and A.L.A. plants for research and development.

(2) For those who were trained, to better serve the Government or make use of their acquired expertise.

SIGNIFICANT EVENTS

July 19, 1977	- Formal signing of the Record of Discussions and start of the project.
February 27, 1980	- Signing of the Annual Work Plan from April, 1980 to March, 1981.
March 27, 1980	- Inauguration of the Pulp Cement Board pilot plant.
April 1, 1981	- Signing on the Annual Work Plan from April, 1981 to March, 1982.

EQUIPMENT RECEIVED FROM JICA

(1)	Pulp Cement Board pilot plant Equipment (Laboratory Equipment included)	Rp. 224.800.000,-
(2)	Landcruiser Jeep (Toyota)	5.499.000,-
(3)	Pulp pilot plant Equipment	211.000.000,-
(4)	Artificial Light Weight Aggregate Test Plant Equipment (Laboraotry Equipment, Block pilot plant included)	248.900.000,-
(5)	Generators	55.100.000,-
	Total	Rp. 745.299.000

Note

Rp. 1,- = ¥ 0,343

ANNEX C

JICA Mission Received
for the Building Materials Development Project

1. Preliminary Survey Team — December 11 - December 27, 1977

Tadaharu Kuroiwa	- Project Leader
Mizutoshi Koga	- Member
Norio Shimomura	- Coordinator

2. Implementation Team — July 5 - July 21, 1978

Sakichi Yoshikawa	- Team Leader
Tadaharu Kuroiwa	- Member
Shigeru Mori	- Member
Mizutoshi Koga	- Member
Seishi Kunikata	- Member
Hiroo Iwai	- Member
Norio Shimomura	- Coordinator

3. Consultation Team — February 14 - February 29, 1980

Tadaharu Kuroiwa	- Team Leader
Masumi Tsuchiya	- Member
Mizutoshi Koga	- Member
Tsuneo Nishi	- Member
Seishi Kunikata	- Member
Junnosuke Sato	- Coordinator

4. 1st Technical Guidance Team — March 21 - April 4, 1981

Makoto Nakamura	- Team Leader
Kaneihiro Yahiro	- Member
Ryo Toyabe	- Member
Kazuo Nakagawa	- Coordinator

5. 2nd Technical Guidance Team — December 12 - December 25, 1981

Ryuhzo Naito	- Team Leader
Mizutoshi Koga	- Member
Norio Kawamura	- Member
Kazuo Nakagawa	- Coordinator

6. Technical Evaluation Team — May 25 - June 8, 1982

Makoto Nakamura	- Team Leader
Toshinori Kaku	- Member
Tadao Miyazono	- Member
Kazuo Nakagawa	- Coordinator

ANNEX D

JICA Experts Received
for the Building Materials Development Project

Year (No. of Persons)	Duration	Name	Assignment
1979 (6)	Jan. 29 - Feb. 18	Takeo Kojima	P.C.B. Pilot Plant Design
		Yoshio Suzuki	P.C.B. Pilot Plant Design
		Yasumasa Okuda	P.C.B. Pilot Plant Design
	Sep. 19 - Oct. 19	Seishi Kunikata	A.L.A.-Mechanical Design
		Katsuyuki Murakami	A.L.A.-Mechanical Design
		Kazuo Hashimoto	A.L.A.-Mechanical Design
1980 (5)	Jun. 18, 1980 - Jun. 17, 1982	Yasumasa Okuda	P.C.B.-General Supervision
	Jul. 19, 1980 - Jul. 18, 1982	Tadaharu Kuroiwa	Project Leader/Promotion and Product Development
	Nov. 7, 1980 - Feb. 8, 1981	Fukashi Hirashima	P.C.B. Mechanical Installation
		Masahiko Chikami	P.C.B. Mechanical Installation
		Yasushi Momosaki	P.C.B. Mechanical Installation
1981 (6)	Feb. 11 - Mar. 12	Yoshinori Hayata	P.C.B. Electrical Installation
	Mar. 3 - Mar. 22	Tsuneo Nishi	P.C.B.-Mechanical Installation
	Mar. 3 - May 5	Ken Yokomizo	P.C.B. Production Management
	May 12 - Jul. 13	Masami Tajima	P.C.B.-Quality Control
	Sep. 12, 1981 - Sep. 11, 1982	Minosaku Kawaguchi	Pulp-General Supervision
	Dec. 12, 1981 - Apr. 11, 1982	Akira Tsumagari	A.L.A-General Supervision
1982	Mar. 4 - May 28	Tetsuo Aoki	P.C.B.-Mechanical Installation (D1 Unit)
	May 28 - August 29	Sumitaka Ueda	A.L.A.-General Supervision

ANNEX E

Administration & Technical Counterparts Trained in Japan

Year (No. of Persons)	Duration	Name	Field of Training
1979 (5)	Mar. 29 - Apr. 15	Darubroto M. SE. Director, CRI	Administration
		Sahat Mulia Ritonga Chief, Administration Dept., DBR.	Administration
	Aug. 7, 1979 - Feb. 5, 1980	Domiri Suramihardja Industrial Engineer,DBR	P.C.B. Manufacture
		Utarya Mechanical Engineer,DBR	P.C.B. Manufacture
	Dec. 10, 1979 - Feb. 5, 1980	Rizwan Lutfi Applied Physicist, DBR	P.C.B. Manufacture
1980 (3)	Dec. ? , 1980 - Mar. 25, 1981	Syarief Hidayat Chief, Research Section, DBR Mechanical Engineer	P.C.B.-Process Engineering
		Dudung Kusmara Chemical Engineer, DBR	P.C.B.-Process Engineering
	Dec. 13, 1980 - Mar. 25, 1981	Rasimin Sujono Mechanical Engineer,IRDCI	Pulp- Pulping Technology
1981 (2)	Oct. 19, 1981 Nov. 3, 1981	Karman Somawidjaja Director, DBR	Administration
		R.B. Tular Chief, Sub-Directorate Building Materials & Construction, DBR	Administration

Year (No. of Persons)	Duration	Name	Field of Training
1982	Jan. 7, 1982 - Apr. 4, 1982	Sumardi Mechanical Engineer, IRDCI	Pulp-Machinery Maintenance
		Gatot Ibnu Santosa Chemical Engineer, IRDCI	Pulp-Process Engineering
	Jan. 28 - Apr.27	Nasroen Rivai Chief, Research Section, DBR Mechanical Engineer	A.L.A.-Product Development
		Purwito BE. Civil Engineer, DBR	A.L.A. Application to Conrete Technology

SUMMARY OF INDONESIAN COUNTERPART BUDGET

Expenditures	1979/80	1980/81	1981/82	Total
I. Personnel Service	- / -	4.000.000 / -	3.800.000 / 16.480.000	7.800.000 / 16.480.000
II. Maintenance & Other Operating Expences	- / -	8.500.000 / -	7.000.000 / -	15.500.000 / -
III. Equipment Outlay	500.000 / -	5.200.000 / -	4.600.000 / 57.500.000	10.300.000 / 57.500.000
IV. Capital Outlay	20.000.000 / -	8.800.000 / -	11.200.000 / 132.920.000	40.000.000 / 132.920.000
V. Other Support Budget	- / -	7.280.000 / -	6.100.000 / -	13.380.000 / -
T o t a l	Rp. 20.500.000 / -	Rp. 33.780.000 / -	Rp. 32.700.000 / 206.900.000	Rp. 86.980.000 / 206.900.000

COUNTERPART BUDGET - 1982

1. Personnel Services	Rp. 9.700.000,-
2. Maintenance & Other Operating Expences	Rp. 6.000.000,-
3. Equipment Outlay	Rp.17.042.000,-
T o t a l	Rp.32.742.000,-

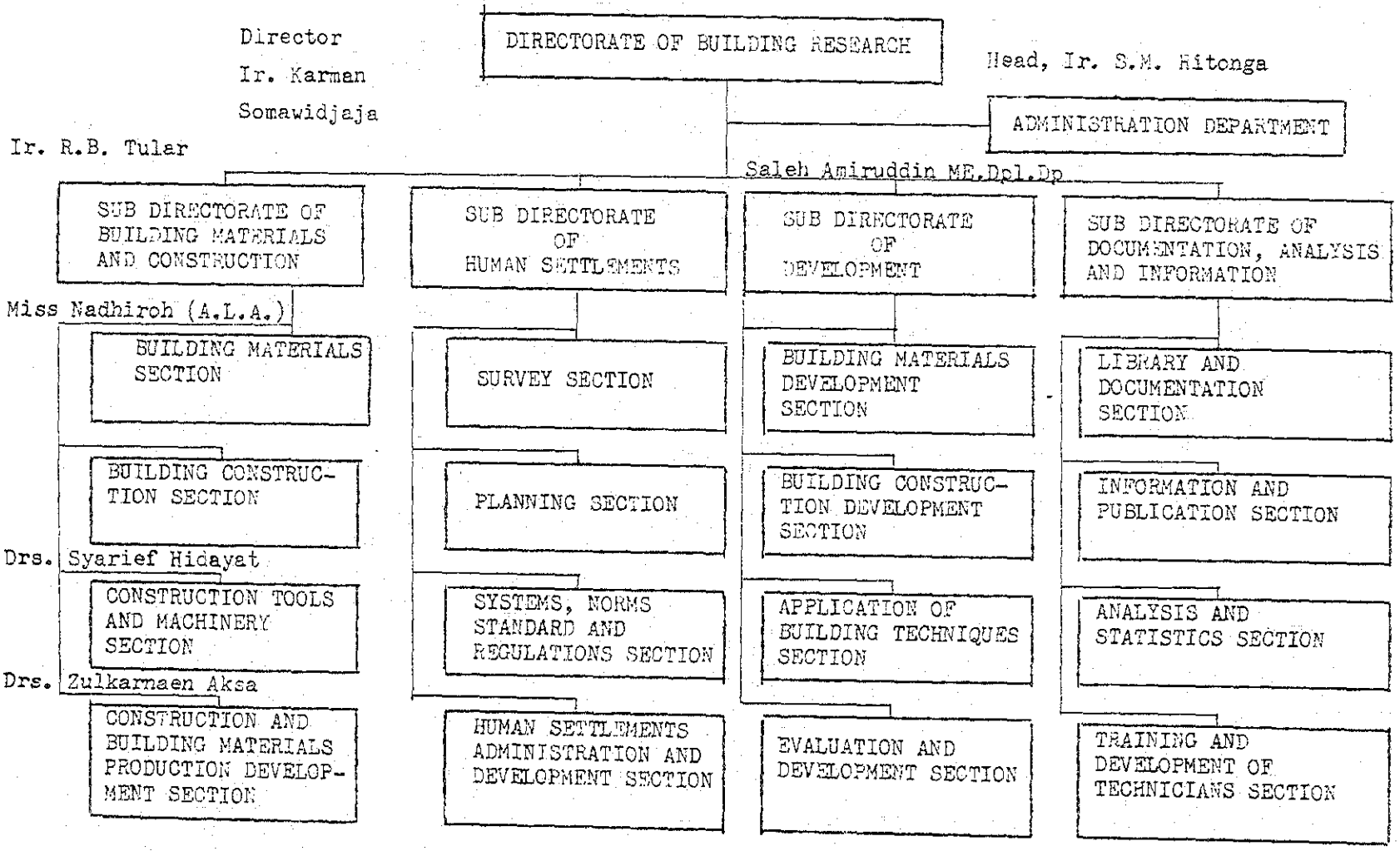
Note

(1) DBR for P.C.B. & A.L.A. / IRDCI (for Pulp)

(2) 1979/80 - 1980/81 : Only for P.C.B.

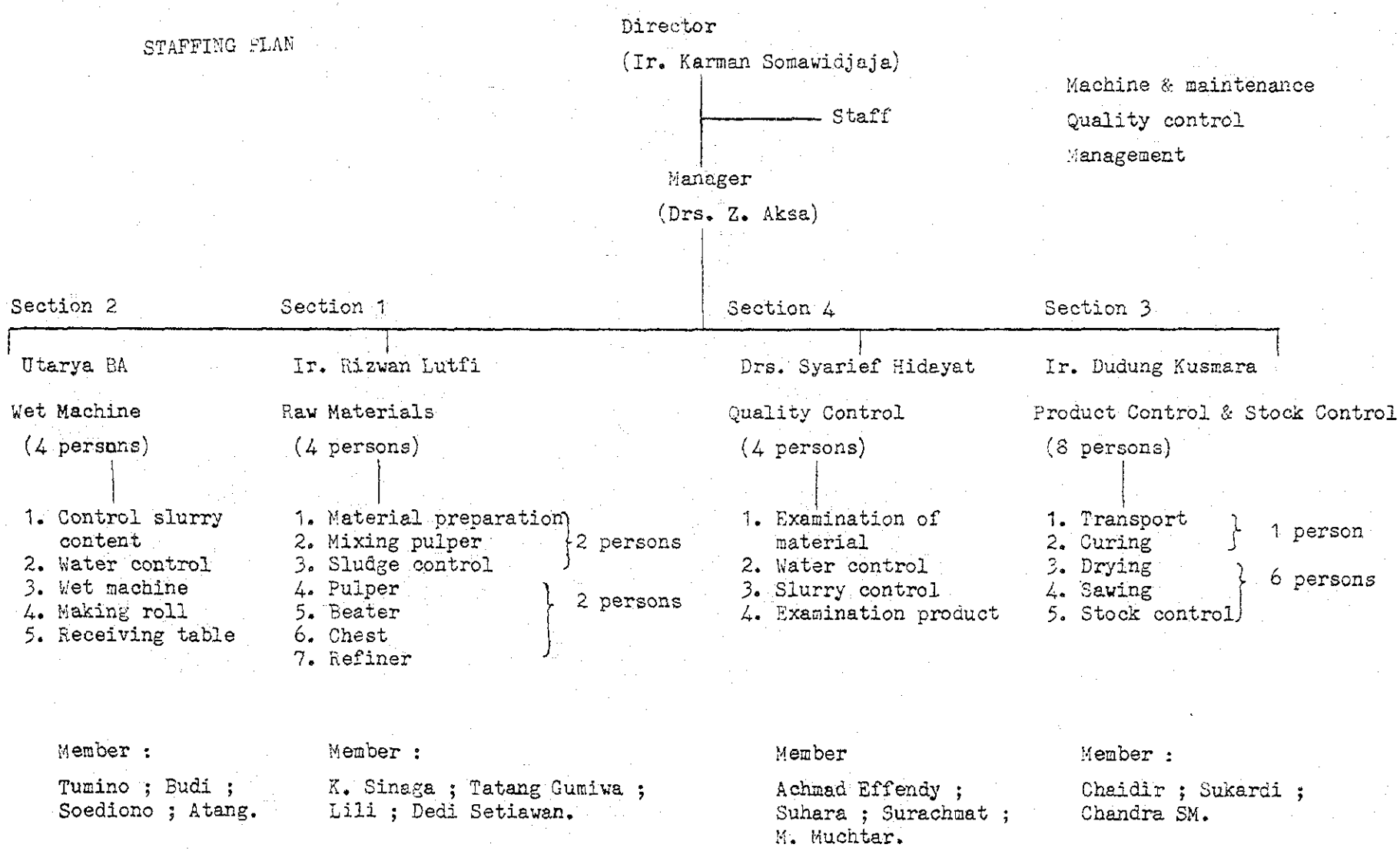
ORGANIZATION CHART

DIRECTORATE OF BUILDING RESEARCH



DBR P.C.B. PILOT PLANT

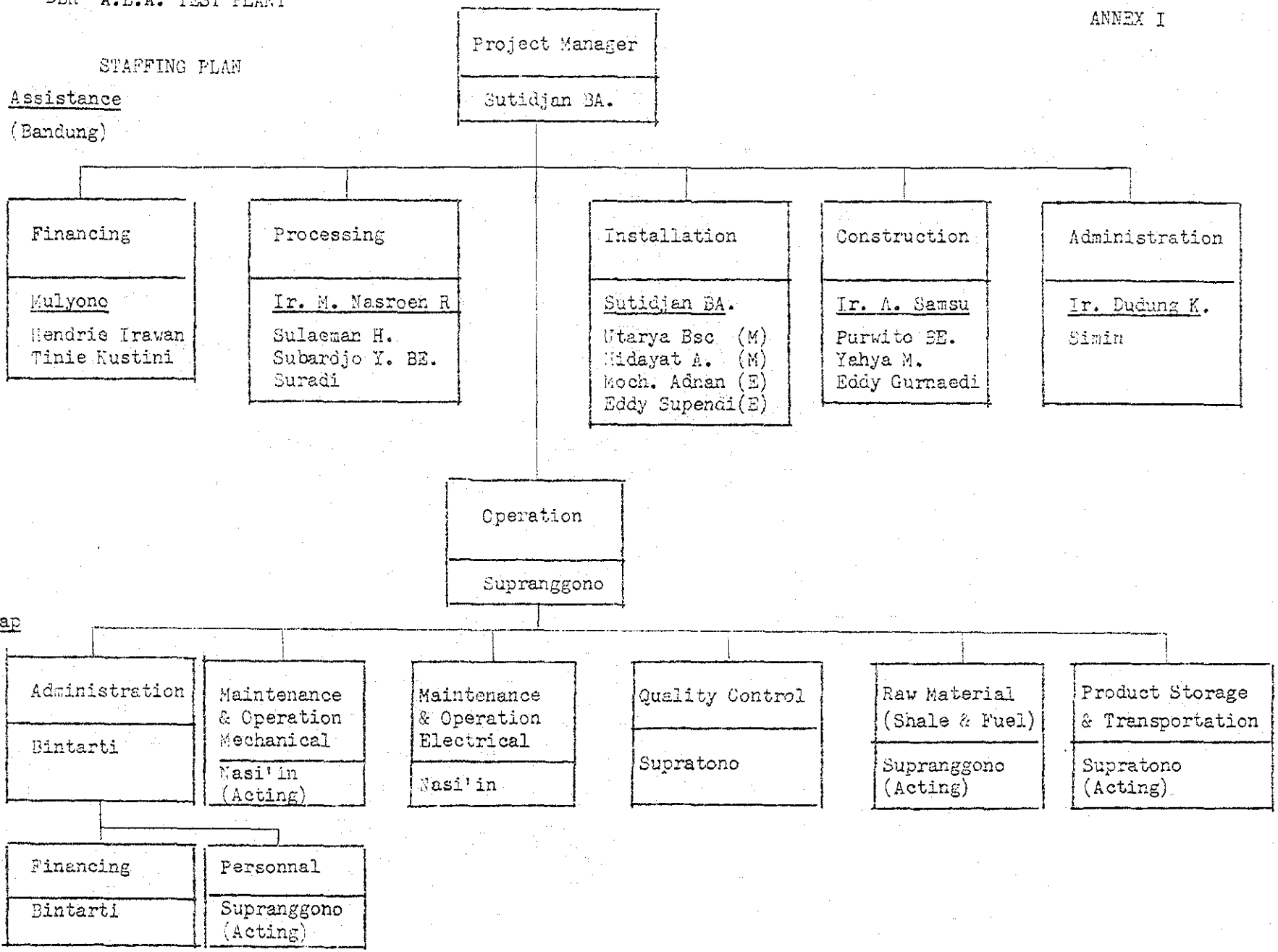
STAFFING PLAN



DBR A.L.A. TEST PLANT

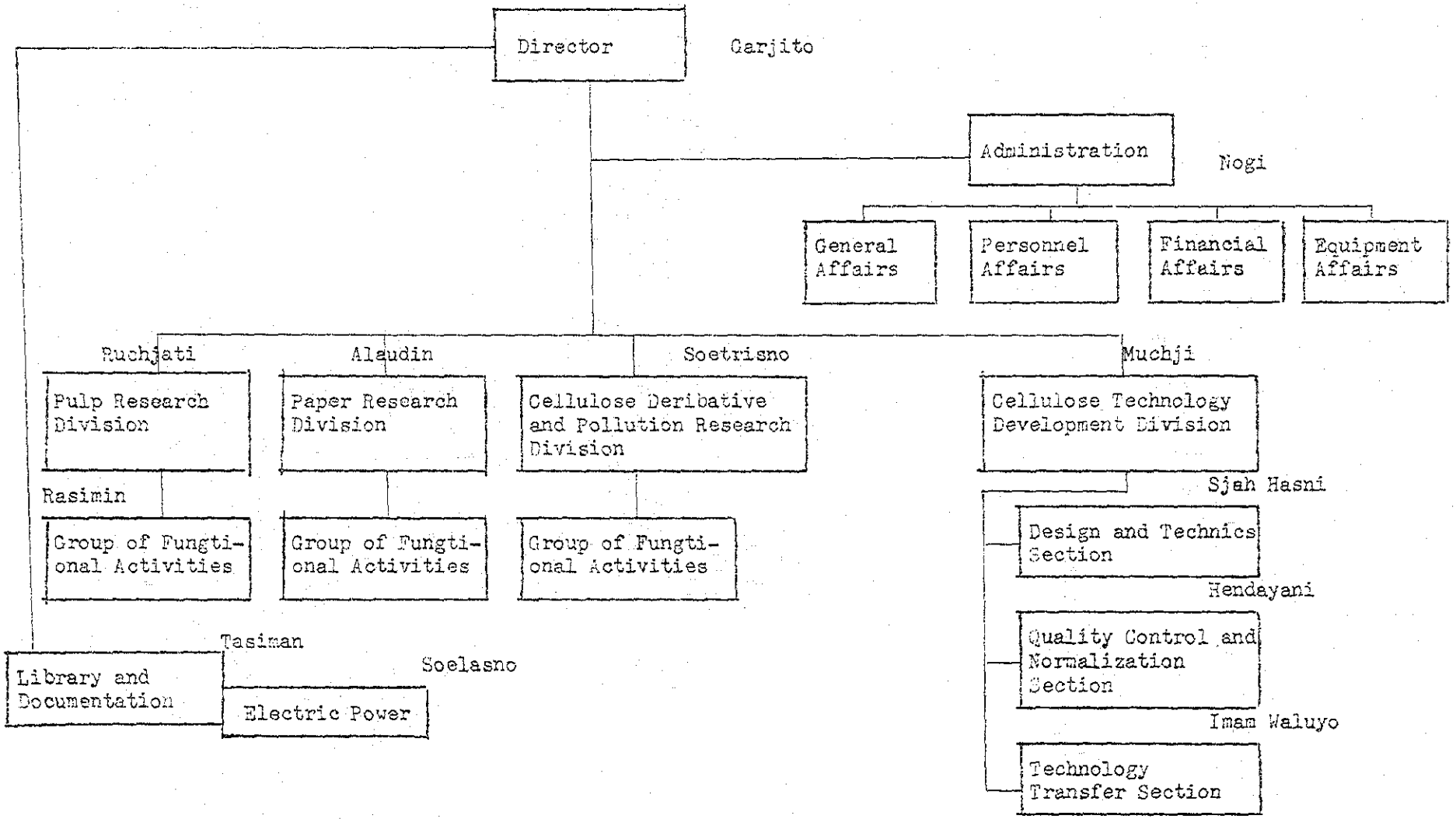
ANNEX I

STAFFING PLAN



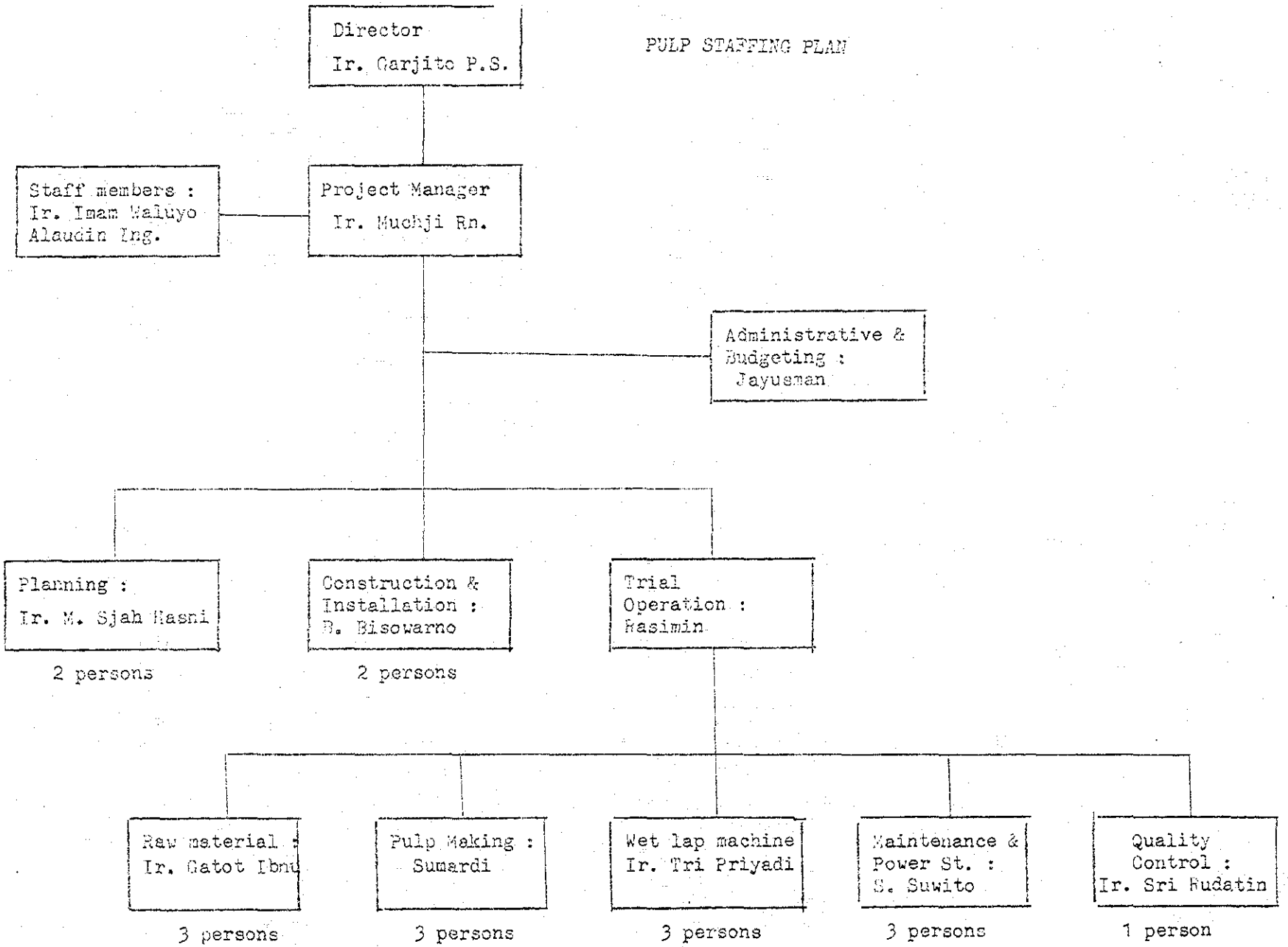
ORGANIZATION CHART

INSTITUTE FOR RESEARCH & DEVELOPMENT OF CELLULOSE INDUSTRY



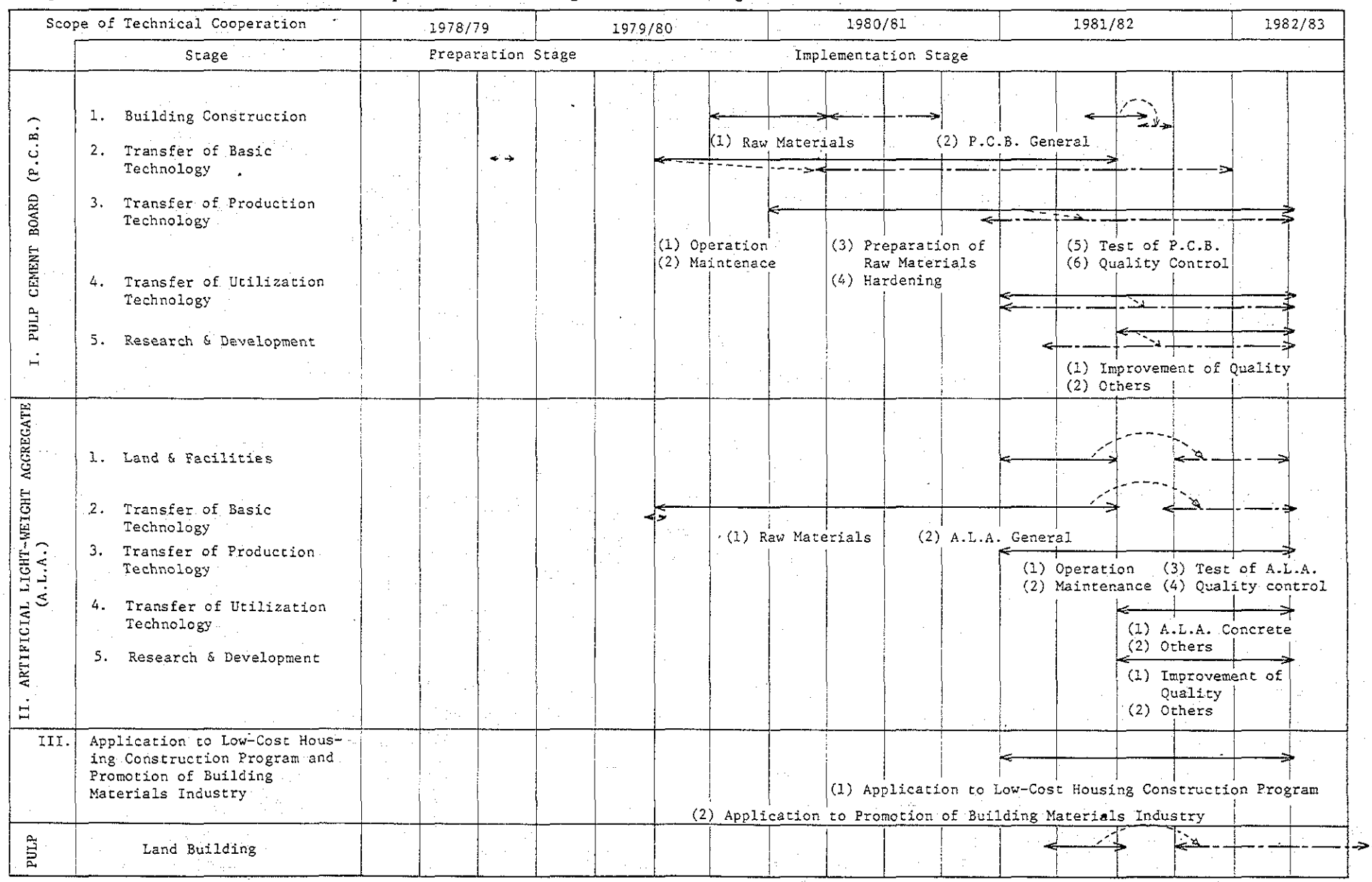
ANNEX K

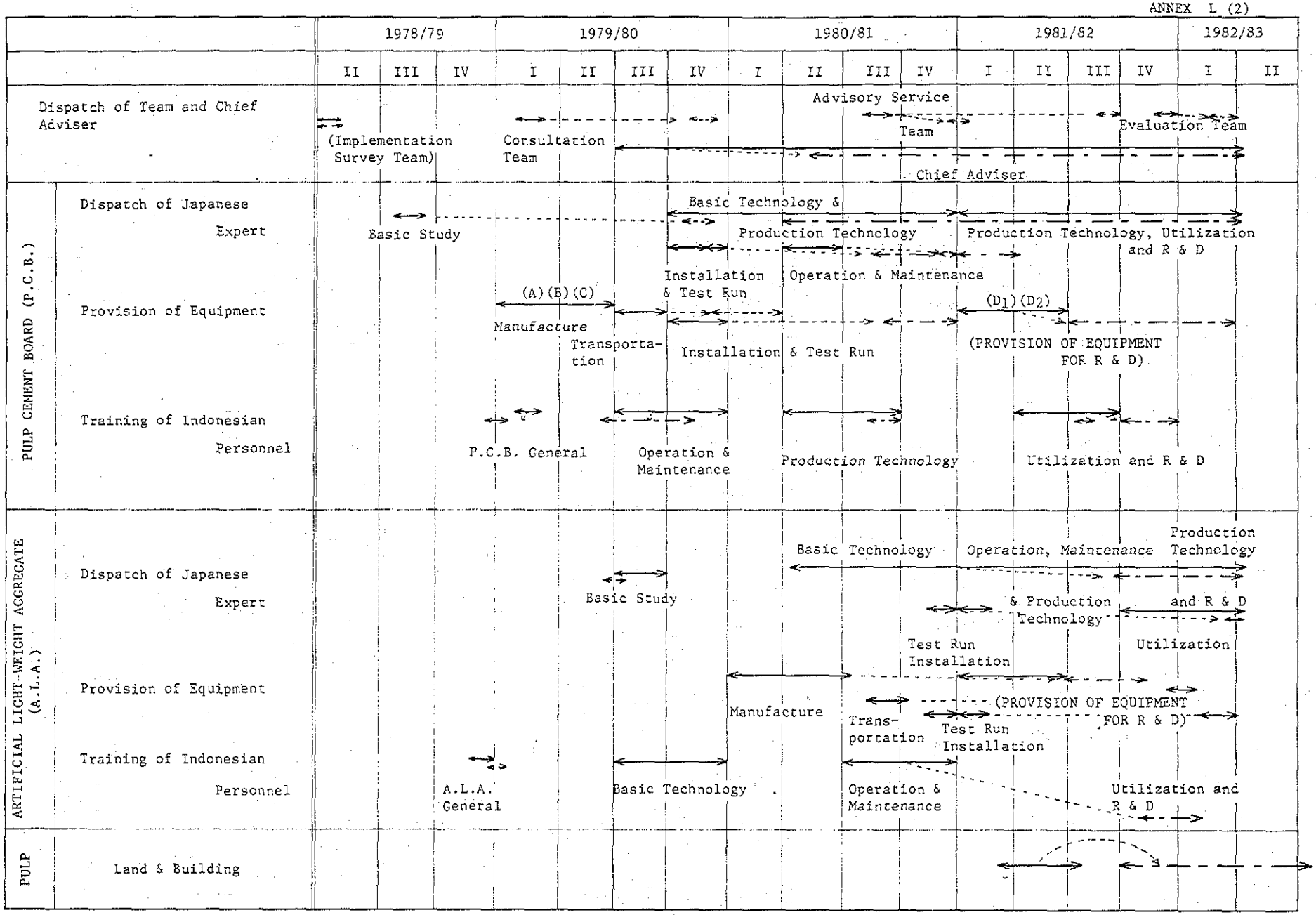
PULP STAFFING PLAN



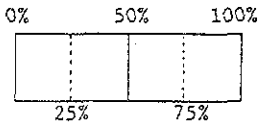
Implementation Schedule of Development of Building Materials Project

ANNEX L (1)




1978/79
1979/80
1980/81
1981/82
1982/83
II III IV I II III IV I II III IV I II III IV I II
Dispatch of Team and Chief Adviser
(Implementation Survey Team)
Consultation Team
Advisory Service Team
Evaluation Team
Chief Adviser
PULP CEMENT BOARD (P.C.B.)
Dispatch of Japanese Expert
Basic Study
Basic Technology & Production Technology
Production Technology, Utilization and R & D
Provision of Equipment
(A)(B)(C)
Manufacture
Transportation
Installation & Test Run
Operation & Maintenance
(D1)(D2)
(PROVISION OF EQUIPMENT FOR R & D)
Training of Indonesian Personnel
P.C.B. General
Operation & Maintenance
Production Technology
Utilization and R & D
ARTIFICIAL LICHT-WEIGHT AGGREGATE (A.L.A.)
Dispatch of Japanese Expert
Basic Study
Basic Technology
Operation, Maintenance & Production Technology
Production Technology and R & D
Utilization
Test Run Installation
Provision of Equipment
Manufacture
Transportation
Test Run Installation
(PROVISION OF EQUIPMENT FOR R & D)
Training of Indonesian Personnel
A.L.A. General
Basic Technology
Operation & Maintenance
Utilization and R & D
PULP
Land & Building

SUBJECT AREA	ESTIMATED ACHIEVEMENT by July 18, 1982 (ED R/D)	EXPECTED ACHIEVEMENT During July 19, 1982 - November 30, 1983	
1. P.C.B.			
(1) Operation with Existing Plant	1) Trial production		
	2) Maintenance of machinery		
	3) Test of produce		
(2) R & D Study, Installation	1) Raw material Assessment for Trial Production		
	2) Trial product analysis		
	3) Installation		
(3) Production Technology		1) Test and quality control	
		2) Maintenance of machinery	
		3) Cost study	
		4) Making operation manual	
		Assignment of counterpart personnal	
		Acquirement of counterpart personnel	



SUBJECT AREA	ESTIMATED ACHIEVEMENT by July 18, 1982 (ED R/D)	EXPECTED ACHIEVEMENT During July 19, 1982 - November 30, 1983	
2. Pulp			
(1) Study of raw materials		1) Investigation of indigenous raw material for Pulp Cement Board making	
	2) Basic design and layout of pulp technology		
(2) Installation		1) Installation	
		2) Examination of machinery	
(3) Production Technology		1) Test and quality control 2) Maintenance of machinery 3) Product development 4) Cost study	
		Assignment of counterpart personnel	
		Acquirement of counterpart personnel	
3. A.L.A.			
(1) Study of raw materials	1) Examination of raw materials 2) Trial production with existing kiln 3) Test of product 4) Crushability 5) Expandability		
(2) A.L.A. Production with test plant		1) Crushing conditions 2) Screening conditions 3) Burning conditions 4) Pre-wetting conditions 5) Test and quality control 6) Cost study	
	Assignment of counterpart personnel		
		Acquirement of counterpart personnel	

SUBJECT AREA	ESTIMATED ACHIEVEMENT by July 18, 1982 (ED R/D)	EXPECTED ACHIEVEMENT During July 19, 1982 - November 30, 1983	
4. Block			
(1) Study of Mixing Proportion		1) Design of mixing proportion 2) Test mixing 3) Test of products	
(2) Block Production with Test Plant		1) Concrete mixing conditions 2) Block making conditions 3) Curing conditions 4) Test and quality control 4) Cost study	
(3) Production Technology		1) Concrete mixing 2) Block making 3) Curing 4) Making operation manual 5) Drafting of operation standard 6) Material balance	

資　　料　　Ⅱ

(Record of Discussions)

THE RECORD OF DISCUSSIONS ON THE TECHNICAL COOPERATION PROJECT ON THE DEVELOPMENT OF BUILDING MATERIALS BY THE EFFECTIVE USE OF LOCALLY AVAILABLE RAW MATERIALS IN THE REPUBLIC OF INDONESIA

The Japanese Evaluation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency, and headed by Mr. Makoto Nakamura, visited the Republic of Indonesia from May 25 to June 7, 1982, for the purpose of identifying past achievements and future prospects of the Japan - Indonesia Technical Cooperation Project on the Development of Building Materials, based on the Record of Discussions signed on July 19, 1978 between the Japanese Implementation Survey Team and the Authorities concerned of the Government of the Republic of Indonesia.

The Team discussed and studied with the Indonesian counterparts concerned, and the Japanese experts, a number of aspects with respects to the performance of commitments, achievements of the function of the Indonesian authorities concerned, constraints which hampered past activities, and possible causes which may restrain future prospect as well.

As a result of studies and discussions, both side agreed to recommend to their respective governments that the period of the technical cooperation as stipulated in the Record of Discussions of July 19, 1978 be extended until November 30, 1983 and that the technical cooperation be carried out in accordance with the attached Tentative Implementation Schedule in order to fully achieve the objectives which were planned in the said Record of Discussions.

Bandung, June 2, 1982

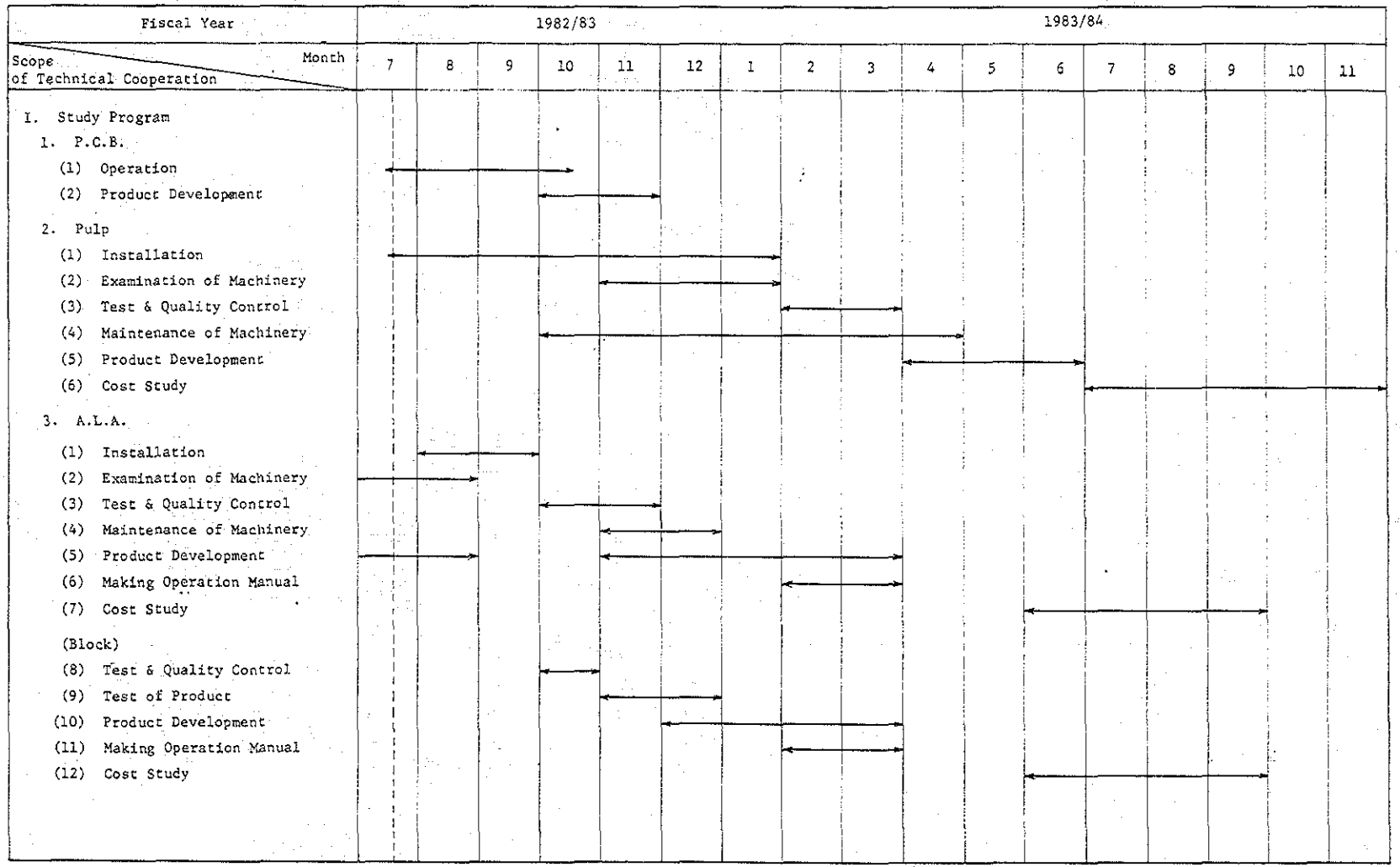
Makoto Nakamura
Leader,
Japanese Evaluation Team
Japan International Cooperation
Agency

Karman Somawidjaja
Director,
Directorate of Buidling Research
Ministry of Public Works

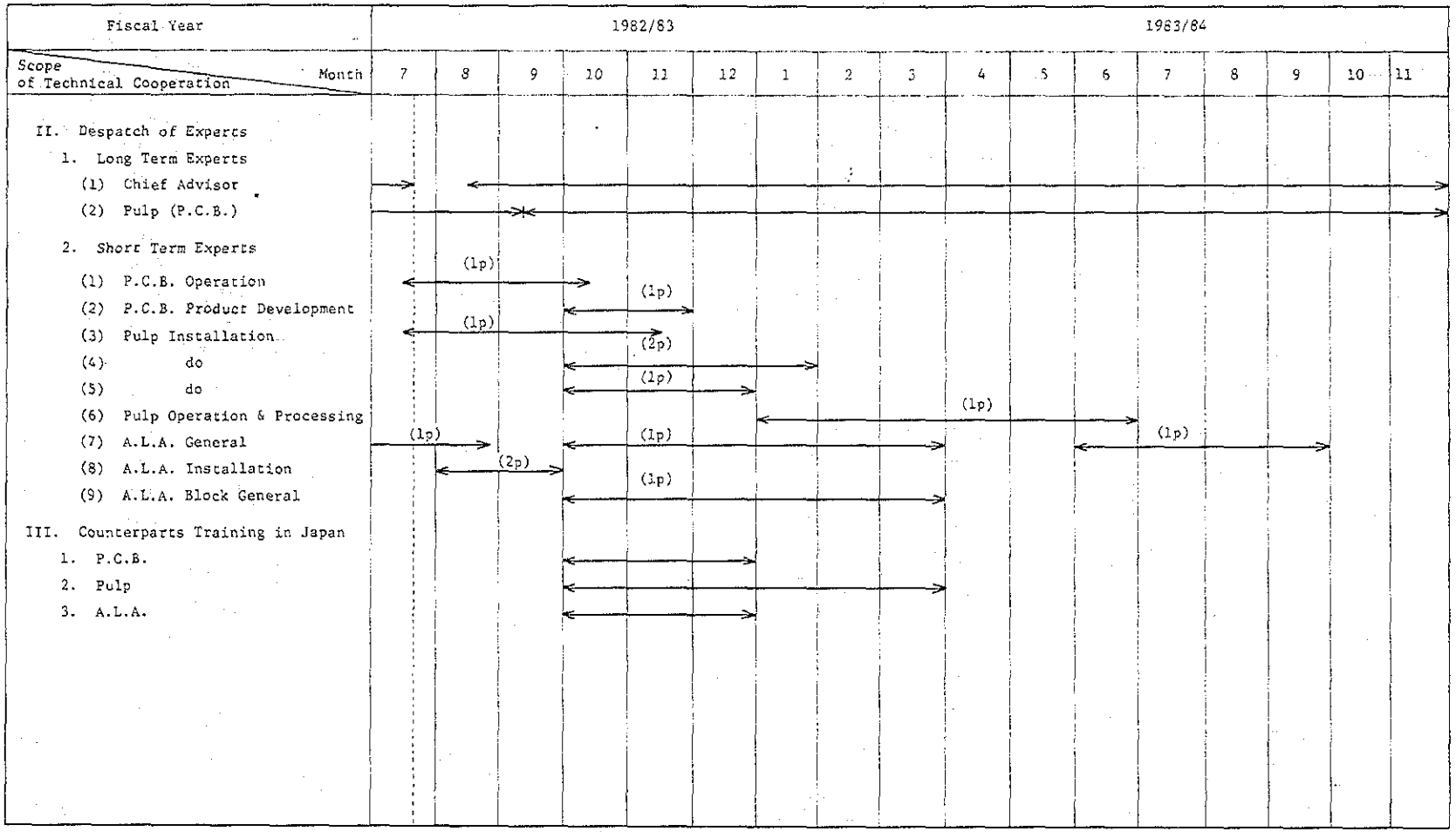
Garjito Pringgo Sudirjo
Director,
Institute for Research and
Development of Cellulose Industry
Ministry of Industry

Tentative Schedule of Implementation

July 19, 1982 - November 30, 1983 (1)



Tentative Schedule of Implementation July 19, 1982 - November 30, 1983 (2)



Note: (1) This schedule is subject to conditions that necessary budget will be aquired for the implementation of the Project.

(2) This Scope of Technical Cooperation is subject to change within the scope of the provisions given in the Record of Discussions.

資　　料　　Ⅲ

（協力事業実績）

インドネシア共和国建材開発技術協力事業に係わる実績

（昭和５７年６月末現在）

1. プロジェクトの経緯

年	月　日	経　緯
52	3/3 ～ 3/17	東南アジア・プロジェクト選定・確認調査団派遣
(1977)	6 月	正式要請受理
	12/11～ 12/27	事前調査団派遣
53	7/5 ～ 7/21	実施調査団派遣
(1978)	7/19～	R／Dに署名
54	1/29～ 2/18	長期調査員派遣（３名，ＰＣＢ）
(1979)	3/29～ 4/15	研修員受入れ（２名，準高級）
	8/7 ～55. 2/5	研修員受入れ（３名※一般）
		※内１名は54. 12. 10 ～ 55. 2. 5
	9/19～ 10/19	長期調査員派遣（３名，ＡＬＡ）
55	2/14～ 2/29	計画打合せ調査団派遣
(1980)	6/18～57. 6/17	長期専門家（ＰＣＢ）派遣　１名
	7/19～57. 7/18	〃　（リーダー）〃　１名
	11/17～56. 2/8	短期専門家（機材据付）派遣　３名
	12/9 ～56. 3/25	研修員受入れ（３名※一般）
		※内１名は55. 12. 13. ～ 55. 3. 25
56	2/11～ 3/12	短期専門家（機材据付）派遣　１名
(1981)	3/3 ～ 3/22	〃　〃　〃
	3/3 ～ 5/5	〃　（運転指導）　〃
	3/21～ 4/4	第１次巡回指導チーム派遣
	5/12～ 7/13	短期専門家（運転指導）派遣　１名
	9/12～57. 9/11	長　〃　（パルプ製造）派遣　〃
	10/19～ 11/3	研修員受入れ（２名，準高級）
	12/12～57. 4/11	短期専門家（人工軽量骨材）派遣　１名
	12/12～ 12/25	第２次巡回指導チーム派遣
57	1/7 ～ 4/4	研修員受入れ（２名，一般）
(1981)	1/28～ 4/27	〃　（２名，一般）
	3/4 ～ 5/28	短期専門家（機材据付）派遣　１名
	5/25～ 6/8	エバリュエーションチーム派遣
	5/28～ 8/29	短期専門家（人工軽量骨材）派遣　１名

2. 調査団の構成

(1) 東南アジアプロジェクト選定確認調査団（５２.３.３～３.１７）３名

	（氏　名）	（所　属）
団　長	太　田　耕　三	国際協力事業団鉱工業開発協力部長
団　員	佐　野　美　則	国際協力事業団鉱工業開発協力部参事
〃	大久保　　大	国際協力事業団　　特別嘱託

(2) 事前調査団（５２.１２.１１～１２.２７）３名

	（氏　名）	（所　属）
団　長	黒　岩　忠　春	工業技術院九州工業技術試験所
団　員	古　賀　瑞　敏	福岡県福島工業試験場
〃	下　村　則　夫	国際協力事業団鉱工開発協力部

(3) 実施調査団（５３.７.５～７.２１）７名

	（氏　名）	（所　属）
団　長	吉　川　佐　吉	国際協力事業団理事
団　員	黒　岩　忠　春	工業技術院九州工業技術試験所
〃	森　　茂	日本パルプセメント板工業組合
〃	古　賀　瑞　敏	福島県福島工業試験場
〃	国　方　聖　士	三井金属鉱業㈱
〃	岩　井　博　雄	通産省窯業建材課
〃	下　村　則　夫	国際協力事業団鉱工開発協力部

(4) 計画打合せ調査団（５５.２.１４～２.２９）６名

	（氏　名）	（所　属）
団　長	黒　岩　忠　春	工業技術院九州工業技術試験所
団　員	土　谷　真　澄	日本パルプセメント板工業組合
〃	古　賀　瑞　敏	福島県福島工業試験場
〃	国　方　聖　士	三井金属鉱業㈱
〃	西　　常　男	松本鉄工所
〃	佐　藤　順之助	国際協力事業団鉱工業開発協力部

(5) 第１次巡回指導チーム（５６.３.２１～５６.４.４）４名

	（氏　名）	（所　属）
団　長	中　村　　信	国際協力事業団鉱工業開発協力部
団　員	八　尋　兼　弘	日本パルプセメント板工業組合
〃	鳥谷部　　良	小野田エンジニアリング㈱
〃	中　川　和　夫	国際協力事業団鉱工業開発協力部

(6) 第２次巡回指導チーム（５６.１２.１２～１２.２５）４名

	（氏　名）	（所　　属）
団　長	内　藤　隆　三	国際協力事業団専門技術嘱託
団　員	古　賀　瑞　敏	福岡県福島工業試験場
〃	河　村　暢　夫	小野田エンジニアリング㈱
〃	中　川　和　夫	国際協力事業団鉱工業開発協力部

(7) エバリュエーションチーム（５７.５.２５～６.８）４名

	（氏　名）	（所　　属）
団　長	中　村　　信	国際協力事業団鉱工業開発協力部
団　員	加　来　俊　則	福岡県商工部
〃	宮　園　忠　夫	小野田エンジニアリング㈱
〃	中　川　和　夫	国際協力事業団鉱工業開発協力部

3. 派遣専門家の構成

(1) 昭和５３年度長期調査員派遣（５４.１.２９～２.１８）３名，ＰＣＢ

（氏　名）	（所　　属）
小　島　武　夫	日本パルプセメント板工業組合
鈴　木　義　郎	〃
奥　田　泰　真	福岡県福島工業試験場

(2) 昭和５４年度長期調査員派遣（５４.９.１９～１０.１９）３名，ＡＬＡ

（氏　名）	（所　　属）
国　方　聖　士	三井金属工業㈱
村　上　克　之	〃
橋　本　和　雄	小野田エンジニアリング㈱

(3) 長期専門家派遣

（氏　名）	（所　　属）
黒　岩　忠　春（リーダー）	工業技術院九州工業技術試験所
（５５.７.１９～５７.７.１８・プロジェクトリーダー）	
奥　田　泰　真（ＰＣＢ）	福岡県福島工業試験場
（５５.６.１８～５７.６.１７・パルプセメントボード）	

(4) 短期専門家派遣（５５.１１.７～５６.２.８）３名

（氏　名）	（所　　属）
平　島　　深（機材据付）	松本鉄工所

近　見　政　彦（機材据付）　松本鉄工所

桃　崎　泰　司（　〃　）　〃

(5) 短期専門家派遣（５６.２.１１～３.１２）1〃名

（氏　名）　（所　属）

早　田　義　則（機材据付）　松本鉄工所

(6) 短期専門家派遣（５６.３.３～３.２２）

（氏　名）　（所　属）

西　　常　男（機材据付）　松本鉄工所

(7) 短期専門家派遣（５６.３.３～５.５）

（氏　名）　（所　属）

横　溝　　健（運転指導）　日本パルプセメント板工業組合

(8) 短期専門家派遣（５６.５.１２～７.１３）

（氏　名）　（所　属）

田　島　政　美（運転指導）　日本パルプセメント板工業組合

(9) 長期専門家派遣（５６.９.１２～５７.９.１１）

（氏　名）　（所　属）

川　口　己之作（パルプ製造）　トキコ設計事務所

(10) 短期専門家派遣（５６.１２.１２～５７.４.１１）

（氏　名）　（所　属）

津　曲　　明（人工軽量骨材）　小野田エンジニアリング㈱

(11) 短期専門家派遣（５７.３.４～５７.５.２８）

（氏　名）　（所　属）

青　木　哲　郎　　日本パルプセメント板工業組合

(12) 短期専門家派遣（５７.５.２８～５７.８.２９）

（氏　名）　（所　属）

上　田　純　孝　　小野田エンジニアリング㈱

4．研修員受入れ

(1) 昭和５３年度受入れ（５４.３.２９～４.１５）２名・準高級

MR. DARUBROTO　　窯業研究所長

MR. S. RITONGA　　建築研究所次長

(2) 昭和５４年度受入れ　３名・一般

MR. UTARYA　　建築研究所員

MR DOMIRI SURAMIHARDJA　　〃

（54.8.7～55.2.5）

MR RIZWAN LUFTI

（54.12.10～55.2.5）

(3) 昭和55年度受入れ　3名・一般

MR. SYARIF HIDAYAT　　建築研究員

MR. DUDUNG KUSMARA　　〃

（55.12.9～56.3.25）

MR. RASIMIN SUJONO　　セルローズ研究員

（55.12.13～56.3.25）

(4) 昭和56年度研修員受入れ　2名・準高級，4名一般

MR. KARMAN SOMAWIDJAJA　　建築研究所員

MR. RULAN B. TULAR　　〃　部長

（56.10.19～55.11.3）

MR. SUMARDI　　セルローズ研究所員

MR. GATOT IBNUSANTOSA　　〃

（57.1.7～57.4.4）

MR. M. NASROEN RIVAI　　建築研究所員

MR. PURWITO　　〃

（57.1.28～57.4.27）

5. 供与機材

(1) 昭和54年度（55.年3月～5月船積）

パルプセメントボード製造プラント

（金　額）　52,281千円

(2) 昭和55年度（56年9月船積）

（合計金額）　113,808千円

i　DBR向パルプセメントボード

製造プラント（リストD_1）　33,408千円

ii　IRDCI向パルプ製造プラント　80,400千円

(3) 昭和56年度（57年3月船積）

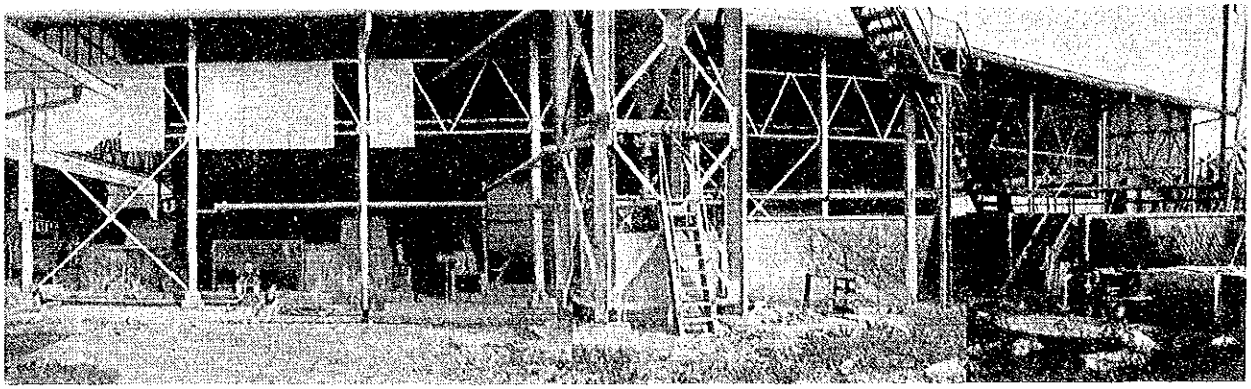
DBR向け人工軽量骨材プラント他　102,350千円

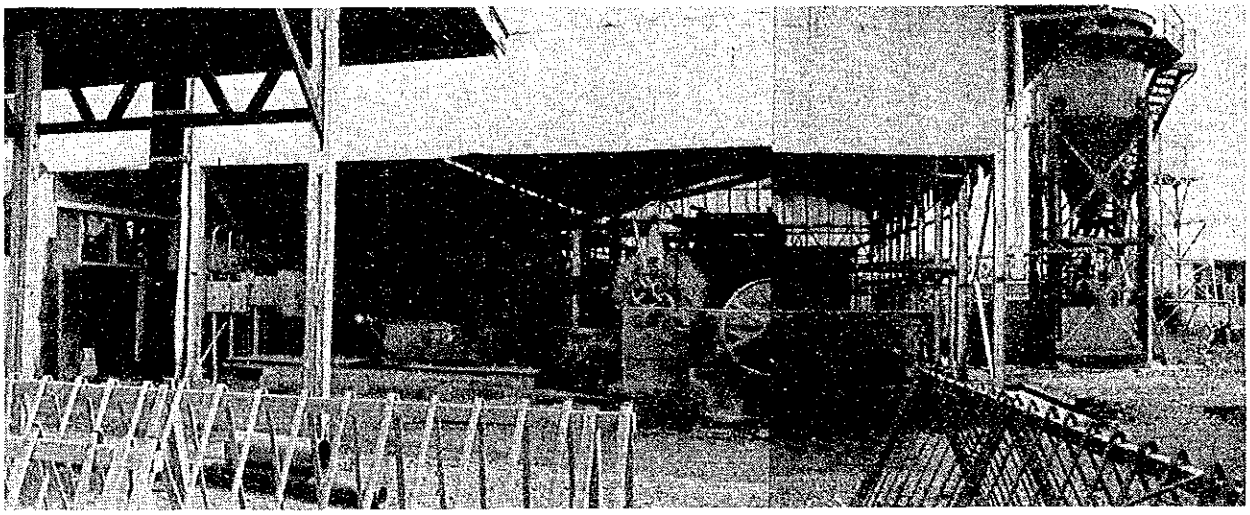
資　　料　　Ⅳ

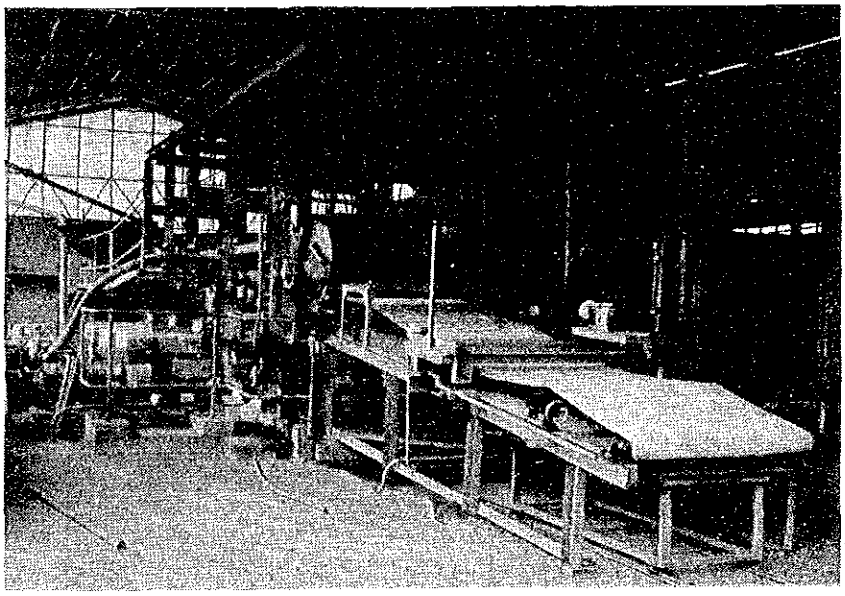
（関　連　写　真）

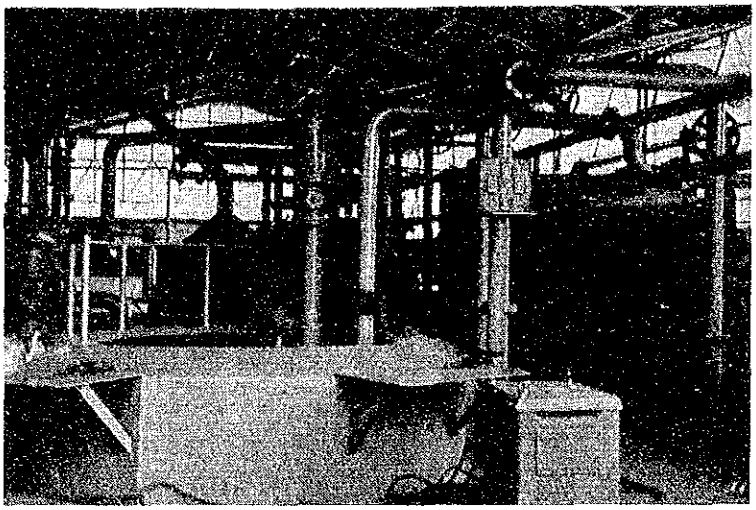
1. 建築研究所

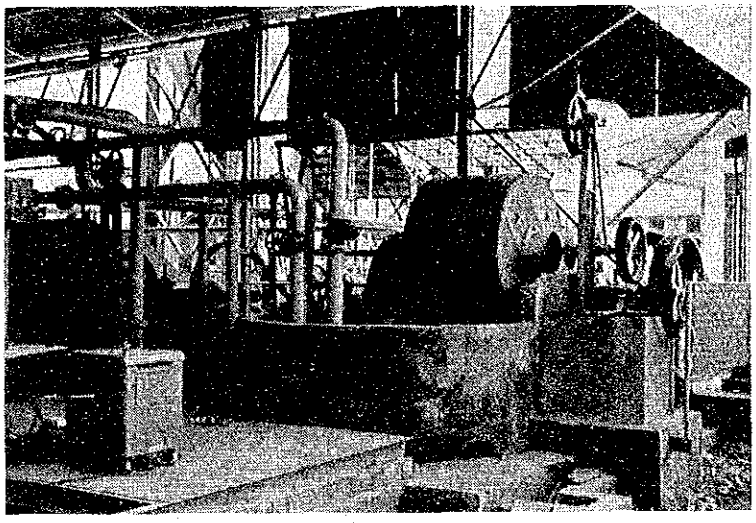
パルプ・セメントボード製造プラント

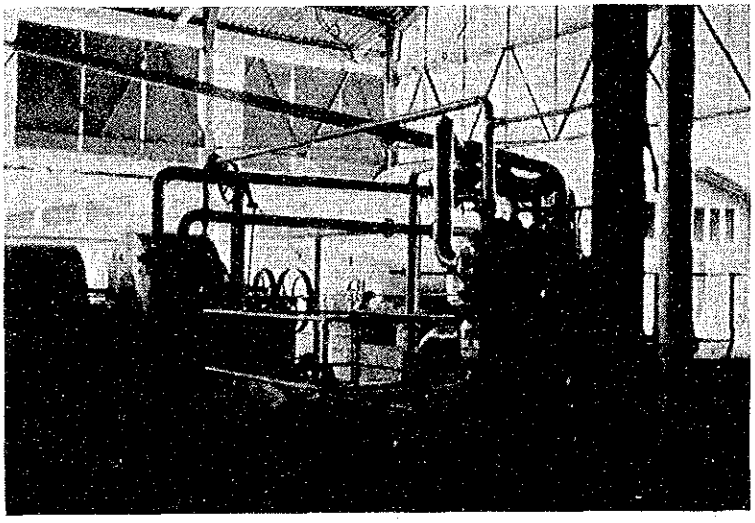


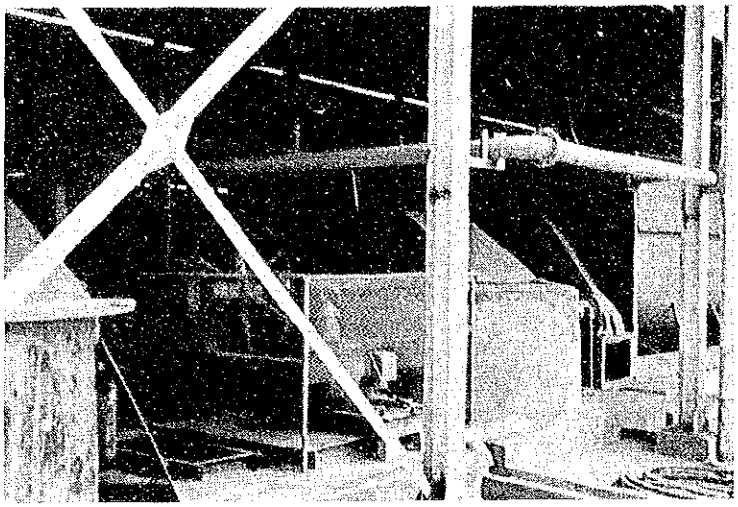


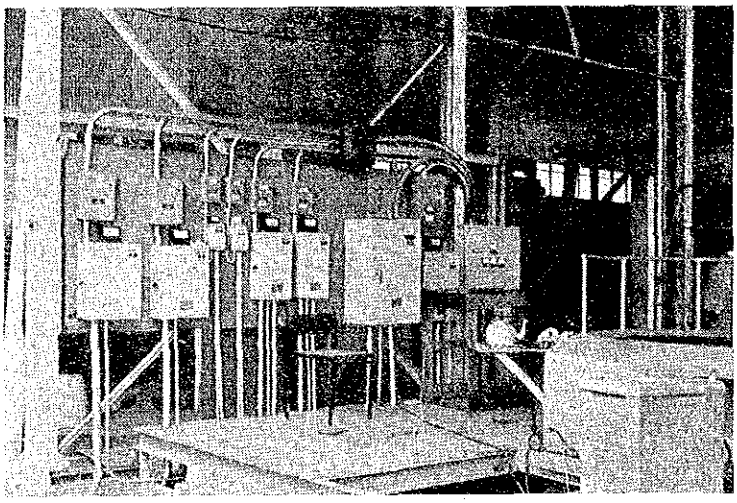






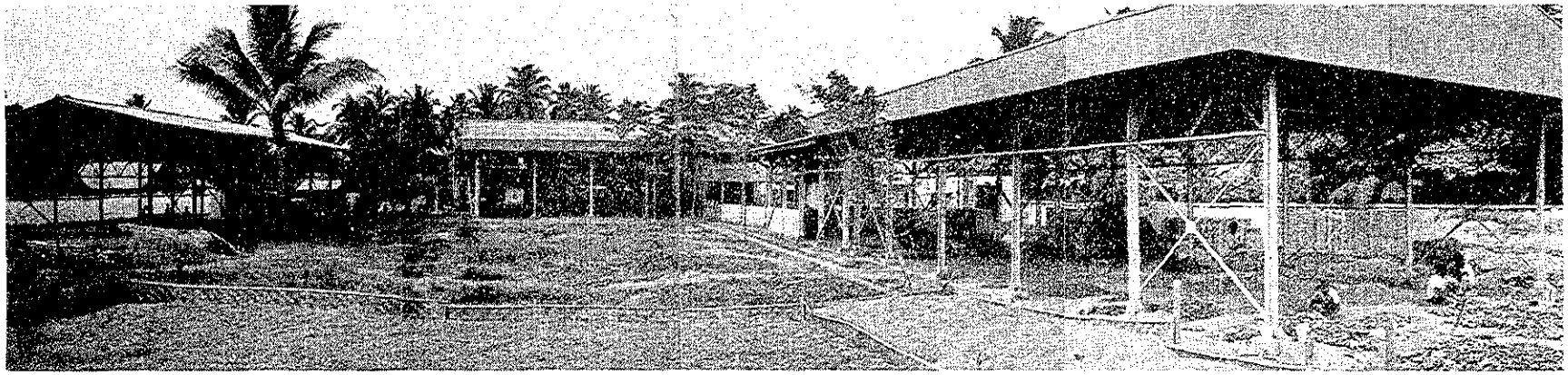


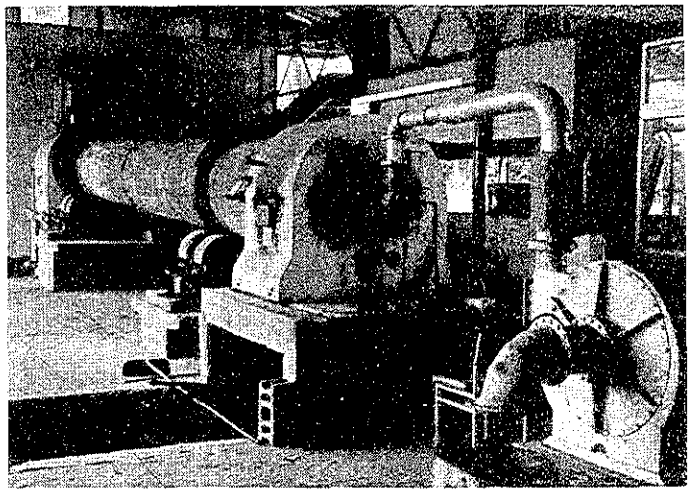




2. セルロース研究所
パルプ製造プラント建屋建設現場（５７年６月）

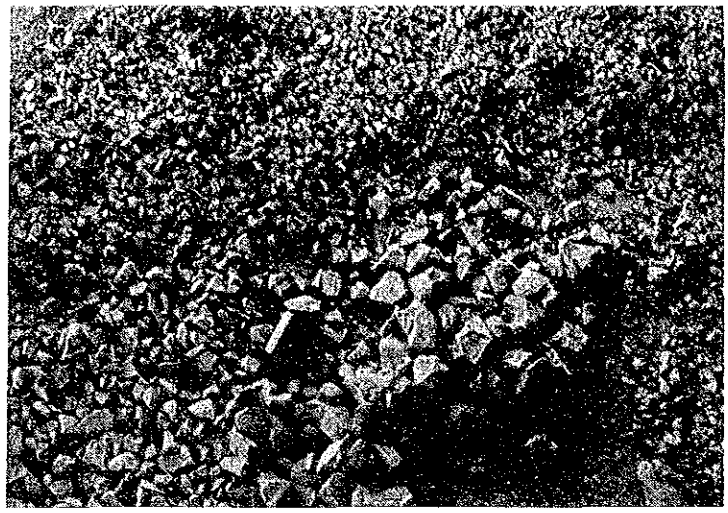
3. 建築研究所人工軽量骨材テストプラント





使用熱量＝1,100～1,200$^{10^3 Kcal}/_{m^3}$）
（メサライト≒600　〃　）
キルンサイズ＝1m^{ϕ}×10m^{L}
バンドン市内の住宅用として、2,500m^3製造の予定で、本年5月末までに500m^3製造済、現在平均10～11m^3／d最大12m^3／dのペースで、4組3交代連続運転中

原料（膨張性頁岩）



日本側供与機材用基礎工事