

フィリピン大気腐食(金属被覆)研究計画打合せ調査団報告書

フィリピン大気腐食 (金属被覆)研究 計画打合せ調査団報告書

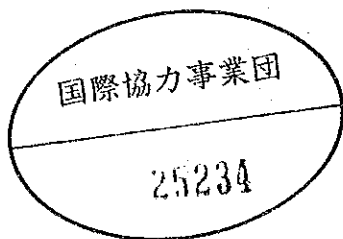
平成 2 年 12 月

国際協力事業団

平成二年十二月

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序 文

1983年5月のASEAN諸国歴訪の際、中曽根首相（当時）は、ASEAN諸国と科学技術を分かち合うという観点からの技術協力を提唱した。本構想に基づき、1983年11月から12月にかけて、東京で開催された高級事務レベル会合及び閣僚会議で協力内容が討議された。これを受けて、ASEAN科学技術委員会（COST）は、1984年3月にフィリピンで、1985年4月にはブルネイで会合し、バイオテクノロジー、マイクロエレクトロニクス、マテリアルサイエンスの3分野の協力に合意した。これらのうち、マテリアルサイエンス分野については、ASEAN側は、プロジェクト技術協力方式による我が国の協力を要請したため、1985年8月以降、ASEAN各国へ一連の調査団を派遣し、1987年11月までにASEAN各国とR/D署名を終了した。

ASEANのうちフィリピンは、この国のニーズから、大気中における金属材料の耐食性評価技術の研究を提唱し、特に金属被覆材料に関し、大気暴露試験を中心とする各種腐食試験、環境因子の測定、腐食した金属表面の評価方法及び防食技術の調査研究を実施している。

協力開始後3年が経過した当プロジェクトでは、研究手法の移転も順調に進んで、論文や技術報告書等の研究成果も出始めている。

本計画打合せ調査団は、協力期間の中間時期にあたるため、協力開始から現時点までの協力実績と研究活動実績を総括し、中間評価を行うとともに、実施上の問題点及び今後の計画についてフィリピン側と協議することを目的として、1990年12月2日から8日まで派遣されたものである。

この報告書は、本調査団の調査結果をとりまとめたものである。

終わりに、本調査の任にあたられた団員各位、及び本調査団派遣に際してご協力いただいた外務省、科学技術庁、在フィリピン日本大使館並びに内外関係機関の方々に対し、深甚の謝意を表する次第である。

平成2年12月

国際協力事業団

社会開発協力部

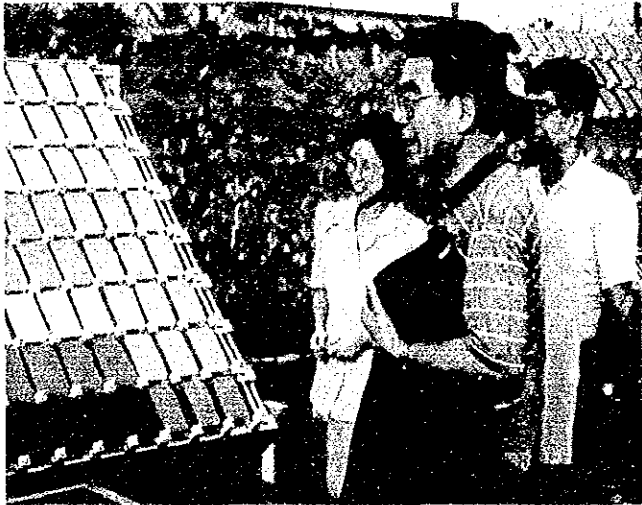
部長 小泉 純 作



▲ 阿部公使表敬



▲ フィリピン側との協議



▲ 暴震試験地視察



▲ ミニッツ署名

目 次

序 文
写 真

1. 計画打合せ調査団の派遣	1
1-1 調査団の構成	1
1-2 調査目的	1
1-3 調査日程	2
1-4 主要面談者	2
2. プロジェクトの実績	4
2-1 プロジェクト活動実績	4
2-2 プロジェクト投入実績	4
2-2-1 日本側投入実績	4
(1) 専門家派遣	4
(2) 研修員受入れ	4
(3) 機材供与	4
(4) ローカルコスト負担	4
2-2-2 フィリピン側投入実績	17
(1) プロジェクト実施体制	17
(2) カウンターパート配置・定着状況	17
(3) ローカルコスト	17
2-3 マルチラテラル活動	23
3. プロジェクトの中間評価	24
3-1 当初の研究・訓練計画と実績	24
3-2 項目別評価	27
3-2-1 技術移転状況	27
3-2-2 供与機材の活用状況	27
3-2-3 技術移転到達度及びその手法	37
3-2-4 カウンターパートの評価	37
3-3 フィリピン側の評価	42

4. 今後の日本側投入計画	43
4-1 専門家派遣	43
4-2 研修員受入れ	43
4-3 機材供与	43
4-4 ローカルコスト負担	47
4-5 マルチラテラル活動実施計画	49

5. ミニッツ	51
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附属資料

1. PROGRESS REPORT	59
2. PLANS AND ACTIVITIES FOR 1991	81
3. MULTILATERAL ACTIVITIES	86
4. THE RECORD OF DISCUSSIONS (1987年10月30日署名)	105

1. 計画打合せ調査団の派遣

1-1 調査団の構成

- (1) 氏名 新居 和嘉
担当業務 総括
現職和文 科学技術庁金属材料技術研究所長
現職英文 Director-General, National Research Institute for Metals, Science and Technology Agency
- (2) 氏名 小玉 俊明
担当業務 大気腐食研究
現職和文 科学技術庁金属材料技術研究所環境性能部第四研究室長
現職英文 Head, Forth Laboratory, Environmental Performance Division, National Research Institute for Metals, Science and Technology Agency
- (3) 氏名 大島 一男
担当業務 協力計画
現職和文 科学技術庁金属材料技術研究所企画課国際研究協力官
現職英文 Head of International Research Cooperation, National Research Institute for Metals, Science and Technology Agency
- (4) 氏名 服部 直人
担当業務 協力企画・業務調整
現職和文 国際協力事業団社会開発協力部社会開発協力第一課職員
現職英文 Staff, First Technical Cooperation Division, Social Development Cooperation Department, JICA

1-2 調査目的

本プロジェクトの協力期間は5年間であり、1990年は中間時期として研究協力が円滑に行われていなければならない。

技術協力の中間点として、効率的な運営・管理の実施状況、供与機材の活用状況、専門家派遣及び研修員の受入れ等の進捗状況を評価し、問題点を抽出して解決策を協議することを目的に調査を実施した。

1-3 調査日程

月 日 (曜)		内 容
12月2日(日)	22:10	マニラ着 (PR 769)
3日(月)	9:30	JICA事務所表敬
	13:30	日本大使館表敬
4日(火)	8:30	フィリピン側との協議
	10:00	日本人専門家との打合せ
	13:30	フィリピン側との協議
5日(水)	8:30	DOST長官表敬
	9:30	フィリピン側との協議
	11:00	ITDI視察
	13:00	ミニッツ案検討
6日(木)	8:00	ミニッツ署名
	13:00	大使館、JICA事務所への報告
7日(金)	8:30	資料整理
	14:50	団長 マニラ発 (JL 742)
8日(土)	14:50	団員3名 マニラ発 (JL 742)

1-4 主要面談者

Sec. Ceferino L. Follosco

Secretary of DOST

Dr. Ernesto S. Luis

Deputy Director, ITDI

Dr. Adolfo Jesus Gopez

Director, Phil. Council for Industry & Energy
Research & Development

Dr. Manolo Mena

Professor, Metallurgical Engineering Dept.,
University of the Philippines

Dr. Paul Abis

Director, MIRDC

Dr. Ricardo Lantican

Undersecretary for R & D, DOST & ASEAN
COST Chairman

Mr. Edwin T. Palma

Chief, Standard and Testing Division, ITDI

Mr. Severino T. Bernardo

Chief, Material Science Division, ITDI

Ms. Priscilla Mantaring

Manager, Mat' ls Testing & Evaluation Division, MIRDC

Ms. Cherry Corral

Chief, Chem. Department, MIRDC

Ms. Estrella Mamaril

Head, Inorganic Lab., , STD, ITDI

Ms. Aida H. Balagot

Head, Analytical Equipment Pool, ITDI

Ms. Concepcion Gayomali

Researcher, Water Lab., STD, ITDI

Ms. Cynthia Bernas

Ms. Margarita Torre

Ms. Cynthia Habana

Ms. Lilian de Guzman

Mr. Rolan Vera Cruz

Mr. Ramilo C. Layco

Ms. Jacqueline D. Padilla

Ms. Cherry Lane Causing

Ms. Aurora C. Vilorio

Ms. Ner Cruz

Project Staff, Philippine Side

阿部 信泰

在フィリピン日本大使館公使

柴田 裕憲

在フィリピン日本大使館三等書記官

宮本 守也

JICA フィリピン事務所長

大川 晴美

JICA フィリピン事務所所員

原田 俊一

チームリーダー

飯塚 昌

調整員

石井 明

長期専門家

小林 敏治

長期専門家

2. プロジェクトの実績

2-1 プロジェクト活動実績

当初計画と実績を表2-1-1と2-1-2に示す。実質的な活動は、R/D署名後10カ月遅れてスタートしたが、フィリピン側の努力もあって、現状ではほぼ計画どおりとなっている。ただし、政治・経済的に不安定要素の大きいフィリピンで、大気腐食研究が根付くか、今後も見守っていく必要がある。

2-2 プロジェクト投入実績

2-2-1 日本側投入実績

(1) 専門家派遣

専門家派遣実績を表2-2-1-1、2-2-1-2に示す。長期専門家は、一致団結して指導にあたっており、カウンターパートとの意思疎通もうまくいっている。また、石井専門家が1991年1月に帰国予定のため、後任に小林専門家が着任しており、引き継ぎが順調に行われていた。

(2) 研修員受入れ

研修員受入れ実績を表2-2-1-3と2-2-1-4に示す。本プロジェクトの場合は、カウンターパートの定着状況がよく、日本研修の成果を帰国後に活かしているようであった。日本研修経験者に研修の印象を尋ねたところ、日本側の受入れ機関は、仕事面を除いて、一般的に冷たい感じを受けるとのことであった。今後は、行事等により、相互理解を深める必要があろう。

(3) 機材供与

機材供与実績を表2-2-1-5及び2-2-1-6に示す。専門家携行機材を含めて、順調に供与されたが、一部の機器について、フィリピンの引取り業者の不慣れ等により、プロジェクトへの到着が遅れる場合があった。また、機器・部品内容明細表が不備の場合が散見された。

なお、活用状況については、3-2-2で述べる。

(4) ローカルコスト負担

平成2年度の実績を表2-2-1-7に示す。

表2-1-1 当初活動計画（マスタープラン）と活動の現状

活 動	予算年		平成元年度		2年度		3年度		4年度	
	昭和62年度	63年度	1.4	2.4	3.4	4.4	5.4			
研究・活動項目名										
1) 研究計画	62.10	63.4	1.4	2.4	3.4	4.4	5.4			
(当初計画)	=====	=====								
(変更計画)								
(実績)	=====	=====								
2) フィリピンにおける										
大気腐食調査										
(当初計画)										
(変更計画)										
(実績)										
3) 大気暴露試験										
(当初計画)										
(変更計画)										
(実績)										
4) 環境因子測定										
(当初計画)										
(変更計画)										
(実績)										
5) 促進腐食試験										
(当初計画)										
(変更計画)										
(実績)										
6) 試験結果評価解析										
(当初計画)										
(変更計画)										
(実績)										
7) ASEAN マルチ活動報										
告 及び										
(当初計画)										
(変更計画)										
(実績)										
8) プロジェクトの評価										
(当初計画)										
(変更計画)										
(実績)										
9) 技術普及活動										
(当初計画)										
(変更計画)										
(実績)										

表 2-1-2 協力実施計画 (Tentative Schedule for Implementation) と実績

投入	予算年		平成元年度		2年度		3年度		4年度	
	昭和62年度	63年度	1.4	2.4	3.4	4.4	5.4			
1) 日本側投入計画と実績	62.10	63.4	1.4	2.4	3.4	4.4	5.4			
(1) 調査団派遣	(当初計画)	(変更計画)	(実績)							
(2) 専門家派遣	(当初計画)	(変更計画)	(実績)							
調整員	(当初計画)	(変更計画)	(実績)							
専門家	(当初計画)	(変更計画)	(実績)							
(3) 研修員受入れ	(当初計画)	(変更計画)	(実績)							
(4) 機材供与	(当初計画)	(変更計画)	(実績)							
(5) ローカル・コスト負担	(当初計画)	(変更計画)	(実績)							
(6) 無償資金協力	(当初計画)	(変更計画)	(実績)							
2) 相手国側投入計画と実績										
(1) 土地・建物	(当初計画)	(変更計画)	(実績)							
(2) C/P	(当初計画)	(変更計画)	(実績)							
① 責任者 (所長)	(当初計画)	(変更計画)	(実績)							
② C/P (Dr. Lais ほか)	(当初計画)	(変更計画)	(実績)							
(3) ローカルコスト	(当初計画)	(変更計画)	(実績)							

表2-2-1-1 派遣専門家実績表

長期専門家：	木村忠雄	大気腐食	1988.07.20 - 1990.03.15
	石井明	大気腐食	1989.01.09 - 1991.01.08
	飯塚昌	調整員	1989.04.20 - 1991.04.19
	原田俊一	大気腐食	1990.03.07 - 1992.03.06
	小林敏治	大気腐食	1990.10.30 - 1992.10.29
短期専門家：	小玉俊明	腐食基礎	1988.10.03 - 1988.10.21
	山田修一	環境因子測定	1988.10.25 - 1988.12.23
	黒沢勝登志	暴露試験手法	1988.11.28 - 1988.12.23
	石原嘉孝	塗装防食技術	1989.02.28 - 1989.04.27
	佐藤修輔	万能試験機	1989.04.10 - 1989.04.21
	坂本勉	走査電子顕微鏡	1989.06.10 - 1989.07.12
	仁科健治	X線回析装置	1989.06.20 - 1989.07.05
	石渡純一	統計解析評価	1989.07.25 - 1989.08.23
	秋元一良	R-O水製造装置	1989.09.04 - 1989.09.10
	大石正幸	R-O前処理施設	1989.09.04 - 1989.09.10
	上岡泰雄	ブラストマシン	1989.09.10 - 1989.09.17
	川井得吉	環境因子測定	1989.10.11 - 1989.11.09
	菊川信治	腐食促進試験機	1989.11.26 - 1989.12.06
	鈴木英明	腐食促進試験機	1989.11.26 - 1989.12.06
	伊藤真二	機器分析	1990.01.08 - 1990.02.17
	藤田栄	大気腐食評価	1990.01.17 - 1990.02.15
	水流徹	金属被覆	1990.08.01 - 1990.08.21
	井沼次男	ポテンショスタット	1990.08.05 - 1990.08.11
	萬友昭	蛍光X線分析装置	1990.08.20 - 1990.09.01
	梨本雅美	ガラスビード作成装置	1990.09.17 - 1990.09.26
	中北郁雄	X線回析装置	1990.09.30 - 1990.10.06
	黒沢勝登志	暴露試験手法(共同研究)	1990.12.05 - 1990.12.19(予定)

表2-2-1-2 長期専門家（実績及び派遣計画）

分野	氏名	派遣期間	4	5	6	7	8	9	10	11	12	1	2	3	随伴家族	備考
チームリーダー／ 大気腐食	原田 俊一	H.2.3.7-H.4.3.6														計画 実績
	飯塚 昌	H.1.4.20-H.3.4.19														
調整員	石井 明	H.1.1.9-H.3.1.8														妻
大気腐食	小林 敏治	H.2.10.30-H.4.10.29														妻

表 2-2-1-3 カウンターパート研修受入れ者リスト

日本研修

Dr. Ernesto S. Luis	ITDI, 比側チームリーダー	1988.07.24-1988.09.09	腐食研究動向調査
Ms. Corazon Quintia	ITDI, カウンターパート	- do. -	
Ms. Priscila Mantaring	MIRDC, 共同研究者	- do. -	
Ms. Aurora Villaflor	ITDI, カウンターパート	1988.10.17-1988.12.16	機器分析
Ms. Margarita Torre	ITDI, カウンターパート	1989.01.09-1989.07.07	腐食モニタリング
Ms. Cynthia V. Bernas	ITDI, カウンターパート	1989.02.16-1989.05.16	電気化学
Ms. Cynthia Habana	ITDI, カウンターパート	1989.06.13-1990.06.12	塗膜下腐食
Ms. Estrella Mamarill	ITDI, カウンターパート	1989.09.11-1989.12.10	促進腐食試験
Ms. Conception Gayomali	ITDI, カウンターパート	- do. -	機器分析
Ms. Ner Abesamis Cruz	ITDI, カウンターパート	1990.05.29-1990.11.29	塗膜下腐食
Ms. Aurora Sadang Vilorio	ITDI, カウンターパート	- do. -	腐食生成物同定
Ms. Rosario dela Rosa Corral	MIRDC, 共同研究者	- do. -	界面分析

第三国提供日本研修

Ms. Josefina R. Celorico	ITDI, MSD, ファインセラミックス	1990.	マレーシア枠提供分
Ms. Araceli J. Magsino	ITDI, MSD, 高分子材料	1990.	インドネシア枠提供分

表2-2-1-4 平成2年度研修員受入れ実績

分野	氏名	受入れ期間	4	5	6	7	8	9	10	11	12	1	2	3	受入れ機関
塗膜下腐食	C. Habana	H.1.6.13-H.2.6.12													金材技研
塗膜下腐食(2)	N. Cruz	H.2.5.29-H.2.11.29													金材技研
機器分析法	A. Viloria	H.2.5.29-H.2.11.29													金材技研
マイクロアナリシス	R. Corral	H.2.5.29-H.2.11.29													金材技研

表2-2-1-5 機材供与実績 (1)昭和62・63年度供与実績

項 目	金 額 (円)
昭和62・63年度供与実績	
1) 分析機器	65,158,000
SEM及び空調設備	(25,135,000)
X線回折装置	(15,999,100)
FT-IR	(14,247,000)
イオンクロマトグラフ	(2,880,000)
ガスクロマトグラフ	(3,930,000)
超純水製造装置その他	(2,966,900)
2) 環境測定機器	6,544,700
全天日射計その他	(6,544,700)
3) 光学・オーディオ機器	4,172,220
金属顕微鏡	(2,281,520)
顕微鏡・カメラその他	(1,890,700)
4) 試験・測定機器	42,461,600
暴露台	(5,830,000)
塩乾湿複合腐食試験機	(5,480,000)
ウエザーメータ	(9,410,000)
逆浸透純水製造装置	(3,606,500)
万能試験機	(5,570,000)
電気化学測定装置	(6,500,000)
表面粗さ計その他	(6,065,100)
5) 試験片調製機器	19,345,620
ブラストマシン	(3,931,000)
ウルトラミクロトーム	(5,837,000)
塗装設備一式	(4,681,850)
切断・研磨装置その他	(4,895,770)
6) 理科学機器	1,686,700
熱風乾燥機その他	(1,686,700)
7) 事務機器	1,506,000
パソコン	(1,506,000)
8) その他機器	453,000
ダウントランスその他	(453,000)
合 計	141,327,840

(2) 平成元年度供与実績

項 目	計 画 金 額	実 績 金 額
平成元年度供与実績		
1) 分析機器		
蛍光X線分析装置	13,000,000	10,969,500
ガラスビード作製装置	4,000,000	6,041,700
原子吸光分析装置	6,000,000	4,562,900
2) 環境測定装置		
積算光量計	2,000,000	2,928,000
3) 試験測定機器		
渦電流式膜厚計	800,000	257,800
電子上皿天秤	150,000	139,300
万能試験機アクセサリ	1,500,000	2,103,000
ウエザーメータ追加	3,699,000	4,494,900
4) 試験片調製装置		
試験片打ち抜き装置	2,500,000	567,000
トリクレン脱脂装置	400,000	510,400
熱風乾燥機	300,000	446,200
ウルトラミクロトーム追加	3,033,000	3,093,000
ブラストマシン追加	720,000	1,101,200
5) 理科学機器		
熱風循環恒温器	196,000	196,900
冷蔵庫	300,000	198,000
大型デシゲータほか	139,000	122,700
6) その他機器		
緊急発電装置	3,000,000	2,938,000
電圧安定装置	500,000	172,000
自動車	4,000,000	2,279,480
合 計	81,049,000	43,121,980

(3) 平成2年度実績

項 目	計 画 金 額	実 績 金 額
平成2年度計画及び実績		
1. 分析機器		
1) エネルギー分散形X線分析装置	24,800,000	
2) イオンクロマト	8,800,000	
3) 原子吸光アクセサリ	1,000,000	変更
4) 分光光度計	1,000,000	変更
5) 光沢計	300,000	変更
2. 環境測定装置		
1) 温湿度計・変換器	500,000	携行機材
3. 試験測定機器		
1) ガス腐食試験機	16,500,000	変更
2) デュパネル光コントロールウエザーメータ	7,200,000	
4. その他		
1) 自動電圧調整装置	3,300,000	
2) オートデシケータ 2	260,000	携行機材
3) オシロスコープ	150,000	携行機材
合 計	44,100,000	

表2-2-1-6 携行機材購送実績

専門家氏名	分野	機材品目・数量		金額 (円)	荷受地到着日	引き取り日	B/L No. (AIRWAY BILL)	検収書発出日	備考
		購入輸送分	輸送のみ分						
木村 忠雄	大気腐食	二酸化鉛用シリングほか		(1,586,060)	'88.08.	'88.09.12	FT 71		
木村 忠雄	大気腐食	冷延鋼板ほか試験材							
小玉 俊明	腐食基礎研究	ハイブリットマルチメ ーターほか		283,600	'88.08.17	'88.08.25	YMA-19	'88.09.23	
山田 修一	環境因子分析	サンプリング機器		203,600	'88.10.27	'88.11.21	079-0 702 053-2	'88.12.28	
木村 忠雄	大気腐食	書籍(洋書)		86,090	'88.11.08	'88.11.15	079-0 702 060-2	'88.11.25	
山田 修一	環境因子分析	分析器具		479,520	'88.11.13	'88.11.21	079-0 705 518-2	'88.12.28	
木村 忠雄	大気腐食	書籍		278,580	'88.12.10	'88.12.19	079-0 660 275-0	'88.12.28	
黒沢勝登志	暴露試験	イオクロマト(HIC- 6A)部品ほか		222,310					
木村 忠雄	大気腐食	書籍(洋書)		192,300					
木村 忠雄	大気腐食	フルイほか		65,500	'89.01.22	'89.02.01	079-0 809 705-1		
木村 忠雄	大気腐食	3/8ビニルパイプ 10m巻ほか		178,100	'89.01.09	'89.01.13	023-NRT-2727 0784		
木村 忠雄	大気腐食	標準液ほか		58,000	'89.02.11	'89.02.27	079-0 809 709-5	'89.03.21	
石原 嘉孝	塗装技術	ポリカップほか		1,360,040	'89.02.23	'89.03.16	KKLUI 113101819	'89.03.21	
石原・石井	塗装・腐食	両面サイドブラスト板 PbO ₂		1,213,660	'89.02.23	'89.03.02	023-NET-2695 6124	'89.03.21	
石井 明	大気腐食	書籍		54,880	('89.01.20)				
石井 明	大気腐食	ビデオ機器、ケーブル ほか		1,073,200	'89.03.31	'89.04.14	079-0 705 540-3		
木村 忠雄	大気腐食	書籍		86,400	'89.03.18	'89.04.12	079-0 809 716-5		
プロジェクト サイト宛て	日本語テキスト		129,150	'89.04.28	'89.05.16	131-5 291 508-5		
飯塚 昌	調整業務	事務機器ほか		1,094,990	'89.05.20	'89.05.29	023-2803 7844		
飯塚 昌	調整業務	書籍		76,430	'89.05.20	'89.05.29	023-2346 0485		

専門氏名	分野	機材品目・数量		金額(円)	荷受地国	引き取り日	B/L No (AIRWAY BILL)	検収書発出日	備考
		購入輸送分	輸送のみ分						
木村 忠雄	大気腐食		フェンス	384,000	'89.05.30	'89.07.05	KKLU 11310 5418	'89.08.11	
坂本 勉	SEM 据付指導	カラー校正板		439,200	'89.07.05	'89.07.12	079-0 705 558-0	'89.07.12	
石渡 淳一	統計解析評価	PbO ₂ (二酸化鉛)		261,000	'89.07.27	'89.08.03	023-3 007 508-0	'89.08.03	
石井 明	大気腐食	ポリエチレン・ボトル はか		1,494,950	'89.07.25	'89.08.15	KKLU 11310 7533	'89.08.15	
秋元 一良	R-O 据付指導	軟水化装置 (R-O 関 係)		980,000	'89.07.20	'89.08.02	023-2 695 635-5	'89.08.02	
木村 忠雄	大気腐食	書籍 (英書 5 冊)		43,362	'89.08.10	'89.08.17	023-3 007 557-0	'89.08.17	
山田 修一	環状因子分析	書籍 (英書 1 冊)		12,080	'89.08.17	'89.08.18	JICA-Post	
大石 正幸	逆浸透純水製造 装置・配管		フロッピーディスクほか	20,000	'89.09.02	'89.09.14	079-0 912 929-3	'89.09.14	オリエ ンテッ クから
鈴木 英明	ウェザーメーター-CC CT 据付、調整指導	PT NIPPLE ほか		70,830	'89.11.14	'89.11.23	079-0 498 939-0	'89.11.27	
伊藤 真二	FTIR, SEM, X- RD 機器分析	AGATE MORTAR ほか (メノウ乳鉢)		269,850	'90.01.06	'90.01.16	023-3 022 632-5	'90.01.16	
木村 忠雄	大気腐食	DUST FALL COLLECTOR はか		790,699	'90.03.06	'90.04.11	KKLU 11311 5523	'90.04.27	
原田 俊一	大気腐食	HYGROTHERMOGR APH ほか (温度計、マ ップル炉)		2,809,898	'90.05.24	'90.06.05	023-2 695 653-2	'90.06.06	切断機 が混送
原田 俊一	大気腐食	書籍 (和書のみ) 13 冊		85,718	'90.06.07	'90.06.25	079-0 703 361-1	'90.06.26	
飯塚 昌	業務調整	デンケーター用棚板ほか		903,479	'90.07.19	'90.07.30	023-0 921 341-1	'90.07.31	
水流 徹	金属被覆	マイクロピペットほか (同時携行)		441,230	'90.08.01	'90.08.06	同時携行	'90.08.06	
井沼 次男	ポテンシヨスタット	オシロスコープ、ほか (同時携行)		943,730	'90.08.05	'90.08.06	同時携行	'90.10.22	invoice 追送
石井・飯塚	大気腐食ほか	エポフオームほか		2,288,888	'90.08.01	'90.08.22	023-3 007 544-1	'90.08.23	グラス カバー 3 個送
石井 明	大気腐食	デンケーター (保険求 償品)		95,062	'90.08.01	'90.08.22	079-0 913 006-3	'90.08.23	
原田 俊一	大気腐食	書籍 (英書のみ) 5 冊		175,803	'90.08.23	'90.08.30	079-0 913 011-1	'90.08.30	1 Oct. 90 追送
梨本 雅美	ガラスビード作 成	電気科学天秤ほか		263,474	'90.09.18	'90.09.18	同時携行	'90.09.18	済み
中北 郁雄	X 線回折装置	オートデンケーターほか		386,682	'90.10.05	'90.10.24	079-0 913 423-0	'90.11.23	

表2-2-1-7 平成2年度ローカルコスト負担実績

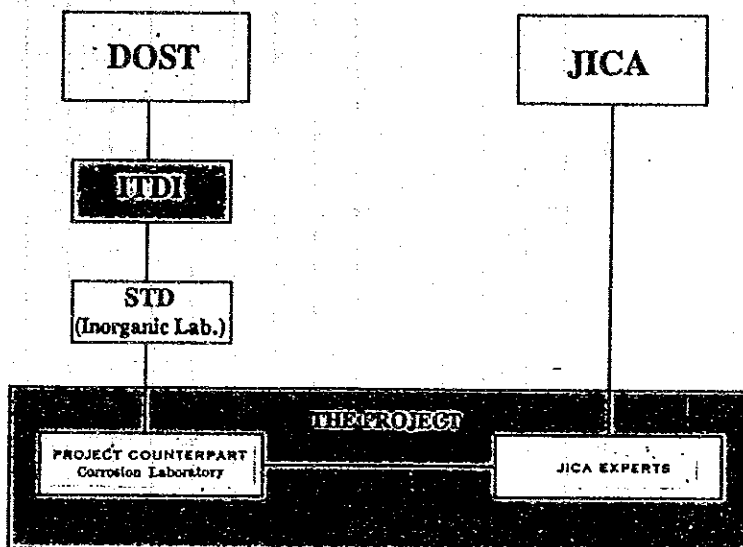
項目(予算科目)	内 容	申請額	承認額	実績額
① 現地業務費定額分				164,488.90
② 視聴覚教材作成費	ビデオ教材作成依頼 (PHRDC)	282,000.00 (¥1,993,458)	277,000.00 (¥1,959,000)	
③ 技術交換費	ASEAN 科技協関連プロジェクトほか技術交換	(¥2,136,988)	180,490.00 (¥1,983,040)	精算中
④ 中堅技術者養成対策費				
a. 共同研究	ASEAN 科技協マルチ活動参加者3名予定	868,044.00	868,044.00	
b. 域内トレーニング	ASEAN 科技協マルチ活動参加者5名予定	414,898.00		
c. セミナー・ワークショップ	ASEAN 科技協マルチ活動参加者15名予定	846,669.00		

2-2-2 フィリピン側投入実績

(1) プロジェクト実施体制

本プロジェクトの実施機関は、工業技術開発研究所 (ITDI) であり、科学技術省 (DOST) に属しているが、本プロジェクトの運営に係る実質的な責任者はITDI 副所長の Dr. Luis である。以下に組織図を示す。

PROJECT ORGANIZATIONAL CHART



DOST Department of Science and Technology
JICA Japan International Cooperation Agency
ITDI Industrial Technology Development Institute
STD Standards and Testing Division

(2) カウンターパート配置・定着状況

カウンターパートの配置状況を表 2-2-2-1 に示す。Dr. Luis を中心としたフィリピン側の努力もあり、質・量ともに十分なカウンターパートが配置されており、定着率も高い。これはフィリピンの経済状態が悪く、再雇用の機会が少ないためであろう。またカウンターパートのメンバーには女性が多く、このことも再雇用の機会が少ない理由の一つである。ただ、女性の場合、結婚・出産による休職が懸念される。

(3) ローカルコスト

ITDI 全体の予算割当ての推移を表 2-2-2-2 に、また、当プロジェクトへの割当て予算を表 2-2-2-3 に示す。

表2-2-2-1 カウンターパーバート配置計画・実績

分野/氏名	日本派遣計画・実績	配置年月日	4	5	6	7	8	9	10	11	12	1	2	3	備考
プロジェクトリーダー															予定 実績 日本研修
Dr. E. S. Luis	S. 63. 7. 24 - S. 63. 8. 9	S. 62. 10. 30													
大気腐食															
Ms. A. Balagot		H. 1. 5													
Ms. C. Bernas	H. 1. 2. 16 - H. 1. 5. 16	S. 63. 7													
Ms. M. Torre	H. 1. 1. 9 - H. 1. 7. 7	S. 63. 7													
Ms. C. Habana	H. 1. 6. 13 - H. 2. 6. 12	S. 63. 8													
Ms. A. Viloria	H. 2. 5. 29 - H. 2. 11. 29	S. 63. 11													
Ms. N. Cruz	H. 2. 5. 29 - H. 2. 11. 29	H. 1. 1													
Ms. R. Principe		H. 1. 2													
Ms. L. de Guzman		S. 63. 10													
Mr. R. V. Cruz		H. 1. 10													
Ms. E. Mamaril	H. 1. 9. 11 - H. 1. 12. 10	S. 63. 7													
Ms. C. Gayomali	H. 1. 9. 11 - H. 1. 12. 10	S. 63. 10													
Ms. J. Hernandez		S. 63. 10													
Ms. A. Villafior	S. 63. 10. 17 - 12. 16	S. 63. 10													
Ms. C. Villanueva	S. 63. 7. 23 - S. 63. 8. 9	S. 63. 7													
Ms. C. Inocencio		H. 1. 1													
共同研究者															
Ms. P. Mantering	S. 63. 7. 24 - S. 63. 8. 9	S. 62. 10. 30													
Ms. R. R. Corral	H. 2. 5. 29 - H. 2. 11. 29	H. 1. 10													

オーストラリア留学

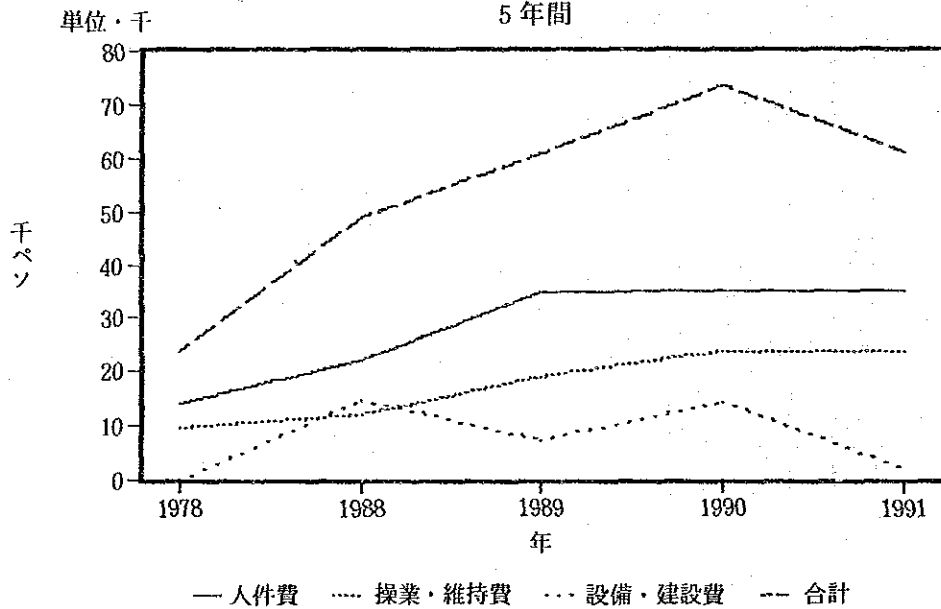
フィリピン側の本プロジェクトへの予算額は、十分な額とはいえないが、これはフィリピン側の努力不足というよりは、フィリピン国全体の経済停滞によるところが大きい。このことは、ITDI 全体の予算額が、この3年間、ほとんど横ばいとなっていることから明らかである。

したがって、プロジェクトを円滑に実施していくためには、今後も日本側の相応の負担が必要と考えられる。

表 2-2-2-2 ITDI の予算割当ての推移 (千ペソ)

	1978	1988	1989	1990	1991
人件費	14,137	22,201	34,947	35,053	35,053
操業、維持費	9,648	12,095	19,322	23,968	23,968
設備費、建築費		14,697	7,500	14,386	2,000
合 計	23,785	48,993	60,869	73,407	61,021

ITDI の年間予算推移
5 年間



ALLOTMENT OF COUNTERPART FUND

Japan - ASEAN Technical Cooperation Project
on Atmospheric Corrosion - Metallic Coatings*CY 1989

I. Maintenance and Operating Expenses	Philippine Peso (P)
200-04 Repair and Maintenance of Government Facilities	300,000
200-06 Other Services*	120,000
200-07 Supplies and Materials	260,000
200-14 Water, Illumination and Power	85,000
200-17 Maintenance of Motor Vehicles Used for official Travel	25,000
200-19 Representation Expenses	<u>60,000</u>
Total MOE	850,000
II. Capital Outlays	
300-33 Equipment Outlays	150,000
Airconditioning Unit Rooms 214, 219 and 124	45,000
Conference/Seminar Room	35,000
Intercom System (12 units)	20,000
Audio System for Conference/ Seminar Room	30,000
Laboratory Chairs and Fixtures	<u>20,000</u>
Total CY 1989 Budget	<u>1,000,000</u>

* The amount released for other services shall be used for the repair and maintenance of equipment.

Note: Local counterpart budget for the project for 1991 will be integrated with the STD budget allocation.

Counterpart Fund : Actual expenditures / balances for the project as of 20 November 1990

SUMMARY

ITEM	Allotment	Expenditure	Balance
		(Philippine Peso, P)	
200-04 Repair and Maintenance of Government Facilities	300,000	130,732.20	169,267.80
200-06 Other Services	120,000	115,460.32	4,539.68
200-07 Supplies and Materials	260,000	169,274.24	90,725.76
200-14 Water, Illumination and Power	85,000	64,621.00	20,379.00
200-17 Maintenance of Motor Vehicle	25,000	5,144.05	19,855.95
200-19 Representation Expenses	60,000	44,013.81	15,986.19
300-33 Equipment Outlay	150,000	79,900.00	70,100.00
TOTAL	1,000,000	609,145.62	390,854.38

2-3 マルチラテラル活動

フィリピンが主催するマルチラテラル活動が、今年度から本格化しており、本調査時にも、タイとインドネシアの研究者が参加し、材料の腐食加速試験をテーマとした共同研究が行われていた。

原田リーダーによれば、共同研究を通じ、現地研究員の間には研究意欲が鼓舞され、供与機材である分析装置の使用頻度も著しく高くなったという。マルチラテラル活動は、現地研究員に新たな刺激を与えたものとして評価してよいと考えられる。同時に域内での人的交流に役立っている。

また、他のASEAN諸国が主催するマルチラテラル活動にも、本プロジェクトから積極的に参加している。参加者リストは以下のとおりである。

Dr. Ernesto S. Luis	ITDI	比側チームリーダー	1989.06.14-1989.06.16	シンガポール域内セミナーI
Ms. Aida H. Balagot	ITDI	カウンターパート	- do. -	
Ms. Aurora Viloría	ITDI	カウンターパート	- do. -	
Ms. Cynthia V. Bernas	ITDI	カウンターパート	1990.02.01-1990.02.28	シンガポール域内研修I
Ms. Lilian de Guzman	ITDI	カウンターパート	1990.03.05-1990.03.17	ブルネイ域内研修I
Mr. Carlos Chua Doria	ITDI	MSD	- do. -	
Ms. Jose L. Gamboa	ITDI	STD (Const. & Eng'g.)	1990.08.06-1990.08.08	ブルネイ域内セミナーI
Ms. Erlinda R. Alinea	ITDI	STD (Metal & Alloys)	- do. -	
Mr. Manuel M. Navarro	ITDI	MSD (Building Mat'l's)	- do. -	
Mr. Rolan Vera Cruz	ITDI	カウンターパート	1990.09.17-1990.09.21	シンガポール域内セミナーII
Ms. Margarita Torre	ITDI	カウンターパート	- do. -	
Ms. Lilian de Guzman	ITDI	カウンターパート	- do. -	
Dr. Ernesto S. Luis	ITDI	比側チームリーダー	1990.10.17-1990.10.19	タイ域内セミナーI
Ms. Cynthia Habana	ITDI	カウンターパート	- do. -	
Ms. Chona I. Dela Pena	ITDI	STD (Paint)	- do. -	
Ms. Gloria U. Gopez	ITDI	MSD (R & D Polymer)	1990.11.03-1990.11.30	インドネシアトレーニングI
Ms. Natividad R. Villostas	ITDI	MSD (Ceramics)	1990.11.18-1990.12.15	マレーシアトレーニングI
Ms. Elinor L. Bedia	ITDI	MSD (Polymer)	1990.12.01-1991.02.28	インドネシア共同研究I
Mr. Aurelio L. Taboral	ITDI	STD (Polymer)	1991.03.06-1991.03.09	インドネシアシンポジウムI
Ms. Araceli J. Magsino	ITDI	MSD (Polymer)	- do. -	
Mr. Severino T. Bernardo	ITDI	MSD (R & D Mat'l's)	- do. -	

3. プロジェクトの中間評価

3-1 当初研究・訓練計画と実績

分野別の研究・訓練の進捗状況については、表3-1-1及び3-1-2にあるように、若干の遅れはあるものの、ほぼ順調に進んでいる。これは、日本人専門家、フィリピン人カウンターパート及び日本国内の支援機関の努力によるものである。

表3-1-1 C/P研修、訓練等計画と実績（マスタープラン）

科 目	目 的	標 準	S.62	S.63	H.1	H.2	H.3	H.4	H.5	備 考
1. 腐食科学	1) 腐食防食に関する基礎的知識の習得 2) 大気中における金属の腐食現象の理論と実 際を理解 3) 気象及び環境汚染因子と腐食の関係を理解 4) 水中はか代表的環境下に於ける腐食の理解	1) 腐食防食に関する基礎的知識の習得 2) 大気中における腐食技術の理解 3) 気象及び環境汚染因子と腐食の関係を理解 4) 水中はか代表的環境下に於ける腐食の理解 5) 各種耐食材料の特性及び応用技術の理解 6) 耐食金属、金属被覆鋼板、塗装鋼板等 7) 代表的表面処理技術の理解								
2. 防食技術 及び 耐食材料	1) 大気中に於ける防食技術の理解 2) 水中その他環境下に於ける防食技術の理解 3) 各種耐食材料の特性及び応用技術の理解 4) 耐食金属、金属被覆鋼板、塗装鋼板等 5) 代表的表面処理技術の理解	1) 大気中に於ける防食技術の理解 2) 水中その他環境下に於ける防食技術の理解 3) 各種耐食材料の特性及び応用技術の理解 4) 耐食金属、金属被覆鋼板、塗装鋼板等 5) 代表的表面処理技術の理解								
3. 腐食試験法	1) 大気暴露試験法の習得 2) 各種促進劣化試験法の習得 3) 試験片調製法の習得	1) 大気暴露試験法の習得 2) 各種促進劣化試験法の習得 3) 試験片調製法の習得								
4. 評価試験法	1) 腐食外観評価法の習得 2) 全面腐食、局部腐食 3) 腐食減量、腐食速度測定法の習得 4) 腐食生成物分析法の習得 5) SEM、XRD その他機器分析法など 6) 電気化学的測定法の習得 7) 表面、皮膜物性測定法その他の習得 8) 試験結果解析技術の習得	1) 腐食外観評価法の習得 2) 全面腐食、局部腐食 3) 腐食減量、腐食速度測定法の習得 4) 腐食生成物分析法の習得 5) SEM、XRD その他機器分析法など 6) 電気化学的測定法の習得 7) 表面、皮膜物性測定法その他の習得 8) 試験結果解析技術の習得								
5. 環境因子測定法	1) 気象因子測定及び解析法の習得 2) 大気汚染因子のサンプリング及び分析法の 習得	1) 気象因子測定及び解析法の習得 2) 大気汚染因子のサンプリング及び分析法の 習得								
6. データ解析法	1) 統計解析手法の理解 2) 分散分析、相関分析手法の習得 3) 実験計画法の習得	1) 統計解析手法の理解 2) 分散分析、相関分析手法の習得 3) 実験計画法の習得								

<計画> : ; <変更/確定> : ; <実績> : ;

表3-1-2 C/P研修、訓練計画と実績（今四半期）

指導科目	対象C/P	内容及び目標	指導方法	6月	7月	8月	9月	10月	成果、備考
1. 腐食科学	全 員	1) 大気腐食の形態	講 義			—			概ね理解
2. 防食技術及び耐食材料	全 員	1) 表面処理鋼板の概要	講 義			—			概ね理解
3. 腐食試験法	全 員	1) 大気暴露試験、試験片調製 2) 暴露試験法マニユアル作成 3) ウエザーメータ、塩水噴霧試験法	実 習 実 習 実 習						ビデオ化を予定 連続試験の検討
4. 評価試験法	全 員	1) 暴露試験片評価法 2) 機器分析法の応用技術	実 習 実 習						実習が必要
5. 環境因子測定法	全 員	1) 汚染因子測定マニユアル作成 2) 気象因子測定法	実 習						ビデオ化を検討
6. データ解析手法	全 員		”						連続測定を開始 実習が必要
参 考 事 項	短期専門家 水流 徹 井沼 次男 萬 友昭 梨本 雅美	金属被覆 (1., 2., 3., 4) ポテンショスタット(4) 蛍光X線装置(4) ガラスビード作成装置(4)	講義、実習 実習 実習 実習			— — —			基礎概念習得 OK(Habana, Cruz) OK(Principe ほか) OK(”)
	C/P 日 本 研 修 C. Habana N. Cruz A. Viloria	塗膜下腐食1 (1., 3., 4.) 塗膜下腐食2 (1., 3., 4.) 機器分析技術 (1., 2., 4.)	—						成果を伸ばすべく 指導する

*指導方法：講義、実習、デモンストレーション、日本派遣、その他
 <確定計画>：..... ; <実績>：.....

3-2 項目別評価

3-2-1 技術移転状況

当プロジェクト開始以来、一部を除き、同じ研究員が継続して研究に従事しており、同グループがフィリピンにおける腐食研究の核として成長しつつある。最近では優秀な男性職員もグループに加わり、将来が期待される。暴露試験、環境分析、暴露試験後の試片の劣化度評価等はグループ内で議論し、研究計画を立てて独自に進めている。

3-2-2 供与機材の活用状況

電子顕微鏡 (SEM)、X線回折装置 (XRD)、フーリエ変換赤外分光分析装置 (FTIR) 等の基本的な物理化学分析装置は順調に運転されている。暴露試験片が順次採集され、またグループ内に、これら装置の操作員が成長すれば、一層の利用増加が期待される。

一般的にみて当研究所には女性が多く、かつ化学出身者が多いためか、化学分析装置 (元素分析装置) は頻度が高く利用されているように見受けられた。これに対し、物理分析装置 (状態分析装置) への理解度は、いまひとつ問題があるように思われるとともに、専門家による指導に対する要請も高かった。

フィリピンでは、これら分析器機を操作するにあたって電源及び水の安定供給という基盤整備の欠如が問題としてあげられる。重要な器機については個別にバックアップ電源を取り付けるようにする。コンピュータや電気化学計測装置のように、電源電圧の安定性、ノイズ除去が要求される場合には、安定化電源を個別に取り付けるといった対策が必要である。個別のバックアップ電源とは別に、平成元年度に大型の緊急発電機が購入され、停電時には、これら器機分析装置をバックアップする予定であった。発電機は納入済みであるが、これを収納する建屋を自助努力で建設するといったものの、未だに放置された状態にある。ITDI による予算獲得のための努力は評価できるものの、近年のフィリピン政府の財政状態を考慮すれば、実現は、いつになるか予測できない。基盤整備に近いものであるかもしれないが、ローカルコスト負担行為による財政援助が必要である。

本調査と同時期に開催されていたマルチラテラル・共同研究は、腐食加速試験をテーマとするものであり、塩乾湿複合サイクル試験機及びウエザーメータなどの水や塩水を常時スプレーして腐食加速を測る試験機が使用されていた。これらの機器の使用頻度は低かったのであるが、共同研究を機に、今後、使用の増加が見込まれる。ただし、これらの器機を利用するにあたっては、水が十分に供給されることが必要である。ITDI では構内の井戸から水を汲み上げ、所内にこれを供給していた。夜間はポンプ電源が落とされ、水供給は停止されていたため、加速試験の効率は極めて低い状態にある。ローカルコスト負担行為により、新規の井戸の掘削が必要である。

ITDI に供給される深井戸の水質は極めて硬質であり、溶解無機成分の高いものである。

化学実験に必要な純水製造には不適當である。当プロジェクトで供与した逆浸透装置は元来ウェザーメータ用のスプレー水用であるが、化学実験用の純水のための一次純水として利用されていた（化学実験用には、これを、さらに処理して高純水をつくる）。そして、この一次純水は全所に供給され利用されていた。

主要機材の活用状況を表 3-2-2 に示す。

表3-2-2 (1) 主要供与機材の使用状況

番号	主要機材・器具、型式	メーカー名	数量	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類(注)	備考
1	Thermometer Screen 600×600×600mm	Isuzu	4	1987	88/09/14		552,000	A	
2	Dust Fall Collector, № 8008-04	Sibata	4	1987	88/09/14		278,000	A	
3	Stereoscopic Microscope, SMZ-2T-1	Nikon	1	1987	88/09/14		259,000	A	
4	Reading Microscope, PRM-2	Pika	1	1987	88/09/14		170,000	A	
5	Scale magnifier, № 7	Honda	1	1987	88/09/14		7,700	A	
6	Camera, F3	Nikon	1	1987	88/09/14		381,000	A	
7	Epidiascope, EP6000	Elmo	1	1987	88/09/14		404,000	C	
8	Screen with Stand 150×150cm, ES-3	Elmo	1	1987	88/09/14		55,000	C	
9	Omnigraphic 252, Omnigraphic 252	Elmo	1	1987	88/09/14		135,000	A	
10	Synchronized Tape Recorder for Slide Projector, Slidecoder 801	Elmo	1	1987	88/09/14		98,000	A	
11	Ultrasonic Cleaner 250×150mm, DT-10	ADVANTEC	1	1987	88/09/14		110,000	A	
12	Electroplating Equipment	Honda	1	1987	88/09/14		387,500	D	
13	Thermo Regulator Rotating magnet system	ADVANTEC	2	1987	88/09/14		42,000	A	
14	Small Pump, CP-08	Honda	2	1987	88/09/14		21,000	A	
15	Hot Air Rapid Drying oven 0-250°C, MSF-12S	Isuzu	1	1987	88/09/14		195,700	A	
16	Hot Air Specimen Dryer, Buehler	Sankei	1	1987	88/09/14		278,100	A	
17	Electronic Analytical Balance, AEL-200	Shimadzu	1	1987	88/09/14		399,000	A	
18	Electronic Analytical Balance, EB-3200H	Shimadzu	1	1987	88/09/14		135,000	A	
19	PH meter, HM-10K	Toadenpa	1	1987	88/09/14		92,700	A	
20	Portable Conductivity Meter, CM-1K	Toadenpa	1	1987	88/09/14		79,300	A	
21	Spectrophotometer, UV-120-2	Shimadzu	1	1987	88/09/14		640,000	A	
22	Ion Chromatography, HIC-6A	Shimadzu	1	1987	88/09/14		2,880,000	A	

番号	主要機材・器具、型式	メーカー名	数量	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類	備考
23	Reverse Osmosis Laboratory Grade Water System, SPB	Millipore	1	1987	88/09/14		1,970,000	A	
24	Recording Hygro - thermograph, 3-month winding	Sato	4	1987	88/09/14		540,000	A	
25	Integrating Dew Time Sensor	EIKO	1	1987	88/09/14		860,000	A	
26	Solar Radiation Measuring Equipment	EIKO	1	1987	88/09/14		1,255,000	A	
27	Black Panel Thermometer	EIKO	1	1987	88/09/14		51,500	A	
28	White Panel Thermometer	EIKO	1	1987	88/09/14		51,500	A	
29	Standard Thermometer, Double tube	Sato	1	1987	88/09/14		13,200	A	
30	Maximum-minimum Thermometer, Bar	Sato	1	1987	88/09/14		14,500	A	
31	Sea Salt Particle Collector 15X15cm	NTP	8	1987	88/09/14		18,080	A	
32	Sulfur Oxide Collector	KIMOTO	1	1987	88/09/14		457,000	A	
33	Pinhole Tester, PH-10	SANKO DENSI	1	1987	88/09/14		89,870	A	
34	Electromagnetic Thickness Tester, LE-300	KETTO	1	1987	88/09/14		190,500	A	
35	Plating Thickness Tester, EF-1000	DENSOKU	1	1987	88/09/14		310,000	D	
36	Portable Surface Thermometer, HL-100	ANRITU	1	1987	88/09/14		48,500	A	
37	Surface Ruffness Tester, SE-40D	KOSAKA	1	1987	88/09/14		1,395,000	A	
38	Color Meter, CR-200	MINORUTA	1	1987	88/09/14		750,000	A	
39	Portable Gloss Meter, HA-9	SUGA	1	1987	88/09/14		447,000	B	
40	Adhesion Tester, 106 Na 2	DENSOKU	1	1987	88/09/14		231,700	A	
41	Down Transformer, KD-1000	TOYODEN	5	1987	88/09/14		100,000	A	
42	Tape Writer, MI360	DYMO	1	1987	88/09/14		41,700	A	
43	Combined Cyclic Corrosion Tester, ISO-3-CY	Suga	1	1987	88/09/14		5,353,000	A	
44	Atmospheric Exposure rack, A-78Z	NTP	8	1987	88/08/16		3,600,000	A	
45	Belt Sander with Dust Collector, BH-43Z		1	1988	89/03/31		307,000	A	

番号	主要機材・器具、型式	メーカー名	数量	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類	備考
46	High - Speed Precision Cutter, N45A	MARUMOTO	1	1988	89/03/31		1,450,000	A	
47	Metallographic Pregrinder, 6525B	MARUMOTO	1	1988	89/03/31		585,000	A	
48	Metallographic Polisher, 5627-56	MARUMOTO	1	1988	89/03/31		454,000	A	
49	Disk Grinder, PDA-100C	HITACHI	1	1988	89/03/31		20,000	A	
50	Water Baths, ET-45D	ADVANTEC	1	1988	89/03/31		222,000	A	
51	Pipe Heater, 81-5258	HAKKO	2	1988	89/03/31		95,200	D	
52	Lobo-Cooler, LC-100F	ADVANTEC	2	1988	89/03/31		250,000	A	
53	Stirrer, MZ-800	ADVANTEC	2	1988	89/03/31		190,000	A	
54	Magnetic Stirrer, HS-8	ADVANTEC	3	1988	89/03/31		174,000	A	
55	Hot Plate, TPH-45	ADVANTEC	2	1988	89/03/31		168,000	A	
56	Labo-Jack		2	1988	89/03/31		14,500	D	
57	Disiccater, BG2		1	1988	89/03/31		67,300	A	
58	Inverted Microscope, TME-NR	Nikon	1	1988	89/03/31		2,225,330	A	
59	No-Pump Dry Booth, DB-2S		1	1988	89/03/31		652,000	A	
60	Air Spray Gun, W-71-2G		2	1988	89/03/31		20,600	A	
61	Air Spray Gun, W-77-2G		2	1988	89/03/31		23,300	A	
62	Paint Cup 250cc, PC-5		2	1988	89/03/31		3,500	A	
63	Paint Cup 400cc, PC-4		2	1988	89/03/31		3,600	A	
64	Air Compressor, SU07Pb		1	1988	89/03/31		194,000	A	
65	Airless Spray Unit, 075T050		1	1988	89/03/31		476,000	A	
66	Sag tester, U type		1	1988	89/03/31		155,000	A	
67	Sag tester, BOX type		1	1988	89/03/31		165,000	A	
68	Drying ovens, SPHH-200		1	1988	89/03/31		1,300,000	A	
69	Ford Cup Viscometer, No.4		1	1988	89/03/31		117,000	A	

番号	主要機材・器具、型式	メーカー名	数量	供与 年度	サイト到着 年月日	稼働開始 年月	金額	使用状況等 の分類	備考
70	NK 2 Cup		1	1988	89/03/31		3,350	A	
71	Stormer Viscometer		1	1988	89/03/31		385,000	A	
72	Rion Viscotester, VT-04		1	1988	89/03/31		82,000	A	
73	Personal Computer, 120	AST	1	1988	89/03/31		1,356,000	A	
74	Sun Duration Meter, MS-091	EIKO	1	1988	89/03/31		423,000	A	
75	UV Pyranometer, MS-140	EIKO	1	1988	89/03/31		350,000	A	
76	Precision Pyranometer with Filter, MS-801 (RG715)	EIKO	1	1988	89/03/31		369,000	A	
77	Tipping Bucket Rain Gauge, MW-010	EIKO	1	1988	89/03/31		73,000	A	
78	Wind Speed & Direction Transmitter with Converter, MA-050	EIKO	1	1988	89/03/31		731,000	A	
79	Data Logger SOLAC III, MP-090	EIKO	1	1988	89/03/31		587,000	A	
80	Installation Pole 6m, PM-030	EIKO	1	1988	89/03/31		217,000	A	
81	Atmospheric Exposure rack, A-78Z	NTP	4	1988	89/03/31			A	
82	Reverse Osmosis Laboratory Apparatus, RO-100	ORUGANO	1	1988	89/05/19		1,775,000	A	
83	FRP Cutter, KS-100		1	1988	89/05/19		258,000	A	
84	Blast Mashine, L-1		1	1988	89/05/19		3,900,000	C	
85	Ultra Mixrotom, ULTRACUTE		1	1988	89/05/19		5,837,000	D	
86	Impedance Tester, CJA-3		1	1988	89/05/19		618,000	A	
87	Dupont Impact Tester, IM-201		1	1988	89/05/19		393,000	D	
88	Erichsen Cupping Tester, PI-101		1	1988	89/05/19		843,000	D	
89	Adhesion Tester, 106		1	1988	89/05/19		134,000	C	
90	Air Cleaner, MA-400-WH	MITHUBISI	1	1988	89/05/19		75,000	A	
91	Air Conditioner, PS-100G-W	MITHUBISI	1	1988	89/05/19		662,000	A	

番号	主要機材・器具、型式	メーカー名	数量	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類	備考
92	Dehumidifiers	NATIONAL	1	1988	89/05/19		98,000	C	
93	X-ray Diffractometer, XD-610	Shimadzu	1	1988	89/05/19		9,058,400	A	
94	Gas Chromatograph, GC-14	Shimadzu	1	1988	89/05/19		1,285,400	A	
95	Scanning Microscope, JSM-T330A	JOEL	1	1988	89/05/19		9,281,000	A	
96	Ion Sputter, JFC-1100E	JOEL	1	1988	89/05/19		821,000	A	
97	Vacuum Coater, SVE-700 TURBO	SANYU	1	1988	89/05/19		2,300,000	A	
98	Dewcycle Sunshine Super Long-life Weather Meter, WEL-SUN-DC-B	SUGA	1	1988	89/05/19		9,410,000	A	
99	Water Cooler, PW-1, PW-1	SUGA	1	1988	89/05/19			A	
100	Fourier Transform Infrared Spectrometer, 1720	PERKIN ELMER	1	1988	89/05/19		7,130,000	A	
101	Automatic Voltage Regulator		1	1989	90/05/28		172,000	A	
102	Preparing Machine for Glass Bead Test Specimen, TR-AUTO-Bead-1000S	Takeda Rika	1	1989	90/05/28		6,041,700	A	
103	Electric Table Balance, EB330H	Shimadzu	1	1989	90/05/28		139,300	A	
104	Integrating Light Dosage Meter, PH-51-T	SUGA	8	1989	90/05/28		2,928,000	A	
105	Coating Thickness Tester, LH-300	Kett	1	1989	90/05/28		257,800	A	
106	Desiccator (Plastic), BG-2		1	1989	90/05/28		67,000	A	
107	Drying Oven, MSF-113S		1	1989	90/05/28		196,900	D	
108	Specimen Dryer, Na 8333		1	1989	90/05/28		446,200	A	
109	Hand Magnifire with Light, Na 7		5	1989	90/05/28		55,700	A	
110	Washing machine Steem Boiling type, TVC-15		1	1989	90/05/28		510,400	D	
111	X-ray Spectrometer, 3030	Rigaku	1	1989	90/05/28		10,650,000	A	
112	Nissan Patorol Station Wagon, WRLGY60SCP9	Nissan	1	1989	90/06/28		1,960,000	A	
113	Automatic Absorption Spectrophotometer, AA-680	Shimadzu	1	1989	90/06/28		2,487,300	D	

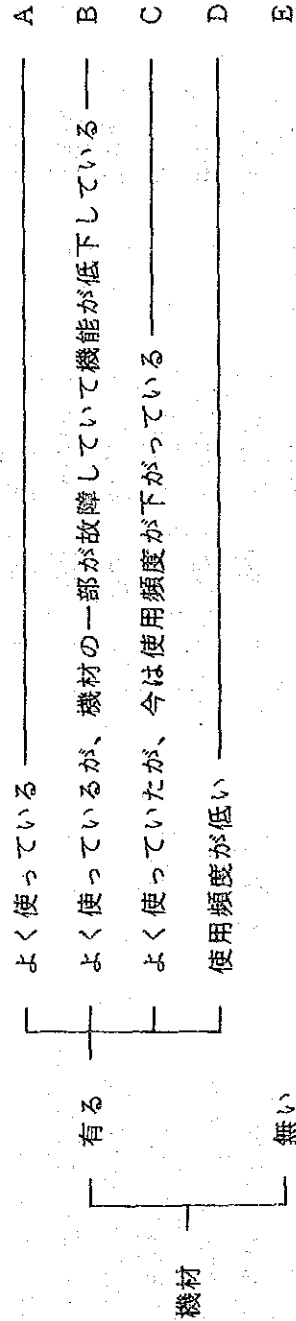
(2) 主要携行機材の使用状況

番号	主要携行機材・器具	メーカー名	数量	供与 年度	サイト到着 年月日	稼働開始 年月	金額	使用状況等 の分類	備 考
1	Vernier Caliper, N20 (530-108)	MITUTOYO	1	1987	88/08/16			A	
2	Micrometer, 193	MITUTOYO	1	1987	88/08/16			A	
3	Personal Computer, PC9801VX	NEC	1	1988	88/09/		1,106,550	A	
4	Hybrid Multimeter, 2441	YOKOKAWA	1	1987	88/11/16			A	
5	Paper Punch, Wholet, #200-N	LION	1	1989	89/05/		11,400	A	
6	Paper Cutter, DN-1	KOKUYO	1	1989	89/05/		14,000	A	
7	Word Processor set, #335	CANON	1	1989	89/05/		555,600	A	
8	Camera set, AZ-1ZOOM	OLYMPUS	1	1989	89/05/		65,000	A	
9	Cutting mat		1	1989	89/05/		6,100	A	
10	Safety Box	KOKUYO	1	1989	89/05/		11,400	A	
11	Fotobix set, FOTOVIX III	TAMRON	1	1989	89/05/		186,500	A	
12	JUSE-QCAS/MA1		1	1989	89/08/03			A	
13	JUSE-QCAS		1	1989	89/08/03			A	
14	Lead dioxide, 500g		9	1989	89/08/03		261,000	A	
15	Disicator, FB-7		2	1989	90/01/16		123,500	A	
16	Handy Aspirator 5L, WP-25	YAMATO	1	1989	90/04/11		82,000	A	
17	Dust Fall Collector Funnel, № 8008-04	SIBATA	5	1989	90/04/16		118,750	A	
18	Dust Fall Collector Set, № 8008-04	SIBATA	2	1989	90/04/16		131,100	A	
19	Portable hygrothermograph, HK-K	CHINO	1	1989	90/06/04		88,900	A	
20	FD Writer, MP-100	EIKO	1	1989	90/06/04		376,200	A	
21	Muffle Furnace, CNR15K		1	1990	90/06/05		517,800	A	
22	Data Memory, MP-100	EIKO	1	1990	90/06/05		376,200	A	

番号	主要携行機材・器具	メーカー名	数量	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類	備考
23	Portable Thermo-hygrograph, HN-K		1	1990	90/06/05		88,900	A	
24	PC98-IBM Interface Board PC-PC Ver.1.2IR		1	1990	90/06/05		91,000	A	
25	Cutting Machine		1	1990	90/06/05		347,700	A	
26	Thermo-hygrograph, No 7012	SATO	2	1990	90/06/05		308,000	A	
27	Fiel 200m /m 10sat/set		3	1990	90/06/05		29,850	A	
28	Thermo-hygrograph, No 7100	SATO	1	1990	90/06/05		185,300	A	
29	Drying Machine, CD-1201B		1	1990	90/06/05		90,000	A	
30	Rolling Cutter DAHLE 508, 113-0508	UCHIDA	1	1990	90/07/30		7,380	A	
31	Shele Boards for Decicator	IUCHI	10	1990	90/07/30		16,750	A	
32	Oscilloscope, SS-6616		1	1990	90/08/06		215,000	A	
33	DC Voltage Current Standard, 2554		1	1990	90/08/06		240,000	A	
34	Multimeter, R6551		1	1990	90/08/06		160,000	A	
35	Stainless Rweezers 150mm		5	1990	90/08/21		7,700	A	
36	Epiphoto	NIKON	1	1990	90/08/21		36,000	A	
37	Micrometer dia. 19mm	NIKON	1	1990	90/08/21		7,200	A	
38	Lighting Unit	NIKON	1	1990	90/08/21		63,000	A	
39	Stainless Beaker 200ml		10	1990	90/08/21		14,700	A	
40	Stainless Beaker 1000ml		10	1990	90/08/21		24,900	A	
41	Stainless Beaker 5000ml		5	1990	90/08/21		26,400	A	
42	Stainless Vat 220x275x45mm		5	1990	90/08/21		12,900	A	
43	Melting Vat Scissors, 419-50-11-02		5	1990	90/08/21		2,850	A	
44	Camera Food	NIKON	1	1990	90/08/21		12,600	A	
45	Melting Vat Scissors, 419-50-11-04		5	1990	90/08/21		10,650	A	
46	Stainless Vat 300x375x50mm		5	1990	90/08/21		19,200	A	

番号	主要携行機材・器具	メーカー名	数	供与年度	サイト到着年月日	稼働開始年月	金額	使用状況等の分類	備考
47	Stainless Beaker 500ml		10	1990	90/08/21		19,200	A	
48	Stainless Vat 283×405×93mm		5	1990	90/08/21		46,050	A	
49	Stainless Beaker 2000ml		10	1990	90/08/21		30,500	A	
50	FM-LW-MW-SW All Band Receiver, RF-B65D	NATIONAL	1	1990	90/09/		4,700	A	
51	Electronic Analytical Balance, AEU-130	SIMADZU	1	1990	90/09/18		248,000	A	
52	Cutting Machine		1	1990	90/10/03		240,000	A	
53	Auto Dry Decicator, 11-056-01	IUCHI	1	1990	90/10/24		38,000	A	

使用状況等の分類



3-2-3 技術移転到達度及びその手法

技術移転の到達度及びその手法については、技術項目別に表としてとりまとめた。到達度は高度から低度の順にA B Cの3段階で評価した。

<u>供与機材利用技術</u>	<u>到達度</u>	<u>手法</u>
走査電子顕微鏡 (SEM)	A	腐食試料の検査で利用、専門家派遣
波長分散型X線分光器	A	同上
X線回析装置 (XRD)	B	専門家派遣
分光光度計	A	自主技術、環境分析で利用
フーリエ変換		
赤外分光光度計	B	専門家派遣、ソフトの整備が必要
ガスクロマトグラフ	C	
イオンクロマトグラフ	B	環境分析で今後利用、専門家派遣予定
全自動分極測定装置	B	専門家派遣
マイクロトーム	C	
原子吸光分析装置	A	従来からの技術があった。装置更新
蛍光X線装置	B	
<u>加速試験</u>	<u>到達度</u>	<u>手法</u>
	B	専門家派遣、マルチ共同研究のテーマとして取り上げた
<u>環境分析</u>	<u>到達度</u>	<u>手法</u>
湿式分析、分光分析	A	専門派遣
湿式分析、分光分析	A	化学分析に従来から習熟していたため、環境分析への転換は容易であった 簡便化、迅速化を図る必要あり
<u>大気暴露試験</u>	<u>到達度</u>	<u>手法</u>
	A	当初に専門家派遣 (現地チームで自主的に進めている)
<u>試験後の評価</u>	<u>到達度</u>	<u>手法</u>
	B	自主技術 今後専門家派遣 マルチ活動のテーマとして取り上げる予定

また、長期専門家が作成した評価結果を表3-2-3に示す。

3-2-4 カウンターパートの評価

現時点での、個々のカウンターパートの評価を表3-2-4に示す。

表3-2-3 C/P訓練実施結果及び評価

研修・訓練科目	研修・訓練の成果または目標達成度	評価・問題点・対応措置等
1. 腐食科学	<p>1) 大気腐食及び電気化学的腐食の概念は理解はしているが、理論的理解は不十分である。</p>	<p>1) 短期専門家により基礎概念は植え付けられたが、具体的事例を処理するにあたり指導するほか、平素頻度高いミーティングで文献検討、研究結果討議及び当面する問題に関するレクチャーなどでレベルアップを図る。</p>
2. 防食技術と耐食材料	<p>1) 材料の製造工程、製品の特性などの知識が不十分であり、防食技術を体得するのは大分先のことである。</p>	<p>1) 材料メーカーの見学、材料特性、防食法について同様のミーティングで身に付けていくようにする。</p>
3. 腐食試験法	<p>1) 大気暴露の方法については、かなり経験も積み安心して見られる。</p>	<p>1) 大気暴露試験片の取り付け方について、暴露試験片の種類に応じた固定方法の応用ができるよう考え方を指導していく。</p>
4. 腐食評価法	<p>1) SEM、XRD、XRF、FTIRなどの原理も理解し、操作も研修済みであるが、使用頻度は低く、手順書がまだ手放せない。</p>	<p>1) 研究所の改装の遅れに伴い、既設装置の移設も未完のものがある。</p>
5. 環境因子測定法	<p>2) 腐食試験片（大気腐食）の外観写真撮影技術を確立し、また、腐食減量測定のための試験液は、実験により選定を終え測定に使っている。</p>	<p>2) 回収した腐食試験片の評価試験が遅れているが、マルチララルの共同研究の中で促進試験との対比で、同時に評価していく。</p>
6. データ解析手法	<p>1) 短期専門家による分析指導を2回行い、また、日本に依頼分析した結果とも比較して、分析値にも、ある程度の自信を得ている。</p> <p>2) 気象因子測定装置は設置終了し、測定データを集積している。</p>	<p>1) 環境因子測定については、日本にも分析を依頼し、比較分析をしているが、これだけでは真の分析値はわからないので、標準試料の作製法を検討する必要がある。</p> <p>2) 気象因子測定装置によるデータのモニタリングによる完全な記録が困難である。電源の不安定や虫などによる妨害に対策を要する。</p>
6. データ解析手法	<p>1) 統計的手法について短期専門家から指導を受け基礎概念は理解したが、応用が効くところまでには至っていない。</p>	<p>1) データ解析は実際のデータまとめの中で応用力をつけていく。</p>

* 総合評価 A: 戦力として非常に当てにしている。
 B: かなり当てにしている。
 C: 余り当てにしていない。
 D: 全く当てにしていない。() : 将来

表3-2-4 フィリピン・大気腐食-金属被覆・カウンタ-パート評価

カウンタ-パート名	所属 職位	機器操作 研修項目	国外研修、発表 (国名) (期間) (技術分野)	特記事項	* 総合評価
Dr. Ernesto S. Luis	ITDI Deputy-Director R&D, ITDI Project Team Leader		日本研修 (日本の腐食研究動向調査) (1988) Technical Exchange (1990) Thailand Joint Meeting (1989) Malaysia Joint Meeting (1990) Singapore Seminar (1989) Thailand Seminar 発表者 (1990)	ITDI 副所長で他の Lab も兼任で多忙。 しかし当プロジェクトには、非常に気を配 って貰っている。毎週1~2回Corrosion Lab のスタッフと日本専門家グループとの 打ち合せへの参加、短期専門家の派遣の歓 迎、マルチラテラル活動の受け入れ整備な ど。	A
Ms. Aida H. Balagot	Inorganic Chem. Lab Head, Corrosion Lab Science Research Specialist	GC/IC	Singapore Seminar (1989) Technical Exchange (1990) 他のJICA日本研修 (機器分析) の 経験あり (1987)	当プロジェクト開始時は参加していなかっ た。仕事の主体がCMDに移っている。 不眠症で長期欠勤が目立った。 現在 Corrosion Lab の戦力になっていな い。	C
Ms. Cynthia V. Bernas	Corrosion Lab Science Research Specialist - 2	SEM	日本研修 (電気化学的評価) (1989) Singapore Training (電気化学的腐 食モニタリングと評価) (1990)	有能で頼りになる。 妊娠中で、昨年流産の経験があり、当分無 理は効かない。	B (A)
Ms. Margarita T. Torre	Corrosion Lab Science Research Specialist - 2	Weather Meter Reverse Osmo- sis	日本研修 (大気腐食モニタリング) Singapore Seminar発表者 (1989) (フィリピンの大気の腐食性) (1990)	リーダー格、研究活動も積極的。 Aida H. Balagot が非戦力化しているので その代理としてリーダー的存在。	A
Ms. Cynthia R. Habana	Corrosion Lab Science Research Specialist - 2	XRF Potentiostat	日本研修 (塗膜下腐食 - 1) (1989 - 90) Thailand Seminar発表者 (塗膜のイオン透過性) (1990)	研究活動活発。 最近 Specialist - 2 に昇進。	A
Ms. Lillian A. de Guzman	Corrosion Lab Science Research Specialist - 2	XRD - 1, XRD - 2, XRF Potentiostat	Brunei Training (鉄筋コンクリ- ートの腐食研究技術移転) (1990)	来年度に日本研修の予定。 (金属被覆鋼板の耐食性評価)	B

カウンタパート名	所属 職位	機器操作 研修項目	国外研修、発表 (国名) (期間) (技術分野)	特記事項	* 総合評価
Ms. Aurora S. Viloria	Corrosion Lab Science Research Specialist-1	XRD	Singapore Seminar発表 (1990)	11月末に日本研修から帰国し戦力化有望。	A
Ms. Ner A. Cruz	Corrosion Lab Science Research Specialist-1	SEM UTM	Singapore Seminar (1989) 日本研修 (XRDによる腐食生成物の同定)	11月末に日本研修から帰国し戦力化有望。	A
Ms. Rosalinda G. Principe	Corrosion lab Science Research Specialist -1	XRD-1 XRD-2 XRF	他のプロジェクトで1週間の日本研修 (島津、理学) 経験あり (1989)	産休中のため戦力としては当分期待出来ない。	A
Mr. Rolan P. Vera Cruz	Corrosion Lab Science Research Specialist-1	XRF Potentiostat	Singapore Seminar発表 (1990)	数少ない男性研究員。昨年1989入所。有能。研究活動活発。将来性大。将来、日本での博士コースを目指す。	B
Mr. Ramilo C. Layaco	Corrosion Lab Science Research Specialist-1	XRF FT-IR	---	数少ない男性研究員、今年1990入所。大学へ戻りたいとの希望あり。	B
パートタイム Ms. Estrella G. Mamarill	Inorganic Lab Head	COCT	日本研修 (促進劣化試験方法) (1989)	Inorganic Chemistry Lab に属しているの でCorrosion Lab の戦力にならないが、 COCT の実施に際しては協力を得られる。	C
Ms. Concepcion Gayamali	Senior Research Specialist Water Lab Senior Research Specialist	FT-IR	日本研修 (機器分析: SEM, XRD, FT-IR) (1989)	FT-IR のみ担当。	C
Ms. Corazon Q. Villanueva	Paint Lab Science Research Specialist-2	SEM	日本研修 (日本の腐食研究動向調査) (1988)	プロジェクト開始当初はメンバーで、中心 的な存在であった。今年3月に Paint Lab に移り、現在はCorrosion Lab の戦力 になっていない。	C
Ms. Eden T. Luna	Metals Lab Science Research Specialist-2		Thailand Training (有機被覆の大 気腐食) (1990)	マルチラテラル活動に協力が期待される。	C
Ms. Chona I. Dela Pena	Paint Lab Science Research Specialist-2	Painting- Equipment	Tailand Seminar (1990)	マルチラテラル活動に協力が期待できる。	C

カウンターパート名	所属 職位	機器操作 研修項目	国外研修、発表 (国名) (期間) (技術分野)	特記事項	総合評価*
Ms. Aurora Vilafior	Inorganic Lab Science Research Specialist - 2		日本研修(機器分析) (1988) (Australia 留学: JICA とは無関係)	余り Corrosion Lab との接触なし。	C
Ms. Priscilla Mantaring	MIRDC, Chemical Lab Division Chief - 1		日本研修(日本の腐食研究動向調査) (1988)	余り Corrosion Lab との接触なし。	C
Ms. Rosario Corral	MIRDC		日本研修(マイクロアナリシス) (1990)	余り Corrosion Lab との接触なし。	C

3-3 フィリピン側の評価

本調査時に、科学技術省（DOST）のFollosco長官を表敬したが、長官は、以下の理由で本プロジェクトを高く評価していた。

1. 腐食は基本的に経済問題であり、腐食による損失は、フィリピンのGNPのうち、少なくとも4%に達している。
2. したがって、腐食研究にたずさわる人材を育成することが急務となっており、本プロジェクトは、この点で多大な貢献をしている。

- (7) ガス腐食試験機 SO₂、H₂S、NO_x
- (8) 表面計
- (9) 超音波厚さ計
- (10) ドラフトチェンバー
- (11) 自動分配装置
- (12) 写真用暗室、現像装置

表4-3-1 1991年度供与機材要望リスト

Requesting Equipmet List for 1991 (JFY) 1991年度 (平成3年度) 供与機材要望リスト	Priority 優先順位	Price 価格
2. 1 Analytical Equipment for 1991 (分析機器)	☆	
a. Accessories for A A S (原子吸光光度計用セレンランプその他)	A	6,000,000
b. UV-Vis Spectropotometer (自記分光光度計 UV-3101PC)	B	5,800,000
c. Image processor for EDAX & Met. Microscope (金属顕微鏡とEDX 兼用イメージャ。ルーゼックスIIIU:セレコ)	C	15,000,000
d. FTIR data library (FTIRライブラリ。パーキンエルマ)	C	5,000,000
e. XRD reference file software. (XRD 用文献検索ソフト)	A	3,000,000
2. 2 Environmental Equipment (環境測定機器)		
a. hermothygraph (温湿度記録計 佐藤計量器)	☆	64,000
b. Automatic Rain Acidity Recorder (酸性雨計測装置システム C500 シリーズ)	B	1,950,000
2. 3 Test and Measurement Equipment (試験及び測定機器)		
a. Gas corrosion tester SO ₂ , H ₂ S, NO _x , (定流量恒温恒湿ガス腐食試験装置)	A	7,120,000
b. Surface quality meter (表面性測定機:新東科学)	A	2,480,000
c. Portale gloss meter (光沢計 HA-G スガ試験機)	☆	350,000
d. Portable PH Meter (携帯用PHメーター 43800型:セントラル科学)	☆	130,000
e. Ultrasonic Thickness Meter (超音波厚み計 Model 22DL:日本パナメトリクス(株))	A	1,440,000
f. Ultrasonic Cleaner 2台 (超音波洗浄器 ヤマト)	☆	200,000
2. 4 Laboratory Equipment (実験用機器)		
a. Fume hood (ドラフトチャンバー)	A	1,500,000
b. Automatic dispenser with nesrvoir (自動分配装置 XD-2型)	A	1,600,000
c. Vacuum pump (ハンディアスピレーター WP-25 型)	☆	88,000
2. 5 Auxiliary Equipment (補助設備)		
a. Dark room w/ developing and printing equipment (暗室)	B	1,000,000
☆ TOTAL (携行機材のみ)		832,000
A TOTAL		23,140,000
A+B TOTAL		31,890,000
A+B+C TOTAL		51,890,000
☆+A+B+C TOTAL		52,722,000

* ☆ Accompanied Equipmet with expert (携行機材)

4-4 ローカルコスト負担

1991年のローカルコスト負担としてフィリピン側から要望のあったものを表4-4に示す。このうち応急対策費について、若干の説明を加える。

(1) 緊急発電装置の小屋建設費

同装置は、既に現地調達がなされていたが、据え付ける小屋の建設が、フィリピン側の予算不足により遅延している。電源の安定化を早急に図るためにも、ローカルコスト負担により支援する必要がある。

(2) 深井戸の掘削費

プロジェクトで現在使用している井戸が浅いため、いつ枯れるかわからない状態であり、腐食促進試験機の連続運転に支障をきたす恐れがあるため、ローカルコスト負担により支援する必要がある。

表4-4 ローカルコスト負担要望書

項目	専門家チームの要望			本部査定備考
	計画	2年度実績	内容	
① 技術普及広報費	単位 千円 3,800千円を希望	単位 千円 0	(具体的計画があれば、必要理由を簡潔に記載するとともに、詳細について別添のうえ申請のこと) a. プロジェクト活動状況のビデオ作成 b. 比国内参加者による供与機器の見学会及びパンフレットの作成 c. ニュースレター(腐食);CAP、大学、editorial board	千円とする
② 研究開発費	4,000千円を希望	0	a 気候条件の異なるマニラ以外での暴露試験の可能性について調査及び暴露開始 b ミンダナオ島カガヤンデオロの海水腐食試験(日本鋼管航協会実施)の見学と試験結果技術情報入手	千円とする
③ 応急対策費	4,000千円を希望	(4,000)	a 停電対策として導入した緊急発電装置を自動的に連続運転が可能なものにする(腐食促進試験)	千円とする
④ 技術交換費	0千円を希望	(2,000)		
⑤ 中堅技術者養成対策費	6,805千円を希望	(13,000)	a ASEAN マルチ活動として①共同研究②トレーニング	千円とする
⑥ セミナー開催費	2,700千円を希望	0	a 国内セミナー:ASEAN 域内から講師を招き、国内の参加者を得て、供与機材の原理、応用までPRし、その応用拡大と国内技術向上に寄与する ①FT-IR ②UMT (ウルトラマイクロトーム)	千円とする
⑦ 実施計画諸費 a 視聴覚教材費	0千円を希望	1,959		
⑧ プロジェクト責任者会議開催費	4,000千円を希望	0	第4回日本・ASEAN科技協プロジェクト責任者会議	千円とする

予算新規項目:(プロジェクトの円滑な運営を図るうえで必要と思われる予算新規項目があれば、項目名称にとらわれずに簡潔に記載のこと)

4-5 マルチラテラル活動実施計画

今後の計画は、以下のとおりである。

(1) 1990年度

ア. セミナー

主題 大気腐食

1991年3月4日～9日

マニラ・インターコンチネンタルホテルにて開催

ASEAN から各国3名の参加

日本から3名の講師派遣

イ. トレーニング

主題 腐食のための器機分析、試料作成及び試験

1991年1月6日から4週間

ITDIにて

ASEAN から各国1名の参加

(2) 1991年度

ア. トレーニング

1991年7月から1カ月

イ. 共同研究

1991年8月から3カ月

なお、参考までに各国の1991年度スケジュール表を次ページに示す。

Schedule on Japan-ASEAN Cooperation on Materials Science and Technology in 1991 FY

	m-m	1991 FY												Note			
		4	5	6	7	8	9	10	11	12	1	2	3				
Brunei	- - -																
Indonesia	- 6m-m 5m-m	4/29	8/21	7/31	9/22	3 Months x 2 persons	12/22										
		4/29	8/21	7/31	9/1	9/30											
							1Mx5P										
Malaysia	- 6m-m 5m-m	5/15	7/1	8/1	10/1-2												
		4/15	5/13	3Mx2P	8/10												
		4/15	5/13	6/11													
							1Mx5P										
Philippines	- 12m-m 5m-m	4/1	5/15	6/14	8/1	3Mx4P	10/31										
		4/1	5/15	6/3	7/1	7/31											
							1Mx5P										
Singapore	- 6m-m -	4/1	5/30	8/1	1/1	3Mx2P	3/31										
Thailand	- 6m-m 5m-m	6/1	7/15	8/15	9/E	5Mx1P	3/E										
		6/1	7/15	8/1	9/15	12/1	12/28										
							1Mx5P										

Explanatory notes: ○ Announcement
 ○ Closing date of application / proposal
 ● Selection / Confirmation of ASEAN participants
 ◆ Deadline for admission of papers

5. ミ ニ ッ ツ

THE MINUTES OF MEETING
FOR
THE PROJECT ON ATMOSPHERIC CORROSION - METALLIC COATINGS

The Mutual Consultation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. Kazuyoshi Nii, Director - General, National Research Institute for Metals, visited the Republic of the Philippines from December 2 to December 8, 1990, for the purpose of understanding the progress and achievement concerning the implementation of the Project on Atmospheric Corrosion - Metallic Coatings (hereinafter referred to as "the Project") and reviewing the technical cooperation with the concerned authorities of the Republic of the Philippines.

During its stay in the Republic of the Philippines, the Team exchanged views and had a series of discussions with the Philippine Project Staff.

As a result of the discussions, both sides came to an understanding concerning the matters referred to in the document attached herewith.

Manila, December 6, 1990

Kazuyoshi Nii

DR. KAZUYOSHI NII
TEAM LEADER
MUTUAL CONSULTATION TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY

Ernesto S. Luis

DR. ERNESTO S. LUIS
DEPUTY DIRECTOR &
OFFICER-IN-CHARGE
INDUSTRIAL TECHNOLOGY
DEVELOPMENT INSTITUTE (ITDI)

THE ATTACHED DOCUMENT

I. The list of participants from the Philippine side and the Japanese side appears as ANNEX 1.

II. The progress report of the Project since its commencement on October 30, 1987 was reviewed and evaluated.

Both sides discussed the present situation, and agreed that the Project implementation is smoothly in progress. The Team appreciated Philippine side's support and cooperation in providing adequate personnel to the Project and its efforts to provide local counterpart fund.

III. The Proposed Project Plan for JFY 1990/1991 was discussed in a series of meetings. The summary of the plan appears as ANNEX 2.

The Team requested the Philippine side to accelerate the improvement of infrastructures required for the Project and the Philippine side agreed that it would exert all possible means to meet the requests. JICA financial assistance is requested.

LIST OF PARTICIPANTS

A. PROJECT STAFF

A.1 Philippine Counterpart

- | | |
|---------------------------|---|
| 1. Dr. Ernesto S. Luis | Deputy Director, Industrial
Technology Development
Institute (ITDI) |
| 2. Ms. Cynthia V. Bernas | Researcher, Corrosion Lab.
Standards & Testing Division
ITDI |
| 3. Ms. Margarita T. Torre | Researcher, Corrosion Lab.
Standards & Testing Division
ITDI |

A.2 Japanese Counterpart

- | | |
|----------------------------|------------------------------------|
| 1. Mr. Shun-ichi Harada | Team Leader |
| 2. Mr. Akira Ishii | Technical Assistant
(Out-going) |
| 3. Mr. Toshiharu Kobayashi | Technical Assistant
(In-coming) |
| 4. Mr. Masaru Iizuka | Coordinator |

B. JICA MISSION TEAM

- | | |
|------------------------|---|
| 1. Dr. Kazuyoshi Nii | Director-General, National
Research Institute for Metals
(NRIM), Science and Technology
Agency (STA) |
| 2. Dr. Toshiaki Kodama | Head, Fourth Laboratory
Environmental Performance
Division, NRIM, STA |
| 3. Mr. Kazuo Oshima | Head of International Research
Cooperation, NRIM, STA |
| 4. Mr. Naoto Hattori | Staff, First Technical
Cooperation Division, Social
Development Cooperation
Department, JICA |

THE PROJECT PLAN FOR JFY 1990/1991

1. UPGRADING OF ITDI FACILITIES

The upgrading of ITDI facilities will be continued. Top priority as discussed during the Second Joint Implementing and Planning Meeting are the following:

1.1 Improvement of power supply to insure proper operation and long life of equipment

A grounding system for the potentiostat was already installed.

A separate power generator for the project's main equipment has not yet been installed. Construction of the generator shed is still to be started.

1.2 Provision of a separate water supply source for weatherometer, combined cyclic corrosion tester and R-0 system

The energy crisis in the Philippines now aggravated by the Persian Gulf strife has caused intermittent brown-outs which in turn cut water supply. Such a situation presents a big problem to the project's implementation especially in using equipment (e.g., weatherometer, combined cyclic corrosion tester and R-0 system) whose operation depends largely on water. Therefore, the provision of a separate water supply source, specifically, a deep well for these equipment was deemed necessary to ensure the smooth progress of the project.

A separate water tank/reservoir was already made available for continuous/back-up water supply. However, the construction for the much-needed deep well has not been started and the proposed work is still up for bidding from contractors.

1.3 Acceleration of repair/renovation of rooms for storage and additional equipment in the future

Repair/renovation of rooms has not been completed mainly due to ITDI budget constraint.

2. REQUESTED EQUIPMENT LIST FOR 1991

The following is the list of requested equipment for 1991.

	PRIORITY
2.1 Analytical Equipment	
a. Accessories for A A S	A
b. UV - Vis Spectrophotometer	B
c. Image processor for EDAX & met. microscope	C
d. FTIR data library	C
e. XRD reference file software	A
2.2 Environmental Equipment	
a. Automatic Rain Acidity Recorder	B
2.3 Test and Measurement Equipment	
a. Gas corrosion tester SO ₂ ; H ₂ S, NO _x	A
b. Surface quality meter	A
c. Ultrasonic thickness tester	A
2.4 Laboratory Equipment	
a. Fume hood	A
b. Automatic dispenser with reservoir	A
2.5 Auxiliary Equipment	
a. Dark Room w/ developing and printing equipment	B

3. LIST OF PROPOSED SHORT - TERM EXPERTS FOR 1991

	<u>No. of Experts</u>
1) EDX Application (3 weeks)	- 2
2) Installation and Operation of GC/IC Chromatography (Dionex) (2 weeks)	- 1
3) Environmental Analysis	- 1
4) Metallic Coatings (4 weeks)	- 2
5) 1991 Collaborative Research	
5.1) Electrochemical Evaluation	- 1
5.2) Evaluation of Data/Results	- 1
6) 1991 Training Programme	
6.1) Estimation of Material Life using the Computer	- 1
Total	- 9

4. PROPOSED TRAINING IN JAPAN FOR 1991

The following are the proposed topics and schedule including the nominees for training in Japan for 1991.

- | | |
|-------------------------|--|
| 1. Lillian A. de Guzman | Evaluation of the Corrosion Resistance of Metallic - Coated Steels (one year duration to start in June 1990) |
| 2. Eden T. Luna | Analysis of Corrosion Products (3 - 6 months) |
| 3. Chona I. de la Pena | Measurement of the Weathering Deterioration of Organic Films (3 - 6 months) |

* Since one training slot is allocated for another ASEAN member country, one nominee from the Philippines may be deferred.

5. IMPLEMENTATION OF RESEARCH STUDIES

The following are the topics of research which the Corrosion Project Staff plan to undertake in the near future.

- 5.1 A Comparative Study on the Atmospheric Behavior between Skyward and Groundward Surfaces of Metals
- 5.2 A Study on the Effect of Exposure Rack Orientation/Angle of Inclination on Atmospheric Corrosion of Metals
- 5.3 A Nationwide Survey of Atmospheric Corrosivity * *

* * Selection of exposure sites will be on a regional basis.

6. PUBLIC RELATIONS ACTIVITIES

The following are the public relations activities to be implemented in 1991:

6.1 Technical Bulletin

A technical bulletin primarily for the promotion of corrosion science education in the Philippines will be published under the auspices of ITDI and JICA in cooperation with the Corrosion Association of the Philippines (CAP). It will feature technical papers and critical reviews in the field of corrosion, particularly, literary contributions from local government and private institutions concerned with or interested in corrosion.

6.2 Brochure

The brochure will feature basic principles, operation and application of the project's main analytical instruments. It will serve as a way of introducing these instruments to government and private entities, especially, the industrial sector which may need the services of these instruments.

6.3 Video Production on Project Activities

The production of a video featuring the various activities of the project will be undertaken with the expert assistance of the Philippine Human Resources Development Corporation (PHRDC).

6.4 Open - house

Project facilities/sites will be open for public viewing during the open - house. A brief discussion on the project, its objectives and different areas of activity will precede a tour to the various laboratories/sites which house the various equipment and facilities of the project.

6.5 Lecture - Demo

This will be held to educate or train small groups coming from the academe or the industrial sector on specific areas or topics of interest.

7. DOMESTIC SEMINARS

Seminars on the application and operation of analytical instruments, specifically, FTIR, AAS, Ultramicrotohm, XRD, XRF and SEM/WDX will be facilitated through the project. These will be conducted by speakers/resource persons from the Philippines and/or other ASEAN countries.

附 属 资 料

1. PROGRESS REPORT
2. PLANS AND ACTIVITIES FOR 1991
3. MULTILATERAL ACTIVITIES
4. THE RECORD OF DISCUSSION (1987年10月30日署名)

附屬資料 1.

PROGRESS REPORT AS OF 16 NOVEMBER 1990

1. PROJECT STAFF

The ASEAN - Japan Project on Atmospheric Corrosion - Metallic Coatings is being implemented in the Philippines by the Department of the Science and Technology (DOST) through the Industrial Technology Development Institute (ITDI) and Japan International Cooperation Agency (JICA).

The personnel involved in the project are as follows :

Philippine Counterpart :

Team Leader : Dr. Ernesto S. Luis

Co - Researchers :

(Full - time)

Cynthia V. Bernas
Margarita T. Torre
Lillian A. de Guzman
Cynthia R. Habana
Aurora S. Vilorio
Ner A. Cruz
Rolan P. Vera Cruz
Rosalinda G. Principe
Ramilo C. Layco

(Part - time)

Estrella G. Mamaril
Concepcion P. Gayomali
Aurora C. Villaflor
Eden T. Luna
Chona I. de la Pena
Priscilla D. Mantaring (MIRDC)
Rosario R. Corral (MIRDC)

Japanese Counterpart :

Team Leader : Mr. Shun-ichi Harada

Technical Assistant: Mr. Akira Ishii (Out-going)

Mr. Toshiharu Kobayashi
(In-coming)

Coordinator : Mr. Masaru Iizuka

2. ACTIVITIES

The original schedule/master plan of the project is given in Figure 1-A. The schedule of implementation and results of activities are also shown in the chart. Figure 2-A shows the tentative schedule of implementation and results of Japanese cooperation under the project.

2.1 Outdoor Atmospheric Exposure test

2.1.1 Environmental factors

Outdoor exposure test, gathering of meteorological data and quantitative analysis of air pollutants have been continually conducted since December 1988.

The exposure sites are as follows :

- a. Rural Atmosphere - ITDI, Bicutan
- b. Urban Atmosphere - ITDI, Pedro Gil
- c. Industrial Atmosphere - NPC, Sucat
- d. Marine Atmosphere - PNRC, Sangley Point, Cavite

A summary of data obtained from the monitoring of environmental factors in the four exposure sites is given in Annex 1-A.

2.1.2 Exposure test specimens

Bare metals (three kinds of steel, zinc, aluminum, and copper), metallic coated steel (galvanized, aluminized, and other alloy-coated steels), painted steels (several kinds of resin - paint coated steels) and FRP have been exposed in the four exposure sites.

The over-all schedule for the exposure test is shown in Figure 3-A.

The retrieved specimens are now being tested and evaluated. The corrosion rate of the specimens is being determined by mass loss method of ASTM G1 - 88 and ISO/DIS 8407. Table 1-A shows the chemicals/reagents for the chemical cleaning of corroded test specimens suggested in the procedure. These chemical solutions were tested at the ITDI laboratory to select the most effective solution for each type of metallic specimen. Selected solutions are identified by asterisks in the table.

2.2 Training of Philippine Project Team Members in Japan and ASEAN Countries

2.2.1 Training in Japan

To date, sixteen (16) participants from the Philippines have been sent to Japan for training in various fields. The list of completed and on-going training in Japan is given in Table 2-A.

2.2.2 Training in Other ASEAN Countries

Training of Philippine participants in other ASEAN countries is discussed under Multilateral Activities.

2.3 Dispatch of Japanese Experts in the Philippines

The long - term Japanese experts, headed by Mr. Shun-ichi Harada who succeeded Mr. Tadao Kimura early this year, have been working closely with the Philippine Project team on planning and implementation of the project and coordination with JICA and the National Research Institute for Metals (NRIM) of Japan.

Short - term Japanese experts who have conducted training of ITDI counterpart staff in various fields of corrosion now total to twenty - one (21).

Annex 2-A shows the list of long/short - term Japanese experts that have already been received in the Philippines.

2.4 Public Relations Activities

The following public relations activities were carried out:

- a. Seminar and ITDI Laboratory Tour, August 1989
- b. National Science and Technology Week, July 1990

A paper on "Atmospheric Corrosion Aggressivity of Selected Locations in the Philippines" which discussed on the results of the project's research activities was presented during the seminar.

ITDI Facilities/Laboratories were open to public viewing during the Open house/tour.

- c. Laboratory tours for visitors/guests
- d. Corrosion Association of the Philippines (CAP) Seminar, August 1990

A paper on "AC Impedance and Photo-Acoustic Evaluation Methods of Organic Coating Degradation" was presented by Dr. Tooru Tsuru, short-term Japanese expert and full Professor at the Tokyo Institute of Technology.

2.5 Second Joint Implementing and Planning Meeting

Philippine Authorities and Japanese Delegation for the effective implementation and planning of the project held a joint meeting at ITDI in March 1990. The progress of the project, plans and activities for 1990 proposed by Philippine side and the problems encountered during its implementation were presented and discussed in a series of meetings. Improvement of power supply, provision of separate water supply, and acceleration of repair/renovation of rooms for additional equipment in the future were emphasized.

The meeting coincided with the turn-over of team leadership for the Japanese side from Mr. Tadao Kimura to Mr. Shun-ichi Harada.

3. EQUIPMENT

ITDI has already received various analytical equipment, environmental testing equipment, test and measurement equipment, test specimen preparation equipment, and other laboratory equipment through the project.

The list of equipment which were donated by JICA is given in Annex 3-A.

4. LOCAL JICA BUDGET

The breakdown of the local JICA budget expenditures for the project is shown as ANNEX 4-A.

5. COUNTERPART FUND

The allotment of the counterpart fund for the JICA - assisted Japan - ASEAN Technical Cooperation Project on Atmospheric Corrosion - Metallic Coatings appears as Annex 5-A. The breakdown of actual expenditures and balances for the project as of 20 November 1990 are given in Annex 6-A.

Figure 1 - A

Project Activity Plan
Master Plans and Activities at Present

ACTIVITIES	FY 1987		1988		1989		1990		1991		1992		Summary of Results
	Month												
Item of Activities													
1. Study Plan (M/P) (I/P) (Actual)		=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	1. In progress in accordance w/ I/P based on R/D. After this, study for dev. of new material would be taken into consideration.
2. Atmospheric Exposure test.		=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	2. In progress as scheduled. Exposure test started in Dec. 1988. T.S. exposed for 6 months & 1 year were already retrieved. T.S. were expdsd for wet season start exposure.
3. Measurement of environmental factors		=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	3. In progress in accordance w/ I/P schedule.
4. Survey of Atm. Corrosivity in the Phil.													4. Preliminary evaluation of corrosivity has been made. Outdoor exposure and measurements of pollutants in progress.
5. Accelerated Corrosion test													5. To be started Dec. 1990, as part of multi. activities.
6. Analysis and evaluation of Testing Results													6. Evaluation of retrieved T.S. in progress.
7. ASEAN Multi. Activities		=====											7. Collaborative research under multi. activities commenced Nov., 1990. Training & Seminar will be in Jan. & March respectively.
8. Report and Evaluation of Project		=====											8. Monthly & Annual Report.
9. Publicity Activities		=====											9. PR activity was carried out Aug. 23: presentation about the project, visit to exposure site & Lab. of DOST, JICA & CAP officials & members. The project was also presented during the ITDI Technical Seminar for the Science week last July, 1990 and CAP Convention on Nov. 23, 1990.
10. 4th Joint Meeting													10. Tentatively scheduled in August or September 1991.

Legend : ===== Master Plan (M/P)
----- Implementation Plan (I/P)

Figure 2 - A

Tentative Schedule for Implementation and Results of Japanese Cooperation

Plan	FY		1987	1988	1989	1990	1991	1992
	Month		10	4	4	4	4	4
1) Japan (1) Dispatch (M/P) of Mission (I/P) (Actual)			==	==	==	==	==	==
2) Dispatch of Expert			=====	=====	=====	=====	=====	=====
a) Team Leader				-----	-----	-----	-----	-----
b) Coordinator				-----	-----	-----	-----	-----
c) Expert				-----	-----	-----	-----	-----
3) Acceptance of Trainees			=====	=====	=====	=====	=====	=====
4) Donation of Equipment			=====	=====	=====	=====	=====	=====
5) Contribution for Local Cost			=====	=====	=====	=====	=====	=====

Legend : ===== Master Plan (M/P)
 ----- Implementation Plan (I/P)
 ----- Actual Activities

Table 1-A. Tested chemical cleaning solutions for the removal of corrosion products

Metal/Alloy	Chemical
Aluminized	50 ml phosphoric acid * (H_3PO_4 , = 1.69 g/ml) 20 g chromium trioxide (CrO_3) Distilled water to make 1000 ml
Bare carbon steel	1000 ml hydrochloric acid * (HCl , = 1.19 g/ml) 20 g antimony trioxide (Sb_2O_3) 50 g stannous chloride ($SnCl_2$)
	50 g sodium hydroxide ($NaOH$) 200 g granulated zinc or zinc chips Distilled water to make 1000 ml
	200 g sodium hydroxide 20 g granulated zinc or zinc chips Distilled water to make 1000 ml
	200 g diammonium citrate [(NH_4) ₂ $HC_6H_5O_7$] Distilled water to make 1000 ml
Zinc and zinc alloys :	
Electrogalvanized	200 g chromium trioxide (CrO_3) * Distilled water to make 1000 ml
Hot - dipped galvanized	100 g ammonium peroxodisulfate [(NH_4) ₂ S_2O_8] Distilled water to make 1000 ml
5 % Al - Zn	
55 % Al - Zn	100 g ammonium chloride (NH_4Cl) Distilled water to make 1000 ml

* Selected cleaning solutions

Table 2-A. Completed and On-going Training in Japan

Name	Term	Subject
FY 1988		
Dr. E. Luis	1988.07.24 1988.08.09	Trend of Corrosion Research in Japan
Ms. C. Villanueva	do	do
Ms. P. Mantaring	do	do
Ms. A. Villaflor	1988.10.27 1988.12.16	Instrumental Analysis
Ms. M. Torre	1989.01.10 1989.07.10	Atmospheric Corrosion - Monitoring Technique
Ms. C. Bernas	1989.02.16 1989.05.16	Electrochemical Method
FY 1989		
Ms. C. Habana	1989.06.13 1990.06.12	Underfilm Corrosion - 1
Ms. E. Mamaril	1989.09.11 1989.12.10	Accelerated Test
Ms. C. Gayomali	1989.09.11 1989.12.10	Instrumental Analysis
FY 1990		
Ms. N. Cruz	1990.05.29 1990.11.29	Underfilm Corrosion - 2
Ms. R. Corral	do	Study on Microanalysis
Ms. A. Vilorio	do	Characterization of Corrosion Products by X-ray Diffraction
Ms. J. Celorico	1990.03.27 1990.09.23	Fine Ceramics (slot for Malaysia Project)
Ms. A. Magsino	1990.06.26 1990.12.23.	Characterization of Polymers (slot for Indonesia Project)

FIGURE 3-A SCHEDULE AND NUMBER OF EXPOSURE TEST SPECIMEN

	1988	1989	1990	1991	1992
1. Bare Metals (ISO)					
Carbon Steel		19		19	
Zinc			19		19
Aluminum		19			
Copper			19		
Stainless Steel 304		18			
Stainless Steel 430				18	
2. Metallic Coatings					
Hot Dip Galvanized	15	15	15	15	
Electro-galvanized	15		15		
Hot Dip 5%Al-Zn		15		15	
Hot Dip 55%Al-Zn		15			
Hot Dip Aluminized			15		
				15	
3. Painting					
Air Dried Coatings	12				
		12			
			12		
				12	
Baked Coating					
		6			
			6		
		6			
			6		
		6			
			6		
		6			
			6		
		6			
				6	
4. Fiber-Reinforced Plastic					
				6	

ENVIRONMENTAL FACTORS DATA

Exposure Site : Bicutan

Month	SO ₃ , x 10 ⁻¹ mg/day/dm ²		SO ₂ , x 10 ⁻¹ mg/d/dm ²	NaCl mg/d/dm ²	HCL mg/d/dm ²	NO ₂ mg/d/dm ²
	Shelter	Ins. Screen	Shelter			
01	2.337	1.732	1.870	0.760x10 ⁻²	2.960x10 ⁻³	1.47 x10 ⁻²
02	1.303	1.983	1.042	2.107x10 ⁻²	4.900x10 ⁻³	1.063x10 ⁻²
03	2.284	1.426	1.827	6.804x10 ⁻²	1.172x10 ⁻²	6.721x10 ⁻³
04	2.186	1.591	1.749	9.600x10 ⁻²	1.172x10 ⁻²	1.498x10 ⁻²
05	1.949	1.450	1.559	1.071x10 ⁻²	8.962x10 ^{-3*}	1.023x10 ⁻²
06	1.444	2.241	1.155	4.044x10 ⁻²	1.568x10 ⁻²	8.765x10 ⁻³
07	2.140	1.543	1.712	4.59 x10 ⁻³	8.684x10 ⁻³	1.138x10 ⁻²
08	2.486	1.721	1.989	2.093x10 ⁻²	9.443x10 ⁻³	9.719x10 ⁻³
09	2.194	1.556	1.755	1.591x10 ⁻²	9.479x10 ⁻³	1.636x10 ⁻²
10	1.917	1.541	1.534	1.123x10 ⁻²	1.026x10 ⁻²	6.176x10 ⁻³
11	2.308	1.712	1.846	1.121x10 ⁻²	7.484x10 ⁻³	8.889x10 ⁻³
12	1.895	1.282	1.516	2.244x10 ⁻²	6.255x10 ⁻³	4.22 x10 ⁻³
Ave.	2.037x10 ⁻¹	1.648x10 ⁻¹	1.630	2.031x10 ⁻²	8.962x10 ⁻³	1.023x10 ⁻²

* Ave. of 11 months

Exposure Site :Herran

Month	SO ₃ , x 10 ⁻¹ mg/day/dm ²		SO ₂ , x 10 ⁻¹ mg/d/dm ²	NaCl mg/d/dm ²	HCl mg/d/dm ²	NO ₂ mg/d/dm ²
	Shelter	Ins. Screen	Shelter			
01	9.900	7.001	7.920	0.47 x10 ⁻²	5.147x10 ⁻³	9.12 x10 ⁻²
02	6.526*	4.905*	5.221	8.240x10 ⁻³	3.716x10 ⁻³	9.435x10 ⁻²
03	8.087	5.265	6.470	6.305x10 ⁻²	6.589x10 ⁻³	5.863x10 ⁻²
04	7.154	5.103	5.723	1.323x10 ⁻²	6.589x10 ⁻³	6.264x10 ⁻²
05	6.132	4.217	4.906	5.764x10 ⁻³	7.845x10 ^{-3*}	4.482x10 ⁻²
06	3.366	6.355	2.693	6.080x10 ⁻³	6.703x10 ⁻³	3.677x10 ⁻²
07	4.100	3.163	3.280	1.120x10 ⁻²	7.997x10 ⁻³	3.595x10 ⁻²
08	4.051	3.110	3.241	2.052x10 ⁻²	6.762x10 ⁻³	2.545x10 ⁻²
09	4.791	3.410	3.832	1.604x10 ^{-2#}	9.16 x10 ⁻³	4.083x10 ⁻²
10	6.332	4.432	5.066	1.851x10 ⁻²	1.419x10 ⁻²	1.881x10 ⁻²
11	9.193	6.074	7.354	9.099x10 ⁻³	5.028x10 ⁻³	5.559x10 ⁻²
12	8.678	5.838	6.942	1.604x10 ^{-2#}	1.441x10 ⁻²	4.655x10 ⁻²
Ave.	6.526x10 ⁻¹	4.905x10 ⁻¹	5.221	1.604x10 ⁻²	7.845x10 ⁻³	5.097x10 ⁻²

* Ave. of 11 months

Ave. of 10 months

Exposure Site : Cavite

Month	SO ₃ , x 10 ⁻¹ mg/day/dm ²		SO ₂ , x 10 ⁻¹ mg/d/dm ²	NaCl mg/d/dm ²	HCl mg/d/dm ₂	NO ₂ mg/d/dm ²
	Shelter	Ins. Screen	Shelter			
01	3.092	1.905	2.474	6.94 x 10 ⁻²	5.380x10 ⁻³	0.59 x 10 ⁻²
02	2.487	2.283	1.990	3.349x10 ⁻²	8.427x10 ⁻³	1.197x10 ⁻²
03	3.921	2.677	3.137	7.785x10 ⁻²	1.208x10 ⁻²	7.988x10 ⁻³
04	3.853	2.821	3.082	2.275x10 ⁻²	1.208x10 ⁻²	9.099x10 ⁻³
05	1.645	1.864	1.316	2.309x10 ⁻¹	1.733x10 ⁻¹	5.452x10 ⁻³
06	1.526	1.841	1.221	1.935x10 ⁻²	8.374x10 ⁻³	4.413x10 ⁻³
07	1.976	1.019	1.581	1.300x10 ⁻¹	1.933x10 ⁻²	9.159x10 ⁻⁴
08	1.091	6.026	0.873	4.856x10 ⁻²	7.825x10 ⁻³	2.247x10 ⁻²
09	1.681	1.075	1.345	5.081x10 ⁻²	1.236x10 ⁻²	6.796x10 ⁻³
10	2.577	1.755	2.062	3.365x10 ⁻¹	1.489	1.989x10 ⁻³
11	2.894	2.070	2.315	3.381x10 ⁻²	8.627x10 ⁻³	3.585x10 ⁻³
12	3.100	2.060	2.480	2.573x10 ⁻²	9.644x10 ⁻³	5.028x10 ⁻³
Ave.	2.487x10 ⁻¹	2.283x10 ⁻¹	1.990	8.429x10 ⁻²	2.522x10 ⁻²	7.134x10 ⁻³

* Ave. of 11 months only (Oct. was not included due to possible contamination of sea water during typhoon).

Exposure Site : Sucat

Month	SO ₃ , x 10 ⁻¹ mg/day/dm ²		SO ₂ , x 10 ⁻¹ mg/d/dm ²	NaCl mg/d/dm ²	HCl mg/d/dm ²	NO mg/d/dm ²
	Shelter	Ins. Screen	Shelter			
01	2.337	1.732	1.870	2.900x10 ⁻²	2.2287x10 ⁻³	1.105x10 ⁻²
02	4.114*	3.197	3.291	1.206x10 ⁻²	3.384x10 ⁻³	1.543x10 ⁻²
03	3.309	2.310	2.647	4.818x10 ⁻²	7.467x10 ⁻³	5.595x10 ⁻³
04	3.371	2.911	2.697	1.855x10 ⁻²	7.467x10 ⁻³	1.530x10 ⁻²
05	3.342	2.214	2.674	2.020x10 ⁻²	9.87 x10 ⁻³	5.912x10 ⁻³
06	4.258	5.483	3.406	1.124x10 ⁻²	7.880x10 ⁻³	1.540x10 ⁻²
07	7.970	6.636	6.376	1.105x10 ⁻²	9.394x10 ⁻³	2.738x10 ⁻²
08	5.674	3.954	4.539	7.046x10 ⁻³	9.902x10 ⁻³	1.633x10 ⁻²
09	4.879	3.677	3.903	1.780x10 ^{-2*}	8.829x10 ⁻³	2.317x10 ⁻²
10	4.033	2.909	3.226	1.987x10 ⁻²	1.255x10 ⁻²	4.93 x10 ⁻³
11	3.398	2.317	2.718	1.770x10 ⁻²	6.413x10 ⁻³	7.062x10 ⁻³
12	2.688	1.583	2.150	1.156x10 ⁻³	7.389x10 ⁻³	4.33 x10 ⁻³
Ave.	4.114x10 ⁻¹	3.197x10 ⁻¹	3.291	1.78x10 ⁻²	7.736x10 ⁻³	1.266x10 ⁻²

* Ave. of 11 months

LIST OF JAPANESE COUNTERPARTS

I. Long Term Experts

Team Leader	Shun-Ichi Harada (Present) 07 March 1990 - 06 March 1992
	Tadao Kimura (Past) 20 July 1988 - 15 March 1990
Technical Assistant	AKira Ishii (Out-going) 09 January 1989 - 08 January 1991
	Toshiharu Kobayashi (In-coming) 30 October 1990 - 29 October 1992
Coordinator	Nasaru Iizuka 20 April 1989 - 19 April 1991

II. Short Term Experts

Item of Instruction	Name	Term	Subject
Corrosion Science	Dr. T. Kodama	1988.10.03 1988.10.21	Introduction to Atmospheric Corrosion
	Dr. T. Tsuru	1990.08.01 1990.08.01	Electrochemistry
Corrosion Control Tech. & Material	Mr. Y. Ishihara	1989.02.28 1989.04.27	Paint Technology
		1988.11.28 1988.12.23	Exposure Test
	Mr. T. Kurosawa	1990.12.05 1990.12.19	Collaborative Research
Corrosion Test Method	Mr. Y. Ueoka	1989.09.10 1989.09.17	Blast Machine: Install. & Operation
	Mr. K. Akimoto	1989.09.04	Reverse Osmosis:
	Mr. H. Ooishi	1989.09.10	Install. & Operation
	Mr. S. Kikukawa Mr. H. Suzuki	1989.11.26 1989.12.06	CCCT & W-Meter Install. & Operation
Evaluation Method	Mr. S. Sato	1989.04.10 1989.04.21	UTM: Install. & Operation
	Mr. I. Sakamoto	1989.06.10 1989.07.12	SEM: Install. & Operation
	Mr. K. Nishina	1989.06.20 1989.07.05	XRD: Install. & Operation
	Mr. S. Ito	1990.01.08 1990.02.17	Instrumental Analysis

	Mr. S. Fujita	1990.01.17 1990.02.15	Evaluation of Atmospheric Corrosion
	Mr. T. Inuma	1990.08.06 1990.08.11	Potentiostat: Install. & Operation
	Mr. T. Yorozu	1990.08.20 1990.09.01	XRF: Install. & Operation
	Mr. M. Nashimoto	1990.09.17 1990.09.26	Glass Beads Preparation Equipment of XRF: Install. & Operation
	Mr. I. Nakakita	1990.09.30 1990.10.06	Repair & Maintenance of XRD
Environmental Measurement	Mr. S. Yamada	1988.10.25 1988.12.23	Sampling & Analysis of Pollutants - 1
	Mr. T. Kawai	1989.10.11 1989.11.09	Sampling & Analysis of Pollutants - 2
Data Analysis	Mr. J. Ishiwata	1989.07.25 1989.08.23	Statistical Method

番号	主要機材・器具
1	Thermometer Screen 600 × 600 × 600mm
2	Dust Fall Collector, No. 8008 - 04
3	Stereoscopic Microscope, SMZ - 2T - 1
4	Reading Microscope, PRM - 2
5	Scale magnifier, No. 7
6	Camera, F 3
7	Epidiascope, EP 6000
8	Screen with Stand 150 × 150cm, ES - 3
9	Omnigraphic 252, Omnigraphic 252
10	Synchronized Tape Recorder for Slide Projector, Slidecoder 801
11	Ultrasonic Cleaner 250 × 150mm, DT - 10
12	Electroplating Equipment
13	Thermo Regulator Rotating magnet system
14	Small Pump, CP - 08
15	Hot Air Rapid Drying oven 0 - 250°C, MSF - 12S
16	Hot Air Specimen Dryer, Buehler
17	Electronic Analytical Balance, AEL - 200
18	Electronic Analytical Balance, EB - 3200H
19	PH meter, HM - 10K
20	Portable Conductivity Meter, CM - 1K
21	Spectrophotometer, UV - 120 - 2
22	Ion Chromatography, HIC - 6A
23	Reverse Osmosis Laboratory Grade Water System, SPB
24	Recording Hygro-thermograph, 3-month winding
25	Integrating Dew Time Sensor
26	Solar Radiation Measuring Equipment
27	Black Panel Thermometer
28	White Panel Thermometer
29	Standard Thermometer, Double tube
30	Maximum - minimum Thermometer, Bar
31	Sea Salt Particle Collector 15 × 15cm
32	Sulfur Oxide Collector

番号	主要機材・器具
33	Pinhole Tester, PH - 10
34	Electromagnetic Thickness Tester, LE - 300
35	Plating Thickness Tester, EF - 1000
36	Portable Surface Thermometer, HL - 100
37	Surface Ruffness Tester, SE - 40D
38	Color Meter, CR - 200
39	Portable Gloss Meter, HA - 9
40	Adhesion Tester, 106 No. 2
41	Down Transformer, KD - 1000
42	Tape Writer, MI360
43	Combined Cyclic Corrosion Tester, ISO - 3 - CY
44	Atomosheric Exposure rack, A - 78Z
45	Belt Sander with Dust Collector, BH - 43Z
46	High-Speed Presicion Cutter, N 45 A
47	Metallographic Pregrinder, 6525B
48	Metallographic Polisher, 5627 - 56
49	Disk Grinder, PDA - 100C
50	Water Baths, ET - 45D
51	Pipe Heater, 81 - 5258
52	Lobo -Cooler, LC - 100F
53	Stirrer, MZ - 800
54	Magnetic Stirrer, HS - 8
55	Hot Plate, TPH - 45
56	Labo - Jack
57	Disiccater, BG 2
58	Inverted Microscope, TME - NR
59	No - Pump Dry Booth, DB - 2S
60	Air Spray Gun, W - 71 - 2G
61	Air Spray Gun, W - 77 - 2G
62	Paint Cup 250cc, PC - 5
63	Paint Cup 400cc, PC - 4
64	Air Compressor, SU 07Pb
65	Airless Spray Unit, 075T050

番号	主要機材・器具
66	Sag tester, U type
67	Sag tester, BOX type
68	Drying ovens, SPHH - 200
69	Ford Cup Viscometer, No. 4
70	NK 2 Cup
71	Stormer Viscometer
72	Rion Viscotester, VT - 04
73	Personal Computer, 120
74	Sun Duration Meter, MS - 091
75	UV Pyranometer, MS - 140
76	Precision Pyranometer with Filter, MS - 801 (RG 715)
77	Tipping Bucket Rain Gauge, MW - 010
78	Wind Speed & Direction Transmitter with Converter, MA - 050
79	Data Logger SOLAC III, MP - 090
80	Installation Pole 6m, PM - 030
81	Atomosheric Exposure rack, A - 78Z
82	Reverse Osmosis Laboratory Apparatus, RO - 100
83	FRP Cutter, KS - 100
84	Blast Mashine, L - 1
85	Urtra Mixrotohm, ULTRACUTE
86	Impedance Tester, CJA - 3
87	Dupont Impact Tester, IM - 201
88	Erichsen Cupping Tester, PI - 101
89	Adhesion Tester, 106
90	Air Cleaner, MA - 400 -WH
91	Air Conditioner, PS - 100G -W
92	Dehumidifires
93	X - ray Difliactometer, XD - 610
94	Gas Chromatograph, GC - 14
95	Scanning Microscope, JSM -T 330A
96	Ion Sputter, JFC - 1100E
97	Vacuum Coater, SVE - 700 TURBO
98	Dewcycle Sunshine Super Long-life Weather Meter, WEL-SUN-DC-B

番号	主要機材・器具
99	Water Cooler, PW - 1, PW - 1
100	Fourier Transform Infrared Spectrometer, 1720
101	Automatic Voltage Regulator
102	Preparing Mashine for Glass Bead Test Specemen, TR-AUTO-Bead-1000S
103	Electric Table Balance, EB 330H
104	Integrating Light Dosage Meter, PH-51-T
105	Coating Thickness Tester, LH-300
106	Desicator (Plastic), BG - 2
107	Drying Oven, MSF-113S
108	Specimen Dryer, No. 8333
109	Hand Magnifire with Light, No. 7
110	Washing mashine Steem Boiling type, TVC-15
111	X-ray Spectoromater, 3030
112	Nissan Patorol Station Wagon, WRLGY 60SCP 9
113	Automatic Absorption Spectrophotometer, AA - 680

LOCAL JICA BUDGET FOR THE PROJECT (April to November 1990)

mit:peso

SUBJECT	CONTENTS	APPLIED AMOUNT	APPROVED AMOUNT	ACTUAL AMOUNT	APR. 1990	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN. 1991	FEB.	MAR.	MEMO
① Local implementation budget	(monthly remittance)		237,752.55	237,752.55	△												
② Audio visual teaching material processing	Video teaching Material processing (FERDC)	282,000.00 (¥1,993,458)	277,000.00 (¥1,959,000)		△	○					●						
③ Technical exchange visit	Visit to ASEAN Countries for Multilateral Activities.	(¥2,136,368)	180,480.00 (¥1,383,040)	on adjusting air fare		○											
④ Multi-Activity A	Collaborative research work	868,044.00	868,044.00								△	○					
⑤ Multi-Activity B	Regional training	414,898.00									△						
⑥ Multi-Activity C	Seminar / Workshop	846,668.00									△						
⑦ Emergency budget	Deep well installation	not applied yet															
TOTAL			1,563,285.55														

* △ Application ○ Approval, Allocation ● Implementation

ALLOTMENT OF COUNTERPART FUND

Japan - ASEAN Technical Cooperation Project
on Atmospheric Corrosion - Metallic Coatings CY 1989

I. Maintenance and Operating Expenses	Philippine Peso (P)
200-04 Repair and Maintenance of Government Facilities	300,000
200-06 Other Services*	120,000
200-07 Supplies and Materials	260,000
200-14 Water, Illumination and Power	85,000
200-17 Maintenance of Motor Vehicles Used for official Travel	25,000
200-19 Representation Expenses	<u>60,000</u>
Total MOE	850,000
II. Capital Outlays	
300-33 Equipment Outlays	150,000
Airconditioning Unit Rooms 214, 219 and 124	45,000
Conference/Seminar Room	35,000
Intercom System (12 units)	20,000
Audio System for Conference/ Seminar Room	30,000
Laboratory Chairs and Fixtures	<u>20,000</u>
Total CY 1989 Budget	<u>1,000,000</u>

* The amount released for other services shall be used for the repair and maintenance of equipment.

Note: Local counterpart budget for the project for 1991 will be integrated with the STD budget allocation.

Counterpart Fund : Actual expenditures / balances for the project as of 20 November 1990

SUMMARY

ITEM	Allotment	Expenditure	Balance
			(Philippine Peso, P)
200-04 Repair and Maintenance of Government Facilities	300,000	130,732.20	169,267.80
200-06 Other Services	120,000	115,460.32	4,539.68
200-07 Supplies and Materials	260,000	169,274.24	90,725.76
200-14 Water, Illumination and Power	85,000	64,621.00	20,379.00
200-17 Maintenance of Motor Vehicle	25,000	5,144.05	19,855.95
200-19 Representation Expenses	60,000	44,013.81	15,986.19
300-33 Equipment Outlay	150,000	79,900.00	70,100.00
TOTAL	1,000,000	609,145.62	390,854.38

PLANS AND ACTIVITIES FOR 1991

1. UPGRADING OF ITDI FACILITIES

The upgrading of ITDI facilities will be continued. Top priority as discussed during the Second Joint Implementing and Planning Meeting are the following:

1.1 Improvement of power supply to insure proper operation and long life of equipment

A grounding system for the potentiostat was already installed.

A separate power generator for the project's main equipment has not yet been installed. Construction of the generator shed is still to be started.

1.2 Provision of a separate water supply source for weatherometer, combined cyclic corrosion tester and R-O system

The energy crisis in the Philippines now aggravated by the Persian Gulf strife has caused intermittent brown-outs which in turn cut water supply. Such a situation presents a big problem to the project's implementation especially in using equipment (e.g., weatherometer, combined cyclic corrosion tester and R-O system) whose operation depends largely on water. Therefore, the provision of a separate water supply source, specifically, a deep well for these equipment was deemed necessary to ensure the smooth progress of the project.

A separate water tank/reservoir was already made available for continuous/back - up water supply. However, the construction for the much-needed deep well has not been started and the proposed work is still up for bidding from contractors.

1.3 Acceleration of repair/renovation of rooms for storage and additional equipment in the future

Repair/renovation of rooms has not been completed mainly due to ITDI budget constraint.

2. REQUESTED EQUIPMENT LIST FOR 1991

The following is the list of requested equipment for 1991.

	PRIORITY
2.1 Analytical Equipment	
a. Accessories for A A S	A
b. UV - Vis Spectrophotometer	B
c. Image processor for EDAX & met. microscope	C
d. FTIR data library	C
e. XRD reference file software	A
2.2 Environmental Equipment	
a. Automatic Rain Acidity Recorder	B
2.3 Test and Measurement Equipment	
a. Gas corrosion tester SO ₂ ; H ₂ S; NO _x	A
b. Surface quality meter	A
c. Ultrasonic thickness tester	A
2.4 Laboratory Equipment	
a. Fume hood	A
b. Automatic dispenser with reservoir	A
2.5 Auxiliary Equipment	
a. Dark Room w/ developing and printing equipment	B

3. LIST OF PROPOSED SHORT - TERM EXPERTS FOR 1991

	<u>No. of Experts</u>
1) EDX Application (3 weeks)	- 2
2) Installation and Operation of GC/IC Chromatography (Dionex) (2 weeks)	- 1
3) Environmental Analysis	- 1
4) Metallic Coatings (4 weeks)	- 2
5) 1991 Collaborative Research	
5.1) Electrochemical Evaluation	- 1
5.2) Evaluation of Data/Results	- 1
6) 1991 Training Programme	
6.1) Estimation of Material Life using the Computer	- 1
	<hr/>
Total	- 9

4. PROPOSED TRAINING IN JAPAN FOR 1991

The following are the proposed topics and schedule including the nominees for training in Japan for 1991.

- | | |
|-------------------------|--|
| 1. Lillian A. de Guzman | Evaluation of the Corrosion Resistance of Metallic - Coated Steels (one year duration to start in June 1990) |
| 2. Eden T. Luna | Analysis of Corrosion Products (3 - 6 months) |
| 3. Chona I. de la Pena | Measurement of the Weathering Deterioration of Organic Films (3 - 6 months) |

* Since one training slot is allocated for another ASEAN member country, one nominee from the Philippines may be deferred.

5. IMPLEMENTATION OF RESEARCH STUDIES

The following are the topics of research which the Corrosion Project Staff plan to undertake in the near future.

- 5.1 A Comparative Study on the Atmospheric Behavior between Skyward and Groundward Surfaces of Metals
- 5.2 A Study on the Effect of Exposure Rack Orientation/Angle of Inclination on Atmospheric Corrosion of Metals
- 5.3 A Nationwide Survey of Atmospheric Corrosivity * *

* * Selection of exposure sites will be on a regional basis.

6. PUBLIC RELATIONS ACTIVITIES

The following are the public relations activities to be implemented in 1991:

6.1 Technical Bulletin

A technical bulletin primarily for the promotion of corrosion science education in the Philippines will be published under the auspices of ITDI and JICA in cooperation with the Corrosion Association of the Philippines (CAP). It will feature technical papers and critical reviews in the field of corrosion, particularly, literary contributions from local government and private institutions concerned with or interested in corrosion.

6.2 Brochure

The brochure will feature basic principles, operation and application of the project's main analytical instruments. It will serve as a way of introducing these instruments to government and private entities, especially, the industrial sector which may need the services of these instruments.

6.3 Video Production on Project Activities

The production of a video featuring the various activities of the project will be undertaken with the expert assistance of the Philippine Human Resources Development Corporation (PHRDC).

6.4 Open - house

Project facilities/sites will be open for public - viewing during the open - house. A brief discussion on the project, its objectives and different areas of activity will precede a tour to the various laboratories/sites which house the various equipment and facilities of the project.

6.5 Lecture - Demo

This will be held to educate or train small groups coming from the academe or the industrial sector on specific areas or topics of interest.

7. DOMESTIC SEMINARS

Seminars on the application and operation of analytical instruments, specifically, FTIR, AAS, Ultramicrotohm, XRD, XRF and SEM/WDX will be facilitated through the project. These will be conducted by speakers/resource persons from the Philippines and/or other ASEAN countries.

MULTILATERAL ACTIVITIES

1. SCHEDULE FOR FY 1990

The implementation schedule of the multilateral activities in the Philippines for FY 1990 is as follows :

- | | |
|----------------------------|------------------------------------|
| 1.1 Seminar | 4 - 9 March 1991 |
| 1.2 Collaborative Research | 19 November 1990 -
9 March 1991 |
| 1.3 Training | 9 January -
2 February 1991 |

Their final announcements which were sent to the ASEAN member countries are given as Annex 1-C, 2-C, and 3-C, respectively. Annex 4-C shows the list of accepted applicants for the multilateral activities for FY 1990.

2. SCHEDULE FOR FY 1991

The implementation schedule of the multilateral activities in the Philippines for FY 1991 is as follows :

- | | |
|----------------------------|--------------------------------------|
| 2.1 Collaborative Research | August - November
1991 (3 months) |
| 2.2 Training | July 1991 (1 month) |

The proposed topics for the collaborative research and training are Electrochemical Evaluation and Estimation of Material Life, respectively.

3. PHILIPPINE PARTICIPATION IN MULTILATERAL ACTIVITIES OF OTHER ASEAN COUNTRIES

Five (5) ITDI staff were dispatched for training, while twelve (12) participated in seminars held in other ASEAN countries. A detailed listing of Philippine participation in multilateral activities in other ASEAN countries is shown as ANNEX 5-C.

4. TECHNICAL EXCHANGE VISITS

4.1 Philippine Team

The Philippine technical exchange team composed of two Philippine counterparts and one long-term Japanese expert visited four (4) ASEAN countries (i.e., Singapore, Malaysia, Thailand, and Indonesia) on 10 - 24 May 1990. Plans for multilateral activities were presented and discussed. The team also visited, in each country, various government and private institutions which have concern on corrosion.

4.2 Other ASEAN Member Countries

Technical exchange teams from other ASEAN member countries, specifically, Indonesia, Malaysia and Thailand visited the Philippines in connection with the implementation of the multilateral activities under the ASEAN - Japan Technical Cooperation on Science and Technology. The schedules of visits of the said teams are:

Indonesia	18 - 21 July 1989
Malaysia	7 - 11 March 1990
Thailand	24 - 27 July 1990

FINAL PLANNING PAPER
FOR ASEAN - JAPAN SEMINAR/WORKSHOP
ON ATMOSPHERIC CORROSION IN THE PHILIPPINES FOR FY 1990

4 - 9 March 1991

1. TITLE:

Seminar/Workshop on Atmospheric Corrosion - Metallic Coatings

2. PURPOSE:

To serve as a venue for exchange of information on atmospheric corrosion among ASEAN member countries and to learn and benefit from the Philippine experience and Japanese expertise in this field under the ASEAN-Japan Cooperative Programme on Materials Science and Technology.

3. DURATION:

The seminar/workshop is scheduled for 4-9 March 1991 in Manila, Philippines.

4. PROGRAMME:

The programme will consist of three (3) days paper presentation/lecture and workshop and one (1) day laboratory visit. Japanese experts will be invited to talk on trends in corrosion science, atmospheric corrosion of metallic coatings and atmospheric corrosion evaluation. The host country will present a technical paper on atmospheric corrosion in the Philippines and participants from ASEAN countries will be invited to present a paper focussing on their experience on atmospheric corrosion problems, prevention and control.

5. PARTICIPATING COUNTRIES:

Brunei Darussalam, Indonesia, Japan, Malaysia, Philippines, Singapore and Thailand.

6. NUMBER OF PARTICIPANTS:

There will be seventy (70) participants, three (3) from each invited ASEAN member country and fifty-five (55) from the Philippines.

7. QUALIFICATIONS OF PARTICIPANTS:

- (1) Participants should preferably have qualifications at the degree level, with relevant experience in the field of corrosion.
- (2) A good command of English is necessary, as this is the language of the seminar.

8. SPEAKERS/LECTURERS:

Three (3) Japanese experts will be invited to talk on trends in corrosion science, atmospheric corrosion of metallic coatings and atmospheric corrosion evaluation. A representative from the Corrosion Association of the Philippines will talk on corrosion prevention and control and another representative from the collaborative research programme being undertaken in the Philippines will also present results of research. Participants from ASEAN countries will present country papers.

9. UNDERTAKING OF BOTH GOVERNMENTS:

In preparing for and implementing the seminar, the Japan and Philippine organizations involved will undertake the following responsibilities:

- (1) Industrial Technology Development Institute -
Department of Science and Technology
 - a. To finalize the programme
 - b. To arrange accommodations for the participants
 - c. To submit details of participants nominated by ASEAN countries to the JICA Philippine office.
 - d. To arrange for domestic travel tours.
 - e. To submit a seminar evaluation report to JICA (Philippine) office and a copy thereof to the Embassy of Japan in the Philippines.
 - f. To coordinate all matters related to the seminar.

(2) JICA

- a. To bear the following expenses for the seminar:
 - a.1. Round trip air fare, accomodation, per diem and medical insurance premium for the participants from outside the Philippines
 - a.2. Expenses for the seminar, such as materials, study tours, secretarial services, etc.
- b. To arrange for the dispatch of Japanese experts/speakers for the seminar.

10. IMPLEMENTATION SCHEDULE:

Date	Activities
21 September 1990	Announcement to ASEAN member countries
21 September 1990	Announcement to Japanese experts
15 November 1990	Deadline for submission of names of ASEAN participants and Abstracts of country papers
3 December 1990	Confirmation of ASEAN participants Call for country papers
10 December 1990	Announcement to Philippine participants
30 January 1991	Deadline for submission of country papers, CAP and Japanese lecturers' technical papers
	Deadline for submission of names of Philippine participants
15 February 1991	Confirmation of Philippine participants

Note: At least one(1) country paper for each ASEAN member country

**GENERAL PROGRAMME
(TENTATIVE)**

March 4, Monday - arrival of participants from ASEAN countries

March 5, Tuesday

AM

8:30 - 9:30	Registration
9:30 - 9:40	Welcome Address (Dr. Luis)
9:40 - 9:50	Welcome Address (Mr. Harada)
9:50 - 10:00	Message (JICA)
10:00 - 10:30	B R E A K
10:30 - 10:45	Keynote address (Sec. Follosco)
10:45 - 12:00	Presentation of Participants
12:00 - 1:30	N O O N B R E A K

PM

1:30 - 2:30	Trends in Corrosion Science
2:30 - 3:00	Open forum
3:00 - 3:30	B R E A K
3:30 - 4:30	Corrosion Prevention and Control
4:30 - 5:00	Open Forum
6:00 - 7:30	WELCOME PARTY

March 6, Wednesday

AM

8:30 - 9:30	Atmospheric Corrosion of Metallic Coatings
9:30 - 10:00	Open Forum
10:00 - 10:30	B R E A K
10:30 - 11:00	Country Paper No. 1 and Open Forum
11:00 - 11:30	Country Paper No. 2 and Open Forum
11:30 - 12:00	Country paper No. 3 and Open Forum
12:00 - 1:30	N O O N B R E A K

PM

1:30 - 2:30	Atmospheric Corrosion Evaluation
2:30 - 3:00	Open Forum
3:00 - 3:30	B R E A K
3:30 - 4:00	Country Paper No. 4 and Open Forum
4:00 - 4:30	Country Paper No. 5 and Open Forum
4:30 - 5:00	Country Paper No. 6 and Open Forum

March 7, Thursday

AM

8:30 - 9:30

Presentation of the Results of
Collaborative Research and Open
Forum

9:30 - 10:00

B R E A K

10:00 - 12:00

Workshop (proposals, detailed
plans based on discussions,
recommendations)
Discussion Leaders: Philippines
Thailand

12:00 - 1:30

N O O N B R E A K

PM

1:30 - 2:30

Seminar Evaluation

2:30 - 3:00

B R E A K

3:00 - 5:00

Closing Ceremony
Distribution of Certificates
Closing Remarks (Dr. Lantican,
DOST Undersecretary)

6:30 - 8:30

FAREWELL PARTY

March 8, Friday

AM

Corrosion Lab/Exposure Site
Visit (Bicutan)

PM

Visit (Malacanang, Intramuros)

March 9, Saturday - departure of ASEAN participants for their
respective countries

FINANCIAL REQUIREMENT

A. Expenses for the participants	Estimated Amount
1. Air fare	P 250,000.00
2. Living allowance	
a. accomodation	
P1800/night X 7 nights X 15 persons	189,000.00
b. Per Diem	
P500/day X 7 days X 15 persons	52,500.00
c. Meeting sertvice	
P100/person X 15 persons	1,500.00
d. Insurance (?)	-
 B. Expenses for the seminar	
1. Materials	
a. Folder	5,000.00
b. Stationaries	3,000.00
c. Name tags	1,500.00
d. Banners	2,000.00
2. Services	
a. Secretarial (printing, binding, etc.)	7,000.00
b. Documentation (photography, video, etc.)	10,000.00
c. Press release/press people	2,000.00
3. Site visit/tour	10,000.00
4. Conference package	150,000.00
 C. Farewell/cocktail party	50,000.00
Sub-total	P 703,500.00
 D. Contingency Cost (10% of actual cost)	70,350.00
TOTAL	P 773,850.00

FINAL PLANNING PAPER
FOR ASEAN-JAPAN COLLABORATIVE RESEARCH PROGRAMME
ON ATMOSPHERIC CORROSION IN THE PHILIPPINES FOR FY 1990

19 November 1990 - 9 March 1991

1. TITLE : Collaborative research Programme on
Atmospheric Corrosion - Metallic Coatings

2. PURPOSE :

To provide participants from ASEAN member countries the opportunity to undertake research in the field of Atmospheric Corrosion - Metallic Coatings using the facilities available in the Philippines and acquired through the ASEAN-JAPAN Cooperation Programme on Materials Science and Technology.

3. DURATION :

The duration of the collaborative research is about four (4) months from 19 November 1990 to 9 March 1991.

4. PROGRAMME :

The collaborative research will be conducted for about four (4) months with the following activities:

- a. Studying the theory and practice of accelerated corrosion testing
- b. Selection of accelerated corrosion test cycles based on available environmental data
- c. Comparison of morphology and composition of corrosion products subjected to accelerated and natural exposure.
- d. Investigation of a correlation between accelerated corrosion test and atmospheric exposure test based on corrosion rate.

Results in the collaborative research will be presented in the ASEAN-JAPAN seminar on Atmospheric Corrosion which will be held in the Philippines in March 1991.

5. PARTICIPATING COUNTRIES :

Brunei Darussalam, Indonesia, Malaysia, Singapore and Thailand.

6. NUMBER OF PARTICIPANTS :

Three (3) participants will be chosen from candidates endorsed by the ASEAN member countries.

7. QUALIFICATIONS OF PARTICIPANTS :

- a) Participants should preferably have qualifications at the degree level/senior researcher with practical experience in atmospheric corrosion study.
- b) A good command of English will be an advantage as each participant will be required to submit a technical report at the end of the duration of research work.
- c) Participants should also be of good health.

8. HOST-RESEARCHER/SHORT TERM EXPERTS :

The collaborative research work will be joined by selected local counterparts involved in the project. Two Japanese experts on Atmospheric Corrosion will be invited.

9. SCHEDULE OF IMPLEMENTATION :

The proposed schedule of implementation of the collaborative research activity is as follows:

DATE	ACTIVITIES
21 September 1990	Announcement to ASEAN member countries
12 October 1990	Deadline for Submission of Application Form
19 October 1990	Confirmation/Announcement of ASEAN participants
19 November 1990	Commencement of Collaborative Research Work

10. WORK SCHEDULE :

ACTIVITIES	M O N T H				
	Nov.	Dec.	Jan.	Feb.	Mar.
1. Selection of two types of atmosphere	—				
2. Study of - a) Recorded environmental data b) Literature on the theory and practice of accelerated corrosion testing	—				
3. Determination of cycle corresponding to each selected atmosphere		—			
4. Preparation of the CCCT equipment and test specimens		—			
5. Accelerated corrosion testing Cycle A Cycle B Preparation of exposure test specimens			—	—	
6. Evaluation of test specimens a) Mass loss b) SEM analysis c) XRD analysis, etc. d) Comparison of corrosion products e) Comparison of corrosion rate				—	
7. Report Writing					—
8. Participation in the Seminar					—

11. AVAILABLE EQUIPMENT FOR THE RESEARCH :

1. Combined Cyclic Corrosion Tester
2. Weather Meter
3. Scanning Electron Microscope with WDX
4. X-Ray Diffractometer and X-Ray Fluorescence Spectrometer
5. Fourier Transform Infrared Spectrometer
6. Atomic Absorption Spectrometer
7. Metallographic Microscope, etc.

FINAL PLANNING PAPER
FOR ASEAN-JAPAN TRAINING
ON ATMOSPHERIC CORROSION IN THE PHILIPPINES FOR FY 1990

7 January - 2 February 1991

1. TITLE:

Training on Atmospheric Corrosion - Metallic Coatings

2. PURPOSE:

To familiarize participants from other ASEAN member countries with the method of study of atmospheric corrosion adopted for the Philippine project.

3. DURATION:

The training will be conducted from 7 January to 2 February 1991.

4. PROGRAMME:

The training programme will be held for four (4) weeks, consisting of actual preparation of test specimens and test samplers; field exposure activities; outdoor exposure testing; instructions on procedures for chemical analysis; measurement of environmental pollutants and meteorological factors; and evaluation of test specimens.

5. PARTICIPATING COUNTRIES:

Brunei Darussalam, Indonesia, Malaysia, Singapore, and Thailand

6. NUMBER OF PARTICIPANTS:

One (1) participant from each ASEAN member country will be invited.

7. QUALIFICATIONS OF PARTICIPANTS:

- (1) Participants should be fresh graduate/junior researcher preferably with basic knowledge on corrosion.
- (2) A good command of English is necessary, as this is the language of training.
- (3) Participants should be physically fit to undertake the training.

8. TRAINERS:

Training will be conducted by investigators both local counterparts and Japanese experts who are directly involved in the project.

9. IMPLEMENTATION SCHEDULE

21 September 1990	Announcement to ASEAN member countries
15 November 1990	Deadline for Submission of Application Form
29 November 1990	Confirmation/Announcement of Participants
January 1991	Commencement of Training

10. TRAINING SCHEDULE:

DATE	ACTIVITIES
7 January	Arrival
8 January	Courtesy call to ITDI Director Dr. Rufino C. Lirag Welcome Address by ITDI Deputy Director for R & D Dr. Ernesto S. Luis Introduction of ITDI by Chief of Standards & Testing Division Mr. Edwin T. Palma Orientation of Trainees
9-11 January	Details on procedures of outdoor exposure test and measurement of atmospheric factors Preparation of test specimens Preparation of test samplers for measurement of atmospheric pollutants Determination of atmospheric pollutants: 1. Cl^- 2. SO_x 3. H_2S 4. HCl 5. NO_x

12	January	
13	January	
14-18	January	Continuation of Determination of Atmospheric Pollutants Meteorological measurement Evaluation of meteorological data
19	January	
20	January	
21-25	January	Retrieval and Exposure of test specimens and test samplers in exposure sites Evaluation of retrieved test specimens: 1. Taking photographs 2. Mass Loss Determination 3. XRD Analysis of test specimens 4. SEM Analysis of test specimens and others
26	January	
27	January	
28-30	January	Continuation of evaluation of retrieved test specimens and test samplers from exposure sites
31	January	Preparation of report
1	February	Evaluation and final discussion
2	February	Departure

NOTE : Saturdays and Sundays will be free

ACCEPTED APPLICANTS FOR THE MULTILATERAL ACTIVITIES

1. Collaborative Research (19 November 1990 - 12 March 1991)

Indonesia	Ms. Harini
Thailand	Ms. Pakarat Hanvivatvong

2. Training (7 January - 2 February 1991)

Indonesia	Mr. Bahari
Malaysia	Mr. Nasrudin Bin Jarkasi
Thailand	Mr. Supachai Surapant
Singapore	Not replied yet
Brunei	Not replied yet

3. Seminar (4 - 9 March 1991)

Indonesia	Not replied yet
Malaysia	1. Mr. Mohd Amin Hashim 2. Mr. Mohd Sharif Mustapha
Thailand	1. Mr. Narong Akkarapattangoon 2. Mr. Wikrom Vejagupta 3. Mr. Chatchai Somsiri
Singapore	Not replied yet
Brunei	Not replied yet

**PHILIPPINE PARTICIPATION IN MULTILATERAL ACTIVITIES OF OTHER
ASEAN COUNTRIES**

Training

Name	Term	Subject
Ms. C. Bernas	1990.02.01 1990.02.28 (Singapore)	Prevention of Corrosion in Structures: (1) Corrosion of Port and Harbor Structures (2) Corrosion Prevention on Drinking Water Storage Tanks
Ms. L. de Guzman	1990.03.05 1990.03.17 (Brunei)	Corrosion of Reinforced Concrete Structures
Ms. E. Luna	1990.10.15 1990.11.13 (Thailand)	Atmospheric Corrosion - Organic Coatings
Ms. G. Gopez	1990.11.03 1990.11.30 (Indonesia)	Characterization of Polymers
Ms. N. Villostas	1990.11.18 1990.12.15 (Malaysia)	Characterization of Fine Ceramics

Seminar

Term/Country	Participants	Topic
1989.06.14 1989.06.16 (Singapore)	Dr. E. Luis Ms. A. Balagot Ms. A. Vilorio	First ASEAN Seminar on Corrosion
1990.08.04 1990.08.09 (Brunei)	Mr. M. Navarro Mr. J.L. Gamboa Ms. E. Alinea	Corrosion of Reinforced Concrete Structures
1990.09.17 1990.09.21 (Singapore)	Ms. M. Torre Ms. L. de Guzman Mr. R. Vera Cruz	2nd ASEAN Seminar on Corrosion
1990.10.17 1990.10.19 (Thailand)	Dr. E. Luis Ms. C. Habana Ms. C. de la Pena	Atmospheric Corrosion - Organic Coatings
1991.03.06 1991.03.09 (Indonesia)	Mr. S. Bernardo Mr. A. Tabornal Ms. A. Magsino	Symposium on Polymers

Collaborative Research Work

Name	Term	Subject
Ms. E. Bedia	1990.12.01 1991.02.28 (Indonesia)	Characterization of Polymeric Materials

THE RECORD OF DISCUSSIONS
BETWEEN THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF JAPAN
AND THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES
ON THE JAPANESE TECHNICAL COOPERATION FOR THE
ASEAN PROJECT ON ATMOSPHERIC CORROSION - METALLIC COATINGS

The Japanese Implementation Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Dr. RYUICHI NAKAGAWA, visited the Republic of the Philippines from 15 December to 19 December 1985 for the purpose of working out the details of the technical cooperation program concerning the Project on Atmospheric Corrosion - Metallic Coatings (hereinafter referred to as "the Project"), as a part of the Japan - ASEAN Cooperation on Science and Technology.

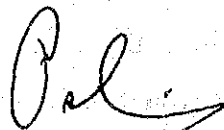
During its stay in the Republic of the Philippines, the Team exchanged views and had a series of discussions with the Philippine authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the project. Following the Team's visit to the Philippines, further discussions with the Philippine authorities concerned thru the Resident Representative of JICA in the Philippines were pursued.

As a result of the discussions, JICA and the authorities concerned of the Government of the Republic of the Philippines agreed to recommend to their respective Governments the matters referred to in the Document attached hereto.

Manila, October 30, 1987



RUFINO C. LIRAG, JR.
Director
Industrial Technology
Development Institute
Philippines



KATSUHIKO OSHIMA
Deputy Resident Representative
Japan International Cooperation
Agency
Manila

THE ATTACHED DOCUMENT

I. COOPERATION BETWEEN BOTH GOVERNMENTS

1. As a part of the Japan-ASEAN Cooperation on Science and Technology, which was initiated at the Ministerial Meeting held in Tokyo in December 1983, the Government of Japan and the Government of the Republic of the Philippines will cooperate with each other in implementing the Project on Atmospheric Corrosion - Metallic Coatings for the purpose of strengthening the technological basis for the reliability of metals and metal coatings against atmospheric corrosion in the ASEAN region in general and particularly in the Republic of the Philippines. It is anticipated that the Project will strengthen and accelerate the cooperation in this technological field among ASEAN countries.

2. The Project will be implemented in accordance with the Master Plan which is given in ANNEX I.

II. DISPATCH OF JAPANESE EXPERTS

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense services of the Japanese experts as listed in ANNEX II through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.

2. The Japanese experts referred to in 1 above will be granted in the Republic of the Philippines the privileges, exemptions and benefits no less favorable than those accorded to experts of third countries and/or international organizations working in the Republic of the Philippines under the Colombo Plan Technical Cooperation Scheme.

III. PROVISIONS OF MACHINERY AND EQUIPMENT

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures through JICA to provide at its own expense such machinery, equipment and other materials necessary for the implementation of the Project as listed in ANNEX III, through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.

2. The articles referred to in 1 above will become the property of the Government of the Republic of the Philippines upon being delivered c.i.f. to the Philippine authorities concerned at the ports and/or airports of disembarkation, and will be utilized exclusively for the implementation of the Project in consultation with the Japanese experts referred to in ANNEX II.

IV. TRAINING OF PHILIPPINE AND OTHER ASEAN PERSONNEL IN JAPAN

1. In accordance with the laws and regulations in force in Japan, the Government of Japan will take necessary measures

through JICA to receive at its own expense the Philippine and other ASEAN personnel connected with the Project for technical training in Japan through the normal procedures under the Technical Cooperation Scheme of the Government of Japan.

2. The Government of the Republic of the Philippines will take necessary measures to ensure that the knowledge and experience acquired by the Philippine personnel from technical training in Japan will be utilized effectively for the implementation of the Project.

V. RESEARCH RESULTS OWNERSHIP AND PUBLICATIONS

The research results arising from the Project will be jointly owned by the participating organizations (JICA and the Industrial Technology Development Institute (ITDI), Department of Science and Technology (DOST)). When the reports or documentations concerning this Project are compiled, it is to be mentioned that the Project has been implemented by JICA and ITDI, DOST as the Technical Cooperation Project between the Government of Japan and the Government of the Republic of the Philippines under the aegis of the ASEAN-Japan Cooperation Programme on Science and Technology.

VI. MEASURES TO BE TAKEN BY THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES

1. In accordance with the laws and regulations in force in the Republic of the Philippines, the Government of the Republic of the Philippines will take necessary measures to provide at its own expense:

- (1) Services of the Philippine counterpart technical personnel as listed in ANNEX II and administrative personnel,
- (2) Provision of laboratory spaces and utilities and use of existing machinery, equipment, instrument, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than those provided through JICA under III above, supply of any other materials shall be subject to the availability of funds, and
- (3) Transportation means for official trips of Japanese experts within the Republic of the Philippines.

2. In accordance with the laws and regulations in force in the Republic of the Philippines, the Government of the Republic of the Philippines will take necessary measures: viz;

- (1) To meet expenses necessary for the transportation within the Republic of the Philippines of the articles referred to in ANNEX III above as well as for the installation, operation and maintenance thereof;

(2) To exempt from payment of customs duties, internal taxes and any other charges, imposed in the Republic of the Philippines, on the articles referred to in ANNEX III above, and

(3) To provide all operating expenses necessary for the implementation of the Project.

3. The Philippine Government will assist in locating and reserving suitably furnished accommodations for the Japanese experts and their families.

VII. ADMINISTRATION OF THE PROJECT

1. The leader of the Philippine Research Team referred to in ANNEX II will assume overall responsibilities for the implementation of the Project.

2. The leader of the Japanese Research Team will provide the necessary recommendations and advice on technical and administrative matters concerning the implementation of the Project to the leader of the Philippine Research Team.

VIII. REGIONAL CHARACTERISTIC OF THE PROJECT

As a part of the Japan-ASEAN Cooperation on Science and Technology, the Project is to be opened to nationals of all ASEAN member countries through training/seminars/workshops and collaborative research works.

IX. CLAIMS AGAINST JAPANESE EXPERTS



The Government of the Republic of the Philippines will undertake to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from occurring in the course of, or otherwise connected with the discharge of their official functions in the Republic of the Philippines except for those arising from the willful misconduct or gross negligence of the Japanese experts.

X. MUTUAL CONSULTATION

There will be mutual consultation between the two Governments on any major issues arising from, or in connection with this Attached Document.

XI. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be five (5) years starting from 30 October 1987.

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- ANNEX I MASTER PLAN
 - ANNEX II PROJECT TEAMS AND PARTICIPATING ORGANIZATIONS
 - ANNEX III LIST OF ARTICLES
 - ANNEX IV TENTATIVE PROGRAM OF COLLABORATIVE RESEARCH TOPICS
 - ANNEX V TENTATIVE IMPLEMENTATION SCHEDULE
- 

ANNEX I

MASTER PLAN

1. Background Information and Justification for the Project

Corrosion of metals is a serious problem in the Philippines as well as in other countries of the world. Machinery, equipment, vehicles and metallic structures that corrode before completing their service life have to be rejected as scrap thereby causing a very large economic loss. In the Philippines, corrosion studies are limited to only some universities and institutions. Presently, none of them conduct Research and Development of corrosion resistance of metals and how their reliability is affected by the environment and atmosphere. The tropical environment of the Philippines causes different effects of the corrosion of metal parts used in several kinds of machinery, equipment, construction materials, etc. Those effects are also different from those found in other countries which are not in the tropics.

2. Objective

The objectives of the Project are:

- (1) To study the effect of atmospheric factors on corrosion of metals in the tropical zone;
- (2) To evaluate metal reliability by the most adequate experimental methods in relation to the results obtained in field practice.

3. Study Framework

The Project is planned to last for five years, divided into five steps, including training Philippine personnel for corrosion monitoring and will cover the following items:

Step 1 - November 1987 to October 1988

- a. Identification of research method and approach
- b. Field observation and survey of corrosion in the Philippines
- c. Data collection from literature
- d. Preparing specimens for the 1st exposure: bare metals, (Fe, Al, Zn, Cu, stainless steel) painted steels, hot dip galvanized steel
- e. Start of the 1st exposure
- f. Environmental analysis
- g. Research review

Step 2 - November 1988 to October 1989

- a. Preparing specimens for the 2nd exposure: electroplated steel and others
- b. Examination of 1 year exposed specimens (1st exposure)
- c. Start of the 2nd exposure
- d. Conducting research on corrosion behaviour of materials
- e. Research review

Step 3 - November 1989 to October 1990

- a. Examination of 2 sets of exposed specimens
 - (a) after 2 years of the 1st exposure
 - (b) after 1 year of the 2nd exposure
- b. Conducting research on corrosion behaviour of materials
- c. Tentative evaluation of the exposure test

Step 4 - November 1990 to October 1991

- a. Examination of 2 sets of exposed specimens
 - (a) after 3 years of the 1st exposure
 - (b) after 2 years of the 2nd exposure
- b. Conducting research on corrosion behaviour of materials
- c. Research review

Step 5 - November 1991 to October 1992

- a. Examination of all exposed specimens
- b. Final evaluation and report
- c. Recommendation on corrosion protection

ANNEX II

PROJECT TEAMS AND PARTICIPATING ORGANIZATIONS

The project will be jointly implemented by the Japanese Research Team and the Philippine Research Team.

The Japanese Research Team will consist of members of the National Research Institute for Metals (NRIM) and others.

The Philippine Research Team will consist of members of the Industrial Technology Development Institute (ITDI).

Each Team will consist of the following experts:

1. The Japanese Research Team

Team Leader

Scientists/Experts in the field of

Protective coating

Corrosion evaluation and environmental testing

Corrosion monitoring

2. The Philippine Research Team

Team Leader

Scientists/Experts in the field of

Protective coating

Corrosion evaluation

Chemical and physical examination

M

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ANNEX III

LIST OF ARTICLES (TENTATIVE)

a. For exposure tests, environmental measurements

- Exposure stand
- Thermometer screen
- Others

b. For coating tests

- Thickness testers
- Paint testers
- Others

c. For surface evaluation

- Salt spray tester
- Roughness meter
- Others

M



B

ANNEX IV

TENTATIVE PROGRAM OF COLLABORATIVE RESEARCH TOPICS

1. Research topics conducted in the Philippines
 - 1) Outdoor exposed tests - base metals, metallic coatings, painted steels, etc.
 - 2) Environmental analysis - SOX, NOX, etc.
 - 3) Preparation of specimens for the 2nd exposure in
 - 4) Measurements of characteristics of exposed specimens.
 - 5) Accelerated tests - salt spray test and others.
 - 6) Field survey of atmospheric corrosion in the Philippines.
 - 7) Others.

 2. Research topics conducted in Japan
 - 1) Information retrieval of atmospheric corrosion.
 - 2) Preparation of specimens for the first exposure in

 - 3) Field survey of atmospheric corrosion in Japan.
 - 4) Technical visits and discussion of the related field.
 - 5) Chemical analysis method of air pollutants.
 - 6) Instrumental analysis method.
 - 7) Characteristics of metallic coatings, paint film and painted steel.
 - 8) Others.
- 
- 

ANNEX V

TENTATIVE IMPLEMENTATION SCHEDULE

A c t i v i t i e s	1987		1988		1989		1990		1991		1992	
	4	10	4	10	4	10	4	10	4	10	4	10
1. Assignment of Japanese experts long term (2 persons) short term (not specified)												
2. Research and training of the Philippine personnel in Japan*		3		3		3		3		3		
		persons		persons		persons		persons		persons		
3. Laboratory improvement (Existing laboratory will be improved by ITDI to meet the requirements of the project)												
4. Transportation and installation of equipment												
5. Preparation and set-up of specimens for exposure												
6. Exposure tests												
7. Evaluation of environmental factors and surface examination												
8. Accelerated test in laboratory												
9. Data interpretation												
10. ASEAN-Japan seminar												
11. Report and evaluation of the project												

* Part of the quota of 3 trainees might be opened to other ASEAN member countries when necessary, for the sake of the ASEAN regional characteristic of the Project.

JICA