

付 属 資 料 2

**ASEAN-JAPAN PROJECT
ON ATMOSPHERIC CORROSION - METALLIC COATINGS**

I. PROGRESS REPORT

INTRODUCTION

The ASEAN-JAPAN Project on Atmospheric Corrosion-Metallic Coatings being implemented in the Philippines by the Department of Science and Technology (DOST) through the Industrial Technology Development Institute (ITDI) and the Japan International Cooperation Agency (JICA) will finish its five-year implementation programme by end of October 1992 in accordance with the Record of Discussions signed by the Philippine and Japanese Governments on October 30, 1987. This project has been undertaken to strengthen the technological basis for the reliability of metals and metallic coatings against corrosion in the Southeast Asian region, particularly, in the Philippines. Appendix 1 shows the developmental objectives of the project as seen from a long-term perspective.

PROJECT STAFF

Philippine Side:

Dr. Ernesto S. Luis	-	Team Leader
Margarita T. Arnaiz	}	
Cynthia V. Bernas		
Cynthia R. Habaña		
Lilian A. de Guzman		
Aurora S. Vilorio		
Ner C. Rodriguez		
Rosalinda G. Principe		
Cherry Lane P. Causing		
Rolan P. Vera Cruz		

Japanese Side:

Mr. Shun-ichi Harada	-	Team Leader
Mr. Toshiharu Kobayashi	-	Technical Assistant
Mr. Masaru Iizuka	-	Project Coordinator

ACTIVITIES

Since the project commenced in October 1987, the Philippines, specifically, ITDI has upgraded its capabilities in terms of new equipment, facilities and trained manpower. The major activities of the project have been the atmospheric outdoor corrosion test; analysis of environmental factors; evaluation of test specimens; training on the operation/application of testing equipment; multilateral activities, specifically, collaborative research, training, seminar, and technical exchange visit; implementation of related studies; and, public relations activities. The schedule of activities and actual accomplishments of the project is presented in Appendix 2.

1 Outdoor Atmospheric Exposure Test

The two (2) components of atmospheric corrosion testing conducted are (1) outdoor exposure of test specimens and (2) gathering of meteorological data and quantitative measurement of air pollutants.

1.1 Exposure Test Sites

Originally, the project had only four (4) exposure test sites as in the following:

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

However, since May 1991, ten (10) additional test sites located all over the country have been established for the nationwide survey of atmospheric corrosivity. With the cooperation of regional offices of the DOST, exposure of two types of test specimens, namely, bare carbon steel (from Japan and Philippines) and hot-dipped galvanized (from Japan and Philippines), and monthly monitoring of environmental pollutants and meteorological parameters have been conducted.

1.2 Monitoring of Environmental Factors

Outdoor exposure of test samplers, gathering of meteorological data, and quantitative analysis of air pollutants such as SO₂, NO₂, HCl, H₂S and NaCl have been continually conducted since December 1988.

1.3 Exposure of Test Specimens

Different kinds of bare metals (carbon steel, zinc, aluminum, copper, stainless steel 304 and 430), metallic coated steel (hot-dipped galvanized, electrogalvanized, hot-dipped 5% Al-Zn, hot-dipped 55% Al-Zn, hot-dipped aluminized), painted steels and FRP have been exposed in the four (4) original exposure sites. Exposure tests are for half, one, two, four, and five or more years duration beginning in December (dry season) and in June (wet season). The first exposure was done in December 1988.

Exposure tests for half, one, and two years have been completed. Test specimens have been retrieved from the exposure sites, and their corrosion rates obtained by mass loss method, the most widely used technique of evaluating the reliability of metals as described by ASTM. Furthermore, corrosion products and base metals of the test specimens have been analyzed using SEM, XRD, FT-IR and XRF.

2 In-house Training by Short-term Experts

Through the project, a number of Japanese experts have been dispatched to the Philippines to conduct short training programmes participated by Philippine project staff and personnel from other DOST agencies in various fields of corrosion.

To date, no less than thirty (30) short training programmes have been conducted to develop local expertise. Appendix 3 shows the list of Japanese experts received in the Philippines under the project.

3 Training in Japan

Seventeen (17) participants from the Philippines have been dispatched to Japan for training in various fields as listed in Appendix 4.

4 Philippine Participation in Multilateral Activities of Other ASEAN Countries

The Philippines has also sent participants in the multilateral activities of other Asean countries. As of 31 June 1992, nine (9) ITDI staff were dispatched for training, while twenty-five (25) participated in seminars and six (6) for collaborative research. The Philippines also hosted a number of technical exchange teams from ASEAN countries. This technical exchange visit is a part of their multilateral activities.

A detailed listing of Philippine participation in multilateral activities of other ASEAN countries is shown in Appendix 5 and Appendix 5A lists titles of Technical papers

in the area of corrosion presented in the seminar of these countries, including the Philippines. Appendix 5B shows list of Technical Exchange Teams that visited the country.

5 Multilateral Activities of Philippine Project

The Philippines has hosted a number of multilateral activities as part of the implementation of the ASEAN-Japan Project on Atmospheric Corrosion - Metallic Coatings including two (2) training programmes, two (2) collaborative research programmes, and two (2) seminar/workshops. Participants from other ASEAN member countries to Philippine multilateral activities are listed in Appendix 6. The technical exchange teams dispatched by the Philippines consisted of two (2) batches already. The list of team members is shown in Appendix 6A

The following multilateral activities were conducted by the project:

5.1 Training Programme

(a) JFY 1990

Four (4) participants from Brunei, Indonesia, Malaysia and Thailand took part in the one-month Training on Atmospheric Corrosion - Metallic Coatings conducted in ITDI from 07 January to 02 February 1991. The programme consisted of instructions by Philippine counterparts and by Mr. Kondo, an invited Japanese expert on Measurement of Meteorological Factors, on the method of study of atmospheric corrosion for the Philippine Project.

(b) JFY 1991

Six (6) participants, each from Brunei, Malaysia, and Indonesia, and three (3) Philippine local counterparts took part in the one-month training programme entitled ASEAN-Japan Training on Statistical Method of Corrosion-Multiple Regression from 08 July to 07 August 1991 as conducted in ITDI by Dr. Akira Tahara, a short term Japanese expert on Statistical Evaluation using Computer. The training activity consisted of instructions on Statistical Methods, data gathering and evaluation.

5.2 Collaborative Research Programme

(a) JFY 1990

The first collaborative research entitled "Comparative Study on the Corrosion Behaviour of Metals Subjected to Accelerated and Natural Exposures" was participated by two (2) researchers from Thailand and Indonesia together with the Philippine counterparts. The result of the research work was presented in the 1st Seminar/Workshop on Atmospheric Corrosion - Metallic Coatings held in Manila, Philippines last 05 - 07 March 1991. The abstract of the technical paper is presented as Appendix 7.

(b) JFY 1991

The second collaborative research programme which focused on "Monitoring of Atmospheric Corrosion Rate by Electrochemical Impedance Method" was conducted for three (3) months from 16 September to 14 December 1991. This programme was participated by four (4) researchers, one each from Brunei, Indonesia, Malaysia, and Thailand, and who collaborated with Philippine counterparts involved in the project.

A technical paper entitled "Study on the Corrosion Behavior of Metals Exposed in Wet/Dry Cycle Chamber by Electrochemical Impedance Method" and which resulted from this collaborative work was presented at the ASEAN-Japan Seminar/Workshop on Corrosion of Metals held in the Philippines on 02 - 04 June 1992. Appendix 8 gives the abstract of said paper.

5.3 Seminar/Workshop

(a) JFY 1990

The 3 - day Seminar/Workshop on Atmospheric Corrosion - Metallic Coatings held in the Philippines on 05 - 07 March 1991, was participated by thirteen (13) ASEAN nationals three (3) each from Brunei, Indonesia, Malaysia and Thailand, and one (1) from Singapore); three (3) invited lecturers from Japan; and sixty-eight (68) local participants from different private companies and universities. The seminar consisted of three days paper presentation and one day observation tour to ITDI Corrosion Laboratory and exposure site.

(b) JFY 1992

The ASEAN-Japan Seminar/Workshop on the Corrosion of Metals was held in the Philippines last 02 - 04 June

1992. Participated in by three (3) experts from Japan, thirteen (13) from other ASEAN countries and fifty four (54) from the Philippines, the seminar/workshop consisted of a three-day technical paper presentation/lectures. A total of fifteen (15) paper presentors from the ASEAN member countries and Japan talked on trends and local experiences in corrosion and corrosion protection technologies. A one-day tour of ITDI equipment and facilities in Bicutan as well as some tourists' spots in Metro Manila was conducted on June 5 for interested participants.

5.4 Technical Exchange Visit

(a) JFY 1989

The first Technical Exchange Team dispatched by the Philippine project on March 03 - March 20, 1990 visited only four (4) out of five (5) ASEAN member countries, namely: Indonesia, Malaysia, Singapore and Thailand. The purpose of the first technical exchange visit aside from exchanging technical information in the field of materials science was to discuss among the countries visited the schedule of implementation of the forthcoming multilateral activities of every member country.

(b) JFY 1992

The second technical exchange visit was conducted last 26 April to 10 May 1992 and all five (5) ASEAN member countries were visited. The primary purpose of the visit was to exchange technical information and to discuss research results under the ASEAN - Japan cooperation Programme.

6 Fourth Joint Meeting

The Philippines hosted the Fourth Joint Meeting of the Asean-Japan Cooperation Programme on Materials Science and Technology and The Asean Sub-Committee Meeting on Materials Science and Technology (ASCMST) on 03 - 05 September 1991. Each ASEAN member country reported the progress of its project implemented under said cooperation programme and presented proposals for new projects.

7 Short Term Research Studies

The following are the two short term research studies which have been implemented under the project:

- (a) A Nationwide Survey of Atmospheric Corrosivity (May 1991 to July 1993)

Ten (10) exposure test sites have been established in ten (10) different regions of the country. Two batches of metallic test specimens, namely, bare carbon steel (from Japan and Philippines) and hot-dipped galvanized steel (from Japan and Philippines) have been exposed for testing: the first batch in May to June 1991 to represent testing beginning wet season; and, the second batch in October to November 1991 to represent exposure test beginning dry season.

Retrieval of the first batch of test specimens from exposure has been started this June and will continue up to August 1992.

- (b) A Study on the Effect of Exposure Rack Orientation/Angle of Inclination on Atmospheric Corrosion of Metals (August 1991 to November 1992)

Two types of test specimens, bare carbon steel (from Japan and Philippines) and hot-dipped galvanized (from Japan and Philippines) have been exposed at the near rural exposure test site in Bicutan since August 1991 at 0°, 15°, 30°, 45°, 60°, 75° and 90°, standard south direction. The same type of specimens have been exposed at a standard angle of 45° in four (4) directions (north, south, west, and east).

8 Public Relations Activities

The following public relations activities have been carried out:

- (a) Project Brochure, January 1991
- (b) Video Production, January 1991
- (c) Lecture/Demo on the principle and operation of the following analytical equipments: May 1991
 - Scanning Electron Microscope with Energy Dispersive X-ray Spectrometer
 - UV-VIS Spectrophotometer
 - Combined Cyclic Corrosion Testing Equipment
 - Weathermeter
- (d) National Science and Technology Week, July 1991
 - Exhibit on Corrosivity of Philippine Atmosphere

- Seminar on Instrumental Analysis using XRD, SEM
- (e) National Science and Technology Week, July 1992
- Exhibit on Project Activities
- Participation in Technical Paper Presentation Contest (First Prize Winner)
- (e) Laboratory tour by occasional visitors

EQUIPMENT

Through the project, ITDI has received various analytical equipment, environmental testing equipment, test and measurement equipment, test specimen preparation equipment and other laboratory equipment. The list of equipment donated by JICA under the project is given in Appendix 9.

In connection with upgrading of ITDI facilities, JICA has also provided financial assistance for the installation of a power generator, construction of a deep well for water supply, and the repair and renovation of rooms for storage and additional equipment.

COUNTERPART FUND

The allocation and actual expenditures for the Project by the Philippine Government is presented in Appendix 10.

REQUEST FOR PROJECT "FOLLOW-UP"

By the end of October 1992, the project will be terminated according to the Record of Discussions between the concerned authorities of the Government of Japan and the Government of the Republic of the Philippines. However, the objectives of the project cannot be fully realized by then as there are still aspects of the project which need completion beyond October 1992. A request for a two-year extension (follow-up) of the project has been made and at the moment, no final decision has been received from the Government of Japan.

The developmental implications and plans of the project extension are presented in the following:

- Appendix 11 - Developmental Implications of the "Follow-up"

- Appendix 12 - Plan for Follow-up Program
- Appendix 13 - Schedule of Evaluation of Corrosivity of Philippine Atmosphere in the Period of Follow-up
- Appendix 14 - Training Items in the Period of Follow-up
- Appendix 15 - Proposed Equipment Outlay for the Follow-up Period

II. EVALUATION OF THE PROJECT

The ASEAN - Japan Project on Atmospheric Corrosion - Metallic Coatings has contributed greatly to the upliftment of science and technology in the country through strengthening the research and testing capability of the Industrial Technology Development Institute (ITDI) of the Department of Science and Technology (DOST) in the area of materials science, particularly in the field of corrosion. Since its implementation in 1987, the Philippine Government received various assistance in the form of donated equipment, training in Japan and other ASEAN countries, and the dispatched of long term and short term experts.

Valuable information on the factors that affect atmospheric corrosion in the tropical region, particularly in the Philippines, has been continually monitored and partial evaluation of the corrosivity of some selected atmospheres in the country was already undertaken. These data and the additional data to be gathered until the completion of the Project will serve as the technological basis for the assessment of the corrosivity of the region.

The Project has also increased the linkages and enhanced the technical services of ITDI to the industry through the upgraded facilities and acquired expertise of the staff. Awareness of the country on the importance of corrosion prevention and control was likewise increased. The academe, government and private/industrial sectors were provided with an opportunity to understand and develop interest in corrosion science through the Project's public relations and multilateral activities. Although it covers only one of the numerous fields in the study of corrosion, it is a good start and it is envisioned that future researches on other types of corrosion will be undertaken.

The dispatch of long term experts is a crucial point in the implementation of the Project especially for a group that has a minimal technical background in corrosion like the ITDI group. Short term experts also play very important role in technology transfer, especially in areas much needed by the Project and staff, however, there were few cases wherein problem in communication was encountered.

The donation of various equipment through this Project has greatly upgraded the research and testing capability of the Institute. Research and technical services have been very much encouraged by the convenience and efficiency brought about by these instruments. The support given by Japan through JICA for the effective utilization of these equipment is very much appreciated.

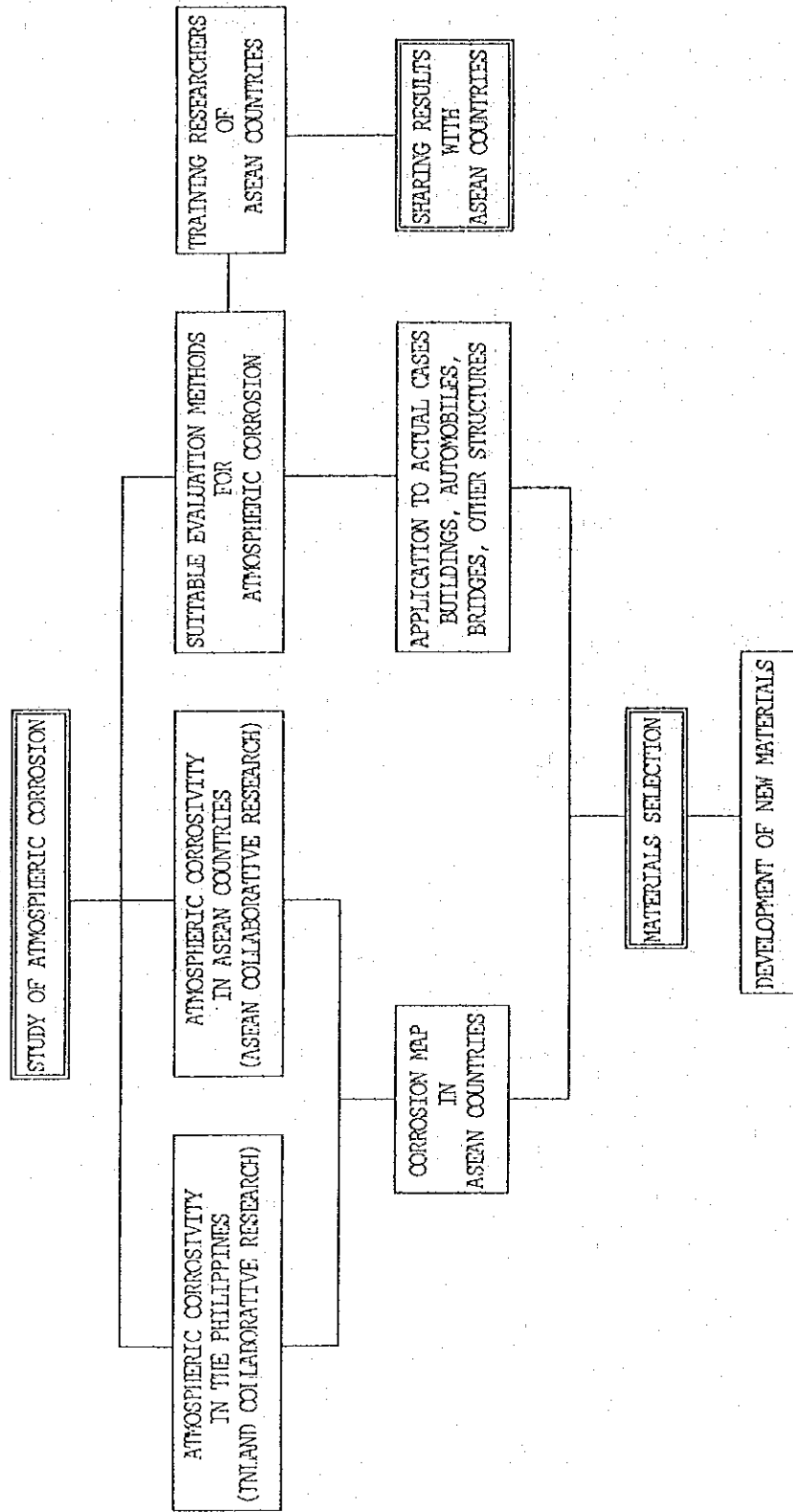
The conduct of multilateral activities, not only in the area of corrosion science but also in polymers and ceramics, brought ASEAN member countries closer to each other. New friendships were established and former ties were renewed. Leadership and self-confidence were developed among local counterparts. Each staff was given the opportunity to attend to other member country's multilateral activities, hence enriching their knowledge not only in the technical field but also the social and cultural characteristics of the other members of the ASEAN.

Training in Japan is also one of the most effective method of technology transfer. Trainees were introduced to Japan's developments in the field of corrosion science. Likewise, appropriate and sophisticated equipment for various fields of corrosion research and testing were introduced and others were made available to the trainees. The National Research Institute for Metals in Japan, which serves as the training ground for the ASEAN participants under this cooperation has been very accommodating to the trainees.

Due to the limited manpower of the Institute, the staff assignment of the Corrosion Laboratory was also affected. The scheduling of work sometimes does not become effective, especially when there are immediate problems/activities that the staff has to attend to. Considering the limited human resource, the demands of the Division and the Institute, backlogs cannot always be avoided.

To summarize, the Project has given valuable assistance to the Philippine Government since the start of its implementation. It served as a machinery for manpower development and has strengthened the research capability of our government. Technology transfer in the form of trainings abroad, specifically in Japan; in-house trainings through short term Japanese experts dispatched by JICA; exchange of information through multilateral activities; upgrading of facilities through the donation of various equipment; and assignment of long term Japanese experts, in which all of them were mentioned above, describe the type of technical cooperation that envisions the beneficiary as key-players in the nation - building endeavors.

APPENDIX 1. FUTURE PLAN OF THE PROJECT



APPENDIX 2. ACTIVITIES OF THE PROJECT

WORK PLAN vs. ACCOMPLISHMENT

ACTIVITIES	1987/88		1988/89		1989/90		1990/91		1991/92		1992/93	
	J.F.Y.	MONTH	J.F.Y.	MONTH	J.F.Y.	MONTH	J.F.Y.	MONTH	J.F.Y.	MONTH	J.F.Y.	MONTH
I. BILATERAL PROGRAM 1. Upgrading of ITDI Facilities a. Donation of R & D Testing Facilities b. Renovation of rooms/working area c. Deepwell Construction d. Generator Shed Construction 2. Research Topics a. 5-year exposure test in 4 general types of atmosphere b. Nationwide survey of atmospheric corrosivity c. Effect of exposure rack/orientation/angle of inclination on the atmospheric corrosion of metals d. Atmospheric corrosion behavior of skyward and groundward surfaces of metals e. Comparative study of corrosion behavior of metals subjected to natural and accelerated conditions f. Monitoring of atmospheric corrosion rate by electrochemical impedance method 3. Transfer of Technology 4. Public Relation Activities a. Project brochure b. Video production	4	10	3	4	3	4	3	4	3	4	3	4
II. MULTILATERAL PROGRAM 1. Counterpart Training in Japan 2. a. Regional Seminar/Workshop b. Regional training c. Regional collaborative research works 3. Technical Exchange Visit												

LEGEND:
 ----- Planned ——— Actual

Appendix 3. LIST OF JAPANESE SHORT-TERM EXPERTS

EXPERTS	SUBJECT	AFFILIATED INSTITUTE	TERM	NO. OF TRAINEES
1. Dr. T. Kodama	Introduction to Atmospheric Corrosion	NRIM	1988.10.03 - 1988.10.21	12
2. Mr. S. Yamada	Sampling & Analysis of Pollutants-1	Kokan Keisoku Co., Ltd.	1988.10.25 - 1988.12.23	11
3. Mr. T. Kurosawa	Exposure Test	NRIM	1988.11.28 - 1988.12.23	11
4. Mr. Y. Ishihara	Paint Technology	Nippon Paint	1989.02.28 - 1989.04.27	14
5. Mr. S. Sato	UTM Install & Operation	Onetech Corp.	1989.04.10 - 1989.04.21	6
6. Mr. T. Sakamoto	SEM Install & Operation	JEOL	1989.06.10 - 1989.07.12	9
7. Mr. K. Nishina	XRD Install & Operation	Shimadzu Corp.	1989.06.20 - 1989.07.05	8
8. Mr. J. Ishiwata	Statistical Method	NKK Technoservice	1989.07.25 - 1989.08.23	13
9. Mr. K. Akimoto	Reverse Osmosis	Tokyo Orogano Trdg. Co.	1989.09.04 - 1989.09.10	8
10. Mr. M. Oishi	R.O. Install & Operation	Tokyo Orogano Trdg. Co.	1989.09.10 - 1989.09.17	8
11. Mr. Y. Jeoka	Blast Machine Install & Operation	Fukuyama Kyodo Kiko	1989.09.10 - 1989.09.17	7
12. Mr. T. Kawai	Sampling & Analysis of Pollutants-2	Kokan Keisoku Co., Ltd.	1989.10.11 - 1989.10.11	12
13. Mr. S. Kikukawa	CCCT & W-Meter	Suga	1989.11.26 - 1989.12.06	8
14. Mr. H. Suzuki	Install & Operation	Suga	1989.11.26 - 1989.12.06	8
15. Mr. S. Ito	Instrumental Analysis	NRIM	1990.01.08 - 1990.02.17	12
16. Mr. S. Fujita	Evaluation of Atmospheric Corrosion	NKK Corporation	1990.01.17 - 1990.02.15	13
17. Dr. T. Tsuru	Electrochemistry	TIT	1990.08.01 - 1990.08.21	8
18. Mr. T. Inuma	Potentostat, Install & Operation	Hokuto Denko Co.	1990.08.05 - 1990.08.11	8
19. Mr. T. Yorozu	XRF, Install & Operation	Rigaku Industrial Corp.	1990.08.20 - 1990.09.01	10
20. Mr. M. Nasrimoto	Glass Bead Machine, Install & Operation	Takeda Rika Kogyo Co. Ltd.	1990.09.17 - 1990.09.26	8
21. Mr. I. Nakakita	Repair & Maintenance of XFD	Shimadzu Corp.	1990.09.30 - 1990.10.06	7
22. Mr. T. Kurosawa	Adviser-Collaborative Research I	NRIM	1990.12.05 - 1990.12.19	3
23. Mr. S. Kondo	Multilateral Activity-Training on Measurement of Meteorological Factor	Etiko Instruments	1991.01.14 - 1991.01.26	7
24. Dr. T. Yamamoto	Invited Lecturer-Seminar I	Nippon Paint	1991.02.04 - 1991.02.09	85
25. Dr. T. Shibata	Invited Lecturer-Seminar I	Osaka University	1991.02.04 - 1991.02.09	85
26. Dr. I. Sekine	Invited Lecturer-Seminar I	Science University of Tokyo	1991.02.04 - 1991.02.09	85
27. Mr. H. Inui	Installation & Application of EDX	Noran Instruments	1991.04.15 - 1991.04.26	9
28. Mr. T. Takami	- do -	Noran Instruments	1991.04.15 - 1991.04.26	8
29. Mr. K. Kyono	Metal Coating	Kawasaki Steel	1991.06.03 - 1991.06.22	8
30. Dr. H. Baba	Analysis of Pollutants by IC	NRIM	1991.06.26 - 1991.07.06	7
31. Dr. A. Tahara	Training on Regression Analysis	NRIM	1991.07.08 - 1991.08.07	6
32. Dr. T. Tsuru	Adviser-Collaborative Research II	TIT	1991.09.12 - 1991.09.25	6
			1991.11.25 - 1991.12.07	6
33. Dr. T. Kodama	Corrosion Data Analysis	NRIM	1992.04.01 - 1992.04.15	11
34. Dr. T. Tsuru	Invited Lecturer-Seminar II	TIT	1992.06.01 - 1992.06.06	85
35. Dr. H. Komuro	Invited Lecturer-Seminar II	Hokkaido University	1992.06.01 - 1992.06.06	85
36. Mr. T. Kimura	Invited Lecturer-Seminar II	Kokan Keisoku Co., Ltd.	1992.06.01 - 1992.06.06	85
37. Mr. H. Maruyama	Surface Coating Evaluation	Kawasaki Steel	1992.06.10 - 1992.06.25	7

Appendix 4. TRAINING IN JAPAN

Participants	Date	Topic
1. Dr. Ernesto S. Luis	1988.07.24 1988.09.09	Japan s Latest Development on Corrosion Prevention Technology
2. Ms. Corazon Quintia	-do-	-do-
3. Ms. Priscila Mantaring	-do-	-do-
4. Ms. Aurora V. Villaflor	1988.10.17 1988.12.16	Instrumental Analysis
5. Ms. Margarita T. Torre	1989.01.09 1989.07.07	Atmospheric Corrosion Monitoring Techniques
6. Ms. Cynthia V. Bernas	1989.02.16 1989.05.16	Electrochemistry
7. Ms. Cynthia R. Habaña	1989.06.13 1990.06.12	Corrosion of Metals
8. Ms. Estrella G. Mamaril	1989.09.11 1989.12.10	Accelerated Corrosion Testing
9. Ms. Concepcion P. Gayomali	-do-	Instrumental Analysis
10. Ms. Josefina R. Celorico	1990.03.27 1990.09.23	Fine Ceramics (slot from Malaysia)
11. Ms. Aurora S. Viloría	1990.05.29 1990.11.29	Characterization of Corrosion Pdts by XRD
12. Ms. Ner A. Cruz	-do-	Underfilm Corrosion
13. Ms. Rosario R. Corral	-do-	Study on Microanalysis
14. Ms. Araceli J. Magsino	1990.06.26 1990.12.23	Characterization of Polymers (slot from Indonesia)
15. Ms. Lilian A. de Guzman	1991.06.26 1992.06.13	Evaluation of Corrosion Resistance of Metallic Coated Steels
16. Ms. Chona I. dela Peña	1991.06.26 1991.12.07	Measurement of the Weathering Deterioration of Organic Films
17. Mr. Rolan P. Vera Cruz	1991.10.09 1993.03.31	Electrochemistry (Monbusho Scholarship)

**Appendix 5. PHILIPPINE PARTICIPATION IN MULTILATERAL
ACTIVITIES OF OTHER ASEAN COUNTRIES**

Name	Term	Multilateral Activity
1. Dr. Ernesto S. Luis	1989.06.14-1989.06.16	Singapore Seminar I
2. Ms. Aida H. Balagot	-do-	-do-
3. Ms. Aurora V. Viloria	-do-	-do-
4. Ms. Cynthia V. Bernas	1990.02.01-1990.02.28	Singapore Training I
5. Ms. Lilian de Guzman	1990.03.05-1990.03.17	Brunei Training I
6. Mr. Carlos Chua Doria	-do-	-do-
7. Mr. Jose L. Gamboa	1990.08.06-1990.08.08	Brunei Seminar I
8. Ms. Erlinda R. Alinea	-do-	-do-
9. Mr. Manuel M. Navarro	-do-	-do-
10. Mr. Rolan P. Vera Cruz	1990.09.17-1990.09.21	Singapore Seminar II
11. Ms. Margarita T. Torre	-do-	-do-
12. Ms. Lilian A. de Guzman	-do-	-do-
13. Dr. Ernesto S. Luis	1990.10.17-1990.10.19	Thailand Seminar I
14. Ms. Cynthia R. Habaña	-do-	-do-
15. Ms. Chona I. dela Peña	-do-	-do-
16. Ms. Gloria U. Gopez	1990.11.03-1990.11.30	Indonesia Training I
17. Ms. Natividad R. Villostas	1990.11.18-1990.12.25	Malaysia Training I
18. Ms. Elinor L. Bedia	1990.12.01-1991.02.28	Indonesia Collaborative I
19. Mr. Aurelio L. Taboral	1991.03.06-1991.03.09	Indonesia Seminar I
20. Ms. Araceli J. Magsino	-do-	-do-
21. Mr. Severino T. Bernardo	-do-	-do-
22. Ms. Juanita B. Salvador	1991.05.12-1991.08.11	Malaysia Collaborative II
23. Ms. Teresa V. Navarro	1991.05.12-1991.06.12	Malaysia Training II
24. Mr. Severino T. Bernardo	1991.09.30-1991.10.03	Malaysia Seminar I
25. Ms. Natividad R. Villostas	-do-	-do-
26. Ms. Josefina R. Celorico	-do-	-do-
28. Ms. Adelaida G. Senica	1991.09.28-1991.10.26	Indonesia Training II
29. Ms. Marissa A. Paglicawan	1991.09.28-1991.12.22	Indonesia Collaborative II
30. Ms. Cherry Lane P. Causing	1991.09.15-1992.03.15	Thailand Collaborative II
31. Ms. Rosalinda G. Principe	1991.11.11-1991.12.06	Thailand Training II
32. Mr. Jose Luis S. Gamboa	1992.01.01-1992.03.31	Singapore Collaborative II
33. Ms. Esmeralda R. Martinez	1992.05.30-1992.06.28	Indonesia Training III
34. Ms. Jocelyn Paz Reyes	1992.05.20-1992.08.16	Malaysia Collaborative III
35. Dr. Assunta C. Cuyegkeng	1992.06.27-1992.07.01.	Indonesia Seminar II
36. Ms. Editha Almario	do-	-do-

37. Dr. Florentino Sumera	1992.06.27-1992.07.01	Indonesia Seminar II
38. Cynthia V. Bernas	1992.06.30-1992.07.02	Thailand Seminar II
39. Ms. Ner C. Rodriguez	-do-	-do-
40. Dr. Lilia Silao	-do-	-do-

Future Participants

41. Mr. Wenceslao Martinez	1992.08.03-1992.08.05	Brunei Seminar II
42. Mr. Jose H. Espiritu	-do-	-do-
43. Ms. Teresita R. de Guzman	-do-	-do-
44. Mr. Shun-ichi Harada	1992.09.17-1992.09 21	Singapore Seminar III
45. Mr. Severino T. Bernardo	-do-	-do-
46. Ms. Margarita T. Arnaiz	-do-	-do-
47. Ms. Cynthia R. Habana	-do-	-do-
48. Ms. Aurora S. Vilorio	-do-	-do-

**Appendix 5A. LIST OF TECHNICAL PAPERS ON CORROSION PRESENTED
BY PHILIPPINE PROJECT STAFF TO SEMINARS/WORKSHOPS
OF ASEAN COUNTRIES**

Title	Presenter
A. Singapore	
1. Atmospheric Corrosion-Metallic Coatings(Country Report)	Dr. E.S. Luis
2. Atmospheric Corrosion Aggressivity of Selected Locations in the Philippines(M. Torre, R.Vera Cruz and L. de Guzman)	M. Torre
B. Thailand	
1. Atmospheric Roof Corrosion Study in the Communities That Surround the Makban Geothermal Complex(E. S. Luis and ITDI Corrosion Staff)	Dr. E. S. Luis
2. A Study of the Permeability of Ions Through Organic Coating (C.Habana and T. Kodama)	C. Habana
3. Atmospheric Corrosion of Galvanized Roofing Materials at Makban Geothermal Power Plant Complex(C. Bernas and ITDI Corrosion Staff)	C. Bernas
4. The Effect of Ultraviolet Radiation on the Bonding Between Organic Polymer and Metal Substrate(N. Rodriguez and K. Kurosawa)	N. Rodriguez
C. Philippines	
1. Comparative Study on the Corrosion Behavior of Metals Subjected to Accelerated and Natural Exposures (M. Torre, Harini, P. Hanvivatvong and ITDI Corrosion Staff)	M. Torre
2. Atmospheric Corrosion of Zinc and Zinc Alloy Coated Steel Exposed for One Year at Selected Locations in the Philippines(L. de Guzman and ITDI Corrosion Staff)	L. de Guzman
3. Study on the Corrosion Behavior of Metals Exposed in Wet/ Dry Cycle Chamber by Electrochemical Impedance Method (C. Habana, A. Vilorio, Lee S.H., Sundjuno, A. Said and S. Kewdoknoi)	C. Habana

**Appendix 5B. LIST OF TECHNICAL EXCHANGE TEAM THAT VISITED
THE PHILIPPINES**

A. JFY 1989

Indonesian Team(1989.07.18-1989.07.20)

1. Dr. Hiroji Sasaki
2. Dr. Arjuno Brojonegoro
3. Dr. N.M. Surdia

B. JFY 1990

Thailand Team(1990.07.24-1990.07.27)

1. Dr. Ladawal Chotimongkol
2. Mr. Wikrom Vajragupta
3. Mr. Tomnori Takeda

Malaysian Team(1990.03.07-1990.03.10)

1. Dr. Ong Khong Seng
2. Mr. Ramli Salleh
3. Mr. Nobuaki Hirakawa

C. JFY 1992

Singapore Team(1992.06.17-1992.06.21)

1. Dr. Tam Chat Tim
2. Mr. Tan Gak Peng
3. Mr. Akio Ikegami
4. Dr. Tsutomu Fukute

Appendix 6. LIST OF FOREIGN PARTICIPANTS IN
PHILIPPINE MULTILATERAL ACTIVITIES

Multilateral Activity JFY 1990

Collaborative Research Work - 1990.11.19 - 1991.03.09

1. Ms. Harini Indonesia
2. Ms. Pakarat Hanvivatvong Thailand

Training - 1991.01.07 - 1991.02.02

1. Mr. Amir Hamzah Hj. Abdul Karim Brunei
2. Mr. Ediman Hotman Indonesia
3. Mr. Nasrudin Bin Jarkasi Malaysia
4. Mr. Supatchai Surapont Thailand

Seminar - 1991.03.05 - 1991.03.07

1. Dr. Toshio Shibata Japan
2. Dr. Isao Sekine Japan
3. Dr. Takashi Yamomoto Japan
4. Mr. Hj. Md. Jumin Bin Hj. Marsal Brunei
5. Mr. Hj. Md. Zin Bin Salleh -do-
6. Ms. Lee Siew Hung -do-
7. Dr. Rochim Suratman Indonesia
8. Mr. Achmad Sulaiman -do-
9. Ms. Yunita Sadeli -do-
10. Dr. Azmi Rahmat Malaysia
11. Mr. Mohd. Sharif Bin Mustafa -do-
12. Mr. Mohd. Amin Hashim -do-
13. Dr. Sukumar Jana Singapore
14. Mr. Wikrom Vajragupta Thailand
15. Dr. Chatchai Somsiri -do-
16. Mr. Detchana Chutinara -do-

Multilateral Activity JFY 1991

Training - 1991.07.08 - 1991.08.07

1. Ms. Dayang Suzana Haji Awang Adenan Brunei
2. Ms. Rochati Dachlan Indonesia
3. Mr. Mohamad Bin Abdul Hamid Malaysia

Collaborative Research Work - 1991.09.16 - 1991.12.14

1. Ms. Lee Siew Hung Brunei
2. Mr. Sundjono Indonesia
3. Mr. Azman Bin Said Malaysia
4. Ms. Siriluck Kewdoknoi Thailand

Seminar - 1992.06.02 - 1992.06.04

1. Dr. Hidetaka Konno Japan
2. Dr. Tooru Tsuru Japan
3. Mr. Tadao Kimura Japan
4. Mr. Hamiddon Bin Hj. Md. Said Brunei
5. Mr. Pg. Amran Bin Pg. Hj. Damit -do-
6. Mr. Iing Musalam Indonesia
7. Dr. Ir. Rochim Suratman -do-
8. Dr. Achmad Sulaiman -do-
9. Mr. Azman Bin Said Malaysia
10. Mr. Abdul Hakim Hashim -do-
11. Dr. Mustaza Hj. Ahmadun -do-
12. Dr. Tan Thiam Chye Singapore
13. Mr. Ng Yew Song -do-
14. Dr. Paritud Bhandhubanyong Thailand
15. Dr. Somchai Thongtem -do-
16. Mr. Pakdi Thongcharoen -do-

Appendix 6A. LIST OF PHILIPPINE TECHNICAL EXCHANGE TEAM

a. JFY 1989(1990.03.04-1990.03.20)

1. Dr. Ernesto S. Luis
2. Ms. Aida H. Balagot
3. Mr. Shun-ichi Harada

b. JFY 1992(1992.04.26-1992.05.10)

1. Mr. Shun-ichi Harada
2. Mr. Severino T. Bernardo
3. Ms. Margarita T. Arnaiz

Appendix 7

Comparative Study of the Corrosion Behavior of Metals Subjected to Accelerated and Natural Exposure

by

Margarita T. Torre*, Harini**, Pakarat Hanvivatvong***
and
ITDI Corrosion Staff****

Abstract

Bare carbon steel and four(4) types of metallic coated steel were exposed in an accelerated and natural environment. The metallic coated specimens were the electrogalvanized and hot dip galvanized steels and; 5% Al-Zn alloy and 55% Al-Zn alloy coated steels. Fair correlation was obtained between the natural and accelerated marine environment using the combined cyclic corrosion test. The accelerating factor was calculated to be 200, 30 and 20 for the combined cyclic corrosion test, modified weathermeter test and standard salt spray test, respectively. The comparison in the corrosion behavior of these specimens was made by measurement of corrosion rate through mass loss method and by evaluation of corrosion products using SEM/WDX, FT-IR and XRD.

*Industrial Technology Development Institute (ITDI)-
Philippines

**Research and Development Center for Metallurgy - Indonesia

***Department of Mineral Resources - Thailand

****ITDI Staff: A.S. Vilorio, N.C. Rodriguez, R.P. Vera Cruz,
R.G. Principe, R.C. Layco, C.R. Habaña, L.A. de Guzman,
C.P. Gayomali, C.L.P. Causing, C.V. Bernas and Dr. E.S. Luis

Appendix 8

A Study on the Corrosion Behavior of Metals Exposed in Wet/Dry Cycle Chamber by Electrochemical Impedance Method

C.R. Habana, A.S. Vilorio, ITDI, Philippines; S.H. Lee, PWD, Brunei Darussalam; Sundjono, LIPI, Indonesia; A. Said, SIRIM, Malaysia; S. Kewdoknoi, TISTR, Thailand

Abstract

The corrosion behavior of carbon steel, electrogalvanized and hot dip galvanized steel exposed to simulated alternate wet/dry cycle conditions has been studied by electrochemical impedance method. Scanning Electron Microscope with Energy Dispersive X-ray Analyzer (SEM/EDX) and X-ray Diffractometer (XRD) techniques were used to evaluate and explain the corrosion process.

Appendix 9. LIST OF DONATED EQUIPMENT
Equipment Listing No.1
ITDI-JICA Corrosion Project

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Aurora Victoria	Exposure Site	METEOROLOGICAL INSTRUMENTS: Thermometer Screen 600 x 600 x 600mm - Isuzu	88/09/14	4 sets	138,000.00	552,000.00	A	
Aurora Victoria (1 pc.) Layco/Causing (3 pcs.) Aurora Victoria	Exposure Site Rm. 235 Exposure Site	Dust Fall Collector, No.8008-04 - Shibata Consisting of: (1) Frame Screen 610mm (2) Funnel 300mm (3) Dust Cover (4) Sampling Bottle		4 sets 1 pc. 1 pc. 1 pc. 20 L	69,500.00	278,000.00	A	
Rolan Vera Cruz	Computer Room	OPTICAL INSTRUMENTS: Stereoscopic Microscope, SMZ-2T-1 - Nikon w/ standard accessories Optional accessories: a) Spare Lamp b) Camera mounting adaptor		1 set 5 pcs. 1 pc.		118,750.00	A	
		Reading Microscope, PFM-2 - Pika		1 set		170,000.00	A	
		Scale Magnifier, No. 7 - Honda		1 set		7,700.00	A	
Lilian de Guzman	Rm. 219	Camera, F3 - Nikon Optional accessories: a) Auto-extension ring PK-19 b) Telephoto lens 300mm F4.5 c) Speed light SB-21A d) Semi-soft case		1 set 1 pc. 1 pc. 1 pc. 1 pc.		381,000.00	A	
Dr. Luis	Conference Rm.	SLIDE PROJECTOR, etc.: Epidiascope, EP6000 - Elmo Screen with Stand 150 x 150cm, ES-3		1 set 1 set		404,000.00 55,000.00	C C	
Dr. Luis	Conference Rm.	- Elmo Omnigraphic 252, Omnigraphic 252 - Elmo with standard accessories Optional accessories: a) Spare Lamp b) Slide tray for 140 pcs.		1 set 5 pcs. 1 pc.		135,000.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Lilian de Guzman	Rm. 219	Synchronized Tape Recorder for Slide Projector, Slidecoder 801 - Elmo		1 set		98,000.00	A	
Ramilo Layco	Rm. 235	Ultrasonic Cleaner 250 x 150mm, DT-10 - Advantec		1 set		110,000.00	A	
.	.	Electroplating Equipment - Honda Consisting of:		1 set		387,500.00	A	
.	.	1. Power supply with auto-vol.		1 pc.				
.	.	2. Plating bath B-92, 20L		1				
.	.	3. Cathode rocker B-96		1				
.	.	4. Quartz heater 500W		1				
.	.	5. Thermo regulator B-93, 30-80°C		1				
.	.	6. 2-way Switch		2				
.	.	On-off Switch		2				
.	.	7. Clip		10				
.	.	8. Lead wire		5 m				
		Thermo Regulator Rotating magnet System - Advantec, Temperature range: 0-200°C		2 sets	21,000.00	42,000.00	A	
Ramilo Layco	Rm. 235	Small Pump, CP-08 - Honda Flow: 11 L/min; lift: 1.5m, with acid-alkali-resisting inside wall		2 sets	10,500.00	21,000.00	A	
.	.	Hot Air Rapid Drying oven 0-250°C, MSF-12S - Isuzu, Model MSF-12S, full-automatic by hot air circu- lation, temperature range: 0-250°C		1 set		195,700.00	A	
		Hot Air Specimen Dryer, Buehler - Sankel, Hot air temperature: room temp + 30°C		1 set		278,100.00	A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Ramilio Layco	Rm. 205	Model AEL-200 - Shimadzu, for chemical analysis, weighing range: 200g with 0.1mg precision Electronic Analytical Balance, Model EB-3200H - Shimadzu, pan balance weighing range: 3100g with 10mg precision PH Meter, Model HM-10K - Toadenpa, measuring range: Ph 0-14 with minimum scale 0.01 Ph, digital display, with standard accesso- ries: Electrode GST-152C Portable Conductivity Meter, Model CM-1K - Toadenpa, measuring range: 0.1US - 100US/cm with +/- 8% pre- cision, with standard accessories: Electrode CV-152C		1 set 1 set 5 pcs. 1 set 5 pcs.		135,000.00 92,700.00 79,300.00	A A A	
Rosalinda Principe	Rm. 203	Spectrophotometer, Model UV-120-2 - Shimadzu, wavelength range: 200- 1100nm with 5nm resolution, with standard accessories: Quartz cell 10mm Quartz cell 30mm Cell holder 50mm Halogen lamp D2 lamp		1 set		640,000.00	A	
Cynthia Habana	Rm. 202	Ion Chromatography, Model HIC-6A - Shimadzu, with anion analysis column system Optional accessories: Data processor, with cation anal- ysis column system CR-6A		1 set		2,860,000.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Cynthia Habana	Rm. 202	Injector Holder Sample injector 7251 Anion column Carbon column Guard column Pre-column Chart paper Reverse Osmosis Laboratory Grade Water System, Model SPB-Millipore Cap: 1.2L/min, consisting of: 1) Water supply MILLI-RO8 2) Water tank 50L 3) High-grade deionizer MILLI QSP 4) Stand 5) Water tank stand 6) Cartridge 7) Filter		1 pc. 1 pc. 1 pc. 1 pc. 1 pc. 1 pc. 20rolls 1 set 1 set 1 pc. 1 set 1 1 2 pcs. 2		1,970,000.00	A	
A. Vitoria (3pcs.)/ R. Layco (1pc.)	Exposure Site Rm. 235	METEOROLOGICAL INSTRUMENTS Recording Hygro-thermograph, 3 month winding - Sato, measuring range: -15→50°C with +/- 1°C precision, with accessories: cartridge pen & 3-month recording paper each for 5-years use		4 sets	135,000.00	540,000.00	A	
Aurora Vitoria	Exposure Site	Integrating Dew Time Sensor - Elko Consisting of: Rain fall detector Dew point sensor Transducer for above		1 set 1 set 1 1		860,000.00	A	
		Solar Radiation Measuring Equipment - Elko, consisting of: 1) All-weather solar radiation sensor Mod. MS42		1 set 1 set		1,255,000.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Aurora Viloria	Exposure Site	2) Analog integrating meter Model MP20-1, 10, 20, 30 min 3) Electronic recorder MP-10 Accessories: recording pen & paper each for 5 years use	1 1					
		Black Panel Thermometer - Eiko White Panel Thermometer - Eiko Standard Thermometer, Double Tube - Sale, range: 0-50°C with 1/10°C precision.	1 set 1 set 1 pc.			51,500.00 51,500.00 13,200.00	A A A	
Aurora Viloria	Exposure Site	Maximum-minimum Thermometer, Bar - Sale, range: -20 → 50°C with +/-0.5°C precision	1 set			14,500.00	A	
Ramilo Layco	Rm. 235	Sea Salt Particle Collector wooden made outer dimension: 15 X 15cm - NTP	8 pcs.		2,260.00	18,080.00	A	
		Sulfur Oxide Collector - Kimoto Consisting of: 1. Cylinder for lead dioxide; a) Cylinder No.002 b) Glass tube No.021 c) Gauze tape No.010 2. Shelter No.001 3. Handy air sampler HS-6A, for various poison gas dust, mea- suring flow: 0.5-2L/min Optional accessories: Nozzle impinger In-10 Filter impinger IF-10	1 set 12 pcs. 50 pcs. 3 box 2 sets 4			457,000.00	A	
Margarita Torre	Stockroom	MEASURING AND PRECISION INSTRUMENTS Pinhole Tester, PH-10 - Sanko Denshi with probe, earthcord, & shoulder bag; battery powered	4 pcs. 4					
			1 set			69,870.00	A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Lilian de Guzman	Rm. 219	Electromagnetic Thickness Tester, LE-300 - Kettlo with measuring range: 0-1500UM		1 set		190,500.00	A	
		Plating Thickness Tester, KOKI EF-1000 - Densoku, electrolytic measuring for Cu, Ni, Cr, Zn, etc.; thickness range: 0.06-300U with +/- 1% precision, with standard accessories		1 set		310,000.00	A	
Ramilio Layco	Rm. 235	Portable Surface Thermometer, HL-100 - Anritsu, with measuring range: -200-+800°C		1 set		48,500.00	A	
Cynthia Habana	SEM	Surface Ruggedness Tester, SE-400 - Kosaka, measuring range and magnitude: 0.001-500Um, X100 - X100,000, differential voltage sensing, special accessory: Recorder RA-40A Spare parts: Stylus A-5 Recording paper No. 137707 Recording paper No. 1711-504 Recording pen PS-11		1 set		1,395,000.00	A	
Rolan Vera Cruz	Computer Room	Color Meter, CR-200 - Minoruta measuring mode: Yxy, Lab, XYZ, with standard accessories		1 set		750,000.00	A	
Lilian de Guzman	Rm. 219	Portable Gloss Meter, HA-9 - Suga, incidental light angle: 60-80°, with standard accessories		1 set		447,000.00	A	
Rolan Vera Cruz	Computer Room	Adhesion Tester, 106 No.2 - Densoku measuring range: 0-70Kg/cm2, with 100 dolly clamps & other standard accessories		1 set		231,700.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Rolan Vera Cruz Rolan Vera Cruz	Computer Room Computer Room	Special Accessories: Hole saw with 25mm/edge Electric drill DMT-13A with stand		3 pcs. 1 set				
Lilian de Guzman(1)/ Rolan Vera Cruz(1)	Rm. 219/ Computer Room	ELECTRIC APPARATUS Down Transformer, Model KD-1000 - Toyoden in 220V - out 100V/60HZ		5 sets	20,000.00	100,000.00	A	
		Marking press, consisting of : 1) Numbers 5mm Numbers 8mm 2) Alphabet 5mm Alphabet 8mm		1 set 1 1 1				no available cost
		Torque wrench with ratchet head, torque range: 70-200Kg, scale Socket 9.5mm 10mm Socket 13mm Ratchet handle		1 set 5 pcs. 5 2			A	no available cost
Lilian de Guzman	Rm. 219	Tape Writer, M1360 - Dymo, alphabet letters and numbers, large and small, Tape 9mm in red, blue, green, yellow Tape 12mm in red, blue, green, yellow		1 set 2 pcs.ea 2 pcs.ea		41,700.00	A	
Margarita Torre	Stockroom	Combined Cyclic Corrosion Tester, Model ISO-3-CY - Suga, with standard accessories and standard spare parts		1 set		5,353,000.00	A	
Aurora Vitoria	Exposure Site	Atmospheric Exposure Rack, A-78Z - NTP	88/08/16	8 sets	450,000.00	3,600,000.00	A	
Ner Rodriguez	Sample Prep. Rm	TEST PIECE MAKING EQUIPMENT Belt Sander with Dust Collector,	89/09/31	1 set		307,000.00	A	Invoice #63-418

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Ner Rodriguez	Sample Prep.Rm	Model: BH-43Z Spare Belt 915 x 100mm #60 - ditto - #80 - ditto - #120 High-Speed Precision Cutter, Model- N45A- Marumoto with standard accessory Specification Cutting Blade: 205mm diameter Cutting Capacity: Iron Pipes 45mm dia Iron Rod 30mm dia		100pcs. 100pcs. 100pcs. 1 set	630.00 590.00 550.00	63,000.00 59,000.00 55,000.00 1,450,000.00	A	
		Spare Blade 205mm dia x 0.8t 1) A 100N 10 pcs/box 2) GC 150N 10 pcs/box 3) GC 320R 10 pcs/box		20boxes 10boxes 5 boxes	5,700.00 6,800.00 6,800.00	114,000.00 68,000.00 34,000.00		
		Moulding Epoxy Cement, Model:EPOFIX - consist of - Hfix 1 kg can with accessory Moulding Vessel EPOFORM 25mm dia 10 pcs/set - ditto - 30mm dia 10pcs/set - ditto - 40mm dia 10pcs/set		1 set 11 sets 2 sets		152,000.00	A	
Ner Rodriguez	Sample Prep.Rm	Metallographic Pregminder, Mod.6525B -Manumoto, with standard accessory Spare Accessory: a) Polishing Disc 228mm dia with Aliming b) Waterproof Paper Disc 223mm dia #180 2 bag #320 2 bag #400 2 bag #600 2 bag #800 2 bag		1 set 3 pcs. 10 bags	26,400.00 6,350.00	585,000.00 79,200.00 63,500.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Ner Rodriguez	Sample Prep.Rm	Metallographic Polisher, Mod.5627-56 -Marimoto, with standard accessory Spare accessories: a) Spare Disc 200mm dia VPC b) Alumina Abrasives 0.05 micron 500g can c) - ditto - Solution No.2000 500ml d) DP Cloth DP-NAP 200mm dia 5 pcs/box e) - ditto - DUR 200mm dia 5 pcs/box - ditto - MCL 5 pcs/box - ditto - NAP 200mm dia 5 pcs/box f) DP Spray 83g 3 micron - ditto - 1 micron - ditto - 1/4 micron g) DP Rubricant 1/1		1 set 5 pcs. 3 cans 2 boxes 3 boxes 2 boxes 2 boxes 2 boxes 2 pcs. 2 pcs. 2 pcs. 6 pcs.		454,000.00 13,000.00 12,200.00 6,300.00 12,000.00 12,800.00 12,800.00 12,800.00 15,700.00 15,700.00 15,700.00 5,200.00	A	
		Disk Grinder, Mod.PDA-100C - Hitachi Accessory for above Sanding Disc 100mm diameter CC#40 10 pcs/box		1 set 3 boxes	1,050.00	20,000.00 3,150.00	A	Reported missing June 10, 1991
		Cap-wire Brush Disc 75mm diameter Tool Kit		5 pcs. 1 set	1,250.00	6,250.00 1,050.00	A A	
Ramilo Layco	Rm. 235	LABORATORY EQUIPMENT Water Baths, Model ET-45D - Advantec with Downtrans stainless bath		1 set		222,000.00	A	
		Pipe Heater, 81-3258 - Hakko, Electric Capacity: 500W with Downtrans		2 sets	47,600.00	95,200.00	A	
Ner Rodriguez	Sample Prep.Rm	Labo-Cooler, Mod.LC-100F - Advantec Flexible Stainless tube with downtrans		2 sets	125,000.00	250,000.00	A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
N. Rodriguez(1pc.)/ Familio Layco	Sample Prep.Rm /Rm. 235	Stirrer, Model MZ-800 - Advantec with Stand and Downtrans		2 sets	95,000.00	190,000.00	A	
Rosalinda Principe/ Familio Layco	Rm. 203/ Rm. 235	Magnetic Stirrer, Mod. HS-8-Advantec Heater: 600dW with downtrans		3 sets	58,000.00	174,000.00	A	
Margarita Torre/ Ner Rodriguez(1)	Stockroom/ Sample Prep. Rm	Hot Plate, Model TPH-45 - Advantec Max-Temperature-350 C Dimension - 300 x 450mm Electric - 2.0KVA with downtrans		2 sets	84,000.00	168,000.00	A	
		Labo-Jack, Stainless Dimension - 200 x 200mm x Plate Jack - 90mm - 320mm		2 sets	7,250.00	14,500.00	A	
Margarita Torre	Stockroom	Desiccator, Model BG2, Accessory Shelf Board, Tray silicagel		1 set 2 pcs. 1 pc.		67,300.00	A	
Rolan Vera Cruz	Computer Room	MICROSCOPE Inverted Microscope, TME-NR - Nikon Consisting of: Eyepieces - CFUW 10X Nomarski differential Interfe- rence contrast Attachment Polarizing Attachment Objective: CFB0 Plan DIC 5X, 10X, 20, 40X each Camera Box FX-35A Optional Accessory: a) Polaroid Film Holder #405 1 set 3-1/4" x 4 1/1" b) Polaroid Film type 667 8 sheet/box size: 3-1/4" x 4-1/1" c) Halogen Lamp 12V 50W		1 set 2 pcs. 1 pc. 1 set 1 set 1 set 13boxes 10 pcs.		2,226,930.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS	
		MEASURING EQUIPMENT Cross Cutter Guide 1mm 2mm 5mm		2 pcs. 2 pcs. 2 pcs.	14,800.00 15,500.00 20,700.00	29,600.00 31,000.00 41,400.00	A		
		Cross Cutter Model: NT type with spare blade 120 pcs. Pencil Model: UNI 9H,8H,7H,6H,5H,4H each 1 doz 3H,2H,H.F.,HB,B. each 2 doz 2B,3B,4B,5B,6B each 1 doz		5 pcs. 23 D	3,100.00 960.00	15,500.00 22,080.00	A		
		SHIPPING CHARGE OCEAN FREIGHT INSURANCE PREMIUM				69,542.00 164,313.00 42,791.00			
		Airvent Filter PP Pipe 1/2" Connector 1/2" x 1/2" p.p. - ditto - 3/8" x 1/4" p.p. - ditto - 3/8" x 3/4" p.p. - ditto - 3/8" x 1/2" p.p. - ditto - 1/4" x 1/4" p.p. - ditto - 3/8" x 1/4" p.p. Bushing P.V.C. 1/4" X 1/2" Water Supply Elbow 16A Rubcock 1/4" Elbow P.V.C. 16A Tease P.V.C. Nipple P.V.C. Elbow P.V.C. Support P.V.C. P.V.C. Piping Tube 16A 4m Water Supply Socket 16A Valve Socket 16A	89/01/19	1 pc. 1 pc. 1 pc. 3 pcs. 2 pcs. 3 pcs. 1 pc. 1 pc. 1 pc. 2 pcs. 1 pc. 4 pcs. 2 pcs. 2 pcs. 4 pcs. 5 pcs. 1 pc. 1 pc.					no available cost #079-08097062(A,B,#)
Cynthia Bemas	Painting Room	*SHINTOA KOEKI* COATING WITH PAINTING EQUIPMENT No-Pump Dry Booth, Model DB-2S with	89/01/21	1 set		652,000.00	A	Invoice #63-395	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Cynthia Bernas	Painting Room	standard accessories: Dimension: 1680 x 1680 x 2900mm FILTER						
.	.	a) Andrea Filter 1.0m x 10m Roll		2 pcs.	24,800.00	49,600.00		
.	.	b) Craft Filter 500x500x25ft 30pcs/set		2 set	20,700.00	41,400.00		
.	.	AIR SPRAY GUN						
.	.	Air Spray Gun, W-71-2G		2 pcs.	10,300.00	20,600.00	A	
.	.	Air Spray Gun, W-77-2G		2 pcs.	11,900.00	23,800.00	A	
.	.	Accessory:						
.	.	Paint Cup 250cc, PC-5		2 pcs.	1,750.00	3,500.00		
.	.	Paint Cup 400cc, PC-4		2 pcs.	1,800.00	3,600.00		
.	.	Air Compressor, Model: SU07Pb with standard accessory and downtrans accessory		1 set		194,000.00	A	
.	.	1) Air Hose Model: AHU-6100		1 pc.				
.	.	2) Hose Joint Model: AU-02F		10 pcs.				
.	.	Airless Spray Unit, Model: 075T050 with Cart, Hose Diameter: 3/8 5m		1 set		476,000.00	A	
.	.	Accessory:						
.	.	1) Chip 163-615		3 pcs.				
.	.	2) -ditto- 163-617		3 pcs.				
.	.	3) -ditto- 163-619		3 pcs.				
.	.	4) -ditto- 163-621		3 pcs.				
.	.	5) -ditto- 163-623		3 pcs.				
.	.	Sag Tester, U type		1 set		155,000.00	A	
.	.	Sag Tester, BOX type		1 set		165,000.00	A	
.	.	4 Faces Applicator:						
.	.	a) Paint Thickness: 2,4 6,8 MILL		1 set		139,500.00		
.	.	b) -ditto- 10,20,60,40 MILL Bar Coater 400mm Length:		1 set		139,500.00		
.	.	1) Model: #5		3 pcs.	16,000.00	48,000.00		
.	.	2) Model: #7		3 pcs.	16,000.00	48,000.00		
.	.	3) Model: #14		3 pcs.	16,000.00	48,000.00		
.	.	4) Model: #16		3 pcs.	16,000.00	48,000.00		
.	.	5) Model: #18		3 pcs.	16,000.00	48,000.00		

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
Cynthia Bemas	Painting Room	6) Model: #20 Rotary Gauge 0-300 Micro		3 pcs.	16,000.00	48,000.00		
		Drying ovens, Model:SPH-200 with recorder 6 point with stan- dard accessory		3 sets	175,000.00	525,000.00	A	
		2) Frange 3) Stand 4) Spare parts		1 set 1 set		1,300,000.00	A	
		a) Tryack Unit b) Temperature fuse c) Glass tube fuse d) Heat Proof Materials		1 set 5 pcs. 5 pcs. 2 sets				
		Ford Cup Viscometer, No.4 with stand NIK 2 Cup		1 set		117,000.00	A	
		Stormer Viscometer with standard accessory: Weight: 25g, 50g, 100g each 200g 500g		1 pc. 1 set		3,950.00 385,000.00	A A	
		Rion Viscoltester, Model:VT-04 with standard accessory & 220V Adapter		2 pcs. 1 pc.				
		UNIVERSAL TESTING INSTRUMENT CO PUTER CONTROL SYSTEM TENSILON		1 set		82,000.00	A	
		1. Main Control & Recorder Model: NEC-9801 Recorder Model:AR5960		1 set		3,723,000.00	A	
		2. Data Processor, MP-200		1 set		1,310,000.00	A	
		3. Tension/Compression Load Cell Cap. 5 TonF, UF-5		1 pc.		330,000.00	A	
		4. Wedge Action Jaw with Double-Cut Faces Model:5000BJM-1D for UF-5		1 set		430,000.00	A	
		5. Compression Type Bending Testing Jigs Cap. 5 TonF		1 set		120,000.00	A	
		6. Compression Base		1 pc.		57,000.00	A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS	
Polan Vera Cruz	Computer Room	"TOKUGAWA" Personal Computer, MODEL:120 - 1286 AST Premium AVR Transform		1 set		1,356,000.00	A		
				1 set		150,000.00	A		
		EXPOSURE METEOROLOGICAL MEASURING SYSTEM		1 set		423,000.00	A		
		Sun Duration Meter, MS-091 - Eiko		1 set		350,000.00	A		
		UV Pyranometer, MS-140 - Eiko		1 set		369,000.00	A		
		Precision Pyranometer with Filter, MS-801 (RG715) - Eiko		1 set		73,000.00	A		
		Tipping Bucket Rain Gauge, MW-010 - Eiko		1 set		731,000.00	A		
		Wind Speed & Direction Transmitter with Converter, MA-050 - Eiko		1 set		587,000.00	A		
		Data Logger SOLAC III, MP-090 - Eiko		1 set		217,000.00	A		
		Installation Pole 6m, PM-030 - Eiko		1 set		908,000.00	A		
		"NIHON TEST PANEL" 1. Main rack A6063S 2. Vertical Frame (Right & Left) 3. Horizontal Frame		4 set 16 pcs. 72 pcs.		9,800.00	908,000.00 160,000.00 424,000.00	A A A	
		4. Collar Bolt Nut SUS-304 5. Anchor Bolt Nut SUS-304 6.7. Test piece Holder Polycarbonate		4 sets 64 pcs. 2000 pcs			39,200.00 78,800.00 620,000.00	A A A	
		SHIPPING CHARGE OCEAN FREIGHT INSURANCE PREMIUM					192,850.00 545,879.00 99,782.00		
		Reverse Osmosis Laboratory Appa- ratus, RO-100 - Orugano with downtrans, spare accessories; RO Module Filter		1 set	89/05/19		1,775,000.00	A	Invoice #63-461
				5 pcs. 50 pcs.		269,100.00 9,700.00	1,345,500.00 485,000.00	A A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		FRP Cutter, Model: KS-100 w/downtrans Spare blade 160mm Diameter		1 set 5 pcs.	17,600.00	258,000.00 88,000.00	A A	
		Blast Machine, Model: L-1 Table type w/dust collector Table dia. 1000mm Max. load: 300kgs. w/standard acc.: Spare parts: a) Inperer, Deflector, Blade Pin and other, b) Steel Grid 10kgs. c) Steel Shot 100kgs.		1 set 1 box 1 box		3,900,000.00 31,000.00 207,000.00 207,000.00	A A A D	
		Ultra Microtom, Model: ULTRACUTE w/standard accessory downtrans Cutting Speed 0.1-90mm/SEC Knife Sleage - 360° Knife Holder - 12mm Illuminator - 3 sets		1 set		5,837,000.00	A	
		AUTOMATIC POLARIZATION SYSTEM - CONSIST OF - 1. Potentiostat Model: HA-501G 2. Arbitrary Function Generator Model: HB-105 3. Frequency response analyzer Analyzer Model: S5720C 4. Controller (for data collector) personal computer Model: PC9802- VM21 with CRT Model: PC9801-29N Model: PC-KD854 5. Printer Model: SP-80 6. Plotter Model: 7440A 7. Computer Rack: RAC-498 8. Potentiostat Rack: HY-4 9. Consumption Printer Paper Floppy Disk 3.5 inch 10 pcs/box 10. Electrolysis Cell Model: HX-102		1 set 1 set 1 set 1 set		947,000.00 684,000.00 2,390,000.00 410,000.00	A A A A	
				1 set 1 set 1 set 1 set		51,000.00 95,000.00 84,000.00 270,000.00 43,000.00 45,000.00	A A A A A A	
				1 box 1 box 1 pc.		12,000.00 22,000.00 105,000.00	A A A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		Sealed Case Model:HS-101 Calomel Electrode PT Electrode 11. Software 12. AVR (Downtrans)		1 pc. 1 pc. 1 pc. 1 set 1 set		90,000.00 50,000.00 50,000.00 895,000.00 257,000.00	A A A A A	
		Impedance Tester, Model: CJA-3 with standard accessory DuPont Impact Tester, Model: IM-201 Magnet type w/ accessory Erichsen Cupping Tester, PI-101 Adhesion Tester, Model: 106 with standard accessory dollies-100pcs		1 set 1 set 1 set 1 set		618,000.00 393,000.00 843,000.00 134,000.00	A A A A	
		AIR CONDITIONER Air Cleaner, MA-400-WH - Mitsubishi with downtrans and filter - 4 sheets		1 set		75,000.00	A	
		Air Conditioner, PS-100G-W - Mitsubishi, PU100G w/ standard accessory		1 set		662,000.00	A	
		Dehumidifiers -National, w/downtrans		1 set		98,000.00	A	
		X-ray Diffractometer, XD-610 - Shimadzu, with recorder		1 set		9,058,400.00	A	
		1. Cooling water circulator CWC- 2000 2. Thin-film analysis attachment 3. Graphite Monochromator DMC-3 4. Rotational/Oscillatory sample holder VOS-350 5. Automated research system w/ JCPDS Full file		1 set		918,600.00	A	
		Consumable Parts: 1. Floppy Disc (10 pcs/set) 2. Printer Paper 3. Thermal Head 4. Plotter Pen (8 colors)		10 sets 50 pcs. 8 pcs. 20 sets	12,300.00 2,460.00 5,750.00 4,900.00	123,000.00 123,000.00 46,000.00 98,000.00	A A A A A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		5. Plotter Paper (100pcs/set)		10 sets	4,300.00	43,000.00		
		6. Fuse		1 set		1,400.00		
		7. Hose (with Clamp)		1 set		5,500.00		
		8. Lamp (Fluorescence type)		1 pc.		6,600.00		
		9. Line Filter, LF250SEW		1 pc.		29,500.00		
		10. Line Filter, GT-220V		1 pc.		6,600.00		
		11. Micro Switch, Z15HO9		5 pcs.	560.00	2,800.00		
		12. DC Solenoid		2 pcs.	2,450.00	4,900.00		
		13. Lamp D5-3		2 pcs.	100.00	200.00		
		14. CU X-Ray Tube		1 pc.		393,700.00		
		15. Flow Switch		1 pc.		49,200.00		
		16. P10-48W98 Input/Output Board		1 pc.		57,400.00		
		17. Micro Switch, S-SHL2-149		3 pcs.	600.00	1,800.00		
		18. Standard Sample (Si,26G)		1 pc.		6,800.00		
		19. Sample Holder		20 pcs.	2,130.00	42,600.00		
		XY Plotter		1 set		292,300.00		
		Transformer for CWC-2000		1 set		65,600.00		
		Auto Voltage Regulator		1 set		328,000.00		
		Gas Chromatograph, GC-14 - Shimadzu		1 set		1,285,400.00	A	
		1. Chromatopac, C-RSA w/ computer-loop interface		1 set		289,300.00	A	
		2. RS-232C Interface w/ expansion case		1 set		140,900.00	A	
		3. Hydrogen Generator, OPGU-500S w/ air-pipe/transformer		1 set		182,400.00	A	
		4. Split/Splitless sample injector		1 set		550,300.00	A	
		5. Stainless column 2M		2 pcs.	3,300.00	6,600.00	A	
		6. Capillary column CBP Series		4 pcs.	63,825.00	255,300.00	A	
		7. Micro Syringe 10		5 pcs.	5,800.00	29,000.00	A	
		8. HE Gas with pressure regulator and gas pipe		1 set		99,700.00	A	
		9. N2 gas w/ pressure regulator and gas pipe		1 set		74,800.00	A	
		10. Air Compressor w/ transformer and gas pipe		1 set		207,200.00	A	
		11. Soap-Flow meter (with stand)		1 set		15,000.00	A	
		12. Molecular Sieve Filter		2 pcs.	33,150.00	66,300.00	A	
		13. Dry Air-Boy (Silica Gel)		1 pc.		12,400.00	A	
		14. Auto-voltage regulator		1 pc.		290,000.00	A	

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		SPARE PARTS 1. Capillary Column CBP-1 2. Capillary Column CBP-20 3. Injection Port Septum(50pcs/set) 4. Etd Nozzle Assy. 5. Thermal Head 6. Thermal(Chart Paper 10pcs/bag)		3 pcs. 2 pcs. 5 sets 1 set 1 pc. 5 bags	63,600.00 63,600.00 500.00 18,220.00	191,400.00 127,600.00 2,500.00 2,900.00 9,900.00 91,100.00		
		Scanning Microscope, Model.: SM-T330A - Joel Operation & Display Console T330- IMS T330-BEIS2 (E) T220-UHR Camera for Scanning Image (T220- T220-CS1) T20.PPH Matsya 6 x 7 Film Holder (50A-MRH) 3pcs/set Four Crystal Spectrometer(T300-FCS) SUPPLEMENTARY CABINET(T300-SOB) T300-DMA, T300-TBU, T300-XCS, T300-XCSPS, W/T300-CR1 Cooling water conditioner(T20-CWC) Ion Sputter, JFC-1100E - Joel Two year's spare parts (2 s/p) as per attached sheet Full Keyboard (T330-FKB) Automatic voltage regulator(SVC- 5KSS) Vacuum Coater, SVE-700 TURBO - Sanyu Dewcycle Sunshine Super Long-Life Weather Meter, WEL-SUN-DC-B - Suga Founer Transform Infrared Spec- trometer, 1720 - Perkin Elmer 1116-5603 JP02-0047 Model 7550A Color Plotter JP02-0068 FS-232C Cable		1 set 1 set 1 set 1 set 1 set 1 set 1 set		0.00 131,000.00 520,000.00 890,000.00 195,000.00 38,000.00 8,300,000.00	A A A A A A A	
				1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set 1 set		454,000.00 821,000.00 610,000.00 550,000.00 210,000.00 2,300,000.00 9,410,000.00 7,130,000.00 800,000.00 35,000.00	A A A A A A A A A A A A A A A A A A A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		L116-0625 Dual Floppy Disk Drive unit		1 set		410,000.00	A	
		L116-0639 Resolution Upgrade Kit for 1720		1 set		840,000.00	A	
		L116-5014 Focused External Beam Kit		1 set		490,000.00	A	
		L116-5000 External Sampling Bench		1 set		840,000.00	A	
		L116-5009 DTGS Detector		1 set		380,000.00	A	
		L116-5113 Flat (Fixed) DTGS Mirror Accessory		1 set		24,000.00	A	
		186-436 Quick Handy Press w/7mm Die Set		1 set		250,000.00	A	
		0186-2289 Die Set 7mm Use for Quick Press		1 set		75,000.00	A	
		0186-2292 Die Set 3mm Use for Quick Press		2 sets	70,000.00	140,000.00	A	
		0690-5927 KBR(Potassium Bromide) Powder 25G		5 sets	9,700.00	48,500.00	A	
		0451-0949 Pellet Holder		2 sets	19,000.00	38,000.00	A	
		0186-0382 Multiple Internal Reflection Accessory		1 set		176,500.00	A	
		0186-1595 Internal Reflection Plate 45° KRS-5		2 sets	110,000.00	220,000.00	A	
		0186-1661 Internal Reflection Plate Germanium		2 sets	110,000.00	220,000.00	A	
		0186-0445 Variable Angle Specular Reflectance Accessory		1 set		420,000.00	A	
		0186-0796 16' Specular Reflectance Accessory		1 set		110,000.00	A	
		JP05-0050 KRS-5 Polarizer w/ mount		1 set		450,000.00	A	
		JP05-0021 Diffuse Reflectance Accessory (Collector TM)		1 set		750,000.00	A	
		0127-1284 10cm GASS Cell KBr Window Infrared Starter Kit		1 set		150,000.00	A	
				1 set		250,000.00	A	
		SHIPPING CHARGE				509,834.00		
		OCEAN FREIGHT				1,374,144.00		
		INSURANCE PREMIUM				517,952.00		

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		Steel Grid SG/50 - ditto - Steel Grid SG/70 - ditto - Steel Grid SG/100 - ditto - Steel Grid SG/120 - ditto - Automatic Voltage Regulator 200V-240V 60HZ Output 200V 1 KVA Preparing Machine for Glass Bead Test Specimen, TR-AUTO-Bead-1000S - Talkeda Rika, standard accessories 1) Pt Crucible w/cap 2) Polisher for Pt Crucible 3) Abrasives Dia-Past 3 micron - ditto - Sic Past #500 250g - ditto - Sic Past #1000 250g 4) Pt-Tong 5) Lithium Borate 500g 6) Sodium Borate 500g 7) Strip Materials Optional Accessories: 1) Pt-Crucible w/ cap Consumable: 1) Heating Element 8pcs/set 2) Crucible Holder 3) Staff 4) Aluminum Pin 3pcs/set 5) Pt-Thermocouple	90/05/28	500kgs. 500kgs. 500kgs. 500kgs. 500kgs. 500kgs. 500kgs. 1 set		137,650.00 137,650.00 137,650.00 137,650.00 137,650.00 137,650.00 137,650.00 172,000.00	A A A A A A A A A A	
				1 set		6,041,700.00	A	Inv.# NIL dated 90/01/12
				1 set				
				5 gms, 2 bl. 2 bl. 1 pc. 1 bl. 1 bl. 100gms.				
				1 set				
				1 set				
				1 pc.				
				1 pc.				
				1 set				
				1 set				
				1 set				
				1 set		139,300.00	A	
Exposure site		Electric Table Balance, EB330H - Shimadzu w/ printer Model EP-50 Integrating Light Dosage Meter, PH-51-1 - Suga Accessories for Ultramicrotome: 1) Anti-Vibration Table Magnetic Table		8 sets	366,000.00	2,928,000.00	A	Reported missing on Nov.20/91 during exposure visit (3 pcs.) → E
				1 set		678,000.00		

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		2) Universal Sample Holder Re- chart Ultracut UT		2 sets	25,400.00	50,800.00		
		3) Sample Holder for Plane Re- chart Ultracut UT		1 set		44,900.00		
		4) Diamond Knife 2.1mm		2 sets	566,500.00	1,133,000.00		
		5) Messr Cut Type C		1 set		113,200.00		
		6) Glass Knife Maker, Mod.MESSER C		1 set		517,300.00		
		7) Glass Plate 50pcs/set		10 sets	9,750.00	97,500.00		
		8) Electron Microscope Oven Mod.TD-700		1 set		458,300.00		
		Coating Thickness Tester, LH-300 - Kett,w/ standard accessories		1 set		257,800.00	A	
		Electric Press Model:FP-3 Capacity: 3 ton		1 set		433,000.00	A	
		Punching Iron Plate 4mm, 8mm dia. each 1 set		2 sets	67,000.00	134,000.00		
		Refrigerator Model:GR-335ESV		1 set		198,000.00	A	
		Spare Parts for Weathermeter WEL- SUN-HC:						
		1) Sunshine Carbon SLL-U		960 pcs.	2,135.00	2,049,600.00		
		2) - ditto - SLL-L		960 pcs.	1,412.00	1,355,520.00		
		3) Glass Filter SF-1		64 pcs.	11,020.00	705,280.00		
		4) Carbon Holder upper part		2 pcs.	37,500.00	75,000.00		
		5) - ditto - Lower part		2 pcs.	45,000.00	90,000.00		
		6) Lead bar		2 pcs.	6,750.00	13,500.00		
		7) Lead Line w/ Insulator		4 pcs.	2,250.00	9,000.00		
		8) Spring Pin		12 pcs.	125.00	1,500.00		
		9) Heat Proof board Upper.		48 pcs.	750.00	36,000.00		
		10) Heat Proof board Lower		48 pcs.	750.00	36,000.00		
		11) Stainless Plate Upper		8 pcs.	2,250.00	18,000.00		
		12) - ditto - Lower		8 pcs.	2,250.00	18,000.00		
		13) Air Filler		6 pcs.	750.00	4,500.00		
		14) Black Panel Thermometer Model:BPS-S		2 sets	26,250.00	52,500.00		
		15) Ink Pad		2 pcs.	3,250.00	6,500.00		

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		16) Recording Paper ES506B 17) Gauze		24 pcs. 24 pcs.	755.00 245.00	18,120.00 5,880.00		
		Desiccator (Plastic), Model:BG-2 Accessories: Silicagel Tray Shelf Board		1 set 1 pc. 2 pcs.		67,000.00	A	
		Drying Oven, Model:MSF-113S-Isuzu Dimension:450 x 450 x 400mm		1 set		196,900.00	A	
		Specimen Dryer, No.8333 w/down- transformer		1 set		446,200.00	A	
		Hand Magnifire with Light, Scale; 10x, No.7		5 sets	11,140.00	55,700.00	A	
		Accessories for Tosting Machine: 1) Load Cell a) 1 kgf UR-1L b) 5 kgf UR-5L c) 100 kgf UR-100L d) 500 kgf UR-500L		1 set 1 set 1 set 1 set		172,200.00 172,200.00 149,500.00 149,500.00		
		2) Jaw a) 100 kgf 100-JM-1D b) 5 kgf 5JF-1D 100 kgf 100JF-1D c) 500 kgf 5000 kgf e) Clip Jaw e) Jaw for Paper		1 set 1 set 1 set 1 set 1 set 1 set 1 set		201,000.00 119,600.00 138,200.00 252,600.00 525,800.00 91,800.00 130,900.00		
		Washing Machine Steam Boiling type, Model:TYC-15, Materials:SUS 304		1 set		510,400.00	A	
		X-ray Spectrometer, 3030 - Rigaku 1) X-ray Generator 60KV-80mA Phodium Target 3KW X-ray Buba		1 set (1 pc.)		10,650,000.00 (3,950,000.00)	A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		2) Spectroscopic Chamber Crystal Changing Device Analyzing Crystal LIF,EDDT, TAP Scintillation Counter Flow Proportional Counter PR Gas System Vacuum System		(1 pc.)		(3,900,000.00)		
		3) X-ray Counting System and System Controller,Pulse Height Analyzer (PHA), Timer,Scaler, High Vol- tage Power Supply for Detectors		(1 pc.)		(1,100,000.00)		
		4) Data Processing Unit		(1 pc.)		(920,000.00)		
		5) Interface for Data		(1 pc.)		(100,000.00)		
		6) Standard Accessories		(1 pc.)		(130,000.00)		
		7) Air Cooling System Water Recirculating Heat Exchanger		(1 pc.)		(950,000.00)		
		OTHER CHARGE				993,300.00		
		SHIPPING CHARGE				188,536.00		
		OCEAN FREIGHT				538,198.00		
		INSURANCE PREMIUM				193,508.00		
		Nissan Patrol Station Wagon, Model: WRLGY60SCP9 - Nissan Transmission: 4-speed Manual Seating Capacity: 9 persons With: Power Steering, Front Air, Conditioner,AM/FM, Radio&Cassette, Roof Rack, Front seat Belts(2), Door Mirrors(2), Standard Tool Set, Jack, Spare Tire	90/06/28	1 unit		1,960,000.00	A	
		Spare Parts:						
		1172043GO1 Belt		1 pc.		2,560.00		
		24021V5020 Fusible Link		1 pc.		460.00		
		2437089900 Fusible Link		1 pc.		460.00		
		2437089905 Fusible Link		1 pc.		460.00		
		2437089910 Fusible Link		1 pc.		460.00		
		1640501770 Fuel Filter		5 pcs.	3,000.00	15,000.00		
		15208W3X01 Oil Filter		10 pcs.	1,750.00	17,500.00		

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		0894121000 Fuse		5 pcs.	66.00	330.00		
		0894121000 Fuse		5 pcs.	66.00	330.00		
		0894122000 Fuse		5 pcs.	66.00	330.00		
		1654806J00 Air Filter		3 pcs.	2,700.00	8,100.00		
		2150106J00 Radiator Hose		1 pc.		2,750.00		
		2150306J00 Radiator Hose		1 pc.		2,600.00		
		23261C9609 Bulb		10 pcs.	130.00	1,300.00		
		2671789911 Bulb		10 pcs.	160.00	1,600.00		
		2571789912 Bulb		10 pcs.	180.00	1,800.00		
		2671689911 Bulb		2 pcs.	140.00	280.00		
		2673689902 Bulb		2 pcs.	150.00	300.00		
		02260131C0 Sealed Beam		1 pc.	2,200.00	2,200.00		
		28890V6901 Wiper Blade		2 pcs.		4,400.00		
		2524089920 Oil Switch		1 pc.		750.00		
		2509089903 Thermo Sensor		1 pc.		1,450.00		
		2263010G00 Thermo Switch		1 pc.		2,500.00		
		3010006J01 Clutch Disc		1 pc.		13,500.00		
		3021008000 Clutch Cover		1 pc.		21,000.00		
		3050221000 Clutch Bearing		1 pc.		1,800.00		
		3061171L25 Clutch Master Kit		1 pc.		1,650.00		
		3062126825 Clutch Opera Kit		1 pc.		750.00		
		3220230000 Clutch Bush		1 pc.		160.00		
		41060C8186 Brake Pad Kit		1 pc.		10,000.00		
		4406001J25 Brake Shoe Kit		1 pc.		7,100.00		
		4112007025 Brake Seal Kit		1 pc.		4,200.00		
		41080C7176 Brake Hardware Kit		1 pc.		3,500.00		
		DX10001J90 Brake Cup Kit		1 pc.		1,100.00		
		KN10030010 Brake Oil		1 pc.		1,900.00		
		40227C8200 Hub Oil Seal		2 pcs.	840.00	1,680.00		
		4022601J00 Hub Oil Seal		2 pcs.	770.00	1,540.00		
		4023201J00 Hub Oil Seal		2 pcs.	720.00	1,440.00		
		4057901J00 Knuckle Oil Seal		2 pcs.	1,150.00	2,300.00		
		4053301J00 Drive Oil Seal		2 pcs.	480.00	960.00		
		4323201J00 Axle Oil Seal		2 pcs.	900.00	1,800.00		
		4325206000 Axle Oil Seal		2 pcs.	900.00	1,800.00		
		8612001J00 Side Lamp		1 pc.	400.00	400.00		
		8612501J00 Side Lamp		1 pc.		6,000.00		
		43210C8300 Hub Bearing		1 pc.		6,000.00		
		40215C6000 Hub Bearing		1 pc.		3,000.00		
				1 pc.		2,500.00		

Equipment Listing No.1
ITDI-JICA Corrosion Project
as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		43215T3200 Axle Bearing 21480R0125 Drain Cook 1102661000 Oil Packing 162043G02 Nozzle 46011V6726 Brake Master Kit		1 pc. 3 pcs. 10 pcs. 6 pcs. 1 pc.	160.00 60.00 4,200.00	3,900.00 480.00 600.00 25,200.00 4,800.00		
		Automatic Absorption Spectrometer, AA-680		1 set		2,487,300.00	A	
		High Temperature Burner Head		1 pc.		81,200.00	A	
		Hollow Cathode Lamp(24 Kinds) Na, Mg, Al, Si, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Me, Ag, Cd, Sn, Ba, La, Pt, Au, Pb		1 set		891,000.00	A	
		Air Compressor with Transformer		1 set		167,400.00	A	
		Drain Separator DS-02		1 set		41,500.00	A	
		Gas Cylinder: C2H2 H2 N2O Ar		1 bl. 1 bl. 1 bl. 1 bl.		102,300.00 102,300.00 183,500.00 102,300.00	A A A A	
		Pressure Regulator(C2H2, N2O, H2, Ar)		1 set		120,200.00	A	
		1. Chart Paper 2. D2 Lamp 3. Nebulizer 4. Dispenser 5. Atomizer Chamber 6. Tubes: Teflon Tube 5m Vinyl Tube 5m (Gas Spray Tube) 7. O-ring for Burner Head 8. Thermal Head		30 rolls 1 pc. 1 pc. 1 pc. 1 pc. 1 set	1,150.00	34,500.00 19,400.00 35,000.00 2,100.00 19,500.00 16,200.00		
				1 pc. 2 pcs.	9,750.00	4,800.00 19,500.00		

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		OTHER CHARGE OCEAN FREIGHT SHIPPING CHARGE INSURANCE				256,380.00 232,872.00 189,716.00 41,467.00		
		Energy Dispersive X-ray Micro-Analysis Model: TN-5502NL & ETC. 1) TN-93-629G150T JEOL T-330 Microtrace S(Li) detector	91/03/07	1 set		20,700,000.00	A	
		2) TN-5502NL, Series II X-ray analyzer mainframe w/LSI-1173 CPU w/ 1 Mbyte CPU Memory, two high density floppy disk drives, high level programming language w/ documentation & source codes		1 set				
		3) TN-5515-246 One 40 Mbyte fixed Winchester disk drive w/ controller & cables(1 double Q-slot)		1 set				
		4) TN-5415-218 MCS controller board w/ 8 inputs, ratemeter and +AT software		1 set				
		5) TN-5515-210 Microtrace pulse processor w/ time variant filter		1 set				
		6) TN-5515-212 FET protected detector bias w/ TN-5515-214 compatible LN level indicator circuitry		1 set				
		7) Display for TN-5502NL		1 set				
		8) Table for TN-5520-210		1 set				
		9) TN-5550-220 SEM quantitative microanalysis w/SSQ standardless quantitative analysis w/ZAF & Phi-Rho correction,SSQ standardless Semi-Quant, MICROQ, QFILE, ZAF, B/A and Phi-Phi-Z		1 set				

Equipment Listing No.1
 ITDL-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		10) Manual (English and Japanese) 11) TN-5520-210 Printer: 120CPS dot matrix Printer/plotter w/10 carriage, parallel port, cable & spectral plot software 12) Stand for TN-5520-210 13) Cable for TN-5520-210 14) Key Board for TN-5502NL 15) Consumables: Printer Paper 2000sheet/box Consumables: 16) Ink Ribbon 6pcs/box 17) Floppy Disk 18) Uninterrupted power supply YUMIC-SA20 19) Step down transformer for YUMIC-SA20 (50A-SDT) 20) Cables for YUMIC-SA20 21) Metal Dewar 22) Metal Dewar OTHER CHARGE SHIPPING CHARGE FREIGHT CHARGE PREMIUM INSURANCE -a. Ion Chromato System, Model:2000/ SP, 220V, 60HZ. Consisting of: Ion-Chromatograph 2000/SP Ionpac AG4A column Negative Ion column Ionpac AS4A column AMMS Suppressors AMMS Installation Kit -b. AI-450 Model I, Full Sys. Manual, Consisting of: AI-450 System Manual ACI Interface	91/03/16	2 each 1 set 1 set 1 set 1 set 2 boxes 1 box 1 box 1 set 1 set 1 pc. 1 pc. 1 pc. 1 set 1 set 1 set 1 set 1 set		621,000.00 39,029.00 333,180.00 336,508.00 3,483,000.00	 A A	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		<p>c. IBM Computer System Consisting of: PS/2 Model: 30-F31 Color Display Printer III Keyboard PS/2 Mouse Printer Cable PC-DOS Ver. 4.0 MS-Windows Ver. 3.0 d. Optical Accessories, 1) Positive ion standard column system, Consisting of: Ionpac CG3 column Ionpac CS3 column CMMS Suppressor CMMS Installation Kit 2) Negative ion standard column system, Consisting of: Ionpac AG4A column Ionpac AS4A column AMMS Suppressor AMMS Installation Kit 3) Injection Loop, Consisting of: 50ul Loop 100ul Loop e. Expendable Supplies, 1) Syringe, (100 pcs./box) 2) DAP-HCl Reagent (5g.) 3) TMAOH Reagent (500ml.) Dewpanel light control weather meter, Model: DPWL-SR with Spare parts of 5-years operation, 1) Spare Lamp 2) Chart Paper, (15 pcs./box) 3) Socket</p>		1 set (1) (1) (1) (1) (1) (1) (1) (1) (1) 1 set (1) (1) (1) (1) 1 set (2) (2) 2 boxes 5 pcs. 10 pcs. 1 set 280 pcs. 5 boxes 40 pcs.		737,000.00 747,000.00 757,000.00 27,600.00 4,900.00 58,500.00 100,000.00 3,940,000.00 11,000.00 13,506.00 550.00	A	
							D → (A)	

Equipment Listing No.1
 ITDI-JICA Corrosion Project
 as of 15 January 1992

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT (Yen)	CODE	REMARKS
		4) Glow Lamp. 5) Weigauze, (5pcs./set) PMN Noise cutout automatic voltage, 1) Recolator: 15kVA, 60Hz, 10 2) Recolator: 3kVA, 60Hz, 30 OTHER CHARGES SHIPPING CHARGE OCEAN FREIGHT INSURANCE PREMIUM VTR Tape Beta L-125	91/06/21	40 pcs. 15 sets 1 set 1 set	350.00 1,098.00	14,000.00 16,470.00 1,785,000.00 1,160,000.00 528,000.00 83,941.00 233,049.00 102,478.00 78,113.00	A	

Classification System: (Code)

- A - Operational
- B - Operational but some parts out of order
- C - Frequently used before but occasionally used at present
- D - Never used
- E - Lost (Disposed)

EQUIPMENT/MATERIALS BROUGHT BY EXPERTS AND LOCALLY PURCHASED

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
Lilian de Guzman	Rm. 219	Micrometer, 193 - Mitutoyo Vernier Caliper, N20(530-108) - Mitutoyo	88/08/16	1			A	no available cost
	Experts Rm.	Personal Computer, PC9801VX - NEC Hybrid Multimeter, 2441 - Yokokawa Kaiser, Paper Cutter	88/09 88/11/16 88/11/19	1 1 1		1,106,550.00 969.00	A A A	Local Purchased (In Pesos)
		Plastic Dessicator 250mm., Nalgene 5311-0250	88/12/12	1		2,175.50	A	Local Purchased (In Pesos)
		Thermos Bottle	89/03/15	1		1,100.00	A	Local Purchased (In Pesos)
		Carrying Case, VM-CB25R - Hitachi Color Television, CMT2700 - Hitachi VHS Movie Camera & Recorder, VM5100A - Hitachi	89/04/14	1 1		18,000.00 178,200.00	A A	
		Video Tape Recorder, VT490EM(j) - Hitachi		1		224,000.00	A	
		Fire Extinguisher		1		116,000.00		
		Camera Set, AZ-1ZOOM - Olympus Cutting Mat Fotobox set, FOTOVIX III - Tamron Paper Cutter, DN-1 - Kokuyo Paper Punch Wholer, #200-N - Lion	89/05/04 89/05	3 1 1 1 1	2,000.00	6,000.00 6,100.00 186,500.00 14,000.00 11,400.00	A A A A A	Local Purchased (In Pesos)
Lilian de Guzman	Rm. 219	Safety Box - Kokuyo Word Processor Set, #335 - Canon	89/06/21	1 1		11,400.00 585,600.00	A A	Local Purchased (In Pesos)
	Experts Room	Kaiser, Copy Stand BOOKS: Statistical Method for Quality JUSE-QCAS Quality Control Statistical Methodology Numerical Table "A"	89/06/30	1 1 1 1		3,800.00 722.60 919.35 412.90 118.45	A A A A A	Local Purchased (In Pesos) - ditto - - ditto - - ditto -

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		Charging Instrument with Electronic Battery	89/07/12	1		3,600.00	A	
		Color Proof Board, CR-A47 - Minolta		1		3,600.00	A	
		Role-Board for Column, SP-91- Kosaka		1		147,000.00	A	
		JUSE-OCAS	89/08/03	1		220,000.00	A	
	Experts Room	JUSE-OCAS/MA1		1			A	
		Circuit Breaker 3p-30A	89/11/23	1		690.00	A	Local Purchased (in Pesos)
		Book: Practice of Surface Analysis	89/11/25	1		483.00	A	- ditto -
		Circuit Breaker HCP3040W	89/11/27	1		620.00	A	- ditto -
	Cherry Lane Causing/ Rolan Vera Cruz	Dessicator, FB-7	90/01/16	2	61,750.00	123,500.00	A	
		Vise Grip	90/01/15	1		670.00	A	Local Purchased (in Pesos)
		Steel Case	90/01/22	2	3,225.00	6,450.00	A	- ditto -
		Light System for Copy Stand	90/01/29	1		7,769.00	A	- ditto -
		Auto Voltage Regulator(STAVOL)1KVA		1		11,600.00	A	- ditto - (FTIR)
		Aluminum Ladder	90/02/07	1		1,260.00	A	- ditto -
		Camera, Tripod	90/02/09	1		3,900.00	A	- ditto -
		Blower	90/02/13	1		20,000.00	A	- ditto -
		FTIR Table		1		14,100.00	A	- ditto -
		Drying Oven	90/02/14	1		12,013.75	A	- ditto -
		Vacuum Cleaner	90/03/01	3		22,380.00	A	- ditto -
		Field Trip Bench Set		1 set	7,460.00	26,686.00	A	- ditto -
		VTR (Sony)	90/03/03	1		8,600.00	A	- ditto -
		Short Wave Radio	90/03/26	1		3,700.00	A	- ditto -
		Pyrex Glass Tray	90/03/30	1		1,041.00	A	- ditto -
		Microscope Table	90/04/06	1		2,180.00	A	- ditto -
		Handy Aspirator 5L, WP-25 - Yamato	90/04/11	1		82,000.00	A	- ditto -
	Cherry Lane Causing	Dust Fall Collector Set, No.8003-04	90/04/16	2	65,550.00	131,100.00	A	
	Aurora Vitoria/ Ramilo Layco	- Shibata						Local Purchased (in Pesos)
		Soldering Heater	90/05/14	1		275.00	A	

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		Book: Recent Development of Image Analyzing Technology for Micro-structure of Metal	90/05/20	1		1,314.35	A	Local Purchased (In Pesos)
Aurora Vitoria	EPCD/Exposure Site	FD Writer, MP-100 - Eiko	90/06/04	1		376,200.00	A	
		Portable Hydrothermograph, HK-K - Chino		1		88,900.00	A	
Ner Rodriguez	Sample Prep. Rm	Cutting Machine w/ Spare Blade #31	90/06/05	1 pc.		347,700.00	A	Mr. Harada
		Drying Machine, CD-1201B w/ transformer 220V/60Hz		1 pc.		90,000.00	A	
		Fiel 200/m/m 10sh/set		3 sets	9,950.00	29,850.00	A	
		Muffle Furnace, CNR15K 220V/60Hz		1 pc.		517,800.00	A	
Rolan Vera Cruz	Computer Room	PC386-IBM Interface Board PC-PC Ver. 1.21R		1 pc.		91,000.00	A	
Chery Lane Causing	Rm. 235	Portable Thermo-hygrographs, HN-K		1 pc.		88,900.00	A	
Aurora Vitoria	Exposure Site	Thermo-hygrograph, No. 7012 - Sato w/ Clock 1 pc.(Aurora-90-II)		2 sets	154,000.00	308,000.00	A	
		Cartridge pen 3 years						
		Recording paper 3 years						
Chery Lane Causing	Rm. 235	Thermo-hygrograph, No. 7100 - Sato w/ Recording paper 5 vols.		1 set		185,300.00	A	
		Cartridge pen 30 pcs.						
		Cartridge pen 30 pcs.						
		Halogen Lamp for EP600 (OHF)		10 doz.	45,600.00	456,000.00	A	
		Alumina Powder 1.0u 500g.		3 pcs.	11,800.00	35,400.00	A	
		Clip (50pcs/set) #70757		3 sets	5,650.00	16,950.00	A	
		Data Memory MP-100		1 pc.		376,200.00	A	
		OTHER CHARGES				76,292.00		
		FOB EXPENSE				33,220.00		
		INSURANCE				8,992.00		
		AIR FREIGHT				148,385.00		
Aurora Vitoria	EPCD/Exp.Site	Book	90/06/05	13 vols.		62,467.00	A	Mr. Harada
		OTHER CHARGES				1,874.00		
		SHIPPING CHARGE				9,877.00		
		AIR FREIGHT				8,500.00		
		INSURANCE PREMIUM				3,000.00		
Lilian de Guzman	Rm. 219	Shelf Boards for Desicator "luchi" 535 x 510 x 700	90/07/11	10 pcs.	1,675.00	16,750.00	A	Mr. Izuka

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		PC Printer Ribbons, EPSON #8762		50 pcs.	900.00	27,000.00	A	
		JK Wiper, 150-S "JUJO KIMBERLY" 415-55-85-01 36boxes/set		1 set		8,100.00	A	
		Kim Paper Towels "JUJO KIMBERLY" 415-55-85-11 24pcs/set		1 set		9,510.00	A	
		Filter Papers for Chromatograph "Advantec" #526, 50pcs/box		4 boxes	3,325.00	13,300.00	A	
		Data Logger Printing Paper for Exposure Meteo-graph System "EIKO SEIKI" OP0021 5 rolls/box		2 boxes	3,500.00	7,000.00	A	
		Gauze, 30cm x 10cm "HAKUUJI"		20 pcs.	630.00	12,600.00	A	
		Seamless Tube Gauze for Surgical Use, No.684392, White "Kimoto Denshi"		20 pcs.	7,200.00	144,000.00	A	
		Lead Dioxide (Lead II Oxide) 500ml "Wako"		15 pcs.	23,950.00	359,250.00	A	
		Oxalic Acid (N-Caprylic Acid)25ml "Wako"		2 pcs.	540.00	1,080.00	A	
		Filing Cover "G-File" No.975 A4-S "King Jim"		40 pcs.	765.00	30,600.00	A	
		- ditto - No. 978		20 pcs.	900.00	18,000.00	A	
		- ditto - No. 995		10 pcs.	1,215.00	12,150.00	A	
Ner Rodriguez	Sample Prep.Frm	Roller Cutter Dahle 508 113-0508 "Uchida Yoko"		1 pc.		7,380.00	A	
		Spare Blade for Dahle 508 113-0844 "Uchida Yoko"		5 pcs.	1,800.00	9,000.00	A	
		OTHER CHARGES SHIPPING CHARGE FREIGHT CHARGE INSURANCE PREMIUM				20,271.00 73,598.00 130,980.00 3,000.00		
		Micro Pipet 741A	90/08/06	2 boxes	26,600.00	53,200.00	A	Mr. Tsuru
		Micro Pipet 751B		2 boxes	26,600.00	53,200.00	A	
		Micro Pipet 761C		2 boxes	32,500.00	65,000.00	A	
		Tips (for Micro Pipet) B 200pcs/box		5 boxes	3,330.00	16,650.00	A	
		Tips (for Micro Pipet) C 50pcs/box		5 boxes	2,100.00	10,500.00	A	
		Parafilm 2" x 250		3 boxes	2,850.00	8,550.00	A	
		Silicone Grease 50g		3 pcs.	5,700.00	17,100.00	A	
		Mortars 70 x 60		1 pc.		14,250.00	A	
		Quartz Cell 10 x 10 x 45 4pcs/box		1 box		38,000.00	A	
		Magnetic Spinbars		6 pcs.		4,380.00	A	
		Forcep 123mm (Plastic)		6 pcs.		2,850.00	A	

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS		
Cynthia Habana	SEM	Clamp	90/08/06	10 pcs.	1,500.00	15,000.00	A	Mr. Inuma		
		Clamp		10 pcs.	445.00	4,450.00	A			
		Board Platinum 0.1mmx10x10cm 22g		1 pc.		105,800.00	A			
		Needle Platinum 0.5mm x 2m		1 pc.		43,700.00	A			
		DC Voltage Current Standard, 2554		1 pc.		240,000.00	A			
		Multimeter, F6551		1 pc.		160,000.00	A			
		Oscilloscope, SS-6616		1 pc.		215,000.00	A			
		Electric Cell HX-102		2 pcs.	109,000.00	218,000.00	A			
		Reference Electrode SCE		2 pcs.	11,500.00	23,000.00	A			
		Counter Electrode Pt		2 pcs.	30,000.00	60,000.00	A			
		Copper for Ground 365 x 200 x 3mm		3 pcs.	3,500.00	10,500.00	A			
		Terminal for Ground BA611S		10 pcs.	135.00	1,350.00	A			
		Cover for Ground BNC52		10 pcs.	435.00	4,350.00	A			
		Rail for Ground BAA600		2 pcs.	245.00	490.00	A			
		Stopper for Ground BNL 5		10 pcs.	45.00	450.00	A			
		Crimping Terminal(100pcs/box) 5.5-6		1 box		1,590.00	A			
		Ground Wire KIV.5.5		50 m	180.00	9,000.00	A			
		OTHER CHARGES							28,311.00	
		Rolan Vera Cruz Chery Lane Causing Lilian de Guzman Chery Lane Causing		Computer Room Rm. 235 Rm. 219 Rm. 235	Camera Food - Nikon	90/08/21	1 pc.			12,600.00
Epiphoto - Nikon	1 pc.				36,000.00		A			
Lighting Unit - Nikon	1 pc.				66,000.00		A			
Melting Vat Scissors, 419-50-11-02	5 pcs.		570.00		2,850.00		A			
Melting Vat Scissors, 419-50-11-04	5 pcs.		2,130.00		10,650.00		A			
Micrometer dia. 19mm - Nikon	1 pc.				7,200.00		A			
Stainless Beaker 1000ml.	10 pcs.		2,490.00		24,900.00		A			
Stainless Beaker 2000ml.	10 pcs.		3,050.00		30,500.00		A			
Stainless Beaker 200ml.	10 pcs.		1,470.00		14,700.00		A			
Stainless Beaker 5000ml.	5 pcs.		5,280.00		26,400.00		A			
Stainless Beaker 500ml.	10 pcs.		1,920.00		19,200.00		A			
Stainless Rweezers 150mm.	5 pcs.		1,540.00		7,700.00		A			
Stainless Vat 220 x 275 x 45mm	5 pcs.		2,590.00		12,900.00		A			
Stainless Vat 283 x 405 x 93mm	5 pcs.		9,210.00		46,050.00		A			
Stainless Vat 300 x 375 x 50mm	5 pcs.		3,840.00		19,200.00		A			
Test Tube Stand	4 pcs.		1,800.00		7,200.00		A			
EPO Form /25mm 10pcs/bag	5 bags		8,900.00		41,500.00		A			
EPO Form /30mm 10pcs/bag	2 bags		17,500.00		17,500.00		A			
Seal Pear 1 kg/can	1 can				4,000.00		A			
Waterproof Sandpaper 100sheets/box	1 box				13,250.00		A			
Non-Reflection Glass	3 pcs.				15,000.00		A			
Lamp	5 pcs.				810.00		A			

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		Spare Lamp 6V/30W		5 pcs.	810.00	4,050.00	A	
		Polyethylene Beaker 1,000ml		10 pcs.	210.00	2,100.00	A	
		Polyethylene Beaker 2,000ml		10 pcs.	260.00	2,600.00	A	
		Polyethylene Beaker 3,000ml		5 pcs.	460.00	2,300.00	A	
		Polyethylene Beaker 5,000ml		5 pcs.	1,050.00	5,250.00	A	
		Test Tube 25ml		50 pcs.	795.00	39,750.00	A	
		Evaporation Dish 696-30-01-05		10 pcs.	555.00	5,550.00	A	
		Evaporation Dish 696-30-02-01		10 pcs.	315.00	3,150.00	A	
		Evaporation Dish 696-30-02-02		10 pcs.	315.00	3,150.00	A	
		Melting Vat Type A 696-30-03-04		20 pcs.	280.00	5,600.00	A	
		Cover for above 696-30-03-54		20 pcs.	180.00	3,600.00	A	
		Melting Vat Type B 696-30-04-04		20 pcs.	280.00	5,600.00	A	
		Cover for above 696-30-04-54		20 pcs.	155.00	3,100.00	A	
		Melting Vat Type C 696-30-05-04		10 pcs.	260.00	2,600.00	A	
		Cover for above 696-30-05-54		10 pcs.	135.00	1,350.00	A	
		Filter for Pure Water Maker		5 pcs.	9,500.00	47,500.00	A	
		Cartridge Module for Pure Water Maker		5 pcs.	71,500.00	357,500.00	A	
		Glass Dome MS-801		2 pcs.	55,700.00	111,400.00	A	
		Glass Dome MS-140		1 pc.	55,700.00	55,700.00	A	
		Glass Dome MS-42		1 pc.	46,000.00	46,000.00	A	
		Glass Cover MS-091		1 pc.	46,000.00	46,000.00	A	
		Opposite Penetration Membrane		5 pcs.	165,600.00	828,000.00	A	
		OTHER CHARGES			63,114.00	63,114.00		
		AIR FREIGHT			102,630.00	102,630.00		
		SHIPPING CHARGE			12,019.00	12,019.00		
		INSURANCE PREMIUM			7,325.00	7,325.00		
		Desiccator 300MM	90/08/22	1 pc.		45,000.00	A	Mr. Ishii
		OTHER CHARGES				1,350.00		
		FOB EXPENSE				9,867.00		
		INSURANCE				3,000.00		
		AIR FREIGHT				35,845.00		
		Books	90/08/30	1 set & 3 vols.		150,849.00	A	Mr. Harada
		OTHER CHARGES				4,525.00		
		FOB EXPENSE				8,929.00		
		INSURANCE				3,000.00		
		AIR FREIGHT				8,500.00		
		Book: Microsoft Quick Basic	90/08/31	1		370.00	A	Local Purchased (in Pesos)

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
Ramilo Layco	Experts Room	FM-LW-MW-SW All Band Receiver, RF- -665d - National	90/09	1		4,700.00	A	In Pesos
	Rm. 235	Electronic Analytical Balance, Model:AEU-130 - Shimadzu Spoons 1. Stainless Spoon w/ Spatula 150mm 2. Stainless Spoon w/ Spatula 240mm 3. Stainless Micro Spatula 150mm Heat Resistant Glove 270mm PP Sample Container 50ml, 37/1mm 50 pcs/box OTHER CHARGE	90/09/18	1 set 1 set 1 pc. 1 pc. 1 pc. 1 set 1 box		248,000.00 600.00	A A	Mr. Nashimoto
Ner Rodriguez	Sample Prep. Rm	Cutting Machine OTHER CHARGE SHIPPING CHARGE AIR FREIGHT INSURANCE PREMIUM	90/10/03	1 set		240,000.00 7,200.00 7,383.00 43,550.00 3,000.00	A	Mr. Harada
		Books OTHER CHARGES AIR FREIGHT SHIPPING CHARGE INSURANCE PREMIUM	90/10/18	1 lot 5 vols.		117,207.00	A	Mr. Tsuru
	Experts Room	Auto Dry Desiccator, 11-056 01 -Iuchi X-ray Diffractometer for XD610 OTHER CHARGE AIR FREIGHT SHIPPING CHARGE INSURANCE PREMIUM	90/10/24	1 set 2 pcs.	150,000.00	38,000.00 300,000.00 10,140.00 26,465.00 9,077.00 3,000.00	A A	Mr. Nakakita
		PC Board for printer B3350 HBPOC-01709 OTHER CHARGES SHIPPING CHARGE AIR FREIGHT INSURANCE PREMIUM	90/11/02	1 pc.		80,000.00 2,400.00 9,877.00 8,500.00 3,000.00	A	Mr. Harada

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		Motor Gear, w/ Shaft for AVR AR-1000FS OTHER CHARGE	90/11/02	1 pc.		5,000.00	A	
	Experts Room	Computer CPU	90/11/20	1		17,000.00	A	Local Purchased (In pesos)
	.	Computer Hard Disk 40MB		1		6,500.00	A	- ditto -
	.	Computer Monitor, Philips		1		8,000.00	A	- ditto -
	.	Computer Printer, Epson FX1050		1		18,800.00	A	- ditto -
	.	Computer AVR Micro Pulse 500		1		1,800.00	A	- ditto -
	Dr. Luis Room	Computer Printer, Epson	91/01/07	1		28,000.00	A	Local Purchased (In pesos)
	.	Computer U.P.S., Wilson 650		1		12,000.00	A	- ditto -(IBM Compatible)
		Drosometer with converter	91/01/15	1 set		300,000.00	A	EKO Instruments Co.
		Adapter for F.D. Writer		1 set		10,000.00	A	
		Gas Sampling Set No.850	91/01/17	1 set		15,000.00	A	Mr. Harada & Ishii
		Test Tube 10pcs/box 1HH		3 boxes	1,500.00	4,500.00	A	
		Test Tube 10pcs/box 2HH		3 boxes	1,500.00	4,500.00	A	
		Test Tube 10pcs/box 4HH		3 boxes	1,500.00	4,500.00	A	
		Test Tube 10pcs/box 5LA		3 boxes	1,500.00	4,500.00	A	
		Test Tube 10pcs/box 11H		3 boxes	1,500.00	4,500.00	A	
		Test Tube 10pcs/box 11L		3 boxes	1,500.00	4,500.00	A	
		Rubber Hose		1 pc.		2,200.00	A	
		Rubber Cork 3pcs/box		4 boxes	2,750.00	11,000.00	A	
		Filter Paper 100pcs/box		5 boxes	7,500.00	37,500.00	A	
		Rubber Cork		10 pcs.	140.00	1,400.00	A	
		OTHER CHARGES				2,823.00		
		SHIPPING CHARGE				9,877.00		
		AIR FREIGHT				9,130.00		
		INSURANCE PREMIUM				3,000.00		
	Experts Room/ Dr. Luis Room	Uninterruptible Power Supply(UPS) WILSON 650	91/01/22	2 units	12,000.00	24,000.00	A	Local Purchased (In Pesos)
	.	Book: World Atlas	91/02/04	1		420.75	A	Local Purchased (In Pesos)
	.	Book Dictionary	91/02/18	1 set		2,009.00	A	Mr. Iizuka
	.	OTHER CHARGE		1 pc.		2,700.00	A	
	.	AIR FREIGHT/SHIPPING CHARGE & INSURANCE PREMIUM				141.00		
						11,000.00		

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
	Dr. Luis Room	Lazer Pointer	91/02/27	1		11,300.00	A	Local Purchased (In Pesos)
		Ram Card J31MESS2	91/03/04	1 pc.		123,000.00	A	Mr. Izuka
		Software MS-DOS (Soft consist of Floppy 1 set Y2000)		1 pc.		26,400.00	A	
		- DITTO - CANOWORD 3.5 (Soft consist of Floppy 1 set Y2000)		1 pc.		29,700.00	A	
		Printer BU-10V		1 set		65,800.00	A	
		Cable LEPC60		1 pc.		4,800.00	A	
		- DITTO - LEPC15		1 pc.		4,400.00	A	
		Auto Sheet Feeder ASF-6410		1 pc.		8,600.00	A	
		BJ Cartridge		10 pcs.	3,080.00	30,800.00	A	
		Control Card PCA-AX		1 pc.		44,000.00	A	
		- DITTO - PCN-201H		1 pc.		26,400.00	A	
		Printer Cable PWS-5453A		1 pc.		5,300.00	A	
		Copy Paper A4 100sheets/vol		25vols.	295.00	7,375.00	A	
		Copy Paper B4 100sheets/vol		13vols.	420.00	5,460.00	A	
		Personal Computer J3100SS02E		1 set		288,000.00	A	
		Automatic Voltage Regulator		1 pc.		127,000.00	A	
		EP-T Toner Cartridge		10 pcs.	23,700.00	237,000.00	A	
		OTHER CHARGES				43,639.00		
		SHIPPING CHARGE				16,281.00		
		AIR FREIGHT				68,200.00		
		INSURANCE PREMIUM				5,201.00		
	Dr. Luis Room	Dishes Cabinet	91/03/15	1		5,090.00	A	Local Purchased (In Pesos)
		NEC Cellular Phone	91/03/21	1		43,450.00	A	Local Purchased (In Pesos)
		Book	91/03/26	14vols.		287,837.00	A	Mr. Kobayashi
		OTHER CHARGE				8,635.00		
		AIR FREIGHT & SHIPPING CHARGE INCLUDING INSURANCE PREMIUM				20,860.00		
		Lamp Control Unit No.4B3278S 'Elmo'	91/04/01	1 pc.		29,100.00	A	Mr. Harada
		Lamp Holder 'Elmo'		3 pcs.	3,650.00	10,950.00	A	
		OTHER CHARGE				1,201.00		
		SHIPPING CHARGE				9,877.00		
		AIR FREIGHT				8,500.00		
		INSURANCE PREMIUM				3,000.00		

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		A4 X-ray Recorder 3025-23	91/04/04	1 pc.		462,800.00	A	Mr. Kobayashi
		A4 Sheet (100 sheets)		5 boxes	2,100.00	10,500.00	A	
		Pen Cartridge B9543cl Red		4 pcs.	1,450.00	5,800.00	A	
		Pen Cartridge B9543cm Green		4 pcs.	1,450.00	5,800.00	A	
		Hard Disk HDD-40F		2 pcs.	151,000.00	302,000.00	A	
		Tool Box 500A		1 pc.		59,800.00	A	
		Driver BSX-9 1.5-10.0mm		1 pc.		7,500.00	A	
		Driver BLX-9 1.5-10.0mm		1 pc.		4,600.00	A	
		Punch No.35		1 pc.		1,200.00	A	
		OTHER CHARGES		2 pcs.	600.00		A	
		FOB EXPENSE				25,800.00		
		INSURANCE				27,213.00		
		AIR FREIGHT				3,133.00		
						61,950.00		
		C/No.1 Sun Duration Meter, Md. MS-91	91/06/03	1 pc.		498,000.00	A	
		C/No.2 Air Temperature Measuring Sensor Model MT-010		1 pc.		33,000.00	A	
		Output cable for above 100 mts.		1 pc.		18,000.00	A	
		Hygrometer, Model MH-010S		1 set		250,000.00	A	
		Hair Differential inductor type Converter for the above, Model MI-070H		1 set		280,000.00	A	
		Output voltage:0 to 100% for 0 to 10 mv with transformer						
		Output cable for above 100 mts.		1 pc.		43,000.00	A	
		Output cable 100 mts.		1 pc.		51,000.00	A	
		Silica Gel 500 gms.		1 pc.		3,000.00	A	
		DC Power Supply		1 set		183,800.00	A	
		*KIKUSUI DENSHI PAD16-18L 220V, 60Hz, Single-phase						
		Output: DC 0-16V/0-18A with booster for battery						
		C/No.4 Steel Sheet		500 pcs	190.00	95,000.00	A	
		JIS G3141, SPCC 1 x 100 x 150mm						
		Zinc Sheet		100 pcs	610.00	61,000.00	A	
		JIS H4001 1 x 100 x 150mm						
		Aluminum Sheet		100 pcs	320.00	32,000.00	A	
		JIS H4000, A1050P 1 x 100 x 150mm						
		Copper Sheet		100 pcs	335.00	33,500.00	A	
		JIS H3100, C1220P 1 x 100 x 150mm						
		Stainless Steel Sheet						

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		JIS G4305,SUS304 1 x 100 x 150mm		50 pcs.	335.00	16,750.00	A	
		JIS G4305,SUS430 1 x 100 x 150mm		50 pcs.	330.00	16,500.00	A	
		Melited Galvanizing Steel Sheet		300pcs	330.00	99,000.00	A	
		JIS C3302 1 x 100 x 150mm						
		Electric Galvanizing Steel Sheet		100pcs	260.00	26,000.00	A	
		EGC-C 0.8 x 100 x 150mm						
		Melited Aluminum Plated Steel Sheet		50 pcs.	260.00	13,000.00	A	
		JIS C3314 0.8 x 100 x 150mm						
		OTHER CHARGE				52,576.00		
		FOB Expense				47,207.00		
		INSURANCE				6,966.00		
		AIR FREIGHT				166,590.00		
		Video Camera *Sony* 8mm Md.CCD-TR45	91/06/29	1 unit		29,400.00	A	Local Purchased (in pesos)
		Serial No.305702						
		Sun-Durabian-Meter Model No. NTS-691+	91/07/02	1 pc.		498,000.00	A	Mr. Harada. P. 67 y. 2. H.
		Glass Cover		1 pc.		45,000.00	A	
		Connector		1 pc.		13,300.00	A	
		-Maintenance Fee-				42,400.00		
		OTHER CHARGE				17,961.00		
		FOB Expense				8,929.00		
		INSURANCE				3,000.00		
		AIR FREIGHT				19,090.00		
		DISMIC-25 (50 pcs./box)	91/07/02	1 box		13,700.00	A	Mr. Baba
		Membrane Filter Holder		3 boxes	5,320.00	15,960.00	A	
		Plastic Filter Holder		1 pc.		5,700.00	A	
		Dowex		3 pcs.	18,620.00	55,860.00	A	
		Tape Writer		1 box		16,300.00	A	
		Color Tape		5 rolls	1,330.00	6,650.00	A	
		Clear Tape		6 rolls	1,330.00	7,980.00	A	
		AC Adaptor		1 pc.		2,470.00	A	
		System Bag		1 pc.		3,600.00	A	
		Compact PH Meter		1 box		18,810.00	A	
		Compact Electro Conductivity Meter (C-172)		1 box		18,810.00	A	
		Compact Electro Conductivity Meter (C-173)		1 box		18,810.00	A	
		Lithium Battery		20 pcs.	280.00	5,600.00	A	
		Econo Pack (50 pcs./box)		1 box		18,900.00	A	
		Stopcock Lock 2way Luer(10pcs./box)		5 boxes	3,700.00	18,500.00	A	

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		OTHER CHARGE FOB Expense INSURANCE AIR FREIGHT				6,835.00 8,929.00 3,000.00 10,790.00		
		Spectroscopic Graphite Electrodes (Carbon Electrode) (15 pcs./1 box) Dotite Thinner (7800-00374) Dotite Paint (4230-02970 XC-12) Dotite Paint (4230-02988 D-550) Sample Holder (7801-07144 T-330A) Stainless Tank Stainless Tank Stainless Tank Stainless Tank Stainless Tank OTHER CHARGE FOB Expense AIR FREIGHT INSURANCE		7 boxes 1 pc. 1 pc. 1 pc. 1 set 3 pcs. 2 pcs. 2 pcs. 1 pc. 2 pcs.	12,000.00 10,000.00 23,000.00 23,000.00 10,000.00	84,000.00 1,800.00 2,600.00 13,000.00 159,000.00 50,000.00 46,000.00 46,000.00 23,000.00 20,000.00 18,762.00 12,321.00 138,260.00 3,000.00	A A A A A A A A A A A	
		Handy Sulphur Dioxide Tester SD-1050 GASTECH	9/10/25	1 pc.		250,000.00	A	Given by PTTC(DTI)
		Metal Mount OTHER CHARGE FOB Expense INSURANCE AIR FREIGHT	9/10/29	1 pc.		350,000.00 10,500.00 8,929.00 3,000.00 8,500.00	A	Mr. Baba
		Makita Cut-Off Portable #2412	9/10/8/21	1 unit		9,378.00	A	Local Purchased (in Pesos)
		Bench Grinder 1/4 H.P.	9/10/8/21	1 unit		1,200.00	A	Local Purchased (in Pesos)
		Kopee Cable Drum Ext 25m	9/10/8/21	1 unit		1,100.00	A	Local Purchased (in Pesos)
		Book Corrosion Monitor (CT-1) Recorder(SP-G36) Corrosion Chamber	9/10/8/26	1 1 1 1		13,392.00 975,000.00 315,000.00 244,007.00		Dr. T. Tsuru
	Rm. 219	*Hanabishi* Electric Airpot	9/10/9/19	1 unit		1,749.50	A	Local Purchased (in Pesos)

Equipment Listing No.2

IN-CHARGE	LOCATION	DESCRIPTION	DATE	QTY.	UNIT COST	AMOUNT	CODE	REMARKS
		Software(Genstat 5) Data Processor	91/11/14	1		360,000.00		Dr. A. Tahara
		Book (Polymer)	91/12/10	7 pcs.		86,500.00		Mr. Iizuka
		Cut Sheet Feeder CW-CF12	91/12/20	1 unit		371,955.00		Local Purchased (In Pesos)
		Portable Multi-Thermometer Yokogawa 2423-14	92/01/09	1 pc.		4,097.05		Mr. Kobayashi
	Experts Room/ XRD Room	*Mitsubishi Electric Air-Conditioners (Mr.Slim) Model PS-3G	92/03/10	2 unit		197,818.00	A	Local Purchased (In Pesos)
		Liquid Nitrogen Tank	92/03/18	1		59,400.00	A	Local Purchased (In Pesos)
		Airconditioner, Mitsubishi	92/03/26	2	18,909.00	197,818.00	A	Local Purchased (In Pesos)
		GRIB Module	92/04/07	1		98,800.00		Dr. T. Kodama
		Digital Multimeter (7551-01-B-5)	92/04/07	1		98,800.00		Dr. T. Kodama
		Earth Tester Model:3235-11 - Yokogawa -	92/05/26	1		55,627.00		Dr. T. Kodama
		Aspirator WJ-20	92/05/28	2		93,600.00		Dr. T. Kodama
		3.5" FD Drive FD-31W	92/05/28	1		56,810.00		Mr. Kobayashi

Classification System: (Code)

- A - Operational
- B - Operational but some parts out of order
- C - Frequently used before but occasionally used at present
- D - Never used
- E - Lost (Disposed)

APPENDIX 10A

Industrial Technology Development Institute
 Jica Corrosion - Local Counterpart (Fund 102)
 Report of Appropriation, Obligation & Balances
 From January 1, 1988 to December 31, 1990

YEAR	PARTICULAR	APPROPRIATION	OBLIGATION	DISBURSEMENT	A/PAYABLE	BALANCES
1988	MOE-Repair	400,000.00	400,000.00	398,641.57	1,358.43	0.00
	Representation					
	CO-Equipment	100,000.00	100,000.00	29,900.00	70,100.00	0.00
1989	CO-Equipment	1,000,000.00	1,000,000.00	702,286.00	297,714.00	0.00
	TOTAL	1,500,000.00	1,500,000.00	1,130,827.57	369,172.43	0.00

CERTIFIED CORRECT:

Note : * -the amount of P369,172.43 was obligated but it remained outstanding as of December 31, 1990, so this was no longer allowed by COA to be spent for the ensuing year 1991. This was reverted already.

Glenda E. Tamayo
 GLENDA E. TAMAYO
 Chief Accountant

APPENDIX 10B

TOTAL EXPENDITURES FROM NOVEMBER 1990 TO JUNE 1992

Personnel Services		P 1,039,220.00
Project Leader (1)	P 144,750.00	
Researchers (9-10)	835,470.00	
Aides (2)	59,000.00	
Supplies & Materials		92,000.00
Maintenance (Nissan Patrol)		8,000.00
		<hr/>
TOTAL		P 1,139,220.00

APPENDIX 11. DEVELOPMENTAL IMPLICATIONS OF THE FOLLOW-UP OF THE PROJECT

The ASEAN-Japan Project on Atmospheric Corrosion - Metallic Coatings is expected to provide useful information in the selection of proper materials for a particular application or intended service. Its extension for another two years will complete and substantiate data or findings particularly from its Nationwide Atmospheric Corrosivity Study which hopes to come out with a Corrosivity Map of the Philippines. This map will serve as good reference material for regional materials selection not only in the Philippines but also in other ASEAN countries.

Considering that a large number of corrosion failures can be directly attributed to the indiscriminate selection of materials, the project can contribute significantly in the prevention of such failures. Data obtained from the project on the corrosion resistance of different bare and protected metals in relation to the meteorological and environmental characteristics of the atmosphere can serve as input especially for industries in coping with technical problems met in the processing of their products.

A two-year follow-up project will also provide minimal time for the transfer of basic know-how/technology by the Japanese experts to their Philippine counterparts. Within this period, ITDI staff will be able to improve and develop, with sufficient confidence, not only their expertise in the operation of various analytical and testing equipment but also their knowledge and capability in metal technology and surface treatment - two areas which are critical to industrial engineering and design. The period of follow-up can give local counterparts the opportunity and proper guidance from Japanese experts to reach a certain level of expertise that can be transferred to industry for the resolution of their corrosion problems. Through the project, local expertise and facilities in the field of corrosion are upgraded, contributing favorably to ITDI's function in providing support to industries towards the attainment of economic and industrial growth in our country.

Appendix 12. SCHEDULE FOR 1991/92 AND PLAN FOR FOLLOW UP PROGRAM (2 years)

		PLAN FOR FOLLOW UP PROGRAM (2 yrs)																		
		1 9 9 1			1 9 9 2			1 9 9 3			1 9 9 4									
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10
① SCHEDULE		<p>(3 YRS) ○</p> <p>(4 YRS) ○</p> <p>(5 YRS) ○</p>																		
a. EXPOSURE TEST (M.M)		<p>RAINY SEASON START</p> <p>DAY SEASON START</p>																		
b. NATION WIDE CROSSIVITY SURVEY		<p>ANALYSIS REPORT</p> <p>ANALYSIS REPORT</p> <p>ANALYSIS REPORT</p>																		
c. ANGLE TEST		<p>ANALYSIS REPORT</p>																		
d. SKY WARD AND GROUND WARD TEST		<p>FINAL REPORT</p> <p>SEMINAR IN MANILA (June 1-6 '92)</p> <p>TECHNICAL EXCHANGE VISIT (April 26-May 10 '92)</p>																		
e. PROJECT FINAL REPORT		<p>ANALYSIS REPORT</p>																		
f. SEMINAR IN MANILA		<p>ANALYSIS REPORT</p>																		
g. TECHNICAL EXCHANGE		<p>ANALYSIS REPORT</p>																		
② PLANNING MISSION		<p>PROJECT EVALUATION</p>																		
a. ADVISORY M. (□)		<p>CONFIRMATION OF FINAL YEARS PLAN (TOKYO)</p>																		
b. EVALUATION M. (□)		<p>Ms. Lillian de Guzman (12 MON.)</p> <p>Ms. Chona dela Pena (6 MON.)</p>																		
c. ASEAN JOINT MEETING (○)		<p>Ms. Eden Enriquez (4 MON.)</p> <p>Ms. Rosalinda Principe (1 MON.)</p>																		
d. LEADER MEETING (○)		<p>(LECTURERS FOR SEMINAR)</p>																		
③ C/P TRAINING IN JAPAN		<p>(6 MON.)</p> <p>(6 MON.)</p>																		
④ SHORT TERM EXPERT		<p>(6 MON.)</p> <p>(6 MON.)</p>																		
		JFY 1991 (HEISEI 3)			JFY 1992 (HEISEI 4)			JFY 1993 (HEISEI 5)			JFY 1994 (HEISEI 6)									

APPENDIX 13. SCHEDULE OF EVALUATION OF CORROSIVITY OF
PHILIPPINE ATMOSPHERE IN THE PERIOD OF
"FOLLOW-UP"

I. Evaluation of Corrosivity of Atmosphere Around Manila

- 1) Retrieval of Specimens after Four (4) Years' Exposure: December 1992
- 2) Retrieval of Specimens after Five (5) Years' Exposure: December 1993
- 3) Analysis of Meteorological Data of Whole Exposure Period in Four (4) Exposure Sites: January - February 1994
- 4) Analysis of Environmental Factors of Whole Exposure Period in Four (4) Exposure Sites: January - March 1994
- 5) Corrosion Rate Measurement of Retrieved Specimens: January - April 1994
- 6) Determination of Corrosion Product on the Retrieved Specimens: March - May 1994
- 7) Report Writing of Five Years' Exposure Test: June - August 1994
- 8) Preparation for the Contribution of Report to Technical Magazine and/or Conference: September 1994

II. Nationwide Evaluation of Corrosivity of Atmosphere

- 1) Retrieval of Specimens Started in Dry Season: November - December 1992
- 2) Analysis of Meteorological Data in Ten (10) Regional Exposure Sites: March 1993
- 3) Analysis of Environmental Factors in Ten (10) Regional Exposure Sites: March 1993
- 4) Corrosion Rate Measurement and Determination of Corrosion Products of Retrieved Specimen: March 1993
- 5) Report Writing: June 1993
- 6) Preparation for the Contribution of Report to Technical Magazine and/or Conference: July 1993

APPENDIX 14. TRAINING ITEMS IN THE PERIOD OF "FOLLOW-UP"

1. The theory and technology of pre-treatment for coating [lecture, experiment, plant visit and training on the resolution of practical problem (some examples)]
 - (a) Pre-treatment of metal surface for organic coating and its effect on the coated products.
(e.g. chromating, phosphating)
 - (b) The effect of cleaning, pickling and rinsing as pre-treatment of electroplating and hot-dip coating on the products.
2. The theory and technology of electroplating [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Zinc electroplating process
 - (b) Tin electroplating: halogen process and ferrosan process
3. The theory and technology of hot-dip coating [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Hot-dip galvanizing process
 - (b) Galvannealing process
 - (c) Hot-dip zinc-aluminum alloy coating process
4. Mechanism of corrosion prevention of electroplating and hot-dip coating products (lecture)
5. The theory and technology of organic coating and lining [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Painting
 - (b) Powder coating
 - (c) Lining
6. Other new technology of coating [lecture, experiments, plant visits, etc.]
 - (a) PVD
 - (b) Metal spraying
 - (c) Electroless plating, etc.

Appendix 15. PROPOSED EQUIPMENT OUTLAY FOR THE EXTENSION PERIOD

As requested in the last Project Leaders' Meeting in Tokyo:

1992 JFY (up to Oct)	(Y 20,000,000)	
1992 JFY (after Oct)	Y 10,000,000	
1993 JFY	Y 30,000,000	—Follow-up
1994 JFY (up to Oct)	Y 15,000,000	

Details of Proposed Budget for the Follow-up Period:

1992	Technical Information Reference System	5,000,000
	Experimental Apparatus (coating, etc)	4,000,000
	Parts of Introduced Equipment For maintenance	1,000,000
		Y <u>10,000,000</u>
1993	Gas Corrosion Test Equipment	20,000,000
	Experimental Apparatus (Hot Dip plating, etc.)	5,000,000
	Technical Information Referencing Software (1993 version)	1,000,000
	Parts of Introduced Equipment For Maintenance	4,000,000
		Y <u>30,000,000</u>
1994	Experimental Apparatus	10,000,000
	Technical Information Referencing Software (1994 version)	1,000,000
	Spareparts for all Equipment Introduced by JICA Project	4,000,000
		Y <u>15,000,000</u>

付 属 資 料 3

日本人専門家チームによる評価

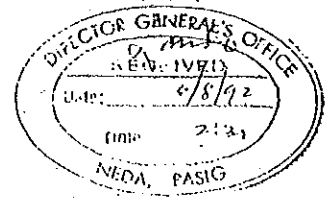
項 目	評 価 結 果
1.プロジェクトの協力実績 1.1 プロジェクト活動実績	『プロジェクトの概要説明』参照 Progress Report 参照
1.2 プロジェクト投入実績 1.2.1 日本側投入実績 (1) 専門家派遣	総じては金属材料技術研究所 (NRIM) の協力を得て計画的に適正、効果的な派遣による指導が成された。金属の表面処理の分野からの防食技術や製品に関する短期専門家の民間企業からの派遣は、その人材確保に困難があったが関係者の協力を得て、実施することができた。プロジェクト側が要望した機材据付の短期専門家派遣は十分であった。
(2) 研修員受入れ	NRIMに17名の日本研修を受け入れてもらい日本の研究所の中での研修は各研修員に大きなインパクトを与え、研究結果も得て大いに効果的であった。 腐食研究室以外からの日本研修参加者は帰国後、必ずしも当プロジェクト活動に常時寄与できるわけではないが、それぞれの部署でその経験を生かすとともに当プロジェクトの強力な支援者となっている。
(3) 供与機材	総じて適正、効果的であったが、例外的には機材導入後に劣悪化した現地の状況(電力事情)に十分対応できない仕様の機材もあった。
(4) ローカルコスト負担	フィリピン側の経済事情から、当プロジェクトを前進させるには日本側で負担しなければならないものが多かった。逆に最初から積極的にローカルコストも日本側が負担すればもっとプロジェクトの成果を大きく出来たものと思われることもあり、フィリピン側に対する自助努力の促進の兼ね合いから判断の時期が非常に難しかった。(例：停電対策、断水対策。)
1.2.1 フィリピン側投入実績 (1) カウンター・パート配置	カウンターパート(正10名、パートタイム7名)がほぼ適正に配置され定着率も高く、技術移転の蓄積が効果的に行なわれた。プロジェクトから離れたのは一時期を含め、日本留学(日本国文部省枠)、配置転換及び退職の各1名程度である。 本来的には研究開発部に配置されるはずであった当プロジェクトが、最終的に標準試験部に組み込まれた事から、ITDIの一部門には腐食研究室が新設され実施部隊となったもののカウンターパートはプロジェクトに専念出来ない面もあったが、プロジェクトの推進に努力が認められた。プロジェクトの活動として海外派遣やマルチラテラル活動のホスト国としての活動により、マンパワーの不足を生ずることがあった。カウンターパートの殆どが女性で且つ、化学専攻出身である。金属学専攻出身者および機材のメカに精通する男性カウンターパートもいると更に良かったと思われる。
(2) ローカル・コスト負担	フィリピン側の国立研究所予算の緊急縮小期間が丁度当プロジェクト実施期間と重なった。当初フィリピン側で負担すると主張し、その努力にもかかわらず予算が取得出来ず、その額はR/Dで期待されたものより大幅に下回ると考えられる。
1.3 マルチ・ラテラル活動	共同研究、域内研修、セミナーそして技術交換をそれぞれ2回実施し、積極的な活動を展開し、総じて1回目よりも2回目の方がより充実したものとなった。 マルチラテラル活動には予想外のエネルギーを投入することになり、プロジェクトの活動は相当に忙しいものとなったが、アセアン他国との研究者の交流はアセアンの研究活動に大いに活性化をもたらし、その活動効果は将来にわたり計り知れないものがあると評価する。

項 目	評 価 結 果
2. プロジェクトの評価 2.1 当初計画と実績	当初の計画には、(1) 腐食の理論、腐食の評価、大気暴露試験と気象、環境因子の測定による熱帯における大気の腐食性の評価の他に、(2) 表面処理、防食技術、表面処理材料の技術協力(指導)も含まれていたが、前者(1)のため測定、実験機器の導入と指導を優先し(これだけでも多分野に亘る)相当の成果を挙げたとも信ずるが、後者(2)の指導は実際のプロジェクト開始が1年近く遅れた事も相まって、途中で時間切れとなった。
2.2 項目別評価 2.2.1 プロジェクト実施体制	ITDIの一部門がプロジェクト実施部隊であり、また理解あるフィリピン側リーダーの下に組織されていたことは恵まれていた実施体制であった。このリーダーが1991年8月末に脳溢血で倒れ、完全復帰が遅れたことは遺憾であるが、実施体制に揺るぎはなかった。
2.2.2 カウンター・パートへの技術 移転状況	導入した多くの高級、新鋭な物理測定機器を含め全ての装置の操作はこなせるようになり、また多種の評価実験手法、統計的データ解析手法は身に付けたが、特殊な応用や得られた多くのデータから、独力で現象の推論による技術問題の解決力はまだ不十分である。
2.2.3 供与機材等の活用状況	供与機材はすべて操作を習得し、使用可能である。使用頻度も時間の経過とともに増大して活用状況は良好といえる。(Progress Report 活用状況表参照)
2.2.4 技術移転到達度及びその手法	研究プロジェクトであるので、単なる技術移転で良しとするものではないが、機器操作などの技術移転の部分はほぼ100%達成していると評価できる。
2.3 マルチ・ラテラル活動協力	アセアンの研究活動の活性化にその効果は究めて大きかった。即ちアセアン域内とは言え国際的に研究活動を発表する場を与えられた事と、研究者及び技術の交流は将来的に多くの意義深い影響を残したと言える。フィリピンとしては非常に積極的に、マルチラテラル活動に取り組んだと評価できる。
2.4 フィリピン側評価	フィリピン側のこのプロジェクトに対する期待と評価は大きい。ITDIの研究の主要な武器となる多くの試験・測定・実験装置・設備の充実とこれらを有効に研究に役立てる研究員が育ち、今後に向けての発展の道筋が出来つつあると評価している。フィリピンの全国腐食性調査についてはフィリピンの内外からその結果(腐食マップの作成)を期待されている。
2.5 総合評価	カウンターパートがフィリピン産業界及び学協会における、腐食防食に関する問題解決に役立つよう一定レベル達成まで指導を続ける必要がある。新鋭機材の導入と種々の研究活動を通じてカウンターパートの実力も次第に増しITDIの腐食研究室は確実にフィリピンにおける腐食の核になりつつあると言える。先ごろITDIが中心となって発足した『表面コーティング研究開発センター』(SCRDC)や大学との関係を深める事により、その活動の重要性が更に高まる事が予想される。

付 属 資 料 4



Republic of the Philippines
Planning and Evaluation Service
DEPARTMENT OF SCIENCE AND TECHNOLOGY



3 June 1992

DR. CAYETANO W. PADERANGA, JR.
Secretary of Socio-Economic Planning
and Director-General
National Economic Development
Authority
NEDA sa Pasig
Amber St. Pasig, Metro Manila

№ 1909-92

Dear Secretary Paderanga:

This has reference to the "ASEAN-Japan Project on Atmospheric Corrosion-Metallic Coatings" being undertaken by the Industrial Technology Development Institute (ITDI) with the support of the Japan International Cooperation Agency (JICA). The five-year project, which started in October 1987, is due for completion in October 1992. However, there are several aspects of the project which can not be fully realized by October 1992. Hence, a request for a two-year extension is being made.

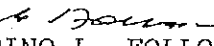
The activities during the two-year extension will concentrate on the completion of the technology transfer, five-year exposure test, nationwide atmospheric corrosivity study, and assistance to corrosion research activities initiated in the Philippines.

Moreover, the extension will give the JICA experts enough time to complete the technology transfer to their local counterparts allowing them to acquire skills and establish a high level of maturity in undertaking research in corrosion and corrosion prevention.

We have attached herewith for your perusal pertinent documents to support our request. We would greatly appreciate your appropriate action for the early transmittal of this request to JICA.

Thank you for your continued support to science and technology.

Very truly yours,


CEFERINO L. FOLLOSCO
Secretary

Encl.: a/s

Postal Address: P.O. Box 3596 Manila
Mailing Address: SCIENCE MANILA
Tele. No. (75) 68819

Head Office: Bicutan, Taguig, Metro Manila
Tel. Nos. 822-09-61 to 67
Fax No. (632) 822-0564

- APPENDIX I. The Records of Discussions for the ASEAN -
Japan Project on Atmospheric Corrosion -
Metallic Coatings
- APPENDIX II. Developmental Implications of the Project
- APPENDIX III. Future Plan of the Project (chart)
- APPENDIX IV. Project Work Plan vs Accomplishment (chart)
- APPENDIX V. Schedule for 1991 and Plan for Follow-up
Program (chart)
- APPENDIX VI. Schedule of Evaluation of Corrosivity of
Philippine Atmosphere in the Period of
"Follow-up"
- APPENDIX VII. Training Items in the Period of "Follow-up"
- APPENDIX VIII. Proposed Equipment Outlay for the Extension
Period
- APPENDIX IX. Equipment Acquired through the Project As of
JFY 1992

APPENDIX I

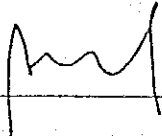
THE RECORD OF DISCUSSIONS
BETWEEN THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF JAPAN
AND THE GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES
ON THE JAPANESE TECHNICAL COOPERATION FOR THE
ASEAN PROJECT ON ATMOSPHERIC CORROSION - METALLIC COATINGS

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.

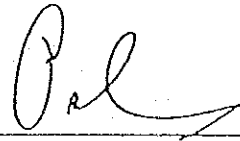
During its stay in the Republic of the Philippines, the Team exchanged views and had a series of discussions with the Philippine authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the project. Following the Team's visit to the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

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

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





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

Activities	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			
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.

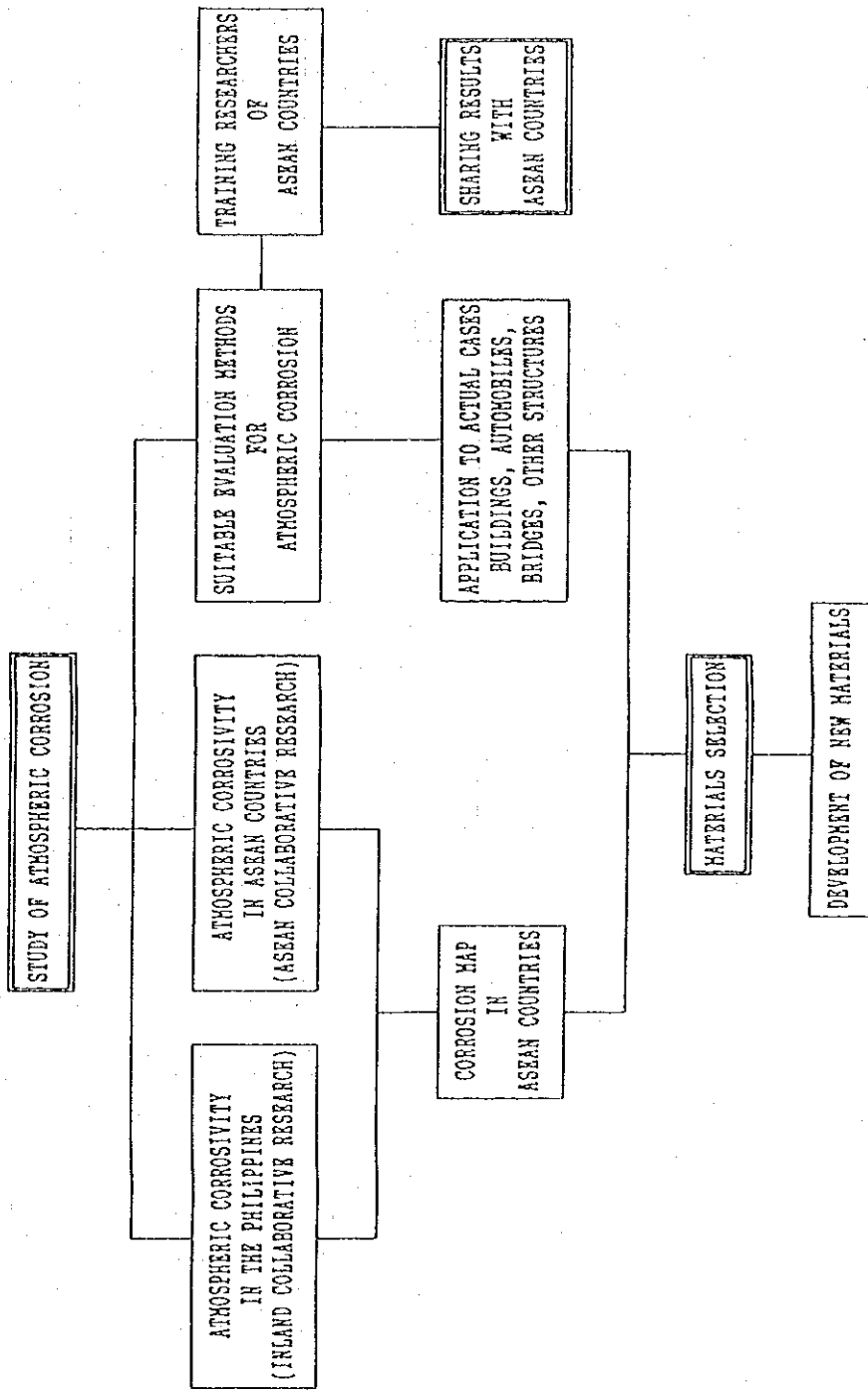
APPENDIX II. DEVELOPMENTAL IMPLICATIONS OF THE FOLLOW-UP
OF THE PROJECT

The ASEAN-Japan Project on Atmospheric Corrosion - Metallic Coatings is expected to provide useful information in the selection of proper materials for a particular application or intended service. Its extension for another two years will complete and substantiate data or findings particularly from its Nationwide Atmospheric Corrosivity Study which hopes to come out with a Corrosivity Map of the Philippines. This map will serve as good reference material for regional materials selection not only in the Philippines but also in other ASEAN countries.

Considering that a large number of corrosion failures can be directly attributed to the indiscriminate selection of materials, the project can contribute significantly in the prevention of such failures. Data obtained from the project on the corrosion resistance of different bare and protected metals in relation to the meteorological and environmental characteristics of the atmosphere can serve as input especially for industries in coping with technical problems met in the processing of their products.

A two-year follow-up project will also provide minimal time for the transfer of basic know-how/technology by the Japanese experts to their Philippine counterparts. Through the project, local expertise and facilities in the field of corrosion are upgraded, contributing favorably to ITDI's function in providing support to the industry.

APPENDIX III. FUTURE PLAN OF THE PROJECT



APPENDIX IV

ACTIVITIES OF THE PROJECT
WORK PLAN vs ACCOMPLISHMENT

ACTIVITIES	FISCAL YEAR MONTH												
	1907/00	1908/00	1909/00	1910/00	1911/00	1912/00	1913/00	1914/00	1915/00	1916/00	1917/00	1918/00	
I. BILATERAL PROGRAM													
1. Upgrading of ITDI Facilities/ Equipment													
a. Donation of R&D/Testing Equipment													
b. Renovation of rooms/working area													
c. Deepwell Construction													
d. Generator Shed Construction													
2. Research Topics													
a. 5-year exposure test in 4 general types of atmosphere													
b. Nationwide survey of atmospheric corrosivity													
c. Effect of exposure fact/orientation/angle of inclination on the atmospheric corrosion of metals													
d. Atmospheric corrosion behavior of skyward and groundward surfaces of metals													
e. Comparative study of corrosion behavior of metals subjected to natural and accelerated conditions													
f. Monitoring of atmospheric corrosion rate by electrochemical impedance method													
3. Transfer of Technology													
4. Public Relation Activities													
a. Project brochure													
b. Video production													

Follow-up Period

1992/93

1993/94

LEGEND: --- PLANNED ... ACTUAL

ACTIVITIES	FISCAL YEAR		1987/88		1988/89		1989/90		1990/91		1991/92		1992/93		1993/94		
	MONTH		1	4	7	1	4	7	1	4	7	1	4	7	1	4	7
1. MULTILATERAL PROGRAM																	
1. Counterpart Training in Japan																	
2. a. Regional Seminar/Workshop																	
b. Regional training																	
c. Regional collaborative research works																	
3. Technical Exchange Visit																	

LEGEND:
 — PLANNED --- ACTUAL

APPENDIX V. SCHEDULE FOR 1991 and PLAN FOR FOLLOW UP PROGRAM (2yrs)

		PLAN FOR FOLLOW UP PROGRAM (2yrs)																														
		1 9 9 1			1 9 9 2			1 9 9 3			1 9 9 4																					
		4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10
① SCHEDULE		<p>(3 YRS) \</p> <p>(4 YRS) \</p> <p>(5 YRS) \</p> <p>ANALYSIS REPORT</p>																														
a. EXPOSURE TEST (A.M)		<p>RAINY SEASON START</p> <p>ANALYSIS REPORT</p>																														
b. NATION WIDE CROSSIVITY SURVEY		<p>DRY SEASON START</p> <p>ANALYSIS REPORT</p>																														
c. ANGLE TEST		<p>ANALYSIS REPORT</p>																														
d. SKY WARD AND GROUND WARD TEST		<p>FINAL REPORT</p> <p>SEMINAR IN MANILA (June 1-6 '92) (5 DAYS)</p> <p>TECHNICAL EXCHANGE VISIT (April 26-May 10 '92)</p>																														
e. PROJECT FINAL REPORT		<p>ANALYSIS REPORT</p>																														
f. SEMINAR IN MANILA		<p>ANALYSIS REPORT</p>																														
g. TECHNICAL EXCHANGE		<p>ANALYSIS REPORT</p>																														
② PLANNING MISSION		<p>PROJECT EVALUATION</p>																														
a. ADVISORY M. (□)		<p>CONFIRMATION OF FINAL YEARS PLAN (TOKYO)</p>																														
b. EVALUATION M. (□)		<p>Ms. Lillian de Guzman (12 MON.)</p> <p>Ms. Chona dela Pena (6 MON.)</p>																														
c. ASEAN JOINT MEETING		<p>Ms. Eden Enriquez (4 MON.)</p> <p>Ms. Rosalinda Principe (4 MON.)</p>																														
d. LEADER MEETING (○)		<p>(LECTURERS FOR SEMINAR)</p>																														
③ OCP TRAINING IN JAPAN		<p>(6 MON.)</p> <p>(6 MON.)</p> <p>(6 MON.)</p>																														
④ SHORT TERM EXPERT		<p>(6 MON.)</p> <p>(6 MON.)</p>																														
		JFY 1991 (HEISEI 3)									JFY 1992 (HEISEI 4)									JFY 1993 (HEISEI 5)									JFY 1994 (HEISEI 6)			

APPENDIX VI. SCHEDULE OF EVALUATION OF CORROSIVITY OF
PHILIPPINE ATMOSPHERE IN THE PERIOD OF
"FOLLOW-UP"

I. Evaluation of Corrosivity of Atmosphere Around Manila

- 1) Retrieval of Specimens after Four (4) Years Exposure: December 1992
- 2) Retrieval of Specimens after Five (5) Years Exposure: December 1993
- 3) Analysis of Meteorological Data of Whole Exposure Period in Four (4) Exposure Sites: January - February 1994
- 4) Analysis of Environmental Factors of Whole Exposure Period in Four (4) Exposure Sites: January - March 1994
- 5) Corrosion Rate Measurement of Retrieved Specimens: January - April 1994
- 6) Determination of Corrosion Product on the Retrieved Specimens: March - May 1994
- 7) Report Writing of Five Years' Exposure Test: June - August 1994
- 8) Preparation for the Contribution of Report to Technical Magazine and/or Conference: September 1994

II. Nationwide Evaluation of Corrosivity of Atmosphere

- 1) Retrieval of Specimens Started in Dry Season: November - December 1992
- 2) Analysis of Meteorological Data in Ten (10) Regional Exposure Sites: March 1993
- 3) Analysis of Environmental Factors in Ten (10) Regional Exposure Sites: March 1993
- 4) Corrosion Rate Measurement and Determination of Corrosion Products of Retrieved Specimen: March 1993
- 5) Report Writing: June 1993
- 6) Preparation for the Contribution of Report to Technical Magazine and/or Conference: July 1993

APPENDIX VII. TRAINING ITEMS IN THE PERIOD OF "FOLLOW-UP"

1. The theory and technology of pre-treatment for coating [lecture, experiment, plant visit and training on the resolution of practical problem (some examples)]
 - (a) Pre-treatment of metal surface for organic coating and its effect on the coated products.
(e.g. chromating, phosphating)
 - (b) The effect of cleaning, pickling and rinsing as pre-treatment of electroplating and hot-dip coating on the products.
2. The theory and technology of electroplating [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Zinc electroplating process
 - (b) Tin electroplating: halogen process and ferrosan process
3. The theory and technology of hot-dip coating [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Hot-dip galvanizing process
 - (b) Galvannealing process
 - (c) Hot-dip zinc-aluminum alloy coating process
4. Mechanism of corrosion prevention of electroplating and hot-dip coating products (lecture)
5. The theory and technology of organic coating and lining [lecture, experiment, plant visit and training on the resolution of practical problems (some examples)]
 - (a) Painting
 - (b) Powder coating
 - (c) Lining
6. Other new technology of coating [lecture, experiments, plant visits, etc.]
 - (a) PVD
 - (b) Metal spraying
 - (c) Electroless plating, etc.

VISCOMETERS

COATING/DRY FILM THICKNESS TESTERS

OTHER COATING/DRY FILM TESTERS (e.g. Pinhole Tester, Portable Surface Thermometer, Surface Roughness Tester, Color Meter, Portable Gloss Meter, etc.)

OPTICAL MICROSCOPES (e.g. Stereoscopic Microscope, Metallurgical Microscope, etc.)

EQUIPMENT FOR SPECIMEN PREPARATION

1. Polishing Equipment (e.g. Belt Sander with Dust Collector, Metallographic Pregrinder, Disk Grinder, etc.)
2. Cutting equipment/tools (e.g. High-Speed Precision Cutter, Ultramicrotome)
3. Blast Machine
4. Ultrasonic Cleaner
5. Specimen Dryers
6. Glass Bead Preparation Machine

REVERSE OSMOSIS LABORATORY GRADE WATER SYSTEM

UNIVERSAL TESTING INSTRUMENT (Computer Control System, Tensilon)

WEIGHING BALANCES

OVENS

APPENDIX VIII. PROPOSED EQUIPMENT OUTLAY FOR THE EXTENSION PERIOD

As requested in the last Project Leaders Meeting in Tokyo:

1992 JFY (up to Oct)	(Y 20,000,000)	
1992 JFY (after Oct)	Y 10,000,000	--- Follow-up
1993 JFY	Y 30,000,000	
1994 JFY (up to Oct)	Y 15,000,000	

Details of proposed budget for follow-up period:

1992	Technical Information Referencing System (C.D.)	5,000,000	--- Y 10,000,000
	Experimental Apparatus (Coating, etc.)	4,000,000	
	Parts of Introduced Equipment for Maintenance	1,000,000	
1993	Gas Corrosion Test Equipment	20,000,000	--- Y 30,000,000
	Experimental Apparatus (Hot Dip Plating, etc)	5,000,000	
	Technical Information Referencing Software (1993 version)	1,000,000	
	Parts of Introduced Equipment for Maintenance	4,000,000	
1994	Experimental Apparatus	10,000,000	--- Y 15,000,000
	Technical Information Referencing Software (1994 version)	1,000,000	
	Spare Parts for All Equipment introduced by JICA Project.	4,000,000	

APPENDIX IX. EQUIPMENT ACQUIRED THROUGH THE PROJECT AS OF
JFY 1992

ANALYTICAL EQUIPMENT

1. Scanning Electron Microscope
 - a. Wavelength Dispersive X-ray Spectrometer
 - b. Energy Dispersive X-ray Spectrometer
2. X-ray Diffractometer
3. Fourier Transform Infrared Spectrometer
4. X-ray Fluorescence Spectrometer
5. Ion Chromatography System
6. Gas Chromatograph
7. UV-Vis Spectrophotometer
8. Atomic Absorption Spectrometer

ACCELERATED TEST EQUIPMENT

1. Combined Cyclic Corrosion Test Instrument
2. Dewpanel light control weathermeter
3. Standard Dew Cycle Sunshine Super
4. Long-life Weather Meter

ELECTROCHEMICAL TEST EQUIPMENT

Automatic Polarization System

ATMOSPHERIC EXPOSURE TEST EQUIPMENT

1. Sulfur Oxide Collector
2. Sea Salt Particle Collector
3. Dustfall Collector
4. Atmospheric Exposure Racks

IMAGE PROCESSING EQUIPMENT

METEOROLOGICAL FACTORS MONITORING EQUIPMENT

ORGANIC COATING/PAINTING EQUIPMENT

JICA

