社会開発協力部報告書

No. 2

フィリピン工科大学総合技術訓練センター
エバリュエーション調査団報告書

昭和62年11月

国際協力事業団
社会開発協力部

序　　文

フィリピン国では，工業化における雇用の拡大は主要な社会的課題であり，その解決のため，技術教育に重点を置いた教育制度の確立を重要な施政の一つとしている。

かかる伴景のもとにフィリピン政府は昭和53年，大統領令により，同国の職業訓練において指導的役割を果たしてきたPCAT（Philippine College of Arts and Trades）を工科大学に昇格させ，高度な技術教育の推進並びに地方の職業訓練学校の指導を統一的に行うこととした。

これらの実施に対して同工科大学内に総合技術訓練センターの設置を計画し，昭和53年８月，我が国に対して本センターの設立につき協力を要請してきた。

これを受けて，我が国は昭和55年12月，事前調査団を派遣し，要請の背景，協力の具体的計画等の調査を行い，その後数次にわたる調査を経て昭和57年３月，無償資金協力により建物を建設し，機材の据付けも完了した。かかる基盤のもと，我が国は昭和57年11月３日から，同センターに対するプロジェクト協力を実施してきたが，昭和62年11月２日にはR／Dによる協力期間を終了する予定となっている。

このため，過去５年間にわたる技術協力の進捗状況を確認してプロジェクトの完成度等について評価を行うとともに，協力の終了または継続の最終的な決定を行うことを目的として，昭和62年５月28日から６月５日までの９日間，東京工業大学教授　内藤喜之氏を団長とするエバリュエーション調査団を派遣した。

調査の結果，本プロジェクトは，おおむね順調に進展しているものの，日本側の協力対象分野（機械工学，電気・電子工学，土木工学）の領域が広く，技術移転が十分になされていない部分を補完するため，昭和63年３月31日まで（約５カ月間）フォローアップ協力実施の必要性を日・比双方がミニッツで確認した。

本報告書は，同調査団の現地における調査・協議結果をとりまとめたものである。

最後に，今回の調査の任にあたられた団員各位，並びに外務省，文部省及び在フィリピン日本大使館その他関係機関の方々に対し，深甚なる謝意を表する次第である。

昭和62年11月

国際協力事業団
理事　玉　光　弘　明

目　　次

Ⅰ　エバリュエーション調査団の派遣

Ⅰ－1　調査団派遣の経緯と目的

本件プロジェクトについては，昭和55年，比側から協力要請がなされ，同年12月，事前調査を実施した。昭和57年３月，Ｒ／Ｄ調査団を派遣したが，合意に至らず，同年11月の計画打合せ調査団において現行のＲ／Ｄ（昭和57年11月３日～昭和62年11月２日）が調印されることとなった。以後，58年度及び60年度において計画打合せ調査団を，また，59年度及び61年度において，それぞれ巡回指導調査団を派遣し，プロジェクトの運営指導における全般的な助言と必要な協議を実施してきた。

今回，62年11月にＲ／Ｄ協力期間が終了するのに伴い，プロジェクトの完成度，管理運営の適正度及び協力延長計画の妥当性につき評価・調査を実施することとなった。

Ⅰ－2　調査団の構成

氏　名	担　当	所　属
内藤　喜之	総括・電気電子工学	東京工業大学工学部教授
色部　誠	土木工学	日本大学理工学部教授
川勝　邦夫	機械工学	舞鶴工業高等専門学校助教授
金子　徹雄	協力企画	文部省技術教育課専門官
道下　高一	業務調整	国際協力事業団海外センター課

Ⅰ－3　調査日程

日順	月日	曜日	行　程	調　査　内　容
1	5／28	木	東京 PR－431→ マニラ	日本大使館，ＪＩＣＡ事務所表敬
2	5／29	金	マニラ	TUP 学長表敬及び日本人専門家との打合せ
3	5／30	土	〃	日本人専門家との打合せ
4	5／31	日	〃	
5	6／ 1	月	〃	TUP，IRTC 側との協議
6	6／ 2	火	〃	TUP，IRTC 側との協議，R／D 案準備
7	6／ 3	水	〃	Steering Committee 開催，R／D 署名・交換
8	6／ 4	木	〃	教育文化スポーツ大臣表敬，ＪＩＣＡ事務所へ報告
9	6／ 5	金	マニラ NW－004→ 東京	帰　国

Ⅰ－4　主要面談者

〔フィリピン側〕

DR. JOSE R. VERGARA	President Technological University of the Philippines
DR. GALICANO. J. DATU	Vice President for Academic Affairs Technological University of the Philippines
PROF. PERLA S. ROXAS	Executive Director Integrated Research and Training Center
MRS. CORAZON CS. CONANAN	Budget Officer Technological University of the Philippines
MR. ALFRED FELICIANO	Supervising Economic Development Specialist National Economic and Development Authority

〔日本側〕

西　田　亀久夫	フィリピン工科大学総合技術訓練センター プロジェクト・チーフアドバイザー
宮　本　守　也	国際協力事業団フィリピン事務所長

Ⅰ－5　評価の方法

評価は，基本的には下記により実施した。また，プロジェクトの評価を「前田，吉田チーフアドバイザー時代」と「西田チーフアドバイザー時代」に区分（別紙「西田チーフアドバイザーへの依頼事項」参照）して実施したことが特徴となっている。

① 専門家の報告書の分析
② 日本側専門家からみた評価
③ 比側プロジェクト運営管理者からみた評価
④ 比側カウンターパートとの意見交換（ミーティング）

別紙　西田チーフアドバイザーへの依頼事項

プロジェクトの評価を「前田，吉田チーフアドバイザー時代」と「西田チーフアドバイザー時代」に区分して行いたいので，下記事項について日本人専門家団からみた評価と実績のとりまとめをお願いします。

Ⅰ　前田，吉田チーフアドバイザー時代

1. R／D 31～38頁に記載のCOURSE TITLE（機械工学のみSUBJECT OF TRAININGとなっている）に関する各C／Pごとの技術移転達成度（優，良，可で評点する※）及び各年度における訓練実績。

※優：十分に技術移転が済んだもの

良：C／P自身でなんとか学生訓練の実施が可能なもの

可：技術移転が不十分なもの

2. 上記COURSE TITLE等について，C／P独自で学生訓練実施可能なコース（SUBJECT）のLISTの作成。

Ⅱ　西田チーフアドバイザー時代

1. CORE DOMAIN方式による細目（構造）について日本人専門家の比側C／Pへの技術移転度（優，良，可）。
2. 課題実験研修（L／S）方式の実績と評価（優，良，可）。

Ⅲ　検討事項

1. 今後のプロジェクト運営と協力延長の必要性について。
2. 供与機材のTUP関連学部等への移管と実施方式について。

Ⅳ　TUP側プロジェクト関係者への依頼事項

下記事項についてTUP・IRTC所長へ依頼願います。

1. 上記のⅠ及びⅡについてTUP首脳陣からみた評価，訓練実績のとりまとめ。
2. 今後のプロジェクト運営について。

昭和63年4月以降日本人専門家が去った後のIRTCのTUPにおける位置づけと将来計画についての検討依頼。

3. 供与機材のTUP関連学部等への移管とその実施方式について。
4. 5カ年間のTUP側首脳陣の忌憚のないご意見をいただきたい。

Ⅱ　調査結果の概要

1. まえがき

本プロジェクトは，昭和57年11月３日にR／Dが調印され，技術協力期間５年間のもので，昭和62年11月２日をもって終了する予定である。その間リーダーを含めて長期派遣専門家６名，短期派遣専門家若干名を毎年派遣することによって遂行されてきた。

本評価ミッションは，昭和62年５月28日から，本プロジェクトの到達成果を評価するために派遣されたもので，１週間にわたり現地において，TUP，IRTC当局並びに日本チームリーダー，専門家並びにカウンターパートと討議を行い，その評価を行った。

各専門分野については，それぞれ担当者より報告があるので，ここでは総括的なことをまとめて記述することにする。

2. 日本からの派遣

日本からの派遣はリーダー，調整員，長期並びに短期専門家であるが，予定どおり行われた。

3. カウンターパートと日本研修

現時点で，機械工学９名，電気・電子工学７名，土木工学７名である。フィリピンの国情を考えると，TUPの努力が認められる。途中退職で数の増減はあったが，IRTCの今後の活動のために必要な最低限の数と質は確保している。

計画に従って毎年４名，最終年度のみ６名の日本研修が行われた。新しくIRTCに雇用されたカウンターパートの日本研修は見事な成果をあげた。彼らの視野が広がり，自分でやる気をもつようになった。この人々が今後のIRTCの中心人物になるであろう。

今後の一層の増員を当局に要請しておいた。

4. 技術移転され，実施できるコース数

機械工学	13コース
電気・電子工学	13コース
（コンピュータ	6 コース）
土木工学	9コース

5. 作制された教材

現在でき上がったもの，または制作中を入れると，

機械工学	11冊
電気・電子工学	6冊

土木工学　　10冊

今後，これらの教材を用いてIRTCでは独自に活動を開始することになる。

6. R／Dに記載内容について

(i) 当初予定されたTraining用のコース（Basic, Advanced, Trainer）はすべて完了した。

(ii) 学問体系化されたシステムにおいては未完了のものが少しあるが，11月3日から昭和63年3月31日までのフォローアップ期間に完了できる。

(iii) 当初，これらのコースをIRTC内でカウンターパートが学生に実施した場合に，大学の認定の単位になる予定であったが，大学内の事情で，これは実現されなかった（毎年のミッションで，その実行を強く要請したが，種々の事情で不可能となった）。しかし，カウンターパートがCOEやCITの非常勤講師として出向いて同一の内容で講義した場合は単位となっている。したがって，実質点な面ではTUPの教育に貢献したことになった。だが，IRTCが大学内で独立した教育機関としての認知は十分には行われなかった。

(iv) (iii)の事情を踏まえて，西田リーダーのときにL／S（Laboratory Study）を新たに設けて，これがCOEの正式単位として認可されるようになった。このL／Sは当初のR／Dにはないものであるが，IRTCの活性化，カウンターパートの意欲向上に大いに役立つものである。

7. 建　　物

無償供与された建物の有効利用について，技協による供与機材の関係で，たびたび要請し，無駄な空間利用を排して，有効に使えるようになっている。

8. 供与機材

供与機材の管理・保守は良好である。今後日本チームが去ったあとの管理・保守について十分配慮するように要請した（これには人員，予算が伴うもので，フィリピン政府に対してTUPが強く要求する必要があろう）。

西田リーダーが，すべての供与機材を分類し，その中で，今後のIRTCの活動には不必要であるが，CITには必要であるデモストレーション用機材（無償供与機材である）は，プロジェクト終了後はCITに管理変えをした方がよいとの提案を行い，JICAマニラ office及びTUP当局とも協議を行い，管理をよく行うという条件のもとに，その方向で移管をすることが認められた。

9. カウンターパートから学生への教育

日本人専門家から移転を受けたコースについて，カウンターパートはIRTCの学生を主にしたTrainingを実施した（その数については後の各学科ごとの報告書参照のこと）。

10. 今後の問題点

(i) 前述しているが，少し残っているコースがあるので，昭和62年11月３日～昭和63年３月31日のフォローアップの必要がある。

(ii) 今後のＩＲＴＣ運営については，まず，現在のカウンターパート，テクニシャンを雇用条件をよくして確保する必要がある（これはフィリピン側の問題であろうが，大学当局に強く要請しておいた）。

また消耗品等の予算の向上が必要である。

11. 最後に

本プロジェクト遂行にあたって数多くの人々の協力を賜った。文部省，国専協，リーダー，専門家（長期，短期），調整員，TUP，ＩＲＴＣの関係者，またカウンターパートの日本での研修先の機関の関係者に心からの感謝を捧げて，まとめとしたい。

長いあいだ，ありがとうございました。

Ⅲ　プロジェクトの評価

Ⅲ－1　機械工学部門について

1.　プロジェクトの完成度

1.1　訓練関係

(1)　専門家からカウンターパート（以下，C／P と記す）への訓練について

〔評価〕　訓練計画に基づき順調に実施されている。

〔背景〕 i　長期専門家については，計画どおり派遣され，また，引き継ぎも円滑に進んでいる。

ii　短期専門家についても，プロジェクト側からの要請に応じて適宜派遣されている。

iii　供与機材が有効に活用されている。

iv　59～61年度の間，長期派遣専門家が2名に増員された。

〔備考〕　一部の訓練において遅れが生じた。その原因は，次による。

i　供与機材の遅着。

ii　〃　の故障。

iii　C／P が多忙すぎる。

iv　現地で訓練用消耗品等の入手が困難。

しかしながら，今後の対応で十分に対応できることを確認した。

(2)　C／P から学生への訓練について

〔評価〕　順調に実施されている。

62年4月までの実績は，Basic Course 519名，Advanced Course53名である。

昨年度よりL／S（Laboratory Study）が実施され，COE の学生に対してIRTCより単位の認定がなされた。本年度も継続して実施することが確認され，具体的な対応が現在進められている。

この方式を定着させれば，比国の工業教育に対して新たな改革の第一歩を記すことになろう。本プロジェクトの大きな成果と認められる。

〔背景〕　プロジェクト開始後1～3年間を目途に，この間を基礎的訓練期間と位置づけし，無償供与機材並びにこの間に到着した供与機材について，その操作法と教材としての活用法の基本をC／P に対して集中的に訓練したことにより，C／P による学生訓練がプロジェクト開始早々から実施できた。

学生訓練実績と同時に，若いC／P にとっては教育実践経験を積むことにもなった。

このような経緯があって，プロジェクト開始後3～5年間を応用的（発展

的）訓練期間と位置づけし，機械工学の学問体系に沿って，さらに高度な訓練をC／P に実施してきた。

以上のようなC／P に対する訓練成果と，専門家の積極的な指導があって，L／S が軌道に乗り，念願であったCOE の学生に対して，IRTCからの単位認定が実現した。

1.2　教材作成について

〔評価〕　マニュアル，テキスト等教材作成は，積極的に推進されている。

C／P の教材作成能力についても，訓練されており，問題はない。

現在までに完成ないしは印刷中のマニュアルリストは，次のとおりである。

- Hardness Tester Machine
- Notes on Internal Combustion Engines
- Fluid Engineering
- Precision Surface Grinding Machine
- Precision Measuring Instruments
- NC Machine Programing
- P－G Model NC Machine
- Synthetic Hydro Experimental Machine
- Review on the Two Thermodynamic Processes and the Pure Substance Equipment Design
- Introduction on the Basics of Steam Power Plant
- Metallurgy

〔背景〕 i　専門家一同が〝IRTC に残せる最大の財産は教材である〟との認識に立って積極的に推進してきた。

ii　C／P 自身が教材の必要性と有効性を認識し，積極的に取り組んできた。

1.3　機材の活用状況について

〔評価〕　既設の機材については，故障しているものを除いて，そのほとんどが訓練を完了し，教材として活用されている。

また，既設機材の保守・管理も十分になされている。

故障している機材については修理チームを，未訓練機材については短期間専門家を，プロジェクト終了までに派遣し，対応することが確認された。

〔背景〕 i　プロジェクト開始当初に基礎的訓練期間として実施されたC／Pへの集中訓練が有効であった。

ii　3年目以降の機材については，次期派遣専門家と連絡をとりながら手配することが可能となった。

iii　短期専門家の対応が円滑に進められた。

ⅳ　専門家が各自の専門にとらわれず，幅広く対処してきた。

2.　比側プロジェクト支援体制

2.1　予算措置，ローカルコスト負担

〔評価〕　TUP 側の努力は認められるが，まだ不十分である。

〔背景〕 i　フィリピン経済の悪化。

ii　予算編成，執行システムの相異。

iii　TUP 関係者のＩＲＴＣに対する認識がまだ低い

〔備考〕　西田チームリーダーの調査結果によると，TUP 側のＩＲＴＣに対する経費使用実績は，急増した 1986年度で 1, 702, 000ペソであった。その内訳は，人件費と光熱水道料で約 90％を占めている状況である。

プロジェクト終了後，ＩＲＴＣが比国における高等工業教育機関として自助発展していけるかどうかの鍵は，まさに予算措置がどれだけ対応できるかにかかっているといえる。

この問題点については，内藤団長よりTUP 側に善処方強い要請がなされた。

2.2　C／P について

(1)　定　員

〔評価〕　定員増の努力は認められる。

〔背景〕 i　ＩＲＴＣの認識が次第に高まってきた。

ii　多数の機材の到着により増員が不可欠であることをやっとTUP 側関係者が認識した。

iii　専門家はもとより日本側関係者の努力の成果。

(2)　能力について

〔評価〕　基礎学力：C／P 間に差は認められるが，優れた若いC／P が 増員されてきている。

学生訓練能力：いずれのC／P も良好。

教材作成能力：　〃

研究活動への取組み：着実に取組みが進んできている。

日本での研修を終えたC／P が，ＩＲＴＣを基盤にして活躍する芽が育っていることが認められた。

〔背景〕　プロジェクト開始当初のC／P は，TUP 関連部門から寄せ集められたことにより，年齢的にも，能力的にも大きな幅が認められた。その後，退職者の補充や増員に対しては，能力的に優れた若いC／P が採用されてきた。

(3)　定着率

〔評価〕　悪いといえる。プロジェクト開始以来15名のC／P が採用され，そのうち 6 名が退職し，１名が休職中である。

〔背景〕 i　C／Pの雇用条件（身分保障，給与，職務等）が悪い。

ii　比国人の気質として，高い給与のところへ簡単に転職する。

〔備考〕　今後のIRTCの自助発展にとっては，日本で研修を終えたC／Pに大きな期待を寄せる。しかしながら彼らにとっても，一定期間IRTCに務めた後は，何の拘束もない。将来にわたって彼らをIRTCで必要とするなら，まず雇用条件の改善と職場環境の改善が急務であると考える。

(4)　日本での研修について

〔評価〕　計画どおり毎年派遣されてきた。

本年度についても，機械工学科から2名のC／Pが派遣されることになった。

〔背景〕 i　C／Pの定着率向上の面からも，派遣を強力に推進してきた。

ii　C／Pが日本での研修に強い関心をもってきた。

iii　日本での受入れ機関が増加してきた。

(5)　研究活動について

〔評価〕　研究活動実績が出た。

上崎専門家の指導のもとにC／Pとの共同研究レポートがまとめられた。その題目は，Mechanical Properties of Commercial Metals and Alloys Selected in Manila

〔背景〕 i　研究活動推進のために必要な機材はIRTC内にあるので，研究意欲さえあれば，いつでも研究活動ができる。

ii　日本での研修を終えたC／Pが，研究活動に興味と関心をもって積極的に取り組み出した。その影響を受けて，他のC／Pにも取り組み姿勢が出てきつつある。

iii　専門家側からの強力な援助。

2.2　テクニシャンについて

(1)　配置人員

〔評価〕　既設の機材の保守・管理を確実にし，しかもC／Pによる学生訓練の補助までするとなれば，明らかに人員不足である。

〔背景〕　現在配置されているテクニシャンが非常によく対応してくれている。

〔備考〕　C／Pの増員要求と同様，プロジェクト開始当初より，テクニシャンの増員も要求されてきた。機材の訓練がすべて完了し，学生訓練及び研究活動が軌道に乗ってくれば，このことをTUP側も現実の問題点として認識するであろう。このようなことは容易に予想されることであり，また一方，L／Sを推進するためにもテクニシャンの力は必要不可欠であり，増員を強く要請した。

(2)　能力

〔評価〕　技術的能力並びに性格も優れている。

〔背景〕　比国におけるテクニシャン教育には，優れたところを認める。

〔備考〕　IRTCの発展のためには，C／Pとテクニシャンが協力し合うことが大切である。しかし，C／Pはエンジニアであり，比国においては，エンジニアとテクニシャンとでは明確な身分区別がある。このことが訓練実施，また彼らの職務遂行上，支障をきたすことがあった。しかしながら，この問題点についても，専門家の地道な指導により改善されつつあることは，本プロジェクトの，目立たないが，大きな成果といえる。

(3) 定着率

〔評価〕　劣る。現在までに5名が配属され，3名が退・離職している。

〔背景〕 i　雇用条件が悪い。

ii　フィリピン流の人間関係。

iii　C／Pと身分相異。

3. 総　括

(1) 現在までのプロジェクトの進展状況より，R／Dに示された目標に対しては，ほぼ完成されたと認められる。残った事項については，下記(2)～(4)項の対応が確認されたので，問題はないと認められる。

また，L／Sの展開が軌道に乗りつつあること，さらには，C／Pが研究活動に関心をもって取り組み，実績をあげつつあること等，これらは，比国の工業教育に対して，新たな出発の第一歩となると認められる。そのため今後ともTUP側のIRTCに対する援助強化の要請がなされた。

(2) 材料工学に関する機材の取り付け遅れの理由により，1987年11月3日～1988年3月31日をフォローアップ期間として援助を継続する。

(3) 短期専門家の派遣については，本年度は次の4テーマについて派遣する。

i　粉体工学

ii　油圧工学

iii　機械力学

iv　非破壊実験

なお，故障中の円筒研究盤，歯切盤については，別途，修理チームを派遣する。

(4) C／Pの日本研修については，2名を派遣する。

Ⅲ－2　電気・電子工学部門について

1. プロジェクトの完成度

1.1　訓練関係

(1) 専門家からカウンターパート（以下，C／P）への訓練について

〔評価〕　訓練計画に沿ってほぼ順調に行われた。

〔背景〕　i　長期専門家については，電気関連1名，電子関連2名，材料関連1名，電子計算機関連1名とバランスよく派遣された。

ii　短期専門家については，長期に派遣された方々を中心に派遣し，引き継きが無難に行われた。

iii　通信関連がこの時点までは全く行われなかったが，1987年11月3日～1988年3月31日のフォローアップ期間で，それを済ませることにしている。

iv　供与機材については，上記の通信関連のみが，まだであるが，他のものについては訓練が終り，C／P は十分にその活用ができるようになっている。通信関連の機材はフォローアップ期間に訓練が終了する予定である。

〔備考〕　現地にて，消耗品等の入手に手こずり，時間が予想以上にかかったものもあるが，短期専門家の携行機材等で入手して，訓練はすることができた。

(2) C／P から学生への訓練について

R／D によると，C／P から学生への訓練は，すべてTUP の単位となるべきであったが，これが長い間，実現しなかった。毎年のミッションでは，この件についてTUP側に強く要求してきたところであったが，可能にならなかった。西田リーダーの時代にL／S（Laboratory Study）が新設され，これが初めてCOE（工学部）の単位認定科目となった。

単位にはならなかったけれども，R／Dに記載されたBasic Course と Advanced Course は，履習証書を出すことで実施された。

昭和62年4月までに，Basic 231名，Advanced 80名が履習した。なお，電子計算機関連は計29名が受講した。

昨年より上述のL／S が実施されたが，まだ正式のものでないので，その成果はここで述べるわけにはいかないが，本年から本格的に実行されるので，その成果が大いに期待される。これは学生が自ら主体的に参加する形式であり，かつC／Pにとっても未知の分野への挑戦であるので役に立つと思われる。

〔背景〕　プロジェクトの初めの3年間は無償供与機材を中心とする訓練であった。その実績の上に，技協による供与機材を中心とした，学問体系による訓練を行った。その結果としてL／S も可能になったものと考えられる。

1.2　教材作成について

R／D においても，教材の作制が重要な項目となっている。専門家とC／Pとの協力に

よって教材をつくる努力をしてきたことは大いに評価できる。

現在までに完成または印刷中の教材テキストは次のとおりである。

- Electrical Machines in the Electrical Engineering Laboratory
- Electronic Fundamentals
- Assembly Language Programming Usiny TK－95
- Amplifiers and Power Supply
- Pulse Circuits and Logic Gates
- Elements of Digital Computer

この後に材料及び通信関連で若干冊は出版される予定である。

〔背景〕　すべて，持てる機材でできるものであるので，今後のIRTC の活動に十分活用されるであろう。このような形で日本の技協が生かされることは，望ましい姿であろう。

1.3　機材の活用状況について

1.1で述べておいたように，通信関連以外は，すでに教材として活用されている。保守・管理も十分である。

2.　比側プロジェクト支援体制

2.1　予算措置，ローカルコスト負担

〔評価〕　経済状況のよくないフィリピンであるので，こちらの要求どおりにはいかなかった。やむをえないであろう。

問題は日本チームが去ったあと，消耗品の補給，機材の保守等に必要な予算がつくかどうかにある。この点の必要性については十分に説明を加えておいた。

2.2　C／P について

(1)　定員

〔評価〕　経済状況悪化のなか，よく努力して，C／P の確保に努めたと考えられる。計算機関連も含めると，発足時は1名であったC／P が，現在は7名になっている。

(2)　能力

〔評価〕　IRTC が設立された以後に新しく採用したC／P は優秀な人々であり，かつ日本における研修により視野が広がっており，今後のIRTCの発展のために力になり得ると考えられる。

(3)　定着率

〔評価〕　良好である。

C／P とテクニシャン含めて9名が雇用されたが，現在7名が在職している。このC／P はIRTC が指向している目標に共鳴している人物であろうと考えられるので，今後の定着も期待できる。

〔備考〕　C／P の中で日本で研修も受けた優秀な人物がIRTC の今後の鍵を握ると考えられる。IRTCに拘束される期間の後に，彼らがどうなるかが一つの問題である。そのためにはTUP，IRTCにおける雇用条件の改善と，IRTC の内容の自力による発展が必要と考えている。

(4) 日本での研修について

〔評価〕　計画どおり毎年派遣された。

〔背景〕　C／P の日本派遣は，彼らにとって新しい視点をつくる面で大いに効果があった。

2.3　テクニシャンについて

(1) 配置人員

〔評価〕　現在5名が雇用されている。機材の保守・管理やC／P による学生訓練の補助に十分である。

〔備考〕　テクニシャンは日本研修の機会が与えられなかったので，転職はフリーである。雇用条件等の改善を図らねば転職する可能性もある。TUP，IRTCに，この旨の要望をした。

(2) 能力

〔評価〕　十分である。

(3) 定着率

〔評価〕　電気・電子部門では，離職はなく，定着率はよい。

〔背景〕　新しい機材について学ぶ機会が多かったこともあろう。今後，日本チームがいなくなった後の定着率が心配であり，当局の配慮が望まれるところであろう。

3. 総　括

(1) プロジェクトの進展状況は，まずR／D に記載された目標は完成している。学問体系についてのリフォームは，材料と通信について，やるべきことが残っているが，これについては，11月3日～3月31日のフォローアップ期間に完了できると考えられる。

(2) 短期専門家の派遣については，本年度は次の3テーマを考える。

(i) 材料工学

(ii) マイクロ波工学

(iii) 光通信工学

(3) C／P の日本研修については2名とする。

Ⅱ－3　土木工学部門について

1. プロジェクトの完成度

1.1　5カ年計画の目標と実績

訓練計画に関する限り，一部をとり残してはあるものの，当初の計画どおり実施できている。これは，土木部門に関しては長期専門家，短期専門家の派遣計画はもちろん，年度別の機材供与計画等が日本大学理工学部に任されていたことによると思われる。

1.2　技術移転の概要

土木のC／P の人員は1982年3名であったが，1987年10名に達している。この間1名の減員はあったものの，定着率は良好である。

C／P を専攻分野別に分け，IRTCに特色をつけようという方針が出され，それが実行されるまで，全C／P が，一斉に専門家の訓練を受けていた。その結果ほぼ全員が1985年，1986年に受けた訓練内容を，不十分ながら学生に伝えることができるとしている（アンケートの回答による）。

C／P の全員とはいえないが，何人かのC／P は，すでにL／S（Laboratory Study）に取り組み，学生を訓練している。1987年末までには，7名のC／P（日本研修中，留学中のもの及びApilado氏を除く全員）がそれぞれL／S を通して学生訓練を行うという計画ができている。これを見てもC／P の自立度は確かなものであり，技術移転の達成度は目標を超えたものと判断される。

2. 比側プロジェクト支援体制

2.1　C／P について

(1)　配置状況

土木の C／P の定着率が良好であることを前に述べたが，年ごとの採用・退職状況は次のとおりである。

年　次	1982	1983	1984	1985	1986	1987
採　用　数	3	2	0	1	5*	0
退 職 者 数	—	1	—	—	—	—
実人員合計	3	4	4	5	10	10

（注＊：うち1名は技術員からの昇格）

1986年の後半に3名が採用されている。このうち1名は，1987年に日本研修の予定であり，1名はL／S に強い関心をもっており，全員が定着すると期待される。

(2)　育成状況

10名のC／P のうち日本研修の機会の与えられたもの4名，今年，機会の与えられるもの2名である。

昨年，Core Domain をつくり，C／P の専攻分野を決めることが西田リーダーから提案

されている。その結果，土木においてつくられた分野は五つである。1987年に入ってからは派遣された専門家の訓練内容は，道路舗装用アスファルト材料工学，プレストレストコンクリート工学，振動構造工学，及び振動実験法であるが，C／P はそれぞれの専攻分野に従って，専門家の指導を受けているようである。結果として，訓練内容は濃密なものとなっている（原助教授のプレストレストコンクリート工学訓練ノート，その他アンケートに対する回答より判断される）。

C／P の専攻分野を決めたことは，C／P の質的向上を速めることに何がしかの効果はあるものと思われる。

しかし，Core Domain に重点をおいた訓練指導方針は，5カ年の訓練計画の後期に採用されたものであり，訓練を受ける側のC／P には戸惑いもあったようである（アンケートの回答による）。

2.2　L／S の実施状況について

L／S について，C／P の間には賛否両論である。しかし，土木のC／P からはL／Sに対する否定的意見は聞かれない。ほとんどがL／S の取り組みに意欲を示している。

現在，8テーマが計画されているが，そのうち一つを除き，他の七つは2～3名のC／P が共同して実施することが予定されている。一般に共同研究であれば，互いに持ち味を生かすこと，不明の点は究明に協力できること，学生への指導も分担して行えることなど，単独研究の場合と比べ，若い未熟な研究者にとり，前途の不安は少ない。

土木と異なり機械，電気・電子では半数近くのテーマが単独研究となっているので，先行きの不安から何人かのC／P にL／S 否定論が生まれたのではなかろうかと想像される。

土木のL／S は現地の地理的条件と関連する竹センイコンクリートの研究とかマニラ市の洪水対策などをテーマに挙げており，成果が期待される。

2.3　供与機材について

生産用品，生活用品の生産と直結する機械工学や電気・電子工学と異なり，土木工学は環境条件の改善と結びついている。すなわち地盤土質条件と構造物の関係とか地理条件と水循環の関係などが土木工学の主題となる。

土木の供与機材に材料実験用の用具が多いのは以上の理由による。これらの機材はよく活用・管理されている。1986年に供与した水平加振機，疲労試験機は，小型ながらこの種の装置を現有する大学あるいは研究機関はフィリピンではIRTCのみのようであり，土木のC／P に活気を与えている。

機材の移管が R／D 終了後の IRTC の問題の一つとされているが，単純な部品すら容易に入手できない状況にあるから，そのあとの機材の保存も IRTC にとり重要問題である。

2.4　教材整備状況について

R／D に基づき，指導は下表の5分野について行われた。各分野，指導内容に沿った教材がつくられつつあるが，第一稿が完了した段階にあり，最終印刷物としては，まだでき上が

っていない。機械工学，電気・電子工学部門に比べて遅れている。教材名称（仮称）は，表に列記してあるとおりである。

指導分野	教材名称
コンクリート工学	◦ Fresh Concrete Test , Sand & Gravel ◦ Cement Test ◦ Prestressed Concrete Beam & its Testing
土質工学	◦ Physical Property Test ◦ Machanical Property Test
測量学	◦ Concept , Distance Surveying ◦ Familiarization of Theodolite Angle Measurement ◦ Survey Operations , Topographic Surveying
舗装工学	◦ Asphalt Test
振動工学	◦ Principle and Operation Technique of Dynamic Testing Machine
全 5 分野	10 編

2.5 フォローアップについて

昨年（1986）の巡回指導調査の折，提出されたフォローアップの要請に基づき，土木部門では，専門家の派遣期間と機材の到着時期とのずれにより，技術移転がとり残されたままとなっている測量学，コンクリート材料学，コンクリート構造工学の各一部を指導できる短期専門家の派遣を検討している。

3. 総括

本部門については，R／Dに基づき，現在まで順調に技術移転がなされてきた。技術移転が未完了の領域においても，今後の協力期間においてカバーされる予定となっている。

また，土木部門はプロジェクト発足当初より，日本大学において一貫して専門家の派遣や研修員の受入れがなされたこと，C／P の定着率が高かったこと等もあり，機械や電気・電子部門に比べ技術移転度が高かったものといえる。

かかる土壌のもとで，C／P 達がより一層研究活動に従事し得る環境の整備が強く望まれる。

Ⅳ 今 後 の 提 言

JICAで，今後，新たに教育援助プロジェクトを開発される場合に配慮していただきたい事項を列記する。

1. プロジェクトの独立性を確保すること。

本プロジェクトが特殊な例なのかもしれないが，TUP 側がIRTC をTUP の従属機関として位置づけ，または認識してきたこと，さらには，その運営に対してもTUP 内部の人的軋轢があり，このことが日本人専門家にとって訓練実施に大きな支障となった。

2. 国内委員会を確立し，支援体制を整えること。

本プロジェクトが期限内にほぼ完成できたのは，国内委員会の支援によるところ大である。国内委員会に期待される事項は，次の3点に要約できる。

ⅰ 訓練計画の立案とチェック

R／D に記された事項を尊重するものの，種々の事情によりプロジェクト期間中に変化も生じてくるものである。

ⅱ 派遣専門家の人選

特に長期派遣専門家については，2～3年先までの人選をしていただきたい。そうすれば，訓練計画の引き継ぎ，機械の手配等が円滑に進展できる。

ⅲ C／P の日本研修受入れ先の手配

C／P の日本研修は，定着率の向上のほかに，C／P 自身にとっても，工業教育に対する意識改革の機会として非常に有効である。

3. 供与機材の要求には，消耗品も含めること。

供与機材の要求においては，次の2点について考慮願いたい。

ⅰ 実際に訓練を実施される専門家と打ち合せて要求すること。

派遣専門家の人選が前向きになされれば可能である。

ⅱ 付属工具はもとより，消耗品も含めて要求すること。

消耗品については，現地で調達するよう指導を受けており，その努力は必要である。しかしながら，それはプロジェクト期間中に，いつでもできる。専門家にとっては，機材が到着したら，すぐにも訓練を実施しなければ，時間がない。したがって，機材の要求に際しては，消耗品も大幅に含めるべきであろう。

TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES
M a n i l a

The Japanese Technical Cooperation Program

for

The INTEGRATED RESEARCH

AND TRAINING CENTER Project

MINUTES OF DISCUSSIONS

On

The Mutual Consultation on the

Integrated Research and Training Center Project

May 28 - June 5 1987

MINUTES OF DISCUSSIONS

ON

THE MUTUAL CONSULTATION ON

INTEGRATED RESEARCH AND TRAINING CENTER PROJECT

The Evaluation Team of the Japan International Cooperation Agency (JICA), headed by Dr. YOSHIYUKI NAITO (Professor, Tokyo Institute of Technology), has been dispatched to the Republic of the Philippines from May 28 to June 5, 1987 for the purpose of carrying out an evaluation of the performance of the Integrated Research and Training Center (IRTC) Project since the signing of the Records of Discussion in 1982.

The team conducted a field survey and held a series of discussions with the Philippine Authorities concerned as to the past performances of IRTC in the last five years and its future plans.

As a result of discussions, both parties have agreed as mentioned in Annex attached herewith.

3rd June, 1987

DR. YOSHIYUKI NAITO
Leader, The Japanese Team, JICA

DR. JOSE R. VERGARA
President, Technological University of the Philippines, The Republic of the Philippines

SUMMARY AND HIGHLIGHTS

1. At the outset of the consultation meeting, President Vergara opened words of hearty welcome to the Japanese Evaluation Team in which Dr. Naito, head of the Team, expressed deep gratitude to the President.

2. Dr. Naito promised the TUP Executives that he will strongly request JICA Headquarters that the following should be realized, as for the follow-up cooperation after the termination of R/D stated in the Minutes of the last Japanese Mutual Consultation Team.

   a. Consecutive dispatch of long term experts until the end of March, 1988.

   b. Dispatch of necessary number of short term experts covering the three engineering fields namely Civil, Mechanical and Electrical/ Electronics.

   And, he also added that the total number of counterparts to be sent to Japan for training has officially been decided to be six (6).

3. Immediately after President Vergara, Prof. Roxas, director of IRTC, read up her report with some explanations.

4. Corresponding to Prof. Roxas' explanations, discussion was started between Prof. Roxas and Dr. Naito. The major points of which are itemized as follows:

   a. The Leader of the Team posed a question why some of the student training (T/S) titles listed in the delivered papers have not been conducted up to the present by the counterparts themselves.

      In response to Dr. Naito's question, the Philippine side explained as follows:

      "Upon the advice of the Japanese Chief Advisor, the L/S was introduced as a new training program and that the Basic and Advanced Training Courses were stopped. Those counterparts who did not actively participate in the L/S were the ones who handled some basic training."

b. It was reported to the Team Leader, that Prof. Nishida, Chief Advisor, presented Director Roxas a plan as to the transfer of the donated machinery and equipment to other concerned TUP divisions/departments and that any answer has hitherto been given Dr. Nishida.

In this respect, Dr. Naito called the attention that a proposal of TUP regarding the settlement of this matter has expressly been given in the Executive Summary. He mentioned, it was quite a surprise show-up and henceforth, he requested Director Roxas to make a much closer contact with the Japanese Chief Advisor.

c. The Leader of the Team also requested the TUP side that the optimization of the donated equipment within entire TUP colleges should be conducted in accordance with the following principles:

(i) Re-installation of the equipment can be carried out with the administration power still belonging to IRTC.

(ii) The transfer of the said administration power to other TUP colleges/departments should be initiated on and after the expiration of the R/D (i.e. 2 November 1987).

(iii) In doing the transfer in question, TUP side shall notify JICA Philippine Office in advance.

(iv) Dr. Naito asked Director Roxas to what extent IRTC could support the proposed B.S. Computer Science described in the Summary. To this TUP side replied that, under the present conditions, IRTC's contribution will be limited only to providing advice and consultation.

(v) For the implementation of Laboratory Study on a Theme by TUP side, the Team Leader requested that after the termination of the Project, since JICA will be unable to financially support IRTC, TUP should take whatever possible step to allocate necessary amount of budget to L/S programs.

5. The Leader of the Team requested TUP the following points in terms of sound operation and management of IRTC:

a) Further development of L/S programs;

b) Application of credit units to T/S programs;

c) Assignment of IRTC Director in charge or assignment of Vice Director in full charge of IRTC to be able to exert entire executive administration power.

d) TUP should take an explicit policy for counterparts to continue research works such as L/S on a sound and lasting foundation.

6. JICA will appreciate to have an annual report from IRTC even after the end of the project.

Members of the Evaluation Team
for the Japanese Technical Cooperation to
the Integrated Research and Training Center,
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DR. YOSHIYUKI NAITO	Professor Tokyo Institute of Technology
DR. MAKOTO IROBE	Professor Nihon University
PROF. KUNIO KAWAKATSU	Assistant Professor Maizuru College of Technology
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IRTC-JICA EXPERTS

DR. KIKUO NISHIDA	Chief Advisor
DR. HIROMASA NADANO	Mechanical Engineering Expert
DR. OSAMU SAIJO	Civil Engineering Expert
DR. MASATOSHI SAKAMOTO	Electrical Engineering Expert
ENGR. SHIGERU TAKARA	Coordinator

JICA Philippine Office

MR. KATSUHIKO OSHIMA	Deputy Resident Representative J I C A Philippine Office

The Technological University of the Philippines Team

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DR. GALICANO J. DATU	Vice President for Academic Affairs Technological University of the Philippines
DR. ERLINDA F. MANALANG	Vice President for Administration Technological University of the Philippines (Abroad)
PROF. PERLA S. ROXAS	Executive Director Integrated Research and Training Center
MRS. CORAZON CS. CONANAN	Budget Officer Technological University of the Philippines
MR. ALFRED FELICIANO	Supervising Economic Development Specialist National Economic and Development Authority

AN EXAMPLE OF
IRTC EQUIPMENT FOR COLLEGE LESSONS

derived from the original inventory

by K. Nishida

Integrated Research and Training Center
Technological University of the Philippines

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IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
ES325	Strength of Materials	Ts	J5-25	Universal Testing Machine "Autograph"
ES341	Fluid Mechanics	Pr	J4-8	Synthetic Hydro Experimental Machine
ME423	Refrigeration, Air-condition	Gn	J2-20	Condensing Unit
ME423		Gn	J2-21	Condensing Unit
ME423		Gn	J2-22	Fun Coil Unit
ME423		Gn	J2-23	Fun Coil Unit
ME423		Gn	J2-24	Ice Maker Unit
ME423		Gn	J2-25	Freezing Room
ME423		Gn	J2-26	Refrigerator
ME423		Pr	J2-27	Refrigeration & Air-Conditioning Training Unit
ME463	Internal Combustion Engine	Dm	J2-28	Steering Gear System Model
ME463		Dm	J2-29	Differential Gear Model
ME463		Dm	J2-30	Planetary Gear Model
ME463		Dm	J2-31	Transmission Model
ME463		Dm	J2-32	Air Brake System Model
ME463		Dm	J2-33	Hydraulic Disc Brake Model
ME463		Dm	J2-34	Hydraulic Drum Brake Model
ME463		Dm	J2-35	4-Cycle Gasoline Engine Cut Model
ME463		Dm	J2-36	2-Cycle Engine Cut Model
ME463		Dm	J2-37	4-Cycle Diesel Engine Cut Model
ME463		Dm	J2-38	Gasoline Engine Cut Model
ME463		Dm	J2-43	Ignition Coil System Model
ME463		Dm	J2-51	Auto Engine with Gear Box Cut Model
ME463		Dm	J2-72	Wankel Engine Model
ME463		Gn	J2-16	Diesel Engine Generator Set
ME463		Gn	J2-18	Fuel Injection Pump Tester
ME463		Pr	J2-14	Engine Test Bed
ME463		Pr	J2-15	Engine Analyzer
ME463		Pr	J2-17	Fuel Injection Pump
ME463		Pr	J2-39	Exhaust Gas Analyzer
ME463		Pr	J2-41	Oscilloscope Engine Ignition Analyzer
ME463		Ts	J5-6	Fuel Consumption Tester
ME463		Ts	J5-7	Fuel Consumption Tester
ME463		Ts	J5-8	Fuel Consumption Tester
ME514	Steam Power Engine	Pr	J2-19	Steam Turbine Generator Set
MEL	Mechanical Engineering Lab.	Ms	J3-1	Digital Measuring Machine
MEL		Ms	J3-2	Surface Measuring Instrument

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IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
MEL		Ms	J3-3-1/3	Micro Indicator
MEL		Ms	J3-4-1/2	Mu-Checker
MEL		Ms	J3-7	Toolmaker's Microscope
MEL		Ms	J3-8	Profile Projector
MEL		Ms	J3-9	Auto Collimeter
MEL		Ms	J3-10	Autocollimeter with accessories
MEL		Ts	J2-5	Shore Hardness Tester
MEL		Ts	J2-6	Brinell Hardness Tester
MEL		Ts	J2-7	Rockwell Hardness Tester
MEL		Ts	J2-8	Vickers Hardness Tester
MEL		Ts	J2-9	Charpy Impact Tester
MT	Mechanical Technology Practice	Gn	J2-45-1/2	AC Arc Welding Machine
MT		Gn	J2-46-1/2	Oxygen Acetylene Welding Machine
MT		Gn	J2-60-1/2	Molding Machine
MT		Gn	J2-61	Sand Shifter
MT		Gn	J2-62	Core Sand Mixer
MT		Gn	J2-63	Shot Tumblast
MT		Gn	J2-64	Shell Core Blowing Machine
MT		Gn	J2-65	Laboratory Sand Mixer
MT		Mc	J2-1	Precision Lathe
MT		Mc	J2-2	Vertical Milling Machine
MT		Mc	J2-3	Universal Tool Grinder
MT		Mc	J2-4	Cylindrical Grinding Machine
MT		Mc	J2-10	Gear Shaping Machine
MT		Mc	J2-11	Universal Gear Hobbing Machine
MT		Mc	J2-12	Electric Discharge Machine
MT		Mc	J2-13	Plastic Injection Molding Machine
MT		Mc	J3-32	Hack Sawing Machine
MT		Mc	J3-37	FANUC Tape Center
MT		Mc	J3-45	FANUC System P
MT		Mc	J4-7	Band Sawing Machine
MT		Mc	J4-10	Electrolytic Polishing Machine
MT		Mc	J4-11	Precision Surface Grinding Machine

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IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
ECE	Electronics	Dm	J3-121	Micro-Robots for Education
ECE		Pr	J2-102	Semi-conductor Static Characteristics
ECE		Pr	J2-103	Transistor Power Supply Circuit
ECE		Pr	J2-104	Semi-conductor Application (Power Supply)
ECE		Pr	J2-105	Oscillation Circuit
ECE		Pr	J2-106	Amplifier Circuit
ECE		Pr	J2-107	Bias Circuit Panel
ECE		Pr	J2-108	AF Amplifier Circuit Panel
ECE		Pr	J2-109	Differential Amplifier Circuit Panel
ECE	Communication	Pr	J2-110	AM Modulation & Demodulation Circuit
ECE	"	Pr	J2-111	AM Transmitter & Receiver Circuit
ECE	"	Pr	J2-112	FM Modulation & Demodulation Circuit
ECE	"	Pr	J2-113	Pulse Circuit
ECE	"	Pr	J2-114	Television Training System
ECE	"	Pr	J2-115	Sequential Control Trainer
ECE		Pr	J2-116	Logic Circuit Trainer
ECE		Pr	J2-117	Logic Circuit Trainer
ECE	Automatic Control	Pr	J2-118	Feedback Control Trainer
ECE	Communication	Pr	J2-119	Microwave Measuring Trainer
ECE	Automatic Control	Pr	J2-120	Servo Mechanism Training System
ECE		Pr	J2-124	D-A Conversion Training System
EE412	Electric Circuits	Pr	J2-101	Basic Electric Circuit Trainer
EE443	Computer Programming	Pr	J2-121	Computer Training System
EE513	Electrical Equipments	Ms	J2-129	AC Voltmeter
EE513		Ms	J3-133	Watt Meter
EE513		Ms	J3-136-1/2	Wheatstone Bridge
EE513		Ms	J3-139	Oscilloscope
EE513		Ms	J3-143-1/2	Electronic Voltmeter
EE513		Ms	J3-146	Logic Analyzer
EE513		Ms	J3-148	X-Y Recorder
EE513		Ms	J3-149	Chart Take Up Unit for X-Y Recorder
EE513		Ms	J3-151	Fast Fourier Transformation Analyzer
EE513		Ms	J3-153	Hard Copy Unit for Fast Fourier Trans. Analyzer
EE513		Ms	J3-154	Noise Level Meter

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IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
EE513		Ms	J4-115-1/2	Frequency Meter
EE513		Ms	J4-116-1/2	DC Ammeter
EE513		Ms	J4-119-1/2	DC Voltmeter
EE513		Ms	J4-121	AC Ammeter
EE513		Ms	J4-127	Low Frequency Oscillator
EE513		Ms	J5-101-1/2	High Frequency Electronic Voltmeter
EE513		Ms	J5-109	LF Impedance Analyzer
EE513		Ms	J5-110	Transistor Checker
EE543	Power Transmission	Pr	J2-144	Transmission Line Testing System
ET	Electrical Shop Practice	Gn	J2-137	DC Motor-DC Generator Control Training Unit
ET		Gn	J2-138	DC Motor-AC Generator Control Training Unit
ET		Gn	J2-139	Synchronus Motor-DC Generator Training Unit
ET		Gn	J2-140	Motor-Generator Automatic Control Unit
ET		Gn	J2-141-1/2	Transformer
ET		Gn	J2-146	L.C.R. Load
ET		Gn	J2-147	Portable Generator
ET		Gn	J2-149	DC Power Source
ET		Gn	J3-106-1/8	Automatic Voltage Regulator
ET		Gn	J3-125	Induction Motor
ET		Gn	J3-130	Induction Voltage Regulator
ET		Gn	J3-137	Variable Resistor
ET		Gn	J3-168	DC Power Supply
ET		Gn	J3-186	Current Transformer
ET		Gn	J3-188-1/3	Volt Slider
ET		Gn	J3-195	Mutual Inductor
ET		Gn	J3-223-1/3	Switching Power Supply
ET		Gn	J4-109-1/2	Automatic Voltage Regulator
ET		Ms	J3-167	Epstein Iron Loss Test Set
ET		Pr	J2-142	Ward-Leonard Training System
ET		Pr	J2-143	DC-AC Universal M-G Training System
ET		Pr	J2-148	Synchronizing Generator Parallel Operation System

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IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
CE323	Reinforced Concrete	Ms	J2-207-1/2	Mortar Flow Table with Scale
CE323		Ms	J2-216-1/3	Specific Gravity Test Set
CE323		Ms	J4-216-1/2	Lucite Air Meter
CE323		Ms	J4-217	Roll-in Air Meter
CE323		Ms	J4-228-1/2	Aggregate Unit Weight Measure
CE323		Ms	J4-229	Specific Gravity Test Set (Density Basket & Hook)
CE323		Ts	J2-211	Los Angeles Abrasion Test Machine
CE323		Ts	J3-380	Michaelis Flexure Tester
CE323		Ts	J3-384	Blaine Air Permeability Test Set
CE323		Ts	J3-385	Schmidt Concrete Test Hammer
CE323		Ts	J3-386-1/2	Slump Test Set
CE323		Ts	J4-209	Cement Comparator Test Set
CE323		Ts	J4-219	ASTM Bond Tester (Dial Gauge/Mold)
CE323		Ts	J4-225	Splitting Tensile Strength Test Device
CE323		Ts	J4-226	Bending Test Equipment
CE332	Soil Mechanics	Dm	J3-358	Photo Slide for Soil Testing
CE332		Ts	J2-202-1/2	Liquid Limit Test Set
CE332		Ts	J2-204-1/2	Compaction Test Set
CE332		Ts	J2-205	Consolidation Test Apparatus
CE332		Ts	J3-321	Basic Triaxial Test Apparatus
CE332		Ts	J3-353	Plate Bearing Capacity Test Apparatus
CE332		Ts	J3-362-1/3	Unconfined Compression Test Apparatus
CE332		Ts	J3-375	Fall-Cone Type Liquid Limit Test Set
CE332		Ts	J3-376	Motorized Direct Shear Test Apparatus
CE332		Ts	J3-377	Large Consblidation Apparatus Set
CE332		Ts	J3-378	Variable Head Permeability Test Set
CE332		Ts	J3-379	CBR Test Set (frame & jack)
CE332		Ts	J3-405-1/2	Shrinkage Limit Test Set
CE412	Higher Surveying	Ms	J2-221-1/6	Transit
CE412		Ms	J3-301-1/6	Tilting Level
CE412		Ms	J3-302-1/6	Tripods for Tilting Level
CE412		Ms	J3-303-1/10	Alminium Staff
CE412		Ms	J3-305-1/20	Turning Stand Triangle
CE412		Ms	J3-306-1/6	Plane-Table Board
CE412		Ms	J3-307-1/6	Alidade Set
CE412		Ms	J3-308-1/6	Tripods for Plane Table with Head

IRTC EQUIPMENT FOR COLLEGE LESSONS

TYPE	LESSON	CTG	ID No.	NAME OF EQUIPMENT
CE412		Ms	J3-309-1/6	Planimeter
CE412		Ms	J3-310-1/10	Steel Measuring Tape
CE412		Ms	J3-311-1/10	Glassfiber Measuring Tape
CE412		Ms	J3-313-1/20	Clamp Handle for Steel Tape
CE412		Ms	J3-317-1/20	Ranging Pole
CE412		Ms	J3-318-1/3	Ahny Type Hand Level with Case
CE414	Theory of Structure	Gn	J5-214	P.C. Grouting Apparatus
CE414		Ms	J5-216	Piano Wire Strain Gauge
CE414		Ts	J5-218	Frame for Shimazu Universal Testing Machine
CT	Civil Technology Practice	Gn	J2-203-1/2	Hobert Soil Mixer
CT		Gn	J2-206	Concrete Core Drilling Machine
CT		Gn	J2-210	Laboratory Concrete Mixer
CT		Gn	J2-212	Asphalt Oven
CT		Gn	J2-214	Cement Autoclave
CT		Gn	J2-215-1/6	2" Cube Mould with Base Plate
CT		Gn	J2-217	Centrifugal Extraction Apparatus
CT		Gn	J2-222	Capping Set for 15cm Cylinder
CT		Gn	J3-346-1/2	Concrete Mixing Pan
CT		Gn	J3-364	Vacuum Pump & Aspirator Set
CT		Gn	J3-372	Mechanical Stirring Apparatus
CT		Gn	J3-381-1/2	Three Gang Mortar Beam Mold
CT		Gn	J3-392	Asphalt Water Bath
CT		Gn	J4-214	Sieve Shaker
CT		Gn	J4-215	Sieving Machine
CT		Gn	J4-238	Asphalt Mixer
CT		Ts	J2-201	Universal Testing Machine

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CATEGORICAL INVENYORY WITH DESCRIPTION FOR EACH DIVISION

CTG	ID NO.	DESCRIPTION	MAKER	NAME OF EQUIPMENT
Dm	J2-519		SHIMAZU	Demonstrator of Newton's Laws
Dm	J2-528	TYPE HB-24	SHIMAZU	Wave Motion Demonstrator
Dm	J2-535	TYPE BMA-30	SHIMAZU	Brawnian Motion Apparatus
Dm	J2-563		SHIMAZU	Self-Induction Current Demonstrator
Dm	J2-564	TYPE EF-4, with Case	SHIMAZU	Electromagnetic Phenomena Demonstration Outfit
Dm	J2-567	TYPE FY-2	SHIMAZU	Fleming's Law Demonstrator
Dm	J2-568	TYPE LZ-10	SHIMAZU	A.A. de la Rive's Discharge Tube
Dm	J2-570	TYPE WE-3	SHIMAZU	Demonstrator for Conversion of Energy
Dm	J2-571	TYPE WE-5	SHIMAZU	Demonstrator for Conversion of Electric Energy
Dm	J2-574	TYPE CG-H	SHIMAZU	Crook's Tube Set
Dm	J2-575-1/2	TYPE VD-40	SHIMAZU	Vacuum Discharge Tube
Dm	J2-576	TYPE CG-E	SHIMAZU	Crook's Tube Deflection Effect
Dm	J2-588-1/2	TYPE DG-30	SHIMAZU	Demonstrator for Galvanometer
Dm	J2-589-1/4	TYPE DU-6N	SHIMAZU	Demonstrator for Volt-Ammeter
Dm	J2-608	TYPE HGS-C5	SHIMAZU	Crystal Model Kit
Dm	J2-609	TYPE HGS-E3	SHIMAZU	Crystal Model Kit
Dm	J2-610	TYPE TPR-3	SHIMAZU	Tripartite Planetarium
Gn	J2-510	TYPE E-3	SHIMAZU	Automatic Water Distillation Apparatus
Gn	J2-533	TYPE S50-2	SHIMAZU	Rotary Vacuum Pump
Gn	J2-539	TYPE GLG-5014, LD-14	SHIMAZU	Laser Apparatus with Bench
Gn	J2-596	TYPE SPH-5F	SHIMAZU	Power Supply
Gn	J2-597-1/10	TYPE ES-5N	SHIMAZU	Power Supply
Gn	J2-598-1/2	TYPE RDS-3N	SHIMAZU	Regulated D.C. Power Supply
Gn	J2-599-1/10	TYPE KG-5	SHIMAZU	Gas Generator
Gn	J2-600-1/10	TYPE GG-6	SHIMAZU	Gas Generator
Gn	J2-604	TYPE EDO-12N	SHIMAZU	Electric Drying Oven
Gn	J2-605	TYPE ETB-2	SHIMAZU	Electric Thermostat Bath
Gn	J2-607-1/10	TYPE RR-B	SHIMAZU	H2gas Generator
Ms	J2-501	101-100	SHIMAZU	Screw Midrometer
Ms	J2-502-1/13	TYPE F	SHIMAZU	Objective Micrometer
Ms	J2-503-1/13	TYPE B	SHIMAZU	Eyepiece Micrometer
Ms	J2-504-1/10	TYPE TB-200	SHIMAZU	Table Balance

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CATEGORICAL INVENYORY WITH DESCRIPTION FOR EACH DIVISION

CTG	ID NO.	DESCRIPTION	MAKER	NAME OF EQUIPMENT
Ms	J2-505-1/10	TYPE NB-8	SHIMAZU	Newton's Spring Balance
Ms	J2-506-1/10	TYPE D	SHIMAZU	Stop Watch
Ms	J2-507	TYPE TH-150	SHIMAZU	Electro-Thermometer
Ms	J2-508	TYPE HU 90 with Transformer	SHIMAZU	Electric Hygrometer
Ms	J2-513-1/12	TYPE SGL-600	SHIMAZU	Optical Microscope
Ms	J2-515	TYPE SGT-80	SHIMAZU	Astronomical Telescope
Ms	J2-534-1/10	TYPE CT-1	SHIMAZU	Pressure Gauge
Ms	J2-540-1/2		SHIMAZU	Comprising Stand, Lamphouse & Transformer
Ms	J2-544	TYPE IM-IS	SHIMAZU	Luxmeter
Ms	J2-550	TYPE OS-27	SHIMAZU	Optical Slit
Ms	J2-551	TYPE BK-30	SHIMAZU	Biprism fo Interference of Light
Ms	J2-552	TYPE IL-2	SHIMAZU	Interference Plates
Ms	J2-553	TYPE S-6	SHIMAZU	Spectrometer
Ms	J2-582-1/10	TYPE HQ-300	SHIMAZU	D.C. Voltmeter
Ms	J2-583-1/10	TYPE HQ-5	SHIMAZU	D.C. Ammeter
Ms	J2-584-1/10	TYPE HQ-150	SHIMAZU	A.C. Voltmeter
Ms	J2-585-1/10	TYPE HQ-10	SHIMAZU	A.C. Ammeter
Ms	J2-586-1/10	TYPE HQ-100	SHIMAZU	Micro Ammeter
Ms	J2-587-1/10	TYPE HQ-30	SHIMAZU	Galvanometer
Ms	J2-590-1/10	TYPE TC-6	SHIMAZU	Circuit Tester
Ms	J2-591	TYPE MT-200A	SHIMAZU	Sensitive Universal Circuit Tester
Ms	J2-593-1/10	TYPE JCD-75R	SHIMAZU	Braun Tube Oscilloscope
Ms	J2-594	TYPE SDS-125N	SHIMAZU	Dual Trace Synchroscope
Ms	J2-595	TYPE GK-600	SHIMAZU	Gauss Meter
Ms	J2-603	TYPE NPH-30	SHIMAZU	Electric pH Meter
Pr	J2-516-1/10		SHIMAZU	Experimental Kit for Fundamental Dynamics
Pr	J2-517	TYPE GB-200N, with Recorder	SHIMAZU	Gas Bearing Runway
Pr	J2-518	TYPE GT-50	SHIMAZU	Air Table
Pr	J2-520	TYPE AE-120	SHIMAZU	Rotational Inertia Apparatus
Pr	J2-521	TYPE AE-420	SHIMAZU	Angular Momentum Kit
Pr	J2-522-1/4	TYPE VF-100	SHIMAZU	Fall Tube
Pr	J2-523	TYPE FI-60	SHIMAZU	Ballistic Cart
Pr	J2-524	TYPE NY-2000	SHIMAZU	Young's Modulus Apparatus
Pr	J2-525-1/10	TYPE TN-3	SHIMAZU	Simple Pendulum
Pr	J2-526	TYPE PT-3,with Light	SHIMAZU	Ripple Tank with Adjustable Phase Wave Generator
Pr	J2-527	TYPE WM-70N,WMK-70	SHIMAZU	Shive's Wave Machine
Pr	J2-529	TYPE MV-160	SHIMAZU	String Vibration
Pr	J2-530-1/10	TYPE A	SHIMAZU	Pascal's Principle Apparatus

PH

CATEGORICAL INVENYORY WITH DESCRIPTION FOR EACH DIVISION

CTG	ID NO.	DESCRIPTION	MAKER	NAME OF EQUIPMENT
Pr	J2-531	TYPE TOR-100	SHIMAZU	Torricelli's Law Experimental Kit
Pr	J2-532	TYPE MA-110	SHIMAZU	Magdeburg Hemispheres
Pr	J2-536	TYPE GMM-35N	SHIMAZU	Mechanical Gas Model
Pr	J2-545	TYPE OT-30	SHIMAZU	Optical Through
Pr	J2-546	TYPE OT-620	SHIMAZU	Reflection & Refraction Apparatus
Pr	J2-547-1/10	TYPE OH-7	SHIMAZU	Lenses & Prisms Kit
Pr	J2-548-1/10	TYPE OB-S	SHIMAZU	Optical Bench
Pr	J2-549	Spectro- & Photometry Attach.	SHIMAZU	Optics Experimental Bench
Pr	J2-555		ASHIDA	Sound Experiment Apparatus
Pr	J2-556	TYPE VT-15	SHIMAZU	Vacuum Cylinder
Pr	J2-557-1/10		SHIMAZU	Magnetic Field Creater
Pr	J2-558	TYPE SES-30	SHIMAZU	Electrostatic Experimental Kit
Pr	J2-559	TYPE KMC-5	SHIMAZU	Maghetic Circuit Experimental Apparatus
Pr	J2-560	TYPE KEM-5	SHIMAZU	Electromagnetic Force Experimental Apparatus
Pr	J2-561	TYPE KIS-15	SHIMAZU	Electromagnetic Induction Experimental Apparatus
Pr	J2-562	TYPE SI-T	SHIMAZU	Primary & Secondary Coils
Pr	J2-565	TYPE TE-1	SHIMAZU	Tesla's High Frequency Current Apparatus
Pr	J2-566-1/10	TYPE OF-3	SHIMAZU	Ohm's Law Demonstrator
Pr	J2-569	TYPE ECT-2	SHIMAZU	Circuit Trainer
Pr	J2-572	TYPE DES-20	SHIMAZU	Discharge Phenomenon Experimental Apparatus
Pr	J2-573	TYPE SH-S,SH-Ne,SH-Ar,SH-SA	SHIMAZU	Spectrum Tubes (five set, Neon, Argon, stand)
Pr	J2-577	TYPE ER-3	SHIMAZU	Electric Resonance Experimental Set
Pr	J2-578	TYPE EU-60	SHIMAZU	Radio Wave Experimental Apparatus
Pr	J2-580	TYPE FH-200	SHIMAZU	Frank-Hertz Apparatus
Pr	J2-581	TYPE HA-4N	SHIMAZU	Plank's Cohstant Apparatus
Pr	J2-601	TYPE HE-50	SHIMAZU	Electrolysis H-Tube
Pr	J2-602-1/10	TYPE EG-20	SHIMAZU	Electrolysis H-Tube
Pr	J2-606-1/10	TYPE RR-10	SHIMAZU	Reduction Reactor

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CATEGORICAL INVENYORY WITH DESCRIPTION FOR EACH DIVISION

CTG	ID NO.	DESCRIPTION	MAKER	NAME OF EQUIPMENT
Mc	J2-729	CL-3AS	HOKUSAN	Wood Copying Lathe
Mc	J2-730	CL-32	SHODA	Corner Locking Machine
Mc	J2-731	RO-116	SHODA	Router Machine
Mc	J2-732	JB-S70	SHIMOHIRA	Wood Band Saw
Mc	J2-733	SS-111	SHODA	Spindle Sander
Mc	J2-734	DB-500	BAN IRON	Disc Belt Sander
Mc	J2-735	SP-153	SHODA	Single Surface Planer
Mc	J2-736	HP-152D	SHODA	Hand Planer
Mc	J2-737	SG-113A	SHODA	Automatic Carbide Tool Grinder
Mc	J2-738	EBT-2	HITACHI	Bench Grinder
Mc	J2-739	BE-360B	HITACHI	Bench Drill Press

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TECHNOLOGICAL INVENTORY WITH PRICE FOR EACH DIVISION

DOM	CTG	ID NUMBER	NAME OF EQUIPMENT	DESCRIPTION	@ PRICE
	Ax	J6-1	Electronic Typewriter	TYPESTAR7	63000
	Ax	J6-9	Personal Japanese Word Processor	BUNGO Mini 5	145000
	Ax	J6-10	3.5" Floppy Disk	PWP-FD1	52500
	Ax	J6-11	Electronic Typewriter	TYPESTAR7	63000
	Ax	J6-55	Refrigerator		53000
	Ax	J6-56	Book Shelve		15000
MO	Ax	J6-14-1/2	Personal Computer	PC8001 MKIISR	106000
MO	Ax	J6-15-1/2	Terminal Floppy Disk	TF-10	122000
MO	Ax	J6-16-1/2	Color Display	PC-KD-351	97000
MO	Ax	J6-17-1/2	Terminal Printer	RP-80F/TII	126000
MO	Ax	J6-18	Barometer	147-300	142000
MO	Ax	J6-19-1/2	Aneroid Barometer	147-310	17300
M11	Mc	J6-12	Precision Lathe	LR-55A with accessories	3000000
M11	Mc	J6-13	Shaping Machine	WN-450N with accessories	2700000
M11	Ax	J6-45	"How to perform surface & internal grinding"	Film Slides with Textbook	1868000
M13	Ax	J6-46	"Machine II: Elements of Machine"	Film Slides with Textbook	638000
M13	Ax	J6-47	"Machine IV: Mechanical Drawing"	Film Slides with Textbook	1812000
M21	Ms	J6-50	Portable X-Ray Unit	Radioflex 130B-B	3973000
M31	Gn	J6-49	Water to Water Heat Exchange for Bench	HEP-200F	1440000
M32	Ax	J6-48	"Reconditioning of Automobile II, Diesel Engine"	Film Slides with Textbook	2452000
EO	EI	J6-20	Universal Counter	TR5823	242000
EO	Ax	J6-43-1/2	Steel Shelve	150x45x180cm	28500
EO	Ax	J6-44	Cabinet	90x40x90cm,90x50x96cm	120000
E22	EI	J6-21	HF All Band Transceiver	IC-731,Power Supply,Antenna	338000
E22	EI	J6-22	50MHz All Mode Transceiver	Power Supply,Antenna,Emotator	204000
E22	EI	J6-23	144/433MHz FM Transceiver	IC-2300,Power Supply,Antenna	133000
E22	EI	J6-24	144MHz FM Transceiver	IC-02N	39200
E22	EI	J6-25	430MHz FM transceiver	IC-03N	40600
E22	EI	J6-26	SWR & Power Meter	ASW-180G & ASW-430G	38300
E22	Ms	J6-28-1/4	Digital Hi Tester	3230	44900
E33	Gn	J6-29	Vacuum Evaporation System	EBH-6 with Transformer	2190000
E33	Ms	J6-30	Vacuum Gauge	GITL-3	168000
E33	Ms	J6-31	Thickness Tester	CRTM-1	938000

TELEOLOGICAL INVENTORY WITH PRICE FOR EACH DIVISION

DOM	CTG	ID NUMBER	NAME OF EQUIPMENT	DESCRIPTION	@ PRICE
E33	Gn	J6-32	Cooling Circulator	TRL-C10	219000
E33	Gn	J6-33	Spread Apparatus	IH-D2,Suction Pump,Transformer	1137000
E33	Gn	J6-34	Draft Chamber	IS-12	795000
E33	Gn	J6-35-1/2	Working Bench	SST-120	107000
E33	Gn	J6-36	Muffle Furnace	OPM-28D	525000
E33	Gn	J6-37	Automatic Water Distiller	GS-181	326000
E33	Gn	J6-38	Ultrasonic Cleaner	321 with Transformer	198000
E33	Gn	J6-39	Magnetic Stirrer	B-2	21500
E33	Gn	J6-40	Vacuum Desiccator	VL	95000
E33	Gn	J6-41	Plastic Desiccator	BG-1	100000
E33	Gn	J6-42	Clean Room Handy Cart	LCP3-80	51000
E4	El	J6-2	Plotter with AVR	MP2000-51 for RS-232C-IF	335000
E4	El	J6-3	PC8001 Extension Module	FA-PAC-8 Accessory	127000
E4	El	J6-4	Timer Counter Module	TIR-4	41000
E4	El	J6-5	IEEE-448 Instrumentation Bas Module	CP-IB(B) Basic Symmetry	64500
E4	El	J6-6	Debag for PG-IB	SBD-488T MRKII	56000
E4	El	J6-7-1/2	A/D Converter	Resol. Ability 12bit ADC80-12	25000
E4	El	J6-8-1/2	D/A Converter	Resol. Ability 12bit DAC80	15000
E4	El	J6-27	Personal Computer	UNIBOX,with OS,Remote Terminal	2089700
	Ax	J6-54	Refrigerator		49000
C5	Is	J6-51	Hydraulic Dynamic Testing Unit	Vertical & Horizontal Loading	16800000
C5	Gn	J6-52	Cooling Tower for Water	1,000 Kcal/hour	381000
C5	Gn	J6-53	Water Pump with Flow Valve & Breaker		1018500

V　附　属　資　料

附属資料 1.

TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES
INTEGRATED REASEARCH AND TRAINING CENTER
Manila

THE IRTC PROJECT
1982 - 1987
EXECUTIVE SUMMARY

FOR: THE JAPANESE EVALUATION MISSION
MAY 28 - JUNE 4, 1987

TABLE OF CONTENTS

Integrated Research and Training Center , 1982 - 1987

PART I. EXECUTIVE SUMMARY

Background

From whereof it started as an $ 8.5 M building and equipment Grant-Aid , and extending further into a Five Year Technical Cooperation Program, the Integrated Research and Training Center (IRTC) project stands as a vision of hope for the advancement of technological education in the country for the future . The Philippine government takes pride and look up with gratitude in having won the support of the Japanese government thru Japan International Cooperation Agency (JICA) by way of two modes of assistance awarded successively to the Technological University of the Philippines (TUP) .

Having been established in 1901 and starting out with a base on vocational education , the TUP considers the IRTC as a needed intervention to enable it to strengthen its programs and to function according to the mandates of PD 1518 in its conversion to a technological university on June 11, 1978. Since then ,the TUP operates on four campuses with six colleges delivering a range of programs from technical courses to five year engineering courses on the undregraduate level and masteral and doctoral courses on the graduate level .

PD 1518 is found on Part II

From among the 78 State Universities and Colleges (SUC) already established , the TUP is considered a pioneer in Vocational Technical Education and to some extent has contributed to the manpower development and indirectly, to the industrial development of the country. In its alumni roster are presidents of state universities, superintendents of vocational schools, manpower development officers, entrepreneurs, and industrial workers.

With the completion of the five year technical cooperation program by November 3 , 1987 , the IRTC faces the challenge of the future . Can it sustain the momentum and enthusiasm with which it has strived to improve technological education in TUP thru the conduct of student training, the introduction of laboratory study (L/S) to students, and the launching of pilot research studies? Is it prepared to extend and share the benefits of technical transfer to other institutions and contribute to the advancement of Technological Education in the country ?

Over and above the benefits of technical transfer from a developed country , the IRTC project has paved the way in fostering stronger friendship and cooperation between Japan and the Philippines.

Developmental changes in the Country

Some social economic and political developments during the past five years have influenced the planning, management and administration in TUP and that of IRTC. During the period of Parliamentary rule there was continuous deterioration of the

economy . Budgeting was very tricky. The allotments carry with them a string of controls such as reserve , delayed releases, and ban on utilization of unused amount for the next quarter. There was ban on hiring , ban on purchase of imported equipment and vehicles . Frequent changes in the appointment of heads of ministries resulted in variations in policies.

The reorganization after the February revolution brought about several changes . There was flexibility in the expenditures where agencies were allowed to utilize unused amounts in succeeding quarters. Salaries of teachers were increased by as much as 35% to 40%. Participation of various groups was sought in resolving issues including the selection of heads of schools. Students, teachers, and parents were never been so busy. Among the policies adopted by the Department of Education, Culture and Sports which will influence future planning for IRTC are :

1 Thrust on quality and relevance in higher education
2 Emphasis on value education
3 Strengthening of extension services among SUC's
4 Accreditation as an approach to improve quality of SUC's
5. Repeal of the spanish law which made 12 credits of Spanish as optional subjects for incoming college freshmen

The Role and Function of IRTC (RD)

The IRTC project was established for the purpose of promoting and strengthening education and related training in the field of technology through the expansion and improvement of the educational training system and thus contributing to the industrial development in the Republic of the Philippines.

Specific Objectives of the Training System

1. To provide and conduct basic training courses as part of curricula for the education of senior undergraduates majored in the field of technology (Undergraduates' Basic Training)

2. To provide and conduct advanced training courses as part of curricula for the education of engineering undergraduates majored in the field of engineering (Undergraduate's Advanced Training)

3. To provide and conduct upgrading training courses mainly for trainors and other personnel of the Technological University of the Philippines and other colleges and institutions ,engaged in teaching and related training in the fields of technology and engineering education (Trainors Upgrading Training)

4. To design, develop and produce curricula, other training software and control system for programme conducted by IRTC

Project Components

1. Dispatch of Japanese long term and short term experts
2. Counterparts Training in Japan
3. Provision of additional equipment
4. Other support provided by Jica experts

Project Performance and Project Outcomes

The performance and effectiveness of the IRTC project can be gauged from the set objectives - the extent to which the objectives were met . Evaluation shall look into the usefulness of technical transfer and the evaluation process shall consider answers to the five questions:

1. How adequate is the technical transfer from the Japanese experts to the counterparts?

2. How capable are the counterparts to conduct training by themselves?

3. How prepared are the counterparts to perform research by themselves and to assist and advise students in their laboratory study (L/S)?

4. To what extent are the machines and equipment utilized?

5. What are some of the impressions on management by the Japanese side

I. Extent of Technical Transfer

Majority of the counterparts agree that the extent of technical transfer from Japanese experts in both periods was adequate. For five years the counterparts were nurtured by the long term experts and were primed to the actual work in the laboratory. Under the guidance of their Japanese long term experts, the counterparts were able to design and conduct student training and prepare training manuals. This was actively done during the Maeda-Yoshida period. It was during the same period when the counterparts were able to start pilot research studies, teamed with their experts. From the short term experts they received special lectures on very specific topics which deepened their understanding of the discipline in their field. This enabled the counterparts to identify themselves to a core domain where they could concentrate and specialize for the second stage of technical transfer - from counterparts to students and peers.

2. **Capacity of Counterparts to Conduct Training**

Majority of the counterparts have conducted student training. The newly hired counterparts who went on peer training from their fellows have also signified their readiness to train students. The experience gained by counterparts from the conduct of student training is very rewarding . It gives them the satisfaction of being able to share a technology they acquired from the Japanese experts to as many students. By working with students they could test the experiments and accumulate data which may be useful in research.

List of Training Courses Counterparts can Perform by Themselves :

A. CIVIL ENGINEERING

1. Surveying Instruments (Familiarization)
2. Soils and Materials Testing - Basic/Advance
3. Site Surveying - Basic/Advance
4. Concrete and Concrete Materials Testing - Basic/Advance
5. Soil Laboratory Testing - Basic/Advance
6. Soil Exploration - Basic
7. Materials Testing - Basic
8. Materials Engineering - Advance
9. Soil Testing - Basic

Counterparts' individual assessment of each expert is found in part II

B. ELECTRICAL/ELECTRONIC ENGINEERING

1. Basic Electronics Circuit - Basic
2. Basic Electronics and Color Television - Basic
3. Power Engineering I - Basic/Advance
4. Power Engineering II - Basic/Advance
5. Electronic Fundamentals - Basic/Advance
6. TV 101 - Basic
7. Basic TV Servicing - Basic
8. Amplifiers and Power Supplies (Analog I) - Advance
9. Electronic Communication (Analog II) - Advance
10. Pulse Circuits and Logic Gates (Digital I) - Advance
11. Elements of Digital Computer (Digital II) - Advance
12. Assembly Language using TK-85 Microcomputer - Advance
13. Power Engineering III - Advance

C. MECHANICAL ENGINEERING

1. Mechanical Processing - Basic
2. Refrigeration and Air Conditioning - Basic/Advance
3. Foundry Training - Basic
4. Steam Power Generation - Basic/Advance
5. Internal Combustion Engines - Basic/Advance
6. Hydraulics Training using the Synthetic Hydro Experimental Machine - Basic
7. Materials Testing - Advance
8. Numerical Control Machine Training - Advance
9. Metrology Training - Basic/Advance

10. Metallurgy Training - Basic/Advance
11. Physical Metallurgy - Basic
12. Tape Preparation System - Basic
13. Machine Tool Processing - Basic

D. PRINTING AND PUBLICATION

1. Advance and Training in Product Design and Photo-Offset Lithography - Basic/Advance
2. Specialized Offset Printing - Basic/Advance
3. Basic Offset (Fundamentals of Photo-Offset Lithography) - Basic
4. General Photography - Basic/Advance

E. COMPUTER

1. Computer Appreciation Course
2. Computer Training for Secretaries
3. EDP for Executives
4. Basic Programming
5. Advanced Basic Programming
6. Operating Systems and Softwares (CP/M, WS, dBASE)

F. AUDIO-VISUAL

1. Introduction to the Principles of Television System I
2. Introduction to the Principles of Television System II
3. ITV/ETV Laboratory Course I
4. ITV/ETV Laboratory Course II
5. CCTV Operation and Transmission

3. Counterparts' Readiness to Perform Research by Themselves

Most of the counterparts have not experienced conducting research on their own but there are quite a number who are young and eager to start and learn.

The counterparts from the Civil Engineering Division were very fortunate in having been given the opportunities to do pilot research studies under the guidance of their experts Engr. Iwai, Dr. Yamao and Engr. Hara. Some of them have the capability and might set the pace in the conduct of research. For the others, they have yet much to learn from their experts.

The Mechanical Engineering counterparts witnessed the process with which Dr. Uesaki conducted his research on microstructure of metals. As their involvement was minimal, they are not too prepared to do research on their own. At present, the new Mechanical Engineering long term expert, Dr. Nadano, is sharing with them his ideas on how to do research.

Dr. Karasawa encouraged the Electrical Engineering counterparts to join him in a research on traffic noise. Some of them are capable of replicating the process.

The experience gained in doing research will be very useful to enable the counterparts to provide advice and assistance to students in the conduct of laboratory study (L/S).

4. Extent of Utilization of Machines and Equipment

All possible available space in the Integrated Research and Training Center has been utilized to install new machines and expand the laboratories. As the additional equipment kept coming there is congestion at the center. Some of the Grant-Aid equipment are most needed for the education and training of CIT students. As they are too many they could not all be served at the center. In the case of some newly arrived equipment, installation is delayed because of lack of laboratory space and this hampers the counterparts training by the Japanese Experts.

To optimize utilization of equipment, a plan to transfer some of the grant-aid equipment to the other divisions was proposed. This move will also decongest the crowded laboratories and provide extra space for other equipment. Among these equipment are:

* Physics Equipment - These are to be transferred to the College of Arts and Sciences new physics laboratory and serve more students. The vacated space will be used as a new laboratory for the EE division.
* Woodwork Machines - These are to be transferred to the College of Industrial Technology. These machines produce a lot of dust during operation which affects the nearby metallurgical laboratory.
* Foundry - In the case of Foundry Machines, they have been installed in a separate structure adjacent to the College of Industrial Technology Foundry Shop. All that is needed is to remove the wall partition and provide access to the foundry classes of CIT.

* Demonstration Equipment , table models and mock ups from the Automotive Laboratory - These pieces of equipment are very useful to both CIT and CAS

Procedures for Transfer

a. Organize a Consultation Team to discuss and prepare proposals on how to effect transfer that will insure mutual benefits (IRTC and CIT/CAS) and achieve optimum utilization of the equipment so mentioned.

Team members:

Dean (CAS and CIT)

1 (one) CAS faculty in charge of Physics

1 (one) CIT faculty in charge of Automotive

1 (one) CIT faculty in charge of Woodworking

1 (one) CIT faculty in charge of Foundry

Team Leader (as chairman)

Mechanical Engineering Expert

Electrical Engineering Expert

Civil Engineering Expert

JOCV Volunteer in Physics / Physics Counterpart

1 (one) Civil Engineering Counterpart

1 (one) Mechanical Engineering Counterpart

1 (one) Electrical Engineering Counterpart

b. Schedule of Work

June 8 - Preparation of communications for formalizing the Consultation Team , sending of notices of meeting.

June 8-11- Inspection and inventory of equipment by concerned counterparts .Preparation of lists and specifications

June 15 - 2:00 P.M. Team Leader' Room.First consultation meeting to start preliminary discussion and preparation of agenda for future discussion

June 22 - 2:00 P.M. Team Leader's Room. Final Review of proposals. Submission for approval to the President.

June 25 - 9:00 A.M. President's Office. Signing ofMemo of Agreement between Deans of CAS/CIT and IRTC director

10.00 A. M. Inspection of laboratories and shops at CIT/CAS where equipment will be installed.

June 26 - 30 - Actual transfer

c. Relevant Points for Discussions:

* Working Philosophy for transfer - to insure effective utilization of equipment.

* Some Criteria to be satisfied by the receiving division .

- there must be available laboratory space for the equipment
- one faculty should be assigned to take charge

of the equipment

- maintenance and operating costs will be charged to the receiving division

* Periodic Status Reports on utilization of the equipment will be submitted to the IRTC to include data on list of experiments and training course, number of students trained.
* IRTC Counterpart to conduct training on the use of the equipment for the faculty of CAS/CIT
* IRTC Experts /counterparts may visit the equipment and may interview students
* A Memorandum of Agreement will be signed between IRTC and CAS/CIT

5. Impressions on Management by Japanese Side

I. Period '83 - '84 (Prof Maeda)

Prof. Maeda's accomplishment as team leader was very significant. He carried out the difficult task of starting the project. He was successful in breaking the cultural boundaries between the Japanese experts and counterparts including the TUP community.His style of management was participative .As the counterparts themselves were involved in the planning of the training courses under the guidance of their experts , student training was started by November 1983 .Regular weekly meetings between experts and counterparts were recognized and a Sub-JointSteering Commitee was formed.Notwithstanding his age and his health , the IRTC made a good start through Prof. Maeda's leadership.

II. Period '84 -'86 (Prof. Yoshida)

The counterparts did not find any difficulty adjusting when Prof. Yoshida took over as team leader . Prof. Yoshida's management approach was simple direct and participative .He managed to get results thru open and frank communication .We have always worked closely as a team in an atmosphere of trust and confidence .He was simply a nice man. His management style carry such a personal touch and concern which earned for him the respect of all the counterparts and staff.He was the first to introduce the idea of experimentation after an extensive study of engineering education in the country.Before his term ended he made efforts to make IRTC visible to all engineering schools , institutions ,agencies,and professional associations .This is important if IRTC is to expand its role in the future.

III. Period '86 - '87 (Dr. Nishida)

Dr. Nishida brought with him a wealth of experience , power and ability. He is truly business like . The IRTC project is just a dent compared to the national and regional projects he managed in Japan. His style of management is highly structured and very authoritative. He held a holistic view as to the future role of IRTC to which he went beyond the master plan when he proposed the laboratory study .Perhaps it was an eagerness to get response as he was running against time ,since project is almost over which compelled him to put pressure on us couterparts to start the L/S immediately after approval of the Joint Steering Commitee on November 12. We did recognize the validity of introducing L/S into the COE curriculum.The problem is in the process and the approach used.1) The resistance to

change is a natural consequence particularly when the counterparts were immersed in activities they themselves planned under the guidance of experts in the last four years . 2) Enthusiasm and morale went low due to the criticisms on the nature of training conducted and manuals written which looked good and acceptable as modest attempts with the previous experts 3) Disgust and disappointment over the opinion of the team leader sent to JICA headquarters describing the serious weakness of technological education in the country which ran smack on our culture and people in an attempt to rationalize the introdction of L/S .

Sometimes such an approach in management pose a challenge and elicit productive results . In many cases they work the other way in our culture.

Future Plans of IRTC After March 1988

1. Position of IRTC in TUP

The IRTC will maintain its status as an independent unit in TUP . All counterparts and staff will continuously carry on their tasks pursuant to the functions of the center and in accordance to its mission. Its budget and resources will be specifically used for carrying out its functions.

2. Philosophy Statement

The IRTC will be an open institution for providing technical transfer aimed at improving Technological Education through Research, Training and Resource Sharing .

It will serve as a nucleus where other institutions and agencies may share in the fruits of technology transfer and benefits of modern technology as a result of an assistance from the Japanese government through JICA .

3. Functions

3.1 To provide opportunities for the conduct of basic training courses as part of curricula for the education of senior undergradutes majored in the field of technology

3.2.To provide opportunities for the conduct of advanced training courses as part of curricula for the education of engineering undergraduates majored in the field of engineering

3.3 To provide opportunities for conducting laboratory study on a theme (L/S) which is part of curricula of fifth year engineering students.

3.4 To provide and conduct Trainors Upgrading Courses for faculty, trainors and staff of TUP and other colleges agencies and institutions , engaged in teaching and related training in the fields of technology and engineering education.

3.5 To provide an environment that will encourage engineers faculty and other professionals to conduct research studies in engineering and technology .

3.6 To provide the opportunities for offering graduate programs in Engineering and Technology to select group of students and faculty.

4. Plans in the Immediate Future (June '87 - March '89)

4.1 There will be full implementation of training programs for students and that for trainors in accordance with the Master Plan in the Record of Discussions.

4.2 The new Laboratory Study (LS) will be offered with credits to fifth year Engineering students by June '87 .

4.3 The B.S Computer Science will be opened by the College of Engineering with ~~support~~ advice and ~~assistance~~ consultation from IRTC .

4.4 The IRTC will open an avenue for collaboration with Industry and agencies to promote institution - university linkage ,increase utilization of facilities and generate extra income for maintenance .

N.B : The above plans are targetted for the next two years and are perceived to be what the counterparts can do by themselves . Thus IRTC is ready to perform four (3.1 - 3.4) out of it's six functions.

Strategies :

4.1. How to Implement T/S

4.1.1 The new DECS order making 12 credits of Spanish as optional subject effective this June for incoming freshmen , is a breaktrough in the long struggle to find a suitable place in the COE curriculum where we could integrate the IRTC training programs . The next step is to prepare final listing of courses based on core domains as previously presented . A consultation between COE faculty and IRTC counterparts to discuss content ,credits and

schedules will be done. After consultations with students and approval by the president the T/S can start by the 2nd semester, November '87.

4.1.2 In the case of Basic training for CIT students, this will be started on a selective basis and only as far as the facilities will allow . Credits and schedules have yet to be negotiated . Limited number of classes may be held at the center .These are in refrigeration, machine processing ,foundry , and soil laboratory testing After the transfer of some equipment to the CIT,classes may be handled by CIT instructors.

(N.B. Students from TUP - Cavite were regular participants)

4.1.3 Trainors training courses will be structured and opened as workshop type .

4.2. How to implement (L/S)

4.2.1 The Laboratory Study is programmed once a week starting this June .

4.3 How to start the B.S. Computer Science

4.3.1 The curriculum is being refined .It would start with 30 selected students . Involvement of EE counterparts will be on the third and fourth year .

4.4 How to open collaboration with Industry

4.4.1 The Civil Engineering Materials Testing .Labor can open ties with the Bureau of Public Highways and become an accredited materials testing laboratory as it develops standard test

4.4.2 The civil Engineering Soil Exploration Tests Laboratory can be directly linked with large

Construction firms involved in infrastructures.

4.4.3 The Numerical Control Machine Laboratory can be linked with Manufacturing Processing Industries involved in mass production of machine tools.

4.4.4 The Scanning Electron Microscope Laboratory may be linked with the Metal Industries Research Development Center (MIRDC) and become an accredited metal testing laboratory.

5. Plans in the Long Range

5.1 Training programs for students will be sustained and whenever possible will be delegated to the colleges .CIT faculty will be active partners in the conduct of basic training

5.2 Trainors Training will extend to faculty of other colleges and to cover other engineering faculty in other countries using the "Third Country Concept"

5.3 By 1990 the number of capable counterparts have increased. AT this stage counterparts are prepared to do research works.The quality and level of students have improved and the good ones are ready to team with the counterparts in research.

5.4 Graduate Programs in Engineering and Technology will be offered to a selected group of faculty and students .

5.5 . Faculty researchers and graduate students from other universities will be encouraged to join collaborative efforts in research projects.

5.6 . By 1996 the counterparts and their graduate students will publish technical articles in journals and exchange research findings with other universities

Will IRTC become a Center of Excellence in Engineering and Technology? We can never tell. Now that the seed has started to grow it needs care and attention year by year, lest it will not bear any fruits as a tree .

附属資料 2.

TECHNOLOGICAL UNIVERSITY OF THE PHILIPPINES

INTEGRATED RESEARCH AND TRAINING CENTER

M a n i l a

The IRTC
PROJECT PROFILE
1982 - 1987

FOR: The Japanese Evaluation Mission

May 28 - June 4, 1987

TABLE OF CONTENTS

WHEREAS, to carry out the various programs with which to attain the objectives and goals, there is need to lead in applied research and extension services so that the Philippine College of Arts and Trades could provide consultation and advisory expertise on the national, regional and institutional levels to the other trade-technical, industrial and technological schools, both public and private, and industry in institutional planning and management, curricular development, supervisory and administrative staff development, equipment prototype research, designs and manufacture using available indigenous materials, and technology transfer and dissemination; and

WHEREAS, the Philippine College of Arts and Trades is the oldest industrial school in the country, and as such, has, since 1901, proved a strong agent of change in manpower development for industrial and engineering technicians, and for supervisory and managerial skills, and has continued to do so in the implementation of the government policies in its accelerated programs;

NOW, THEREFORE, I, *FERDINAND* E. MARCOS, President of the Philippines, by virtue of the powers vested in me by the Constitution, do hereby order and decree:

SECTION 1. The present Philippine College of Arts and Trades is hereby converted into the "Technological University of the Philippines", hereinafter referred to in this Decree as the University. The present campus in the city of Manila shall be known as the University College:

SEC. 2. The University shall provide higher and advanced vocational, technical, industrial, technological and professional education and training in the industries and technology, and practical arts leading to certificates, diplomas, and degrees. It shall provide progressive leadership in applied research, developmental studies in technical, industrial and technological fields and production using indigenous materials, effect technology transfer in the countryside; and assist in the development of small and medium scale industries in identified growth-centers.

SEC. 3. The governing body of the University shall be the Board of Regents of the Technological University of the Philippines which shall be composed of the following:

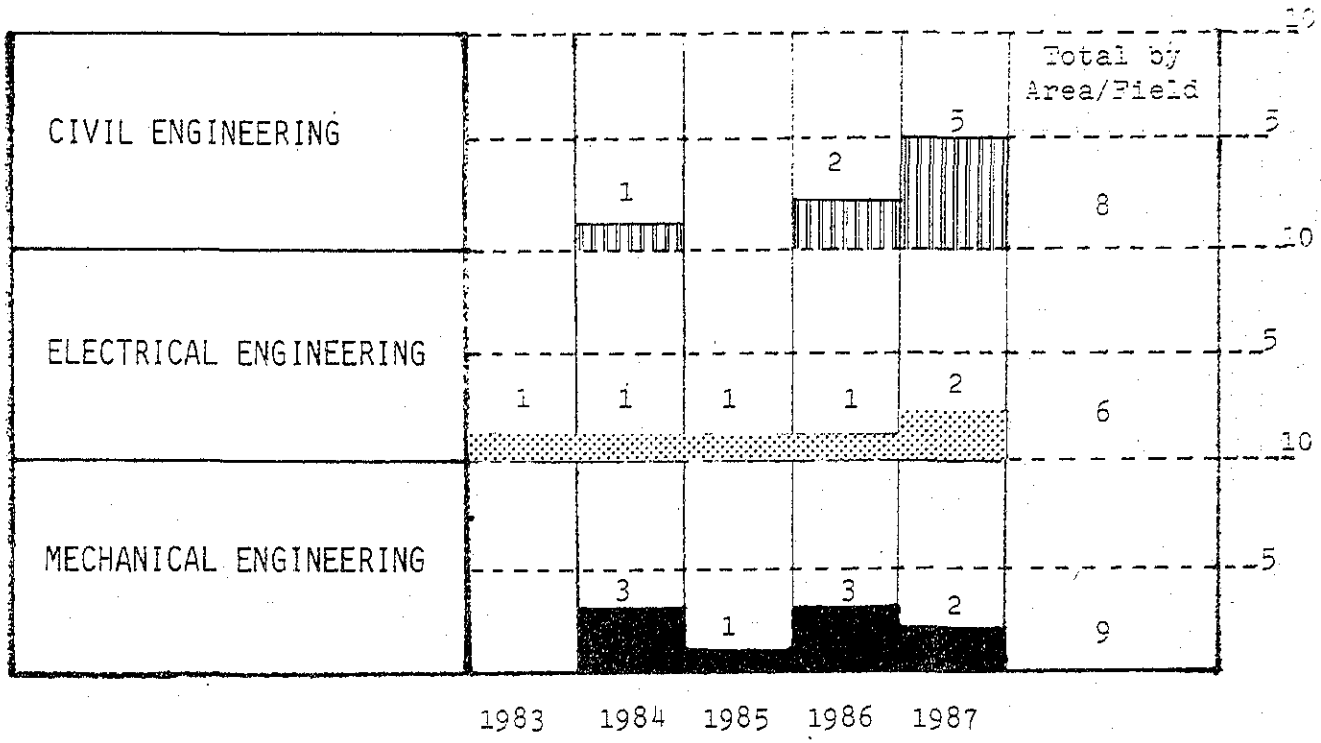
Minister of Education and Culture, Chairman
President of the University, Vice-Chairman
Representative of the National Economic and
Development Authority (NEDA), Member

LONG TERM EXPERTS

Field	Names of Experts	1983	1984	1985	1986	1987
CIVIL ENGINEERING	Engr. SHIGEO IWAI Construction and Civil Engineering	———	———	———		
	Dr. YOSHIHIDE YAMAO Structure and Concrete Engineering			———	———	
	Dr. OSAMU SAIJO Structural Engineering					———
MECHANICAL ENGINEERING	Prof. YASUHO MAEDA Metrology/Fluid Mechanics/Advance Mathematics/ Computer Programming	———	———	———		
	Prof. KUNIO KAWAKATSU Machine Processing/Principle of Hardness		———	———		
	Dr. TADASHI SHINKAWA Fluid Engineering			———	———	
	Dr. KOICHI UESAKI Metallurgy			———	———	
	Dr. KIYOSHI KUROSHITA Hydraulics				———	———
	Dr. YUKIHIKO IBUKI Strength of Materials & Management				———	———
	Dr. HIROMASA NADANO Machine Element and Heat Transfer					———
ELECTRICAL/ ELECTRONICS ENGINEERING	Dr. SHINJI YAMAGUCHI Power Engineering	———	———			
	Dr. MASAZUMI KUMAGAI Electronics Engineering		———	———		
	Prof. SHINJI KARASAWA Electronics Engineering			———	———	
	Prof. HIDETATSU KAKENO Electrical Engineering and Management				———	———
	Dr. MASATOSHI SAKAMOTO Metal Materials					———
CHIEF ADVISOR	Prof. YASUHO MAEDA	———	———			
	Prof. JUZO YOSHIDA		———	———	———	
	Prof. KIKUO NISHIDA				———	———
COORDINATOR	Engr. HIDEKI TANIMOTO	———	———	———	———	
	Engr. SHIGERU TAKARA				———	———

DISPATCHED SHORT TERM EXPERTS

1983 - 1987

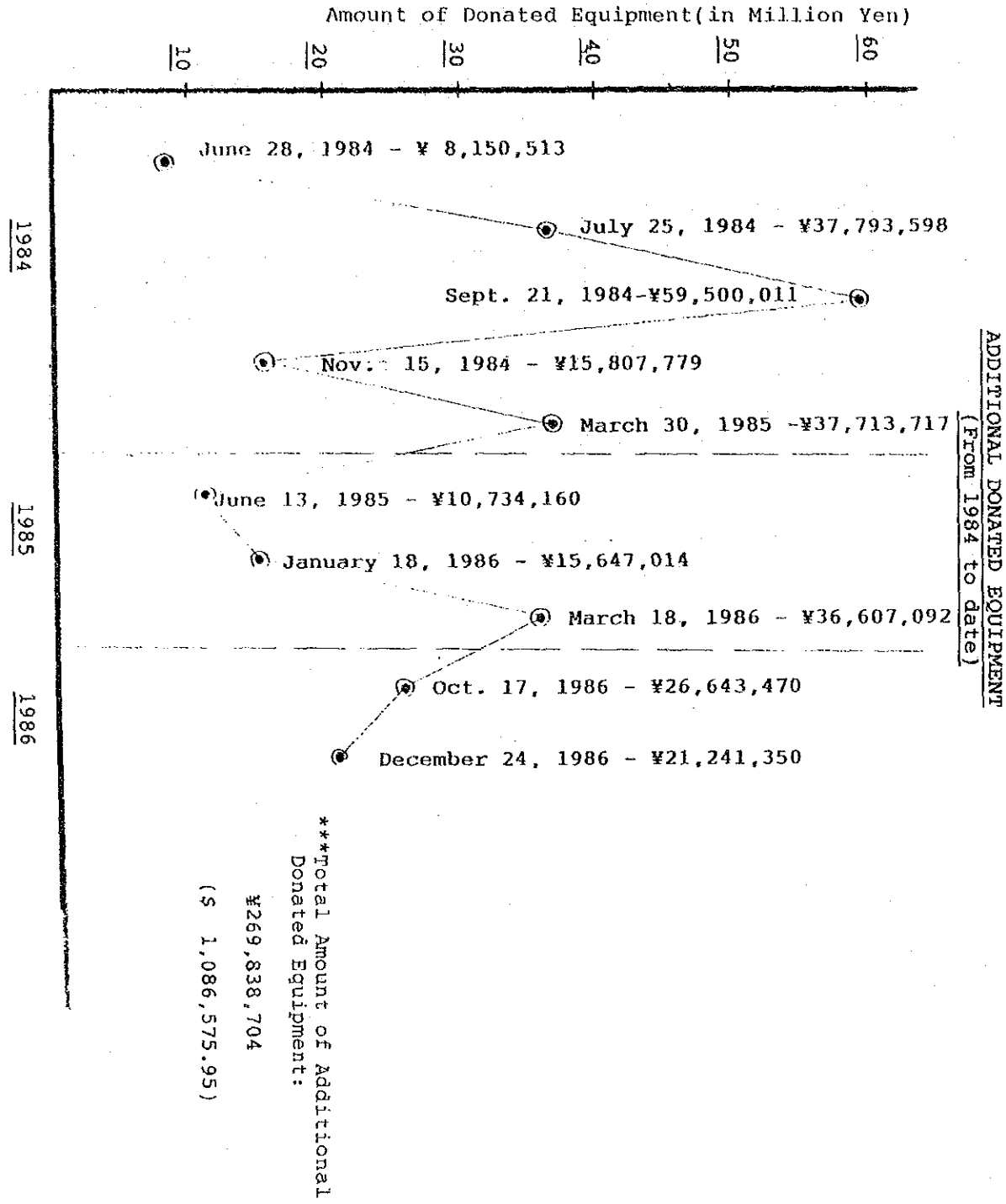


SHORT TERM EXPERTS

Field	Name of Expert	1983	1984	1985	1986	1987
MECHANICAL ENGINEERING	Dr. YOSHIO YOSHIZAWA Steam Power Plant Engineering		***			
	Dr. TAKEYUKI KAMIMOTO Automotive Engineering		***			
	Dr. KOICHI UESAKI Foundry		***			
	Dr. TOSHIAKI UEDA Scanning Electron Microscope			***		
	Dr. IWAO HAYASHI Instrument Engineering				***	
	Dr. TAKEAKI ATSUMI Machine Shop Practice				***	
	Mr. TAKASHI ITO Mechanical Engineering				***	
	Dr. SUMIO USHIRODA Automatic Control					***
	Dr. YOSHITAKA MURAI Automatic Control					***
CIVIL ENGINEERING	Engr. MITSURO KAWAKUBO Concrete		***			
	Dr. MASAHIRO KAWAGUCHI Civil Engineering				***	
	Engr. SHIGEO IWAI Soil Laboratory Testing				***	
	Dr. HARUYUKI NAKAYAMA Asphalt Pavement					***
	Dr. TADAKATSU HARA Prestressed Concrete					***
	Mr. ICHIRO ISO Dynamic Machine Installation					**
	Mr. MASAJI KOBAYASHI Dynamic Machine Installation					**
	Dr. SACHIO TOGAWA Dynamic Experimental Study					====
ELECTRICAL/ELECTRONIC ENGG	Dr. MASAZUMI KUMAGAI Electronics Engineering	***			***	
	Dr. YOITI SUZUKI Computer Engineering		***			
	Dr. SHINJI YAMAGUCHI Power Engineering II			***		
	Dr. SUMIO USHIRODA Automatic Control					***
	Dr. SHINJI YAMAGUCHI Transmission Line					***

COUNTERPART TRAINING IN JAPAN

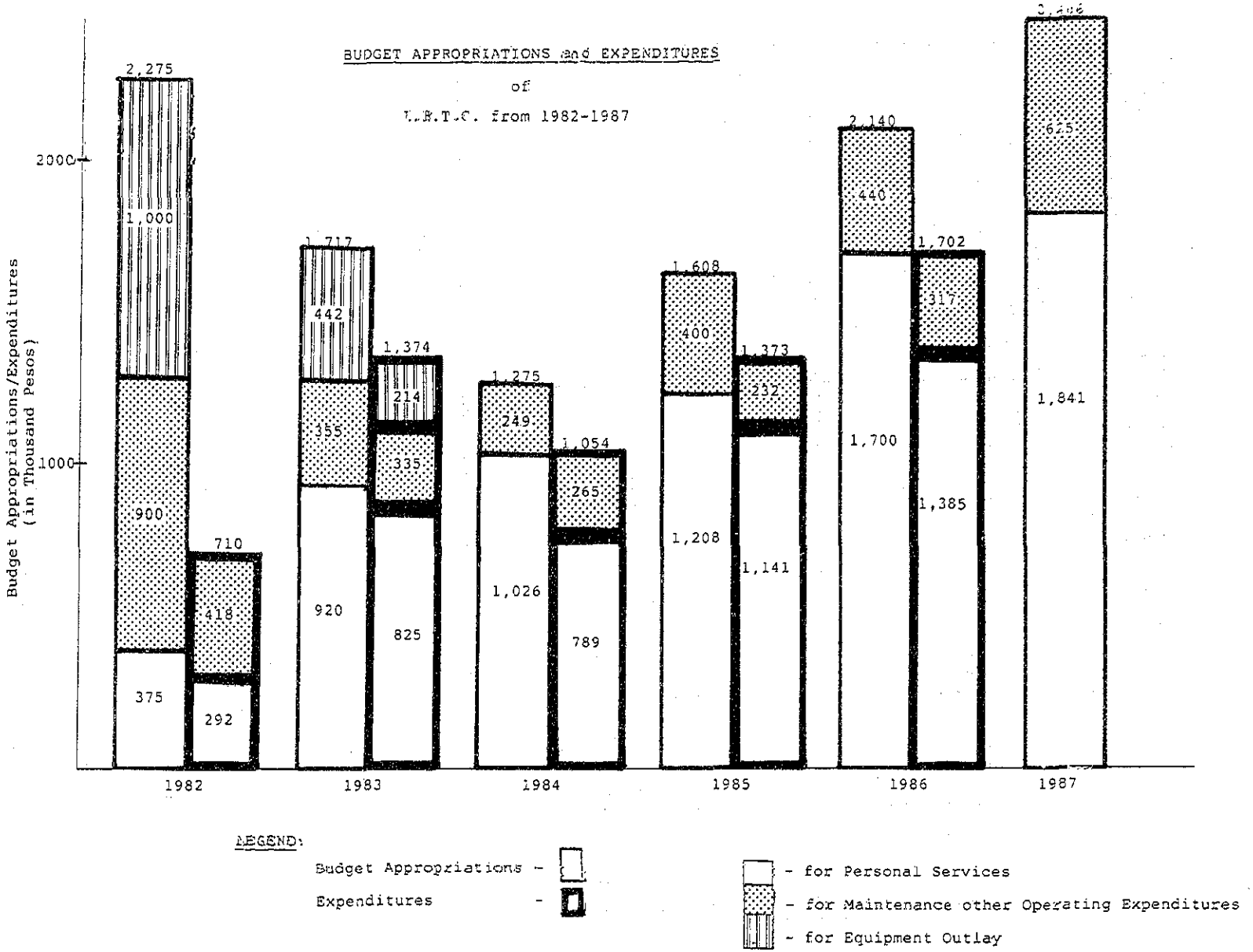
AREA/FIELD	1984	1985	1986	1987	Scheduled to leave for Japan
Civil Engineering	1	1	1	1	2
Electrical Engineering		1	1	1	1
Mechanical Engineering	1	1	1	1	1
Audio Visual				1	


Amount of Donated Equipment(in Million Yen)
10
20
30
40
50
60
1984
1985
1986
June 28, 1984 - ¥ 8,150,513
July 25, 1984 - ¥37,793,598
Sept. 21, 1984-¥59,500,011
Nov. 15, 1984 - ¥15,807,779
March 30, 1985 -¥37,713,717
June 13, 1985 - ¥10,734,160
January 18, 1986 - ¥15,647,014
March 18, 1986 - ¥36,607,092
Oct. 17, 1986 - ¥26,643,470
December 24, 1986 - ¥21,241,350
ADDITIONAL DONATED EQUIPMENT
(From 1984 to date)
***Total Amount of Additional
Donated Equipment:
¥269,838,704
($ 1,086,575.95)

DONATED BOOKS
As of September, 1985

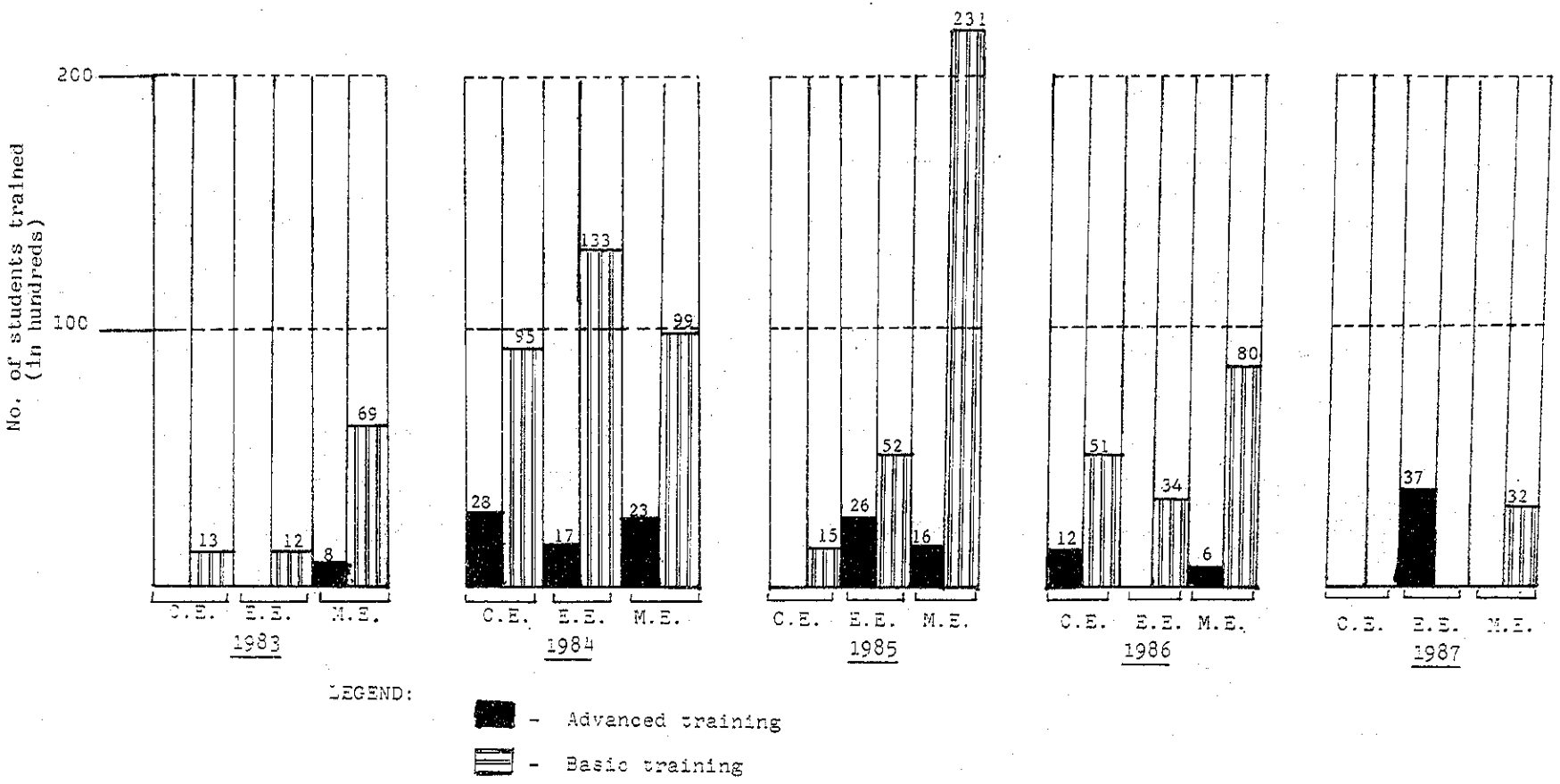
		Number of Volumes	Total Number of Volumes
CIVIL ENGINEERING	1983	34	71
	1984	16	
	1985	21	
MECHANICAL ENGINEERING	1983	15	35
	1984	2	
	1985	18	
ELECTRICAL/ ELECTRONIC ENGINEERING	1983	55	90
	1984	27	
	1985	8	

over-all total 196


BUDGET APPROPRIATIONS and EXPENDITURES
of
L.R.T.C. from 1982-1987
Budget Appropriations/Expenditures
(in Thousand Pesos)
2000
1000
2,275
1,000
900
375
710
418
292
1,717
442
355
920
1,374
214
335
825
1,275
249
1,026
1,054
265
789
1,608
400
1,208
1,373
232
1,141
2,140
440
1,700
1,702
317
1,385
2,466
625
1,841
1982
1983
1984
1985
1986
1987
LEGEND:
Budget Appropriations -
Expenditures -
- for Personal Services
- for Maintenance other Operating Expenditures
- for Equipment Outlay

FIELD/AREA	SPECIALIST/TECHNICIAN/STAFF	1982	1983	1984	1985	1986	1987
	SPECIALISTS:						
MECHANICAL	Menet C. Graza						
	Quirino F. Almeniana						
ENGINEERING	Ramon A. Amoncio						
	Alexander P. Malonzo						
	Valentino J. Angeles						
	Rey Crizanto Rizon						
	Marlonito R. Gonzales						
	Nne B. Ramirez						
	Ruben Mario A. Domingo						
	Gerardo D. Erguiza						
	Jose U. Fronda						
	Teocasimiro O. Prado						
	Lorenzo O. Gaviola						
	Roel J. Feliciano						
	Gilberto David						
	TECHNICIANS:						
	Vicente L. Julian Jr.						
	Edgar A. Felipe						
	Lot B. Ramirez						
	Reymundo C. Montoya						
	Francisco C. Dime						
	Roberto Pascual						
	Marko J. Dakanay						
	Rodelio P. Revilla						
CIVIL	SPECIALISTS:						
	Marie SM. Gutierrez						
ENGINEERING	Loreto D. Apilado						
	Ma. Carmen M. Buzar						
	David P. Mondo						
	Victor R. Macam						
	Dominador S. Pagbilao						
	Pablo A. Jorillo						
	Bernardo A. Lejano						
	Milo C. Zabala						
	Arnel S. Gomez						
	Benjamin J. Verdejo						
	TECHNICIANS:						
	Eduardo O. Quintos IX						
	Benjamin J. Verdejo					Spec.	
	Arnel S. Gomez					Spec.	
	Reynaldo P. Ramos						
ELECTRICAL	SPECIALISTS:						
	Jerome O. dela Torre						
ENGINEERING	Marissa S. Calma						
	Marvil S. Graza						
	Wilfredo Lopez						
	Harry Alfonso DL. Joson						
	Allan T. Sandoval						
	Vicente Elizar D. Pendang						
	Jose Juan Ignacio S. Noda						
	TECHNICIANS:						
	Alberto M. Cruz						
	Manuel N. Cawil		Tr. to Physics				
COMPUTER	SPECIALIST:						
	Edwin C. Koh						
	TECHNICIANS:						
	Ma. Carmela P. Fajardo						
	Roderico M. Francisco						
AUDIO VISUAL	SPECIALISTS:						
	Elizabeth Javier						
	Rodrigo dela Cruz - detailed						
	Nona D. Sevilla						
	TECHNICIAN:						
	Teodoro Gatioan						
PHYSICS	SPECIALISTS:						
	Alfredo C. Cate						
	Ma. Lourdes Caballo						
XCOE Faculty							
	TECHNICIAN:						
	Manuel N. Cawil						
PRINTING &	SPECIALIST:						
	Gelacio T. Dagum						
PUBLICATION	TECHNICIAN:						
	Leticia P. Caranguian						
EXECUTIVE DIRECTOR	PERLA S. ROXAS						
SUPPORT STAFF	Emma C. Francisco			Tr. to Pres. Office			
	Michaela O. Andrada						
	Maria A. Criste						
	Liza Bautista						
	Tina Chang						
	Cynthia Jusay						
	Tito C. Querido			tr.to EE			
	Abelardo A. Able						
	Ernita V. Rodriguez						
	Arnel Uyaco						
	Eulogio Galingan						
	Gregorio Lebato						
	Florephis Suan						
	Alex Frigillana						
	Consuelo C. Cabrera						
	Ferdinand B. Garcia						
	Lorenzo Gaviola						Spec.
	Merlita L. Estrada						
	Aurora Pagulayan						
	Ernesto Laxa						
	One (1) Driver						

STUDENTS' TRAINING CONDUCTED
1983 - 1987



Update: Students Training
in Support Divisions

	TITLE OF TRAINING	No. of Students	Trainor	Division
1986	CCTV Operation & Transmission	8	E. Javier	Audio-Visual
	Basic Programming	17	H. Joson	Computer
1987	Computer Fundamentals	10	H. Joson	Computer

LABORATORY STUDY ON A THEME

Conducted during the 2nd Semester
s.y. 86-87

	THEME	No. of Students *	Coordinator
E.E.	ANALYTICAL STUDY OF THE ELECTRIC POWER CONSUMPTION IN IRTC/TUP	6	A. Sandoval
	COMPUTER-AIDED VOLTAGE CONTROL OF SYNCHRONOUS GENERATOR	6	E. Pendang
M.E.	INVESTIGATION ON THE STATICAL STRENGTH OF COMMERCIAL METALS IN MANILA	5	T. Prado
	TOOTH CONTACT ANALYSIS OF CUTTING TOOLS ON CNC MILLING	5	R. Amoncio G. David
C.E.	EFFECT OF BAMBOO FIBERS TO CONCRETE STRENGTH	8	D. Mundo
	SOIL-LIME STABILIZATION STUDY	8	D. Pagbilao

*Students are graduating students from the respective fields of engineering.

TRAINORS TRAINING

Computer Division

	Title of Training	Participants	Number of Trainees
1982	Basic Computer Course	TUP Faculty & Staff	57
	Computer Basic Programming Course	TUP Faculty & Staff	32
1983	Computer Basic Programming Course	TUP Secretaries & Staff	8
	EDP for Executives	OBM Executives	22
		MOLE Executives	12
		OBM Executives	28
		MECS Executives	20
		PNC Executives	15
		PNB/PTRI/NMYC & heads of Government organization	29
1984	EDP for Executives	TUP-main and VTI Executives	20
		MOLE Executives	19
1985	Computer Course for the trainors of the TUP System	TUP Instructors	20
	Two week Course in BASIC Programming	Mr. Rajesh Joshi*	1
UPDATE... 1987	Introduction to Basic Microcomputer Applications	TUP faculty and administrative staff	8
	Seminar on computerization of Library for Instruction	TUP faculty and administrative staff	6
		total	297

TRAINORS TRAINING

	Title of Training	Participants	Number of Trainees Input	Number of Trainees Output
1984 October 22-30	Concrete Design Mix	Civil Engineering Faculty, TUP-COE	6	6
	Electrical Machines	Electrical Engineering Faculty, TUP-COE	6	2
	Machine Tools Processing Engine Performance Foundry Technology Fundamentals of RAC Steam Power Generation	Mechanical Engineering Faculty, TUP-COE	4	4
UPDATE... 1986-1987	Peers Trainors Course in Foundry (Summer 1987)	TUP Faculty	7	7
	Instrument Engineering (Echo Training Summer 1986)	TUP-COE Faculty	7	7
		TOTAL		26

PRODUCTION OF TRAINING MATERIALS

	TITLES	1982	1983	1984	1985	1986	1987
CIVIL ENGINEERING	SURVEYING MANUAL Iwai, Macam, Mundo, Verdejo					for final editing	
	CONCRETE ENGINEERING LABORATORY MANUAL Yamao and CE Counterparts						
	SOIL ENGINEERING LABORATORY MANUAL Y. Yamao and M. Gutierrez						
	ASPHALT TESTING LABORATORY MANUAL Y. Yamao and D. Pagbilao						
ELECTRICAL/ELECTRONIC ENGINEERING	ELECTRICAL MACHINES IN THE ELECTRICAL ENGINEERING LABORATORY Yamaguchi, Graza, Sandoval			**********			
	ELECTRONIC FUNDAMENTALS Kumagai, Joson, Sandoval			*****			
	ASSEMBLY LANGUAGE PROGRAMMING USING TK-85 Kumagai, Graza, Koh			**********			
	AMPLIFIERS AND POWER SUPPLY Kumagai, Sandoval, Joson				**********		
	ELECTRONIC COMMUNICATION Karasawa, de la Torre, Sandoval Pendang, Noda						
	PULSE CIRCUITS AND LOGIC GATES Karasawa, de La Torre, Sandoval Pendang, Noda					**********	
	ELEMENTS OF DIGITAL COMPUTER Karasawa					**********	
MECHANICAL ENGINEERING	HARDNESS TESTER MACHINE K. Kawakatsu				**********		
	NOTES ON INTERNAL COMBUSTION ENGINES N. Graza					**********	
	FLUID ENGINEERING T. Shinkawa					******	
	PRECISION SURFACE GRINDING MACHINE T. Shinkawa					******	
	PRECISION MEASURING INSTRUMENTS Hayashi, Graza, Hizon, Erguiza					for binding	
	NC MACHINE PROGRAMMING Shinkawa, David						
	P-G MODEL NC MACHINE Shinkawa, Domingo						
	SYNTHETIC HYDRO EXPERIMENTAL MACHINE Shinkawa, Fronda						
	REVIEW ON THE TWO THERMODYNAMIC PROCESSES AND THE PURE SUBSTANCE EQUIPMENT DESIGN: Solved Problems on Design and Performance An Introduction on the Basics of STEAM POWER PLANT (The Rankine Cycle) M. Gonzales						
	METALLURGY K. Uesaki					*******	

NOTE: **** printed | ____ copy preparation

RESEARCHES AND STUDIES IN I.R.T.C. From 1982 to 1987

Field	Title	1982	1983	1984	1985	1986	1987
E.E.	Measurement of Traffic Noise and Survey of Noise Conciousness in Selected Cities By S. Karasawa, P. Roxas and Counterparts				———	———	
M.E.	Mechanical Properties of Commercial Metals and Alloys Selected in Manila By K. Uesaki				———	———	
C.E.	Frictional Characteristics of Non-Woven Geo-textiles Sand Interface By. M. Gutierrez (training in Japan)			———			
	Physical Properties and Soil Type Classification of Volcanic Ash and Sandy Soil from Bicol Region By S. Iwai and Counterparts			———			
	A Survey of Properties of Concrete Aggregates from Different Sources near Metro Manila By Y. Yamao and Counterparts	published in the Phil			———	Research paper was Engineering Journal	
	A Survey of Properties of Different Brands of Cement By Y. Yamao and Counterparts	submitted to the Phil			———	Research paper was Engg. Journal Editor	
	Effect of Different Aggregates on the Strength of Concrete By. Y. Yamao and Counterparts					========	
	Effect of Curing on the Strength of Concrete By. Y. Yamao					=======	
	Experimental Tests on Prestressed Concrete By T. Hara and Counterparts						===

LEGEND: ——— completed ======= on-going

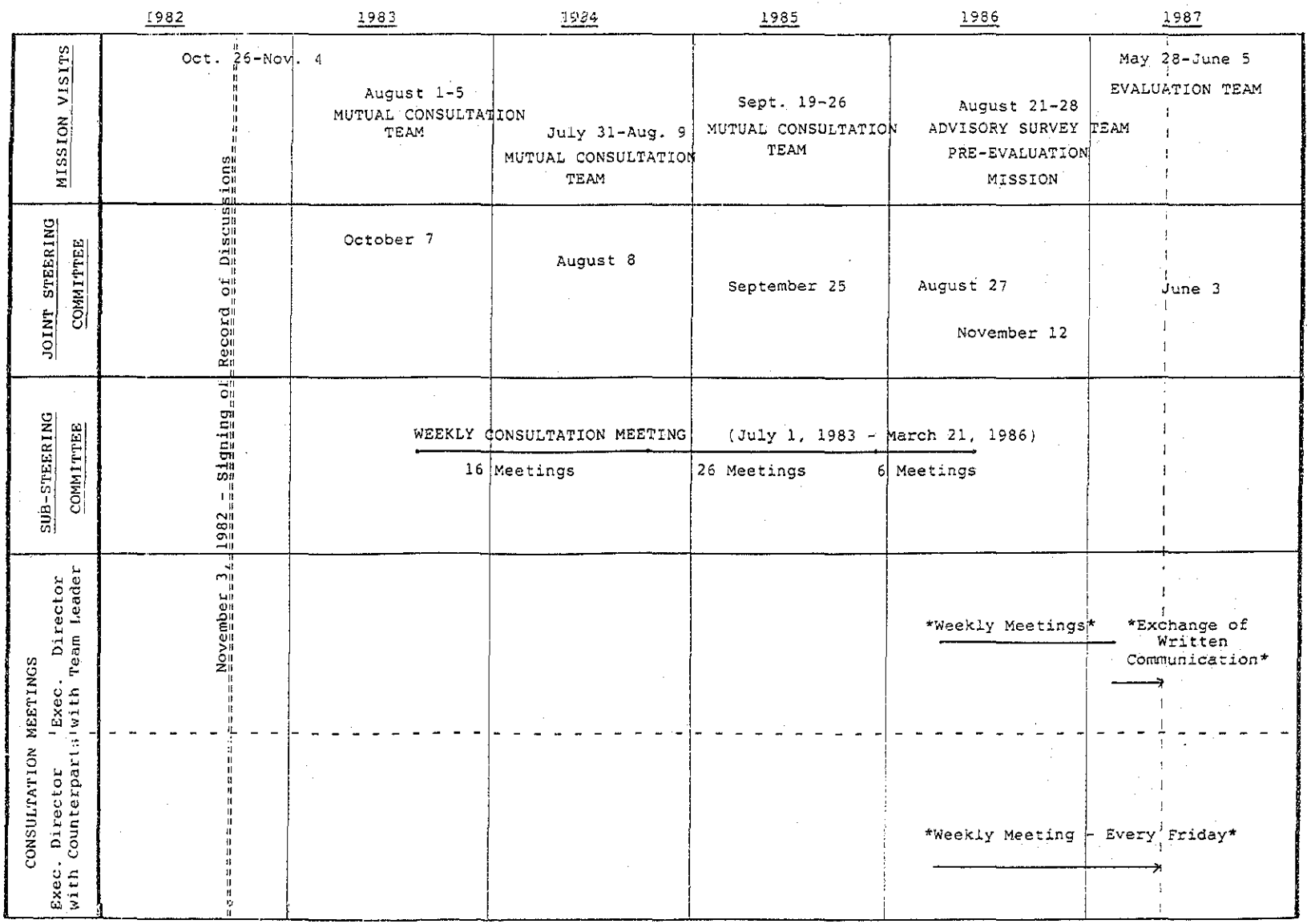
EXPANSION OF SHOPS AND LABORATORIES

	New Laboratories	1982	1983	1984	1985	1986	1987
CIVIL ENGINEERING	SOIL AND ASPHALT TESTING LABORATORY			**********			
	CONCRETE RESEARCH LABORATORY				———	———	———
	Curing Tank				****		
	STRUCTURAL DYNAMIC LABORATORY						****
	Oil Pressure Unit Compartment						———
	Water Cool Grillage						———
MECHANICAL ENGINEERING	METALLURGICAL AND PRECISION MEASUREMENT LABORATORY				********		
	NC MACHINE ROOM LABORATORY				*******		
	FLUID ENGINEERING LABORATORY				*******		

Legend: ******* completed

——— on-going

PROJECT COORDINATION AND MONITORING



STUDENTS' TRAINING CONDUCTED

FIELD	TITLE OF TRAINING	1983 NO. OF STUDENTS WHO COMPLETED THE TRAINING ADVANCED	1983 NO. OF STUDENTS WHO COMPLETED THE TRAINING BASIC	1983 TRAINOR	TITLE OF TRAINING	1984 NO. OF STUDENTS WHO COMPLETED THE TRAINING ADVANCED	1984 NO. OF STUDENTS WHO COMPLETED THE TRAINING BASIC	1984 TRAINOR	TITLE OF TRAINING	1985 NO. OF STUDENTS WHO COMPLETED THE TRAINING ADVANCED	1985 NO. OF STUDENTS WHO COMPLETED THE TRAINING BASIC	1985 TRAINOR	TITLE OF TRAINING	1986 NO. OF STUDENTS WHO COMPLETED THE TRAINING ADVANCED	1986 NO. OF STUDENTS WHO COMPLETED THE TRAINING BASIC	1986 TRAINOR	TITLE OF TRAINING	1987 NO. OF STUDENTS WHO COMPLETED THE TRAINING ADVANCED	1987 NO. OF STUDENTS WHO COMPLETED THE TRAINING BASIC	1987 TRAINOR
Civil Engineering	Soils & Materials Testing		13	Marte Gutierrez	Soils & Materials Testing		69	Loreto Apilado Victor Macam	Concrete Mix Design		8	Loreto Apilado	Soil Laboratory Testing		25	Arnel Gomez Dominador Pagbilao				
					Site Surveying		26	Victor Macam David Mundo	Surveying		7	Arnel Gomez	Concrete Materials Testing		9	Bernardo Lejano Benjamin Verdejo				
					Surveying Instrument	12		David Mundo					Soil Testing		17	Loreto Apilado				
					Site Surveying	16		Victor Macam David Mundo					Materials Engineering I	12		Marte Gutierrez Victor Macam Dominador Pagbilao Bernardo Lejano				
Electrical/ Electronic Engineering	Basic Electronic Circuits		12	Jerome dela Torre	Basic Electronic Circuits		28	Jerome dela Torre	Basic Electronics and Color Television		11	Jerome dela Torre Harry Joson	Power Engineering		6	Alan Sandoval	Power Engineering I & II	37		Jose Juan Noda Alan Sandoval Elizar Pendang
					Basic Electronics & Color Television		113	Jerome dela Torre	Electronic Fundamentals		36	Harry Joson Alan Sandoval Marvil Graza	Television 101		18	Jerome dela Torre				
					Power Engineering I & II	17		Marvil Graza	Selected Experiments in Electronic Fundamentals		5	Alan Sandoval	Basic TV Servicing		18	Jerome dela Torre				
									Electronic Fundamentals	26		Jose Juan Noda Elizar Pendang								
Mechanical Engineering	Machine Tools		57	Ramon Amoncio	Injection Pump Tester		4	Menet Graza	Machine Shop Practice		45	Noe Ramirez	Physical Metallurgy		18	Teocasimiro Prado	Physical Metallurgy		23	Teocasimiro Prado
	Refrigeration and Air conditioning (Equipment Training)		6	Valentino Angeles	Refrigeration and Air-Conditioning (Equipment Training)		95	Valentino Angeles Rey Hizon	Steam Power Generation		45	Marlonito Gonzales	Boiler Operation		9	Rey Hizon	Tape Preparation System			
	Boiler Operation		4	Alexander Malonzo					Internal Combustion Engine		44	Menet Graza	Refrigeration and Air-conditioning		19	Valentino Angeles	Numerical Control Machine			
	Steam Power Generation		2	Marlonito Gonzales	Engine Performance & Design	12		Menet Graza	Refrigeration and Air-conditioning		75	Rey Hizon	Tape Preparation System				Tape Center Model O:PD		9	Gilbert David
	Boiler Operation	8		Alexander Malonzo	Injection Pump Tester	8		Alexander Malonzo	Sand Testing & Molding		22	Quirino Almeniana	Numerical Control Machine							
					Internal Combustion Engine	3		Menet Graza	Internal Combustion Engine	16		Menet Graza	Tape Center Model O:PD		25	Gilbert David				
													Tape Preparation System							
													Numerical Control Machine							
													Tape Center Model O:PD		15	Ruben Domingo				
													Machine Tool Processing		2	Ramon Amoncio				
													Mechanical Processing	6		Ramon Amoncio				
TOTAL		8	94			68	327			42	298			18	165			37	32	

TOTAL ADVANCED 173
TOTAL BASIC 916
GRAND TOTAL 1,089

CIVIL ENGINEERING DIVISION

Integrated Research and Training Center
CIVIL ENGINEERING DIVISION

RESPONSE TO QUESTIONNAIRE DATED MAY PP, 1987

A. Period of Messrs. Maeda and Yoshida

JAPANESE EXPERTS	TOPICS	DATE	RATING
Engr. Iwai	Construction & Civil Eng'g.	Apr.83-Mar.85	0
Engr. Tanimoto	Coordinator	Jan.83-Jun.86	0
Engr. Kawakubo	Concrete	Aug.12-Sept.30,84	0
Dr. Yamao	Structures & Concrete Eng'g.	Jun.85-Sept.86	0
Dr. Kawaguchi	Civil Engineering	Feb.21-28,86	0

B. Period of Dr. Hishida

Engr. Tohara	Coordinator	Jun.86-present	0
Dpt. Imai	Soil Laboratory Testing	Aug.3-Sept.6,86	0
Dr. Saijo	Structural Engineering	Sept.6-present	0
Dr. Nakayama	Asphalt Pavement	Jan.12-Feb.6,87	0
Dr. Hara	Prestressed Concrete	Feb.7-Mar.13,87	0
Dr. Ito	Dynamic Machine Installation	Mar.11-21,87	0
Dr. Kobayashi	Dynamic Machine Installation	Mar.11-21,87	0

C. List of Student Training Title with Ready Manuals

1. Concrete Materials Testing
2. Tests for Fresh and Hardened Concrete
3. Soil Laboratory Testing
4. Soil Exploration
5. Building Construction Technology

D. IRTC's Direction in Management after April 1988

After all the Japanese Experts shall have left by 1988, IRTC shall function in up-grading Technical and Engineering Education in TUP in particular and the whole country in general. By then counterparts shall be ready to assume their role in basic and advance training as an outgrowth of their intensive training here and abroad. Counterparts are already trained in their respective fields of specialization to handle both training and research activities.

E. Transfer of Machine to Other Divisions

All machines and equipment in the CE division are needed for a more varied theoritical and practical training/exposure of students. However, in the Woodwork Laboratory, the following machines are needed for the construction of wooden formworks: Band Saw, Jointer, Surfacer, Disc Sander, Drill Press, Sharpener and Electric Grinder. A table type Circular Saw is badly needed to complement the other machines. All the other machines there can be given to whoever need them most.

Opinion Regarding Japanese Management of IRTC

IRTC depended to a great extent on JICA assistance. The management of the Japanese Team has been very beneficial, considering the coming of Experts to train the counterparts. The sending of counterparts to Japan for training can be considered as the most lasting aspect of Technical Cooperation between Japan and the Philippines.

Respectfully submitted:

LORETO D. APILADO

David F. Mundo
C.E. Counterpart

Subject of Study Training in Japan: Concrete Construction Materials and Concrete Structures

A-1. Period Under Messrs. Maeda and Yoshida

1.a) The technical transfer under Mr. Iwai were more on a lecture type, except surveying, because there was lack of testing equipment. The machines and equipment needed in the conduct of training arrived late. The remaining time for the expert was used more in the installation os the newly arrived equipment/machines. The rest of the time was spent on familiarization of the equipment.

Dr. Yamao's training in Concrete Engineering was purely laboratory work. It was during this time that the CE Division had published a paper in the Philippine Engineering Journal.

1.b) Student training titles which counterparts can perform are the following:

a. Surveying
b. Soil Laboratory
c. Soil Exploration
d. Concrete Construction Materials
e. Concrete Structures

A-2. Period of Mr. Nishida

Dr. Osamu Saijo is the present long term expert in the C.E. division. He specializes in Structural Dynamics. Each counterpart in the C.E. division is encouraged to specialize in two major subjects. For me, I've selected two major subjects before the training in Structural Dynamics started. However, I sometime attend the training in Structural Dynamics.

2.b) The C.E. division had started two thematic laboratory studies (TL/S), one is about "Soil Stabilization by Using Lime" and the other is the "Investigation of Chopped Bamboo Fiber to Concrete Strength". The students who participated in these studies showed interest as indicated by their nearly perfect attendance and their willingness to present their accomplishment last March 20, although they came in voluntary basis. However, their interest was gradually lost after they graduated last March 31.

B) IRTC should continue the conduct of trainings and research. It should stand as an independent institution.

C) I am not favor in the transfer of equipment to other shops/divisions in TUP. Most of the equipment are to be used in the conduct of research thus they should be in the proper shops and laboratories.

D) Despite of their difficulty to express themselves in the English, the experts tried their best to teach the counterparts in their respective fields of specialization. They have given much support for the IRTC Project.

Counterparts' Training

Long Term Expert	Field	Duration	Grade
Engr. Shigeo Iwai	Construction & Civil Engineering	3/84-4/85	O
Engr. Hideki Tanimoto	Coordinator	6/83-6/86	O
Engr. Yoshihide Yamao	Concrete Engineering	6/85-9/86	Partially attended
Engr. Shigeru Takara	Coordinator	6/86-present	O
Dr. Osamu Saijo	Structural Dynamics	9/86-present	O
Short Term Experts			
Engr. Mitsuro Kawakubo	Concrete	8/12-9/30/84	O
Mr. H. Nakayama	Asphalt Pavement	1/12-2/6/87	O
Mr. Tadakatsu Hara	Pre-Stressed Concrete	2/7-3/5/87	O

Counterpart : Bernardo A. Lejano
Division : Civil Engineering
Date : May 28, 1987

A.

1.a) Periods of Messrs. Maeda and Yoshida

Training Title	Japanese Expert	Duration	Technical Transfer	Student Training	Remark
Concrete Technology	Y. Yamao	Dec'85-Sept'86	○	⊖	Initiated the conduct of research in conc.

Note: I started in IRTC last Nov. 28, 1985 which covers only the later period of Mr. Yoshida.

Legend: ○ - adequate technical transfer
⊗ - inadequate technical transfer
⊖ - capable of student training

1.b) Student Training Capabilities:

Basic Concrete and Concrete Material Testing
Soil Laboratory Testing
Asphalt Properties Testing
Basic Pre-stressed Concrete
Basic Vibration Mechanics

2.a) Period of Mr. Nishida

Training Title	Japanese Expert	Duration	Technical Transfer	Student Training	Remark
Concrete Technology	Y. Yamao	12/85-9/86	○	⊖	Initiated the research on concrete.

Vibration Mechanics	O. Saijo	10/86-present	○	⊖	Has a very good training program.
Soil Lab. Testing	S. Iwai	8/3/86-9/6/86	○	⊖	The training was comprehensive.
Asphalt Pavement Eng'g.	H. Nakayama	1/12/87-2/6/87	○	⊖	The training was comprehensive.
Pre-stressed Concrete	H. Hara	2/7/87-3/13/87	○	⊖	The training was comprehensive.
Data Analysis & Measurement system	S. Togawa	5/8/87-present			The training is ongoing.

2.b) At present, I don't have laboratory studies because I concentrated first in Vibration Mechanics Training under Dr. Saijo and also the dynamic testing machine was not yet installed. But this coming semester maybe it is already possible to conduct a laboratory study in the field of vibration mechanics since the dynamic testing machine is already installed.

B. In my opinion, after all the Japanese Experts have left at the end of March 1988, IRTC should be able to continue its function as an independent department. The conduct of trainings and researches should be fully implemented through student trainings, trainor's training, laboratory study, and specialized researches.

C. In this question I can only react for the CE division, and my comment is that, as of now all the machines and equipments acquired through JICA are being used and are needed in the conduct of our trainings and researches, therefore I think these machines/equipments should not be transferred.

D. As of the period of Mr. Yoshida, I cannot say much because when I started working here in IRTC it is already the later part of his period. So basing from that duration, I think that his performance as the Japanese team leader in IRTC is very good.

For the period of Mr. Nishida, I think his greatest contribution is the introduction of laboratory study. As far as his management of IRTC, I think he is a very good administrator.

In general, I think that the Japanese experts are fully supporting us both technically and financially.

Counterparts: Dominador S. Pagbilao
Field: Civil Engineering (Asphalt - Soil)
Date Hired: April 1986

A. Evaluation of Technical Transfer

Expert	Term	Technical Transfer Exp → Cp	Technical Transfer Cp → St
Y. Goto	Apr 83 - Mar 85	Not attended	Not applicable
H. Tanimoto	Jun 83 - Jun 86	No Lecture	Not applicable
[illegible]	Jun 83 - Sep 86	O	O
S. Takara	Jun 86 - Present	No Lecture	Not applicable
O. Saito	Sep 86 - Present	Not attended	Not applicable
H. [illegible]	Aug 12-Sep 30 84	Not attended	Not applicable
H. Kawaguchi	Feb 21 - 28 86	No Lecture	Not applicable
Y. Goto	Aug 3 Sep 6 86	O	O
H. Nakayama	Jan 12 Feb 6 86	O	O
T. Hara	Feb 7-Mar 15 86	O	Not Capable
T. Iso	Mar 11-21 86	No Lecture	Not applicable
H. Kobayashi	-do-	-do-	-do-
S. Togawa	May 87 - Present	Not attended	Not applicable

B. Student Training Titles

1. Soil Property Testing
2. Asphalt Property Testing
3. Cement Property Testing

C. Past Records and Evaluation of Laboratory Studies

1st Mtg (Feb 13 87)	Presentation of theme and discussion on mechanics of the study
2nd Mtg (Feb 20 87)	Trial testing of a sample and scheduling of works
3rd Mtg (Feb 24 87)	Collection of samples for testing
4th - 7th Mtg (Feb 28, Mar 6 & 13)	Testing of samples (Data gathering)
8th Mtg (Mar 20 87)	Presentation of the laboratory study and of the partial results obtained

The laboratory study was temporarily stopped because the students involved have to finish their On-The-Job Training this summer. We hope that the laboratory study will resume this coming semester.

D. IRTC's Direction in Management

As for me, I hope that the trainings of students and research works be strongly supported.

E. Transfer of Machines

All machines are indispensable, and are therefore to be maintained in the laboratory.

F. Management of Japanses side

The differences in the management for the two periods are affected by the counterparts' condition. The emphasis of manual writing and students' training in the first period was met because of the presence of experts who can directly contribute to the work. The emphasis of integrating the center's service to the COE through LS is a thrust towards continuous use of the center by the students and is likewise effective.

[illegible]
Counterpart: CE Div.

ANSWER TO QUESTIONNAIRE : JICA EVALUATION MISSION

A.1 Period of Messrs. Maeda and Yoshida
(This C/P is not yet employed during the said period)

A.2 Period of Mr. Nishida

A.2.a Grade of technical transfer to the Counterparts:

EXPERT	FIELD	DURATION	GRADE I	GRADE
DR. O. Saijo	VIBRATION MECH.	DEC.'86-present	○	⊖
Mr. H. Nakayama	ASPHALT PAVEMENT	JAN.-FEB.'87	○	
Mr. I. Hara	PRESTRESSED CONCRETE	FEB-MAR.'87	○	
Dr. S. Togawa	DATA ANALYSIS	MAY'87-present	○	⊖

B. IRTC's Direction in Management after April 1988

I would like to suggest that IRTC should be instituted as a research oriented and training center for the advancement of technological education in this country, since almost all of the learning institutions of this country derived their basis of instruction from books alone. The creative capability of the teacher as well as the students has not been effectively utilized and the best way to improve the situation is to expose them to the laboratory arena where they could use their keen mind to investigate and verify important factual information which the book could not facilitate and even justify that the data which had been stated have had its basis.

C. There are some equipments and instruments which could be transferred to the more suitable divisions in TUP for their effective use. This matter, however, should be properly consulted to the proper authorities and be assigned to the appropriate persons who could facilitate their effectiveness into a better technology education, particularly TUP.

Pablo [illegible]

Civil Engineering Division

1. Period of Messrs. Haeda and Yoshida

notes: Employed as of Sept 1,1987. Past of the period covered by Mr.Maeda and Mr. Yoshida.

2. Period of Mr. Nishida

Training title	Term	technical transfer	training	Remarks
1.Osamu Saito Vibration Mechanics	9/86 -present	o	⊕	Comprehensive theoretical back-up,motivates us to work harder.
2.Hideo Tagawa Data Analysis and measurement system	May 8 - present	o	⊕	Efficient and the training is still continuing.
3. Tadakatsu Hara Prestressed concrete	Feb 7-Mar 15,'87	o		Encourage research output. Very effective
4. Hiroshi Nakayama Asphalt Pavement	Jan 12-Feb 6,'87	o		Motivates us to learn both from theory and experiments.
5. Shigeo Iwai Soil Lab testing	Aug 3-Sept6,'87	o	⊕	Very hardworking and a good teacher Very effective.

4. Management after April '87

To continue what we have started, to implement fully the Laboratory Study in order to encourage research. IRTC shall be a part of TUP with specific tasks/functions.

5. Transfer of Machines and Equipment

Some equipment could be transferred to other disciplines/shops in TUP but these equipment and machines are better off in IRTC. This is a place of research and laboratory works, its use could be more efficient in IRTC; this does not mean that other departments/colleges are deprived of these new equipment. They could make use of them and we are ready to assist them when the need arises.

6. Project Management

For about a year now, I've seen that the Japanese have supported us through and true, both financially and in the field of learning. Qualified Civil Engineering experts have shared their expertise and knowledge. Output oriented behaviour encourages us to even try harder in our own chosen field of specialization.

RESPONSE TO THE QUESTIONAIRE GIVEN BY THE JICA MISSIONS
DATED MAY 22,1987

A. Evaluation of Technology Transfer by the Japanese Experts:

EXPERT	TRAINING	DURATION	RATING	REMARKS
Dr. Y. Yamao	Structures & Concrete Eng'g	June'85-Sept'86	O	The training was not sufficient enough in terms of technology transfer and this is due to the difficulty of the expert to express his ideas clearly.No formal lecture was was done.
Dr.O. Saijo	Structural Eng'g	Sept'86-present	N/A	The trainig was only attended by selected counterparts majoring the field of structural & dynamics Eng'
Engr. S. Iwai	Soil Laboratory Testing	Aug'86-Sept'86	O	The training was sufficient enough & the method of teaching as well as the presentation of lectures was done very clearly.
Mr. H.Nakayama	Asphalt Pavement Eng'g	Jan'87-Feb'87	O	The training was interesting & very much applicable to the Philippine condition, but I think one month is not enough to discuss & understand the course.
Mr. T. Hara	Pre-Stressed Concrete	Feb'87-Mar'87	O	Also a very interesting course,the trainor is a very good one,he conducted his training in a very systematic way.

A.2b. *******not applicable*********

A.1b. List of Student Training which can be conducted:

1. Basic and Advance Surveying

2. Soil Laboratory Testing

3. Asphalt Pavement Eng'g(Testing of mat'ls)

4. Materials Testing (cement/concrete)

B. IRTC's Direction in Management after Apr'88

After the contract has expired in April,1988, I think what IRTC should do is to continue conducting trainings specially for the technically oriented groups parhicularly the TUP students. The training must be done in a systematic manner in which the participant could easily understand and appreciate the course.The center should also concentrate on income generating programs so that it can augment its budget in terms of financial needs.All on going activities and programs that will be left by the Japanese Experts should be continued by the Filipino counterparts.The center must also start to establish its own structure of programs that is really suitable to the Philippine condition.As for the stand of IRTC in TUP, I think. these matters lies on the hand of the TUP administration.

C. As for the transfer of some machines/equipment to more suitable department in TUP, I don't see any reason why it should not be done specially those machine that are not oftenly used in thetraining programs of the center.Instead of keeping these equipment idle here in the center, why not let those who really needs it to utilize it more specially the students of the other colleges of the university.

D. In my personal opinion,I think the Japanese have given their best to make the IRTC project a success.They have supported and meticulously guide the counterparts in their field of work. The only problem that I have observed during the past years,is the lack of proper coordination between the Japanese Experts particularly its team leader. I have noticed that from the period of Dr. Yoshida up to the present period of Mr. Nishida, different programs were implemented, and some these programs were left unfinished because a new sets of program are to be done .This situation only create confusion in the part of the Filipino counterparts. I suggest that a concrete structure of programs be implemented continuously to avoid the overlapping of activities. Before starting a new set of activity it is better to let the on going activity to be fully finished first,in this case, there will be a smooth flow of activities. Hence, we can more or less foresee the actual direction of the center.

Submitted by: ARNEL S. GOMEZ
Civil Engineering Division

BENJAMIN VERDEJO
C.E. Specialist

Answers to Questionnaires

A.
1.) b.) Surveying
Concrete Materials Testing and Design Mix

2.) a.) Under the Period of Mr. Nishida

Long Term Expert	Subject	Technical Transfer	Student training Capability
Dr. Yoshihide Yamao (June'85-Sept'86)	Structures & Concrete Eng'g	Adequate	Capable
Short Term Expert			
Engr. Shigeo Iwai (Aug'86-Sept'86)	Soil Laboratory Testing	Adequate	Capable
Dr. Haruyuki Nakayama (Jan'87-Feb 87)	Asphalt Pavement	Adequate	Capable
Mr. Tadakatsu Hara (Feb'87-March'87)	Pre-stressed Concrete	Adequate	Incapable

Remarks: Conducted Concrete materials testing training even at the time of Mr. Nishida.

B. The formal stand of IRTC at the end of March, 1988, It will continue with its training & research programs. My opinion about our future plan is to extend our training programs outside TUP or to other schools or agencies. Continue using the equipment to produce more specific research papers.

C. The transfer of some unused equipment will be an advantage for us because it will add space for new laboratories.

D. The project management of the Japanese side is inconsistent because the previous two phases of the project differ from the present one. The first two phases concentrated on trainings, research and manual writing while the third phase concentrated on Laboratory Study (L/S). I don't have any background of the Laboratory Study. According to the objective of the R/D, the experts are here to suggest and guide us but it seems that they are the ones dictating us what will be our project.

ELECTRICAL ENGINEERING DIVISION

Technological University of the Philippines
Integrated Research and Training Center
ELECTRICAL/ELECTRONIC ENGINEERING DIVISION

Evaluation of Technical Transfer

Topic	Japanese Expert	Tech Transfer[1] Expert to C/P	Tech Transfer[1] C/P to Students
PERIOD OF PROF. MAEDA & PROF. YOSHIDA[2]			
1. Power Eng'g I - DC Machines	Yamaguchi	O	⊖
2. Power Eng'g II - AC Machines	Yamaguchi	O	⊖
3. Fundamental Electronics			
a. Electronic Fundamentals	Kumagai	O	⊖
b. Amplifiers & Power Supplies	Kumagai	O	⊖
c. Pulse Circuits & Logic Gates	Karasawa	O	⊖
4. Advanced Electronics			
a. Electronic Communication	Karasawa	O	⊖
b. Elements of Digital Computer	Karasawa	O	⊖
5. Control Engineering	- none -		
6. Computer			
a. TK-85 Assembly Programming	Kumagai	O	⊖
b. Interface Technology for Microcomputers	Kumagai	O	⊖
c. CP/M Operating System	Suzuki	O	⊖
d. Advanced Disk BASIC and the BASIC Compiler	Suzuki	O	⊖
e. WordStar Word Processing	Suzuki	O	⊖
PERIOD OF PROF. NISHIDA[3]			
E1. Electric Power			
a. Transmission Lines and Protective Devices	Yamaguchi	O	⊖
E2. Tele-Communications	- none -		
E3. Applied Electronics	- none -		
E4. Computer Technology			
a. TK-85 Assembly Programming	Kakeno	O	⊖
b. Sequence Controller	Kakeno	O	⊖
c. Fundamentals of Computer Elements	Kakeno	O	⊖
d. Control of Peripheral Devices	Kakeno	O	⊖
ME5. Automatic Control	Ushiroda	O	⊖
Material Science[4]	Sakamoto	on-going	

1 O adequate technical transfer
⊖ capable of student training
⊗ inadequate technical transfer
2 Evaluated according to the list of course titles on pages 31 to 38 of the R/D.
3 Evaluated according to the list of core domains as prepared by Prof. Nishida.
4 Not included in the core domains as defined by Prof. Nishida.

Regarding IRTC's Directions after April 1988

At the end of the project on March 1988, the following proposals are hereto presented:

1. Redefining of objectives from broad view to a well defined specifics;
2. The establishment of an effective administration autonomous from any TUP collegiate body and tasked with the study, formulation, and implementation of programs it shall undertake;
3. Though autonomous, IRTC shall charge upon itself the coordination with the different collegiate bodies on matters of training and research not imposed on them (the colleges) but those they themselves perceived and would voluntarily join or request;
4. The sustained funding of its operation inclusive of maintenance, servicing, updating of equipment, manpower, ministerial costs, and other allied services necessary for its continued existence; and
5. The institution of self-generating programs supplementary to #4, utilizing the facilities and equipment of IRTC.

Regarding the Transfer of IRTC Machines and Equipment

The machines and equipment must remain as part of IRTC assets for general use of the different divisions (EE,ME,CE) and in pursuance of its goals as a training and research center.

The Physics Laboratory, at this point in time, as a laboratory is not necessary. However, its equipment are vital for research and training of the existing divisions. The room, on the other hand, is more appropriate as a research laboratory extending the areas of interest of other divisions. To cite as an example, the setting of a Semiconductor Clean-Room Laboratory.

Assessment of Project Management by Japanese Experts

ACHIEVEMENTS

Maeda Period:

1. The initialization of the IRTC project starting off with the setting-up of facilities;
2. Pursuance of counterparts' training abroad; and
3. Staff training on computers.

Yoshida Period:

1. The coordination of shipments, installation, and set-up of equipment;
2. The formulation of training programs and packages;
   a. Experts to counterparts
   b. Counterparts to students
      1) Basic Training
      2) Advanced Training
3. The preparation and printing of text/manuals for training;

4. Re orientation of experts and counterparts on the needs of the present industries thru company and school visitations;
5. Proper coordination of programs per division thru weekly consultation meetings and proper channeling of communications; and
6. Pursuance of counterpart training abroad.

Nishida Period:
1. Introduction of Laboratory Study on a Theme.

COMMENTS

Maeda Period:
Superb management in terms of establishment of rapport and coordination between Japanese and Filipinos and the enhancement of knowledge/skills thru self-training on computers.

Yoshida Period:
Excellent management thru:
Introduction of self-motivated research among experts and counterparts;
Strengthening of camaraderie/rapport between Japanese and Filipinos thru proper coordination, consultation, and visitations; and
The emphasis and conduct of more student training and preparation of training aids.

Nishida Period:
Non-recognition of previous achievements/output of counterparts as well as his fellow Japanese;
Abrupt implementation of his own programs of management, resulting in the unfavorable stoppage of text/manual production and student training; and
Non-observance of protocol, i.e., coordination between Team Leaders and Counterparts without consultation and knowledge of the Executive Director.

MECHANICAL ENGINEERING DIVISION

NAME OF COUNTERPARTS : QUIRINO F. ALMENIANA
Foundry

1. 8

EXPERTS	TRAINING	DURATION	PERIOD	RATING	REMARKS
1. Professor Maeda	Basic Computer Programming	June 2-30, 1984	Professor Maeda	O	Transfer of Technology is now implemented satisfactorily
2. Prof. Kawakatsu	Manual Writing of Foundry EQUIPMENT	Sept. 2-Dec. 10, 1984	Prof. Yoshida	O	Works completed and approved by the Executive Director
3. Dr. Kamimoto	Automotive Engineering	July 16-28, 1984	-do-	O	High level qualification of the expert
4. Dr. Uesaki	Foundry Technology	Aug. 14-29, 1984	-do-	O	Technology transfer is effected and implemented
5. Dr. Uesaki	Principles of Hardness Testing, Metallurgy	August-December 1985	-do-	O	-do-
6. Dr. Sinkawa	Fluid Mechanics	May 2-30, 1984	-do-	O	Transfer of technology via experiment using equipment
7. Dr. Hayashi	Instrument Engineering	Jan. 13-Feb. 1 1986	-do-	O	Technology transfer on hands-on basis
8. Dr. Atsumi	Shell Core molding machine	Dec. 2-[illegible], 1986	Prof. Yoshida	O	Technology now being implemented to PIIKE / Students
9. Dr. [illegible]	Automatic Control	Feb. 1-[illegible], 1987	-do-	O	Very informative

Type of Conducted Training	Title of Training	Duration	Days	Total	Number of Participants	Period
1. PEERS/TRAINORS	Sand Testing in Foundry	Feb. 23 to Mar. 31, 1987	Every Monday Only	5 days 30 hours	5	Prof. Nashida
2. PEERS/TRAINOR	Foundry Technology	April 21 to May 15, 1987	Daily Monday to Friday	17 days 102 hours	7	Prof. Nashida

B. IRTC DIRECTION :

IRTC will operate under TUP budget which will serve as the venue for those who are interested to conduct research and training in engineering, science and technology. It will attempt to present an effective scheme of programs.

C. IRTC Foundry will seek its own identity towards institutionalization as a nucleus in the development of prototype machines for production purposes.

D. Japanese experts assigned to this project have exerted their efforts to effect transfer of technology. I do believe that if technical assistance could be extended up to 1990 the outcome would be very impressive and productive.

Mr. Marlonito R. Gonzales
M.E. Counterpart

Answers to Questionnaire

A. Period of Messrs. Maeda and Yoshida

a. Experts' Rating

Expert	Specialization	Grade
Prof. Yasuho Maeda	Fluid Mechanics Advanced Math	θ
Prof. Kunio Kawakatsu	Machine Processing	θ
Dr. Koichi Uesaki	Metallurgy Foundry	θ
Prof. Tadashi Shinkawa	Fluid Engineering	θ
Dr. Yoshio Yoshizawa	Steam Power Plant Engineering	θ
Dr. Takeyuki Kamimoto	Auto Engineering	0
Dr. Toshiaki Ueda	Scanning Electron Microscope	0
Dr. Takeaki Atsumi	Machine Shop Practice	0
Mr. Sumio Ushiroda	Auto Control	0
Dr. Yoshitaka Murai	Auto Control	0

b. List of Training Titles

1. Steam Power Plant Engineering

   a. Basic Steam Plant Operation and Control
   b. Heat Exchangers

B. Period of Mr. Nishida

a. Expert Rating

Expert	Specialization	Grade
Dr. Kiyoshi Kuroshita	Fluid Mechanics	θ He did not give deeper emphasis of his expertise. He only asked the counterparts to solve sample problems in the book which he said should be compiled in the name of the counterparts.

MARLONITO GONZALES
M.E. Counterpart

Expert	Specialization	Grade
Prof. Yukihiko Ibuki	Strength of Materials	θ However, he wasn't able to give any lecture maybe because he can hardly speak English.
Dr. Hiromasa Nadano	Heat Transfer	0 He gives much emphasis on the procedure of research. He gives each counterpart a worthwhile job/work for the counterpart's further study.

b. Past records of laboratory studies and their evaluation:

1. Tooth Contact Analysis of CNC by Engr. David and R. Amoncio	(Personal Opinion) The procedure of the laboratory study is not much defined. Lack of understanding of the theme.
2. Analysis of Materials in Metro Manila (Metals) by Engr. Prado	Lack of specialization for each metal, but the proceeds are almost reliable and factual.

C. IRTC's direction in management after April, 1988

IRTC should understand its real role in the advancement of technology in the country. It should stand alone to show that it learned from the theme of the project "Transfer of Technology."

EXPERTS	TRAINEES	PERIOD	RATING Adequate Technical Transfer	RATING Students Training	RATING Inadequate Technical Transfer	REMARKS
Dr. Koiti Uesaki (long term)	Machine Processing Prin. of Harness Testing	Yoshida			●	
Prof. Tadashi Shikawa (long term)	Fluid Engineering	-do-		●	●	
Dr. Kiyoshi Kuroshita (long term)	Fluid Machinery and Management	Nishida	●			
Dr. Yukihiko Ibuki (long term)	Stength of Materials and Management	-do-		●	●	
Dr. Iwao Hayashi (short term)	Instrument Engineering	-do-	●	●		
Dr. Takeaki Atsumi (short term)	Machine Shop Practice	-do-	●	●		
Mr. Takashi Ito (short term)	Mechanical Engineering	- do-	●			
Mr. Sumie Ushiroda (short term)	Automatic Controls	-do-	●			
Dr. Yoshitaka Murai (short term)	Automatic Controls	-do-	●			

By: Gilbert David
M.E. Counterpart

ANSWERS TO QUESTIONNAIRES

by: LORENZO O. GAVIOLA
M.E. COUNTERPART

1A. BASIC TRAINING COURSES ABLE TO CONDUCT:
1. Steam Power Engineering
2. Machine Processes
3. Heat Transfer

2A. Under the period of Fr. Nishida:
See last page of the answers.

B. The stand of IRTC at the end of April 1988, is to continue the Basic Training Programs and Laboratory Studies. My opinion about the future plan is: The center should pursue the establishment of a Foundation in order to come with its program of handling trainings for the Engineering students and Faculty members. There is need also for the Center to accept "outside jobs" to finance some of our programs and to use the other resources for maintenance of th machines and equipment

C. With regards to the transfer of unused equipment it will be an advantage for us to have a wider space once these equipment will be transferred.

D. Well, i think the Japanese handled the project the way they want and the way they think it should be.

EVALUATION OF JAPANESE EXPERTS

JAPANESE EXPERT	ADEQUATE TECHNICAL TRANSFER	CAPABILITY OF STUDENT TRAINING	INADEQUATE TECHNICAL TRANSFER	REMARKS
1. Dr. Kiyoshi Kuroshita (Long Term)			●	As per his supposed expertise in the field, only solving problems were conducted during the training. He can communicate with the counterparts fluently.
2. Prof. Yukiho Ibuki (Long Term)			●	We have difficulty in communication. He can speak little english, so only few demonstrations were conducted during the training.
3. Dr. Takeaki Atsumi (Short Term)	●	●		Eventhough he can't speak English at all, he requested Dr. Kuroshita to translate his lectures so that we can understand each other.
4. Dr. Sumio Ushireda (Short Term)	●			The training package is good. But i think its highly theoretical for Mechanical Engineering counterparts.
5. Dr. Yoshitaka Murai (Short Term)			●	Only lectures were given to us during the training. And i think its also highly theorical in aspect since his topics were new to us.

Note:

[illegible] counterpart : May 13, 1986

1. [illegible] PERIOD

A. Long Term Expert	Grade	Remarks
1. Dr. Tsuyoshi Kuroshita	⊖	During his stay, we were trained only on theoretical aspect of Fluid Mechanics. We solved problems on books and discussed the solutions.
2. Dr. Yukihiko Ibuki	⊖	He has difficulty in communicating with counterparts. But he tried his best to do what he can in order to teach us his expertise. He is my adviser in the Laboratory Study.
B. Short Term Expert		
1. Dr. Takeaki Atzumi	○	Even though he can't communicate in English we learned a lot. He is very good because he trained us on theoretical as well as practical. Hope he stays longer.
2. Engr. Takashi Ito	○	He is very good in communicating w/ counterparts.
3. Dr. Sumio Ushiroda	⊖	He dicussed the topics well but we need more background of his field.
4. Dr. Yoshitaka Furai	⊖	He is very good in his field but due to limited time he is very fast in his lecture. We have very little background of his field.

B. BASIC TRAINING COURSES ABLE TO CONDUCT

1. Basic Physical Metallurgy
2. Machine Processing
3. Fluid Mechanics
4. Precision Measuring

C. About the laboratory study, I think this is a good experience for the students. It will be a great help for them when they will conduct a mini research in the future. Since it was the first time for the students to be involved in laboratory study, they were not prepared.

B. IRTC's DIRECTION IN MANAGEMENT AFTER APRIL 1988

I think the basic and advanced training courses should continue. These training programs will provide a good foundation for students specially those who plan to work with industry after graduation.

Since we will no longer receive support from JICA, we should tie up/link with industries so that we could solicit some help for our research projects.

C. With regards to the transfer of equipment, I think it is better if the equipment will remain in the shop. We need the equipment for demonstration during the conduct of trainings.

D. I think the Japanese handled the project very well. One condition which affected the conduct of trainings by experts is the delay in the arrival of the equipment to be used in the training. The equipment usually arrive when the expert is about to leave for Japan, thus the counterparts will have a hard time studying the operations of such equipment. Short term experts have to come to conduct training on the operations of the equipment. The Japanese were always ready to help us in our activities.

FELICIANO, ROEL J.
M.E. COUNTERPART

May 22,1987

ANSWERS TO QUESTIONAIRE

A. PERIOD OF MR. NISHIDA

a) JAPANESE EXPERT — TRAINING — RATING — REMARKS

JAPANESE EXPERT	TRAINING	RATING	REMARKS
1. Prof. [illegible] Uchiroda (Feb.1-28,1987)	- AUTOMATIC CONTROL	- O	- His training is good because he supplemented it with the aid of necessary Equipment and Apparatus. However, I am not that capable to teach it to the students because it is more of the Electrical Eng'g. subject.
2. Dr. Y. [illegible] (March,1987)	- AUTOMATIC CONTROL	- O	- Training is adequate, however the approach is more of theory, wherein he uses mathematical equations.
3. Dr. Hiromasa NADANO	- HEAT TRANSFER - LUBRICATION TECH.	- O	- Training is good and consistent and I think I can handle it with the students.

b) List of Training Titles: (can handle with the students)

-Performance on the Heat Exchanger Apparatus.(HEAT TRANSFER)

B. IRTC'S DIRECTION IN MANAGEMENT AFTER APRIL 1988

- After all the Japanese Experts left Irtc, the counterparts with the strong support of the Director should continue and innovate certain steps for the growth, development and mprovemnt of IRTC in TUP to help its students and faculty members too, thus the IRTC plays a vital role in TUP for the adavancement of Technology.

-For future plan, there should be a consistent flow of communication with the Japanese administration and the Counterparts by providing materials and other resources which can help to the growth of the IRTC.

C. TRANSFER OF MACHINES AND EQUIPMENT IN OTHER DIVISIONS OF TUP.

- Regarding this matter, I also agree but it should be limited. Those machines and equipment which can be helpful to the Laboratory studies and for research should remain in IRTC. Such are the Engine-Research Test Bed, Heat Exchanger ,Steam Boiler and others.

D. OPINION:

- Since I am just a new counterpart, the only thing I can say is that there should be a coordination between the counterparts and experts . The experts should supervise the direction of the counterparts.