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8 FEBRUARY 1972 THROUGH 7 FEBRUARY 1973

PREPARED BY

THE RALPH M. PARSONS COMPANY, CONTRACTOR

IN ASSOCIATION WITH

THAI ENGINEERING CONSULTANTS COMPANY - SUBCONTRACTOR

FOR

THE OFFICE OF ACCELERATED RURAL DEVELOPMENT OF THE

ROYAL THAI GOVERNMENT

IN COOPERATION WITH UNITED STATES OVERSEAS MISSION

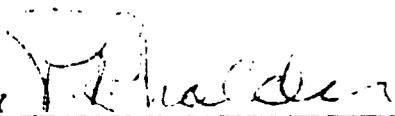
AGENCY FOR INTERNATIONAL DEVELOPMENT

BANGKOK, THAILAND

CONTRACT NO. AID/ea 146

THE RALPH M. PARSONS COMPANY

BY



P.R. HALDER

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INTRODUCTION

This second contract year annual report is submitted in lieu of the final report required by ART I,D,3 of Appendix A, on the basis of the pending second contract amendment now in circulation for signature.

The realigned contract operations for both objectives were agreed upon among the contracting parties about the first of the second contract year. Contractor staffing changes were completed with the arrival of the Training Coordinator on 10 May 1972. Subcontractor staffing changes were completed substantially as scheduled. Contract and subcontract staffing details are included in Appendices A and B.

Baht funding for contract operations was delayed unexpectedly. The advance of trust funds carried over from the first contract year were adequate for contractor's Baht costs, but it was necessary for the subcontractor to finance his entire costs through 16 June 1972, following which he was reimbursed the full amount of Baht 1,458,754.22 which were due him. This was made possible when PIO/T 20044 was issued on 2 June 1972, and the Contracting Officers authorized expenditure of Baht Funds obligated for contract purposes in that document.

Contract Amendment No. 1 carrying an effective date of 8 February 1971 was executed by the Contractor on 21 August 1972, by the RTG Contracting Officer on 14 September 1972 and by the AID/W Contracting Officer on 29 September 1972. This document obligated Baht 10,492,400 for contract operations.

THE CONTRACT OBJECTIVES ARE:

A. Intensive Training Unit (ITU)

To develop within the ITU a permanent training staff possessing the capacity to:

1. Upgrade skills of Accelerated Rural Development (ARD) mid-management and supervisory personnel in the areas of engineering management, supply and maintenance systems management, construction operations management and job supervision;
2. Conduct on-the-job training for engineers, construction technicians, drivers, equipment operators, field lubrication and maintenance personnel, and supply logistics personnel,

So that, within a period of two years, the ITU training cadre will be able to assume full responsibility for these kinds of training without further contract assistance.

B. Changwat Construction Management Systems and Guidelines

The contractor is to:

1. Develop through research, and test under controlled conditions, relatively unsophisticated but effective construction management systems, sub-systems and guidelines for the changwats; and
2. Through classroom and on-the-job training of carefully selected supervisory and management personnel and through other appropriate means introduce the preferred construction management systems and sub-systems to changwat routine and habits of operation.

PART I: CONTRACT OBJECTIVE ONE

Intensive Training Unit (ITU)

To develop within the ITU a permanent training staff possessing the capacity to:

1. Upgrade skills of Accelerated Rural Development (ARD) mid-management and supervisory personnel in the areas of engineering management, supply and maintenance systems management, construction operations management and job supervision;
2. Conduct on-the-job training for engineers, construction technicians, drivers, equipment operators, field lubrication and maintenance personnel, and supply logistics personnel,

So that (within a period of two years) the ITU training cadre will be able to assume full responsibility for these kinds of training without further contract assistance.

1. ON-THE-JOB TRAINING (OJT)

1. Perhaps the single most significant contract accomplishment during the second contract year was the establishment, evolution and development of the ITU Training Section following such a suggestion by the CFO/USOM. This was accomplished by the augmentation of the ITU cadre to include a training section chief and two recently-graduated educators. The ARD then authorized a staff position as special assistant to the director for training. The ITU assigned to this position a very well qualified Civil Engineer whose primary responsibility is to strengthen and ensure the effectiveness of the training capability of the ITU. The subcontractor provided two well-trained educators to assist and advise the fledgling training staff. In addition, the contractor added an experienced training specialist to his staff to coordinate the overall training program. The Engineering Office of the ARD, in its continual efforts to improve the professional level of the ITU, has recently assigned two civil engineers with advanced degrees in engineering management to the staff. Specific goals attained by the training staff during this past year are described in greater detail later in this section.
2. Ranking only slightly lower in importance has been the improvements achieved by the ITU in the Mechanical Operations. Based on the contractor's recommendations, the ITU embarked on a three-pronged program to increase the efficiency and output in this area by (1) issuing and enforcing more stringent controls over drivers, operators and preventive maintenance of equipment, (2) by instituting changes designed to improve the procurement, receipt and issue of repair parts and (3) by making certain personnel changes in order to upgrade management capabilities.

As a result of these and other improvements, the ITU has reduced the equipment deadline from an excessively high figure to the present 30%-35%. Repair parts procurement has been facilitated by the instigation of a number of USOM/ARD-sponsored open-end contracts with major parts dealers and through better liaison with the Korat center. Better accountability has been achieved by having the procurement, receiving and issuing all done by the Administration Department's Supply Section. More effective management of the mechanical operations has been achieved by the ITU by their temporarily charging the Deputy Director with the direct supervision of this sector pending the return of Participant Trainee Khun Somsakdi Bualamyai in mid 1973. A second interim action taken by the contractor to pursue contract objective accomplishment in mechanical operations reforms has been to

reluctantly acquiesce in the designation of one subcontract mechanical engineer as the day-to-day shop supervisor as well as trainer.

3. The ITU has changed from a construction accomplishment organization to a Training accomplishment organization - without losing sight of the need to accomplish better quality construction work. A "new" training staff is being developed; one that will have professional training expertise as its goal. With the continued addition and development of key experienced leaders to provide the type of guidance required to improve Changwat staffing, the ITU will become a valued ARD asset.
4. During the second contract year the ITU moved a step closer to self-sufficiency in the OJT area in that all OJT is presently being done by the ITU teaching cadre. The contractor and subcontractor trainer/instructors have assumed the role of monitors and have been or will be phased out as planned. Specific achievements and milestones are as follows:

a. First Training Cycle - OJT for ITU Teacher-Trainees

- (1) The initial training cycle, which was started during September 1971 with primary emphasis on training of the selected trainers to become permanent teaching cadre, was completed on March 11, 1972. Following thorough analysis and agreement as to standards and methods of testing between ARD & USCIB staff members after consultation with NETA, testing and evaluation of both ITU training cadre and trainee personnel at the ITU was performed during March 3-11, 1972. Subcontractor and ITU management scoring was based 25% on past performance, 25% on written test results and 50% on practical testing. Forty-six persons of the total 50 selected trainers and 100 persons of the total 141 trainee personnel passed the test as shown in detail in the following table:

Teaching Cadre

<u>Executive Staff</u>	<u>No. Req.</u>	<u>No. Tested</u>	<u>No. Passed</u>
Civil Engineer, 1st Grade	1	-	-
Civil Engineer, 2nd-1st Grade	1	-	-
Civil Engineer, 2nd Grade	2	2	2
Mechanical Engineer, 2nd Grade	1	1	1
Administrator, 2nd Grade	1	-	-

No. Req. No. Tested No. Passed

Plans, Survey & Design Department

Civil Engineer, 3rd-2nd Grade	3	3	3
Technician, 3rd Grade (Draftman)	1	1	1
Technician, 3rd Grade (Surveyor)	3	3	3
Technician, 3rd Grade (Soils Tech.)	3	3	3

Construction & Maintenance Dept.

Civil Engineer, 3rd-2nd Grade	2	1	1
Technician, 3rd Grade (Earthwork Foreman)	2	1	1
Technician, 3rd Grade (Builder Foreman)	2	2	1
Technician, 3rd Grade (Dr./op. Instr.)	6	6	6

Equipment Repair & Maintenance Dept.

Mechanical Engineer, 3rd-2nd Grade	4	4	3
Technician, 3rd Grade (Mechanic)	9	9	9
Technician, 3rd Grade (Dispatcher)	1	1	1
Technician, 3rd Grade (Mech/Electrician)	1	1	1
Technician, 4th Grade (Lubrication Tech)	2	2	2

Administration Department

Administrator, 3rd-2nd Grade	3	3	2
Accountant, 3rd Grade W/Degree	2	2	2
Accountant, 3rd Grade	2	1	1
Technician, 3rd Grade (Warehouseman)	1	1	1
Technician, 4th Grade (Warehouseman)	1	1	1
Educator, 3rd Grade	1	1	1
Statistician, 3rd Grade	1	1	1
Total	<u>56</u>	<u>50</u>	<u>46</u>

Trainee Personnel

	<u>No. Tested</u>	<u>No. Passed</u>
Draftman	10	6
Surveyor	14	8
Soils Technician	9	3
Earthwork Foreman	5	2
Builder Foreman	5	3
Mechanic	22	14
Warehouseman	1	1
Operator	28	26
Driver	<u>47</u>	<u>46</u>
Total	<u>141</u>	<u>109</u>

- (2) The qualification test for excess personnel (i.e., 30 Mechanics, 55 Operators and 40 Drivers) was conducted by subcontractor instructors during January 13-24, 1972 with ARD and USOM representatives witnessing the testing. Of this number, twelve mechanics, 44 operators and 36 drivers were passed and their names submitted to ARD as being available for transfer from the ITU to the Changwats.

Training Statistics as of 30 November 1972

	No. Trained	No. Passed	No. Assigned to ITU	No. Reassigned to Changwats	No. Awaiting for Re- assignment	Remarks
Draftsman	10	9	-	-	9	One resigned after had failed the 1st cycle test.
Surveyor	14	13	-	-	5	One resigned after had failed the 1st cycle test and eight reassigned after had completed the course
Soil Technician	9	9	-	-	9	
Earthwork Foreman	5	4	1	-	3	One resigned after had failed the 1st cycle test
Builder Foreman	5	5	1	-	4	
Mechanic	52	48	14	6	27	Four resigned after had failed the 1st cycle test and another resigned after had completed the course
Operator	83	82	19	30	25	One resigned after had failed the 1st cycle test

	No. Trained	No. Passed	No. Assigned to ITU	No. Reassigned to Chang-wats	No. Awaiting for Re-assignment	Remarks
Driver	37	36	15	29	41	One resigned after had failed the 1st cycle test and another one resigned after had completed the course
Warehouseman	1	1	1	-	-	
TOTAL	266	257	51	73	123	

- (3) In order that a programmed course of instruction could be given to the ITU teacher-trainees and, subsequently, by them to future trainees (including 341 driver, operator and mechanic trainees required by USOM to operate and maintain USOM-purchased ARD equipment), the TEC developed and produced a series of course outlines (as listed below), training manuals and trainee's texts. Most of these outlines were available for the ITU cadre's use during the second training cycle. All of them were complete by June 1972.

List of Course Outlines for Instructors:

	<u>Period of training</u>
1. Training Manual for Civil Engineer	1 year
2. " " for designer	6 months
3. " " for draftsman	6 months
4. " " for surveyor (Chief of Party)	6 months
5. " " for surveyor (Instrument Man)	6 months
6. " " for soils technician, 3rd Grade	6 months
7. " " for soils technician, 4th Grade	6 months
8. " " for construction foreman	6 months
9. " " for earthwork foreman	6 months
10. " " for builder foreman	6 months

		<u>Period of training</u>
11.	Training Manual for administrator	6 months
12.	" " for accountant	6 months
13.	" " for supplyman	6 months
14.	" " for mechanics	6 months
15.	" " for operators	6 months
16.	" " for drivers	3 months
17.	" " for the management course	6 months
18.	" " of teaching techniques	6 months

The theoretical objective tests will be statistically analyzed. Appropriate training evaluation procedures will be employed and applied to each course.

- (4) Knowing that training aids can do much to improve the training program of the ITU, the Contractor and sub-contractor have procured several training films, slides and various other manuals relating to the repair and maintenance of equipment. Several ready-made and teacher-made wall charts were added to the list of available training aids. A comprehensive list of additional training aids needed by the ITU has been compiled and forwarded for approval and purchase by the contractor. Following the recommendation of the Contractor and Subcontractor, the ITU management has arranged to procure a 16 mm movie projector, a slide projector and a movie screen.
- (5) Bangkok equipment dealers agreed to re-institute regular visits and training sessions by their service representatives. This program is now well under way and each session is coordinated by the ITU's Training Section. To date, classes have been conducted by representatives from Caterpillar Tractor Co., John Deere Tractor Co., International Harvester Co. and Eaton Co., makers of Trojan Front End Loaders,
- A specialized training session on Caterpillar Equipment machines was conducted by the two-man specialists team of the International Engineering Company, Bangkok for five days at the ITU during the month of August 1972. This course was attended by 52 ITU mechanics.
 - A Specialized training session on John Deere Equipment was conducted by the John Deere Thailand Company service team for ten days between 13-27 September 1972.
 - Yontraphan Company Bangkok, IHC distributor, conducted specialized training sessions for six days in October covering maintenance and repair of International Harvester Equipment. ITU provided 16 mechanics to attend this session.

During 20 November to 15 December 1972, a specialized training session on repair, maintenance and operation of the Caterpillar Motor Scraper 613 was conducted by the service team of the International Engineering Co. Eight mechanics who will be servicing the 613 Scraper attended this course.

The courses presently in the ITU curriculum include the aforementioned 19 regular courses and 23 special courses. The courses, their next scheduled starting dates and their proposed duration are listed below.

Regular Courses (RC)

Course No.	Course for:	Duration	Starting Date
RC-111	Civil Engineer, 3rd Grade	12 mos.	To be arranged
RC-112	Mechanical Engineer, 3rd Grade	12 mos.	" "
RC-103/113	Accountant, 3rd-4th Grade	6 mos.	2 April 73
RC-104/114	Administrator, 3rd-4th Grade	6 mos.	" "
RC-301	Construction Technician	6 mos.	" "
RC-105	Supply Technician	6 mos.	" "
RC-311	Construction (Earthwork) Foreman	6 mos.	" "
RC-312	Builder Foreman	6 mos.	" "
RC-211	Design Technician, 3rd Grade	6 mos.	" "
RC-201	Drafting Technician, 4th Grade	6 mos.	" "
RC-212	Survey Party Chief, 3rd Grade	6 mos.	" "
RC-202	Instrument Man, 4th Grade	6 mos.	" "
RC-213	Soil Chief, 3rd Grade	6 mos.	" "
RC-203	Soil Technician, 4th Grade	6 mos.	" "
RC-411	Chief Mechanic	6 mos.	" "
RC-401	Mechanic	6 mos.	" "
RC-402	Automotive Electrician	6 mos.	" "
RC-403	Equipment Operator	6 mos.	" "
RC-404	Driver	3 mos.	" "

Special Course: (SC)

Subject	Duration	Starting-Ending
1. Design Technician, 3rd Grade	2 mos.	15 July 73-15 Sep. 73
2. Cost Estimating for 3rd Grade Tech.	1 "	15 Sep. 73-15 Oct. 73
3. Field Administration	2 "	15 Aug. 73-15 Oct. 73
4. Survey for Design, 3rd Grade	2 "	15 Jul. 73-15 Sep. 73
5. Survey for Design, 4th Grade	2 "	15 Jul. 73-15 Sep. 73
6. Survey for Construction 3rd Grade	2 "	15 Oct. 73-15 Dec. 73
7. Survey for Construction 4th Grade	1 "	15 Oct. 73-15 Nov. 73

Subject	Duration	Starting-Ending
8. Quality Control, 3rd Grade	1 mo.	15 Jul.73-15 Aug.73
9. Quality Control, 4th Grade	1 "	15 Jul.73-15 Aug.73
10. Engine Overhaul	2 "	15 Jul.73-15 Sep.73
11. Light Vehicle Maintenance	2 "	15 Jul.73-15 Sep.73
12. Mechanics	2 "	15 Jul.73-15 Sep.73
13. Automotive Electricity	1 "	15 Jul.73-15 Aug.73
14. Preventive Maintenance	1 "	15 Jul.73-15 Aug.73
15. Correspondence Record Management	1 "	15 Jun.73-15 Jul.73
16. Personnel Administration	1 "	15 Jun.73-15 Jul.73
17. Budget & Funding	2 "	15 Jun.73-15 Aug.73
18. Gov. Accounting	1 "	15 Jun.73-15 Jul.73
19. Principles of Auditing	1 "	15 Jun.73-15 Jul.73
20. Cost Accounting	2 "	15 Jun.73-15 Aug.73
21. Procurement and Contract Administration	1 "	15 May 73-15 Jun.73
22. Supply Record Control	1 "	1 Jul.73- 1 Aug.73
23. Warehousing	2½ "	1 Aug.73-15 Oct.73

Additional courses will be added to the curriculum as required. Once a need has been identified, and the authority to proceed received from ARD Bangkok, the ITU Training Section will develop the course and add it to the curriculum. The development process will follow the pattern already established by the contractor, i.e. develop course objectives, outline and lesson plans, make first presentation, review and evaluate, make necessary modification and revision, make second presentation, review, evaluate, etc.

b. Second Training Cycle - ITU Teaching - TEC Supervising

- (1) The second contract training cycle was started on April 1, 1972 with the emphasis mainly on monitoring the ITU teaching cadre which were now taking the active role in both classroom and on-the-job training. Secondary emphasis was placed on the retraining of 66 recycled trainees and 18 support staff personnel who had failed to pass the qualification tests at the end of the first training cycle. Of this number three draftsman trainees, five surveyor trainees, 5 soils technician trainees, two earthwork foreman trainees, two builder foreman trainees, 22 mechanic trainees, 11 operator trainees and five driver trainees and the 18 support staff personnel successfully completed the recycle training; eleven trainees having resigned either before or during the course.
- (2) All selected ITU teaching cadre were given training on how to conduct classroom training as well as practical on-the-job training for the recycled trainees and other qualified

personnel. The training followed very closely the program and course outlines set forth in the OJT manual prepared by the relevant subcontractor instructors. Close supervision and monitoring of the ITU teacher-trainees was given by the subcontractor instructors and the subcontractor's training specialists. Recommendations for and help in improving both technical knowledge and teaching ability were given to each individual teacher-trainee.

- (3) Two civil engineer teacher-trainees and one technician teacher-trainee gained practical teaching experience when they conducted classroom training and OJT programs for three draftsman trainees and six other qualified draftsmen on the design, estimating and planning for construction work of projects SKN-1, SKN-2, SKN-3, SKN-4, SKN-5, SKN-6, SKN-7, SKN-8, SKN-10, SKN-11, SKN-12, NKP-1, NKP-2, NKP-3 and camp site improvements.
- (4) Four cadre surveyors gained valuable practical experience by conducting classroom and OJT programs for six recycled surveyor trainees and four other qualified surveyors on the survey for design of projects SKN-9, SKN-11, SKN-12, SKN-13 and the survey for construction of projects SKN-4, SKN-5, SKN-10, and NKP-2.
- (5) One engineer and three other soils technician teacher-trainees also gained experience when they conducted the classroom and practical training both in the field and in the soils laboratory for six recycled soils technician trainees and three other qualified personnel on soils investigation, laboratory testing and field quality control of construction work of three construction projects and three repair projects under the close monitoring of the subcontractor's soils instructors.
- (6) Two engineers, two earthwork foremen and two builder foreman cadre were given practical teaching experience when they conducted the classroom training and OJT programs for:-
 - a. Two recycled earthwork foreman trainees and two qualified earthwork foreman on construction techniques and management of road construction using projects SKN-1, SKN-2, SKN-3, SKN-4, SKN-10 and NKP-2 as the medium of instruction.
 - b. Two recycled builder foreman trainees and two qualified builder foreman were introduced to modern construction techniques and management for the construction of culverts, wooden bridges and concrete bridges on actual construction projects (SKN-1, SKN-2, SKN-4, SKN-5, NKP-1, NKP-2, and NKP-3).

- (7) Seven engineers and 12 technician instructor/trainees were given instruction on how to carry out effective classroom training and OJT programs. Classes were given to 22 recycled mechanic trainees and 25 qualified mechanics on preventive maintenance, adjustments, major & minor repairs and repair of automotive electrical systems using the work in the workshop as well as that in the mobile shop at the construction job sites as the medium of instruction.
- (8) Six driver/operator instructor cadre gained practical teaching experience when they conducted classroom training and OJT programs for 11 operator trainees, 5 driver trainees, 27 qualified operators and 43 qualified drivers on daily maintenance, work operations care of the equipment and techniques of using the equipment for construction.
- (9) Three administrator cadre were trained to conduct classroom training and OJT programs for the general administrative section on general administration techniques official disciplin, preparation of official correspondence, and the system of selective testing for recruitment of personnel. Instruction was given to six support staff personnel.
- (10) One accountant cadre was given training on how to conduct classroom training and OJT programs for members of the finance section. Instruction was given on the preparation of the budget for each fiscal year and the preparation of documents for obtaining Government approval to carry forward budget items into the next fiscal year. The accountant gave one course to 13 support staff members in order to gain practical experience.
- (11) One accountant cadre was trained to conduct classroom training and OJT programs in cost accounting. Five accounting personnel from Khon Kaen, Loei, Mahasarakham, Nakhon Phanom and Sakon Nakhon took the course thur affording the accountant a chance to gain practical teaching experience.
- (12) One accountant and two supply cadremen were trained to conduct classroom training and OJT programs for procurement section personnel concerning the regulations, planning and procedures for purchasing the control systems used in warehousing and the inventorying of spare parts. Controlled practice teaching by the three men resulted in instruction being given to ten support staff members of the procurement section.

c. In addition to the OJT given to the ITU training cadre, the following actions were taken in conjunction with recommendations made to the ITU:

- (1) Evaluations of the teaching ability of each of the ITU teaching cadre were made on a monthly basis during the second training cycle by the subcontractor instructors and ITU management. Several trainers were switched to other positions that were considered to be better suited to their character and their desire. Some were replaced by trainee personnel who demonstrated the ability to be better trainers and some were replaced by newly assigned personnel from Bangkok/ARD. The contractor's recommendations for the selection of personnel to be ITU instructors have been followed by the ITU, with the result that, at this time, there is only one cadre position, that of the Chief of the Equipment Repair and Maintenance Department, that is still unfilled. As previously stated, it is anticipated that a Participant Trainee (Mechanical Engineer) will be assigned to the ITU by the ARD/Bangkok in mid 1973.
- (2) As suggested by the Joint Contract Representatives of ARD and USOM during the first year of the contract, a teaching techniques course was set up by the subcontractor training specialists for up-grading the teaching abilities of the ITU teaching cadre and supporting staff. Classroom training in this subject was given to five separate groups of 54 ITU trainers and 42 ITU supporting staff members in special sessions in order to avoid interference with the OJT program. The course outline covered principles of learning, principles of teaching, principles of on-the-job training, training problems, trainer's responsibilities, lesson planning, training aids, evaluation and testing, individual differences and successful trainers.
- (3) All the course outlines, lesson plans and other training guides have been assembled and incorporated into training manuals as listed hereinafter by the subcontractor staff. Fifty percent of these manuals were completed during the second training cycle. The balance are in process of being reviewed and published. The completed sections were published and are presently being used by the ITU cadre and trainees. The remaining training manuals will be completed by the end of December 1972.

List of Training Manuals:

1. Survey & Design for Engineers	3 Volumes
2. Soil mechanics for Engineers	1 Volume
3. Soil Mechanics for Technicians	1 "
4. Drafting for Technicians	1 "
5. Survey for Technicians	1 "

6.	Teaching Techniques	1	Volume
7.	Management for Supervisory Upper Echelon Personnel	1	"
8.	Management for Supervisory Lower Echelon Personnel	1	"
9.	Construction Management for Engineers	1	"
10.	Construction Supervision for Earthwork Foremen	1	"
11.	Construction Supervision for Builder Foremen	1	"
12.	Supply & Warehousing	1	"
13.	Administration Systems	1	"
14.	Accounting & Finance	1	"
15.	Equipment Repair & Maintenance	1	"
16.	Operation of Earth Moving Equipment	1	"
17.	Driving for Construction Work	1	"

d. Third Training Cycle - ITU Training, TEC Monitoring

(1) The third training cycle began on October 2, 1972 with the arrival of 138 newly assigned trainees and three administrative department personnel from the Changwats. The class includes 30 mechanics, four construction technicians, four soils technicians, seven field clerks, two warehousemen, 51 operators, 40 drivers and three administrators and accountants. The course will continue until the beginning of April 1973. The training session was officially opened by the Governor of Changwat Sakon Nakhon on October 5, 1972 with the participation of Changwat and military officials as well as key personnel from the ARD engineering office. The main objective of this training cycle is to have the ITU cadre perform the training activities under real-life conditions of training with minimum guidance from the subcontractor instructors. So far, with two months of the cycle already passed, the results are most gratifying.

(2) The training programs for mechanics, operators and drivers were revised to suit the background of these new trainees. A number of qualified ITU personnel were selected and re-assigned to the support staff in order to assist the ITU instructors in conducting on-the-job training for the operator and driver trainees. Since the training had to begin at a very basic level, one to two weeks of classroom orientation was given followed by an intensive OJT program which included four recognized steps of learning: (1) trainee watches instructors; (2) trainee sits along side instructor; (3) instructor sits along side the trainee and (4) the instructor watches from the ground.

(3) In order to assure that appropriate training techniques are being applied by the ITU cadre, the subcontractor's training specialists have constantly made close observations and evaluations of each individual ITU cadre/member. Recommendations for improving teaching techniques were given individually to each ITU trainer and supporting staff member. Ready-made and teacher-made training aids have been recommended and their use promoted in conjunction with the training process so that greater effectiveness from the training program can be obtained. Practical examinations given to each category of new trainees by the ITU cadre have been and will continue to be closely observed and evaluated by the subcontractor. Recommendations for improvement of testing methods as well as the content of the examinations will be made to individual ITU trainers as required.

e. Upgrading and Refresher Courses for Changwat Personnel

It is anticipated that the ARD will not always need a large number of new trainees, but, rather, after an initial staffing period, they will require more and more upgrade training for their personnel as well as a certain amount of cross training to insure greater operating efficiency and flexibility. The contractor has assisted the ITU Training Section in developing a pre-service training curriculum containing 19 different courses of study to meet USOH-imposed training requirements. At least 13 of these could be considered up-grade courses. In addition, 23 Special Courses have been developed for refresher and upgrade training. A brochure which describes the ITU and the courses offered has been prepared and will be sent to all ARD Changwat officials. Accompanying this brochure will be a questionnaire/request which will allow the Changwat officials to make known to the ITU the number of personnel they would like to have upgraded, the fields of study, and when the personnel could attend. Changwat officials can also request any additional training they would like to see the ITU offer.

The information received from these questionnaires will enable the ITU Training Section to plan for the next training cycle, arrange for any special in-house or on-site training that might be required and to advise the Changwats as to when to send the trainees to the ITU or when to expect the training team from the ITU. Should any Changwat require it, the ITU is also prepared to loan a qualified team of people to a Changwat while that Changwat's people are being trained at the ITU.

The reports prepared by ARD inspectors contain valuable data which the ITU can use in designing training courses to assist the Changwats. Arrangements have been made to have these data sent to the ITU periodically.

PART II CONTRACT OBJECTIVE TWO

Changwat Construction Management Systems and Guidelines

The contractor is to:

1. Develop through research, and test under controlled conditions, relatively upsophisticated but effective construction management systems, sub-systems and guidelines for the changwats; and
2. Through classroom and on-the-job training of carefully selected supervisory and management personnel and through other appropriate means introduce the preferred construction management systems and sub-systems to changwat routine and habits of operation.

A. GENERAL COMMENT

One direct result of the re-structuring of the contractor's approach to contract performance which grew out of the ARD/DTEQ USOM guidance late in the first contract year, was the transfer of the contract staff engaged on the second contract objective from Sakon Nakhon to Bangkok. This change was made to give more emphasis to the influences of central government upon the team effort. This move was accomplished in March. Both newly selected Management Analysts were in place, and the Civil Engineer together with one subcontractor's management assistant were moved to Bangkok. Recruiting of a second management assistant was undertaken on a very selective basis.

Consolidation of data collected during the first year was the primary activity in April and May. The second subcontractor's management assistant was employed in May, and the Civil Engineer was phased out in June upon the completion of the data consolidation.

The contract contemplates that ARD would participate with the management team by providing several senior employees who might form the eventual nucleus of an ARD engineering management group working in headquarters with others engaged in management improvement throughout ARD's sphere of influence. Several senior ARD officials have been assigned along with one junior official for varying periods. Apparently the demands on ARD's senior staff members is so great that substantial continuity of staff assigned to work with the contract staff has not been possible. There is hope that one or two returning participant trainees who have the aptitude for this type of staff duty will be assigned to work with the contract team during the remaining contract term.

One fortunate development was the availability as a consulting team member on a half-time basis from the RTG Bureau of the Budget. This official has had very great interest in the contract second objective, and has made very material contributions to the team effort,

both in Bangkok and during field investigations. He has been very instrumental in guiding the formulation of fiscal matters in every respect.

B. PLANNING THE MANAGEMENT TEAM APPROACH AND SCHEDULING ITS ACTIVITIES

During the first three months (March April and May) of this contract year, extensive team effort was applied in developing a management plan of action acceptable to both USOM and ARD. During this time such documents as : (1) Getting Results (an Approach to the Changwat Construction Management Analysis); (2) Role of Senior Thai Officer for Construction Management Systems and Guideline Efforts; and (3) Net-work - "For Changwat Construction Management System & Guidelines" were prepared.

Included in this formative period was the consolidation of first year management analysis work at Sakon Nakhon into a preliminary manual of systems and guidelines for all units of the Changwat Engineering Division. This manual was assembled as a means for conducting research and interviews at ARD Changwats, to test its validity and to coordinate management activities with ITU.

C. RESEARCH DEVELOPMENT

In preparations for the management teams report of findings, recommendation and implementation plans, four months (June through September) were devoted to an extensive survey of ARD changwats and all RRG agencies which support changwat engineering and construction. During this intensive data collection period: (1) changwat officials were solicited for their opinions and suggestion in operating engineering projects, (2) previous findings and data were verified, (3) existing changwat management practices and practices acceptable to the changwat were noted and researched, (4) an assessment of changwat personnel's competence was made, (5) cooperative personnel were identified for future coordination and evaluation of management recommendation, (6) and members of the management team were provided exposure for establishing their credibility at the changwats.

The changwats visited included: (1) Chaiyaphum (2) Chiang Mai (3) Nakhon Ratchasima (4) Phitsanulok (5) Buri Ram (6) Chiang Rai (7) Nan (8) Hong Khai (9) Phetchabun (10) Sakon Nakhon (11) Si Sa Ket (12) Ubon Ratchathani (13) Surin (14) Udon Thani, and (15) Uttaradit. Visits to these changwat lasted several days and included interviews with Governors, Vice Governors, Palads, Assistant Palads, Planning Chiefs, Chief Engineers, Survey, Soil analyst, design, construction Equipment Repair and Water Resources Section Chiefs, Finance and Budget Chiefs. These totaled up to 75 officers and technicians in the changwat.

The sample of ARD changwats selected represented changwats which: (1) have been in the ARD program a long time as well as those changwats newly added, (2) large as well as small changwats in size, (3) changwats with a reputation for good management and leadership as well as changwats with management and leadership problems and (4) Changwats in both the northern and northeastern sections of the country.

As a follow-up to the changwat interviews, Regional, Central Government and advisory agencies who support the Changwat Engineering organizations were also consulted and interviewed. These included ARD's technical and educational centers in Korat (NEARDC and TTARD/NETI) and ARD's technical Divisions in Bangkok. The Divisions the management team has devoted extensive coordination to date have been the Finance, Planning, Technical Services and Rural Survey and Analysis divisions. Because of their direct support to the Changwat Engineers ARD offices such as the Procurement Expediting Office (PRO) were consulted.

In the areas of long term planning, financing and technical support, Thai agencies outside of ARD exert direct and as well as indirect influence in how changwat engineering projects are supported. In light of this, the management team has also done extensive coordination in establishing lines of communication with the Bureau of the Budget, the Controller General's office, the Royal Highway Department and The Royal Irrigation Department.

To take advantage of the efforts of other Thai Advisory groups services and data, the management team has contacted and coordinated their efforts with USOM's field operation's extensive advisory and contracted services. These included the Area Engineers, PERM Team, Rural Engineering (Korat), and Rural Development, and UECC. Besides developing communication and coordinations, with all the above agencies the management team has also participated in conferences, meetings and briefings for them, including top management briefing for the Secretary General of ARD and Director of USOM. Participation also included seminars for Assistant Palads, New Planning Officers and Rural Economic Developers.

These Research Development Activities brought the management team in direct contact with over 60 officials in the central agencies of the Thai Government and US support mission. Combining this with the managements team's Changwat coordination, the contractor's objective of developing and researching data for management recommendations and guidelines has been amply accomplished. Although the main objective of research development is for making management recommendation and guidelines, maintaining the established lines of communication and coordination will be a continuing effort throughout the management team existence.

D. MANAGEMENT REPORT

During the last four months of this year the team has concentrated on the compilation of data for management recommendations. The objective of this effort is a series of reports, plans and schedules to: (1) Tell the Changwat what the management team has found in their changwat, (2) tell Bangkok agencies the changwat problems (3) identify key problem areas that can be defined, (4) recommend for ARD approval, areas where future development is feasible, and (5) publish detailed plans for implementing approved recommendations. Nearly 200 recommendations will be presented to reviewing and participating agencies.

E. THE WORK PLAN FOR THE THIRD CONTRACT YEAR

During the third contract year the management team will devote its efforts to demonstrating the impact of the approved recommendations in each ARD Changwat and the feasibility of implementation in the Changwat.

Along with this effort to gain acceptance, the management team will:

1. Help the ARD Bangkok and ITU install promulgated directives and guidelines in the Changwats and supporting agencies;
2. Assist ITU and other training activities in course development and instructor training for management training programs and courses included in the training programs at such facilities; and
3. Follow-up evaluating and troubleshooting the impact of the implemented Engineering Management improvement procedures.

PART III CONTRACT STAFFING

- A. Contractor. All members of the realigned contractor's team were either at post or awaiting security clearances to come on board at the beginning of the second contract year. With the arrival of the second Management Analyst on 23 February 1972 and the Training Coordinator on 10 May 1972 staffing by the contractor was complete. The Construction Management Civil Engineer was phased out on schedule at the end of April.

Unreconciled incompatibilities undermined the training effectiveness of the Construction Management Engineer-Mechanical during the first half of the second contract year. With the concurrence of all contracting parties, the full responsibility for mechanical training/advisory services was shifted to the augmented subcontractor's team. The contractor's Mechanical staff member was phased out at the end of July 1972.

Details of the Contractor's team staffing evolution are found in the chart identified as Appendix A.

- B. Subcontractor. With few unprogrammed exceptions, subcontractor's second contract year team was carried over from the first year. In keeping with contract scheduling several team members were phased out at the end of the first contract year. Several new positions were found necessary through consultation among all contracting parties, and filled on the basis of very selective recruiting. The stability of the team has contributed to excellent rapport with the ITU cadre and staff.

Details of the subcontract team staffing is shown in Appendix D.

PART IV OBSERVATIONS, EVALUATION AND RECOMMENDATIONS:

- A. The contractor's entire staff have been deeply impressed by numerous experiences with knowledgeable and dedicated staff members of the ARD engineering organizations both in headquarters, in Korat and in the Changwats. Our internal discussions of examples of enlightened individuals who have demonstrated capabilities beyond their years have repeatedly driven this deeply into our understanding.

The remarks in this section of this report are based on a much larger volume of experiences and observations resulting from in-depth analysis and must not be considered as detracting from our very great respect and regard for those who have made very favorable impressions on us as noted immediately above.

We feel that a remark attributed to Winston Churchill has a place at this point, and we include it for emphasis:

"As imperfect as it is, nothing better has come along."

- B. The contractor considers that the paramount existing shortcoming upon which ARD should act to accomplish its ITU Training Center objectives is the selection and assignment to ITU of a few more qualified and experienced officials. Senior (in terms of respected experience) staff members in the key positions of the ITU management and training cadre, with the background of experience enabling them to furnish inspirational leadership which will entice the younger learners to aspire to follow in their footsteps are only partially available now. All of the institution building at ITU by ARD, USOM and the contractor will be useful contributions toward the planned objectives, but it is not possible to substitute anything known to the contractor in lieu of experience for this requirement. There is no way to get experience other than through the school of hard knocks.
- C. Similarly, the best efforts of ARD to improve its internal management of its public works programs are likely to produce a variety of disappointments until ARD can assemble a small staff of experienced and qualified managers with adequate staff analysts to tackle and solve intricate management problems. Such a group must be able to rely on its background of field experience to help analyze and formulate sound, workable solutions to vexing stumbling blocks preventing progressive management improvements which are needed. The yardstick by which the effectiveness of such individuals can be measured will frequently lie in their willingness to dig into the nitty-gritty of problem causes realistically, with great and inspired tenacity. A second important qualification is their ability

and willingness to painstakingly coordinate proposed solutions with all of the government and private institutions which have interests needing consideration.

These tasks are not normally easily solved by "eyeball" methods. It takes a lot of dedicated and persistent work to accomplish these tasks in keeping with the great and pressing needs of the ARD.

- D. In keeping with these observations and evaluations, the Contractor recommends that ARD, with continuing USOM assistance, pursue the development and support of the ITU Training Center at Sakon Nakhon as an "in-service" upgrading training facility along the course which has been developed for ITU by the contract staff. ITU is currently demonstrating its flexibility by the interruption of its regularly scheduled in-service training work, to incorporate pre-service training for several hundred newly recruited staff urgently needed by ARD. ITU is furthermore currently engaged in developing its ability to plan, develop, schedule and organize short term training courses for individual skill requirements of Changwats. This should be expanded as needed for long range plans coupled to the ARD staffing and manpower needs.
- E. The Contractor recommends that ARD formulate a continuing Agency organization which should be closely related to its internal inspection group, to analyze and solve agency management improvement needs. One element of such an office for management improvement should be charged with handling the engineering management problems arising out of the ARD sponsored public works programs. The Contractor is addressing these latter problems in the second contract objective. To maximize the long term benefits for ARD, the Contractor recommends that there be stable continuity of assignment by ARD of the individuals working with the Contractor's team on this second contract objective.

SUBCONTRACTOR STAFFING CHART

Second Contract Year = 8 February 1971 to 7 February 1972

SUBCONTRACTOR PERSONNEL	1971												1972												73
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F
Luang Traphan - Thai Advisor																									
Mr. Jaruit Jaruprakorn Thai Advisor/Consultants																									
Mr. Siva Charoenpong Chief of Party																									
Mr. Surachai Janvit Chief of Inst./Advisor																									
Mr. Prasithiporn Chayangkanond Deputy Chief of Party & Chief Instructor																									
Mr. Annuay Kunachiva Mechanical Engr. Inst./Adv.																									
Mr. Phadej Asavameha Mechanical Engr. Inst./Adv.																									
Dr. Kittima Freededilok Educator																									
Mr. Pramote Thongsomchit Educator																									
Mr. Chanlong Jaipetch Project Engr. Inst./Adv.																									
Mr. Rapee Boonchuay Project Engr. Inst./Adv.																									
Mr. Tongdee Pudanrong Survey Inst./Adv.																									
Mr. Annuay Rinnanont Office Engr. Inst./Adv.																									
Mr. Semsak Wongwanij Soil Mechanic Inst./Adv.																									
Mr. Manoon Arayasiri Soil Mechanic Inst./Adv.																									

SUBCONTRACTOR PERSONNEL	1971												1972					73						
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Mr. Prasetsak Kalayanamitr Management Assistant																								
Mr. Kullapat Kuramarohit Management Assistant																								
Mr. Bundith Kaeoluan Adm. & Fin. Inst./Adv.																								
Mr. Somchai Poonakasem Adm. & Fin. Inst./Adv.																								
Mr. Amphol Feuplang Earthwork Foreman Inst./Adv.																								
Mr. Deja Dhumidit Earthwork Foreman Inst./Adv.																								
Mr. Manit Santikom Supply Inst./Adv.																								
Mr. Sorachitta Vilaiwong Supply Inst./Adv.																								
Mr. Viload Arkardvipart Builder Foreman Inst./Adv.																								
Mr. Hom Rathanaton Builder Foreman Inst./Adv.																								
Mr. Bannarn Pinitsak Builder Foreman Inst./Adv.																								
Mr. Sunruay Himsian Mechanical Inst./Adv.																								
Mr. Sa-nguan Intrasorn Shop Maint. Inst.																								
Mr. Sakol Aensward Shop Maint. Inst.																								
Mr. Sombau Sikkamonton Shop Maint. Inst.																								

SUBCONTRACTOR PERSONNEL	1971												1972												73	
	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Mr. Nusonh Sajakul Translator																										
Miss Bang-orn Sirodom Secretary																										
Miss Kamika Kampanatsanyakorn Secretary-Typist																										
Miss Duangchan Chowchavanin Secretary																										
Miss Chanrat Udomdej Secretary																										

PUBLIC WORKS PROJECTS ACCOMPLISHED

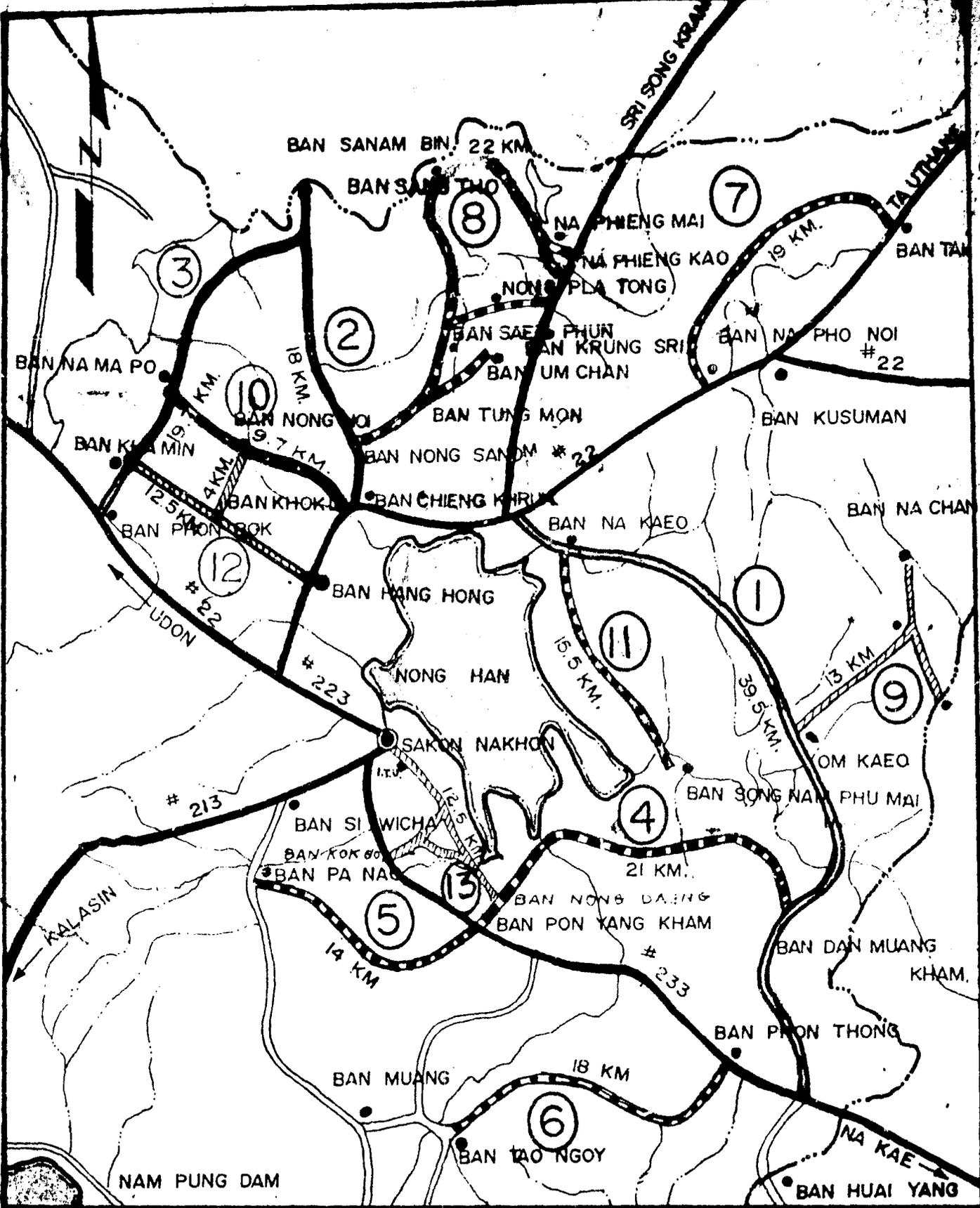
The work accomplished during the OJT program by the ITU trainees under the guidance of contractor and subcontractor is shown on the accompanying project maps and chart and can be summarized as follows:

1. The construction and repair work of Sakon Nakhon Project No. 1, No. 2 & No. 3, with a total length of 80 km., was completed and turned over to Changwat Sakon Nakhon in July 1972.
2. The construction of Nakhon Phanom Project No. 2, 19 km., was finished at the end of November and is now ready for turnover to the Changwat. Completion of the project was delayed during September and the early part of October because of the rainy season.
3. The construction of Sakon Nakhon Project No. 4, 21 km., (but not including the 120-meter concrete bridge), was approximately 36% complete in July 1972, the work was stopped during August and September due to the persistent rains. The construction work was resumed at the middle of October 1972 with the anticipation that the whole project will be completed in February 1973.
4. The 120 m. long concrete bridge under construction on Sakon Nakhon Project No. 4, was approximately 75% complete in October 1972. The entire project is expected to be completed by the end of February 1973.
5. The two 80 m. long concrete bridge under construction on Nakhon Phanom Project No. 3, were 100% complete in July 1972, the embankment of the bridge approaches will be completed in April 1973.
6. The construction of Sakon Nakhon Project No. 10, 10 km., was approximately 23% completed in November 1972.
7. The construction of Sakon Nakhon Project No. 5, 14 km., was approximately 34% complete in November 1972.
8. The design and estimating on Sakon Nakhon Project No. 6, 13 km., & No. 7, 19 km., was completed in March 1972 and April 1972, respectively.
9. The design work on Sakon Nakhon Project No. 8, 27 km., & No. 11, 10 km., was completed in September 1972; the drafting work is expected to be finished in December 1972.

10. The design work of the super structure of the concrete bridge for Nakhon Phanom Project No. 1 which will unite the two existing concrete bridges at km. 1+050 and 2+037 was completed in October 1972. The design of the foundation can not start until the HEARDC makes available the data from the foundation investigation of the said bridge which is now being processed and is expected to be completed by the end of November 1972.
11. The surveying work and soil investigation of Sakon Nakhon Project 12, 17 km., was completed in October 1972. The project is now under design and drafting and is expected to be finished in December 1972.
12. Sakon Nakhon Project No. 9, 11 km., and No. 13, 13km., is under the OJT program for surveying and soils investigation.
13. With the completion of the new warehouse building in April 1972 all spare parts from the storeroom at the central workshops at SKI and HKP were moved into this new warehouse. This made possible the relocate of central shop elements into a better organized arrangement.
14. The construction of the sewage and drainage systems of the ITU compound were completed in June 1972.
15. The improvement of the electric distribution system and the installation of a new telephone system was completed in October 1972.
16. The construction of a wash rack, grease rack and loading/unloading ramp was completed in June 1972. The wash rack was equipped with a high pressure pump during August 1972, which made it possible to clean all the heavy equipment and vehicles prior to their entry into the shop for repair. The preventive maintenance area was considerably improved with the result that much better MTI is being obtained.
17. The construction of the office and classroom building at the ITU compound, Sakon Nakhon, was partially completed by the end of March 1972 which permitted consolidation of the Contractor's and Subcontractor's office with that of the ITU management office. The entire building was completed and occupied in May 1972.
18. The construction of additional living quarters for both ITU staff members and trainees was completed during May 1972.
19. The construction of additional office space in the workshop, the improvement of the canteen building and the installation of a

boundary fence around the ITU compound has been approved and invitations to bid are being prepared. It is anticipated that all of this construction will be completed by the end of February 1973.

20. The storage room for survey instruments and equipment was built and completed in September 1972. It is now possible to keep the surveying gear in a more organized arrangement and to keep the equipment free from corrosion.



NOTE

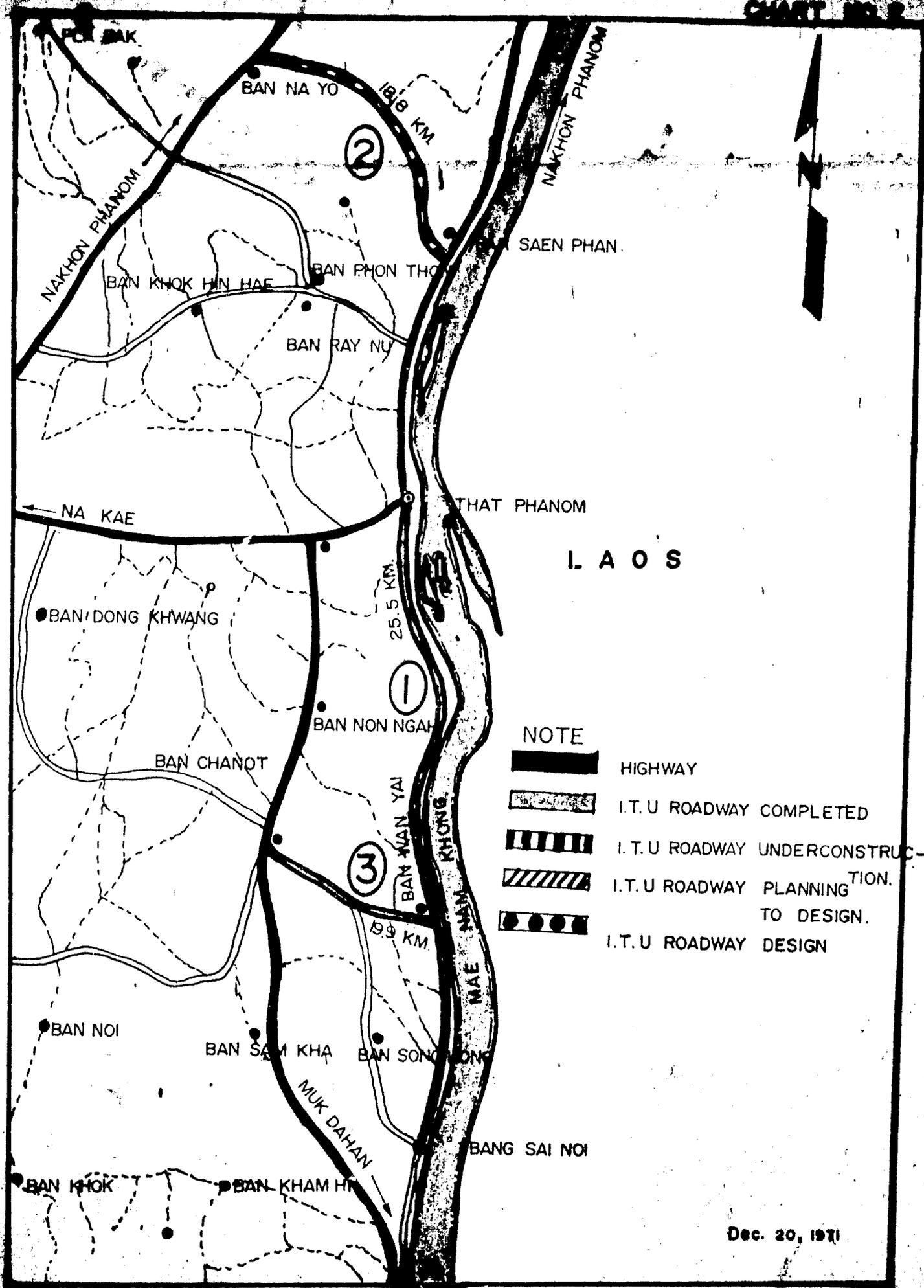
- HIGH WAY
- I.T.U ROADWAY COMPLETED
- I.T.U ROADWAY UNDERCONSTRUCTION.
- I.T.U ROADWAY DESIGN
- I.T.U ROADWAY PLANNING TO DESIGN

Dec. 20, 1971

REV. 1. JULY 21, 1972

SCALE 1 : 200,000

3, 1972



- NOTE**
-  HIGHWAY
 -  I.T.U ROADWAY COMPLETED
 -  I.T.U ROADWAY UNDERCONSTRUCTION.
 -  I.T.U ROADWAY PLANNING TO DESIGN.
 -  I.T.U ROADWAY DESIGN

Dec. 20, 1971

SCALE 1:250,000

I.T.U. ROADWAY PROJECTS

OCT. 20, 1972

DESCRIPTION	DIST. K.M.	FUND BAHT	EARTH WORK M ³	SURFACE M	BRIDGE		REMARK
					WOOD BRDG. M.	CONC. BRDG. M.	
ROADWAY CONSTRUCTION & DEVELOPMENT							
1000 SKN. KAEAO — DONGNOI	39.5	5,142,523	422,695	3,0814	123	34	TRANSFERED TO CHANGWAT
1001 SKN. CHIANG KRUA — SANAM BIN	18.7	5,010,410	141,127	1,3430	30	120	"
1002 SKN. PHON BOK — SANAM BIN	19.7	2,165,058	200,000	3,0771	100	—	"
1003 SKN. PHON YANG KHAM — DAN MUANG KHAM	21.0	5,141,400	236,381	49,100	81	120	UNDER CONSTRUCTION
1004 NKP. THAT PHA NOM — BAN WAN YAI	25.4	9,152,000	257,859	20,620	154	311	COMPLETE
1005 NKP. SAEN PHAN — NA YO	18.8	2,595,337	176,962	34,580	86	—	UNDER CONSTRUCTION
1006 NKP. KHAM PLA LAI — SAI NOI	19.9	4,031,591	349,788	30,178	41	80	INCOMPLETE
1007 SKN. PHON YANG KHAM — PA NAO	14.0	2,947,355	156,130	21,840	225	—	UNDER CONSTRUCTION (OJT)
1008 SKN. CHIANG KRUA — NONG HOI	9.7	916,611	45,000	15,250	30	—	"
ROADWAY REPAIRS							
1001 SKN. NA KAEO — DONG NOI	13.0	492,070	4,770	14,440	30	—	COMPLETE
1002 SKN. CHIANG KRUA — SANAM BIN	2.0	331,910	35,380	1,326	25	—	"
1001 NKP. THAT PHANOM — BAN WAN YAI	25.4	—	—	—	—	—	REQUEST FUND
1003 NKP. KHAM PLA LAI — SAI NOI	19.9	—	—	—	—	—	"
ROADWAY DESIGN							
1005 SKN. PHON YANG KHAM — PA NAO	14.0	} 4,4964	—	—	—	—	COMPLETE
1006 SKN. PHON TONG — TAO NGOY	18.0		—	—	—	—	"
1007 SKN. NA PHO NOI — BAN TAI	19.0		—	—	—	—	"
1008 SKN. NONG SANOM — KRUNG SRI	27.0		29,700	—	—	—	—
1009 SKN. OM KAEO — NA CHAN	13.0	—	—	—	—	—	—
1010 SKN. CHIANG KRUA — NONG HOI	9.7	10,860	—	—	—	—	COMPLETE
1011 SKN. NA KAEO — NAM PHU MAI	14.0	15,132	—	—	—	—	UNDER DESIGN
1012 SKN. BAN KHA MIN — HANG HONG	16.5	—	—	—	—	—	PLAN TO DESIGN
1013 SKN. SAKHON NAKHON — NONG DAENG	12.5	—	—	—	—	—	"

OUTLINE OF INTERIM AID IMPLEMENTATION REPORT FOR CHANGWAT ENGINEERING
MANAGEMENT

I INTRODUCTION

II ORGANIZATION - DESCRIPTION

A. MISSION

B. PROGRAM STRUCTURE

1. Potential (the different Planning Guidance documents)
2. Existing Projects and Activities

C. Support Organizations

1. ARD Bangkok, including PEO and CCARD
2. NEARDC
3. NETI/TTARD
4. CHANGWAT, Governor, Palad, Financial and Planning Officers, Treasury
5. ITU and TARD
6. Bureau of the Budget
7. ETC
8. Comptroller General

D. Element of Engineering Division (Reference Manual of Engineering Division Systems and Guidelines)

1. Survey and Analysis Section
2. Design Section
3. Construction and Maintenance Section
4. Equipment Repair Section
 - a. Shops and Mobile Units
 - b. Warehousing
5. Water Resources
6. Cost Accounting and Non-Engineering Staff

E. Coordinating Organizations

1. Planning Division
2. Finance Division
3. Amphoes
4. Community Development
5. Royal Highway Department
6. Royal Irrigation Department

7. Department of Local Administration
8. Communist Suppression Operations Command
9. Regional Development

III PROBLEM AREAS

A. Performance Control

1. Survey
2. Soil Analyst
3. Design and Project Estimation
4. Work Planning
5. Construction and Maintenance
 - a. Equipment Operations
 - b. Performance efficiency (deadlines)
 - c. Construction Survey

B. Financial Management

1. Budget Estimation
 - a. Project Integration
 - b. Road Maintenance
2. Project Pre-Audit
3. Allotment Procedures
4. Carry over Procedures
5. Reprogramming
6. Accounting System at the Changwat
7. Delegation of Expenditure Authority

C. Planning

1. Basic Data Availability
2. Guidelines from ARD
3. Responsibilities at Changwat
 - a. Palad
 - b. Engineer
 - c. Planner
4. Long Range Plan Quality
5. Annual Work Plan

D. Stock Control

1. Inventory Records
2. Expediting
3. Supply Issuing

4. Consumable material control
 - a. Fuel
 - b. Oil
 - c. Stationary
 5. Supply Procurement
 - a. PEO
 - b. Local Purchase
- E. Equipment Control
1. Equipment Records
 2. Issuing
 3. Equipment Assignment
 4. Fuel Control
 5. Statistic Reports
 6. Work Shop Control
 - a. Mechanic Control/manpower
 - b. Tool Control/Workshop Facilities
 - c. Working System Procedures
- F. Road Maintenance
1. Operations Cycle for Maintenance
 2. Operations Concept
 - a. Royal Highway Department Support
 - b. Contract Alternatives
 - c. Self help Alternatives
 - d. Recommendations
 3. Organization and Assignment
 4. Equipment List
 5. Record System
 6. Inspection Procedures
- G. Training
1. Timing
 2. Comprehensiveness
 3. Performance of Trainees
 4. Credibility - Public Relations
 5. Additional Requirements
- H. Administration
1. Procedures and Authorizations
 2. Personnel Assignments
 3. Follow-up

IV IMPLEMENTATION PLAN

- A. Summary
- B. Responsibilities
- C. Schedule
- D. Budget