

**BASIC DESIGN STUDY REPORT**  
**ON**  
**THE PROJECT FOR CONSTRUCTING**  
**THE UBON INSTITUTE FOR SKILL DEVELOPMENT**  
**IN**  
**THE KINGDOM OF THAILAND**

**APRIL 1987**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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INTERNATIONAL COOPERATION AGENCY

## PREFACE

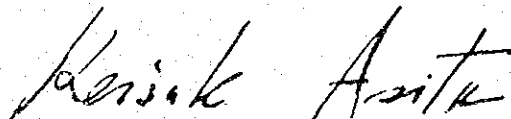
In response to the request of the Government of the Kingdom of Thailand, the Government of Japan has decided to conduct a basic design study on the Project for Constructing the Ubon Institute for Skill Development and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand a study team headed by Mr. Michio HAMADA, Director, Workers' Property Accumulation Department, Employment Promotion Corporation, from November 25 to December 17, 1986.

The team had discussions on the Project with the officials concerned of the Government of Thailand and conducted a field survey in the suburbs of Ubon Ratchathani city. After the team returned to Japan, further studies were made, a draft report was prepared and, for the explanation and discussion of it, a mission headed by Mr. Koichi IGARASHI, Deputy Director, Overseas Cooperation Division, Ministry of Labour, was sent to Thailand from March 18 to 27, 1987. As a result, the present report has been prepared.

I hope that this report will serve for the development of the project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Kingdom of Thailand for their close cooperation extended to the team.

April, 1987.

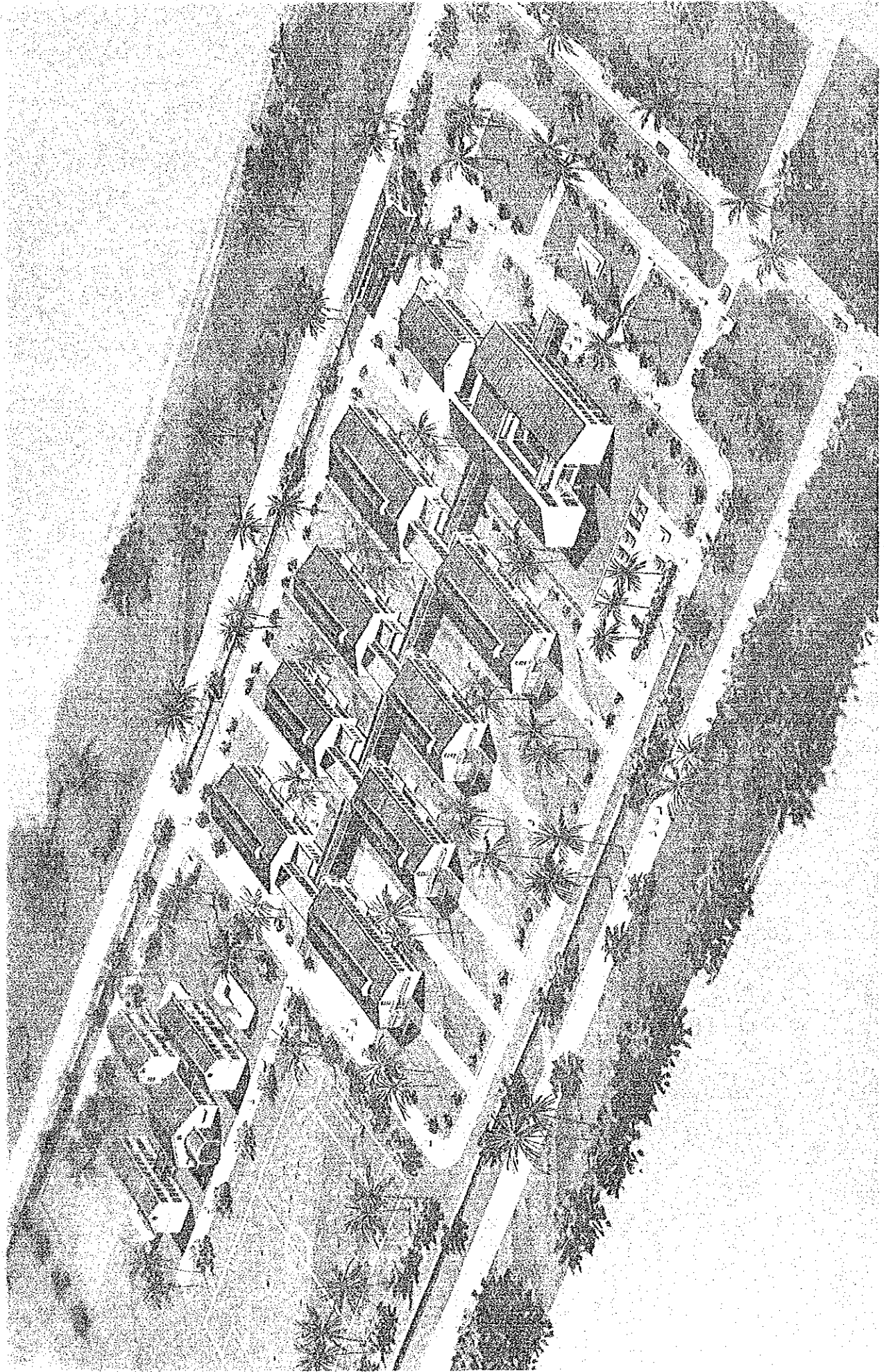


Keisuke Arita  
President

Japan International Cooperation Agency

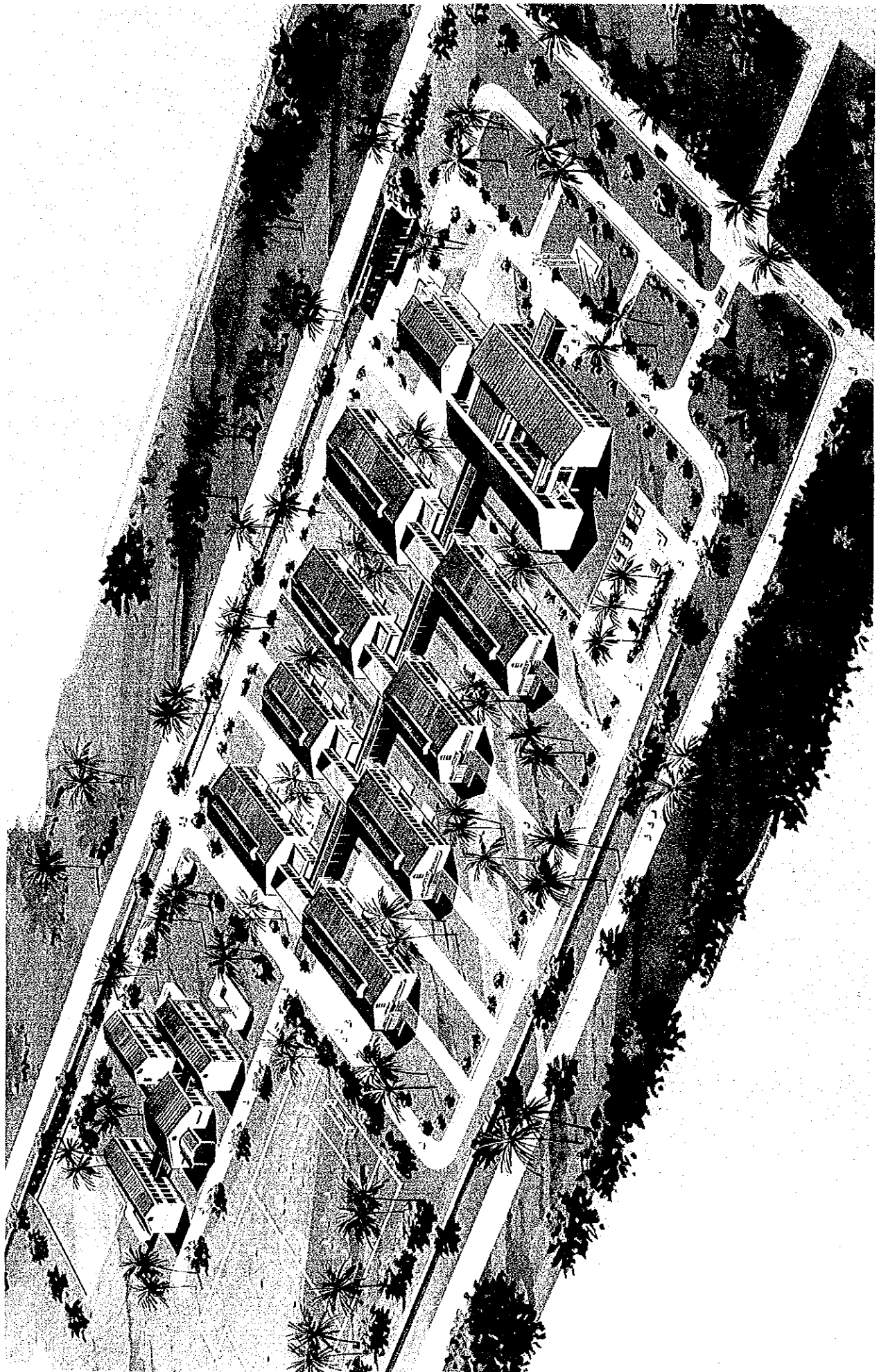




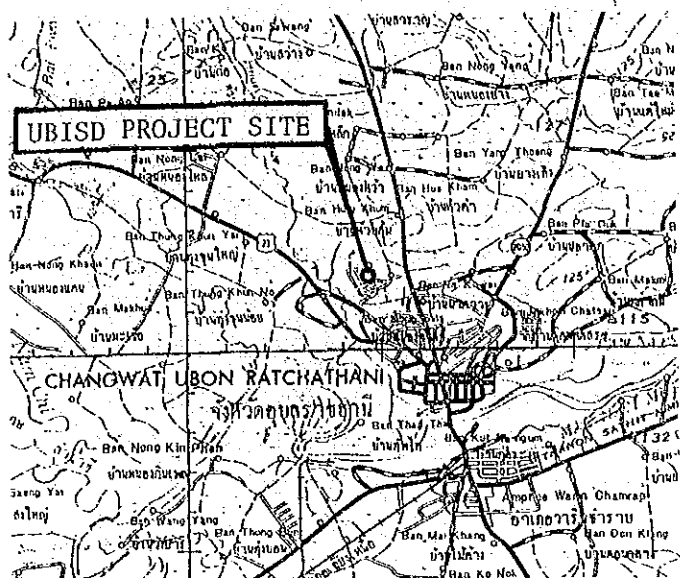


THE UBON INSTITUTE FOR SKILL DEVELOPMENT

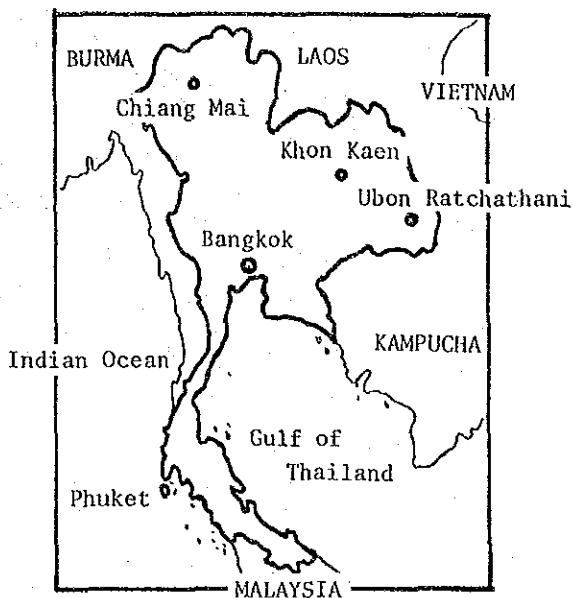
THE NEW INSURANCE FOR SKIFF DEALERSHIP



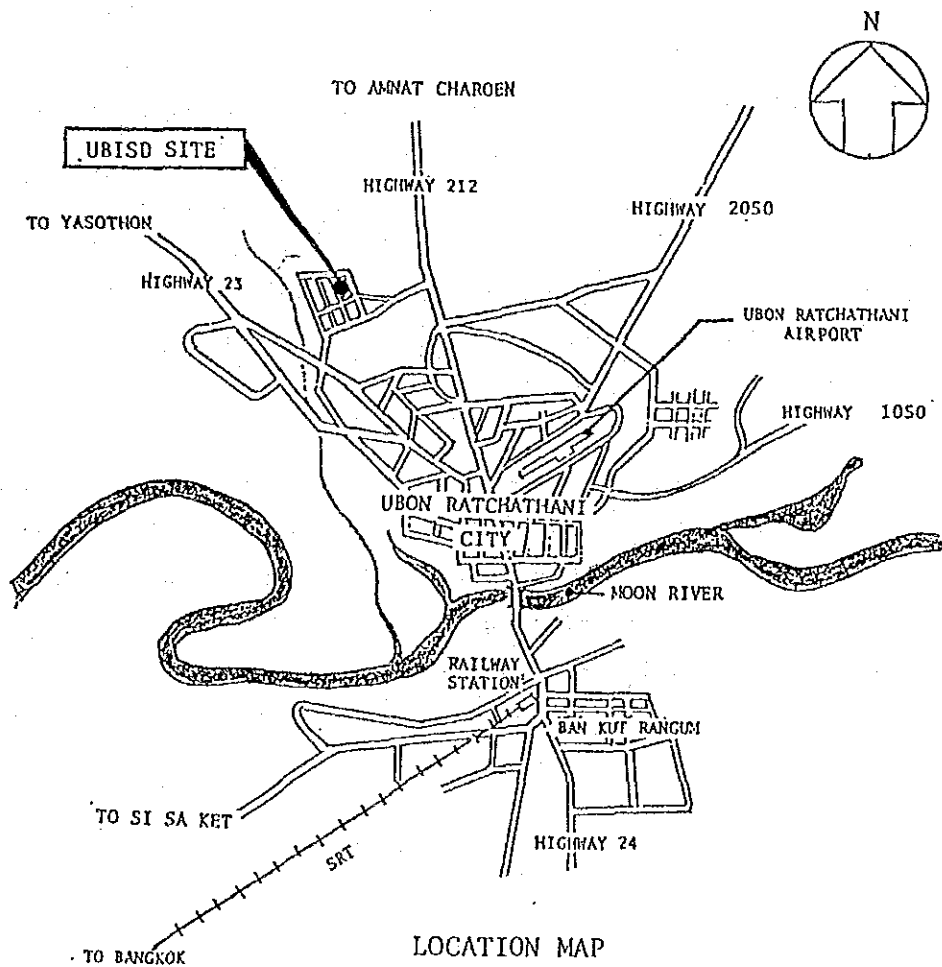




AREA MAP



MAP OF THAILAND



LOCATION MAP



## SUMMARY

The Government of the Kingdom of Thailand has adopted a series of 5 Year Economic and Social Development Plans with the aim of changing its economic structure from one relying predominantly on agriculture to that of a balanced one. The Government has been steadily implementing various measures aiming at creating and promoting job opportunities, increasing the national income, correcting the income difference between different areas. The Fifth and Sixth 5 Year Economic and Social Development Plans place particular emphasis on manpower development through job training in order to increase the income in agricultural areas and to provide opportunities for as many unemployed youth as possible to find employment or become self-employed.

As part of this national policy objective, the Department of Labour of the Ministry of the Interior has established throughout the country a number of regional institutes for skill development offering job training for unemployed youth. The objectives of these institutes are to train the technicians and semi-skilled workers urgently required by Thai industries. The establishment of the Ubon Institute for Skill Development (UBISD), the 8th as final such institute, was planned at Ubon Rachathani in the Lower Northeastern Region of Thailand. In this regard, the Thai Government has requested grant aid and technical cooperation of the Japanese Government for the establishment of the Institute.

In response to this request, the Japanese Government, through the Japan International Cooperation Agency (JICA), has dispatched to Thailand the teams listed below to have discussions with the Government of Thailand to study the appropriateness and cooperation effects of the project, and to determine the direction of training to be given at the Institute.

Contact Team (Technical Cooperation)  
March 5 - 15, 1986

Preliminary Study Team (Technical Cooperation/Grant Aid)  
July 21 - August 3, 1986

Long-Term Survey Team (Technical Cooperation)  
July 30 - September 6, 1986

Based on the results of the above studies, JICA sent a Basic Design Study Team to Thailand from November 25 to December 17, 1986 headed by Mr. Michio Hamada, Director of the Workers' Property Accumulation Department of the Employment Promotion Corporation.

To examine the appropriateness of the project as a grant aid project, the Basic Design Study Team held a series of discussions and consultations with its Thai counterpart to review the background of the Project and to confirm the requests of the Thai Government. Information and materials to determine the scope and grade of the Project were collected and construction conditions at the planned site in Ubon Ratchathani were surveyed.

Upon its return to Japan, the Basic Design Study Team conducted further discussions with relevant agencies of the Government of Japan to determine the necessary equipment and facilities for the Project. Information obtained in Thailand, problems anticipated in the operation and management of the Institute and the anticipated effects of the project were taken into consideration in preparing a Basic Design.

A Study Team headed by Mr. Koichi Igarashi, Deputy Director, Overseas Cooperation Division, Ministry of Labour was dispatched to Thailand by JICA on March 18, 1987 for ten days to explain the draft of this Report. The contents of this Report were approved by the authorities concerned of the Government of Thailand to be compiled into the Final Report.



The training programme to be conducted in this Centre has been prepared in view of the special conditions and needs of the Ubon area, in addition to the curricula offered by the existing regional institutes for skill development. For example, the ceramics course is newly established as part of the Pre-Employment Training in view of expanding employment opportunities for women. Moreover, the introduction of mobile training is intended for those living in remote areas who are, therefore, unable to attend courses at the Institute.

Contents of training are as follows:

Pre-Employment Training is to be provided to develop the technical skills of unemployed youths who have completed primary or lower secondary education in order to meet the needs for skilled workers required by local industries.

Pre-Employment Training is to be given in 12 courses in 5 fields as listed below:

|                        |                                                                                |
|------------------------|--------------------------------------------------------------------------------|
| Mechanical:            | Finishing and assembly, lathe operation,<br>machining                          |
| Electrical:            | Electrical motors, refrigeration/air-<br>conditioning, radio/television repair |
| Automotive:            | Automobile maintenance, body repair, agro-<br>machinery repair                 |
| Sheet Metal & Welding: | Sheet metalwork, welding                                                       |
| Building Construction: | Painting, furniture making, piping, ceramics                                   |

Upgrading Training is to be given to those already employed to upgrade their levels by teaching modern techniques and skills. Courses in architectural and mechanical drawing will be added to those offered for Pre-employment Training.

Non-Technical Training is to be aimed mainly at women with courses in dressmaking, hotel employment, housemaid, receptionist and secretary as requested by the industries.

Mobile Training is in line with national regional development plans. Training equipment is to be loaded onto a mini-bus and trailers, and training is to be provided for those living in remote areas and who cannot attend the Institute in such fields as small engine repair, motorcycle repair, household electrical appliance repair, etc. This training will also serve as a means of propaganda for the Institute.

Foreman and Supervisor Training is to foster foremen and supervisors of the shopfloor by offering training in leadership, interpersonal communication and safety. Training is to be given at the Institute by use of audio-visual materials.

National Skill Certificate Examinations (consisting of practical and written tests) are to be held annually in the 12 trades of arc welding, gas welding, lathe operation, machining, refrigeration/air-conditioning, radio/television repair, woodworking, plumbing, masonry, plastering, electrician and automobile maintenance.

Buildings and facilities to be provided are as follows:

|                                                                |   |                       |
|----------------------------------------------------------------|---|-----------------------|
| Main Building                                                  |   |                       |
| Administration, Classrooms and Multipurpose Training & Canteen | 1 | 3,088 m <sup>2</sup>  |
| Workshops                                                      | 8 | 9,968 m <sup>2</sup>  |
| Dormitory                                                      | 1 | 1,895 m <sup>2</sup>  |
| Storage                                                        | 1 | 354 m <sup>2</sup>    |
| Garage for Mobile Equipment                                    | 1 | 200 m <sup>2</sup>    |
| Guard Houses<br>at front and back entrances                    | 2 | 69 m <sup>2</sup>     |
| Corridors                                                      |   | 670 m <sup>2</sup>    |
|                                                                |   | <hr/>                 |
| Total                                                          |   | 16,244 m <sup>2</sup> |

Training equipment is to be provided in such fields as follows:

- Mechanical Training
- Electrical and Electronics Training
- Sheet Metal and Welding Training
- Building Construction Training
- Ceramics Training
- Painting Training
- Automobile Maintenance Training
- Agricultural Machinery and Car Body Repair Training
- Mobile Training
- Special Training
- Audio Visual Training
- Others

The site for this Institute is located in the suburbs of Ubon Rachathani at a distance of 8.7 km from the city centre. The total area of the site is 145,800 m<sup>2</sup>. The site was used before for a refugee camp. Paved roads surround the site, and there are no obstacles on the site for building construction activities. The service infrastructure, including electric power, water supply and telephone service lines, is to be completed with sufficient capacities by the completion of the Project in 1989 according to plans and budgets confirmed by the Basic Design Team at the offices of relevant authorities.

The portion of the cost for the project to be provided for by the Government of Thailand is estimated to be approximately 23,386,000 baht.

The period required to complete this Project is estimated at 18 calendar months, starting with the Exchange of Notes between the two governments and up to its being handed over to the Government of Thailand. This includes, with some overlap, 3.5 months for the preparation of detailed design, 2 months for tendering, 13 months for the construction of buildings and facilities, 6.5 months for the procurement of training equipment, 2.5 months for transportation and 3.5 months for the installation of training equipment.

The social and economic merits to be gained by this Project are assessed as follows:

- (1) The unemployed youth of the Lower Northeastern Region of Thailand, who have had little opportunity to receive vocational training, will be able to receive practical training as skilled workers. They will thus have more favourable opportunities for employment, and this will help alleviate the income difference between other regions.
- (2) Graduates of this Institute will find employment in local enterprises or contribute to the local economy by self-employed businesses. However, in view of the present scarcity of employment opportunities in the Region, it is inevitable that some will seek employment in the Bangkok area or abroad. This will be a great improvement in the sense that they have hitherto been forced to seek employment as unskilled labourers. The fostering of self-employed enterprises can also serve to stimulate the regional development being promoted by the Government of Thailand. Regional development will, in the future, increase local employment needs and opportunities, and graduates of the Institute will become most vital to local enterprises and economy.
- (3) Pre-employment and upgrading training at the Institute will turn out skilled workers who will be able to pass national skill certificate examinations. Together with graduates of higher education, they will contribute toward a higher regional social and educational standard.

The expenditures estimated to be required by the Government of Thailand for the implementation of the construction project as well as for the future maintenance of the Institute were confirmed to be within the budget range of the Government. It was also confirmed that construction appropriations would be definitely secured by the Thai Government over two fiscal years in pace with the anticipated schedule of construction to be provided by the Japanese side.

In conclusion, therefore, the establishment of the Institute will be highly significant. Its implementation by a grant aid of the Japanese Government will have far reaching effects towards the economic development of the Northeastern Region of Thailand.

Positive and continuous efforts on part of the Thai Government will be an absolute necessity for the Project's success. This will include the recruitment and long service of capable staff in both qualitative and quantitative aspects, and budgetary measures for the proper operation and management of the facilities.

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**CHAPTER ONE**  
**INTRODUCTION**



## CHAPTER ONE INTRODUCTION

The Thai Government has adopted a series of 5 Year Economic and Social Development Plans with a view to changing its economic structure from that of an agricultural country to that of an industrialized country. A number of measures have been promoted to develop a healthy economy and society. As part of the overall policy to achieve the above-described goals, the Department of Labour of the Ministry of the Interior has established a series of Institutes for Skill Development in 7 areas to develop manpower through job training, and has achieved positive results in this regard. As an institute of this kind, however, has not yet been established in the Lower Northeastern Region of Thailand, the unemployed youth in this area have had no opportunities for job training and, therefore, have been forced to seek employment as unskilled workers. Moreover, the scarce employment opportunities for unskilled workers has been one factor contributing to the spreading of regional income differences.

In view of improving this situation, and to complete the national job training network, the Thai Government has planned the establishment of the 8th Institute for Skill Development in Ubon Ratchathani, the centre of the southern part of the Northeastern Region. The Thai Government has requested the Japanese Government to provide grant aid and project-type technical cooperation to implement the Project.

In response to this request, the Japan International Cooperation Agency (JICA) of the the Japanese Government, has sent a series of study teams, i.e. Contact Team (Technical Cooperation), Preliminary Study Team (Technical Cooperation/Grant Aid) and Long-Term Survey Team (Technical Cooperation) to Thailand in 1986 to determine the suitability of the Project and assist in determining the direction of the training plans for the Institute.

Based on the results of the studies conducted by these teams, JICA dispatched the Basic Design Study Team on the Ubon Institute for Skill Development Project to Thailand for a period of 23 days from November 25 to December 17, 1986. This team was headed by Mr. Michio Hamada of the Employment Promotion Corporation.

Following a series of discussions between the Study Team and the Thai Government officials, Minutes of Discussions regarding items basically agreed upon were concluded on December 4, 1986 between Mr. Hamada and Director General Chamnarn Potchana of the Department of Labour of the Ministry of the Interior.

On returning to Japan, the Basic Design Study Team held further discussions with the related agencies and organizations on the Project's suitability, its appropriate size and grade, its management system and the anticipated effects of the aid. This Basic Design Report outlines the necessary equipment and buildings recommended to be provided as grant aid.

A Study Team headed by Mr. Koichi Igarashi, Deputy Director, Overseas Cooperation Division, Ministry of Labour was dispatched to Thailand by JICA on March 18, 1987 for ten days to explain the draft of this Report. The contents of this Report were approved by the authorities concerned of the Government of Thailand.

The present Report compiles the optimal basic design for the implementation of the Project based on the results of the discussions with the Thai Government officials and the information and materials, etc. collected in Thailand. Minutes of Discussions, lists of members of the Basic Design and Draft Report Study Teams, schedules of the Teams in Thailand and lists of persons interviewed by the Teams are appended to this Report as Attachments.

**CHAPTER TWO**  
**BACKGROUND**



## CHAPTER TWO BACKGROUND

### 2-1 ECONOMY OF THAILAND

#### (1) GENERAL

Thailand's social structure is traditionally characterized as an agricultural society mainly engaged in the production of rice, the main agricultural product for export. Up to the Second World War, all industrial products were imported. Following the War, however, an industrialization policy was introduced to promote economic development, and speedy industrialization was achieved by the end of the 1960's. As the mainstay of this industrialization was light industry, production of most consumer goods became self-sufficient.

The main factors for this successful and speedy industrialization are as follows.

1. Based on the World Bank's recommendation in 1959, expansion and improvement of the infrastructure, including electricity and road networks, were achieved with aid from international organizations and industrialized countries. Such expansion and improvement provided the basis for industrial development as well as for increased production in the agricultural sector.
2. As a result of the consolidation of the infrastructure, diversification of agriculture was attained, from the monoculture of rice to cassava, maize, flax, cane etc. These new cash crops, as major export items, contributed to increasing the income of the farmers as well as the hard currency revenue of the Government.

3. With the enforcement of the Industrial Investment Promotion Act in 1962, the emphasis of the industrial policy was changed from government-led industrialization to the encouragement of foreign investment led by the private sector. Foreign companies were subsequently given various kinds of preferential treatment, resulting in a conspicuous flow of foreign capital into the Thai market. Although this process of industrialization aiming at import substitution was generally considered to be rather slow, it was a wise decision in view of Thailand's technical levels and capital strength.

The growth of the Thai economy, which had been steady in the 1960's as described above, was forced to slow down due to the two oil shocks in the 1970's.

Thailand faced economic difficulties in the late 1970's in terms of the slowing down of the rate of growth of its economy and the steep rise in the prices of general commodities. In the 1980's, however, the economic growth rate began to recover due to good harvests, the steady increase of processed agricultural products production and the favourable market conditions for transportation machinery and textiles.

The continued good harvests have now brought about a problem of an excessive supply in the domestic market, and coupled with the international price decreases for primary commodities, have resulted in the general feeling of a domestic depression.



## (2) NATIONAL 5 YEAR ECONOMIC AND SOCIAL DEVELOPMENT PLANS

Since 1961, five National 5 Year Economic and Social Development Plans have been implemented by the Thai Government to bring about the sound development of the Thai economy and society. These policies have been changed whenever deemed necessary. The industrialization policy of promotion of import substitution industries has resulted in dependence on imports for capital goods, raw materials, intermediate materials and energy. The decline in foreign investment in Thai industries following the 1973 oil shock also contributed to the retardation of the growth rate of economic development in Thailand.

### 1) Fifth 5 Year Economic and Social Development Plans

Under these circumstances, the Fifth 5 Year Plan which started in October 1981 was aimed at the transformation of Thailand from an agricultural country to a country having an increased industrial products export ratio. This Plan aimed at the independence of the Thai economy in order to cope with changes in the world economy by changing the domestic economic structure by relocating industries to local areas, increased job opportunities, correcting regional income differences and developing regional economies. In particular, the policy for manpower development through job training has been stressed to improve the income level in rural areas.

The policy targets of the Fifth 5 Year Economic and Social Development Plan (1981 - 1986) are listed below:

1. Coordination and improved efficiency of the economic structure rather than growth
2. Economic and social development based on the principle of equality
3. Increase of income in underdeveloped areas
4. Harmony between economic development and national security
5. Planning and execution coordination between public agencies
6. Promotion of the private sector

2) Sixth 5 Year Economic and Social Development Plans

While industrialization efforts have been carried out based on the policy targets described above, the Sixth 5 Year Plan (1986 - 1991) specifies the need to promote the establishment of industrial parks in local areas, to assist in technical improvements, to assist and promote job training in order to promote employment, to create job opportunities in local areas through the expansion of various industries, and to improve technical standards. A total of 10 specific industries, including the chemical, steel, ceramic, machine, electrical machinery and car industries, have been selected as priority industries to improve both the quality and productivity of industrial products.

The policy targets of the Sixth 5 Year Plan are listed below.

1. Stabilization of the economy and public finance
2. Development of social and human resources and the labour force
3. Development of natural resources and environmental management
4. Development plans for science and technology
5. Management improvement plans and review of the Government's role in development processes
6. Development plans for governmental enterprises
7. Production, distribution, industrial technology and job creation development plans
8. Development plans for basic services
9. Development of cities and special development areas
10. Development of the Regions

### (3) INDUSTRIES IN THE LOWER NORTHEASTERN REGION

#### 1) Population and Area

The Lower Northeastern Region of Thailand is composed of the 8 provinces of Ubon Ratchatani, Nakhon Ratchasima, Yasothon, Chaiyaphum, Surin, Sri-Sa-Ket, Buri-ram and Mukdahan. Its area is 87,955.3 square kilometres and its population in 1982 was estimated at 8.59 million.

#### 2) Industries

The main industries in the Region are agriculture (45.4%) and commerce (16.6%) comprising 62% of total industries. Other industries include service (9%), construction (8.2%) and manufacturing (7.1%).

As agriculture is the main industry in the Region, agro-industries and the production and repair of agro-machinery (especially tractors and cultivators) must be fostered. The development of the Region is also expected to result in the increase of small-scale household industries. Training of skilled workers for these industries will lead to the absorption of local labour which has hitherto migrated to the Bangkok area, and will help alleviate the unfavourable income differential of the Region.

The main business of local enterprises is repair work, and there is a shortage in the supply of workers skilled in automobile maintenance and repair of motorcycles, household electrical appliances, refrigerators and air conditioners. In accordance with the national policy of locating processing plants where raw materials are available, large-scale industries are increasingly being established in the Region. This is increasing the local demand for the training of skilled workers capable of running and maintaining machinery which are of higher order than in the past.

Another national objective of regional development is the preservation of cultural heritages and fostering of handicraft industries. Industries related to woodworking (production of

cabinets, tables, chairs and other furniture with carvings), production of ceramics (vases, tableware, ornaments, religious figures, roofing tiles, etc.) and production of textiles of local character are to be increased, and the training of skilled workers for these new industries will become necessary.

The training of skilled labourers possessing basic skills is required to support the development of local industries, and the upgrading of the level of skilled workers is acutely necessary for the modernization of agriculture and industrialization of the Region.

In the Northeastern Region, the percentage of school attendance is only 11.5% of its school age population, the majority of this percentage being drop-outs. It is very important that such youths are provided with the opportunity of receiving job training. The number of those attending schools and those unemployed in the Northeastern Region are compared in the tables included hereinafter.

The Northeastern Region is the largest supplier of people working overseas, and, therefore, the hard currency earned by these people helps to improve the low living standard of the Region. Since it is believed that the graduates of the Institute will have employment opportunities not only in local industries but also in both the metropolitan area and abroad, a substantial effect is expected to be attained in increasing their opportunities for employment.

For reference purposes, the number of Thai nationals working overseas totalled 67,000 in 1983 and their remittance of hard currency amounted to 19,315 million baht in 1983 and 20,951 million baht in 1984.

## 2-2 EDUCATION AND VOCATIONAL TRAINING

### (1) GENERAL EDUCATION SYSTEM

Though Thailand's education is based on a 6-3-3-4 educational system, only the 6 years for primary education is compulsory. This explains the low ratio of secondary school graduates in poor rural areas (32.94% in 1982) vis-a-vis the ratio of primary school graduates (94.87% in 1982). Following the three years of lower secondary education, students can choose from several courses. Depending on their choice, they can go on to job training schools, technical colleges, arts schools or universities. The total percentage of students undergoing higher education is less than 21%.

However, at present, most employees of small and medium size companies are either primary school or lower secondary school graduates. These young people have little opportunity to undergo job training, partly because their wages are needed at home and partly because of the inadequate provision of training facilities. They therefore have to start their working life with insufficient skills, and are obliged to work for low wages.

Current Education System

(Adapted in 1978)

|                | Primary Education<br>(Compulsory) |   |   | Secondary Education |    |    | Higher Education |    |    |    |    |    |    |    |    |    |                  |                        |    |                |
|----------------|-----------------------------------|---|---|---------------------|----|----|------------------|----|----|----|----|----|----|----|----|----|------------------|------------------------|----|----------------|
|                | 1                                 | 2 | 3 | 1                   | 2  | 3  | 4                | 5  | 6  | 1  | 2  | 3  | 4  |    |    |    |                  |                        |    |                |
| Nursery School |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    |    |    |    |                  |                        |    |                |
| Nursery School | 1                                 | 2 | 3 | 4                   | 5  | 6  | 1                | 2  | 3  | 4  | 5  | 6  | 1  | 2  | 3  | 4  | Teacher Training |                        |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  |    | Teacher Training |                        |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | University             |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | University             |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | University             |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  |                  | Technical/Job Training |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | Technical/Job Training |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                |                        |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | Cadet Academy          |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  | 3  | 4                | Police Academy         |    |                |
|                |                                   |   |   |                     |    |    |                  |    |    |    |    |    |    | 1  | 2  |    |                  | Music/Drama School     |    |                |
| 5              | 6                                 | 7 | 8 | 9                   | 10 | 11 | 12               | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22               | 23                     | 24 | (average ages) |

Number of Students and Attendance Ratio (1982)

| (unit: persons)                 |               |                |                   |                   |                     |
|---------------------------------|---------------|----------------|-------------------|-------------------|---------------------|
|                                 | Grade         | Standard Age   | No. of Students   | No. in Age Group  | Attendance Ratio(%) |
| Pre-School Education            | 1             | 4              | 148,136           | 1,415,290         | 10.47               |
|                                 | 2             | 5              | 114,916           | 1,392,014         | 8.26                |
|                                 |               | 6              | 145,635           | 1,370,720         | 10.62               |
| <b>Total</b>                    |               | <b>4 - 6</b>   | <b>408,687</b>    | <b>4,178,024</b>  | <b>9.78</b>         |
| Primary Education               | 1             | 7              | 1,366,765         | 1,350,944         | 101.17              |
|                                 | 2             | 8              | 1,229,891         | 1,332,224         | 92.32               |
|                                 | 3             | 9              | 1,211,048         | 1,314,098         | 92.16               |
|                                 | 4             | 10             | 1,236,868         | 1,291,396         | 95.78               |
|                                 | 5             | 11             | 1,315,152         | 1,275,893         | 103.08              |
|                                 | 6             | 12             | 1,058,847         | 1,250,147         | 84.30               |
| <b>Total</b>                    |               | <b>7 - 12</b>  | <b>7,413,571</b>  | <b>7,814,702</b>  | <b>94.87</b>        |
| First-Half Secondary Education  | 1             | 13             | 427,039           | 1,231,559         | 34.67               |
|                                 | 2             | 14             | 399,618           | 1,205,054         | 33.16               |
|                                 | 3             | 15             | 364,262           | 1,178,423         | 30.91               |
| <b>Total</b>                    |               | <b>13 - 15</b> | <b>1,190,919</b>  | <b>3,615,036</b>  | <b>32.94</b>        |
| Second-Half Secondary Education | 4             | 16             | 340,344           | 1,156,948         | 29.42               |
|                                 | 5             | 17             | 165,833           | 1,123,833         | 14.76               |
|                                 | 5             | 18             | 328,116           | 1,057,689         | 31.02               |
|                                 | 6             | 19             | 112,985           | 1,056,737         | 10.69               |
| <b>Total</b>                    |               | <b>16 - 19</b> | <b>947,278</b>    | <b>4,395,207</b>  | <b>21.55</b>        |
| Higher Education                | 1             | 19             | 80,463            | 1,056,737         | 7.61                |
|                                 | 2             | 20             | 103,473           | 1,018,774         | 10.16               |
|                                 | 3             | 21             | 59,017            | 976,463           | 6.04                |
|                                 | 4             | 22             | 37,812            | 948,412           | 4.00                |
|                                 | 5             | 23             | 6,650             | 905,266           | 0.73                |
|                                 | 6             | 24             | 1,041             | 877,867           | 0.12                |
| <b>Total</b>                    |               | <b>19 - 24</b> | <b>288,456</b>    | <b>5,783,519</b>  | <b>4.99</b>         |
| Graduate School                 |               |                | 571               |                   |                     |
|                                 | Master Course |                | 11,442            |                   |                     |
|                                 | Doctor Course |                | 165               |                   |                     |
| <b>Total</b>                    |               |                | <b>300,634</b>    |                   |                     |
| <b>GRAND TOTAL</b>              |               |                | <b>10,261,089</b> | <b>25,786,488</b> | <b>39.79</b>        |

Source: Guidebook on Thailand Economy

## (2) VOCATIONAL EDUCATION SYSTEM

### 1) Job Training Schools and Regional Institutes for Skill Development

Current job training education in Thailand can be classified into that provided by job training schools (under the jurisdiction of the Ministry of Education) and that provided by institutes for skill development (under the jurisdiction of the Department of Labour, Ministry of the Interior). While job training schools mainly provide classroom study of the theories and research related to advanced technologies, the institutes for skill development aim at fostering semi-skilled workers through practical training in basic skills. They also offer upgrading training or further education and training for employed workers.

The following table gives a comparison of these 2 types of training institutions.

Comparison Between  
Job Training Schools and Institutes for Skill Development

| Items                | Type | Job Training Schools<br>(Ministry of Education) | Institutes for Skill Development<br>(Ministry of Interior)                                                |
|----------------------|------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 1. Training Period   |      | Long                                            | Short                                                                                                     |
| 2. Training Contents |      | Theory-Oriented                                 | Practical Training-Oriented                                                                               |
| 3. Demand            |      | Required by Parents<br>& Youth                  | Required by Industries<br>(graduates form a ready-made<br>workforce for small & medium<br>size companies) |
| 4. Curriculum        |      | Flexible                                        | Fixed                                                                                                     |
| 5. Training Cost     |      | Cheap                                           | Expensive                                                                                                 |
| 6. Target Students   |      | Technicians &<br>Engineers                      | Skilled Workers & Unemployed<br>Youth                                                                     |
| 7. Status            |      | Within the Formal<br>Education System           | Outside the Formal Education<br>System                                                                    |



## 2) Job Training Schools

In the 8 provinces of the Lower Northeastern Region, there are a total of 18 Job Training Schools under the Ministry Education.

Entrance qualifications for these schools are that candidates be graduates of the higher secondary schools. Education at these schools is mainly in theory with little training in the practical operations of equipment. Graduates therefore do not necessarily meet the practical needs of industries or self employment.

## 3) Regional Institutes for Skill Development

Institutes for skill development under the jurisdiction of the Department of Labour offer practical training to graduates of primary and lower secondary schools. Training emphasizes practical skills through the use of actual machinery and equipment for training. Graduates are therefore fulfilling the practical needs of industries for semi-skilled workers.

After completing training at the Institutes, it is intended in principle, that the trainees seek employment in local industries. In cases where the locality cannot absorb all of the trainees, some seek employment in the Bangkok area or overseas. It is anticipated that quite a number of youths will enter the new Institute.

## 4) Concurrence of Job Training Schools and Regional Institutes for Skill Development

Job training being promoted by the Ministry of Education, when compared with training being given at the Institutes for Skill Development, is insufficient for actual employment in respect to content and duration, and that no conflict exists between the similar programs of the Ministry of Education and the Ministry of Interior.

Job Training Schools are part of the school education system, and therefore stress education of theory for technicians and engineers, while skill development institutes provide practical training for unemployed and skilled workers.

Skill training for unemployed primary and lower secondary school graduates complements the inadequacy of formal education in meeting the practical needs of the industries, and will contribute significantly towards alleviating the unfavourable income differential of the predominantly agricultural region.

(3) THE NISD AND REGIONAL INSTITUTES FOR SKILL DEVELOPMENT

The Thai Government founded the National Institute for Skill Development (NISD) in Bangkok in 1968 to develop the skills of domestic workers in line with the policy objectives of the 5 Year Plan. The Institute was founded with the cooperation of the UNDP and ILO, and was placed under the jurisdiction of the Department of Labour, Ministry of the Interior. Institutes for Skill Development were subsequently established in 7 areas under the unified management of the NISD.

At present, the institutes for skill development are as follows.

1. National Institute for Skill Development, 1968 UNDP/ILO
2. Ratchaburi Institute for Skill Development, 1975 UNDP/ILO
3. Cholburi Institute for Skill Development, 1976 UNDP/ILO
4. Lampang Institute for Skill Development, 1977 UNDP/ILO
5. Khon Kaen Institute for Skill Development, 1978 JICA
6. Songkhla Institute for Skill Development, 1980 W. Germany
7. Nakornsawan Institute for Skill Development, 1981 UNDP/ILO

Of these Institutes, the North Northeastern Institute for Skill Development at Khon Kaen was founded by grant aid and technical cooperation provided by the Japanese Government.

The West German Government provided the equipment and technical cooperation for the Songkhla Institute for Skill Development in Southern Thailand.

The establishment of the 8th regional institute in the Lower Northeastern Region to serve the needs of the 8 provinces therein will complete the national network of institutes for skill development. Ubon Ratchatani is considered the suitable seat for this new institute.

## 2-3 CONTENTS OF REQUEST

### (1) OBJECTIVES OF THE REQUEST

The Thai Government's Fifth 5 year Economic and Social Development Plan (1982 - 1986) intended the transformation of Thailand from an agricultural to an industrial country with special emphasis on increased employment opportunities, the correction of income difference and local development. Manpower development through job training was particularly stressed for the agricultural areas.

There are currently 7 local institutes for skill development in Thailand including the NISD which are under the jurisdiction of the Department of Labour, Ministry of the Interior. Of these, the Khon Kaen Institute for Skill Development (KISD) in the Northeastern Region was founded by the grant aid and project-type technical cooperation provided by the Japanese Government.

No institute for skill development, however, currently exists in the southern part (8 provinces) of the Northeastern Region (17 provinces) where development has been most delayed. As the youth of this area have very few job opportunities and tend to migrate to urban areas without the proper skills, the introduction of measures to deal with this situation is urgently required. In view of the above, the Thai Government has planned the establishment of the 8th Institute for Skill Development at Ubon Ratchathani, the centre of the area, to train the technicians urgently required by Thai industries. The Government of Thailand has requested grant aid and project-type technical cooperation from the Japanese Government.

The main objective of the UBISD is the provision of pre-employment training (fostering of semi-skilled workers) for primary and secondary school graduates (unemployed) in the 8 provinces of the southern part of the Northeastern Region, together with upgrading training to improve the technical level of those already employed, as well as non-technical training, mobile training and skill certificate examination.

(2) BUILDING SITE

Suburbs of Ubon Ratchatani (former refugee camp site)

Area of Site: 145,800 m<sup>2</sup>  
(91 Rai)

(3) OUTLINE OF TRAINING PROGRAM

The Training program for the Institute was formulated, under the request of the Government of Thailand, through discussions between the Government of Thailand and members of the Feasibility Study Team, the Preliminary Study Team and the Long-Term Survey Team as follows:

1) Length of Training Courses

Though the length of training courses was initially envisioned to be 6 months, studies and surveys revealed that the curricula being planned to meet the needs of industries can not be completed within this period. The length of training courses was therefore determined to be 10 months.

2) Size of Classes

In order to alleviate the shortage of skilled workers as early as possible, the Government of Thailand has initially requested that the size of classes be between 30 to 40, and that about 500 graduates be turned out annually. Studies and surveys, however, revealed that though the needs of the industries were strong in the fields of automotive, sheet metal, welding and machining, it would be difficult to find total employment of that number in other fields. The size of classes has therefore been set at 20.

3) Number of Courses

Though the total number of courses was initially contemplated to be 15 in 5 fields, the number was finally set to be 12 in 5 fields.

(4) DETAILS OF TRAINING PROGRAM

1) Pre-Employment Training

This is the main training offered by the UBISD and is aimed at fostering semi-skilled workers. With a view to widening the training opportunities offered by the Institute, the only requirement is the completion of a primary education.

Enrollment Qualifications : Primary or lower secondary school graduates aged between 16 and 25.

Training Duration : Institute training of 10 months and in-plant training of 2 months for each course.

Training Hours : 8.30 am - 4.30 pm

Training Courses : 12 courses in 5 fields

Mechanics : Assembly and Finishing, Lathe Operation, Machining

Electrics : Electric Appliances, Refrigeration and Air Conditioning, Radio and Television Repair

Automotive : Automobile Maintenance, Car Body Repair, Agricultural Machinery Repair

Sheet Metal & Welding : Sheet Metal Work, Welding

Building Construction : Painting, Furniture Making, Piping, Ceramics

2) Upgrading Training

Upgrading training is intended with a view to improving the technical standards of those already employed by providing training in the latest technologies and techniques.

Enrollment Qualifications : Currently employed with experience in an applied field and ages 16 or over.

Training Hours : 2 hours a day (5.00 pm - 7.00 pm)  
10 hours a week (480 hours a year)

Ratio Between Classroom : 80 (classroom study) : 20 (practical  
Study and Practical training)  
Training

Training Courses:

|                               |                                                                   |
|-------------------------------|-------------------------------------------------------------------|
| Automotive                    | Maintenance, Tune-up, Electrics,<br>Agricultural Machinery Repair |
| Electrical and<br>Electronics | Indoor Wiring, 3-Phase<br>Motors, Transistor Circuits             |
| Mechanics                     | Mechanical Measurements, Thread<br>Cutting                        |
| Sheet Metal & Welding         | Arc Welding, Gas Welding                                          |
| Building Construction         | Architectural Drawing                                             |

### 3) Non-Technical Training

Non-technical short training courses include those to train secretaries, receptionists, waiters and waitresses, housemaids and shop assistants, etc. A large number of courses for women are provided.

Course Length : 20 - 350 hours

Number of Trainees : 15, twice a year

Courses : 6

Dressmaking

Housemaid

Individual Enterprise

Waitress/Waiter

Receptionist

Guard

### 4) Mobile Training

Mobile training intends to provide job training for the unemployed of working age who live in remote areas. The training equipment and materials are loaded onto a bus or trailer and those areas where there is a demand for training are to be visited.

The NISD has requested a trailer bus for flat areas and a 4-wheel drive vehicle for rough roads in order that any area can be visited. The NISD has also further requested equipment for teaching basic skills and knowledge.

Following this mobile training, those young people with the right motivation will be given the opportunity to enrol at the UBISD for longer training courses.

Mobile-type upgrading training is also intended in areas of small engine maintenance, motorcycle repair and household electrical appliances repair, etc.



5) Foreman and Supervisor Training

This training is intended to foster foremen or supervisors for the shopfloor.

Equipment Required for Supervisor Training

Films or video films relating to leadership and inter-personal communications, etc. which are indispensable parts of the knowledge required for supervisors as well as related equipment.

6) National Skill Certificate Examination

There are 3 levels of skill certification and the UBISD, as in the case of the other Institutes, will carry out skill certificate examinations to assess the skill of the trainees.

(5) DEPARTMENTAL SETUP

The Ubon Institute for Skill Development (UBISD) is to be established as a regional skill development institute under the Department of Labour of the Ministry of Interior. Under the Director of the Institute, UBISD will be constituted of the following branches:

General Administration Branch

Technical Support and Co-ordination Branch

Instructor Development and In-Plant Training Branch

Machine Shop Branch

Automotive Branch

Electrical & Electronics Branch

Building Construction Branch

(6) CONTENTS OF REQUEST

1) Requested Buildings and Facilities

| <u>Name of Building</u>            | <u>Areas Requested</u> |
|------------------------------------|------------------------|
| Administration Building            | 979 m <sup>2</sup>     |
| Multi-Purpose Training Building    | 3,190                  |
| Workshops                          |                        |
| Electrical                         | 1,700                  |
| Machine                            | 1,700                  |
| Building Construction              | 1,700                  |
| Welding and Sheet Metal            | 1,700                  |
| Painting                           | 1,000                  |
| Ceramics                           | 1,000                  |
| Agro Mechanics and Car Body Repair | 1,700                  |
| Auto Mechanics                     | 1,700                  |
| Classroom and Shower Building      |                        |
| Dormitory                          | 2,169                  |
| Canteen                            | 807                    |
| General Storage and Garage         | 775                    |
| Guard and Security Staff House     | 94                     |
| Covered Corridor                   |                        |
| Total                              | 20,214 m <sup>2</sup>  |

2) Requested Training Equipment

Machine Workshop  
Electrical and Electronics Workshop  
Welding and Sheet Metal Workshop  
Building Construction Workshop  
Ceramics Workshop  
Painting Workshop  
Auto Mechanics Workshop  
Agro Mechanics and Car Body Repair Workshop  
Mobile Training  
Special Training  
Audio Visual Equipment

**CHAPTER THREE**  
**OUTLINE OF THE PROJECT**



## CHAPTER THREE OUTLINE OF THE PROJECT

### 3-1 OBJECTIVES

The objectives of the Project are to provide training opportunities for the unemployed youth and to train the labour force required by the industries of the Lower Northeastern Region where development is the lowest in the nation. This is in accordance with the policies of the national economic and social development plans to increase employment opportunities, correct income differences between regions, and to increase income.

### 3-2 ANALYSIS OF REQUEST

#### (1) NECESSITY OF THE PROJECT

As requested by the Government of Thailand, to develop the regions in accordance with the objectives of the Sixth 5 Year Economic and Social Development Plan, it is very important that industries suitable to each region are promoted. The training of skilled workers is an absolute necessity for those industries to be developed.

As a regional institute for skill development has not been established in the Lower Northeastern Region of Thailand, the number of unemployed youths in this region has been increasing. The youths are being compelled to migrate to Bangkok and other areas without skills.

The creation of training opportunities for these youths, will increase the skilled labour force needed by industries in the area, and eventually contribute to the development of the economy of the region.

Judging from the experiences of the neighbouring Khon Kaen Institute for Skill Development (KISD), 60% of those entering UBISD will be those with recommendations from the regional labour office or other public offices, and the remainder will be selected from other

applicants by examinations. In case of KISD, only 600 of the 6,000 applicants are able to enter. It can therefore be expected that the full number of trainees selected from a greater number of applicants will enter UBISD annually for training.

Although it is desired that graduates of the Institute will obtain local employment, this may not always be the case due to the present status of development within the Region. This condition is to be improved as positive measures to relocate industries to the regions are being taken by the national government.

According to estimates of the Government based on experiences of KISD, the employment rate of graduates within the Northeastern Region will be 65%, of which 60% will be employed by local enterprises, and the remaining 5% be self-employed in such fields as radio/television repair, agricultural machinery repair and automobile repair.

Even if some of the graduates exit to the Bangkok area or abroad for employment, the basic aim to foster employment of the local youth will still be attained.

## (2) OPERATION AND MANAGEMENT

The operation and management of UBISD is to be conducted by the National Institute for Skill Development (NISD). NISD has the experience of successfully operating 7 regional institutes of similar nature in the past, and the appropriation of an adequate budget and the securing of the necessary staff for the Institute can be expected.

## (3) NUMBER OF TRAINEES

An appropriate number has been selected for trainees of training classes in fields where the need for skilled workers is acute. Number of trainees in other fields was selected in consideration of the number of employment opportunities expected after completion of training.

(4) SCALE OF BUILDINGS

The size of training shops for the 8 fields was determined by the number of training equipment to be installed and the training activities to be performed therein.

The dormitory is an important facility for this particular institute. The area of the Lower Northeastern Region is very large, and it will be difficult for trainees coming from remote places to find lodging outside the Institute.

(5) EXTENT OF TRAINING EQUIPMENT

In view of the prevailing conditions and needs of the area, emphasis was placed on equipment for the courses in automobile maintenance, sheet metal, welding and machining.

Equipment for mobile training, especially needed for the region, will also be a special feature of this Institute.

### 3-3 IMPLEMENTING SETUP

#### (1) ORGANIZATION AND OPERATIONAL STAFF

The total staff for UBISD is to be 84 persons in 7 departments and including the Director, as shown in the Organization table to follow. The classification of the staff is as follows:

##### 1. Civil Servants

Officials of the Government with Position Classifications of 1 to 6. Will be mainly in charge of theory aspects of the training. 28 officials of this category are be stationed at this Institute.

##### 2. Permanent Employees

Trainers obtained from the industries, and who will be mainly in charge of the practical aspects of training belong to this category. Even those with low academic qualifications will be hired if they have abundant practical experience. They are classified into 4 positions. 13 will be stationed at this Institute.

#### (2) BUDGET

A total budget of 25,830,000 baht to cover the fiscal term of 1987 - 1989 has been applied for. According to hearings by the Basic Design Team, authorities have stated that this budget will be provided when the grant aid of the Government of Japan has been determined.



Organization of UBISD

Director

| (27)                         |    | (10)                                             |   | (6)                                                       |   |
|------------------------------|----|--------------------------------------------------|---|-----------------------------------------------------------|---|
| <u>Administrative Branch</u> |    | <u>Technical Support &amp; Adjustment Branch</u> |   | <u>Instructor Training &amp; In-Plant Training Branch</u> |   |
| Manager                      | 1  | Manager                                          | 1 | Manager                                                   | 1 |
| Administration               | 2  | Research & Evaluation                            | 2 | Instructor Training                                       | 1 |
| Accounting                   | 2  | Project Planning                                 | 1 | In-Plant Training (Upgrading Training)                    | 1 |
| Warehouse Keeper             |    | Recruitment & Personnel Adjustment               | 3 | In-Plant Training (Re-Employment Training)                | 2 |
| Guard                        | 22 | Skill Certification & Skill Competition Meeting  | 2 | Non-Technical Training                                    | 1 |
| Driver                       |    | Training Materials & Curricula Development       | 1 |                                                           |   |

| <u>Machine Shop Branch</u> |   | <u>Automobile Branch</u> |   | <u>Electrical &amp; Electronics Branch</u> |   | <u>Building Construction Branch</u> |   |
|----------------------------|---|--------------------------|---|--------------------------------------------|---|-------------------------------------|---|
| Manager                    | 1 | Manager                  | 1 | Manager                                    | 1 | Manager                             | 1 |
| Finishing Machinery        | 2 | Automobile               | 4 | Electrical                                 | 3 | Furniture Manufacture               | 3 |
|                            |   | Body Repair              | 2 | Radio/TV                                   | 3 |                                     |   |
| Lathe                      | 2 | Agricultural Machinery   | 2 | Air Conditioner                            | 2 | Plumbing                            | 2 |
| General Finishing          | 2 |                          |   | Refrigerator                               |   | Painting                            | 2 |
|                            |   |                          |   |                                            |   | Drawing                             | 2 |
| Welding & Sheet Metal      | 2 |                          |   |                                            |   | Ceramics Manufacture                | 3 |

TOTAL NUMBER OF STAFF: 84

## Staffing Plan

|                                                  | (unit: persons) |           |           |           |
|--------------------------------------------------|-----------------|-----------|-----------|-----------|
|                                                  | 1987            | 1988      | 1989      | 1990      |
| 1. Director                                      | 1               | 1         | 1         | 1         |
| 2. Officers                                      |                 |           |           |           |
| 2.1 Administrative Officer                       | 6               | 7         | 7         | 7         |
| 2.2 Training Coordinator                         | -               | 14        | 14        | 14        |
| 3. Instructors                                   |                 |           |           |           |
| 3.1 Skill Development<br>Officer (Civil Servant) | 8               | 13        | 28        | 28        |
| 3.2 Instructor<br>(Permanent Employee)           | 4               | 6         | 13        | 13        |
| 4. Others                                        |                 |           |           |           |
| 4.1 Guard                                        | 7               | 7         | 7         | 7         |
| 4.2 Janitor                                      | -               | 10        | 10        | 10        |
| 4.3 Driver                                       | -               | 2         | 2         | 2         |
| 4.4 Gardener                                     | -               | 2         | 2         | 2         |
| <b>Total</b>                                     | <b>26</b>       | <b>62</b> | <b>84</b> | <b>84</b> |

### 3-4 TRAINING PROGRAM

The proposed training program has been determined by the Government of Thailand in accordance with discussions and consultations held on the occasions of the Feasibility Study, the Preliminary Study and the Long-Term Survey. The characteristics of the Ubon area have been considered in formulating the training curriculum. Pre-employment training for the unemployed graduates of primary and lower secondary school will be the main field. Upgrade training for those already employed, special training in non-technical fields, mobile training and skill competitions will also be provided.

(1) TRAINING OBJECTIVES

1) Mechanical

Broad knowledge and skills in measurement, finishing, lathe operation, milling, shaping and other operations in machining are to be given to train workers to gain multiple skills.

2) Sheet Metal and Welding

Knowledge and skills in arc welding, gas welding, gas cutting, carbon dioxide arc welding, mechanical shearing, bending and other sheet metal techniques will be provided. Workers having multiple skills in these fields are expected to find employment as maintenance workers in such industries as pulp, fertilizer and whiskey production.

3) Electrical/Electronics

a. Electric Appliances

Training of workers to gain broad knowledge and multiple skills in the repairs of domestic machinery such as refrigerators, electric fans and washing machines. Similar training will also be given in domestic wiring installation and sequential control operations for households and factories.

b. Refrigeration and Air Conditioning

Training of workers in the field of the maintenance and repair of domestic and industrial air conditioning and refrigeration equipment.

c. Radio and Television

Training of workers who can maintain, repair and assemble radio and television sets and audio equipment. Training will also be provided so that they can adapt themselves to work in the broader field of audio visual equipment maintenance and operation.

d. Automotive

1. Automobile Maintenance

Training will be given in the maintenance, adjustment and overhaul of gasoline and diesel engines. Knowledge and skills in the maintenance and servicing of carburetors, engine accessories, electrical parts, etc. will also be provided.

2. Agricultural Machinery

Training will be given in the maintenance of agricultural machinery, servicing and inspection of parts incidental to agricultural machinery.

e. Building Construction

1. Furniture Making

Training will be given in the usage of manual tools and mechanical machinery for the finishing and assembly of woodwork. Training will also be given to train workers in the development, manufacture and repair of woodwork.

2. Painting

Training in the field of wood painting, automobile painting and building painting will be provided.

### 3. Ceramics

Training of workers to gain broad knowledge and general skills in the preparation of clay material, operation of mills and wheels, porcelain painting and furnace operation. Training will also be given in the production by press techniques of bricks and roof tiles.

### 4. Piping

Training will be given in cutting, threading, bending and jointing of pipes. A broad and thorough knowledge regarding pumps, valves and other accessories of domestic and industrial water supply, drainage and sanitary equipment will be provided.

(2) TRAINING COURSES

Number of trainees and the training duration of each course are shown in the following tables.

Pre-Employment Training

| Training Course                     | Training Duration (Months) |       | No. of Courses/Year | Course Capacity | Annual No. of Trainees |
|-------------------------------------|----------------------------|-------|---------------------|-----------------|------------------------|
|                                     | Institute                  | Plant |                     |                 |                        |
| 1. Agricultural Machinery           | 10                         | 2     | 1                   | 20              | 20                     |
| 2. Car Body Repair                  | 10                         | 2     | 1                   | 20              | 20                     |
| 3. Automobile Repair                | 10                         | 2     | 1                   | 30              | 30                     |
| 4. Painting                         | 10                         | 2     | 1                   | 20              | 20                     |
| 5. Furniture Manufacture            | 10                         | 2     | 1                   | 20              | 20                     |
| 6. Plumbing                         | 10                         | 2     | 1                   | 20              | 20                     |
| 7. Ceramics Manufacture             | 10                         | 2     | 1                   | 20              | 20                     |
| 8. Electrical (Wiring & Appliances) | 10                         | 2     | 1                   | 20              | 20                     |
| 9. Refrigeration & Air Conditioning | 10                         | 2     | 1                   | 20              | 20                     |
| 10. Radio & TV                      | 10                         | 2     | 1                   | 20              | 20                     |
| 11. Sheet Metal & Welding           | 10                         | 2     | 1                   | 60              | 60                     |
| 12. Machine Tooling                 | 10                         | 2     | 1                   | 45              | 45                     |
| Total:                              |                            |       |                     |                 | 315                    |

Enrollment Qualifications : Primary or lower secondary school graduates aged between 16 and 25.

Training Duration : Institute training of 10 months and in-plant training of 2 months for each course.

Training Hours : 8.30 am - 4.30 pm

Upgrading Training

|                                     | Training Duration (Hours) | No. of Courses/Year | Course Capacity | Annual No. of Trainees |
|-------------------------------------|---------------------------|---------------------|-----------------|------------------------|
| <b>Automobile</b>                   |                           |                     |                 |                        |
| Maintenance                         | 60                        | 3                   | 15              | 45                     |
| Tune-Up                             | 60                        | 3                   | 15              | 45                     |
| Electrical                          | 60                        | 3                   | 15              | 45                     |
| Agricultural Machinery Repair       | 60                        | 3                   | 15              | 45                     |
| <b>Electrical &amp; Electronics</b> |                           |                     |                 |                        |
| Indoor Wiring                       | 60                        | 3                   | 15              | 45                     |
| 3-Phase Motor Repair                | 60                        | 3                   | 15              | 45                     |
| Transistor Circuits                 | 60                        | 3                   | 15              | 45                     |
| <b>Mechanical</b>                   |                           |                     |                 |                        |
| Mechanical Measurement              | 60                        | 3                   | 15              | 45                     |
| Profile Turning                     | 60                        | 3                   | 15              | 45                     |
| Thread-Cutting                      | 60                        | 3                   | 15              | 45                     |
| <b>Sheet Metal &amp; Welding</b>    |                           |                     |                 |                        |
| Electric Welding                    | 60                        | 3                   | 15              | 45                     |
| Gas Welding                         | 60                        | 3                   | 15              | 45                     |
| <b>Building Construction</b>        |                           |                     |                 |                        |
| Architectural Drawing               | 60                        | 3                   | 15              | 45                     |
|                                     |                           |                     | <b>Total:</b>   | <b>585</b>             |

Enrollment Qualifications : Currently employed with experience in a related field and ages of 16 or over.

Training Hours : 2 hours a day (5.00 pm - 7.00 pm)  
10 hours a week (480 hours a year)

Ratio Between Classroom Study and Practical Training : 80 (classroom study) : 20 (practical training)

### (3) NON-TECHNICAL TRAINING

Non-technical short training courses include those to train secretaries, receptionists, waiters and waitresses, housemaids and shop assistants, etc.

#### Non-Technical Training

|                 | Training Duration (Hours) | No. of Courses/Year | Course Capacity | Annual No. of Trainees |
|-----------------|---------------------------|---------------------|-----------------|------------------------|
| Dressmaking     | 350                       | 2                   | 15              | 30                     |
| House Maid      | 60                        | 2                   | 15              | 30                     |
| Self-Employed   | 60                        | 2                   | 15              | 30                     |
| Waiter/Waitress | 30                        | 2                   | 15              | 30                     |
| Receptionist    | 20                        | 2                   | 15              | 30                     |
| Guard           | 20                        | 2                   | 15              | 30                     |
|                 |                           |                     | Total:          | 180                    |

Training Hours: 8:30am - 5:30pm

### (4) MOBILE TRAINING

Mobile training is to provide job training for the unemployed of working age who live in remote areas. The training equipment and materials are to be loaded onto a bus or trailer and those areas where there is a demand for training are to be visited.

The NISD has requested trailers and mini busses for flat areas, and a 4-wheel drive vehicle for rough roads in order that any area can be visited. The NISD has also further requested equipment for teaching basic skills and knowledge.

Following this mobile training, those young people with the right motivation will be given the opportunity to enrol at the UBISD for longer training courses.

Mobile-type upgrading training is also intended in terms of portable engine maintenance, motorcycle repair and household electrical appliances repair, etc.



Visits to remote areas will also help to spread knowledge of the existence of the Institute to the youths in remote areas.

(5) FOREMAN AND SUPERVISOR TRAINING

Foreman and Supervisor Training is to foster foremen and supervisors of the shopfloor by offering training in leadership, interpersonal communication and safety. Materials required for this course are films or video tapes relating to leadership and inter-personal communications, etc.

(6) NATIONAL SKILL CERTIFICATE EXAMINATION

There are 3 levels of skill certification. The conduction of skill certificate examinations to assess the skill of workers has been entrusted to the UBISD as is the case of other regional institutes. are to be held annually in the 12 trades of arc welding, gas welding, lathe operation, machining, refrigeration/air-conditioning, radio/television repair, woodworking, plumbing, masonry, plastering, electrician and automobile maintenance.

### 3-5 PROJECT SITE

(1) PRESENT CONDITIONS OF THE SITE

The location of the planned construction site is 8.7km from the town centre of Ubon Ratchathani. The shape of the site is rectangular measuring 220 m x 663 m with a total area of 145,800m<sup>2</sup> (91 Rai). As all 4 sides of the site are bordered by 6 m wide roads, no construction problems are anticipated.

The site slopes down gently from the south to the north. The difference in height is 6 m for the length of 660 m. The gradient is therefore slightly less than 1 in 10.

The site was once used for a refugee camp. At present, it is flat and open with no buildings. A drainage ditch exists down the middle of the site in the south to north direction. On the east side of the site there exist some embankments which are remnants of the ammunition dump.

The site is to be levelled by the Thai side as preparation for the subsequent construction of buildings by the Japanese side.

(2) SERVICE INFRASTRUCTURE

With the exception of drainage culverts at the northern end of the site, there are no power, drainage, city water or telephone systems currently at the site. Plans for these service systems have been formulated and are to be executed through the agencies responsible for the respective services. Implementation of these services is to be the responsibility of the Thai side.

(3) COORDINATION WITH TECHNICAL COOPERATION

Technical cooperation from the Government of Japan is planned for this Project as can be seen from the participation of technical cooperation members in the preceding three study and survey teams for this Project.

The close coordination between the grant aid program and technical cooperation program will be absolutely necessary for the success of this undertaking.

Planning of the stationing of technical cooperation members from Japan are being made accordingly.

Transfer of considerable knowledge has been conducted through the implementation of the KISD Project, and the experience gained should be applied to this Project to avoid duplication.

**CHAPTER FOUR**  
**BASIC DESIGN**



## CHAPTER FOUR BASIC DESIGN

### 4-1 BUILDING AND FACILITIES

#### (1) DETERMINATION OF SCALE

The scale of buildings and facilities has been determined to be in accordance with the background of this project mentioned before and to be appropriate for the conduction of the training program.

The National Institute for Skill Development has operated 7 regional institutes in the past, and has supplied the Japanese study and survey teams with much valuable material and data which is based on their abundant experience regarding the proper scale of buildings and and equipment, as well as the conditions prevailing in Thailand.

Information and material based on the experience of the 7 regional institutes have been carefully analyzed and considered in planning for this Project. A balance with other regional institutes as well as the local characteristics of the Ubon area were considered to arrive at designs for substantial buildings which are economical to maintain.

#### (2) DETERMINATION OF GRADE

Field studies on the following matters were conducted by the study and survey teams. The results of these studies were discussed with the officials of the Government of Thailand to determine the grade of buildings and facilities.

1) Local Conditions

It was noted that climatic conditions in Ubon Ratchatani, during both the dry and rainy seasons, differ greatly from those of the Bangkok area, and was extremely severe. Information on these special conditions were gathered directly from local officials and elders. Living customs were also considered in designing the buildings for this locality, together with the direction of prevailing winds and rain patterns.

2) Economy

Natural cross ventilation and natural lighting is to be utilized to economize on running costs for the buildings. Local procurement of materials is to be emphasized to its full extent to help the locality as well as to facilitate maintenance after the buildings are completed.

3) Local Construction Practices

Buildings are to be designed so that construction techniques practiced in Thailand can be used. Local material and labour are to be utilized to their full extent. Local construction laws and regulations are to be carefully followed. Japanese codes are to be applied when no applicable codes are found locally.

(3) SITE LAYOUT PLANS (LAND UTILIZATION PLANS)

- 1) The construction of the following buildings is planned under the present Project.

Main Building

Administrative Zone

Multipurpose Training Zone

Canteen

Workshops

Dormitory

Storage

Garage for Mobile Training Equipment

Guard Houses

Staff Houses are to be constructed by the Thai side on the northern portion of the site.

Seasonal winds dominate throughout the year from opposite directions, depending on the season. Northeast by north during October through March, the dry season, and southwest by south during April through September, the rainy season. Axes of major buildings will be in the east-west direction so that the maximum benefits of natural ventilation can be enjoyed while avoiding the low sun rays during morning and late afternoon hours.

The main approach to the site is from the southwest and, therefore, the main gate is to be located facing this main approach. After passing by a recreation field, the administrative zone, classroom zone, practical training zone, recreation zone and housing zones will be reached in that order from south to north.

As for the preparation of the ground, the existing embankments on the eastern side and the drainage ditch at the centre of the site is to be leveled and new drainage ditches be provided along the east, west and north boundaries of the site. It is agreed that the Thai Government is to conduct the work and bear the expenses for these site preparations.

## 2) Distribution of Buildings

From the main gate at the south end of the site, an open area is to be provided in front of the Main Building which is to be the so-called face of the Institute. After approaching the Main Building through this open area, the Administrative Zone of the Main Building is entered. Thereafter, all buildings can be reached directly through a corridor running in the south to north direction. This corridor is the spine of the Institute, and the eight training buildings are placed on both sides of this corridor. The canteen which is to serve as place for rest and relaxation, is provided with a terrace, and is not far from the administrative and classroom zones.

An area for future athletic fields is reserved near the staff housing area.

Access roads are to be provided along the perimeter of the site to facilitate services to all facilities.



#### (4) ARCHITECTURAL PLANNING

##### 1) General Design Considerations

###### a. Building Plans

1. Consideration of traffic patterns or flow lines are to be particularly stressed to achieve a functional and useful layout of rooms and facilities.
2. The size of the rooms, in principle, are to be made as spacious as possible to allow cross ventilation and flexibility for changes in equipment layouts in the future.
3. Open-ended corridors will be introduced to provide all rooms with natural ventilation and light.
4. Toilets will be located at either end of the buildings to prevent odour reaching other rooms. If necessary, access to the toilets is to be from outside corridors or from terraces.

###### b. Cross-Section Design

1. Roofs of the main buildings will have steep slopes in view of the torrential rain in the rainy season. Louvres with a structure to eliminate rain will be installed under the eaves for good ventilation. The eaves are to be deep and shall extend over the outer walls to cut off strong sunlight. Louvres or canopies will be introduced to eliminate sunlight in those areas not protected by the eaves.
2. The ceiling height of each room will be made as high as possible for efficient natural ventilation.

## 2) Main Building

The administrative functions as well as the various classrooms, electronics training rooms, multipurpose hall and canteen are located in this central facility for the Institute. This planning consideration was taken to save floor space.

### a. Composition of the Building

The multipurpose hall and canteen portion which require a high ceiling is connected to a double story building portion in which the administrative and classroom functions are located.

### b. Functions and Size

#### 1. Administrative Zone of Main Building

This zone houses the central functions of the UBISD administration. It includes areas for application/registration, accounting, general administration, development and planning, the director and staff rooms, as well as such incidental facilities as conference rooms, space for exhibition, an entrance hall, toilets and pantries.

According to the staffing plan, this building will be used by a total of 38 people, comprised by the director, 27 general administration staff, 4 research, study and evaluation staff and 6 specialists. The floor area of the administration zone on the ground floor is 1,411 m<sup>2</sup>.

## 2. Multi-Purpose Training Zone of Main Building

### (a) Functions

Classrooms required by the training plan, lecture rooms, seminar rooms, seminar rooms for upgrading/special training, study rooms, drawing room, electronics training room, A/V room for common use, training material development room, and a multi-purpose hall are provided in this zone. The multi-purpose hall is to be used for entrance/graduation assemblies, training in electronics, lighting and audio-physics. It is also to be used as a gymnasium and other multiple purposes.

### (b) Size

Accommodations for 6 instructors and workshop training staff, 3 electronics staff, 7 technical aid and study staff, 2 librarians, lecture room (20 persons), seminar rooms (two for 15 persons and one for 20 persons), non-technical classrooms (15 persons x 2 rooms), drafting room (20 trainees), and a 350 person multi-purpose hall (35 staff and 315 trainees) are to be provided.

Based on the area required for each room in the training plan, the total area required has been calculated to be  $1,655\text{m}^2$ , consisting of  $1,205\text{m}^2$  for the classroom zone and  $488\text{m}^2$  for the multi-purpose hall.

### 3. Canteen

#### (a) Functions

The canteen will provide daily meals for the trainees and can also be used for various other purposes, such as meetings, recreational activities and parties.

As no canteen is planned for the dormitory quarter, the canteen will be fully utilized and will provide 3 meals a day.

The canteen will consist of a dining room, kitchen (backyard terrace for cooking and cooking booth for serving), service counter, storage, toilets and a service yard.

As the planned site of the Centre is 8.7km from the centre of Ubon and as there are no restaurants in the vicinity, all the people related to the Centre will use the canteen, thus making it one of the most important facilities.

#### (b) Size

The people using the canteen will consist of 84 Centre staff, 6 experts, 315 basic trainees, 195 upgrading trainees and 180 special trainees, totalling 780 people.

As the special training courses last for only short periods, 2 types of conditions are assumed, i.e. where all the courses are run at the same time and where the special training courses are not run.

In view of the seating capacity, the number of shifts has been determined as follows.

Seats : 120 (indoor)

$$399 \times 0.9 \div 3 = 119.7 \text{ (3 shifts)}$$

The size of the indoor dining area is calculated on the basis of  $2.5\text{m}^2$ /person, including service aisles, and is taken as  $300\text{m}^2$ .

It is assumed that the kitchen will be  $100\text{m}^2$  which is one-third of the dining room area. As the NISD has indicated a specific way of using these facilities, the cooking will be carried out on the roofed outdoor terrace and a booth will be used for serving. It has also been requested that the cooking booth be divided into 4 sections.

#### c. Planning Design

##### (1) Administrative and Multi-Purpose Training Zones

The main axis of the building will run on the east-west direction. To gain maximum cross ventilation and natural lighting, the building is divided into 4 block with a central light well and connecting corridors.

All rooms have windows facing the north or south directions. The rooms will also face open corridors with opening at both ends. Therefore, ventilation will be obtained from all 4 directions.

Louvers will be provided for windows facing north or south directions to shut out the strong sunlight.

Based on their respective functions, the following distribution of the rooms has been decided.

Ground Floor:

General administration, application/registration, accounting, the director and staff rooms, teaching aids development, library and multi-purpose hall

First Floor:

Lecture and seminar rooms, electronics training rooms, A/V room.

(2) Canteen

The Canteen is within the same wing as the Multi-Purpose Training Hall, and as separation between the two functions is by movable partitions, part of the training hall can be used to expand the canteen area as the occasion requires.

In view of strong seasonal winds, windows and doors have been provided at south and north sides of the Canteen. These windows and doors can be fully opened for ventilation during times of good weather.

d. Cross-Section

The ground floor will be 80cm above the ground and the distance between floors will be 4.5m, allowing a ceiling height of 3.2m in consideration of a number of relatively large rooms.

As the floor area of the multi-purpose hall will be as large as  $450\text{m}^2$ , the height of the main beams will be 11.5m and louvres for natural ventilation will be provided all around at the main beam height.

The roof will be gabled, as in the case of the administration zone, to give a strong impression of it being a local building.

### 3) Workshops

#### a. Functions

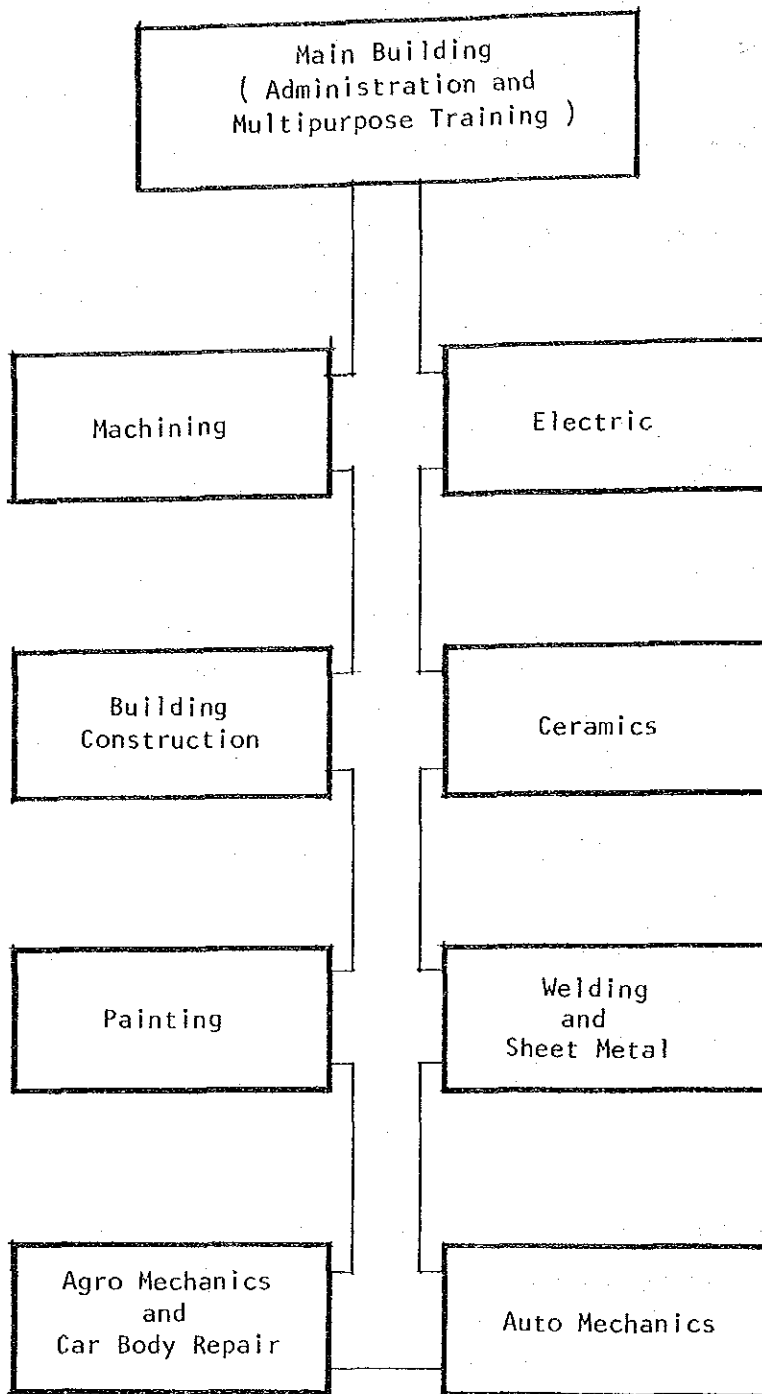
Those trainees who have completed the classroom studies will undergo practical training in the workshops using actual machinery.

Based on the training curricula, the machinery for 12 subjects of 5 departments will be housed in the workshops.

Though a variety of machines, including those producing heat, gas, dust or noise, will be installed in the workshops, they will be classified into groups in order to avoid any hazards and undesirable nuisances between groups. The distribution in 8 workshops of the training equipment has been mutually agreed upon between the Basic Design Team and the training staff of NISD, who have contributed their valuable practical experiences.

The 8 workshops will be distributed in pairs, taking into account the travelling frequency between the classrooms and the workshops and the communication between different workshops. Each pair of workshops will be connected by a wide corridor, keeping the distance between them to a minimum.

The following is a layout diagram showing the relationships between major buildings.





b. Size

There will be a total of 41 instructors for those subjects taught in the workshops and a total of 12 basic training courses, each lasting 10 months. The class capacity is planned to be 60 for the welding and sheet metal course, 45 for the machining course and 20 each for the other courses, totalling 315.

Appropriate work space for the trainees must be secured around the equipment in each workshop provided by the training curricula.

c. Common Facilities

Chief's Room

Instructors' Room

Meeting Room

Classroom

Material Storage and Tool Storage

Locker Room

Toilets (Instructors' and Trainees')

Shower Room

As any workshop requires a large amount of space and a high ceiling, the above-mentioned rooms will be located on 2 levels to minimize the ground plan.

d. Spans

Based on a thorough examination of the various alternatives, it has been decided to use a 22m span for the north-south direction which will allow the proper functions of the workshops. In the case of the east-west direction, a span of 5 m will be used to cover the required length.

e. Plans

The ground plan of each workshop will have its core at either the eastern or western ends of the workshop. The access to the trainees' toilets and shower room will be from the central corridor running between the pair of workshops to prevent any odour reaching the workshops.

Each workshop will be designed to have the maximum amount of open space in the different work sections which will be only divided by markings painted on the floor. No special partition will be used for tool storage. Instead, a high counter with lockable drawers will be used to maintain an unobstructed view inside the workshop. The floors of both the chief's and the instructors' rooms will be 1 m higher than the floor of the workshop and they will be located in places which allow a good view of the entire workshop via glass windows.

f. Cross-Section

As stress will be placed on natural ventilation and lighting, as many openings as possible will be provided. In addition, the ceiling will be high and louvres for natural ventilation will be designed at the top of the gabled roof. The roof's long eaves will be designed to prevent strong sunlight or rain from entering the building.

Catwalks will be provided in workshops to enable cleaning servicing and maintenance of high windows facing the north and south directions.

#### 4) Dormitory Building

##### a. Functions

The UBISD is planned to serve the southern part of Thailand's Northeast Province (8 districts). According to Thai Government statistics, the area's population is 8,951,594 with approximately one third (1,587,323) consisting of unemployed youth (15 - 24 years old). The number of business undertakings in the area is 11,002, employing 61,024 workers.

While the aim of the Centre will mainly be the provision of basic job training for the unemployed youth of the area, it will also provide upgrading and special training for those already employed.

A large number of dormitories will naturally be required in order for the UBISD to provide job training for the 1.5 million unemployed youth and employed workers which are scattered over a vast area.

The dormitory building will be functionally divided into the administrative and quarters sections and the following rooms will be required.

##### Administration

Entrance hall, reception area and office, warden's quarters, general purpose area, service counter for drinks, etc. and toilets.

##### Quarters

Dormitories (trainees will be accommodated based on their respective training courses in view of the age differences), shower rooms, toilets, linen storage, laundry and drying area.

b. Size

While the basic training courses last for as long as 10 months (1 course/year), the upgrading training and special training courses are as short as 6 weeks (3 courses/year) and 3 - 9 days (2 courses/year) respectively, excepting the special training dress-making course which lasts 10 weeks (2 courses/year). In determining the building size, therefore, priority will be given to the accommodation capacity for those trainees in the basic training courses.

The duration of training, courses and class capacities are as follows.

Basic Training

10 months, 12 courses, once a year

Class Capacity: 20/class x 9 courses = 180

30/class x 1 course = 30

45/class x 1 course = 45

60/class x 1 course = 60

Total 315/year

Upgrading Training

6 weeks, 13 courses, three times a year

Class Capacity: 15/class x 13 courses x 3 times = 585/year

Special Training

3 - 9 days (10 weeks for dress-making course), 6 courses, twice a year

Class Capacity: 15/class x 6 courses x 2 times = 180/year

The ratio of those trainees whose homes are far from the Centre and who, therefore, should be accommodated at the Centre is set as follows.

Basic Training: 33%

As the target trainees of the upgrading and special training courses will be already employed by the companies concentrated in Ubon and other relatively large towns and as the courses will generally be short and held 2 or 3 times a year, the ratios of the boarded trainees in these courses are set at relatively low levels.

Upgrading Training and Special Training: 12.7%

Accommodation Capacity (Men-Women Ratio 6:1)

Basic Training: 315 persons x 33% = 104  
(80 men / 16 women)

Upgrading Training 285 persons x 12.70% = 36  
and Special Training: (28 men / 8 women)

Total 140

In view of the buildings location in the UBISD overall site plan and its relative balance with the other buildings, it has been decided that a single story administration wing and dormitory wings having one or two stories be constructed.

c. Ground Plan

The ground plan shows the symmetric distribution of the dormitories on both sides of the administration wing. As the age groups of the basic trainees (primary or junior high school graduates) and the upgrading/special training trainees (adults) differ, their respective dormitories will be completely separated in the ground plan in order to secure privacy.

All the rooms will face either balconies or open corridors in view of good, natural ventilation.

The dormitories for the basic trainees will have large rooms and bunk beds. These large dormitory rooms will be adopted partly in view of the need to enforce a regulated lifestyle for the young trainees, as well as preventing home-sickness, and partly with a view to the easy control of the trainees by the warden. As the trainees in the upgrading and special training courses will be adults, they will be provided with smaller dormitory rooms. In order to reduce the required floor area, however, each dormitory room will have 2 bunk beds.

As the men-women ratio has been determined to be 6 to 1, the boarding trainees will consist of 116 men and 24 women. The womens' dormitories will be located on the first floor of the north wing in order to separate them from the men's dormitories and also in view of the proximity to the warden's quarters.

Accommodation Capacity for Each Training Course

|                    | <u>Basic Training</u> | <u>Upgrading/<br/>Special Training</u> | <u>Total</u> |
|--------------------|-----------------------|----------------------------------------|--------------|
| Ground Floor - Men | 56                    | 28                                     | 84           |
| Women              | 16                    | 8                                      | 24           |
| Second Floor - Men | 32                    |                                        | 32           |
| Total              | 104                   | 36                                     | 140          |

Each dormitory wing will be connected to the entrance wing by a roofed connecting corridor. Although the NISD requested a large canteen in the dormitory building, agreement was reached during the final field study that the canteen in the Centre would also be used for serving the boarding trainees.

#### Toilets/Shower Rooms

These will be located at the end of each wing so that odour does not reach the dormitories.

#### Laundries/Drying Areas

Common laundries and drying areas will be provided outside each wing on the ground floor. For the sake of appearance, they will be surrounded by concrete blocks (with ventilation openings) in order to prevent them from being seen directly.

#### d. Cross-Section Plan

The local characteristics of the building will be particularly emphasized, with a high ceiling and large windows for good, natural ventilation. In anticipation of strong rains, a steep sloping roof will be adopted as in the case of the other buildings.

The distance between the floor and the ground will be 80cm to avoid any damage caused by flooding.

While the entrance wing will be a single story building, its lowest beam height will be as high as 4m and the heights of the ceilings in the entrance hall and the meeting room will be 5 - 6m, taking advantage of the sloping roof. The accommodation wings will be 2-story buildings and the design floor height and ceiling height of the dormitories will be 3.8m and 3.2m respectively.

## 5) General Storage

### a. Functions

The general storage will consist of storage space for training equipment and materials, expendables and textbooks for use in the Centre and those products made by the trainees, display space, temporary storage space for scrapped equipment or materials and administration space.

### b. Size

The necessary floor area is calculated based on the relevant data on other NISD training centres. The total area will be 15m x 24m and a site for storing scrapped materials will be located adjacent to the building and fenced on one side.

### c. Plan

The building's location will be decided with consideration paid to the convenience of material deliveries and shipments, as requested by the NISD.

The storage area will have a waiting area for people receiving goods, a counter in the entrance hall and a display area next to the entrance hall.

### d. Cross-Section Plan

The building will have a sloped roof with louvres fitted at the top and both ends. 2.5m high partitions will be used inside the building for zoning and ventilation purposes.



6) Garage for Mobile Training

a. Function

Mobile training equipment to be used for visiting remote locations are to be housed in this garage.

b. Size

Sufficient area to store a land cruiser, three trailers and a mini bus.

c. Plan

A single story 20m x 10m structure.

7) Guard and Security Staff Houses

a. Functions

The Centre will have a 24 hours security plan with posted security guards. There will be 2 guardhouses, i.e. at the main gate and the sub-gate, which will have 2 guardsmen each. The required rooms are a guardroom which can also act as a reception area, relief staff room, temporary sleeping room, dining room, pantry, toilets, shower room and storage.

b. Size

A temporary sleeping room will be required for the guard house at the main gate. The results of the required floor area calculation are shown below.

|           |                    |
|-----------|--------------------|
| Main Gate | : 39m <sup>2</sup> |
| Sub-Gate  | : 30m <sup>2</sup> |
| Total     | : 69m <sup>2</sup> |

c. Plans

In order to provide a good view from the information counter at the reception area, the counter will protrude 1m from the rest of the building. The relief staff room, temporary sleeping room and toilet, etc. will be located next to the reception area.

d. Cross-Section

The roof will have strong local characteristics and ventilation will be provided by jalousie windows. The ceiling height will be 3.0m. Ventilation louvres will be installed between the roof and the ceiling next to the eaves so that radiant heat can be removed by natural ventilation.