

Chapter 9 Training

9.1 Overview

Training in labour-based technology needs to be provided at several levels to disseminate and sustain labour-based road works technology in Lao PDR. The most immediate demand will be to provide training to the current actors in the road sector and in particular to the institutions which is expected to be involved in future rural road works programmes, i.e. the provincial road authorities and domestic small-scale contractors. In addition, a more limited training programme is needed for managers, decision makers and planners involved in rural infrastructure development.

To sustain the technology in the country on a long term basis, labour-based construction and maintenance technology should be integrated into the regular training courses provided by the university, technical colleges, and the in-house training facilities of the MCTPC.

A larger-scale application of labour-based technology in the country would also require an appropriate research capacity, preferably in conjunction with a training institution.

The CTC currently runs long-term courses in road construction and maintenance for the supervisory staff and short-term courses on various topics, including training of trainers courses. The Centre is well equipped in terms of teachers and teaching aids. Through its cooperation with labour-based projects, such as the ILO and ADB projects, the CTC has built up a considerable capacity in the field of labour-based road works technology.

However, if labour-based road works technology will be used on a large scale in the future, the capacity of CTC needs to be expanded. In a large programme, training is a continuous activity, which requires training staff and related resources committed to the programme on a permanent basis.

Furthermore, if the local contracting industry is to be involved in a future programme, there will be a demand for training in additional subjects such as contracts management for government staff and business management for contractors.

Training and education in labour-based technology at the higher learning institutions in the country is also an important aspect. The School of Communication and Transport (SCT) in Savannakhet provides a three year training programme for road supervisors. The ILO project has given students and teachers at the branch of the SCT in Savannakhet some training and initial exposure to the technology. The School has recently expressed an interest in including labour-based methods in its regular courses.

The ILO has started discussions with SCT in Vientiane and the National Polytechnic Institute on the integration of new elements covering labour-based road works technology in their courses. Through an inter-regional project funded by SIDA, the ILO is in a position to support training institutions which are interested in incorporating labour-based technology in their course curricula.

9.2 Training for a Nation-wide Programme

The training programme described in this section defines a general model which has been successfully applied in other rural infrastructure development programmes where domestic small-scale contractors have been involved, using labour-based works technology.

Training is generally accepted as an important component in any capacity building programme. However, for it to become effective, it is important that the training provided, is purpose-oriented and address subjects which are relevant to the duties and responsibilities of the various cadres of staff. This training programme focuses on practical skill training in the expected work environment of all

the involved parties, covering both staff from the private contractors as well as from the government agencies at both provincial and central level.

9.2.1 Training Needs Assessment

Before commencing a training programme, it is important to first establish the organisation required in the public and private sector to carry out a rural road works programme. The next step, will then be to physically identify this staff and study their current capacity and compare it with the future performance requirements as defined in the programme organisation.

When private contractors are involved, a similar exercise needs to be carried out among the candidate firms, expected to participate in the programme. In this respect, the first step will be to carry out a detailed survey of contractors available and preferably operating in the programme areas. Chapter 8 describes the organisation and staff requirements, necessary to implement a rural road works programme in the provinces using labour-based methods.

Through interviews with the contractors' and government staff can their past experience as well as formal training background be identified. The detailed content and extent of a training programme will therefore only be finalised once the final screening and selection of participating contracting firms have been carried out. However, at this stage it is possible to identify the main topics which needs to be included in a future training programme (see Tables 9.2 and 9.3).

9.2.1 Training Strategy

The training should concentrate on skills development specially required for the planning, execution and supervision of the envisaged road rehabilitation and maintenance works. Training would therefore include both government staff and personnel from the contracting firms, ranging from general management to plant operators, mechanics, store keepers and site supervisory staff.

The objectives of a training programme would be to:

- o Create a capacity within the government to plan, manage and supervise road works carried out by local contractors using labour-based methods;
- o Establish a cadre of domestic small-scale contractors capable of undertaking road rehabilitation and maintenance works using labour-based methods. This implies that the firms are fully conversant with the technology, contract management, business administration and supervision of labour, machines and materials;
- o Establish a local capacity for training government and private sector staff in the use of labour-based rural infrastructure rehabilitation and maintenance technology.

In order to achieve the above objectives training should be provided to:

- (a) DCTPC technical staff including engineers, planners, technicians, supervisors and contracts administrative staff,
- (b) DCTPC and DPC management staff including senior engineers, planners and coordinators,
- (c) contractors' staff from managers, engineers, supervisors, clerks, mechanics to plant operators, and
- (d) representatives of the local communities, policy makers, planners and administrators.

The training should be target oriented and meet the performance requirements of each category of staff. Table 6.1 provides a brief summary of the training needs, describing the formal education required, skills to be acquired and necessary training for some of the key personnel participating in a future rural road works programme.

Position	Duties and Background Education	Skill Requirements	Training
Provincial Engineer Contractor Engineer Technicians	Duties: Responsible for planning and implementation of major road works Background Education: NPI or High Level SCT	Be able to effectively plan, manage and monitor large scale road works programmes, and provide on-the-job training and instruction to subordinates	<ul style="list-style-type: none"> ◦ Labour-based road works technology ◦ Contracts Management ◦ English ◦ Training of Trainers Course ◦ On-the-job training through TA ◦ Computer training
Supervisors	Duties: Responsible for road works sites Background Education: Medium or High Level SCT	Be able to independently plan and manage a road works site and to provide instruction and supervision to local contractors	<ul style="list-style-type: none"> ◦ Labour-based road works technology ◦ Equipment Operation and Maintenance ◦ Contracts Management ◦ English ◦ On-the-job training through TA
Foremen	Duties: Responsible for a group of workers carrying out a certain site operation. Background Education: Medium Level SCT or Secondary School	Be able to manage the various work operations on a road site and command a group of 50 workers	<ul style="list-style-type: none"> ◦ Labour-based road works technology ◦ Equipment Operation and Maintenance ◦ English ◦ On-the-job training through TA and supervisors

Table 6.1 Skills and Training Requirements

The training for the various categories of staff should be carried out with varying durations and through different approaches, such as on-site and classroom training, workshops, seminars and study tours.

9.2.2 Training Methods

(i) On the Job Training

It has been proved over the years in a number of countries that on-the-job training is the most effective tool for training most categories of government and contractor's staff. Training of technical staff should therefore be carried out through demonstration and practice at full-size training sites. This approach can be used for managers, engineers, inspectors, supervisors, foremen and machine operators with the on-site training being supported by classroom components tailored for the various categories of staff.

(ii) Short Courses

Intensive refresher courses for periods of one to two weeks should be organised to supplement on-the-job training for some of the technical staff. The training programme should also include independent courses for other staff categories such as storekeepers, accountants, pay clerks and administrative staff.

(iii) Seminars

Seminars is an efficient method for dissemination of data and information, in particular to senior government officials at central and provincial level, as well as representatives for other government agencies, donors and the private sector. Thus, seminars are a useful platform for policy makers, planners and administrators to review the implications of using labour-based methods and to enhance the domestic private sector participation in rural road rehabilitation and maintenance works. The physical work outputs may also have implications for other parts of the road network as well as other sectors.

(iv) Study Tours

Visits to similar but more advanced programmes in other countries can be very stimulating and inspiring for managers, engineers and trainers. It is therefore proposed to organise study trips to ongoing rural road construction and maintenance programmes in the region (i.e. Cambodia and China) as well as to Africa where domestic contractors have been trained in the use of labour-based methods (e.g. Ghana and Lesotho).

(v) International Courses

To strengthen the capacity as well as to motivate the provincial engineers and technicians, it is recommended that selected government staff are sent for further training in the management of labour-based road construction and maintenance at Kisii Training School in Kenya. These courses, organised and supported by the ILO and the Swiss Development Cooperation in collaboration with the Ministry of Public Works in Kenya, are aimed at improving the efficiency of the management of labour-based road projects, introducing the participants to latest information and techniques for the effective use of labour and other local resources, drawing upon the experience from ongoing projects worldwide.

9.3 Curricula

The training package should consist of the following four major elements:

(i) Labour-based Road Construction and Maintenance Technology

This topic would constitute the major part of a training programme. Labour-based methods will be a complete new topic for the majority of the trainees, however, during this training it will also be necessary to review basic road works technology which does not necessarily relate to any specific work method.

This training should be provided to both government and contractors' staff. It is equally important that planners, supervisors and the management staff in Government are fully conversant with the technology. The curricula on labour-based road rehabilitation works would cover the subjects as outlined in Table 9.2.

(ii) Business and Contracts Management

One of the objectives of a future programme should be to further develop the contractors to enable them to manage contracts, which may be of a larger size than the works they have previously carried out. In order to achieve this goal, the contractors will not only require training in road works technology, but also in general management subject related to the daily running of a construction company.

It is therefore proposed that the small-scale contractors are offered short-courses in essential aspects of management such as pricing and bidding, book-keeping, accounting, marketing, office work and planning. This training component will be offered to the various cadres of staff as outlined in Table 9.3.

Equally, government staff needs further training in contracts preparation and management in order to effectively fulfil its obligations responsibilities.

(iii) Operation and Maintenance of Equipment

The small-scale contractors needs to acquire a certain amount of light construction equipment and hand tools to effectively carry out works to established standards. To ensure that the equipment is not misused and quickly fall into disrepair, their mechanics and operators will require proper training in preventive maintenance and correct use of the equipment, and the managers will need instruction in efficient equipment utilisation and economics.

(iv) English

To facilitate collaboration between foreign technical assistance teams and local staff, English language training should be provided to government counterpart staff as well as key staff from the contractor firms. This training can be sub-contracted to local institutions/capacities.

Subject	Contents	Trainees
Planning	how a labour-based road works programme is planned at different levels, discusses the planning responsibilities of the various levels of staff, work plans, organising site camps, planning of tools and equipment, and the hiring and organisation of casual labour	Contractor Managers, Technicians and Supervisors, Provincial Engineers and Site Inspectors
Reporting and Control	administrative control of a work site, production control and quality control	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Site Inspectors
Work Organisation	sequence of labour-based work activities, gang balancing, instruction and motivation of labourers	Contractor Engineers, Technicians and Supervisors and Site Inspectors
Tools and Equipment	selecting appropriate tools and equipment, how it is handled, its use and maintenance and the role of the store-keeper	Contractor Engineers, Technicians and Supervisors, Plant Operators, Storekeepers Provincial Engineers and Inspectors
Survey and Setting Out	setting out horizontal and vertical alignments, cross sections, curves and how to use various setting out equipment such as profile boards, templates, string line levels etc.	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Clearing	clearing the alignment of vegetation and boulders	Contractor Engineers, Technicians and Supervisors Provincial Engineers and Inspectors
Drainage	the vital importance of a well functioning drainage, how to construct side and mitre drains, camber, catchwater drains, scour checks, and culverts	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Earthworks	how to measure and estimate earth works done by labour, the organisation of excavation, levelling, hauling, loading, unloading, filling and spreading, compaction and erosion control	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Compaction	presents simple soil mechanics, optimum moisture content, indirect compaction, direct compaction and the use of hand rammers, deadweight and vibrating compaction	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Gravelling	how to organise gravelling operations, and testing of gravel quality	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Maintenance	the organisation and implementation of the various activities on labour-based routine, periodic and emergency road maintenance, and the required tools and equipment	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors
Structures	construction and maintenance of small bridges, drifts, causeways, culverts and box culverts	Contractor Engineers, Technicians and Supervisors, Provincial Engineers and Inspectors

Table 9.2 Labour-based Road Works Technology

Subject	Contents	Trainees
Business Management	bookkeeping, profits, budgeting, cost control, cash flow planning, material purchase, personnel management, banking, taxes, labour regulations	Contractor Managers and clerks
Contract Management	bidding and submission, unit rates, estimating, tender preparation, contract documents, contract variations, claims, payments	Contractor Managers, Technicians and clerks
Contract Supervision	contract conditions, submission and tendering, contract variations, claims, payments, work inspection, contract administration	Provincial Engineers and Inspectors

Table 9.3 Business and Contracts Management

9.4 Training Facilities

Training should be executed through a combination of class-room and on-site training. For this purpose, it is important to establish class-room training facilities and a demonstration site in close proximity to each other. The training location will require easy access to catering and accommodation facilities for trainees, lecturers, instructors as well as for visitors. The training centre together with the demonstration site would also be an essential asset for promoting the programme and its technology and approach amongst donors as well as other government institutions.

The demonstration site should be fully equipped with the same type of hand tools and light equipment with which the envisaged road works is carried out. In addition, the classroom facilities needs to be equipped with training aids such as overhead projectors, slide projectors, video equipment, training manuals, flip charts, black boards, etc. For the development and production of training materials the training centre requires personal computers with good printing facilities, a photocopier and a stenciller.

9.5 Training Materials

The technical/training manuals covering labour-based road works technology in Lao PDR have been developed to cover the essential needs of past and currently on-going projects. It is important that in a future training programme that these documents are upgraded and adopted to the further development of work methods and organisation.

An important source of information, in this respect, is all the training materials developed under similar contractor development programmes in other countries (e.g. Cambodia, Lesotho, Ghana and Uganda). The Technical Enquiry Service of the ILO in Nairobi, Kenya can provide a vast collection of additional literature already developed by these programmes.

9.6 Collaboration with Local Training Institutions

In order to achieve a sustainable programme, it is crucial that the training capacity for this type of programme is fully institutionalised in the country. To achieve this goal, there is a demand for a structured plan for the involvement of local trainers.

From the onset of training, a number of government engineers, technicians and supervisors should be permanently attached to the training site. They should be trained to gradually take over responsibility for the training from foreign training specialists, and cater for a future expansion of labour-based road

works technology. This will ensure that, once the training material and the first training programme has been conducted, it should be possible for the government, with minor external assistance, to take the lead in conducting further courses.

There are three training institutions in the country which currently provide training related to road works technology, namely the Communication Training Centre in MCTPC, the School of Communication and Transport and the National Polytechnic Institute.

With a shift of road works activities from the national to rural roads, it is important that these institutions respond the new type of works and consecutive training requirements.

Communication Training Centre

For the immediate training demands it is logical that MCTPC's own training resources are involved.

During previous labour-based training courses arranged in collaboration with ILO and other projects, the Communication Training Centre (CTC) has provided valuable assistance in terms of preparing and conducting courses. Through this involvement, CTC and its trainers have established a considerable experience in organising and conducting training in labour-based road construction and maintenance technology as well as developing training materials and courses. It is therefore proposed that CTC is fully involved in all the training activities in a future programme. By doing so, the training capacity can be fully institutionalised and sustained within a local organisation.

The business management training could be carried out together with a local capacity within this field (i.e. local consultant, bank, university, etc.). Possible collaborators in this field still needs to be further explored before a large scale programme commences.

9.7 Long-term Training

Labour-based methods is a technology which should not be regarded in isolation and only applied in special programmes to satisfy special social concerns or specific interests of the donor community. The task of determining the most appropriate technology to carry out certain civil construction works has always been an important task of technicians and engineers. As described in this report, in many cases the most appropriate technology may prove to be the use of labour-based methods. For this, it is important that the new generation of engineers and technicians in Lao PDR also learn about this technology at the same time as they are exposed to more traditional equipment-intensive work methods.

SCT and NPI are currently in the process of establishing a collaboration with ILO with the objective of creating an awareness among road and bridge engineering graduates of the principles, methods and benefits of labour-based technology as an alternative to conventional approaches. This will be carried out by (i) strengthening the capacity within SCT and NPI to provide training in labour-based road engineering and (ii) developing course materials and conducting training in labour-based technology in the existing road and bridge engineering courses.

Although this is a good first initiative in terms of introducing the technology in the higher training institutions of the country, it should be noted that the resources available are very limited and will probably be insufficient to fully achieve the stated objectives. It is therefore recommended that, when designing future training programmes for this sector, further assistance is provided to SCT and NPI in its efforts to incorporate labour-based technology in its engineering courses.