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United Nations Industrial Development Organization

Interregional Training Workshop on the
Implementation of Industrial Projects and
Related Systems

Beirut, Lebanon, 10 - 26 August 1970

AIDE MEMOIRE

PURPOSE AND SCOPE^{1/}

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I. Purpose of the Interregional Training Workshop

As is well known, effective implementation of industrial projects is of crucial significance to developing countries. Only recently several developing countries and many field experts have pointed out that the implementation of industrial projects is the least regarded of the major problems confronting developing countries in the course of industrialization. All too often, failure to achieve targeted development has been failure to achieve successful or even satisfactory implementation to the extent that this has frequently been a considerable impediment to industrial development. Experience indicates that developing countries encounter a number of problems in the course of project implementation. Foremost are lack of appropriate techniques for programming, coordination and control of project implementation and lack of qualified personnel in charge of implementation.

In order to alleviate these problems the United Nations Industrial Development Organization (UNIDO), with the cooperation of both the United Nations Economic and Social Office of Beirut (UNESOB) and the Industrial Development Centre for the Arab States (IDCAS), will organize an Interregional Training Workshop on the Implementation of Industrial Projects and Related Systems.

II. Location and date of the Interregional Training Workshop

The Interregional Training Workshop will be held in Beirut, Lebanon, from 10 - 26 August 1970.

III. The participants in the Interregional Training Workshop

The training workshop will comprise about 25 participants from 19 developing countries. The participants to be selected are those responsible for working in one or more of the stages of project implementation. These stages include detailed project design and planning, bidding and contracting, developing the

project implementation plan or schedule, constructing the plant and starting-up production.

IV. Scope of the Interregional Training Workshop

The interregional training workshop is designed to include mainly the following:

1. Techniques for programming, scheduling and control of project implementation*

(a) General

It has been recognized that the complexity of the industrial development projects has challenged current implementation programming and control techniques in most developing countries. Implementation problems and shortcomings have been recognized only when they have occurred and hence delays and overrun of cost. The situation has been further aggravated by the absence of adequate coordination between the parties (governmental departments, local and foreign contractors, etc.) participating in the

* Programming and scheduling of project implementation is used here to indicate not only the process of subdividing the project into its component tasks or activities and identifying their interrelationships, but also for each of these activities, the selection of methods for execution, the assignment of resources, the estimation of time requirements and the establishment of the necessary scheduling data. This process results in a plan of operation and a time schedule for implementing the project which, for brevity, may be called the "project implementation plan". The project implementation plan must, of course, be communicated to the parties in charge of its execution. The "control of project implementation" must also include an evaluation of progress, a revision of decisions, reallocation of available resources, and the updating of the project implementation plan in order to achieve more effective implementation.

implementation process. As an example, ordered machinery and equipment are frequently received before construction work and buildings necessary to house them are completed, and thus they might be damaged or become rusty with a loss of capital invested, particularly the foreign exchange component in case of imported items.

Furthermore, existing techniques in most developing countries fail to recognize project implementation as a dynamic process. Since conditions inevitably change in the course of implementation, a project implementation schedule or plan that was initially well prepared frequently ceases to be so soon after its execution has started. For example, deliveries of supplies may fail to meet scheduled dates, climatic factors may effect delay and interruption of work. In the absence of "dynamic implementation programming, scheduling and control techniques" - which allow continuous programming and scheduling in greater detail as the project progresses and continuous reprogramming and rescheduling of the originally prepared project implementation schedule or plan - successive work is then performed as if it were not programmed before or according to a schedule which has ceased to be valid and hence there is interruption of work, waste of scarce resources and increase in cost.

Therefore, one of the main objectives of the inter-regional training workshop is to train the participants from the developing countries in the step-by-step application of dynamic operational techniques for programming, scheduling and control of the implementation of individual industrial

projects and groups of projects such as the network analysis techniques* which are adapted to the conditions prevailing in developing countries (as for instance the lack of necessary skills and the scarcity of particular facilities in a given situation) which are to be illustrated by examples and case studies from developing as well as developed countries. The approach to these techniques to be followed in this training workshop is essentially practical, comprising a set of fundamental principles which are applicable to any project situation. The role of computers in applying these techniques will be briefly covered but the emphasis will be placed on manual techniques which can be easily understood and readily used in developing countries.

(b) Specifics of these techniques

The techniques to be included in the training workshop are used in identifying component tasks or activities of the project(s) at hand, determining their interrelationships, making time-cost trade-off decisions for project activities and allocating resources. A brief discussion of these is of value.

The identification of project activities makes it possible to estimate more accurately the time required to accomplish each of them. By determining the interrelationships of the activities, one can make simple computations of the basic scheduling data of the project activities, thus

* Network analysis techniques became the world-wide accepted tool for planning or programming, scheduling and control of project work. They have originally been applied to projects in developed countries but soon their value and the benefits achieved from applying them have been and are being appreciated by most developing countries even for small and medium-sized projects.

determining the activities that control the duration of project implementation. (If the accomplishment of any of these activities is delayed, the project completion date will be delayed by a corresponding amount). In this way, project management can concentrate its efforts where they are most needed and utilize its resources with a minimum of waste.

In project activities the problem of time-cost trade-off arises from the fact that most of the activities of the project can be performed by a number of alternative methods requiring different periods of time, resources and costs. In undertaking an activity, direct and indirect costs are subject to change when the performance time changes. In expediting a project activity, i.e. if its rate of implementation is quickened - direct or variable costs tend to increase. If the project completion date has been set by certain economic linkages, time-cost trade-off techniques would be applied in order to arrive at the implementation schedule of project activities which meet the specified completion date with the lowest total direct costs. These techniques, however, can also be used for finding a more general solution for the lowest overall project cost, as when they are applied to determine the most economic completion date of a project. Here indirect or fixed costs should be considered as well since they tend to decrease as project duration is shortened and time-cost trade-off techniques should be carried out with a view to developing a project implementation schedule which gives the lowest sum of direct and indirect costs.

The allocation of resources often presents a problem. Most of the activities of a project require one or more resources for their performance. If a project implementation

schedule is developed, the amount of each resource required for each time period can be determined. If the demand for one or more resources exceeds their availability during certain periods, some project activities will have to be rescheduled in order to reduce the demand for this or these resources during these particular periods. In case of excessive demand for certain scarce resources, the performance of some project activities may also have to be replanned to satisfy resource availability. In some cases these factors may necessitate delaying or extending the duration of implementation. These proposed effective techniques have as a main objective the development of an implementation schedule that economically meets resource availability and minimizes delays or extensions of the duration of project implementation. Such techniques provide an effective tool for the implementor who must deal with the more complex problem of allocating resources for several projects to be implemented concurrently.

It is worth mentioning that these techniques have been successfully applied in several developing countries which are at various stages of development and have different economic and social frameworks.

2. Project implementation systems

As is well known, a development programme and the projects selected to implement it comprise the prediction of the behaviour of a set of variables over the programme horizon, during which conditions may change beyond the control of the planners, and even beyond the control of the government. This may develop out of foreign trade, foreign aid, changes in price levels, etc. Any of them may have a profound effect on the assumptions on which the feasibility of the development programme and/or projects were based. Thus, sufficient flexibility and appropriate organization and decision-making in the process of implementation is required to

allow changes and accept adjustments in a proper situation. To facilitate prompt adjustment a feedback mechanism should be established to make it possible to undertake modifications to the initial plans on time, according to actual experience gained in the course of implementation. Proper channels of communication should be established so that necessary information and/or directives can reach the right place at the right time.

The aforementioned necessitates an integrated approach to project implementation whereby implementation is geared to some control systems - in other words, project implementation systems. These are: organization and decision-making system, and information and monitoring system (i.e. management information system), with a built-in communication system, which are closely related.

The Interregional Training Workshop, therefore, will deal with these systems - their definition, components, functions, design and efficient operation - taking into account the conditions prevailing in developing countries. It should be noted, therefore, that the underlying concepts, and the main functions of each of these systems, are valid irrespective of the size of the project in hand and availability of facilities and qualified personnel necessary to operate them in the country concerned. However, the degree of sophistication and detail in applying them varies accordingly. It seems worthwhile to include a brief exposé of the main areas which the Interregional Training Workshop will deal with under each system.

(a) Organization and decision-making system

This includes how to organize programme or project implementation at the sector and project level. The various levels and elements of the organizational set-up necessary for implementing the development programme and/or project in hand; definition of objectives, delegation of responsibility

and authority from higher to lower levels in the system to avoid delays and cost increase in decision-making, and the importance of locating the point of decision-making as far down the organizational hierarchy as possible. Here consideration should be given to a number of factors such as: the nature of decisions to be taken, whether they are strategic and concern policy measures of the agency, department or company sponsoring the project, or tactical and involve operational problems which may be of a day-by-day nature; the capability of the personnel at each organizational level; and at what level reliable information with the required degree of coverage and depth is available at the right time.

(b) Information and monitoring system

This covers the different aspects of this system which involve collecting and maintaining a flow of information on each part and phase of project implementation, processing, classifying and storing this information so that it will be readily available for use, reviewing and adjusting the originally adopted logic of the project implementation strategy, and updating the project implementation plan or schedule to render it realistic for further use as a control tool for project implementation. This system is closely related to the above mentioned system since information flows or reporting systems for planning, implementation and control can be directly determined once the organization hierarchy is established.

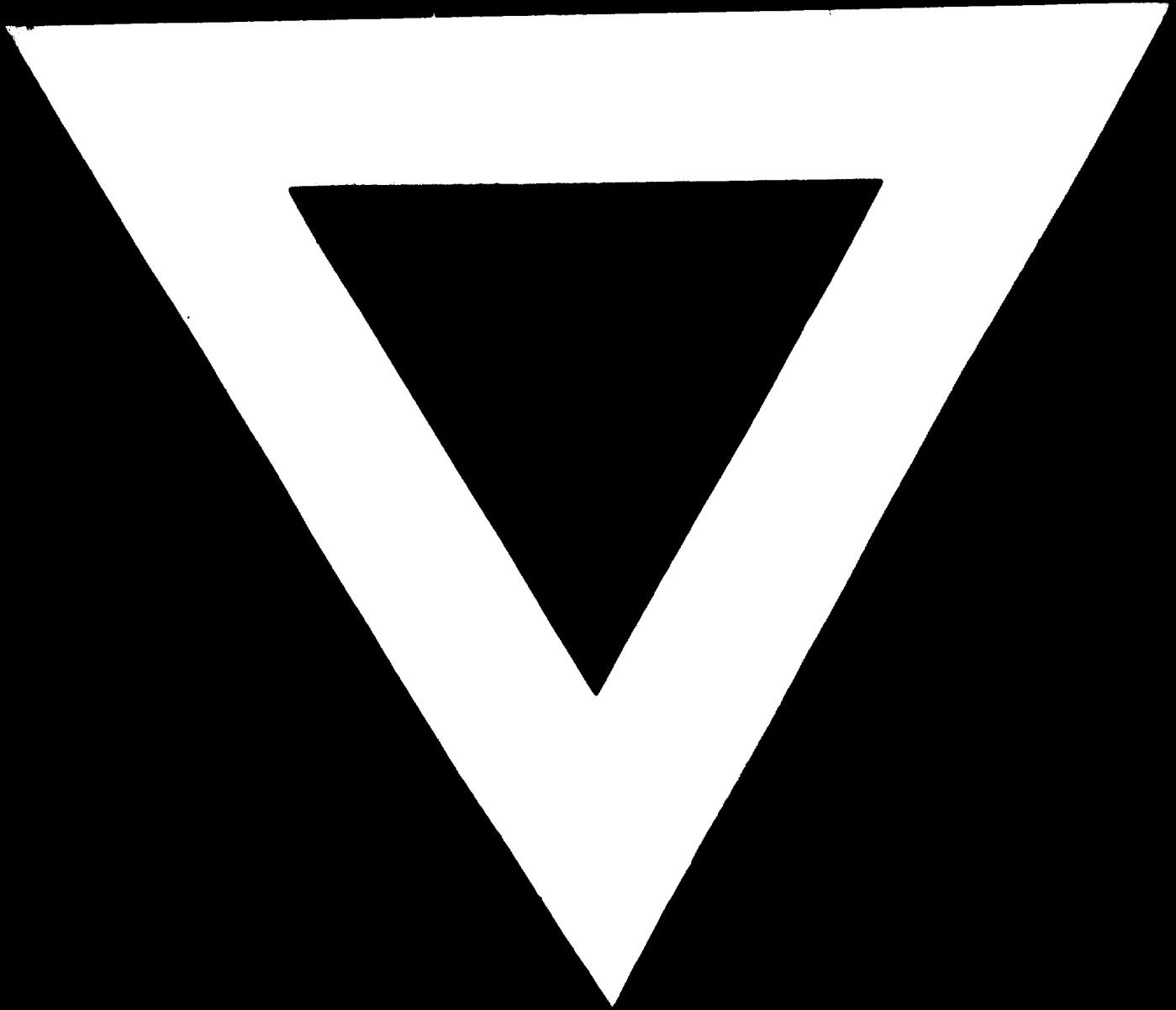
The information needed here concerns the various phases of project planning and development. Reporting systems would be considered together with the mechanics of reporting and periodic revisions. In this context project monitoring and related techniques will be dealt with, as well as the updating of project implementation schedules.

Reporting systems should be based on effective communication in order to transmit, precisely and on time, information from lower to higher levels within the project organization, sideways among project personnel at the same organizational level, from the project organization to other agencies participating or interested in some aspects of the project as well as convey directives from higher to lower levels in the project organization. In this respect the Interregional Training Workshop will consider the different means of communication and the factors influencing their choice.

As has been mentioned above, one of the major components of the information and monitoring system is that related to data processing. The Workshop will, therefore, deal in a rather brief way with data processing for project planning, implementation and control; different data processing systems, computer utilization in developing countries, when to use a computer and factors to be considered and what a computer can do in this respect.

The above mentioned systems will then be illustrated by some examples of appropriate organization forms for project implementation to various situations in developing countries.





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