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THE NEED OF COORDINATION BETWEEN MANAGEMENT IMPROVEMENT  
AND TECHNICAL DEVELOPMENT IN ELECTRIC POWER  
by Merrill J. Collett

Note: This paper is an outline of a concept, and does not represent a complete dissertation. The Seminar should produce the questions and examples so important in applying general concepts to specific situations.  
This text is subject to editorial revision.



The technical problems in electric energy system development and operation are so demanding they tend to require the exclusive attention of executives, specially in the early phases of project or corporation development. Yet the answers given to technical problems will, in many cases, determine the ability of the organization to be managed effectively and, conversely, the answers to management problems may well affect system stability and quality of service.

Included among the early-phase technical problems are such questions as the following: Is there reasonable assurance there will be financial support for technical development of the scope which is planned? In the early stages, should money be spent on building segregated plants or in developing an integrated system? In providing facilities for electrical energy, could they be used for other purposes? How should the costs and revenues be allocated?

Among the operations and maintenance problems which have similar two-way implications are the following: Should there be centralized dispatching? Should the system carry loads to full capacity or operate with reserves? What type of maintenance program should be established? If the system which is being put together has been run as a series of separate electrical operations at diversified voltages, should a uniform voltage be selected or should the system continue to operate on a diversified basis?

These questions and many like them face executives in new system development. They cannot be answered on a strictly technical basis. They will require coordination of technical and management aspects in their solution. The

answers frequently require phasing and periods of lead-time. (For the purpose of this paper "lead-time" means the time which elapses between a decision and the usable availability of what the decision called for--for example, the placing of an order for a turbin and the date the turbin is actually in use.) It is true that the complexities of procurement and construction lead-times tend to fix the development calendar, yet even in these matters management problems will affect operating decisions and results. The present capability of staff may tend to limit the technical refinements in operations design. The speed and effectiveness with which construction superintendents get their jobs done may in large measure be dependent upon the manner in which their offices are organized so they are freed from time-demand details, important but secondary, such as construction camp administration, etc. Organizational decisions will determine the smoothness of testing and take-over between employees responsible for construction and those responsible for operation. It is unwise to avoid considering management lead-times.

Let us look now at some of these management lead-times.

We must allow for considerable time in transferring basic enterprise philosophies into employee actions.

Few of us can expect to find present in our developmental planning the whole miracle-in-timing which made possible the relatively rapid transfer of philosophy-to-actions in the Tennessee Valley Authority of the United States of America. Consider the factors which were in existence at one time: (a) there was a depression; (b) brilliant college graduates were looking for jobs; (c) the Tennessee Valley Authority, a great social experiment in the United States, was established by Congress; (d) the Authority made sure that persons being considered for employment clearly understood the purposes of the Tennessee Valley Authority Act and were in agreement with it. Taken together, these factors produced a highly qualified staff, with both technical skill and social imagination,

but without previous experience in this type of undertaking to restrict decision-making or to create barriers to the rapid carrying out of policies established.

An employee working on something has the same relation to an employee believing in something as a dull sluggish organization has to a live, aggressive organization.

This translation of basic philosophy into employee actions requires advanced planning, specific executive policy decisions, and management determination as to how much and what kind of effort will be made.

We must allow for a lead-time in transferring organizational decisions into effective working relationships.

Of course we should develop groupings of functions into organizational units in such a way as to prevent duplication while ensuring complete program coverage. This process should be extended to key individuals within the organizational units. But we should do more. We should make sure that each key individual clearly understands his authorities and responsibilities in terms of relationships with superiors, colleagues at the same administrative level, and subordinates.

There may be a vast difference between a management decision at the policy level of an organization and the actual manner in which that decision is carried out at the operating level. Unless we allow time for individual discussions with persons involved, including complete freedom for presentation of differences or of questions which affect the three-way relations mentioned above, the written organization and its effective date will be obsolete as of the date of issuance. Further, we should allow for the time and executive determination to firmly cement responsibilities assigned. A written statement of assignments is nothing more than the initial entrance of a nail into hardwood: it must be hammered in until it will hold weight.

We must expect management lead-time in the evaluation of key manpower needs and the meeting of those needs.

This requires an evaluation of present supply, in terms of trained and trainable personnel. Also, if workers or executives who can be trained are available in the organization, is there someone available to train them? If certain technical, professional or executive skills cannot be provided from within the organization within scheduled lead-times, is someone able to do the intensive, pin-pointed search for candidates that is required? Will whoever is expected to carry on the search represent the best interests of the organization, secure personnel committed to carrying out the purposes of the enterprise?

A major consideration in the meeting of manpower needs is the lead-time required to secure technicians, professionals and executives in time so they will be able to assume their assigned responsibilities when required. There is involved a lead-time, generally, for recruiting, transporting, and giving job training as required to new personnel. In addition, for operating and maintenance personnel, a longer lead-time is involved due to the necessity of their knowing the system, personalities, and backgrounds within the organization, and being fitted into a working group so that group effort will be at maximum possible productivity.

We must allow a management lead-time between determining the kind of staff development needed and the actual conduct of a program.

There are distinct differences in approach to staff development, depending upon the level in the organization and the occupational characteristics of the staff involved. These differences should not be discovered only through the costly process of experimentation. Yet many of us will attempt, and discover for ourselves, the shortcomings of the lecture method of training. Some will experiment with lead-times for operations training and executive training, trying various methods until, in many cases, the advantage of a planned approach

will be lost.

We shall need to consider very objectively the background of manpower available to us, either presently employed or as a recruitment source, since it will affect both current assignments and the type of training planned. Again referring to the TVA experience, TVA's practice of providing near-engineering level training for plant operators would not be possible in most of your utilities because the combination of pre-requisites involving industrial experience, education, and aptitude may not be present. And of course over-training is a constant danger. We'll do well to consider, first, training employees to meet the requirements of the job immediately ahead: As we have more time, we can provide a gradual broadening of outlook and of capabilities.

As staff development continues, and chief executives become aware of the potential managers and supervisors in their organizations, formal "promotion ladders" may be drawn up, requiring experience in one position as a pre-requisite to the next higher position. These formalized "promotion ladders" tend to freeze the selection process into narrow channels of specialization, or pre-select future executives at far too low in the organizational ladder. We should, rather, search constantly for the employee with great ability, with a desire to make his capabilities known, at whatever administrative level he may be when that ambition or desire manifests itself.

We must allow for lead-time between the determination of organizational objectives and a management evaluation of progress toward those objectives.

Too frequently we surround ourselves with a vast complex of technical reports and detailed statistics without first determining what, specifically, we wish to accomplish, and then eliminating from management consideration those data which have no part in decision making.

For evaluation purposes organizational objectives cannot be stated in broad policy terms with a literary flair. They must be down-to-earth statements of

measurable goals. Unless they can serve as progress targets against which the experience of a year--or whatever time period is used--can be measured, they are not performing a useful management function.

After objectives have been determined, and this is no rapid process if it is done correctly, there will need to be planning and effort, involving much time, at the various administrative levels in the organization to develop a system of control reports which will provide information required to make evaluation possible. Every step in this process should be carefully planned with the needs of management in mind. To be effective, such a system should fix responsibility at each organizational level in relation to the authority actually possessed, making available only that information which is required for decision-making at the level involved. The system should also be built upon a concept of "exception reporting"; --management does not have the time to read a multitude of data, all of which merely supports what the reporter wants to prove, that he is doing an excellent job. Management should, rather, be interested in the construction which is ahead of schedule or behind schedule, the maintenance schedules which have not been met, the generating plant efficiencies which are greater than anticipated or less than anticipated, etc. This calls for a system of control reports combining carefully selected data representing the maximum measurable units and supported by brief explanations of pertinent facts in such a way as to require management decisions and action.

#### Summary

Unless management improvement considerations are a part of technical development from the beginning, later consideration of management factors will lead to improvements temporary in nature and requiring frequent emergency consideration at policy levels. These are wasteful of executive time and may result in frequent changes in system and procedures, a process which disrupts an organization. Also, if forced into the organization thinking only during

the operating and maintenance phase due to an increasing ratio of operating expenses to revenues, management improvement tends to become a program of its own. It is born of financial emergency which requires priority. This alienates officials charged with conducting the program responsibilities of the enterprise because they are burdened with undue time requirements for non-program matters, and because too frequently it is accompanied by overly aggressive activities of "staff" officials who may have certain responsibilities for personnel, planning, accounting, and similar service functions.

Specifically, in the same phase as project concept and planning determination should be made of management philosophies, basic organizational plan, and the streamlined basic systems or procedures needed to achieve objectives.

Early in the design and construction phase of technical development, attention should be given to translating organizational objectives and management principles into effective working relationships and attitudes, and in evaluating manpower needs.

As the operations and maintenance phase begins, emphasis should be given those aspects of management improvement relating to the determination of objectives, the establishment of control reports and evaluation of progress, and the productivity of units and individual employees. During the physical construction phases employees receive satisfaction through seeing things happen. Later, during operations and maintenance, there must be conscious provision of a substitute motivation for individual employees. Measurement and control devices can provide self-competition or inter-unit competition as an incentive to improved service and lower costs.

During the operations and maintenance phase, coordinating devices should be emphasized. In this phase the organization is large; individual units have received their assignments and, as is always the case, are tending not only to carry out functions they were originally assigned but to seek additional

functions because, as they so frequently claim, these functions must be responsive to their needs. For example, the distribution and sales unit may insist upon having responsibility for transmission line construction in order to be sure service commitments regarding date of energy availability are met. Consequently, electric energy executives must either constantly maintain the responsibilities and functions originally assigned or consciously make changes in them, bearing in mind the total needs of the organization. Executives must provide coordinating devices to assure that information about the program is made available to all affected supervisory officials. Coordination at all levels will bring the full knowledge of the organization to bear upon problems encountered at these levels.

Management improvement is indeed an integral part of technical development. Management lead-time will determine whether technical developments are put to use skillfully, smoothly, and at lowest cost or whether we end up in a bureaucratic maze. Yet this management lead-time tends to be forgotten until executives are almost up to the date the system, or a major extension, will be put into operation. The time calendar for electric energy executives must be divided equally between technical development and management considerations.