

A Critical Appraisal of PERT/CPM Application in Korean Public Admini- stration; Case Studies

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I. PURPOSE, SCOPE, AND ASSUMPTION

The purpose of this study is to derive through the examination of Korean experiences some meaningful suggestions for those who want to apply a new modern management technique, PERT/CPM, in the context of the public administration in a developing country, Korea.

The knowledge on PERT/CPM technique was initially introduced to Korean military organizations. Its application was also attempted in private sector by a few civil engineering and construction companies. In public sector, similar attempts were made mainly by the Ministry of Construction and the Economic Planning Board. This study deals with these latter two cases.

The analyses of only these two cases will not justify the generalizations as to the whole Korean scene, and this is even more so when one attempts to apply the conclusions we derive from this study to the context of another developing country. Therefore, the conclusions will merely serve as suggestions and may contribute to the development of insights on the part of those who are going to apply this technique in the future.

The writer assumes that the reader of this paper already knows the basic concepts and

possesses some knowledge of techniques of PERT/CPM. Consequently, the writer will avoid reiterating the technique, concepts, and the advantages of the technique for the management improvement as applied in the U.S.

II. DESCRIPTION OF THE CASES

1. Ministry of Construction (MOC) Case

It was in 1968 under Minister Ju Won, a former professor of urban planning, that the director and the staff of the Training Institute of the Ministry of Construction visited the Korean Military Academy for the enlightenment of the faculty of the training institute. The curriculum together with the various features of the military academy was briefed to these visitors. Later, the training institute of the ministry asked the military academy to send a few of its faculty members on a part time basis to open such courses as *PERT/CPM, Linear Programming and Economic Development*.

Major Lee Kyong-Jong, a faculty member of the military academy who had been teaching PERT at the academy, made commitment to teach a course on PERT/CPM for about a week for the grade 3-B civil engineers of the ministry. This is how the new technique of PERT/CPM was officially introduced into the Ministry of Construction. Since then, major Lee has involved himself in the various phases of the change introduction including the teaching of PERT/CPM course as a part time lecturer.

In 1969, a new minister, Lee Han-Lim, one-time four star general of the army, took his office. The new minister had known major Lee as a cadet at the military academy when the former was the president of the academy. Because of this previous acquaintance, major Lee insisted that PERT/CPM should be introduced into the construction projects of the ministry in order to prevent ineffective and inefficient manners of planning and execution of these projects by the civil servants of the ministry. Asked whether PERT/CPM could serve as the real solution to such a manner of conducting construction projects, major Lee responded by saying that at least an exercise should be held in order to test the validity of the technique.

Thus, by order of the minister, a team, named "New Process Management Development and Research Group," was formed in the summer of 1969. The group was headed by the vice minister and his deputies were the director-general of the Office of Plan-

ning and Management and the director of the Public Works Research Institute of the ministry. Major Lee served as technical consultant. The rest of the group, numbering 39, were lended from the three regional construction offices from among those in the grades below the 3-B level. These 39 men divided themselves into three groups; harbor construction, water resource development, and the road construction. The group selected ten on-going projects which were being carried out under the responsibility of the Ministry of Construction, and went through a three month long exercise and report writing. Exercise for computer program for PERT/CPM was also included. During this three month period of exercise, the top managers who were ex officio members of the group did not involve themselves because of the heavy workload at their offices of the ministry.

Consequently, the experience of exercise was limited to those who came for this purpose from regional offices, major Lee and sub-section chief Chon Hoh-uk, a 3-B grade civil engineer of the Public Works Research Institute. Mr. Chon was a man, besides his normal duties as a civil engineer at the research institute, who was very much interested in the development and utilization of EDPS. It was because of his initiation that FACOM 230-10, the first electronic data processing system in the ministry, was installed at the research institute in 1969. Mr. Chon started to develop programs for PERT/CPM by himself and demonstrated to the participants in the exercise how the computer programs could be used.

As a result of the exercise, the report of 759 pages which was to serve as a guide book for the others was published together with an annexed book which contains the networks for the ten selected projects.

Meanwhile, the training by the Training Institute of the Ministry of Construction on the use of PERT/CPM has been extended to include Grade 4 and 5 civil engineers. An official at the institute who has involved himself in the training programs from the initial stage said that by the end of 1971 almost all of the civil engineers both at the headquarters and the regional offices had gone through 30 hour education on PERI/CPM. Even those in the middle and top management positions who are classified as "administrators" also received the training in this techniques for three hours. From 1969 the training institute solicited the private civil engineering companies to send their men to receive the training. So far 75 men have undergone such training.

In 1971, another minister by the name Tae Wan-Son came in. He showed his concern by asking his staff to brief for him at his office on the technique of PERT/CPM,

After the dissolution of the New Process Management Development and Research Group, the ministry selected 19 projects to which PERT/CPM was to be used. Out of the 19 projects, 2 have been dropped because of the official suspension of the projects. The Public Works Research Institute, through its Civil Engineering Standards Section, is receiving the original and subsequent revised networks from the regional construction offices which are supervising the project execution at the field.

By now, there is almost none in the ministry who does not know the word, PERT and many even know the details of the technique. The technique is being put into practice in the 17 projects the names of which the ministry officials were reluctant to disclose to this writer because of many possible shortcomings.

2. Economic Planning Board (EPB) Case

It was in 1968 that the president Park, on the occasion of his visit to the Economic Planning Board, instructed to develop scientific and rational methods of budget allocation for various construction projects. The instruction was given because of the wide and increasing rate of gap between the initial investment plans for multi-year construction projects and the actual budget requests in the subsequent years. There was also a tendency among the agencies to prolong the project period.

Because of this presidential instruction, the EPB, under the leadership of Minister Pak Chung-Hun, established in January 1969 a subunit called "Office of Budget Control," upon which responsibility fell for the development of new methods to advance the rationality of budgetary decision making. The legal status of the office was that of bureau level. A section chief in the EPB was promoted to head the office. Section chiefs and subsection chiefs of the office were recruited from the other bureaus of the agency. A new minister, Kim Hak-Yol, also supported the *raison d'être* of the budget control office. In December 1969, a graduate of the Graduate School of Public Administration of the Seoul National University by the name of Mr. Kang Yun-Mo was hired at this office as grade 4-A official. Mr. Kang was relatively well versed in the technique of PERT/CPM because of his exercise in the project management workshop at the school and his thesis on the Yo-I-Do island enbankment project. By the time of Mr. Kang's employment, the members of the office were studying PERT/CPM through reading of books and contracting with an outside consulting agency. The office also had been developing the standard units of measure-

ment and cost for the use in the designing of various government construction projects. Many of the staff of the office had been examining the contents of investments of major multi-year construction projects. For these purposes, the office hired several engineers of different fields.

The knowledge Mr. Kang Yun-Mo possessed was easily going to be utilized in the venture of the office to introduce a new system of budgetary decisions. In order to demonstrate the utility of PERT/CPM technique, Mr. Kang analyzed the so far unread report submitted by the consulting agency on the application of PERT/CPM to the construction project of a telephone exchange office in Seoul. He explained to the director of the office that the savings of 14.6 million won or 15.3% of the total expenditure and 122 days equivalent to 37% of the total time could have been made by the use of PERT/CPM compared to the application of more conventional method of Gantt Chart.

Given full support by the director, Ahn Yong-Chol, many of Mr. Kang's ideas were accepted. With the approval of the minister, director Ahn, at the monthly cabinet briefing on economic situation of February 1970, briefed the president about the utility of PERT/CPM for the advancement of more rational budgetary decision making. The president instructed the EPB to go ahead with the application of this new technique to the FY 1971 budget.

The EPB then selected the following 13 major construction projects to which PERT/CPM should be applied for the FY 1971 budget requests.

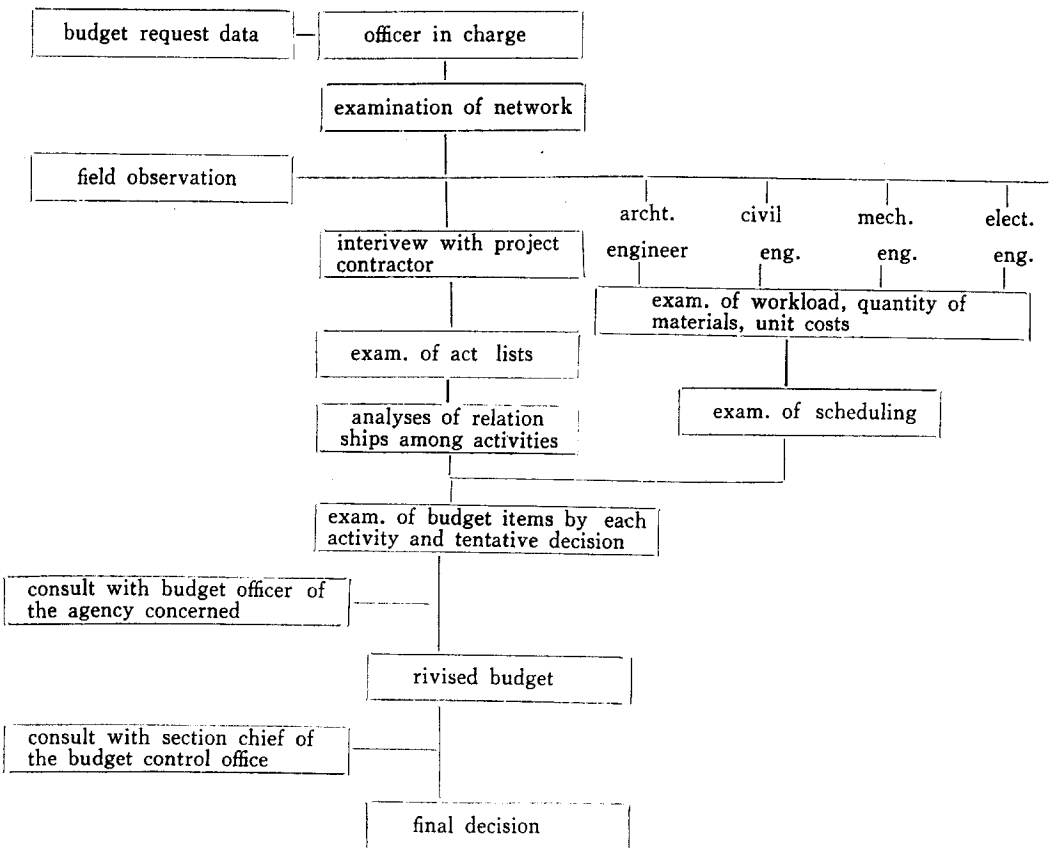
- 1) Construction of National Assembly Building at a New Site
- 2) National Highway Construction
- 3) So-yang River Dam Construction
- 4) The Second Dock Construction at Inchon Port
- 5) Industrial Water Development at Suwon Anyang Area
- 6) Free Port Construction at Ma-San
- 7) Petro-Chemical Plant Constructon
- 8) Construction of the Seoul National University Campus at a New Site
- 9) Construction of National Culture Center
- 10) Kimpo International Air Terminal Construction
- 11) Honam Railway Construction
- 12) Yongsan Cargo Terminal Construction

13) Pohang Steel Mill Construction

The agencies in charge of the above projects were requested to submit a series of master network and subnetworks with the activity lists, in which detail informations on materials, equipments and manpower were to be presented.

Meanwhile, the training of budget officers of the above agencies and also of the personnel of the Bureau of the Budget of the EPB was conducted for two days, where Mr. Kang served as instructor.

The budget review process inside the EPB was stipulated as follows.



In September 1970, the office evaluated its own efforts of PERT/CPM introduction and for this purpose distributed questionnaire to the agencies concerned. Based on this evaluation, Minister Kim of the EPB reported the results to the cabinet meeting of economic ministers in October and announced the EPB's policy to further extend the application to include more projects and eventually to apply the technique in budget allotment process. A

further refinement in the budget request documents for FY72 was made, and another training for two days for the agencies concerned was conducted in February 1971. Projects such as the Construction of the Seoul National University Hospital, Andong Dam Construction, Central Telephone Exchange Office Construction, Mintage Plant Construction, etc. were added to those of the previous year. The appraisal of the FY 1972 program was conducted in September 1971.

Because of these efforts for two years, it is said that the rationality of budgetary decision making is enhanced. Formerly the budget decisions had been political and bargaining processes as in any other country. This is still true in many other cases. However, the practice of requesting the amount in which a certain portion of expected cut is included has been decreasing in its degree with respect to the above projects, because the examiners at the budget control office analyze activity by activity as to its content, sequence, ways of conduct, duration, feasibility, etc. in contrast to the former practice of merely relying on experiences and insights.

This way of examining the budget also has served as a good rationale for the EPB to defend its budgetary decisions vis-a-vis the requesting agencies. The program also had the effect of stimulating the requesting agencies to draw the designs of projects first and then request the budgets to the EPB. The practice in the past was in the reverse direction.

However, because of the shortage of technological speciality in the EPB in various substantive areas of engineering in spite of the availability of several engineers, this PERT/CPM application to the budget reviewing process may eventually bring about the tendency for the EPB to go along with the requests of the line agencies, in which case the EPB may have to take into consideration a new dimension to its budgetary decision making.

II. MULTIDIMENSIONALITY OF THE INTRODUCTION OF TECHNOLOGICAL CHANGES IN MANAGEMENT

During the conduct of interviews with those involved themselves in the above two cases, various problems and issues were raised with regard to the application of PERT/CPM to the Korean public administration. Consulting agency reports and unpublished documents of self-appraisal by those who conducted the programs also pointed out various problems of application. In the following pages, these problems together with possible suggestions for

a successful application will be presented.

1. Project Traits

(1) There are two types of government projects; one those contracted out to private companies and the other conducted by the government agencies themselves. In most construction projects, the practice is to rely on the former method. In order to make contract with private companies, the following procedure is to be followed according to the budget and accounting law and the Ministry of Finance decrees and regulations. In the bidding whether it is open or closed, the designs of projects, specifications of engineering, and the date of completion, etc. are shown to the bidders before they actually bid.

Once the contract is signed with the successful bidder, it becomes the contractor's obligation to finish the project by the deadline following the every specification laid out in the contract. If the government is satisfied with the achievements, it becomes the obligation of the government to pay the amount of money in the manner as stipulated in the contract. On top of this legal arrangement, the government posts its personnel at the site of project to inspect the every detail of project implementation, and upon the completion of a project the government conducts the final inspection in which another government personnel checks every detail of the construction.

In view of the above arrangement existing in Korea, the value of PERT/CPM for government use is certainly limited as far as the implementation stage is concerned, where the contractor only is responsible for project execution. The value of PERT/CPM in this case lies rather with the planning stage in which the project period and sequence of activities based on the specifications of design and engineering can be rationally arranged. This will be more so when the government eventually makes it practice to show the bidders the PERT networks before the bidding is made. On the other hand, when the project is being executed by a government agency, PERT/CPM technique can be applied both at the planning and execution stages.

(2) Some government projects are the offsprings of the pledges made by the candidates in the election campaigns. Many of these projects were not carefully planned beforehand as to their feasibility and economic necessity. When many of successful candidates individually promised their constituents projects of this nature, the usual consequence is that the projects, after the initial phase of launching, will be abandoned at some point of execution

process. Sometimes it also becomes necessary from the political perspective of a candidate to conduct the project completion ceremony at a certain symbolic occasion, in which case prolongation of the project implementation to match this date will be necessitated. Consequently, the projects of this nature will not be adequate for PERT/CPM application.

(3) When a project, by its nature, is mere repetition of a few simple activities whose inter-relationships are not complex, the value of PERT/CPM technique is also limited. For this type of projects Gantt chart technique is more useful because this technique is simpler and easier to use than PERT/CPM and serves the same purpose. Examples of such projects are embankment projects and road repair and pavement projects.

(4) PERT/CPM may be more useful for large-scale projects than the projects of small-scale. The project which requires large amount of money and long period of execution because of its scale may need greater savings in money and time. On the other hand, small project, especially when it is of the nature specified in (3) above, definitely does not need to be the object of PERT/CPM application. It does not merit the manpower and time needed for the application of PERT/CPM.

(5) Since a government is conducting many projects at the same time, the natural tendency is that some projects receive more attention and steady support, while others are sometimes neglected at some points of project period. The large scale projects are more likely to receive such attention than the projects of small-scale. The projects which have symbolic significance to the government and to the nation will attract more attention and will receive continuous and strong support as reflected in the allocation of greater amount of resources and in the government's legitimization efforts for such projects. The large scale projects of this kind are likely to have steady flow of resource inputs even when they are multi-year projects, in spite of the annual basis of government budgetary decisions.

Consequently, PERT/CPM will be of greater use to the projects of this kind than to the projects for which there is little possibility of continuous resource input over many years even when they are multi-year and large-scale projects.

2. Management Style

When PERT/CPM is perceived by those who are responsible at the field for the implementation of project as another means of control over them, then they are likely to resist in various ways against the introduction of this new technique. This is especially

so because PERT/CPM technique has the centralization effect. The technical details of project which used to be at their discretion have to be reported to the higher echelons. The sequence, starting and finishing times of each activity together with the costs are likely to be controlled by those at higher echelons. The resistance took the following forms in MOC and EPB cases. The time required for each activity is purposely extended at the project planning phase so that those implementing the project can enjoy leeway and avoid possible delays in the future which will induce negative sanctions from above the hierarchy. Similar behavior of falsification could be observed with regard to the costs of activities. In order to raise the costs, the unit cost, quantity and quality of manpower, equipments, methods of engineering, etc. are manipulated at the planning stage of a project.

Another method of resistance was to purposely drop the critical and major activities from the project plan at the time of requesting annual budget based on PERT network data. In this case, the requesting agency had in mind to request this portion of budget at a later period of the year, when the government will formulate a revised budget, which is actually additions to the original budget.

As long as PERT/CPM technique is taken as a means for negative sanctions, the resistance of the above kind will prevail and the introduction of this new management technique will only do harm to the management practices of a country. In order for PERT/CPM to be really helpful for more effective and efficient planning and implementation of a country's projects, new style of management is needed, in which the higher echelons are willing to share the responsibility and accountability with those lower in hierarchical status. People who draw the networks and derive the cost figures of a project should not be taken as the target to whom the buck is to be passed.

The role content of top managers under this new style of management should be like the following. The top managers should do everything to provide the favorable conditions for smooth implementation of a project. Many construction projects rely on the import of foreign equipments and materials, the purchase of which is centralized by a government agency. Some projects depend on foreign loans and investments. Frequently, a project implementation is delayed and the best season of the year is wasted because these foreign supplies do not reach the project site in time. It should be the responsibility of the top managers and their aides at the central agency to do everything including external contacts to accelerate and expedite the faster delivery of these money and goods so that the peo-

ple at the field do not become inactive. In other words, the top managers and the central government are in supportive management for the people in the field to achieve concrete results.

The networks being used for the above two cases were not successively summerized for the series of networks of greater abstraction to be used for managerial purpose for the managers at the higher echelons. In other words, the PERT networks so far used were the master networks which cover more than two years and subnetworks for the fiscal year concerned. And the latter network was the one to be used at the project site by the project manager and the engineers alike. Besides these networks, there should be series of networks which can be used for managerial purpose by the managers of different levels. One of the benefits of using the networks for managerial purpose is that the managers also can identify the forthcoming troubles and can have clearer picture of the current problems involved in the project implementation. Quite frequently it is out of the authority of the project manager in the field to solve these problems. The managers at higher echelons should take up this responsibility.

When the managers at higher echelons of a government do not actively engage themselves in such supportive functions, the men at the project site are easily disappointed and frustrated, and will finally seriously doubt the validity of PERT/CPM application to their projects.

3. Budget and Auditing Regulations and Practices

(1) According to the current regulations on open bidding, the period of ten days are required for public notice. After these ten days, only one to three days are allowed for the estimate by the bidders before actual bidding is held. Supposing that the bidding in the future will be based on the PERT networks together with the cost estimates for component activities prepared by the government agency, the period of one to three days is too short to enable the bidders to make their own counterpart networks and cost estimates together with the examination of the site. If this regulation of the Ministry of Finance continues to exist, the bidders will not be able to base their bidding on PERT/CPM.

(2) According to the current provision of the budget and accounting law, the criterion of successful versus unsuccessful bidder is the proposed estimate of the cost. The contract is awarded to the bidder who proposed the lowest cost. Because of the competition among

the bidders, some bidders may sometimes propose the amount lower than the minimum needed for the conscientious implementation of the project. The difference will be made up later by lowering the quality of the project, i.e., by violations of engineering specifications. This practice can be alleviated if the bidders are requested to submit their PERT networks and if the government disqualifies the bidder who has presented impossible and unreasonable networks even if the same bidder proposed the lowest amount.

(3) According to the current practice of deriving an estimate out of the design of a project, the initial itemized costs do not render easily to the rearrangement required for budgetary requests to the Budget Control Office of the EPB. The office is asking the agencies responsible for the projects mentioned in EPB case to submit the budgetary requests which are broken down into three major categories; salaries and wages, materials, and equipments for each activity.

However, according to the current practice, items of cost are diffused over many activities. Rearrangement into the three categories and again into each activity means more work for the designer and the budget officer of the requesting agency. The current forms of documents should be revised to suit the PERT/CPM purpose.

(4) For some project, the total period of project is not agreed upon in the contract between the government and the contractor because the government is unsure of the times at which the foreign capital, supplies and the domestic resources become available.

On the other hand, requests are frequently made by government to shorten the project period to meet a certain occasion. This will cause cost push as to wages, methods of engineering, kinds of equipment and materials. However, according to the current provisions of the law and the regulations, there is no way of compensating the expense occurred above the initially contracted amount. Consequently, the contractor is likely to degrade the quality of the project.

On the other hand, if the project contractor made extra savings due to either unreasonably higher estimate by the government at the planning stage or the decrease in the unit costs of wages, materials and equipments at later stage, the saved money automatically belongs to the contractor in addition to the certain percentage of profit legally recognized in the contract.

In order for PERT/Cost applicable under these conditions, there should be a new arrangement in which a balance sheet is made between the government and the contractor based

on the actual expenditure after the project is completed, and the difference thereof is made up by one party to another.

(5) Allotment of budget is made on quarterly basis, in which the amount of the total project budget is evenly divided. In other words, the budget allotment process does not take into account projects differing needs for financial resources at different periods of time. Thus even when a project needs 50% of the total financial input at the first three months, the current allotment practice does not allow this much of money disbursed. The consequence is the prolongation of the project to adjust to the pattern of availability of financial resources. In order to alleviate this situation, the allotment for each quarter should be based on the data of PERT network for the same period.

(6) For large-scale and multiyear national projects, the setting aside of a certain portion of a revenue source of the government for the entire project period may bring about the stable and consistent pattern of project execution over the years. Otherwise, the availability of financial input to these projects will be unpredictable because of the annual nature of budgetary cycle.

(7) The auditing by the Board of Audit is based on the budgetary document which shows the fixed amount for each item of expenditure. The auditor examines whether the fixed amount of each item was actually spent with due legal process. However, he does not consider whether the money was used in most effective manner for the project. The cost push effect of shortening the project period is neither taken into account by the auditor. The auditor does not consider the duration of the project. In other words, he does not probe into the causes of project delay and the reasonable date of completion. This practice of auditing is likely to induce the executing administrators to act in very similar behavior patterns. In order for the applications of PERT/CPM technique really successful, auditors should also use PERT/CPM data as an important basis for the auditing of project execution.

4. Development of Standards

The successful application of PERT/CPM presupposes the existence of well developed standards on manpower, equipments, materials and engineerings for different types of projects. In Korea, the EPB has been developing these standards over the past several years for various construction projects. The EPB at the same time is delegating to the other government agencies concerned the similar work with regard to the special features and special types of projects.

The designer concerned use these standards in the designing and deriving the cost estimate of a project. However, with regard to the projects which are very new to a country, the application of PERT/CPM faces difficulty because of the lack, at the planning stage, of technical knowledge and experiences on the similar projects among the indigeneous personnel.

5. Skill Proficiency

In the above two cases, the sheer difficulty of and time consumed for drawing alternative networks, identifying their critical paths, rearranging the sequence of activities according to the available manpower, equipments, materials, financial resources and according to the predetermined date of completion with the minimum cost of expenditure, etc. were one of the major reasons why the personnel concerned were reluctant to use PERT/CPM technique.

Most of the agencies which were responsible for the projects designated by the EPB depended, in the first year, entirely on the consultants in drawing the networks for budget requests. Those who participated in the New Process Management Development and Research Group of the MOC case expressed their opinion that for some projects the value of PERT/CPM technique is doubtful because the network drawing took up too much time of too many people. In view of the need for frequent and quick revisions of network in the implementation stage of a project besides the initial works involved in the planning stage, their view is not only valid but also very important and should be taken into well consideration in the introduction of the technique.

Rather than lectures, workshop should be the main feature of teaching method, so that the trainees can acquire the confidence and proficiency in their skills of drawing the networks through real experiences.

On the other hand, for the managers of higher levels the major concepts of PERT/CPM should be more emphasized than the rigorous observation of the technical details of PERT/CPM as developed in the United States. Some revisions of the technique with possible modification and simplification to suit the needs and the competence level of the civil service of a developing country may be necessary.

6. Reporting System

According to the current system of reporting in Korea, major item of report content is

the degree of progress of a project implementation, which is shown by the percentage of the total project. The main methods of control are the Gantt chart and the budget. Each agency responsible for project implementation reports back to the Planning and Coordination Office of the Prime Minister and the Economic Planning Board. The degree of a project progress is determined by the amount of money disbursed out of the approved budget items. This degree of progress then automatically determines the length of the bar of the corresponding phase of a project in the Gantt chart. The checking of progress in this manner is done on quarterly basis to match the budget allotment cycle.

In order for PERT/CPM to be used in project progress control, the reporting system should also be revised. Rather than the uniform quarterly checking, the timing of checking should be geared to the events of the critical path. The amount of money disbursed should rather hold a secondary importance and major content of report should be geared to the actual completion of activities in the network. This means that the percentage of money spent out of the total budget should not be regarded as the degree of actual progress of a project.

7. Organization

It is evident that the use of PERT/CPM should involve wide variety of participants starting from the planning stage until the project is completed. The participants will include not only those placed in hierarchical relations but also those in the horizontal relations. As was suggested earlier, the Ministry of Finance, the Office of Supply, Office of Planning and Coordination of the Prime Minister, the Economic Planning Board and the Board of Audit should involve themselves in one way or another in the major projects of the government.

Within the Economic Planning Board, besides the Office of Budget Control, all the other bureaus such as the Bureau of the Budget, the Bureau of Planning and the Bureau of International Economic Cooperation should change their mode of operation for the successful introduction of this new management technique.

Within each ministry the budget officer, personnel officer and the office of Planning and Management should work closely with the bureaus responsible for the projects to form a team on the basis of project by project. The same pattern of interaction should also govern the field agencies of the ministry.

Vertical and horizontal divisions of work should be flexible enough to allow versatile team work in which engineers, supervisors and managers of various functional responsibilities at different levels of hierarchy can work together as more or less equal partners for a selected project.

Individual PERTers and PERTer teams should be placed in the different levels of hierarchy and they should work with designers, planners and budget officers in order to facilitate quick and smooth conversion of project designs to PERT networks and budget requests.

III. CONCLUDING REMARKS FOR THE TWO CASES

1. Ministry of Construction Case

The approach used in the introduction of change in the MOC case was incremental in nature in so far as the selection of the projects for PERT/CPM application was concerned. The change process was also characterized by extensive prior training and exercise and then moving into the application of the technique to the real situations. The core men who identified themselves throughout the whole process with the change introduction were very few in number and minor in their status and power. These were major Lee and subsection chief, Chon. The former was outside the hierarchy of the ministry bureaucracy. The latter was in the position whose influence was bound to be very limited because of his minor position and the institute to which he belongs, the Public Works Research Institute whose prestige level is lower than the line bureaus of the ministry.

The ministerial leadership has been changed three times from the year 1968. Every change accompanied extensive reshuffle in the senior positions of the bureaucracy. These changes meant that constant and consistent policy emphasis has not been provided to the introduction of the new technique.

The loci of core activities concerning PERT/CPM introduction were the Training Institute of the Ministry and the Public Works Research Institute. These two agencies are located in a suburban sector of the city of Seoul distant from the headquarters office of the ministry. These two agencies are also less prestigious agencies in the sense that the civil servants of the ministry usually do not want to be assigned in these institutes. While these characteristics of the center of activities may have helped in providing a

certain degree of stability, they nevertheless may have had the effect of pulling the change program out of the attention scope of the minister and degrading the attraction level of the new technique.

Finally, the top grade civil servants at the ministry headquarters office who were placed either immediately under the minister or at the middle echelon were not closely linked with the process of change. Their identification with the change introduction was a sort of reluctant one in spite of the fact that they were in the positions to provide substance to the program.

2. Economic Planning Board Case

In addition to the constant pressure from inside to rationalize its budget decisions and the legitimation given by the president, the FPB has had stable leadership at the top of the structure. The change program has received Minister Kim's strong support for the last three years. In the middle management level including the directorship of the Budget Control Office, there have been many changes of posts during the period. In spite of these changes at the level in-between Minister Kim and Mr. Kang, the program not only survived but has not lost its initial thrust.

The Office of Budget Control, since its inception, has been on precarious ground, because of its young age and non-existence of fixed, clearcut and stable responsibilities.

The survival of the unit has been the ultimate concern and the members of the unit had to cling to PERT/CPM, because this was the only new and unique venture on which the office could establish its legitimacy vis-a-vis both the minister and the other bureaus of the EPB. Thus, in spite of the frequent changes in the managerial personnel of the office, most of these men identified with PERT/CPM during their assignment in the office. This identification was helpful in bringing about the change.

In contrast to the MOC case, the locus of the change activities was the headquarters office and was at the place very near to the Minister of EPB.

Finally, though there was some resistance in the initial period from the Bureau of the Budget, this was gradually mitigated because of the inter-flow of managerial personnel between that bureau and the Office of Budget Control and because there was a strong need for both units to unite themselves vis-a-vis budget requesting agencies.