Problems Encountered in Developing and Installing a Maintenance Management Reporting System

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In the five years we have spent in the development, implementation and operation of the maintenance management reporting system in Virginia, we have encountered a variety of problems. My task is to condense five years of problems into a short paper. Some of the problems encountered are universal and would be encountered in making any operational change; other problems were unique to the project. The problems I wish to discuss are primarily those of installation rather than development because I feel that many of our development problems would be somewhat unique to Virginia.

First, I would like to present a brief timetable and enumerate a few steps in the development and installation of our maintenance management reporting system. The Virginia Maintenance Study began in June 1963 and extended until December 1966. During the first two years the primary development of the system occurred and during the last 18 months of the study we were pilot testing the management system. To put the system into operation required that several new positions be created to properly administer the maintenance function, operating personnel be trained in the operation of the system, maintenance sections be revised, maintenance activity codes be revised, and computer programs prepared and report forms revised.

To implement the system with the least amount of confusion and difficulty, we decided to implement in stages. Early in 1966, the additional maintenance positions were filled and training began. On July 1, 1966, we changed to our new maintenance activities, and on July 1, 1967, we put the entire reporting system into operation. We have now been in operation for slightly more than a year and while we still have problems we are well pleased with the results.

The first problem and one that is common to any new idea or change is selling the idea or concept. We did not have any particular problem securing the approval of the top management for the installation of the system; however, we did have and still do have problems with the acceptance of the system by a few field operating personnel. We recognized at the beginning of the study the necessity of having all levels of management sold on any new concepts developed. To promote endorsement and the solid support of field operating personnel, we tried to involve these personnel in the development of the system as much as possible. Field operating personnel were given committee assignments such as the committee which developed maintenance standards. Many were invited to attend the quarterly advisory meetings of the study. Some field personnel were directly involved in the data-gathering phase and analysis. Several orientation sessions were held with the field managers, and members of the study staff made many individual contacts to explain the system.

With all the effort put forth we still have a few who do not believe the system is worthwhile. I might add that experience with the operational system has reduced the number who were not originally sold on the idea.

While this lack of support from certain field managers did not appreciably hamper the development and installation of the reporting system, these managers are not effectively utilizing the reports. They are not encouraging their subordinates to utilize the reports or to participate to the fullest extent in the management system. I do not mean to suggest they are actively opposing the system, but they are apathetic.

We believe that securing the participation and involvement of many field personnel in the development of the system eased the problems of selling the concept and installing

the system. As we all know however, one hundred percent acceptance and support is a dream and we can expect to find in any proposal a few people who will disagree entirely with, or with portions of, the proposal.

A number of orientation sessions with field personnel at all levels were held. These sessions presented a number of problems. To get good audience participation and subsequent understanding, and satisfy differences in informational needs as to details, it was necessary to hold several sessions in each area of the State with different groups of personnel. One series of sessions was with the district engineer, resident engineers, and residency maintenance supervisors. Another series of sessions was with the maintenance superintendents, foremen and timekeepers. In order to cover the whole State, holding these orientation sessions with one team of instructors, we had to start several months before the implementation date. In some cases, problems arose where the benefit of orientation was lost due to resignations or promotions. In some cases, people forgot. Also since we held these sessions near the end of the fiscal year, some of the personnel were occupied with preparing budgets for the next year, revising five-year plans, or other duties related to the close-out of the end of the year.

We feel now that we would have made a smoother transition by covering the State with several teams a few weeks before the implementation date to discuss the working details of the reporting system. We also should have had a series of meetings with superintendents, foremen, and timekeepers about a month after the implementation date to further discuss the system, answer any questions and review the feedback reports. We planned to do this; however, the next problem interrupted our plans.

The problems mentioned so far are all related to personnel or training personnel. While I do not want to minimize these problems, the problems that have been by far the most troublesome involve the computer programs to handle the data and furnish the feedback reports. I mentioned that we pilot-tested the management system. The pilot test involved only testing the management aspects of the system. While a computer program was written to handle the pilot test, this program could not be used when we put the system into operation. Consequently, we began operations with a virtually untested program. We anticipated having our first report for the month of July 1967 back to the field by mid-August. At this time we planned a series of sessions with field personnel to discuss the reports and their use in the management system. Actually we got our first report back to the field in November 1967 and this report was for the month of August.

Our first major setback occurred when half the tapes for July were accidentally erased. Due to errors in reporting and other factors, it was decided not to try to duplicate these tapes; so we forgot July. With the processing of the August data, program errors in the computer program became very apparent. The computer program has now been corrected, however, we are still finding minor changes which should be made in the program to improve reporting and the usefulness of the feedback reports.

The necessity of having tested computer programs before beginning operations cannot be overstressed. The long delay in getting the first report back to the field somewhat dampened the field personnel's enthusiasm for the system and when the first few reports contained obvious errors due to the computer program errors, enthusiasm further waned. It has taken a number of months to build back up to the original enthusiasm

All of our computer programs producing reports for maintenance, construction, administration, and other special items are part of one integrated computer system. In devising the reporting forms and the computer program to handle the maintenance management reporting system, we were required to adjust our program to fit the existing system. In adjusting our program to fit the existing system, we had to compromise some of our original goals. To have revised the existing system would have required at least a year and we would have been delayed accordingly in getting our reporting system into operation.

We in Maintenance are convinced that it would have been desirable, solely from a maintenance standpoint, to have been able to start new with our reporting forms and computer programs designed specifically for the maintenance management reporting system. The administration of the Department, however, decided that the changes

and additional flexibility Maintenance desired did not justify the disruption and cost of changing all of the accounting programs.

I do not mean to imply that our program for the maintenance management reporting system falls short of that desired; however, if we could have started new with little or no restrictions in reporting format or computer programs, we could have tailored a reporting system to better fit our needs and desires.

The requirement that our reporting format conform to the existing computer system did have its benefits however. The small changes made in the existing reporting format made the installation and operation of the system easier. If we had drastically revised our reporting forms the timekeepers would have had quite an adjustment to make and consequently the number of reporting errors would have been much greater.

We ran into one additional problem with reporting forms. We found that we had about a six months' supply of an old reporting form which was to be replaced. Being a very conservative and financially conscious State, it was decided to use the old reporting forms until the supply was exhausted. Needless to say, this posed a problem and I would suggest if you are planning a change in a reporting format that you keep a close tab on your supply of existing report forms. Also you should allow ample time for revising, printing, and distributing reporting forms. We found that for the first month or two, we had problems with the printer in furnishing an adequate supply of report forms, and getting the forms distributed to locations where they were needed.

Some of the problems of a lesser nature affecting the implementation are employee turnover, accuracy of reporting, and measurement of work quantities.

Employee turnover in the timekeeper position has contributed to many of our lesser problems. When a trained timekeeper resigns or is promoted, it takes a month or two for the new timekeeper to become acquainted with his duties. We can just about review the edit report and tell where the new timekeepers are. To aid in this problem, we found it necessary to develop a comprehensive timekeeper's manual which we believe will help the new timekeeper quickly adjust to his duties.

Accurate reporting was an initial problem. Prior to July 1, 1967, no continuous checks were made on whether charges were being prorated between routes and activities, and in general, accuracy of charges was not stressed. Another factor contributing to inaccuracies is the fact that while the timekeeper prepares the report documents, he can only report what the superintendent or foremen tell him.

Promoting accurate reporting from the timekeeper's position was not too difficult. Input data go through an edit program where such items as prorated charges to route and activities, wrong units of measure, and no reported accomplishment are kicked out. These items are then sent back to the timekeeper for correction. During the first months, the timekeepers decided it was much easier to prepare accurate reports initially than have to correct the errors.

Getting the superintendents and foremen to report accurately and completely to the timekeeper has been more of a problem. This is particularly true in reporting work accomplishment which is not material, such as acres, miles or feet. However, through indoctrination and the use of a foremen's daily report card, accurate reporting to the timekeeper has improved. I am told that accuracy in reporting has now progressed to the point where errors are running less than one percent.

Our experience during our short operational period has indicated that there could be problems related to the use of feedback reports. In developing and implementing the system, we spent a considerable sum of State and Federal funds. After a few months of operation, all levels of management began to ask such questions as, Is the system worth the cost? Where have we shown improvement? What is the magnitude of the improvement? These are logical questions and need to be answered. However, if we become too impatient for the answers and try to force answers to these questions, we can adversely affect the acceptance and operation of the system.

Many of our first-line supervisors originally looked upon the system as another "ball bat" that higher management would have to work them over. So far, particularly from the maintenance engineer's office, we have used the soft sell approach in bringing performance deficiencies to their attention.

We feel that this approach has contributed to the acceptance of the system and has contributed to improving the accuracy of the reports. Since management to date generally has not made an issue over specific work items that need improvement, the first-line supervisor has concentrated on improving performance rather than just doctoring input data to reflect improved performance.

We expected many problems to arise in the development and installation of our maintenance management reporting system. From our experience, however, I feel that many of our problems were minimized by adequately selling the concept, adequately orienting personnel, and once operational, by not pressing for immediate results. Further we feel that some of our problems could have been eliminated or reduced in scope by allowing more time for the orientation, by better timing of the orientation with relation to implementation, by having tested computer programs available at the beginning of the implementation and by conducting timely follow-up conferences with operating personnel.

Even though we have had many problems during the past five years and I am sure we will have more in the future, none have been insurmountable and the results of the system appear to be worth all our efforts.