A Study of Human Relationships in County Road Administration

For County Commissioners and Engineers¹

KEITH F. JONES, Washington State Association of County Engineers

● ROADS, in the modern sense of the word, have become one of the primary tools of today's civilization. The network of roads and streets which makes possible the modern way of living performs a vastly greater number of functions than did the early-day paths and tracks which served only as a means of getting people from one place to another by the most direct and easiest routes.

And just as the function of the road network has changed, so have the characteristics of the roads themselves. It is no longer possible for one man to build his own road alone, nor to fulfill the need for roads for himself and his neighbors together by contributing only the strength of his arms and back on a hand shovel. The provision of modern roads demands too much in terms of skills, money, equipment, imagination and training for any but the most thoughtful of delegations of responsibility and authority.

Modern highway laws in the State of Washington are an excellent example of that thoughtfulness in the delegation of road building responsibility, particularly that portion of the laws which governs county road building. Extreme care has been exercised by those who devised and enacted those laws, and it behooves those who must administer them to use equal care in putting the statutes into effect, to the end that the public is served by the best county road network it is possible to obtain in terms of the needs of the public as they exist at any time, and as they may change from time to time, all within the limits of available funds.

While these laws are very specific in outlining responsibility and accountability, embrace broad guides for administrative bodies in determining procedures, establish standards of performance, provide for financial support, and make possible efficient administration, certain other definitions need to be arrived at, other relationships spelled out in detail, and certain attitudes on the part of each member of the roadbuilding-and-using trinity toward the other must be spelled out and agreed upon. This Manual of Relationships is an attempt to accomplish some of that, to the end that Washington counties may ". . . insure efficiency in the planning, laying out, constructing, repairing, improvement and maintenance of county roads through local administration . . . (with) . . . full coordination between the state and the counties but with a maximum of local autonomy and a minimum of state control." (Preamble to Chapter 156, Laws of 1949)

A "manual of relationships" such as this presupposes that there are two parties to the contract of relations. In this case, of course, the two parties are the board of county commissioners and the county engineer. Each of these has separate duties which he exercises individually and alone. At the same time, there are a multitude more which the two perform together, or through one another.

For example, the engineer functions alone, usually, in such purely technical fields

¹ Prepared by a joint continuing committee sponsored by the Washington State Association of County Commissioners and the Washington State Association of County Engineers, and comprising the following:

Commissioners

C. Tab Murphy, Grays Harbor County² Roy A. Nelson, Douglas County Angus McDonald, Yakima County W.O. Druffel, Whitman County

Engineers

Donald B. West, Chelan County² J.W. Arrasmith, Spokane County Keith F. Jones, Pierce County as the evaluation of traffic patterns, size of drainage structures, and cost of paving by types, on the county road system. Commissioners function alone in the evaluation of public demands for more or better roads.

The general public has turned over to the boards of county commissioners the full responsibility for building and maintaining a thoroughly adequate system of county roads. It has further said how much it is willing to pay for those roads. Finally, it has directed the boards, in the interests of maximum efficiency in a complex and technical field, to make use of the professional services of a licensed and registered engineer to be their agent in carrying out the policy decisions the board makes in the name of the public. But the public has reserved unto itself the final authority over both the board and the engineer—has made very clear that while the engineer is responsible to the board for carrying out its instructions, the board remains responsible to the public itself. And the penalty for failure of that responsibility is dis-election!

It is a dual responsibility of both the board and the engineer to maintain constant contact with the people of their counties to ascertain what the wishes and the actual needs of these people are, for roads which best serve the people in the development of a county. Out of these needs and wishes, the board, with the professional advice and assistance of its engineer, must develop a carefully planned road network, adequate to serve the needs of the whole people of the county both for today and for the foreseeable future.

The principal function of the board is not detailed technical supervision, but the exercise of true leadership in selecting from among the "wishes," the "needs" which fit best into the future development of the county. It is the essential function of the board to make policy decisions which will best implement this basic planning to meet present and future needs. Consultation with the public is a continuing function of the board not a one-time, over-and-done-with, hard-and-fast single decision—but a continuous checking up to see how well the road program is being carried out, how well it continues to fit the over-all needs of the people of the county, and what additions and improvements are needed from time to time to develop the area.

Nor is the complete responsibility of the board discharged by the simple making of a plan of operation and development. It must see that the plan stays up to date and is carried out in the most efficient manner possible, and in orderly stages. It is at this point that the board ceases to use its engineer simply as a technical adviser and begins to utilize the administrative skills he has been taught to use, for their benefit.

For the board now must turn its basic plan, and the policy decisions it has reached -the program and its guidelines—over to the county engineer for execution. It is here that the line of demarcation between policy-making and administration is drawn, and the administrative authority is delegated by the board to the engineer they have chosen. But since in some cases the line between policy-making and administration is not necessarily a sharp one, and some blending is apparent on both sides of the line, a "rule of thumb" definition of the two may be helpful. A policy decision is one for which the available facts provide no ready-made decision, but for which the exercise of judgment is necessary. Administrative or executive decision, on the other hand, is one which can be made automatically, once the appropriate factual information is assembled and standing policy rules are applied to it.

The real purpose of the separation of policy making from administration so far as road building is concerned is not so much for the purpose of relieving engineers of making policy decisions they will undoubtedly be confronted with, as it is for the purpose of keeping the board from becoming bogged down in a mass of administrative detail that can better be handled by the engineer, who is an administrative specialist. A mutual determination between the board and their engineer as to the precise boundary between policy making and engineering must be made to insure efficiency, coordination of effort and effective comprehensive planning.

In assuming the responsibility and authority (and the two must go together) for the proper maintenance and construction of county roads and the management of the county road department, the engineer assumes very definite obligations to his board of county commissioners. Some of these may be enumerated as follows: 1. He must accept the fact that the board is responsible for establishing policy and that he is responsible for carrying it out to the best of his ability, regardless of his personal opinions.

2. He must, at all times, keep the board advised on the activities of the road department, since these affect the formulation and execution of policy.

3. He must keep the board advised on technical matters as they relate to county road operations and make proper recommendations when appropriate.

4. He must keep himself free from active participation in politics, remembering that he is employed by the board as an engineer and not as a politician. He must also make every effort to keep the employees of his department free from political activities.

5. He must always keep in mind that the activities of the engineering and road departments are financed entirely by public funds and that he has an obligation to the public to maintain good relations and to keep the records of his office open to public scrutiny at all times.

6. He must be willing to delegate authority to his subordinates in order that the work be carried out efficiently. However, he must remember that he is responsible to the board and to the public for their activities.

7. He must maintain the discipline and maximum effort of his employees. He has a duty of leadership to see that there is high morale among his men. He must inspire confidence and have faith in his operating forces.

8. He must be willing to appear at public meetings when so requested by the board or by the public and give technical advice and information. He is also obligated to thoroughly prepare himself with facts.

9. He must keep himself thoroughly informed and up to date on new techniques, equipment and materials and be willing to apply them to his operations when he is certain their use will provide better and more economical service.

10. He should be willing to attend road forums and clinics, association meetings and technical meetings, when authorized to do so by the board.

11. He must employ the most talented personnel obtainable in all jobs and positions in the engineering and road departments.

These are a few of the obligations of the engineer toward his employer, the board of county commissioners.

In any satisfactory employer-employee relationship there are certain obligations on both parties. The board of county commissioners has obligations to the engineer. These may be broadly defined as those of a corporation board of directors employing a technical manager.

1. They should be sure that they employ a competent and qualified man, then give him full authority to operate his department without political or other interference, and remunerate him in keeping with the responsibilities involved.

2. They should repose enough confidence in him that he may exercise his technical talent and initiative in the proper administration of the county road department.

3. He should be assured of a certain amount of security so far as job tenure is concerned and be eligible for periodic increases in salary as his value to the county increases.

4. He should not be subjected to political pressure either in the employment of personnel or his own activities.

5. The board should always keep in mind that a qualified engineer is interested, primarily, in the most efficient management possible and is, by education and training, concerned with the construction and maintenance of the finest road system possible for his individual county.

6. The board should always feel free to take advantage of the talents that the engineer has acquired, and they should encourage his participation in professional associations and meetings.

7. They should be obligated to support the engineer at public meetings where pressure may be applied to revise a program that has been arrived at on the basis of detailed technical information, and the engineer should not be subjected, individually, to the action of pressure groups. 8. They should provide satisfactory working conditions and salaries for all road department employees in order that they can hire and retain competent and experienced help.

It is believed that mutual, voluntary subscription to the principles of common understanding outlined in this manual of relationships will result in a most effective and efficient administration of the county road systems of the State of Washington, for the job is one of dual responsibility. An understanding on the part of both commissioners and engineers of the other's problems, responsibilities and authorities is a basic essential.

Within this framework, then, the following maintenance functions should, in the majority of cases, be assigned to the board or the engineer.

MAINTENANCE

COMMISSIONERS	COMMISSIONERS-ENGINEERS (Together)	ENGINEERS
CONSIDER RECOMMENDATION OF ENGINEERS.	FORMULATE COUNTY MAINTENANCE POLICIES	Make recommendations as to (1) policy, (2) program, (3) the weed
FORMULATE AND ADOPT MAINTENANCE		FOR QUALITY AND QUANTITY OF MATERIAL.
POLICIES.	EXPLAIN POLICIES, PROGRAMS,	
	NEEDS AND ACCOMPLISHMENTS TO	ANALYZE BIDS AND REPORT TO BOARD.
CALL FOR BIDS, CONSIDER ADVICE OF	THE PUBLIC.	
EQUIPMENT AND MATERIALS.	RECEIVE CONDIALNES FROM THE	FREPARE BUDGET FOR ANNUAL AND LONG-
	PUBLIC.	TERN HAINTCRANCE.
RECEIVE COMPLAINTS FROM PUBLIC AND		MAKE RECOMMENDATIONS FOR THE RE-
PASS THEM ON TO ENGINEER FOR	INSURE ADEQUACY AND PROPER	PLACEMENT AND PURCHASE OF EQUIPMENT.
INVESTIGATION AND ACTION, IN ACCOR-	FUNCTIONING OF MAINTENANCE	•
DANCE WITH ESTABLISHED POLICY.	POLICY.	REPORT TO BOARD PERIODICALLY AND
		ANNUALLY ON STATUS OF (1) FINANCE,
CONSIDER PERIODIC AND ANNUAL REPORTS REVIEW WORK OF DEPARTMENT		(2) DEGREE OF COMPLETION OF PROGRAM,
CRITICIZE AND EVALUATE DEPENDENT,		(3) NEW DEVELOPMENTS IN CONDITION OF
OF DEPARTMENT.		ROADS.
HOLD ENGINEER RESPONSIBLE FOR		REPORT COMPLAINTS RECEIVED BY ENGINEER
EXECUTION OF POLICY AND PROGRAM		AND THOSE RECEIVED FROM THE COMMIS-
ADOPTED BY BOARD,		SIONERS AND REPORT TO BOARD THE ACTION
		BEING FOLLOWED.
REQUEST INFORMATION OF ENGINEER		•
RESPECTING (I) ADVANCES IN KNOW-		MOUTINE MAINTENANCE IS UNDER CONTROL
CONDITIONS IN THE MORALE. FEETCH		OF THE ENGINEER IN ACCORDANCE WITH
VENESS OF ROAD CREW AND ITS		POLICIES SEL FORTH BT THE BOARD.
CAPACITY TO CARRY OUT POLICY, (3)		INFORM THE COMMISSIONERS OF
CONDITIONS OF ROADS AND EQUIPMENT,		EMERGENCIES AND RECOMMEND ACTION TO
(4) HOW CHANGES IN POLICY, ORGANI-		BE TAKEN.
ZATION OF DEPARTMENT MIGHT IMPROVE		
THE SERVICE.		

In Washington law, the county engineer is required to be in charge of the maintenance on county roads, under the policies laid down for him by the board of county commissioners. And, if the county's maintenance policy is sound, this becomes so routine a matter that the commissioners are freed of the necessity of doing more than checking from time to time to make sure that the policy is being carried out effectively. This becomes doubly important when the multitude of duties of the county commissioner is considered. Anything which will operate to keep the commissioner from having to deal with the detail of routine operations under established policy is all to the good and should be utilized to the fullest extent possible. Reliance upon a good engineer to carry out the details, and operation of a sound policy not only saves wear and tear on the commissioners, but actually will insure a smooth-running organization, with lines of authority and responsibility clearly known to everyone concerned, from the commissioners to the lowest paid man in the road crew.

But formulation of a policy to guide the county's road maintenance activities is best performed by the commissioners and their engineer acting together, whether formally or informally. Like all other policies which guide the activities of the county road department, maintenance policy is the ultimate responsibility of the county commissioners. In its formulation, however, the board is wisest to seek the recommendations of its engineer before reaching its final decision.

Good maintenance policy has as its foundation regularity and uniformity. All people

throughout the county should get the same amount of service. This does not mean that all graveled roads are bladed each two weeks, but it does mean that all graveled roads throughout the county are regularly graded to the extent and frequency necessary to keep all of them to the same standard of usefulness. On the less-traveled roads, this will require fewer trips per year than on the more heavily-used roads, but the same standards of smoothness and usability should be maintained on all roads, with such regularity that residents along any road know they need not even call in to report a chuckhole—they know the maintenance crew will be along next week, or next month or this fall—whenever they are due—to take care of the road, and that meanwhile, sufficient inspections will be made so that if the condition warrants, the crew will be along even earlier than their regular time to repair the damage. It is the level and the regularity of maintenance that count, not necessarily the amount or the frequency.

Almost equally important is that the public have knowledge of and confidence in this schedule—they must know when to expect that grader crew, or they will believe it necessary to call in and report the new chuckhole, and the beneficial effect of the regularity is lost.

Inherent in the establishment of a sound maintenance policy is a schedule of priorities. For example, it is important to plow snow on the most heavily traveled roads first, but by the same token, snow will have to be plowed on all roads. The rules which govern such a system of priorities for maintenance are obvious but will vary in application in every county.

Also important in the formulation of a sound maintenance policy is the assignment of responsibility for maintenance to some particular person or persons.

There are many bases on which such an assignment may be made. It is feasible to have a single maintenance supervisor for the entire county, or for an entire road district, or some individual employee may be assigned the responsibility for the level and regularity of maintenance in a single geographic area. The "who" and "how" are far less important than that there should be someone having definite responsibility.

Again, it should be repeated that, while it is essential that responsibility for level and regularity of maintenance be assigned to some person or persons, it is still the responsibility of the board. The commissioners cannot shift that responsibility—cannot tell an irate taxpayer "Joe was supposed to see that road was kept up, don't blame me." It's the commissioner's job to know that Joe is keeping up with whatever was assigned him, just as the engineer's job is to see that Joe got caught up before the irate taxpayer called in (incidentally, if the commissioners have delegated immediate supervision over Joe to someone else—his foreman, the maintenance supervisor or the engineer—the man the commissioner should jump on is not Joe, but whoever was made responsible for Joe's actions in the first place).

The advantages of a carefully worked out, thoroughly publicized and effectively carried on maintenance policy are several. In the first place, it will result in better service to the public, which is paying for and has a right to expect good service in terms of adequate, regular maintenance. Second, it will cut down on the number of calls and requests for service, if the public is accustomed to regularity of maintenance, and if it accepts the level of maintenance provided. Third, it will insure uniformity of treatment for all residents of the county, regardless of where they live or what the level of traffic on their own road. Too many complaints about the level or the frequency of maintenance is the best barometer of the acceptability of the maintenance policy of the county.

There should be established and made known a procedure for handling both complaints and requests for additional service. As has been pointed out, regular and adequate maintenance schedules which are well known to the public should keep complaints to a minimum, but there should be established a regular routine for handling those which do arise, just as there should be an equally well known method of handling requests for additional service, such as for new roads, or improvement of an existing facility. It is impossible to overemphasize the importance of the public's knowledge of both these procedures.

It is equally impossible to overemphasize the fact that the commissioners should never give the public a "brush off" in this matter of requests for additional service or new facilities, or that they should always consult the engineer about both complaints and requests. Equally important is the public's knowledge that the engineer always consults with the board before proceeding upon any complaint or request, other than emergencies.

In the matter of complaint and request procedure, it should be pointed out that the public always deserves a sympathetic ear, and no commissioner should ever have the attitude of, "Don't bother me with these trivial matters—go see the engineer." Neither should the engineer adopt either a buck-passing nor a, "No use to tell those stupid commissioners about it—they wouldn't understand anyway" attitude. Even if he doesn't understand (and chances are he does), it is both the commissioner's right and his duty to know what is going on at all times in the county road department.

As a suggestion in this field, when a request for added service or new or improved facilities is received by the board, the petitioner should always be listened to with a sympathetic ear, should be told his request will be looked into, and dismissed without an answer to his request, until the board has had an opportunity to consult with the engineer, who may at that very moment be on his way to the office with a suggestion for meeting the problem, or who already may have laid plans to bring the matter before the board.

Another suggestion in this field of public relations is for the engineer to keep all key personnel in the road department adequately aware and conversant with the policies and plans of the board. These men generally have considerable contact with the public and if familiar with such policies and plans can often nip complaints before they can get a good start. In addition, the action necessary to impart this information to them generally makes these key people feel that they are recognized as important cogs in the operation of the road department. This is excellent for over-all employee morale.

Whether or not the petitioner is told the board wishes to consult the engineer before making its decision, is for each board to decide; usually it is wisest to do so. In any case, once the recommendation of the engineer is known to the board the decision to grant or deny the request should be made by the board as soon as possible and communicated by them to the petitioner.

The board should always give its reason for denying a request and the reason should never be just, "The engineer recommended against it."

The above should not be taken to imply that the engineer always waits to handle a routine complaint until after he has consulted with the board—there are many instances when the engineer will respond to a complaint or request automatically, but in every case he will report both the complaint and his action to the board at the earliest opportunity. This is particularly true in emergencies.

Another area in which the work of the engineer, when properly performed, is of invaluable assistance to the board is in his analysis of the need for new or additional road building equipment.

It is axiomatic that equipment inventories should be kept to the effective minimum. Idle, surplus or partially-used equipment ties up capital which should be at work on the roads. By the same token, antiquated or obsolete equipment, or items in need of too-frequent maintenance or repair are too costly to retain. Likewise, it is impossible to do an efficient job with too little equipment, or equipment of the wrong kind. Ideally, no county should own more equipment of any kind than can be fully used.

A properly operating set of equipment rental records will show, upon analysis, whether a particular piece of equipment is in need of replacement, or should be retired. It will also show whether the county's type of road operation requires additional pieces of equipment, and what type these should be. This analysis should be made periodically by the engineer, and his recommendation for the replacement of individual pieces of equipment and the purchase of new and additional items be placed before the board at budget time.

It is difficult to arrive at a "rule of thumb" indicative of the "break-even" point where it will pay a county to own a particular piece of equipment. Some analyses seem to indicate that 1,000 hours of annual use is the point at which a county can justify owning a particular machine, but the application of this rule breaks down on some specialized items, such as distributors and paving machines. This manual will make no attempt to point out the principles which govern the establishment of a sound equipment rental rate. This has been done in the county-developed uniform accounting manual. Suffice it here to say that rental rates must take into account all the elements of equipment cost, and not just an amount sufficient to amortize the replacement cost of an individual piece over its expected lifetime in years.

It might be well at this point to say a few words about the value of accurate, adequate cost accounting records kept by the engineer and made available to the board. Cost accounting should be viewed as a simple means of recording past costs in order to help in predicting future expenditures. Not only are they essential in planning future expenditures, but also they are invaluable in keeping track of current outlays, so that at all times the board knows precisely how much money is on hand to work with, and can measure the amount of work still possible to accomplish. Moreover, the commissioners can also tell from moment to moment what the elements of road cost are so they can determine the point at which inefficiencies have crept in and how they can be eliminated. A properly kept set of cost accounting records, which produces all needed information (not just "interesting" information) is the most useful device ever developed for the use of a board of commissioners and an engineer in keeping tabs on themselves. Reports based on summaries of these records should be regularly given the board.

When the engineer has checked with the supervisors and foremen and with the equipment maintenance people, as to needed replacements or added equipment, and has submitted his recommendations to his board, effective law requires that necessary purchases be submitted to bid call. It is at this point that the engineer can again be of real service to his board in the preparation of the specifications on which the bid call is based. The writing of specifications for equipment purchase is an art, and much can be done to insure the selection of precisely the equipment best suited to the job planned for it with a proper set of specifications. Much can also be done to eliminate the confusion as to what is the "lowest and best" bid if the specifications are written to bring in as narrow a spread of bids as possible.

Commissioners should keep in mind the fact that the lowest bid may not always be the best bid, and that usually they have the right to accept the bid which to them seems best, even if not the lowest, or to reject all bids and call for new ones. They should also remember, however, that the reason for making such a choice should be written into the record at the time of making the decision. Such a reason, given at the time, is a reason; the same statement, given later, becomes an alibi.

Perhaps the most important element in arriving at sound, effective road administration of the type that makes each available road dollar do 100 cents worth of work is planning—looking ahead today to make sure that tomorrow's work gets done properly and on time.

Nowhere is this truer than in the field of new construction or improvements to the road plant. If the board of commissioners and its engineers are not well out in front of the needs of the public in any county for a road plant planned for both the today and the economic tomorrow of that county, then that county is in serious trouble; and its board soon will be.

Washington law (RCW 36.81.120) requires each county to have adopted, in 1949, a ten-year plan for the development of its road system. The law further requires (RCW 36.81.130) that each county, every year, shall adopt an annual plan to accomplish at least one-tenth of the ten years' work. Provision is made for necessary deviations from the ten-year plan to meet changing conditions, but basically each year's construction program should fit into the over-all, long-range scheme of development.

The thinking behind this law is sound, for each county must have a sense of direction in the spreading of its available funds (scarce as they are) to the end that it will be ready for the future when it has arrived. But even if there were no statutory requirement for an annual plan, cold-hard-common sense would indicate that such advance laying out of the work to be done for an entire year would be an absolute necessity. Nothing is more inefficient than haphazard, unplanned and improperly scheduled road work. Men and equipment are held idle, or work piles up too fast to be taken care of with available funds and manpower. Someone must think ahead to both the

COMM ISSIONERS-ENGINEERS		
COMMISSIONERS	(TOGETHER)	ENGINEERS
CONSIDER LONG-TERM PROGRAM, ANNUAL PROGRAMS, SYSTEM CLASSIFICATIONS, PRIORITY OF CONSTRUCTION PROJECTS AND MAKE DECISIONS.	HEARINGS ON ADOPTION OF LONG- Range program, additions or changes therein.	PREPARE LONG-TERM CONSTRUCTION PRO- GRAM, ARRANGE PROJECTS IN ORDER OF PRIORITY, CLASSIFY ROADS AND SUBMIT THIS TO BOARD WITH RECOMMENDATIONS.
RECEIVE PETITIONS FROM THE PUBLIC CONCERNING MAJOR IMPROVEMENTS TO THE COUNTY ROAD SYSTEM.	MEETINGS WITH THE PUBLIC IN AREAS In the county where they are re- Quested, to discuss the improve- Ment of roads pertinent to these	RECEIVE PETITIONS FROM THE COMMIS- Signers and investigate the needs For Said improvements and make Recommendations to commissioners.
ENGINEER, ALTER PROGRAM WHERE Necessary and establish standards to be followed.	PRELIMINARY DISCUSSION OF ROAD Program.	INVESTIGATE REQUESTS FOR IMPROVEMENTS At public hearings and make recom- mendations to the board.
ADOPT FINAL PROGRAM.	DISCUSSION CONCERNING NECESSARY Rights-of-way to meet require-	MAKE PRELIMINARY BUDGET AND ROAD PROGRAM.
AWARD CONTRACT AFTER CONSULTING With engineer.	MENTS OF PROPOSED IMPROVEMENT.	SURVEY AND DESIGN TO MEET PRE-ESTAB-
FINAL ACCEPTANCE OF PROJECT.	PURCHASE OR CONDEMNATION ARE Discussed and procedure is Determined.	WRITES AND EXECUTES THE DEEDS (acquired by donation).
		PREPARE PLANS AND SPECIFICATIONS & Advertise for bids.
		SUPERVISE CONSTRUCTION AND INFORM THE BOARD OF PROGRESS.
		CERTIFICATION OF COMPLETION OF PROJECT.

total amount of work which must be done, and to the priority scheduling of which job comes first, which second, and so on, to the end that there be neither idle time nor a stack of work left undone, or not done when needed.

The question then becomes, what is the best method of arriving at this advance plan for the coming year's work, and who should be responsible for making the plan?

Making the plan is a two part job, and must be done by both the commissioners and engineer working together. It is not possible to arrive at a sound plan for a year's work just by each commissioner sitting down by himself and saying to himself, "These are the road jobs I want to do next year, and this is the order I want to do them in." This leads to chaos, conflict, and simple, unadorned waste.

Neither is it possible for the engineer to sit down by himself and arrive at a listing and scheduling of the needed year's work. For it is the commissioner's job to know the needs of all the people of the county, and to see that these needs are met in the most effective manner.

The best procedure begins at least six months before the actual date by which the year's plan must be adopted by the board. Each commissioner should spend much of his available time out in his district, looking, listening, attending meetings, talking to people, learning what their hopes are for development and change, what their wishes are for new or improved roads, what new or different conditions must be met, as well as how adequately the present plant is serving. He should be asking for, and hearing, the public's impression of how well the road job is being conducted and how it could be bettered.

The engineer should be spending much of his available time in the same type of observations, though in different terms. He should be seeing how well past work is holding up, seeing how different techniques have worked out in various parts of the county, making his own observations on what needs to be done in both maintenance and improvement. A large part of the engineer's job in planning relates directly to the professional nature of his work and his training. Many of the recommendations he will offer to his board are based upon his technical study of the county's roads—their traffic patterns; the amount and kind of traffic each road carries now and can be expected to carry in the future; the type of construction needed to meet special topographic or climatological conditions, etc. This is obviously a longer range type of planning than that required for a single annual plan. It is also one of the most valuable contributions which an engineer makes to his board. He should spend time with each of his commissioners, discussing his observations with them, gathering their ideas and their thoughts on what needs to be done.

Sometimes before plan-adoption time, each commissioner should give the engineer a list of the work he would like to see done during the coming year, with a request that some preliminary cost and time figures be prepared for the pre-planning discussion between the board and the engineer. The engineer should also add to that list anything which he feels should be looked after, and which is not on any of the lists given him by the commissioners (such a list need not be a formally written document, of course). It only needs to be a notation from time to time to the engineer that this or that project ought to be on the list to be considered.

Sound planning requires that the engineer submit his recommended plan to the board prior to the time of adoption of the county's annual road budget. He should do this far enough in advance of budget time so that the commissioners may discuss his recommendations in detail, with him and with one another, at sufficient length that when budget time arrives, they will be thoroughly familiar with each of the engineer's recommendations, and with those of each other member of the board.

In submitting his recommended plan for the year's operations to the board, the good engineer will include far more projects than he knows there is money for. He covers all his own recommendations, and all those which the commissioners have suggested, together with dollar estimates of the cost of each. By so doing, he leaves final selection of the program to the commissioners, but with full information needed on which to base their selections. He should also indicate his ideas as to the priorities of need, but he should provide his board with the widest possible latitude of choice.

In this way, adoption of a sound, well-thought-out annual plan is assured. Under this method, as large a part of the total needs of the county will be met as available funds will allow, and each of the four men will be thoroughly familiar with not only what is in the final plan, but with what has been left out of it, and why.

Once the year's plan is agreed upon, it becomes important that the public have full knowledge of what is to be done during the coming 12 months. A copy of the plan should be published, and other copies kept available to the public in both engineer's and commissioner's offices.

After the year's road-building plan has been completed, the engineer uses it as the basis for developing his budget request for the operation of the county road department during the coming year. His estimates of the costs of the construction program have already been made and submitted with his recommendations on the plan. It remains for the engineer to estimate his forthcoming costs for the year's maintenance, and overhead and operations costs, together with the operation of the equipment rental and revolving fund, and provision for emergencies.

It might be pointed out here that Washington law provides a means for taxpaying individuals or groups to petition the board for road improvements, and that the number of such petitions received by any board is a pretty good barometer of how well the commissioners are doing their planning job—the fewer petitions that are received, the greater the indication that the board has anticipated the needs of the public with accuracy.

Some petitions will invariably be received, however, particularly in rapidly developing residential areas. Therefore, each county should develop a procedure both for receiving and for handling these requests for additional services. A "petition" may take many forms at its inception at least. It may be a small group of people appearing before the board; the same group appearing at the engineer's office; it may be one or two persons coming to a commissioner's home or office; it may be a signed resolution of a grange or community club; it may even be the formal type of petition called for under some laws.

The type of procedure adopted, however, is far less important than that there should be an established procedure, that it be well known to the public and that it be easy to comply with. Equally important is that each petition must be acted upon and the petitioners informed of both the action and the reason for the action.

A work regarding the use of federal-aid secondary funds for county road construction might well be inserted at this point. It is a known fact that not all 3,000-odd counties avail themselves of this additional source of revenue. Many reasons for this exist. Among them is the fact that there is an amount of engineering required in connection with FAS work that requires a job of some size to keep this cost from becoming too large a percentage of the total cost. As a "rule of thumb," most counties find it advisable to keep the minimum size of their FAS projects above \$15,000, although some as small as \$8,500 have been let.

With this in mind, it becomes apparent that some counties will have difficulty in utilizing their FAS allotments unless some form of pooling construction money is worked out. There are several methods of accomplishing this in use among the counties. In those counties where the "coordinated administration" system is in effect, this presents no problem, since construction funds are spent where needed, in the required amounts, without regard to road district boundaries. Other counties take an amount sufficient to match all FAS money available during the year "off the top" before dividing the remainder among the districts. Some counties rotate the FAS money over a 3-year period; spending all of it in one district one year, another district the second year, and in the third district during the third construction year. Still other counties find they have sufficient district funds to match the district's share of FAS money without the necessity for pooling. Others find that they can "save up" their construction funds and match in sufficient amounts to justify the economical use of FAS funds.

It is possible for a county to pool two years' worth of FAS allotments, too. This can be done by making no expenditures of one year's funds during the first 12 months of its availability to the county. In the second year, the second year's amount will also be available to the county, and the two years' allocations can thus be spent at one time.

The value of FAS funds to a county's road construction program is obvious. The least they do is to stretch the construction dollar to two dollars. Actually, the value of FAS funds to a county goes far beyond the dollars and cents involved. Because they must be part of a planned system of improvements, the FAS roads fit nicely into any county's long-range planning as a basis for orderly improvement of the road plant. Too, their careful design and construction means that these roads become a part of the county's permanent primary network, and are usually of a higher type than the county could afford to build without financial assistance. FAS funds are particularly helpful, on this score, in bridge construction.

Once the year's plan and budget have been adopted by the board, the engineer goes to work on the plans, surveys and designs for the year's construction work (some of the preliminary work will have already been done, of course—sometimes all of the basic field work will have already been accomplished). And he and his board together lay their plans for acquisition of the needed right-of-way.

In the course of preparing for the year's construction program, the county engineer will have prepared plans and specifications covering any project which is proposed to be done by contract. When these have been submitted to the commissioners and approved, a bid call is advertised by either the state highway department, in the case of FAS jobs, or by the county, for its own contract work. When the bids are received, the engineer advises the board as to which is lowest and best (all FAS bids must be let to the lowest bidder). In the case of noncontract construction, the scheduling and supervision of this work is done by the engineer, working either independently, or with the advice and assistance of the supervisor or foreman. This scheduling of men and equipment, where construction by county forces is to be undertaken, is a highly important function, and is virtually impossible if responsibility or authority is divided. The county engineer, having the threads of all construction work in his hands, can perform the function of assigning men and equipment to places and jobs with the least confusion and wasted time, and this actually means a saving of men, money and time (as pointed out in the maintenance section, the scheduling function with regard to maintenance can often as well be delegated to another individual than the engineer, but even there, the responsibility needs to remain undivided).

On all contract construction jobs, whether FAS or county, the engineer should perform the supervisory function for the county, keeping his commissioners informed of the progress of the work at all times. He prepares or checks the progress-payment reports, if they are required, and makes the final inspection prior to acceptance by the board. He also executes the certificate of completion of the project. One other set of relationships between the board, the engineer and the general public needs to be touched upon. This takes the form of reports, on either a periodic or an "as needed" basis. The first of these is an accounting report—a report which tells the board and the general public what has been done with the road money which has been spent. Usually rendered on an annual basis, this report should be a complete and accurate fiscal accounting, but should be in terms that are understandable to the layman. Graphs and illustrations, or photographs, are especially helpful in this connection.

The second type of report which the engineer should regularly render his board is an operations report—his statement to his commissioners of just what he has done so far in carrying out their directive to him (the annual road construction and maintenance plan). This report should be more detailed than the public report, and should show both expenditures made and balances remaining—these latter shown against the balance of work remaining to be done. It should be rendered not less than quarterly, because it forms the foundation of the commissioners' information about the functioning of the road department.

Finally, the engineer needs a different type of report (or reports, actually) for his own purposes—for the internal management of his department. These reports tell him such things as the balances of materials on hand, and the relative costs of the various parts of his operation, show up the efficiencies and the inefficiencies, and enable him to keep track of such things as his equipment rental balances and the earning capacities of the equipment. These reports to himself, coupled with a comprehensive inventory of this road system enable him to "keep tabs" on his whole operation—without them, he is running his office blindfolded. No engineer can competently advise his board unless he knows the relative maintenance costs of the various types of surfacing in his county, the relative proven efficiency of this type of machine over that type, the effectiveness of this policy as opposed to that policy. These reports are the means by which the engineer keeps his finger on the pulse of his own department.

So far, this study has concerned itself with the human relations between the commissioner and the engineer, and between both of them and the public. There still remains for study the detailed professional techniques the engineer uses in the day-today performance of his job of being the strong right hand of a sound county road administration.