By the passage of the 1956 Federal Highway Act the Congress gave assurance to the general public, which includes contractors and engineers, that a sizable highway program will be in progress for a considerable period of years. Both engineers and contractors can now plan their work with confidence in the future. However, the public, to have complete confidence in our undertaking, must feel that the work is carried on efficiently and economically. This can be done if there is complete understanding between our groups.

Great progress has been made in coordinating the efforts of engineers and contractors by the elimination of many things which are not fundamental to the production of a quality product. Yet, there still appears to be a wide gap in a proper understanding by some engineers of a contractor's operations and what things tend to delay these operations, make them more costly and generally create problems. This comes about, I believe, because of the radical difference between the engineer's operation and the contractor's. The engineer's work embraces the creation of ideas and putting them on paper so that they can be translated into a physical product for the use and convenience of the public. The contractor, on the other hand, is involved primarily in physical operations in which he is brought in contact with many forces which are foreign to those encountered by engineers in their work. In other words, the engineer must know the "Why" and the contractor the "How" of construction.

The highway engineer must direct, supervise and coordinate the design and construction phases of the highway program and will always be a major factor in the successful completion of the national highway program. Through the medium of good engineering management, it will be the responsibility of highway administrators and engineers to assure the timely completion of the various inter-related phases of the program to prevent loss of time, money and traffic service to the public.

It is the responsibility of the highway engineer to clear roadblocks that frequently impair prosecution of the work and which lead to loss of time, money and traffic service.

The timely acquisition of rights-of-way is a major factor in the construction schedule of our highway systems, and it is a prime function of the highway engineer to coordinate the preparation of contract plans, the appraisal and acquisition of rights-of-way and the award of construction contracts. Improper coordination of acquisition of rights-of-way with planning and construction can and often does result in substantial losses of time, money in the form of claims, and traffic serviceability.

Another major element in the development of an expanded highway program is the matter of public utility facilities which are either publicly or privately owned. To permit the orderly preparation of contract plans and the orderly prosecution of construction operations, it is necessary that the manner in which such utility lines are to be handled be ascertained and agreed upon very early in the development of any project. To accomplish this end, the engineers responsible for the development of the project must confer with the owners of the utilities regarding the crossing, closing or relocation of their public utility facilities and negotiate agreements covering such crossings, closing or relocations. These agree-
ments must cover the manner the work will be done, the sequence of operations, when work is to commence and be completed, the manner and method of compensating for work performed and insurance requirements, if any.

Then come the negotiations with other levels of government, such as counties and cities, regarding the closing, relocation or adjustment of other public thoroughfares for the purpose of providing grade separation structures, or otherwise accommodating the proposed facility. In view of the fact that intersections with other highways or streets are often control points in the determination of final lines and grades, the completion of the planning phase of a facility is dependent upon quick determination and agreement regarding the solution at these locations. Not only is there a problem of traffic accommodations on the intersecting roads and streets during and after construction, but also the problem of lines, grades, clearances, roadway widths, types of construction, division of maintenance responsibility, mail delivery, school bus routes, and a host of other related problems too numerous to mention. Progress on projects has been delayed months on end for lack of management and consequently, lack of agreement in this area of the work.

Upon completion of a set of plans and specifications for a particular project, these documents must be reviewed and approved or modified. The flow of completed plans must be so scheduled and programmed to accommodate a realistic bidding schedule. In order to obtain maximum competition in the bidding and to give the highway contractors ample time to analyze the prospective job, the amount of work to be advertised and the time interval between lettings must be carefully reviewed and scheduled. In an expanded program, it becomes apparent that a loss of a bidding date through delays not only affects the one contract scheduled for letting, but has its impact upon subsequent lettings. A relatively short delay in the advertising and award of contracts can often result in as much as a year's delay in the opening of a facility to traffic.

Once a contract for improvement of a road section is executed it is the responsibility of the Project Engineer to obtain the results specified in the contract documents. He is the key man.

Unless field inspection is aggressively carried out, the completed project may well be an unknown quantity, a potential high maintenance facility, and a threat to the reputation and prestige of the Highway Department.

Absolute integrity on the part of all State highway personnel is absolutely essential if public confidence in the department is to be maintained.

Any case of dishonesty or serious conflict of interest that is found anywhere in the Department should result in immediate dismissal of the person or persons involved.

Failure of top echelon officials to support field inspection forces, where they have acted properly, can be very damaging and seriously affect the quality of the work that is obtained, not only on the particular project involved, but throughout the Department. It takes very few arbitrary cancellations of sound inspection controls to destroy the confidence, interest, and effectiveness of the project inspection people. If top level leadership fails, apathy, laxity, and inefficiency occur in the lower levels of the organization.

The delegation of authority, and the subsequent reclaiming of such authority in some instances, can also damage morale. It leaves a question in the mind of the lower echelon personnel if they really have authority and are expected to exercise it, or if certain persons or conditions are expected to receive top-level preferential treatment.

In closing, I point out that integrity, confidence, interest in the work, freedom from political interference, must prevail at all levels of the engineering staff of the Department if any procedure is to be satisfactory and in the public's interest. This will assure the public of full value for their highway dollar.