

# REORGANIZATION FROM PATROL TO GANG-TYPE MAINTENANCE

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•ILLINOIS has not been immune to the inflationary pressures of the last decade. Our maintenance administrators, like those of every other state, have felt the pressures of demands to curb the cost trends and yet provide equal or better service. Perhaps this is for the best. Perhaps this was needed to make us take a good "in depth" look at our operations.

Illinois, like many other states, has made a number of changes in the past 10 years. Training programs, cost accounting systems, management reporting systems, budgeting controls, and better equipment will all help to improve maintenance efficiency. In 1969, we made a change that should prove to be one of the most effective steps toward increased efficiency to date. The entire maintenance field organization has been re-vamped—not for the sake of change, but to provide equal or better service with fewer employees and consequently fewer dollars.

## THE PATROL SYSTEM

To set the stage for comparison, some background on the development of our early organization will be required. Back in the early 1920's, one man with a pickup truck and a few assorted tools could patrol 20 or 30 miles of "hard road" and bury the dead chickens, drag the shoulders, or patch an occasional hole in the pavement. This was the beginning of the patrol system that formed the framework for our maintenance organization until 1969.

In the 1930's, traffic increased and pavements began to deteriorate, but two men could still patrol a 20-mile section and provide the services required. Traffic continued to increase along with travel speeds, making good traffic protection mandatory. By 1961, three full-time workers were needed on each 20-mile section, and these often had to be supplemented with extra temporary help to provide one or two flagmen. In addition, extra gangs had been formed to perform such specialized functions as bridge repairs, mudjacking, grading, and concrete patching.

By 1969, some of our supervisors had 250 to 300 miles of highway and as many as 15 of the three-man sections under their jurisdiction, each section with its own small storage site. Adequate supervision became almost impossible.

## THE TEAM SECTION SYSTEM

Illinois maintenance engineers had talked for years about replacing the patrol system with a "gang" maintenance system, but no positive steps were taken until 1968. One of our district maintenance engineers presented a plan to trim maintenance costs with a gang-type operation. The proposal was tested with a pilot program in one county and the idea was sold.

Late in 1968, the consulting firm of Bertram Tallamy and Associates was retained to design the new organizational structure and to establish operating procedures. By July 1969, team section maintenance was implemented and we are now in operation. The guidelines used were simple but logical:

1. Team section boundaries would follow county lines where possible since our non-technical personnel are patronage employees. Where the work load was low, as in counties where highway networks were minimal, two or three counties could be combined to form a single team section. Likewise, highly urbanized and dense counties could be divided into two or more team sections.

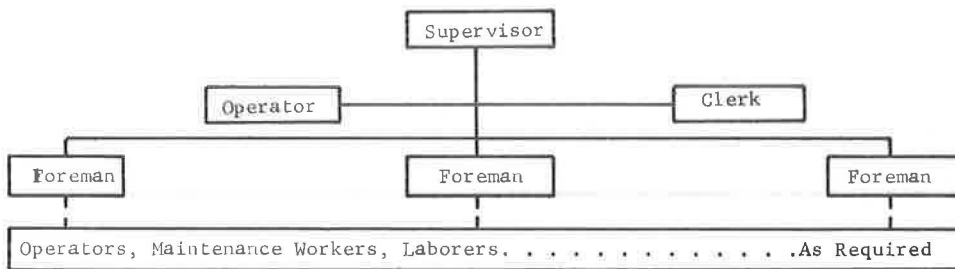


Figure 1. Team section organization, Illinois Division of Highways.

2. The number of men in each team section would depend on the work load. Ideally 20 to 30 men would be required to perform the maintenance functions.
3. The team section jurisdiction would cover 100 to 200 centerline miles of state highways. Essentially we had a larger crew covering a larger section with better supervision.
4. The greatest travel distance for team section boundaries to headquarters would be 25 miles. Where this was not possible, subheadquarters would be established.
5. Headquarters would be located on state-owned property.

The simplicity and flexibility of the new system can be seen from the organizational chart shown in Figure 1. The supervisor usually has three to six working foremen under his direct supervision instead of some 12 or 15 separate sections. The number of equipment operators and maintenance men under each foreman is dependent upon the current project requirement and can be varied to meet any mix of project requirements. The supervisor also has a clerk and an equipment operator at the headquarters to allow him maximum time for field inspection and planning.

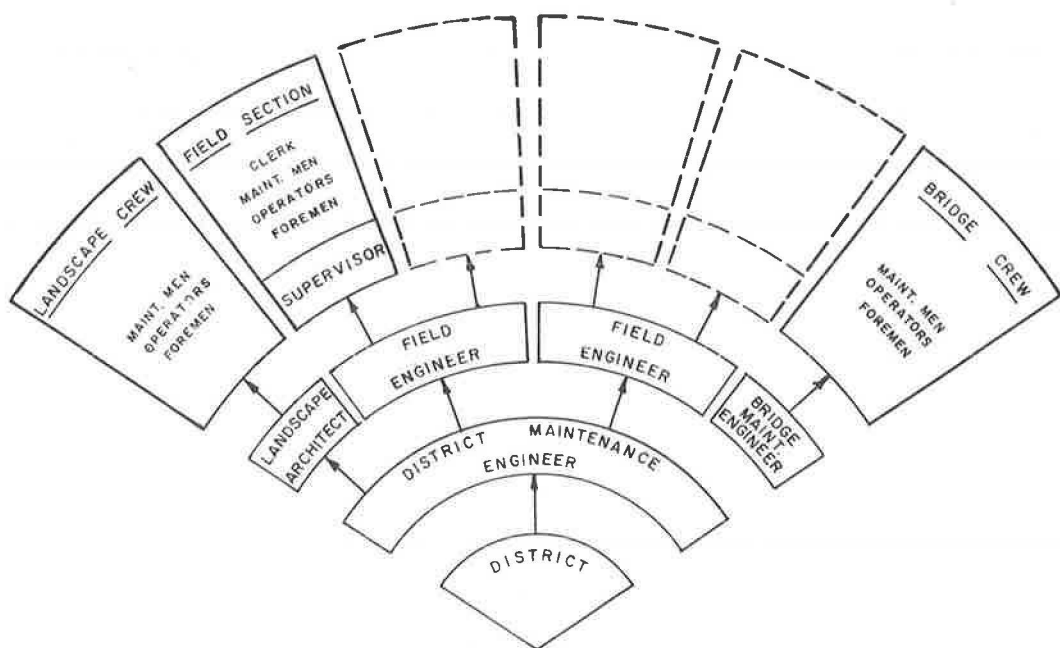


Figure 2. Field maintenance organization, Illinois Division of Highways.

The maintenance organization above the supervisor's level, shown in Figure 2, remained essentially the same, with a field engineer normally provided for each 2 or 3 team sections.

It might appear that the only accomplishment was to put the small sections into groups, but it was not that simple. The work load has been redistributed and manpower resources adjusted according to mathematical models with variables including miles of pavement, number of lanes, type of system, environment, and all the important traffic volumes. In addition, manpower complements were adjusted by snowfall factors to accommodate different snow removal loads that might be experienced by the 10 districts. Snowfall factors were based on 30-year norms from eight reporting stations throughout the state using such variables as days of snowfall, average inches of snow, and days of maximum 32-degree temperatures. The work force was actually reduced by several hundred men.

Mathematical models were also used in determining equipment requirements for each team section. The variables used for trucks included highway classification, mileage, and, of course, the snow factor. The system was designed to provide complete coverage each two hours, allowing for dead haul, loading, and down time. Tractor mowers were also distributed using classification and mileage. Each team section now has labor and equipment resources related directly to work loads.

### OPERATIONAL CONCEPTS

Rather than go into more detail describing models or techniques or statistics used to balance the organization, it will probably be more meaningful to discuss some of the operational concepts of team maintenance.

1. Flexibility—Team section maintenance allows the supervisor to adapt his organization to any operation that may be encountered throughout the state. Crew sizes can be adjusted to the most efficient size, as required.

2. Planning and Scheduling—Long-range and seasonal programs are prepared by the district maintenance engineer and field engineer, but the supervisor actually schedules the work and assigns the crews for his team section. Magnetic assignment-scheduling boards have been provided to aid the supervisor in planning.

3. Operations—All personnel normally report to the team section headquarters to begin work each day. (Exceptions are made when a crew is assigned to a temporary job site for a project remote from headquarters or during snow removal operations.) This guarantees daily contact between the supervisor and other team members and helps to create conditions for a well-managed, efficient organization.

4. Patrolling—Patrolling and inspection of highways and structures is a responsibility of the supervisor or those designated by him. Regularly scheduled and organized inspections can now be conducted as part of a system rather than by individual sections in a piecemeal manner. Inspection data and counseling of the field engineer aid the supervisor in determining job priorities in scheduling his men and equipment.

Snow removal is one of the prime functions of the Illinois highway maintenance organization and consequently has much influence on manpower and equipment requirements. Naturally any reduction in manpower would have substantial impact on snow removal operations. Until 1969, Illinois used two men on every snowplow from 1½-ton dump trucks to 6-ton, four-wheel-drive units. Now all trucks that have controls easily accessible to a single operator and do not have side-mounted wings can be operated by one driver during normal snow storms. As a safety feature, all trucks are now equipped with mobile radios in case the operator should encounter problems and require assistance. With a truck assigned to each 17 miles of highway (in rural areas), help would only be a few minutes away. This also enables the supervisor and field engineer to maintain constant communications with each unit in their territories.

During the last two weeks in December of 1969, it is estimated that this change alone saved over \$500,000 in overtime salaries. The investment in 1,100 additional mobile radios was returned in payroll savings long before the first winter ended.

After 30 years of operating under a patrol system and plowing snow with two men on a truck, we were all a little apprehensive when the team section system was implemented

even though many states had operated successfully for years with similar organizations. Now that the winter is behind us, most of us are pleased at the results. One district maintenance engineer claims he reduced the amount of contractual services for snow removal by over 75 percent last winter. Field engineers claim they have never accomplished so much work with their forces. Supervisors, when recently given the option of establishing foreman's storage sites, chose to continue to operate from the centralized headquarters. They feel that the new system allows them to manage their forces efficiently and that smaller organizational units would destroy the flexibility it provides.

As happens so many times when looking at a new installation in retrospect, I glossed over some of the rough spots. Many of our field people were reluctant, to put it mildly, to accept such a drastic change. Headquarters was no longer just around the corner from home. The thought of plowing snow alone all night at first brought open opposition. Some areas felt that the manpower allotments were inadequate. A year's operation has resolved many of the problems, and a few minor changes, as we gain experience, should level out the system.

Our maintenance engineers and field engineers have put forth extraordinary efforts for months in laying plans, training people, locating new storage sites, and selling team maintenance to their men. Unfortunately all the work is not over. We still have new headquarters buildings to construct, inventories to revise, and maps to draw; but we feel we are over the hump.

I mentioned earlier that Illinois had made some giant steps in 1969. Here are some of the accomplishments:

1. Maintenance work loads are directly related to labor and equipment resources.
2. Nontechnical employees have been reduced from over 4,000 to approximately 3,400.
3. Mobile communications have been expanded to include all snow route trucks.
4. Flexibility is available to handle all normal maintenance situations.

The future looks as promising as the past for the team section system from an administrative viewpoint. Once the models used for determining manpower and equipment requirements have been evaluated and adjusted, if necessary, needs can be determined quickly by computer, using current highway inventory data. Projections for appropriation requests can be substantiated by incorporating future highway improvement programs into inventory. The maintenance system will be as dynamic as the highway system itself.