

*Abridgment*

# Collection of Pavement Inventory Data for the Illinois Pavement Feedback System

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Collection of inventory data for a pavement management system requires searching for data from several sources. Often, locations of these sources are not commonly known. Many times, officials of government bureaus or district agencies do not even realize that they have certain pieces of information in their own files. Thorough procedures were used in the Illinois Department of Transportation, Bureau of Materials and Physical Research, to obtain original construction and rehabilitation design information for the Department's pavement management system.

Collection of inventory data for the Illinois Pavement Feedback System (IPFS) has been a long and grueling process. Many problems have hampered collection of these data. Establishing a pavement inventory data base requires plenty of patience and perseverance. Thorough procedures were used in the Illinois Department of Transportation, Bureau of Materials and Physical Research (BMPR), to obtain original construction and rehabilitation design information for the Department's pavement management system.

## DATA ELEMENTS

The first step was to decide what data elements were required for the system. Because this step is described in detail in other reports (1,2), it is only discussed briefly. It involved forming a team of users to decide what outputs from the system would be desirable. The required data elements were determined on the basis of these output reports. The data elements were then organized into a hierarchy with the contract number of the project as the primary key.

## PAVEMENT MANAGEMENT FILE (PMF)

In data collection efforts, the most readily available information was obtained first. The logical starting point was the PMF, which was established before development of the IPFS. The PMF, created by the Office of Planning and Programming in 1983, is now maintained by the Bureau of Design. The PMF contains valuable information, such as the original pavement design, construction sections, subbase type, aggregate sources, previous pavement rehabilitations, and previous shoulder rehabilitations for the Illinois Interstate and supplemental freeway systems. Because the initial scope of the Illinois Pavement Feedback System was the Interstate highway system, the PMF was a good starting point.

However, the PMF had some limitations that prevented its direct use. The PMF was divided into management units described by milepost limits that did not necessarily correspond to the limits required for the IPFS. For the IPFS, initial efforts concentrated on determining the milepost limits for the original design contracts. In most cases, the milepost limits in the PMF did not correspond to the original contract limits, for two reasons. First, when analysts for the PMF felt that there were not any significant differences between adjacent contracts, they included two or more contracts in the same management unit. Second, in some instances milepost limits were modified to reflect limits of a rehabilitation contract that were either longer or shorter than those of the original construction contract.

Some information was missing from the PMF. For example, a few sections on the Interstate highway system incorporated parts of existing highways. Approximately 28 mi of I-55 in Grundy and Will counties contains pavement constructed for US 66 and its predecessors. For these sections, the PMF simply listed the construction section as unknown and listed the original pavement type as 10-in. jointed pavement even though there were several stretches of 9-7-9-in. thickened-edge pavement contained in these sections. Another problem was that experimental sections, of great interest for research purposes, were usually not broken out in the PMF either because of their complexity or their short length. Finally, the PMF did not contain contract numbers either for original construction or rehabilitation contracts. Because the contract number was to be the primary key for the data base, it was of paramount importance to obtain these items of information.

## MONTHLY CONSTRUCTION REPORTS

The first attempt at obtaining contract information was through the Monthly Construction Report published by the Bureau of Construction. The Monthly Construction Report contains information such as project number, route, section, contract price, date work started, and date work completed. The BMPR has a copy of every year-end summary of the Monthly Construction Report dating from 1944 to the present. This time span covered the construction of all the Illinois Interstate system except for a few sections where older routes were incorporated into the system. Unfortunately, the Monthly Construction Report only contains contract numbers for projects constructed after 1970. More than half of the Illinois Interstate system was constructed before 1970. Nevertheless, the Monthly Construction Report is still the best source for obtaining contract information easily.

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The contract information search began by using old Monthly Construction Reports to locate information on the original sections and rehabilitations listed in the PMF. The PMF lists the year each section was originally constructed as well as the years rehabilitations were performed. For these years, the appropriate year-end summaries were located. However, the year listed in the PMF was often incorrect, necessitating that several summaries be searched for years preceding and following the year listed. A minimal amount of information was collected the first time through. During this phase, the contract number, date that contract was awarded, date that work started, and date that work was completed were recorded. For older sections for which the contract number was not listed, the Federal Aid project number was recorded instead.

### DISTRICT 1 INPUT

Next, a breakthrough occurred. While in the process of updating the PMF, the Bureau of Design had sent each of Illinois' nine highway districts a copy of the pertinent pavement management sections and asked them to make corrections and updates as necessary. For some districts, this process was relatively easy, but for District 1, located in northeastern Illinois and containing the city of Chicago, it required a great deal of work. Rather than making the updates directly, the District 1 Bureau of Maintenance supplied the BMPR with information needed to make the updates. This information included a summary of the original construction and rehabilitation sections, maintenance team section maps, and copies of typical sections from the construction plans. The summary contained the route number, section number, approximate year originally constructed, type of construction, and microfilm reel number on which the plans were located. The maintenance team section maps listed the original and rehabilitation sections and, most important, provided the station limits for the sections. Of course, the original construction plans were the most valuable pieces of information of all.

Experience with District 1 provided direction for the remainder of the project. Information on the plans considered useful was recorded on notebook paper because the data entry sheets had not yet been finalized. Milepost limits and contract number for each contract still had to be determined.

### MILEPOST LIMITS

Two methods for determining the milepost limits were used. In most cases, the survey sheets from the pavement distress survey were sufficient. The BMPR had been conducting a detailed distress survey biennially since 1985. This survey is done on a sample unit basis with 500-ft sample units surveyed at each milepost. Any stationing found in the pavement along with its distance from the start of the unit is recorded. In this manner, the required link between the stationing and the mileposts was established. The one problem with this method was that it could not be applied in areas where the distress survey was not conducted. These areas, all located near Chicago, were skipped because of high traffic levels that made it too dangerous to conduct the survey manually. Therefore, the milepost station link was established by using the main-

tenance team section maps and the roadway inventory file. The roadway inventory file, maintained by the Office of Planning and Programming, contains the milemarker, to the nearest 0.01 mi, for all structures located along a given route. Because the maintenance team section maps provide the stations for all structures, connections between mileposts and stationing could be established.

### CONTRACT NUMBERS

For the jobs constructed after 1970, contract numbers were obtained from the Monthly Construction Report. Many of the older contract numbers were obtained directly from the plans. Usually, the contract number was stamped on the plans. Unfortunately, a large portion of the expressways around Chicago were constructed by Cook County rather than the State of Illinois. As a result, these jobs often did not have state contract numbers. Also, some of the older jobs constructed before the start of the Interstate program did not have contract numbers stamped on the plans. Dummy contract numbers were assigned in these cases.

### DOWNSTATE DISTRICTS

Using knowledge gained from the experience with District 1, a search for contract information for the other eight districts was begun. Each district bureau of maintenance was called and a copy of its maintenance team section maps was requested. After the maps were obtained, the milepost limits for the original construction sections could be calculated using pavement distress survey sheets.

### MICROFILM

Next, a copy of the cover sheet and typical sections from the construction plans were needed. The plans were on microfilm, but which reels contained the plans was not known. However, the Bureau of Design maintains a card file that contains the microfilm reel numbers for both original construction and rehabilitation contracts. By providing the Bureau of Design with the route number, county, section, and either the contract number or Federal Aid project number, the microfilm reel numbers could be obtained—with a few exceptions for which the cross sections had been contained in the proposal and no formal plans had been prepared. This problem will be discussed later.

### DATA ENTRY

After the reel numbers were received, copies of the cover sheet and typical cross sections for each contract were made. By this time, data entry sheets were complete, so entering data could be started. After the original construction design data were entered, the data sheets were proofread. Many errors were found. Contracts that contained more than one design type were not always split up, incorrect assumptions were made regarding materials used, and milepost limits were

often miscalculated or left blank. It was decided that it would be best if one individual, the pavement inventory engineer, maintain control of entering the design data. Inaccurate contracts were corrected and all subsequent data sheets were filled out by the pavement inventory engineer except for sheets containing general contract data from the Monthly Construction Report, which were filled out by others and checked by the pavement inventory engineer.

On completion of the original construction contract phase, information on rehabilitation contracts was collected. The process was virtually identical to the one used for the original construction contracts. Many rehabilitations had proposal plans rather than formal plans. After some searching, it was found that the districts had copies of the job proposals needed in their dead files. Later, it was discovered that the copies of the proposals needed were in the BMRP's own file room. The more recent jobs were in paper files and the older ones were on microfilm. The sheets for these last few rehabilitation contracts were soon due to be completed.

#### DATA BASE STATUS

Although data for almost all of the Interstate contracts have been entered, the data base is at present far from complete. Most of the original construction contract plans did not contain any design traffic or reinforcement data. Also, in many cases the plans were ambiguous. Usually, three options were shown for the shoulder design with no indication of which design was used. The subbase type was usually described as 4-in. stabilized, without specification whether it was bituminous aggregate mixture (BAM), cement aggregate mixture (CAM I), or Econcrete (CAM II). Underdrains were described by diameter, but the type of material used was not specified.

#### CONCLUSION

Trying to collect inventory data requires searching for data from several sources. The location of these data is often not commonly known. In many cases, officials of a given bureau or district agency may not even realize that they have certain pieces of information in their own files. The purpose of the IPFS is to give everyone easy access to this type of information through computer terminals. Although this project has required the expenditure of much time, money, and effort, the potential future savings are enormous. It is hoped that this paper will give agency officials of other states a realistic idea of the effort required as they embark on creating their own pavement management systems. To successfully complete this kind of undertaking, it is important to be prepared for potential problems and to persevere.

#### REFERENCES

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