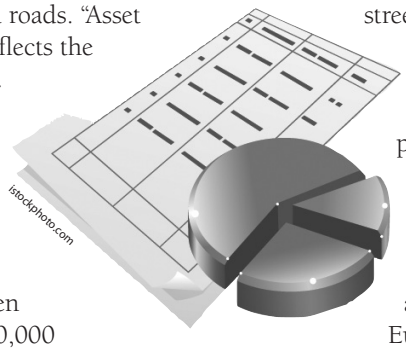
Kansas
LTAP Fact Sheet
A Service of The University of Kansas Transportation Center for Road & Bridge Agencies

Keeping it Simple in Eudora

By Norm Bowers, P. E.

The City of Eudora has implemented a simple pavement management approach that might be a reasonable management approach for other small communities.

Since the 1980s there has been a lot of talk about the need for pavement management to properly manage and take care of our streets and roads. "Asset management" is the new term for this, and reflects the need to manage all our assets, not just streets. The Federal Highway Administration even has a special unit that promotes asset management and is a good resource for more information. See http://www.fhwa.dot.gov/infrastructure/asstmgmt/.



Although there are recognized benefits to asset management, in Kansas it has seldom been implemented in communities with less than 20,000 in population. Larger communities are more likely to have a technical staff and financial resources to implement management systems. But smaller communities have the same issues as the larger communities, yet they lack office staff and technical expertise to develop and maintain a management system.

The major obstacles to implementing an asset management system have been the same for both small and larger communities: 1) Cost of the software, 2) Learning the software, 3) Time and effort involved in the collection of initial inventory and other needed information. Then there is the issue of ongoing maintenance of the management system. The effort to maintain and effectively utilize such a system is more problematic at a small agency where it is likely that only one person knows how to operate the system and keep it current. If that one person quits or retires, the successor will likely not understand the system and might not know it exists. For that reason a management system for a small community needs to be easily understood and be simple to maintain.

There may be a solution available for smaller communities: Consider the City of Eudora, Kansas. Eudora is a growing city with a population of 6,000 located on K-10 Highway between Lawrence and the Kansas City metro area. The city maintenance program was to chip seal older streets at 3 year intervals and crack seal the newer hot mix streets. Records were kept on a color-coded city map. The street department consisted of two people and some summer help.

Eudora has a city administrator who is charged with properly managing city operations. It is not unusual for a city administrator to stay just three years with a city, and that has been the case with Eudora. In 2009 Eudora hired a new city administrator, John Harrenstein. At that time, the city council was concerned that the street system was not being maintained properly—but how would a new city administrator know? He didn't even know how many miles of street the city maintained.

It was obvious to Harrenstein that what he lacked to evaluate the street network was data. A color-coded map is nice to keep track of what has been accomplished, but a map cannot tell you if you are doing the right thing, or reveal the condition of the streets.

Harrenstein contacted me for advice on how to proceed. My advice was: "Keep it simple." The more complicated the system, the more likely it will fall into disuse if there is staff turnover. For software, I recommended using an Excel spreadsheet. Excel is fairly powerful if set up properly, but the big advantage of Excel over a database application is that almost all agencies have someone that can use Excel. Excel does not scare people like database applications.

For a pavement rating system, the simplest model I've found is the PASER system developed by the University of Wisconsin. PASER is a 10 point system that is easy to understand. It's also easy to train people to do the ratings, and it's fast, as it is basically a windshield survey.

The city first considered doing the initial inventory and rating with city staff, but due to time constraints and being uncomfortable with the process of properly rating the streets, they decided to contract the work. In addition to the pavement rating, the city was interested in the condition of the curbs & gutters and a tabulation of the amount of sidewalk in the city. The city also wanted an outside consultant to look at the street maintenance program to see if the three year chip seal schedule was appropriate.

The initial inventory involved measuring the width and length of each street, and rating the condition of the pavement and curbs. Old aerial photos and construction plans were used to determine the approximate construction year. Aerial photos were available for each decade back to 1935. The city has had good construction plans since 1991. Sometimes the date on the subdivision plat was used for the road construction date. Maintenance records were available back to 2006, and those records were used to determine the last rehabilitation date.

Knowing the pavement type is important, as each type has a different maintenance strategy and schedule. For Eudora's inventory, the pavement type was determined based on construction plans, if available; otherwise the construction year and type of surface distress gave a good indication of the pavement type. The pavement types that were the most difficult to differentiate were chip seal from hot mix asphalt if the hot mix had been chip sealed later for maintenance.

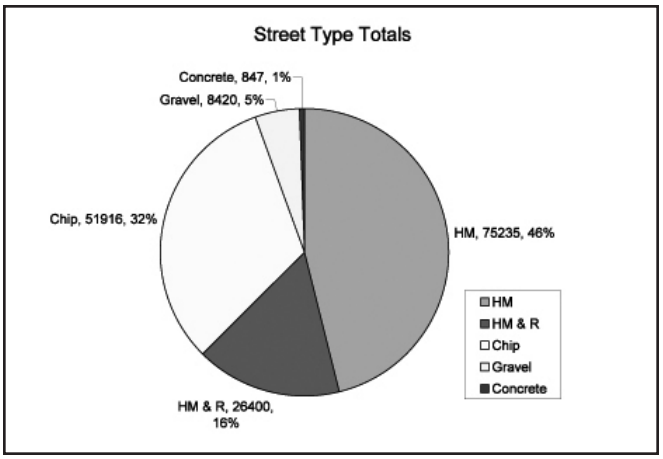
An Excel workbook was developed that included the following worksheets:

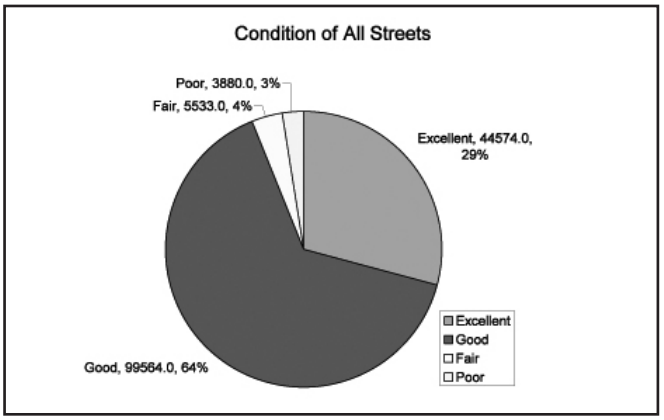
- Street, curb & gutter, and sidewalk inventory, by block.
- Definitions describing the abbreviations and terminology.
- Budget history including cost drivers and material costs.
- Checklist to document annual maintenance of system.
- Pre-defined charts that display key data.

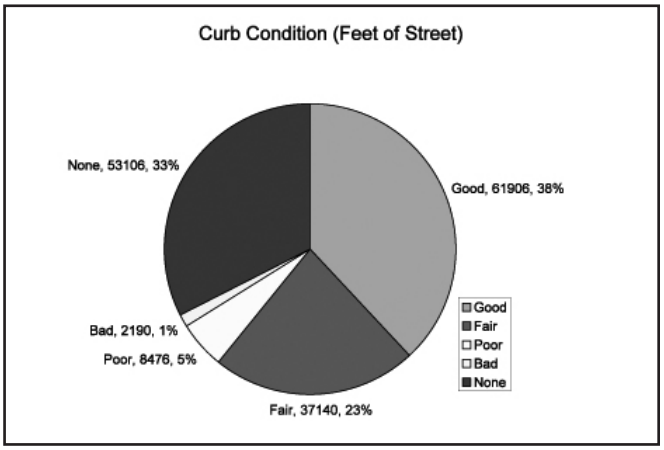
The inventory worksheet is a listing of all the street segments (blocks) with their physical characteristics: pavement type, pavement rating, curb rating, and maintenance history. So for any block it is easy to see what was done to the street and the year it occurred. With budget history, costs, and the street inventory in the same workbook, all the data is there to produce a variety of reports, such as work accomplished by year, budget vs work accomplished, budget vs cost by year, and pavement condition by year.

Eudora's simple management program also has an instruction manual that explains the street system and how to use and maintain the data. This manual includes the history of street construction standards for Eudora, the major pavement types, definitions, and most importantly how to maintain the overall system, and the data within it, so it stays current and effective.

Through this process the City was able to develop facts and data to manage their street system. The city learned that they had 30.84 center-line miles of street, 41.56 miles of curb, and 90,000 ft. of sidewalk. City officials thought they had only two types of streets: full depth hot mix and chip seal. The inventory found that there were quite a few hot mix streets with rock base that were being chip sealed too often.

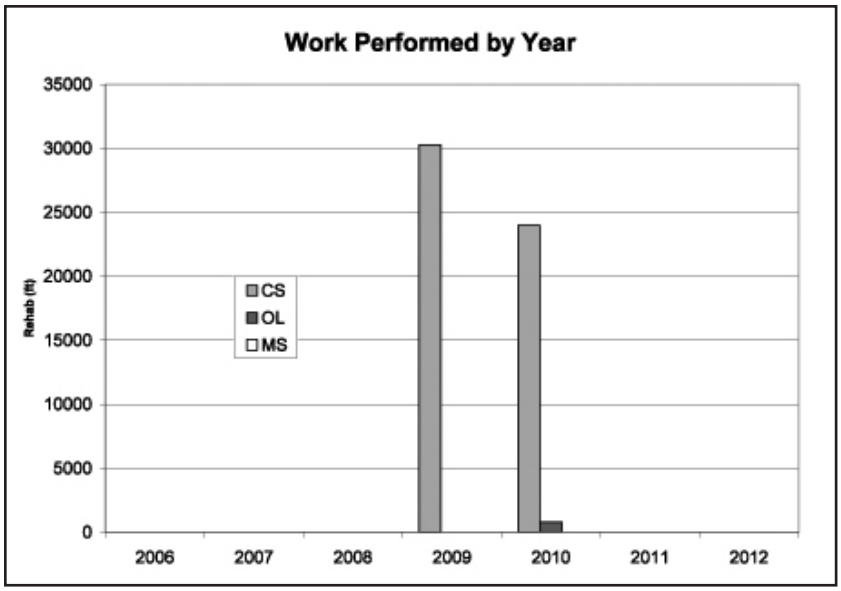


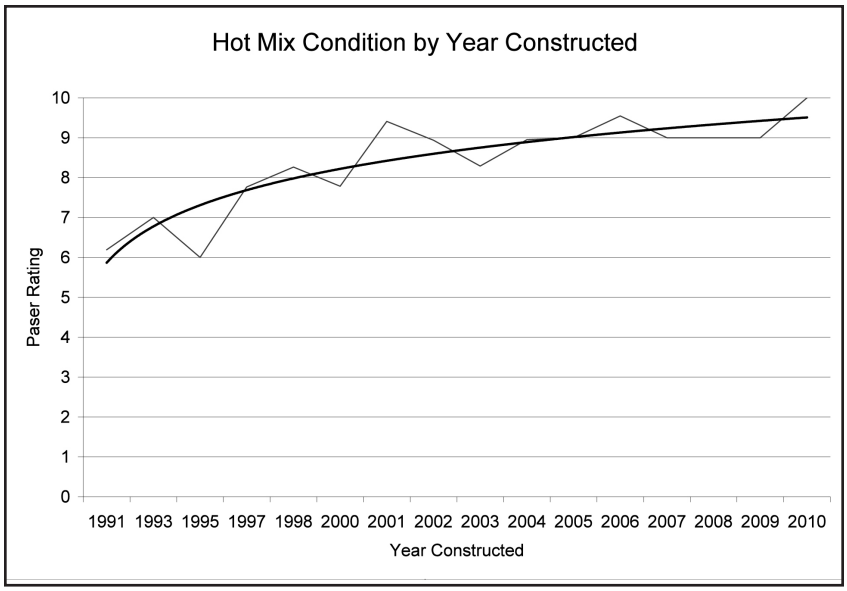




A number of other important things became apparent when they looked at the entire street network as a whole. The streets were in relatively good condition, but the curb condition indicated that a curb replacement program should be considered. Some curbs were showing premature deterioration at joints, probably due to poor aggregate in combination with salt used for deicing. The city is considering cutting back on salting, and upgrading the specification for curbs in new subdivisions.

The street system mileage has almost doubled since





1990. The newer streets are all hot mix pavement that has needed little maintenance, but the budget had not been increased to allow for overlay of the new streets when needed. The three year chip seal cycle was too frequent, and the city is considering going to four years, with the cost savings going to more extensive patching to smooth the streets.

Some interesting data is shown in the accompanying charts. Pavement types were divided as shown in Figure 1.

The pavement condition was tabulated and is shown in the Figure 2. Ninety three percent of the streets were rated good or excellent. Most small cities would be satisfied if their streets rated this high.

The city did not have a curb replacement program and the inventory showed quite a lot of curb in poor and bad condition as shown in Figure 3.

Figure 4 shows the amount of work accomplished for the past five years. The previous city manager did not believe in chip sealing, so no rehabilitation work was performed for three years. This kind of chart will be updated annually as new data is entered into the spreadsheet.

The city had good enough records on construction dates of hot mix streets that a performance curve (Figure 5) was developed to determine the optimum time for rehabilitation.

Note that the condition fell off rapidly after 17 years (1993) and this indicates the need for an overlay at 17 year intervals.

In summary, the City of Eudora now has a complete inventory of their streets with condition ratings. They can now track how much work is accomplished and the condition of their streets. Rather than rely on hunches and impressions, city officials now have data on which to base their decisions.

A simple program like this is not for everyone; some larger public works agencies need the power and functionality of software specifically design for asset management. But if your city or county is interested in taking a simple approach, consider Excel and the PASER rating system.

About the author: Norm Bowers teaches some courses for Kansas LTAP, works part time for Kansas Association of Counties as Local Road Engineer, and does private consulting. Norm is retired Johnson County Engineer and has been involved in pavement management for 19 years. Norm can be contacted at norm@bowerscivil.com . ■

Reprinted from the Fall 2010 issue of the *Kansas LTAP Newsletter*, a publication of the Kansas Local Technical Assistance Program (LTAP) at the Kansas University Transportation Center.