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

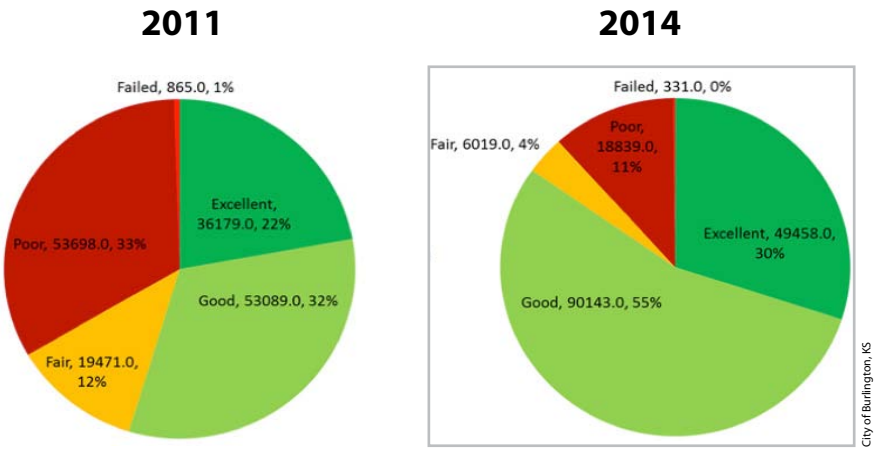
Pavement Management: Small Agencies Can Do It

By Norm Bowers, Local Road Engineer, Kansas Association of Counties and Doug Mast, Burlington Public Works Director

By keeping it simple, small communities can implement a pavement management system to meet their needs.

A pavement management system for a small community needs to be easily understood and simple to maintain. A common traditional pavement management system is a colored map, showing what year streets were worked on. A colored map is nice for keeping track of what has been accomplished, but it cannot tell you if you are doing the right thing, or reveal the condition of the streets. However, with a computer and simple software, you can do much.

Condition of All Streets



Pavement condition in Burlington improved significantly in a period of three years after the city initiated a pavement management system. The city also modified its maintenance approach to catch up with a backlog of needed maintenance (see sidebar on next page).

Burlington did it

Case in point: In 2011 the City of Burlington, Kansas, initiated a pavement management system using just an Excel spreadsheet. Burlington has a population of 2,600 and is located on US 75 Highway about an hour south of Topeka. Excel is a simple solution but has proved more than adequate for them. The big advantage of Excel over a database application for a small city is that even small agencies have someone who can use Excel.

An Excel workbook was developed for Burlington that included the following worksheets:

- Inventory, dividing the street system into blocks;
- Pre-defined charts that display key data in graphic form;
- Budget history, including cost drivers and material costs.

The inventory worksheet lists of all the street segments (blocks) with physical characteristics, pavement type, pavement rating, curb rating, and maintenance history. For any block it is easy to see what was done to the street and the year it occurred.

Reports easy to generate. With budget history, costs, and the street inventory in the same workbook, all the data is there to produce a variety of reports. Reports can be generated for work accomplished by year, budget vs. work accomplished, budget vs. cost by year, pavement condition by year, etc. Reports are only limited by the expertise and needs of the user. If you would like a copy of the Burlington spreadsheet to modify for your agency, just email Norm Bowers or Doug Mast (email addresses are listed at the end of this article).

How pavement type was determined. Determining the pavement type is important, as each type has a different maintenance strategy and schedule. The pavement type for Burlington was determined based on construction plans, when available. In the absence of plans, the construction year and type of surface distress gave a good indication of the pavement type.

Burlington has the following pavement types: Concrete, hot mix

asphalt, chip seal with a hot mix overlay, chip seal with good base, chip seal, and rock. The hardest pavement type to differentiate was chip seal from hot mix asphalt if the hot mix had later been chip sealed.

How the pavement was rated. For pavement ratings, Burlington used the PASER system, probably the simplest rating system in widespread use. Its simple 10-point rating system is easy to understand. It is also easy to train people to do the ratings, and they can be done quickly, as it is basically a windshield survey. Guidebooks on PASER, for different types of road surfaces, are available for free from the University of Wisconsin at http://tic.engr.wisc.edu/Publications.lasso

The most time-consuming aspects of establishing a pavement management system are the initial inventory and pavement ratings. Setting up the initial inventory involves measuring the width and length of each block, and rating the condition of the pavement. For inventory purposes the block lengths can be obtained from Google Earth. The edge of the pavement is harder to determine from Google Earth, and for accurate results, the pavement widths will need to be field-measured. Curbs and sidewalk can be inventoried and rated at the same time. Burlington used old aerial photos and construction plans to determine the approximate construction year, and maintenance records to determine the last time maintenance was performed.

The results: Better quality information and better road conditions. Since 2011 Burlington has been using their pavement management system to determine their yearly maintenance schedule. Each year the spreadsheet is updated with work performed that year. The city is now able to easily track the condition of the streets and when work was performed.

The pie charts on page 1 show the improvement in pavement condition from 2011 to 2014. (These charts were created easily using the PivotTables feature in Excel.)

Burlington Modifies Maintenance to Stretch Dollars

by Doug Mast

A pavement management system helps you decide which roads need attention first, and how often different road types need to be maintained. But a PMS will not generate the money to fix the problems. Burlington had some catching up to do, and had to get creative to get the job done.

Burlington has used RAP in street reconstruction for the last two years, as departure from our typical repair practice. We have a lot of streets without curb and gutter that were poorly built for the weight of existing vehicles. So we were fighting base failures and serious rutting. Our options were limited to rebuilding in some form, or wasting time and money patching a street we knew would never hold up in the long run, until we could afford rebuilding.

We wanted to be able to make more progress in a year than what we were able to accomplish with our typical rebuilding process. Our typical process is to dig out the street 12 inches and put Tensar down, then put in 6-8 inches of base and 4-6 inches of hot mix asphalt depending on the type of street and the budget constraints.

Two things were slowing us down: One was the amount of money we had to spend patching while keeping up with other street maintenance duties, and the second was the amount of time our patching process took our small crew to complete when there are so many other duties to accomplish in the warmer months. (We have a total of six employees in the street department.)

We came up with a new rehabilitation process that uses a recycling machine to grind up the existing pavement and base. There is usually not much to grind. The surface course is varied. It may be a chip seal or two and that's it, or it may have an overlay of blade-layed cold mix with it. The base is varied as well. It usually has anywhere from two to four inches of some type of base material, which could be river rock or AB-3 aggregate. We take care to make sure that we don't get into the sub-grade while grinding this portion. Then we add six inches of RAP material and grind this all together with the original grindings. This helps to get the RAP material to a uniform size and it mixes everything together for a base for the finished street. We then take a motor grader and mix in water so that you can compact the material correctly. We roll the material with a vibratory sheep's foot roller and a rubber tired roller as we are mixing and placing the material. When we get to the desired grade we take the sheep's foot off and use the rubber tired roller and a vibratory steel wheel roller. We let this sit and bake out the moisture to get harder before placing the surface material on it. That's why it is best done in the heat of the summer. We like to let this sit over the winter if possible but we've put the surface coat on within the same year when needed. Afterward we add two inches of hot mix or a double chip seal. This all depends upon our budget and the amount of traffic the new street will be exposed to in the future. Our goal here is to get some solid base down and a start on the surface coat, with the intention of getting a minimum of four inches of hot mix when the money is available.

There are some limitations that should be considered with our new process. It can't be done on a curb and gutter street due to the added material. You need to make sure you will be able to tie into the existing driveways when the street is completed without causing problems for the landowners, and you may have to replace some sidewalk to match your new elevations of your street. If you have drainage issues in the ditches, you need to correct those prior to this work. This will not work for high traffic areas or where you have very heavy loads on a regular basis.

I hope this helps and I have given you some idea of what we are trying to do here in Burlington.

Based on the improvement in street conditions, the pavement management system seems to have been well worth the effort. The City of Burlington 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 relying on hunches and impressions, city management now has data on which to base their decisions.

For more information, contact Norm Bowers email: bowers@kansascounties.org, or Doug Mast email: burlstreets@mchsi.com

For another example of a city using Excel for a pavement management system, see our *LTAP Newsletter* Fall 2010 article "Keeping it Simple in Eudora." ■

Based on the improvement in street conditions, the pavement management system seems to have been well worth the effort.

Reprinted from the Spring 2015 issue of the ***Kansas LTAP Newsletter***, a publication of the Kansas Local Technical Assistance Program (LTAP) at the Kansas University Transportation Center.