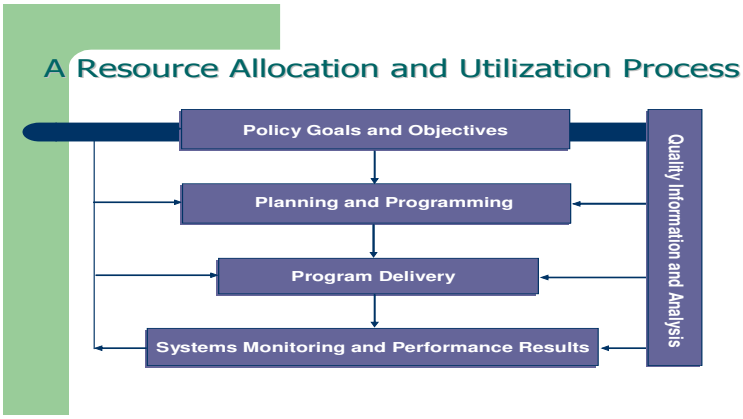
Asset Management Peer Exchange
Michigan DOT

1. How is your organization using asset management in decision making and resource allocation?

The Michigan Department of Transportation uses the 5-step resource allocation and utilization process of:

- Policy Goals & Objectives
- Planning & Programming
- Program Delivery
- Quality Information & Analysis
- System Monitoring & Performance Results (see following diagram)



The information is used at all levels of the department from staff in the field to upper management.

The Transportation Asset Management Council is following this same process but has only been in existence for two years. They have adopted a specific mission statement and Goal Statement. They are also in the second year of gathering condition data on the federal-aid eligible system. This information is reported to the State Transportation Commission and the Michigan Legislature.

MISSION STATEMENT: Advising the State Transportation Commission on a statewide asset management strategy and the necessary procedures and analytical tools to implement such a strategy on Michigan's highway system in a cost-effective, efficient manner.

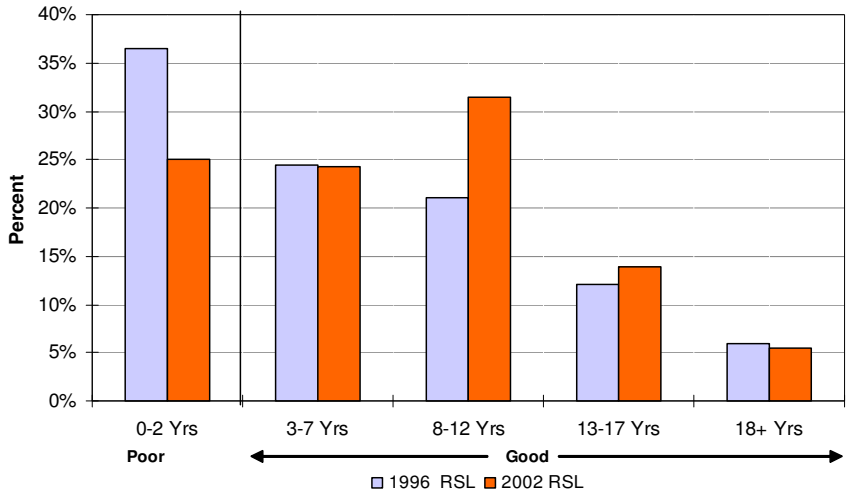
GOAL STATEMENT: The Transportation Asset Management Council will expand the practice of asset management statewide to enhance the productivity of investing in Michigan's roads and bridges through coordination and collaboration among state and local transportation agencies by:

1. Surveying and reporting the condition of roads and bridges by functional classification categories for the State and Regional Planning areas,
2. Assessing completed and planned investments in roads and bridges by the various transportation agencies of the state,
3. Supporting the development of appropriate asset management tools and procedures, and
4. Providing education and training on the benefits of developing road improvement programs through the use of asset management principles and procedures.

Our expected outcome is an asset management process that is easily used and communicated and leads to a road network that is managed by function.

2. How has your system improved or your program changed due to the use of asset management principles and data?

Prior to the adoption of asset management principles the department followed a "worst-first" approach. Now we use a mix of pavement fixes that balances investments between short-, medium-, and long-term with the current condition of the road. With the change to asset management, MDOT has reduced the number of poor pavement by over 11% since 1996. The average remaining service life has increased by 26%.



We have established very specific goals for both highways and bridges.

Program Targets – Percent Rated "Good"

- ✓ **HIGHWAYS:**
  - **95% of trunk line freeways**
  - **85% of trunk line non-freeways**
- ✓ **BRIDGES:**
  - **95% of trunk line freeway bridges**

- **85% of trunk line non-freeway bridges**

The heart of our process is our cash flow model and our call for projects process.

Our cash flow model provides an evaluation of the amount and type of road and bridge projects that can be built with a given funding amount. It calculates the expected expenditures and revenues for 7-10 years. The model allows management to estimate the impact of:

- New revenue sources
- Changes in cost of projects
- Changes in the timing of federal-aid reimbursements and lagged effects of expenditures

It also provides us with a tool to talk to the Governor and the Legislature about financial expectations and the resulting conditions.

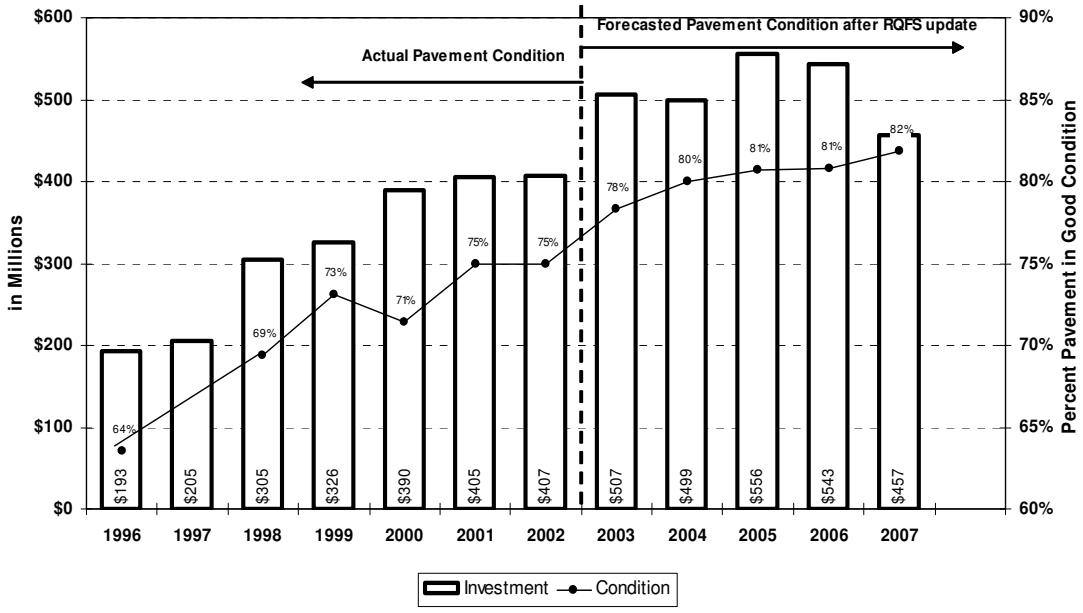
We use a Call for Projects process as a cooperative process to determine which roadways should be reconstructed, rehabilitated or receive capital preventive maintenance. These decisions are made by the MDOT regional offices and the statewide planning staff. The selections are reviewed by a multi-disciplinary Project Screening team. This team is made up of Planning, Construction & Technology, Lansing Development and region staff.

We have a Road Quality Forecasting System (RQFS) to predict future system condition based on alternative investment scenarios. Forecasts from RQFS are used to assess project selection and fix type in determining whether a particular strategy will meet the system-wide condition goals. Once the type of fix for a particular section of pavement is decided, and associated design life is identified and used in designing the pavement structure.

We track the delivery of the program and the resulting changes in pavement condition. If necessary we make changes. We repeat the analysis on at least an annual basis.

As we looked closely at our program it was becoming clear that our progress toward our goals was not proceeding at the anticipated pace. So we needed to make an adjustment. (See graph.) We also adjusted our preservation funding to keep pace with inflating project costs.

Road Preservation Investment Level and Pavement Condition (Freeway and Non-Freeway)



3. What barriers have you faced to using asset management? Data problems/integration/collection; Percent of system or operation covered; interagency cooperation.

With regards to the Transportation Asset Management Council the biggest barrier was a lack of trust between the department and the County Road Association. This was overcome when Lou Lambert from MDOT and John Daly from the Genesee County Road Commission decided to enter into a joint pilot project. This project was so successful it led to the department and the County Road Association introducing a bill to create the TAMC. The Council is comprised of representatives of the state, cities, counties, township, MPOs, and regional planning agencies.

The Council, today, is facing several barriers to successfully implementing asset management on a statewide basis. The first is that there are 619 separate agencies that manage some portion of the highway system in Michigan of which 62% own less than 25 miles of roads. Twenty percent of the agencies, in fact, own 92% of the total assets. Or to state it differently, 80% of the agencies own only 8% of the assets. Some agencies manage as few as 3 mile or less. At what level does it no longer make economic sense to engage in a full-blown asset management process? How do you make the process simple enough for very small agencies to engage in it?

A second barrier for the Council is that only 45% of all agencies in Michigan are using a pavement management system.

4. Are you using Asset Management for non-highway modes and how?

At MDOT our investment strategies include multi-modal considerations. The framework provides the necessary flexibility to coordinate with the projects and needs of other transportation modes adjacent to and crossing the highway systems.

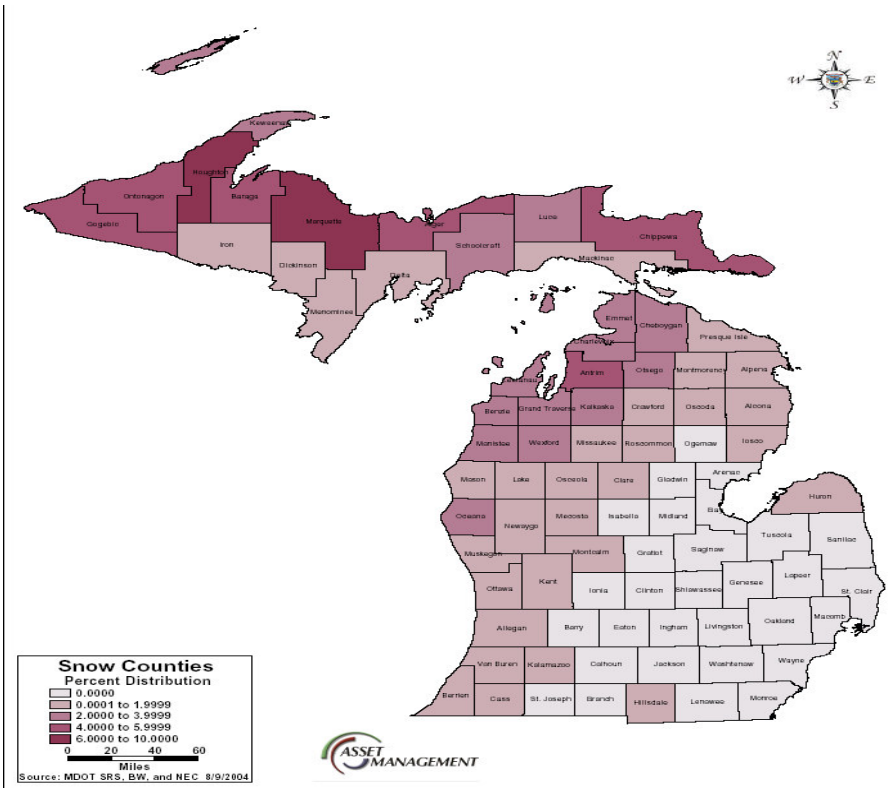
5. What improvements would you recommend in the implementation of Asset Management? Areas that need improvement; future research; data?

Areas that need improvement:

- University civil engineering courses need to incorporate asset management into their curricula.
- To make asset management more effective for local governments it need to take a "comprehensive" approach "within the entire right-of-way". This would include water, sewer, and utility management into the process. If you don't do this you can be faced with a situation where you have just resurfaced a road and three months later the power company comes along and cuts into your pavement significantly reducing your service life.
- Example: Lansing – MDOT- Capitol Loop

Future research:

- Is there a certain size of system at which this process is NOT cost-effective? Do cities with less than 10 miles of road need this elaborate of a methodology?
- Rates of deterioration need to be made more specific to local or regional conditions. In Michigan we have a lot of lake effect snow that affect deterioration rates in different ways. (See map)



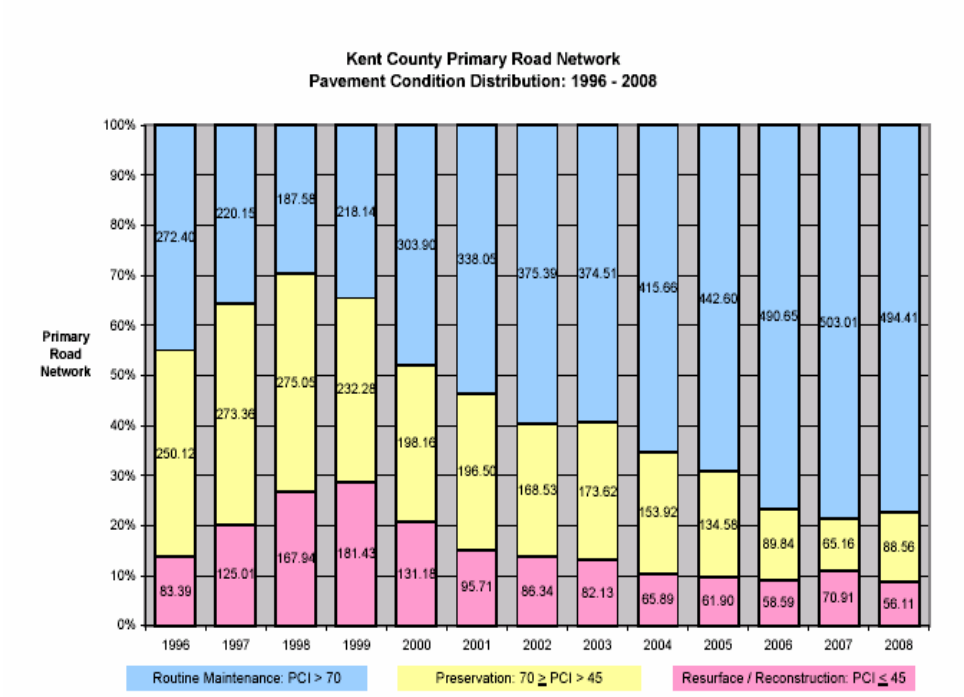
Data:

- A paring down of data that is needed for agencies to do asset management effectively. What is the minimum data you need?
- Sharing of information internationally.

Asset Management at the local level in Michigan; Kent County

The Kent County Road Commission's (KCRC) experience in asset management began in 1995 with an annual process of surveying pavement conditions on the primary road system for a new pavement management system. That effort significantly expanded the organization's ability to assess needs on a systems level and to forecast the impact of various investment alternatives. As a result, KCRC stepped up its investments in system preservation and the affect of that decision is illustrated on the accompanying chart.

Since 1995, KCRC has more than doubled annual investments in its overlay and seal coat program. With the information generated by the pavement management system, KCRC has the ability to forecast the affect of its investment decisions. The accompanying chart demonstrates that ability and shows improving conditions on the primary road system due to increased investment in system preservation. This trend continues through 2008 with projects included in KCRC's current Five Year Improvement Program.


Kent County Primary Road Network
Pavement Condition Distribution: 1996 - 2008
Primary Road Network
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
272.40
250.12
83.39
220.15
273.36
125.01
187.55
275.05
167.94
218.14
232.28
181.43
303.90
198.16
131.15
338.05
196.50
95.71
375.39
168.53
86.34
374.51
173.62
82.13
415.66
153.92
65.89
442.60
134.58
61.90
490.65
89.84
58.59
503.01
65.16
70.91
494.41
88.56
56.11
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Routine Maintenance: PCI > 70
Preservation: 70 ≥ PCI > 45
Resurface / Reconstruction: PCI ≤ 45