

The process for developing an asset management system

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Editor's note: In previous articles in this series, Tom Maze of Howard R. Green Company introduced the concepts behind transportation asset management and explained the relationship between asset management and the requirements of Government Accounting Standards Board Statement 34 (GASB 34). This article continues the series and explains some of the fundamental components of an asset management system. It also discusses some of the more important decisions that need to be made as an asset management system is designed and developed.

The two general approaches for meeting GASB 34 requirements

As noted in previous articles in this series (see www.ctre.iastate.edu/gasb34/), the need for state and local government transportation agencies to comply with the provisions of GASB34 is driving the development of asset management systems. GASB 34 requires, for the first time, many state and local transportation agencies to account for the value of their infrastructure assets.

GASB 34 is not written as a "one size fits all" standard and allows for considerable flexibility in reporting the value of infrastructure assets. Two general approaches are available to account for infrastructure assets:

- The depreciation approach. Under the depreciation approach, the agency determines an initial value for its assets (probably by broad classes of assets rather than by individual assets) and then applies standard depreciation schedules (such as straight-line depreciation) to estimate the current value of assets.
- The modified approach. The modified approach sets a minimum condition standard at which infrastructure is to be maintained. This standard is a policy decision of the governing board of the transportation agency. The agency must then regularly (on at least an every three year basis) assess the condition of its assets to assure that the minimum standard is being attained or exceeded. (If the minimum standard is not being met, an agency using the modified approach will have to revert to using the depreciation approach.) Adopting the modified approach effectively requires that an agency develop and maintain an asset management system.

Smaller transportation agencies

In general, small transportation agencies with limited resources will be better off adopting the depreciation approach to comply with GASB 34. The additional resources required to implement a full-blown asset management system will not likely be worthwhile unless an agency also needs extensive

information to make better decisions about infrastructure maintenance, rehabilitation, and replacement.

Larger transportation agencies

On the other hand, larger transportation agencies that are already investing in condition data collection and other elements that could be used to build an asset management system may find it beneficial to employ the modified approach. This is because the asset management system required to follow the modified approach will yield benefits to the agency in terms of having better information and making better decisions about maintenance, rehabilitation, and investments.

Asset management system development steps

Assuming an agency has decided to move ahead with the modified approach and develop an asset management system, several steps are necessary early in the process. The first involves setting a framework for the asset management system. The framework depends on the objectives the agency needs to have satisfied by the system. A second major step involves a careful determination of data needs and the resources needed to collect data. The third step involves completing an assessment of the baseline condition of assets. Finally, a forecast of future asset condition should be prepared.

Establishing an asset management system framework or "game plan"

Developing a framework will provide the "game plan" for the entire asset management system development effort. How an asset management system is designed depends entirely upon the intended use or uses of the system. Knowing what you intend to do with the asset management system is the key to the design of its framework. If you don't know what your goals and objectives are in creating an asset management system, it will be very difficult to move toward implementing one or to justify investing in asset management.

An organization might establish any number of objectives for an asset management system. Some of the more common objectives could be

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- satisfying the GASB 34 requirements.
- providing objective support for maintenance decisions.
- providing objective support for capital improvement programming, including the development of a Capital Improvement Program (CIP).
- forecasting future costs for maintenance, rehabilitation, and capital investment.
- having the ability to perform “what-if” analyses with different infrastructure investment strategies and programs.

Some objectives will require a much greater level of detail (or “granularity”) in the asset management system and the data required. For instance, simply complying with GASB 34 would require far less data than providing objective support for maintenance since data could probably be collected on a less detailed, more aggregated basis.

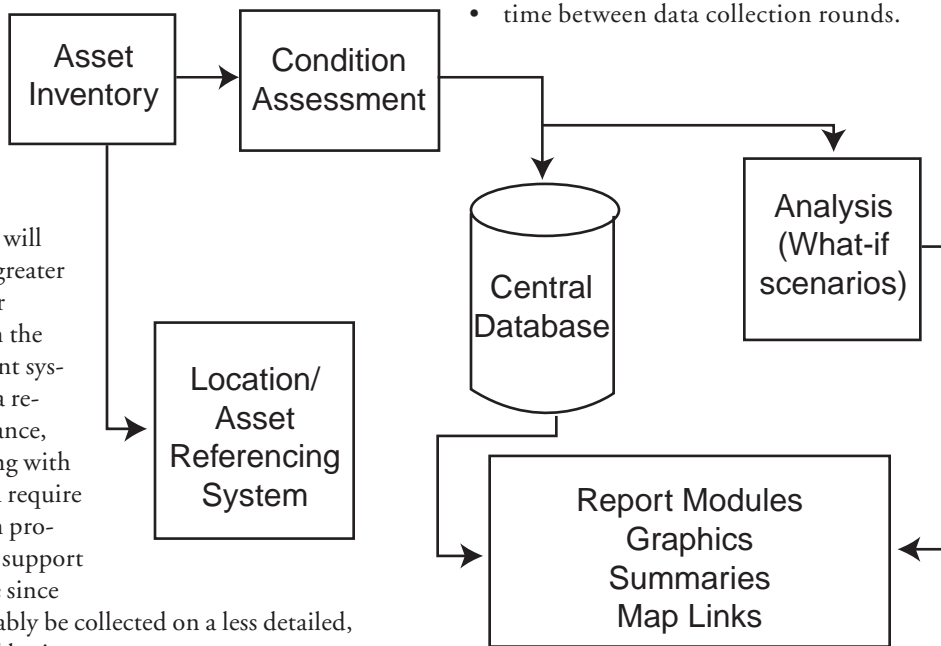
Determining data needs and resources

The primary data requirement for any asset management system is a relatively current inventory of important assets. An asset inventory includes such information as the geographic location, facility type, age, size, and initial construction cost for each asset. Generally, agencies that choose to implement an asset management system will already have an extensive set of inventory databases in place and a system of data collection established to keep it current. However, if they do not, an assessment of the data needed to support asset management and an estimate of the cost to establish it and keep it up is critical early on. It should be remembered that data collected to support asset management could have other valuable uses for an agency. Data already being collected for other purposes could be used in

an asset management system. For instance, existing bridge management system data used in a program such as PONTIS might naturally feed an asset management system.

A number of considerations will determine the cost of the data collection effort. These include such factors as the:

- level of detail at which data are collected (e.g., the length of pavement sections or the bridge elements considered).
- time between data collection rounds.



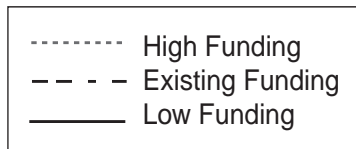
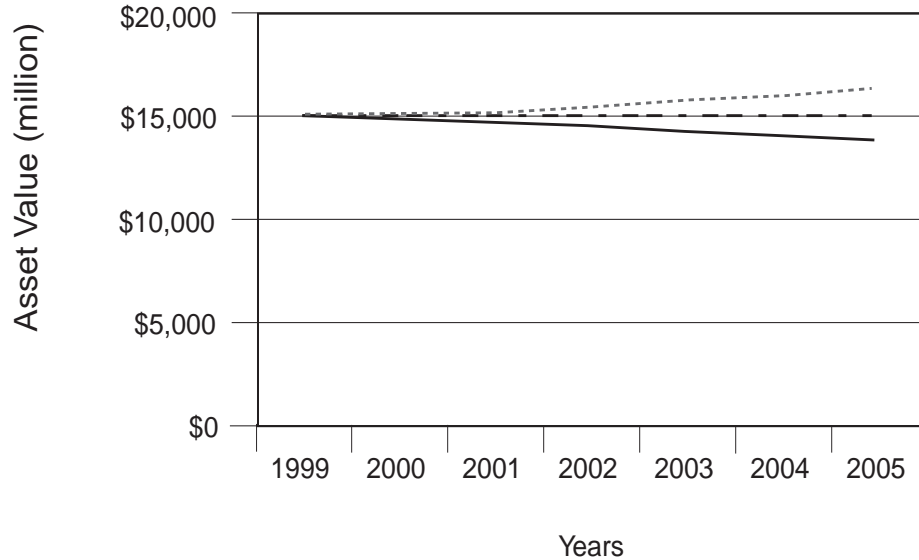
- extent of the geography or system covered by data collection.
- level of data quality needed.
- need to include pictures and video as data.
- ability to automate the data collection process.

Assessment of the current condition of assets

Once an inventory is in place, the next step in an asset management system is to perform a regularly scheduled assessment of the physical condition of all assets. For pavement assets, such physical condition assessments would include measuring characteristics such as distress and roughness. Both visual and automated assessment techniques are available. For example, in Iowa many pavements are assessed on a

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Asset Values vs. Funding (example only)



regular basis by an automated process using a van; however, bridges are assessed visually. Condition assessments are stored as data to be used in the asset management system. The ability to relate all of the inventory and condition data collected implies that information management tools such as relational database programs and geographic information systems (GIS) will be the technological building blocks for most asset management systems.

Asset condition forecasting

Most major assets may be reasonably expected to decline in condition over time unless preventive maintenance and rehabilitation investments are made. A complete asset management system will contain methods that forecast the likely future condition of assets. Two approaches to asset condition forecasting are used. These are

- deterministic models. Deterministic condition forecasting uses tools like deterioration curves for pavements to make an estimate of future condition based on average observed performance.

- probabilistic models. These models estimate a statistical distribution of values of future conditions. Some bridges and pavements may deteriorate faster than other, similar assets.

No matter which way it is done, asset condition forecasting provides a valuable tool for transportation agencies since they can begin to see the magnitude of resources that will be needed in the future to keep up their asset base. This is also the step at which “what-if” analyses become feasible.

Next issue

In the next issue of *Technology News*, Omar Smadi, CTRE pavement management specialist, will discuss the use of resource allocation models as a final step in developing a complete infrastructure asset management system. •