

Common Q's and A's pertaining to Transportation Asset Management

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Asset Management definition and its benefits

Q.1. What is the definition of Transportation Asset Management in simple terms?

A.1. In simple terms, Transportation Asset Management is a process used for managing transportation infrastructure with the objective of improved decision making for resource allocation. Another way of saying this is, which programs/projects should the DOT spend/invest their funding for the best long term benefit.

Explaining further, Asset Management aides in making 'informed decisions' about managing your network over the whole life-cycle considering network performance, economics, and engineering. Its focus is on improved decision-making for resource allocation to manage the various transportation assets and their performance such as pavements, bridges, congestion, safety, etc. Management Systems for pavements, bridges, congestion, safety, etc., are sub-elements necessary for sound information to support Asset Management decision-making.

Q.2. Is Asset Management a system?

A.2. Asset Management is not a “system”. It is a systematic process based on economic, engineering, and business principles which monitors the system performance, and performs analysis utilizing accurate data for managing various assets within the transportation network.

Q.3. Is Asset Management a complex computer program or “black box”?

A.3. Asset Management is not something that can be purchased. It is not a computer program or “black box.” It is the decision process of using sound information, tools, and proven practices to more effectively manage the highway assets in the public trust. Software is used, however, for analysis and to predict asset deterioration and outcomes that can be applied to help make informed decisions. Software does not make the decisions; people would make the highway investment decisions that affect the network performance. Asset Management is about making informed decisions that are quantifiable and supportable from both an engineering and economic basis.

When dealing with a large network such as transportation, transportation managers typically need to consider information drawn from thousands of records for estimating expenditure under several alternatives. Clearly, sophisticated tools capable of analyzing several thousand records and performing tradeoff analysis under various scenarios are needed. Asset Management principles and concepts suggests the use of software so the decision-maker has access to information on system performance, the condition of various asset elements and funds available. Moreover, use of Asset Management software tools will allow a clearer understanding of the link between investments and overall performance of the highway assets.

Q.4. What are transportation infrastructure assets?

A.4. Transportation infrastructure assets are the physical elements, such as pavements, bridges, culverts, signs, pavement markings, and other roadway and roadside features that comprise the whole highway infrastructure network, from right-of-way line to right-of-way line. A major component of an effective Asset Management program is the existence of an inventory of infrastructure assets by type and their condition.

Q.5. Why should a State DOT focus on an initiative such as Transportation Asset Management at the time that financial resources are so limited?

A.5. Asset Management is a way of doing business for improved decision making and resource allocation. Implementing an Asset Management approach is essential to ensure that we invest our funding wisely, maximizing performance with the limited resources available.

Q.6. Do States lose flexibility in decision making or resource distribution when they implement Asset Management?

A.6. No, they do not. In fact Asset Management provides the decision maker the data or the basis for making tough decisions on allocating resources. Please also see the answer to “Is Asset Management a black box?”

Q.7. All organizations manage their assets, aren't they all applying Asset Management?

A.7.

- All organizations manage their assets, but not all use an Asset Management framework.
- Management frameworks provide a systems approach to managing an organization.
- These systems are generically labeled “quality” systems or “performance management” systems.
- These models promote the Plan-Implement-Evaluate framework. These models all stress data analysis to precisely compare processes and results against desired results/performance goals.
- Therefore, to answer the question correctly, may need to look closer at how decisions are made, performance monitored, analysis undertaken, and results/performance evaluated.

Vision, mission, goal and strategies associated with Asset Management

Q.8. What is the goal of Transportation Asset Management?

A.8. The goal of Transportation Asset Management is to provide a desired level of service and performance for various assets within the transportation network, in a most cost effective manner.

Q.9. What are the vision, mission, and strategies of FHWA as they pertain to Asset Management?

A.9. The vision of the Office of Asset Management is that all States effectively manage their transportation systems using Asset Management principles.

The mission of the [Office of Asset Management](#) is to provide leadership, guidance, support, and expertise in the principles of Asset Management with emphasis on the systematic management of highway infrastructure assets. FHWA's Office of Asset Management serves as an advocate for Asset Management, system preservation, pavement management and analysis, economic evaluation and analysis, bridge management and inspection, construction quality management and maintenance activities, as well as technology development, outreach, and partnering initiatives.

Strategies include:

- Increase the use of decision support techniques and tools such as management systems, proven system preservation techniques, economic analysis, and other Asset Management principles to improve FHWA's and our transportation

- partner's ability to make operational and strategic decisions to maximize program effectiveness and efficiency
- Improve data sharing and decision linkages between program areas to create consistency and continuity of program initiatives and project actions to sustain and improve the network condition and operations.
 - Assist States in developing robust systems for collecting, analyzing, and integrating the data necessary to calculate, forecast, and display the selected performance indicators, and sound information to identify critical performance gaps and liabilities.
 - Develop experts in the Office of Asset Management on the above topics.

Q.10. What makes Transportation Asset Management strategic?

A.10. Transportation Asset Management is strategic because it involves planning with a focus on the strategic goals of the agency, performance measures, and system performance. At the planning stage:

- All assets are considered comprehensively rather than separately;
- TAM decision process compares actual system performance with desired system performance using measures balancing costs and priorities;
- It uses tradeoff analysis and life cycle performance to support decision making;
- It applies economics, business and engineering principles, needs assessment/public involvement, and risk assessment to manage assets and evaluate tradeoffs;
- It performs trend analysis.

Issues to be aware of while developing a work plan to implement Asset Management

Q.11. How does Transportation Asset Management work?

A.11. Using Asset Management principles, decisions are made based on accurate data and sound engineering & economic analysis. It's important to have good accurate information as decisions are being made with regard to condition, performance, other needs, etc. with a long term view of assets. As a DOT implements an Asset Management Program, funding decisions are also made pertaining to highway operations, safety, environment, and other efforts. Data related to performance in these areas is also recommended.

Q.12. What questions do I need to ask with regard to developing the best long-term strategy for managing my assets?

A.12. There are five core questions:

- What is the current condition of my assets?
- What is my desired level of service/ performance?
- Which assets are critical to sustained performance?
- What are my best “Operations and Maintenance” and “Capital Improvement” investment strategies?
- What is my best long-term funding strategy?

Q.13. How do you develop and implement a Transportation Asset Management Program

A.13. The manner in which an Asset Management Program is developed and implemented in an organization may vary, the AASHTO Guide on Asset Management describes this in further detail; however the following steps are important as a TAM Program is implemented:

- Set Target Level of Service/Performance Goals (priorities);
- Develop representative asset inventory;
- Conduct condition assessment and determine failure modes;
- Determine Remaining Service Life(RSL) for each asset element;
- Determine life cycle and replacement costs and perform economic analysis;
- Evaluate Business Risks;
- Optimize preservation, safety, mobility, operation reliability, and maintenance;
- Optimize Capital Investment;
- Determine Funding Strategy;
- Build Asset Management Plan; and
- Monitor performance.

Q.14. What are some of the characteristics of the most successful asset management programs?

A.14. The following are some of the characteristics of a successful program:

- There is a champion in the organization;
- There is support by high level management;
- It has performance measures that guide investment decisions;
- It has adopted a “preservation first” strategy for their investment priorities;
- It must have moved away from a “worst first” investment strategy, and instead have adopted investment principles that are based on life cycle costing
- It utilizes “what if” and trade-off analysis tools
- It utilizes enough data to develop a trend line

Q.15. Application of Transportation Asset Management applies to which State DOT programs?

A.15. Asset Management principles apply to the:

- Planning process
 - Initial goal setting
 - Long-range planning
 - TIP/STIP development
- Operation
- Preservation
- Maintenance
- Construction (including quality)
- Safety
- Performance Measurement/Evaluation

Q.16. How much money is needed to start an Asset Management Program?

A.16. Most agencies already apply various aspects of Asset Management in their programs, such as pavement and bridge management systems. Formally adopting an Asset Management Program can be initiated with minimal funds; however, as more complex information management systems are added for other assets, in addition to costs related to purchasing the systems, there are additional data collection costs. Generally, data collection costs may be substantial and can be in the millions of dollars.

Q.17. What background should an asset management specialist have?

A.17. As Asset Management specialist's background could be in planning, project development, engineering, economics or construction. The primary qualification of an asset management specialist would be someone who is knowledgeable of the principles of Asset Management, including familiarity with life-cycle cost analysis, preservation, performance management, establishing goals and objectives, etc.

How Transportation Planning relates to Asset Management

Q.18. What is the relationship between Transportation Planning and Asset Management?

A.18. Transportation Planning can help to provide an agency with both a short and long term vision and direction. States may apply Asset Management principles and techniques which aide in making 'informed decisions' in establishing planning goals, defining STIP priorities, and assessing transportation investment decisions, including transportation system safety, operations, preservation, and maintenance (23 CFR450.208.7e). Transportation planning can help to define a strategic, long term plan for the agency based on high-level, broad stroke terms. Transportation Planning, in simplified terms, should be based on the Asset Management concepts of incorporating accurate data with engineering and economic analysis in the planning effort. The Asset Management strategy applied during the transportation planning process can help to validate that the agency's projects and programs are meeting the objectives of the agency's plan.

How Management Systems relate to Asset Management

Q.19. How do management systems tie to Asset Management?

A.19. Management systems such as for pavements, bridges, congestion, safety, etc., are sub-elements of an Asset Management Program. Management systems include a great deal of information including data pertaining to inventory, condition, and performance. The Management systems can perform “what-if” analysis based on various performance targets and outcomes using various investment strategies. This helps to optimize asset performance based on funding constraints.

Q.20. We use pavement management systems and bridge management systems to prepare our annual program of projects. Why do we need to have an Asset Management Program?

A.20. Asset Management is more than a pavement management system or bridge management system. Asset management is about managing your network over the whole life-cycle; it includes, managing your pavements, bridges, congestion, safety, and other assets. Asset Management applications go beyond development of an annual program of projects, and play an essential role in setting goals and policies in an agency. One of the main components of an Asset Management Program is monitoring the network and its performance. Decision makers can set realistic policies and goals by comparing performance measures against performance objectives. In other words, Asset Management provides decision makers with proactive analysis of options and tradeoffs across assets with a direct focus on performance goals. See also question number 21.

Q.21. We already have a Maintenance Management Systems, isn't this enough?! Why do we need to have an Asset Management Program?

A.21. Asset Management is more than a maintenance management system. Asset management is about managing your network over the whole life-cycle; includes, managing your pavements, bridges, congestion, safety, and other assets. Your Maintenance Management System enables you to allocate staffing, equipment and supplies on a day-to-day work plan with a focus on maintenance. However, it does not provide top decision-makers with all the information they need to make decisions with regard to resource allocation across DOT functions. See also question number 22.

Role of data in development of Asset Management

Q.22. How much data is needed to start an Asset Management Program?

A.22. You do not need to have a wealth of data. You can start with what you have available, such as pavement and bridge information, and later build on that information.

If you have your primary data (data essential for condition assessment) you are ready to go! Most States already have enough data to get started.

Q.23. What is the role of data in Asset Management?

A.23. Useful and reliable data are central to a fully functioning Asset Management process. Asset Management is a data intensive process that involves the gathering, retrieval, storage, analysis, and communication of enormous quantities of data. The information that is drawn from these data is essential to the cooperative and informed decision-making process underlying Asset Management. Information is required to evaluate and monitor the condition and performance of the asset inventory, develop performance objectives and measures, identify cost-effective investment strategies, and conduct asset value assessments. Information is also required to monitor the effectiveness of the Asset Management business process.

Q.24. What is data integration?

A.24. Data integration is the process of combining or linking two or more data sets from different sources to facilitate data sharing, promote effective data gathering and analysis, and support overall information management activities in an organization.

Q.25. How does data integration benefit Asset Management?

A.25. The benefits of data integration to the Asset Management process are many. Asset Management relies on highly organized and integrated databases to drive its many decision-support functions. For instance, the below table is a sample of specific AM business processes and how each could potentially be enhanced by data integration.

AM Business Process	Potential Benefits of Data Integration
Inventory and Field Data Collection	<ul style="list-style-type: none"> ▪ Promotes one-time (single source) data acquisition and uploading ▪ Allows determination of how much data exists and how much needs to be collected ▪ Helps standardize the inventory and data collection procedures throughout the agency
Condition Assessment and Investment Requirement Determination	<ul style="list-style-type: none"> ▪ Enables quick identification of assets that need immediate attention ▪ Promotes standard condition rating procedures and uniform criteria for evaluation ▪ Promotes collective decision-making from various parts of the organization
Program Development	<ul style="list-style-type: none"> ▪ Improves statewide program development through comprehensive system information ▪ Promotes efficient distribution of funding among competing programs ▪ Allows evaluation of multiple program categories
Scheduling of Activities and	<ul style="list-style-type: none"> ▪ Expedites timing of activities and assignment

AM Business Process	Potential Benefits of Data Integration
Allocation of Resources	<p>of resources</p> <ul style="list-style-type: none"> ▪ Promotes consistent level of detail in scheduling an resource allocation ▪ Allows coordinated, optimized scheduling and allocation of resources
Performance Evaluation	<ul style="list-style-type: none"> ▪ Provides for the immediate feedback necessary to improve performance ▪ Promotes consistent performance measures throughout the agency ▪ Allows quick comparison of assets, resources, personnel, and activities

Q.26. How does GIS fit into Asset Management?

A.26. Geospatially collected information enables asset management personnel and others in an organization to use GIS as a tool for linking various data bases (holding geospatial data) and perform analyses across assets.

Cost analysis in relation to asset life

Q.27. How do I analyze project benefits and costs?

A.27. A benefit-cost analysis deals with comparing a project’s cost with the benefits derived from those costs as they are consumed over some period of time. Project benefits and costs should be evaluated relative to the life cycle of the highway assets in question. Highway assets are expected to provide some measured benefit and perform above some minimum performance level during that period of time. The analysis includes costs incurred by agencies applying preservation, maintenance, and rehabilitation activities to maintain the asset. Costs incurred by users in the form of user costs should also be considered. Each activity has an expected cost to the agency and users associated with it and an expected time frame when that action will be needed. Details for these expected activities are derived from numerous sources including bridge, pavement and other management systems, prior inspection reports of similar assets, as well as expert knowledge held by the asset manager. The product a benefit-cost analysis includes a present value comparison of a project’s life-cycle costs compared to the benefits derived from those costs. It is commonly represented as a ratio of benefits to costs where the project worth undertaking has a value greater than 1. More information can be found on the FHWA Economic Analysis website located at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/economic.cfm> and the FHWA Life-Cycle Cost Analysis web-page at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>.

Q.28. What is Life-Cycle Cost Analysis?

A.28. Life-Cycle Cost Analysis is a present value analysis of agency and user costs that occur over the life of a highway asset. Once the benefits of implementing a particular asset management strategy are established, the evaluator may be interested in exploring the life-cycle of various approaches to achieve the objective of the strategy. A Life-cycle cost analysis may consider materials, activity timing, methods of construction or even preservation options. The objective of a life-cycle cost analysis is to identify the strategy to achieve a particular objective that requires the least costs. More information can be found on the FHWA Economic Analysis website located at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/economic.cfm> and the FHWA Life-Cycle Cost Analysis web-page at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>.

Q.29. What are roadway user costs?

A.29. User costs are costs incurred by roadway users as they are impacted by roadway construction activities. There are three components usually associated with user costs, delay, vehicle operating costs, and crash costs. Delay represents the value of time lost by the roadway user as they are impacted by work-zones. Vehicle operating costs represent the increased costs incurred by roadway users as their vehicles are impacted by work-zones. They typically comprise increased fuel and maintenance costs. Crash costs represent the value of vehicle damage and loss of life resulting from work-zone activities. Values for roadway user costs are available from various resources. Many highway agencies develop and maintain many of these costs for their particular area. More information on user costs can be found on the FHWA Economic Analysis website located at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/economic.cfm> and the FHWA Life-Cycle Cost Analysis web-page at <http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>.

Available software, training and resources

Q.30. Is there any training available on Asset Management?

A.30. Yes. There are many training opportunities available on Transportation Asset Management. The National Highway Institute offers the Transportation Asset Management Course (NHI Course Number: 131106). Other training and workshops can be found at: <http://www.fhwa.dot.gov/infrastructure/asstmgmt/training.cfm>.

Q.31. Is there software to assist with the Asset Management process?

A.31. Yes, there are some commercial software packages available that States can use in implementing Asset Management. However, there is no one comprehensive software solution that exists today that incorporates all asset management solutions. Some States have independently developed programs that fit their custom needs. For example, some

states have developed independent management systems for pavements, bridges, safety, etc, they use today.

Some available software packages from FHWA are HERS-ST which is free to the public (See Q.33), and ASHTOWare: AssetManager NT and PT and Pontis which are licensed and sold by AASHTO; however, all these software have limited capabilities. Commercial software is also available, but these were primarily developed for the private sector and are expensive.

Q.32. What tools are available to perform an economic analysis of investment trade-offs?

A.32. FHWA supports the Surface Transportation Efficiency Analysis Model(S.T.E.A.M.). The model and software allows the analysis of corridors and system wide trade-offs between mobility and safety benefits to meet transportation demand. More information as well as the free software is available for download from the FHWA Economic analysis web site located at <http://www.fhwa.dot.gov/infrastructure/asstmngmt/economic.cfm>

Q. 33. What is HERS-ST?

A.33. HERS-ST stands for the Highway Economic Requirements System – State Version. It is an engineering/economic computer model designed specifically for State Departments of Transportation, Metropolitan Planning Organizations, and local governments as a decision tool used to analyze highway “needs” for programming & planning. The HERS-ST software may be used to answers questions such as:

- What level of capital expenditure is justified on benefit-cost grounds?
- What user cost level will result from a given stream of investment?
- What investment level is required to achieve a certain level of performance?
- What is the cost, over 20 years, of correcting all existing and accruing highway deficiencies?

Users of the HERS-ST utilize this tool to develop and/or perform: (1) long-range planning, (2) scenario evaluations, (3) corridor-level studies, (4) project/program evaluations, and (5) congestion management. Free training, documentations and implementation support are available. For more information, visit the HERS-ST website <http://www.fhwa.dot.gov/infrastructure/asstmngmt/hersindex.cfm>.

Q.34. How can I learn more about Asset Management? What are the available resources?

A.34. The following is a list of some of the available resources:

[FHWA, Office of Asset Management](#)

- [System management and Monitoring Team](#)
- [Bridges](#)

- [Culverts](#)
- [Pavements](#)
- [Tunnels](#)
- [Preservation Team](#)
 - [Construction](#)
 - [Pavement Preservation](#)
- [Evaluation and Economic Investment Team](#)
 - [Data Integration](#)
 - [Economic Analysis](#)
 - [Highway Economic Requirements System](#)
 - [Life Cycle Cost Analysis](#)
- [General asset management publications](#)
 - AASHTO Transportation Asset Management Guide
 - Transportation Asset Management Course (NHI Course Number: 131106)
 - Asset Management Today website / community of practice at: <http://assetmanagement.transportation.org/>
 - AASHTO Subcommittee on Asset Management <http://www.transportation.org/?siteid=95>
 - TRB Asset Management Committee
 - AASHTO-AGC-ARTBA Data Collection Guide

Q.35. Is there information available on asset management practices used in other countries?

A.35. Yes. Many countries have implemented asset management. We suggest reviewing the report from the International Scanning review that was undertaken in 2006, "Transportation Asset Management in Australia, Canada, England, and New Zealand". The report can be found at [Transportation Asset Management In Australia, Canada, England, and New Zealand](#).

Q.36. How can I get help to assess what my state needs to do to get asset management started?

A.36. You may contact members of the Office of Asset Management:

- Stephen Gaj at 202-36-1336 or stephen.gaj@dot.gov
- Francine Shaw-Whitson at (202) 366-8028 francine.shaw-whitson@dot.gov
- Bryan Cawley at (202) 366-1333 Bryan.Cawley@dot.gov
- Butch Wlaschin at Butch.Wlaschin@dot.gov