Configuration Management for Transportation Management Systems

Establishing and Maintaining System Integrity
Presentation Outline

- What is CM?
- Benefits of CM
- CM Process
- Recommendations for use in TMSs
- Resources
What is Configuration Management?

Why is It Important to My Agency and System?
A management process for establishing and maintaining consistency of a product’s performance, functional, and physical attributes with its requirements, design, and operational information throughout its life.

-EIA Standard 649
Purposes of CM

There are two fundamental purposes of configuration management (CM):

1. Establish system integrity
2. Maintain system integrity
CM is an Integral Part of the Systems Engineering Process
Why CM?

With almost 20 years experience in the design, implementation, modification and expansion of our system, the benefits of being quickly able to recover from problems by returning to an earlier working state are enormous.
Benefits

- Enables efficient system changes, upgrades and deployments
- Thorough, complete documentation
- Rapid recovery from failure
- Saves operating and maintenance costs over life of system
CM in Transportation

- As transportation management systems grow in scope and complexity, more and more agencies are incorporating CM practices.
- There is a need to accelerate use of CM:
  - 27% of signal systems use CM.
  - 62% of freeway management systems use CM.
- Source: NCHRP Synthesis 294 (2001)
The Challenge

- Increase the use of CM practices to improve transportation management systems integrity.

- Use of CM must:
  - Require reasonable levels of personnel and financial commitments
  - Be tailored to the unique needs of transportation agencies
CM Process

Configuration Management

- Configuration Identification
  - Define the product and its configuration documentation identification
- Change Management
  - Control changes to a Product and its configuration documentation
- Configuration Status Accounting
  - Provide status and information about a product and its configuration documentation
- Configuration Audits
  - Verify consistency of configuration documentation against the product
CM Plan

- CM Plan describes:
- How configuration management is accomplished
- How consistency is developed and maintained between system's configuration and records
- Resources, tools & opportunities to apply recommended CM practices
Configuration Identification

Configuration Identification is the basis where the configuration of items are:

- Defined
- Verified
- Products and documents labeled
- Changes are managed
Change Control

Change Control is a process for managing product configuration changes and variances in order to assure system integrity.
Configuration Status Accounting

Configuration Status Accounting is a set of activities associated with periodic reporting on the status of a configuration and the changes to that configuration.
Configuration Audits

Configuration Audits ensure that:

- Performance and functional requirements defined in configuration documentation have been achieved
- Design has been accurately documented
Guiding Principals

1. Identify the context and environment in which CM is to be implemented and develop an appropriate CM Plan accordingly.

2. Define procedures describing how each configuration management process will be accomplished.

3. Conduct training so that all responsible individuals understand their roles and responsibilities and the procedures for implementing configuration management processes.

4. All items are assigned unique identifiers so that one item can be distinguished from other items.

5. Configuration documentation defines the functional, performance, and physical attributes of a system.
6. A baseline identifies an agreed-to description of the attributes of an item at a point in time and provides a known configuration to which changes are addressed.

7. Each change is uniquely identified.

8. Consider the technical, support, schedule, and cost impacts of a requested change before making a judgment as to whether or not it should be approved for implementation and incorporation in the item and its documentation.

9. Implement a change in accordance with documented direction approved by the appropriate level of authority.
Resources to Support the Use of Recommended CM Practices
Configuration Management for Transportation Management Systems Handbook
Document Philosophy

- Relate national CM standards and guidance to transportation management systems
- Extensive use of examples of CM usage in transportation management systems
- Provide "pointers" to allow one to avoid reading document sequentially
EIA Standard 649 was used as the foundation for the document. Basic definitions and guidance were derived from the standard.
Handbook Features

- TMS-specific implementation guidance following the standard definitions
- Summary boxes of implementation guidance for quick access and review
- Transportation best practices based on concrete examples
- Numerous navigation boxes to help locate additional information
Handbook Chapters

1. Into to CM & TMS
2. CM Current Practices
3. CM Processes
4. CM Plan
5. CM Baselines
6. Making it Work in Your Agency
7. CM & System Life Cycle
8. CM Tools
9. Resources to Support CM Programs
Other CM Resources:

Outreach Materials:
- CM Primer
- Fact sheet
- Tri-fold brochure
- Available from TMC Pooled Fund Study
  Web Site @ http://tmcpfs.ops.fhwa.dot.gov/projects.htm

FHWA 2-day Training Course: CM for Transportation Management Systems
  http://www.nhi.fhwa.dot.gov
Other CM Resources

- NCHRP Synthesis 294: CM for Transportation Management Systems
  - www4.nationalacademies.org/trb/synthesis.nsf

- ITS Peer-to-Peer Program
  - www.its.dot.gov/peer

- ITS Electronic Document Library
  - www.its.dot.gov/itsweb/welcome.htm