

Key Aspects of Configuration Management

Excerpts from ANSI/EIA-649 on Configuration Management

The purpose and benefits of configuration management include the following:

- Product attributes are defined. *Provides measurable performance parameters. Both Buyer and Seller have a common basis for acquisition and use of the product.*
- Product configuration is documented and a known basis for making changes is established. *Decisions are based on correct, current information. Production repeatability is enhanced.*
- Products are labeled and correlated with their associated requirements, design and product information. *The applicable data (such as for procurement, design or servicing the product) is accessible, avoiding guesswork and trial and error.*
- Proposed changes are identified and evaluated for impact prior to making change decisions. *Downstream surprises are avoided. Cost and schedule savings are realized.*
- Change activity is managed using a defined process. *Costly errors of ad hoc, erratic change management are avoided.*
- Configuration information captured during the product definition, change management, product build, distribution, operation, and disposal processes, is organized for retrieval of key information and relationships, as needed. *Timely, accurate information avoids costly delays and product down time; ensures proper replacement and repair; and decreases maintenance costs.*
- Actual product configuration is verified against the required attributes. *Incorporation of changes to the product is verified and recorded throughout the product life. A high level of confidence in the product information is established.*

Table 1— Phases of a Product’s Life Cycle

Phases	Conception	Definition	Build	Distribution	Operation	Disposal
Aliases	Marketing Concept Study Research Exploration Pre-Development	Development Design Engineering Program Definition & Risk Reduction Engineering & Manufacturing Development Coding/Software Build ¹	Fabrication Production Construction Manufacturing	Sales Delivery Installation Fielding Deployment	Operational Maintenance Warranties Service Life Performance Operation & Support Repair	Removal From Service Disposition Unsupported
Characteristics	Need Opportunity Mission Analysis Trade-Offs Investigation Survey Functions Pre-Concept & Concept Definitions	System Definition Specification Architecture Preliminary Design Detailed Design Software Code & Test Manufacturing Planning Prototyping Testing Evaluation	Facility Construction Production Assembly Installation ¹ Inspection	Order Supply Stock Transport Acceptance Deployment Installation Setup	Use Utilization Operate Maintain Service Depreciate	Mothball Discard Deactivate Destroy Disassemble Scrap Recycle Disposition

Note: 1. Alias or characteristic may apply in more than one product phase.

CM Processes	Typical CM Activities	
CM PLANNING & MANAGEMENT <i>Selection, tailoring, guidance, assessment</i>	<ul style="list-style-type: none"> Define application environment Select tools, techniques and methods suitable for the environment Plan implementation Integrate CM within Enterprise defined processes 	<ul style="list-style-type: none"> Prepare procedures Perform training Measure performance
CONFIGURATION IDENTIFICATION <i>Attributes, identifiers, baselines</i>	<ul style="list-style-type: none"> Define product structure and select sub-elements to be managed Assign unique identifiers Select configuration document types & formats Define product attributes, interfaces, details in configuration documentation Conduct review and coordination of configuration documentation and if required, obtain customer review and approval Establish release process; Release configuration documentation, authorizing use 	<ul style="list-style-type: none"> Baseline configuration documentation for internal design control and, as applicable, for customer configuration change management Assign serial and lot numbers, as necessary to differentiate individual units and groups of units, respectively Ensure marking or labeling of products and documentation with applicable identifiers enabling correlation between the product, configuration documentation and associated data.
CONFIGURATION CHANGE MGMT <i>Manage changes</i>	<ul style="list-style-type: none"> Identify need for change or variance Document each request for change or variance and assign identifiers Evaluate each change and variance, coordinating with affected areas of responsibility Classify each request and establish effectivity 	<ul style="list-style-type: none"> Disposition each request, obtaining required approvals Plan change implementation Implement change and verify re-established consistency of product, documentation, operation and maintenance information, services and training
CONFIGURATION STATUS ACCOUNTING <i>CM information & status</i>	<ul style="list-style-type: none"> Identify and customize information requirements Implement information system <ul style="list-style-type: none"> Capture and report information about <ul style="list-style-type: none"> Product configuration status Configuration documentation Current baselines Historic baselines Change requests Change proposals 	<ul style="list-style-type: none"> Change notices Variations Warranty data/history Replacements by maintenance action <ul style="list-style-type: none"> Configuration verification and audit status/action item closeout Provide availability and retrievability of data consistent with needs of the various users
CONFIGURATION VERIFICATION & AUDIT <i>Verify performance & consistency</i>	<ul style="list-style-type: none"> Verify product within normal course of process flow Assure consistency of release information and production/modification information Conduct formal audit when required Review performance requirements, test plans, results, other evidence to determine product performs as specified, warranted & advertised 	<ul style="list-style-type: none"> Perform physical inspection of product and design information; assure accuracy, consistency & conformance with acceptable practice Record discrepancies; review to close out or determine action; record action items Track action items to closure via status accounting
CM OF DIGITAL DATA <i>Assure data integrity</i>	<ul style="list-style-type: none"> Apply identification rules to document representations and files Use business rules based on data status for change management and archiving of data 	<ul style="list-style-type: none"> Maintain data-product relationships Apply disciplined version control Assure accurate data transmittal Provide controlled access

Note: Some activities are not applicable in every application environment

Figure 1 — Typical Configuration Management Activities
 NOVA Working Group Meeting

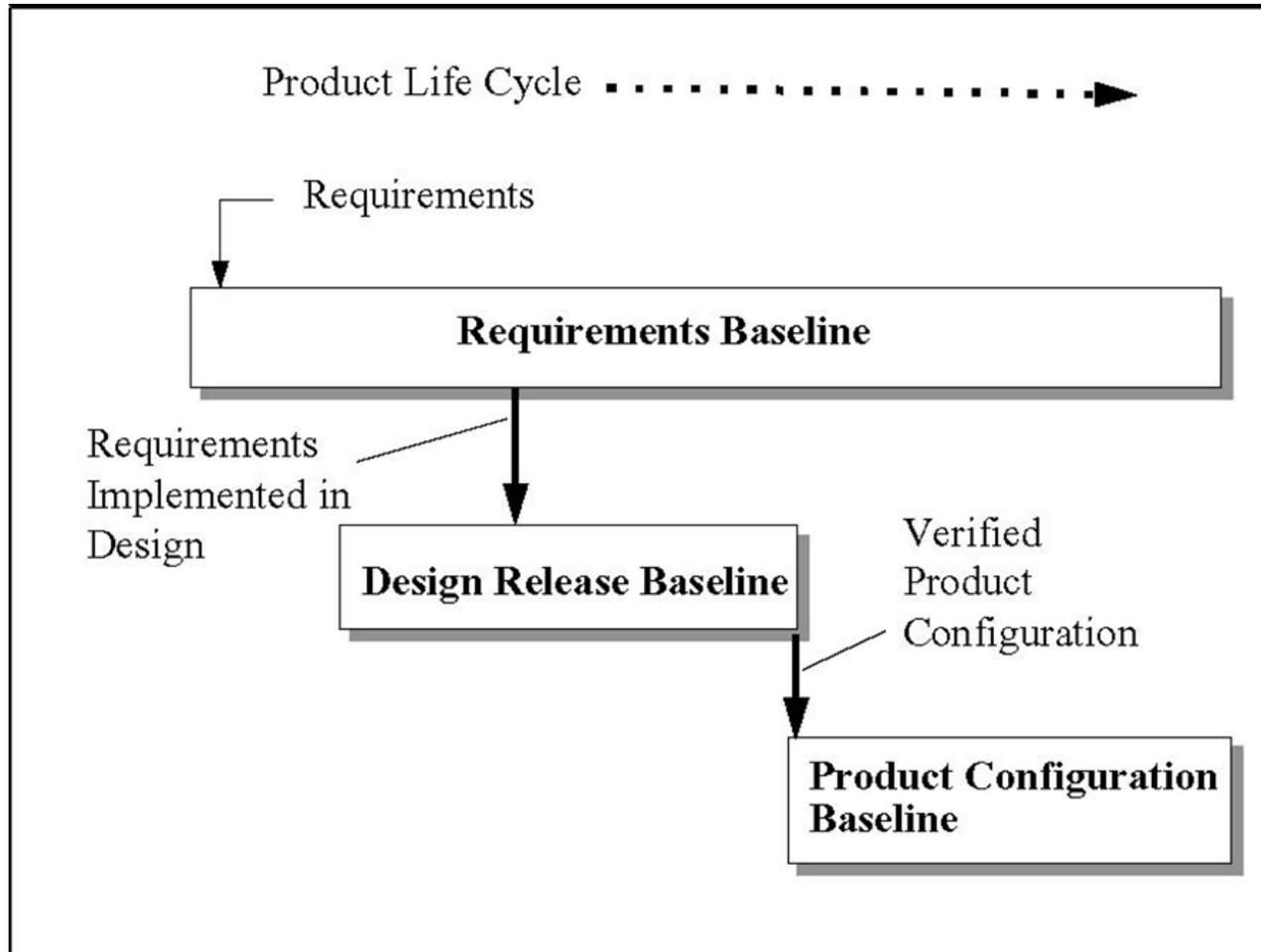


Figure 3 — Configuration Baselines

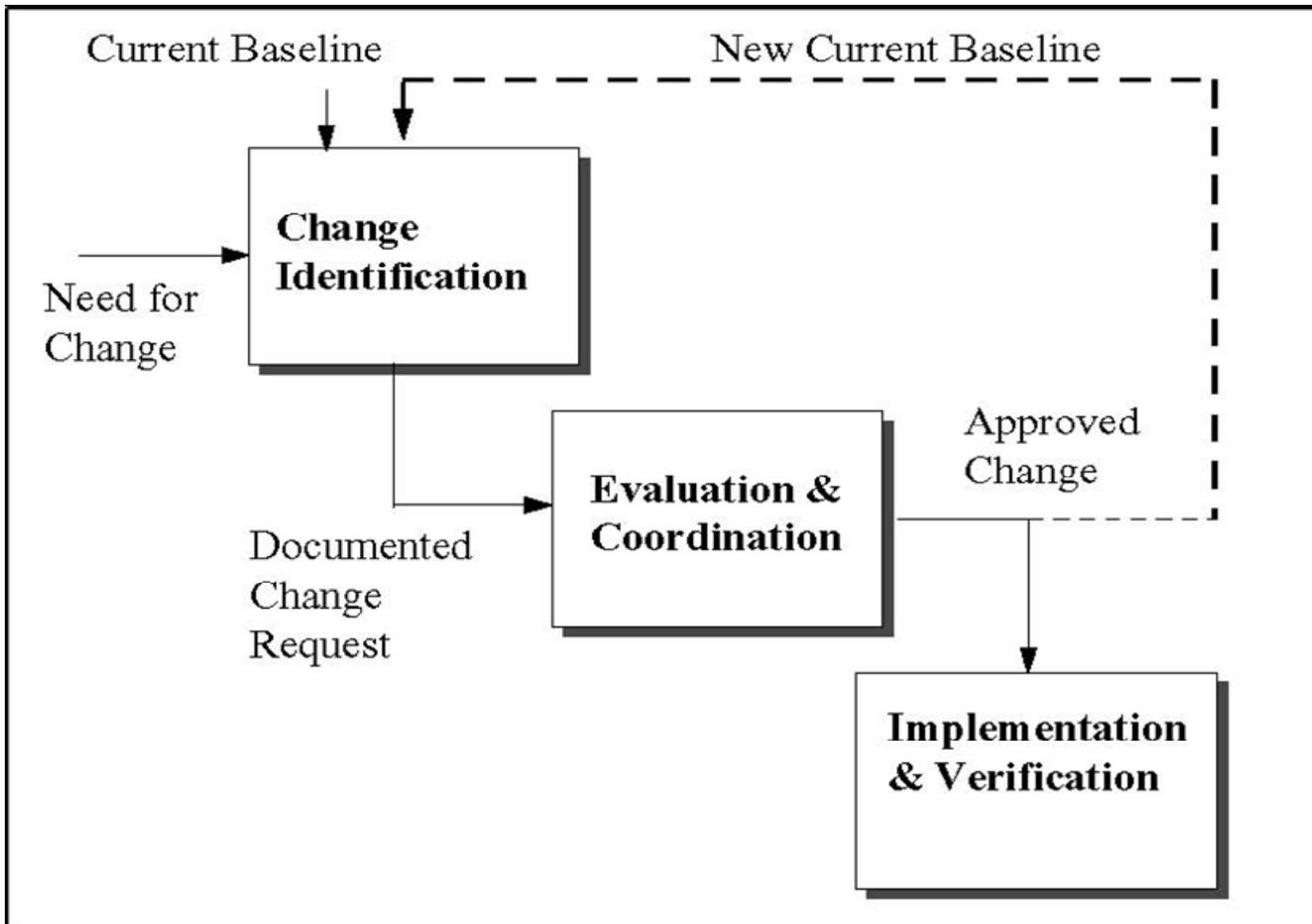


Figure 4 — Change Management Process Model

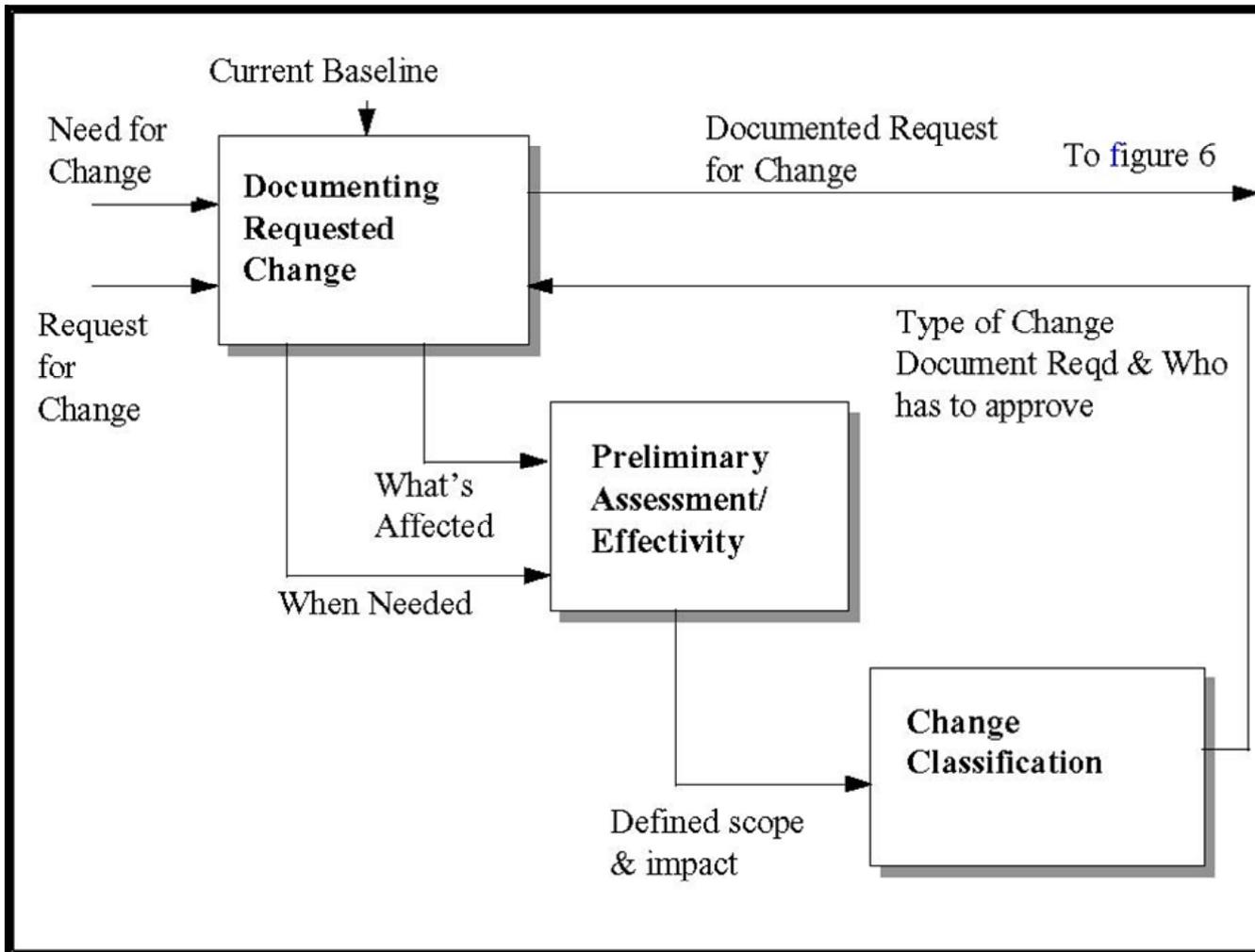


Figure 5 — Change Identification Process Model

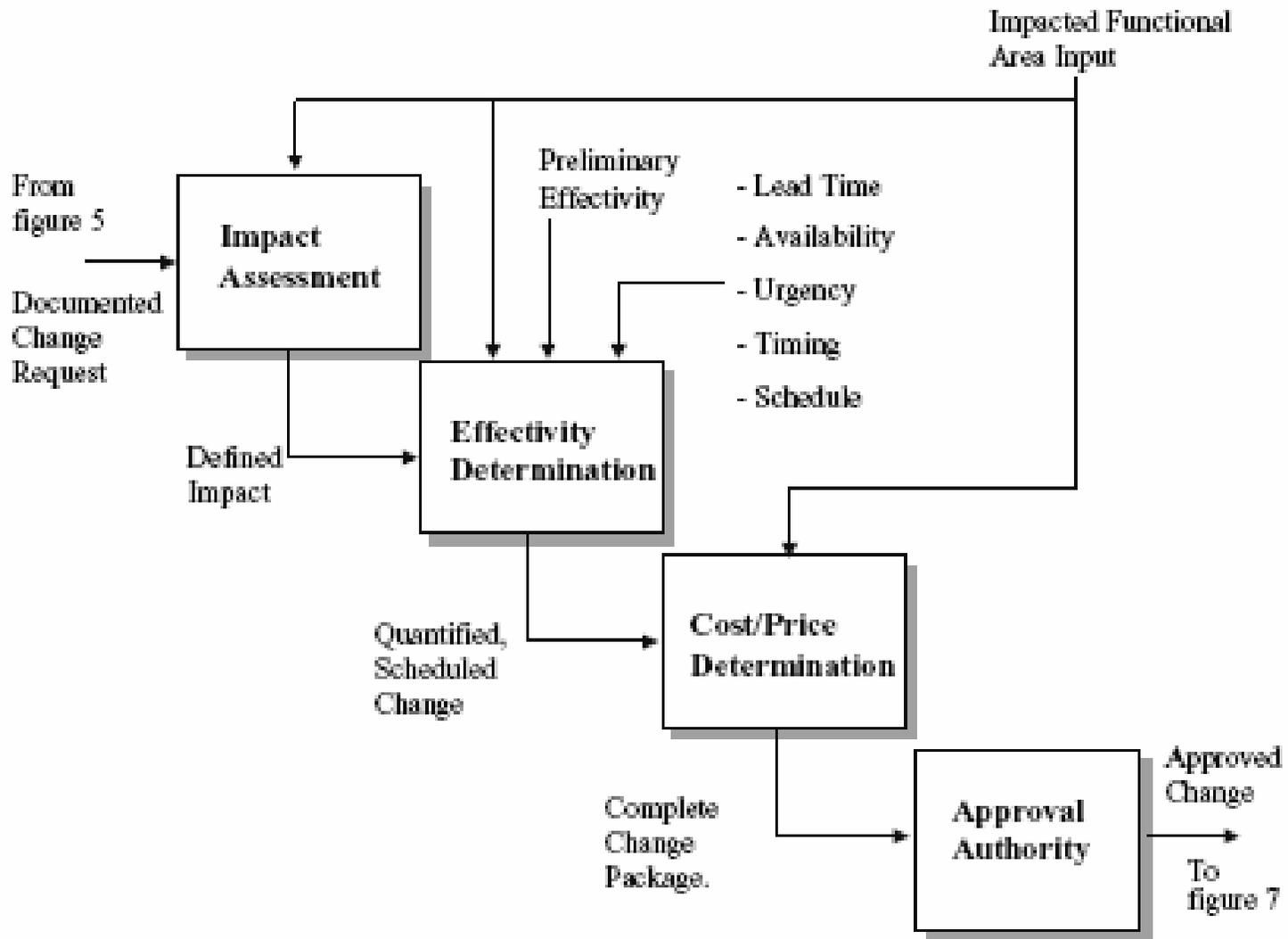


Figure 6 — Change Evaluation and Coordination Process Model

From figure 6
Approved Change

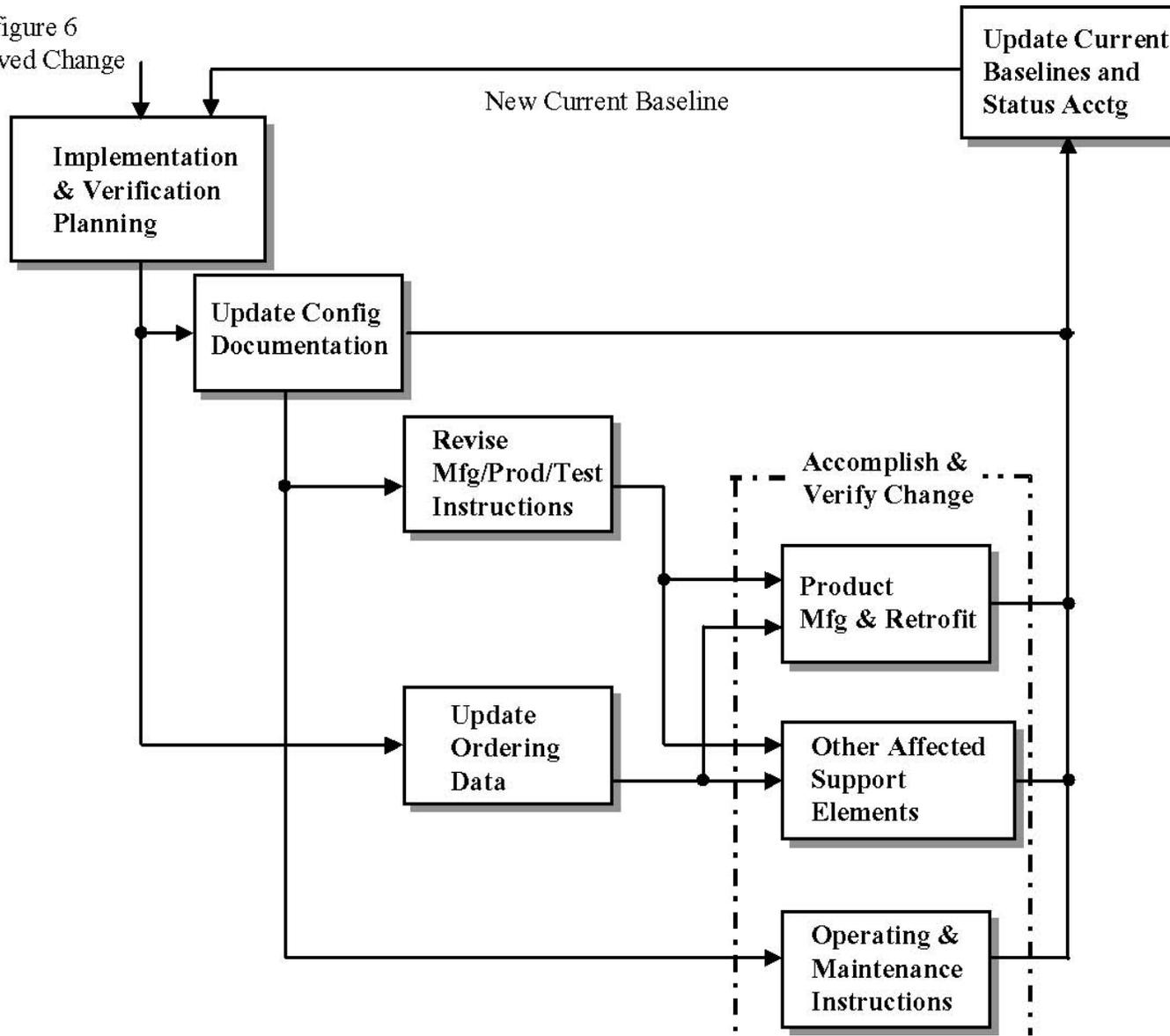


Table 5—Typical Status Accounting Information Across the Product Life Cycle

	CONCEPTION	DEFINITION	BUILD	DISTRIBUTION	OPERATION	DISPOSAL
Life cycle Phases Typical CSA Information (Select, where applicable and appropriate)						
Requirements documentation	•	•	•	•	•	•
Product structure information		•	•	•	•	•
Configuration documentation		•	•	•	•	•
Configuration documentation change notice		•	•	•	•	
Change request and proposal	•	•	•	•	•	
Engineering change effectivity		•	•	•	•	
Variance documentation		•	•	•	•	•
Verification and audit action item status		•	•	•	•	•
Event date entries		•	•	•	•	•
Product as-built record			•	•	•	
Product as-delivered record				•	•	
Product warranty information				•	•	•
Product as maintained, as modified					•	•
Limited use, shelf life restrictions, etc.			•	•	•	•
Product operation and maintenance information revision status					•	•
Product information change requests and change notices					•	•
On-line information access directory or index					•	•
Restrictions due to facility/product performance degradation					•	•
Product replacement information						•
Environmental impact information (where applicable)	•	•	•	•	•	•
Product or Parts salvage information						•

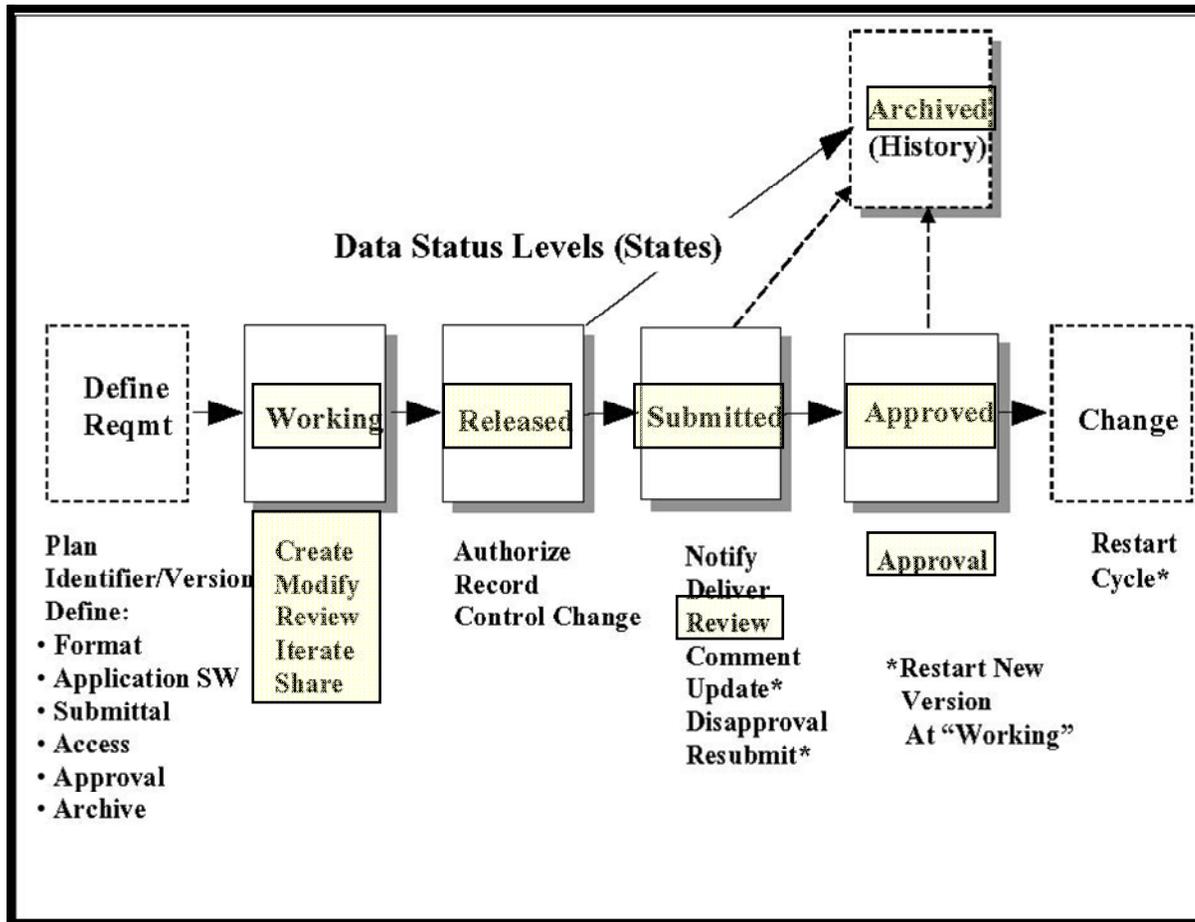


Figure 8 — Standard Data Life Cycle Model

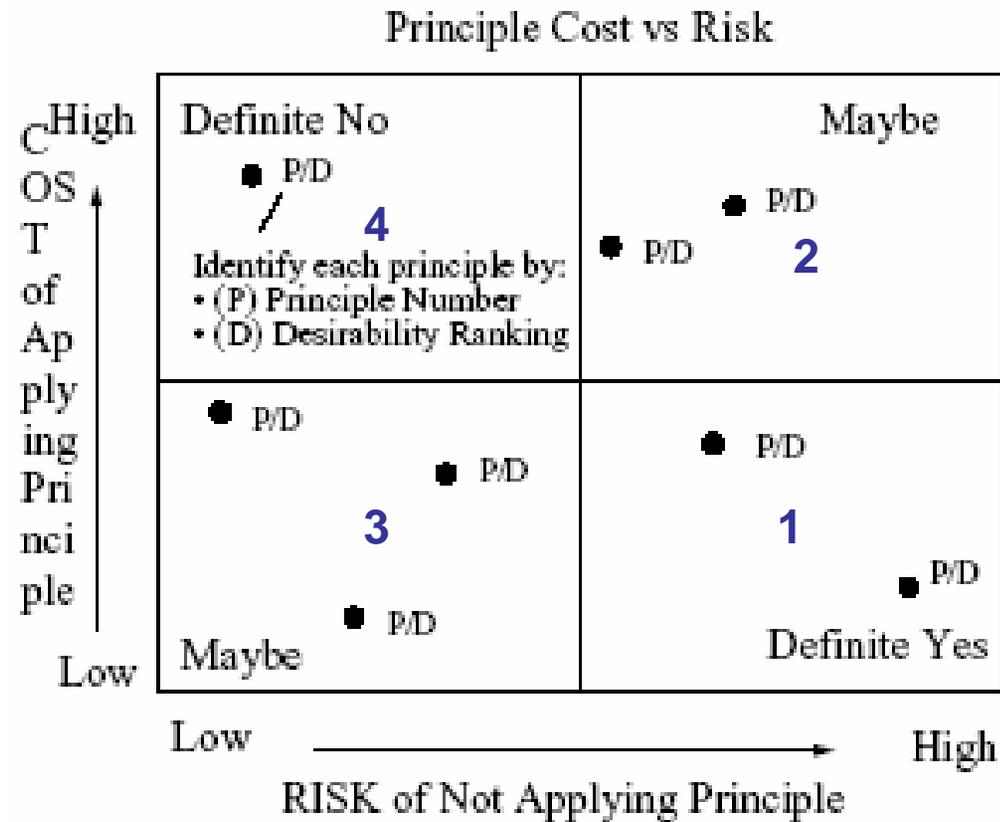


Figure B.1 — Affordability of Desirable CM Principles