

Common DoD-wide Standard Practice for Configuration Management

MIL-STD-973

Update and Reinstatement

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Guidelines in preparing -973

Purpose of Having a Standard

❑ What is the purpose of a Standard?

1. To provide a common language.
2. To establish uniform engineering criteria, methods, processes, and practices.
3. To provide a standard of reference or widely recognized model of authority.

❑ What is NOT the purpose of a standard:

1. To be a cost driver.
2. To constrain a program unnecessarily.
3. To impose the standard writers judgment in place of the program of record's judgment.
4. To anticipate every eventuality.

Guidelines in preparing -973 Draft Standard

- Assume the person using the standard is reasonably knowledgeable and has the best interest of the customer in mind.
- View the standard as a tool for the program manager to use, not a club to beat him with.
- Make it easy to read... short words better than long words, short sentences better than long sentences, short para better than long para.
- Keep it at the appropriate level-not so high as to be useless, not down in the weeds, dictating every detail.
- KISS philosophy applies – Keep It Simple Stupid. (example: Goal of <100 page document)

Guidelines in preparing -973 Draft Standard

- ❑ MIL-STD-973 must work over a wide range of efforts:
 - ❑ .22 Cal rimfire cartridge to a 100K Ton Aircraft Carrier.
 - ❑ Commercial products to military unique.
 - ❑ Both developmental and production efforts (full lifecycle).
 - ❑ Both Hardware and Software.
 - ❑ From complete Government control to complete industry controlled programs.

Overarching 973 Issues

- Should development of MIL-HNDK-61 parallel or follow after -973 (or can we cancel -61 and use EIA-649 handbook).
- What DIDs need to be created, updated or cancelled to support -973?
- What other related DOD regs, standards, policy documents, etc. need to be updated?
- What level of detail with respect to configuration control of 3D based models should be included?

Specific Issues Proposed in -973 Draft

1. Classes of ECP: From two classes (i.e. Class I & II), to three classes (Major, Minor, Admin).
2. Deletion of ECP Justification Codes.
3. RFD/RFW versus RFV.
4. Elimination of the Specification Change Notice (SCN).
5. Problem /Issue Reporting.
6. Alternate Change Process.
7. Redline NOR Stamp.
8. Definition of As-Designed, As-Built, As-Maintained baselines.
9. Definition of “vendor baseline”.
10. Establishment of Configuration Management Strategy.

Specific Issues Proposed in -973 Draft (cont)

11. Description of two phases of configuration identification and two types of CIs.
 - Functional Configuration Identification
 - Product Configuration Identification
12. Forms of Product Config Documentation
 - TDP
 - Performance Spec
 - Commercial Item

Classes of ECP

- ❑ Recommended change from two classes to three.
- ❑ Rationale: Design changes naturally fall in three categories:
 1. Administrative (typos, clarifications, etc)
 2. Minor design changes
 3. Major design changes (improvements/changes which will impact the end user or maintainer)
- ❑ Benefit: Provide more granularity in assignment of class and gives flexibility in process/approval authority

Deletion of ECP Justification Codes.

- Current codes are (per handbook -61):
 - B-Interface
 - C-Compatibility
 - D-Correction of Deficiency
 - O-Operational
 - P-Production Stoppage
 - S-Safety
 - V-Value Engineering
- Codes are generally not used for any purpose.

RFW/RFD vs RFV

- Request for Waiver (requesting forgiveness) and Request for Deviation (requesting permission) are both request to depart from baseline.
- EIA-649 uses single term Request for Variance.
- Should -973 use two terms, or single term?

Elimination of Specification Change Notice

- ❑ Rationale for elimination: A Specification is no different than any other document. It can be changed via ECP/NOR like other documents, or thru ECR (see alternate change process).
- ❑ Statement from Para 6.4 of MIL-HNDK-61

“Note: Requirements for SCNs should be eliminated because of their administrative complexity and because in the digital environment, it is preferable to maintain the specification current at all times and to archive each proceeding version. Furthermore, paragraph rather than page control of specifications is feasible and desired. Revised paragraphs can be inserted into the ECP, and be approved as part of the ECP, or where that is not practical, submitted to the approving authority during ECP implementation.”

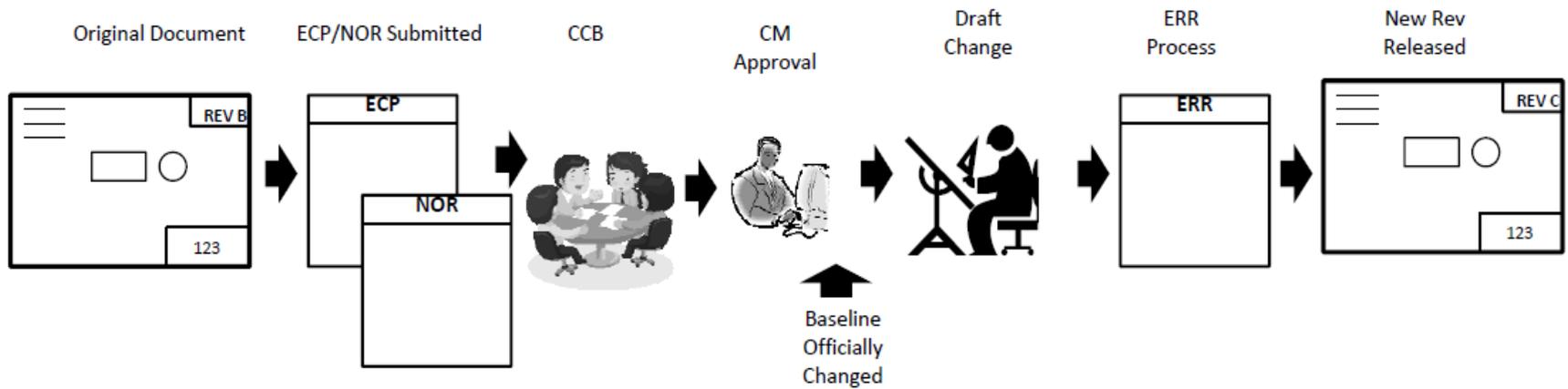
Problem/Issue Report

- ❑ ECPs and RFW/RFDs generally start as a problem, improvement request, manufacturing stoppage, etc.
- ❑ Problem/Issue Reports are widely used in many different capacities to address these issues. Also know as Feature Change Request, Quality Deficiency Reports, Improvement Reports, etc.
- ❑ Problem/Issue reporting is “built in” to many configuration status accounting systems such as Windchill and CM-PRO.
- ❑ Not intended to create a new Configuration Management “rice bowl”. Just establish terminology and linkage with CM.

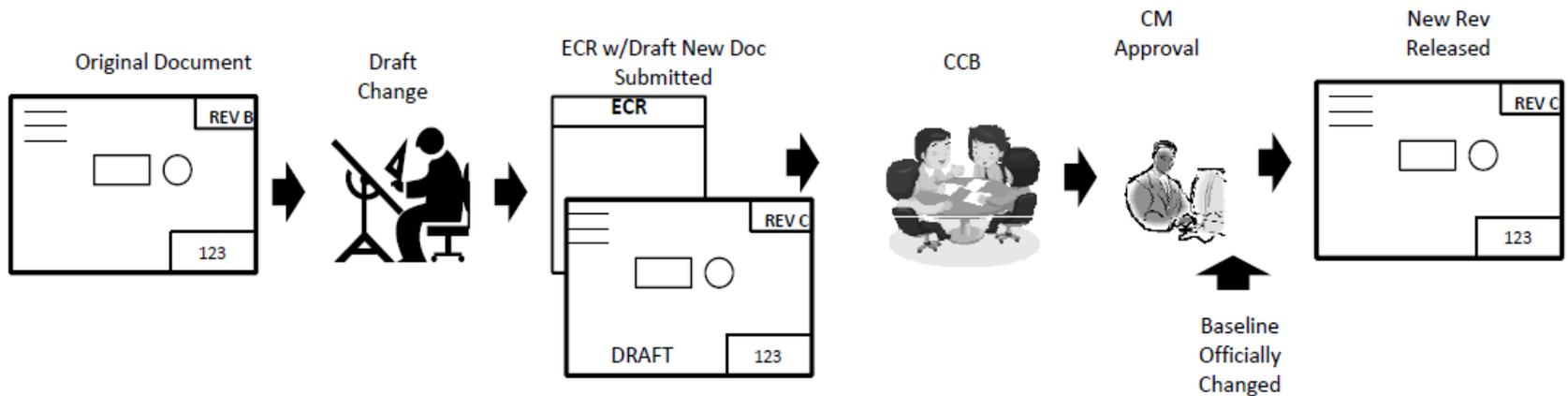
Alternate Change Process

1. Extracted from CM II change philosophy.
2. Combines functions of ECP, NOR and ERR into a single ECR form.
3. Changes the order the document gets revised from post change approval to pre-change approval.
4. Eliminates “hanging paper” issue.
5. Could be more costly if ECRs are disapproved/modified.
6. Requires access to master document and native CAD environment.

MIL-STD-973 STANDARD CHANGE PROCESS



MIL-STD-973 ALTERNATE CHANGE PROCESS



REDLINE NOR Stamp

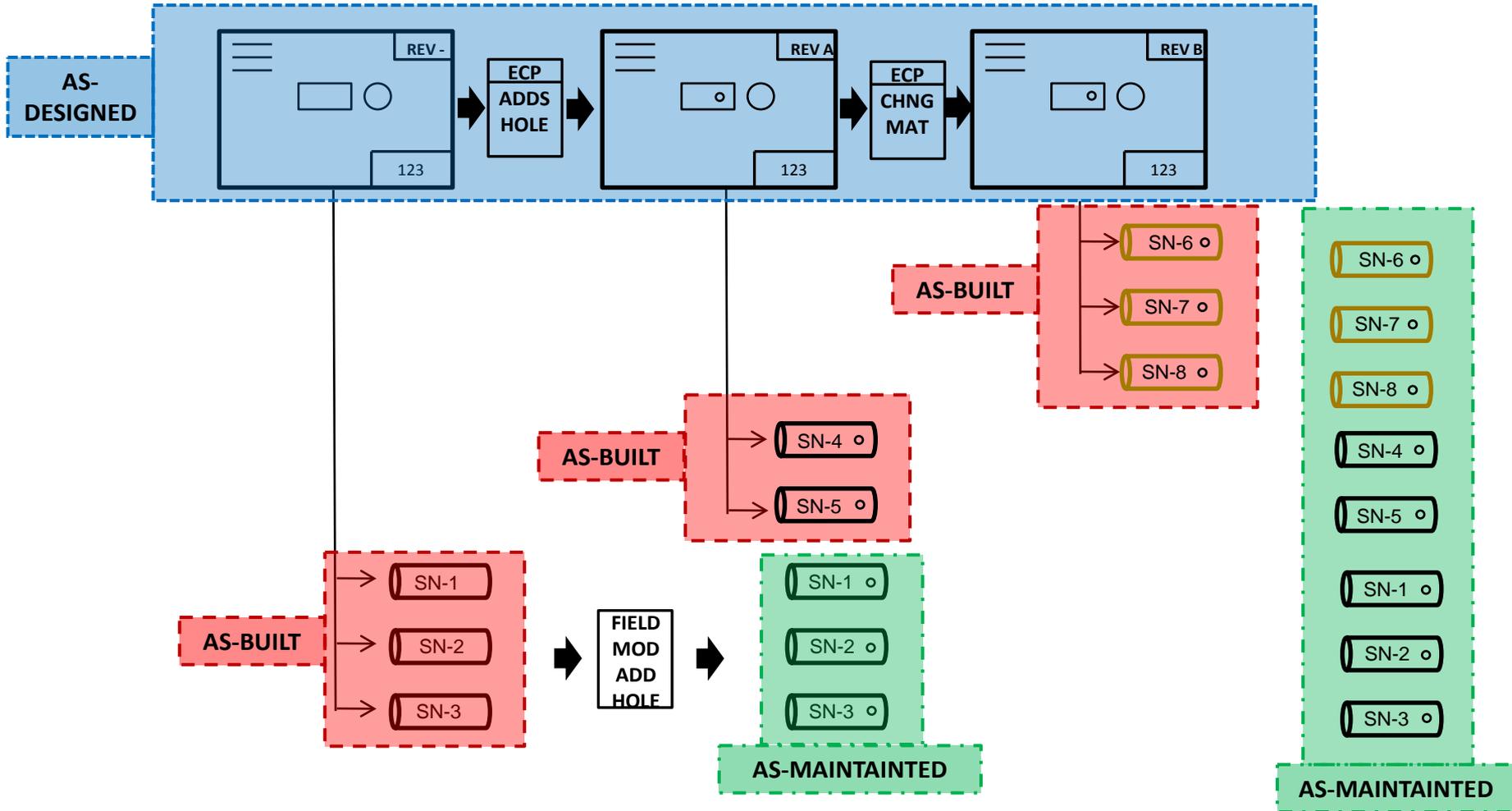
- ❑ Use of redline drawings to document change.
- ❑ Simplifies some types of changes and makes interpretation of the change easier.
- ❑ No separate NOR needed, change approver signs on redline drawing.

As-Design/ Built /Maintained

- ❑ A product configuration exist in several forms:
 - ❑ **Theoretical-As-Designed.** Exists only in the form of documentation (the documented product baseline at the time of manufacture).
 - ❑ **Actual-As-Built.** The instantiation of the As-Designed in actual product (hardware) at the time of manufacture.
 - ❑ **Actual-As-Maintained.** The As-Built as it changes over time while in-service.

COMPARISON OF AS-DESIGNED:AS-BUILT:AS MAINTAINED CONFIGURATIONS

TIME



Vendor Baseline Example

- ❑ The MK93 is a dual purpose mount for the MK19 Grenade Machine Gun and M2 Heavy Machine Gun designed for vehicular mount.
- ❑ US Army is the owner of this design and maintains the product baseline.
- ❑ In response to situation in Iraq / Afghanistan, the need for this mount increased greatly.



Baseline Example

- ❑ US Army procuring 3000 per month spread across eight different manufacturers.
- ❑ Due to errors in the technical data, changing tactical vehicle mix, variation in manufacturing procedures and time of contract award, all eight producers are building varying configurations (i.e. ECPs and RFDs implementation varies for each of the eight producers).
- ❑ None of the vendors is building exactly to the current product baseline.

Question: what is the baseline each vendor is building called? Is there a need to configuration manage (identify, status account) this baseline Beyond tracking the product baseline?



Types of Configuration Identification and Configuration Items

- ❑ Definition in draft -973 is **“Configuration Item (CI). A product or an aggregation of products that accomplishes an end-use function and is deemed to require separate identification for purposes of configuration management.”**

Example: A new aircraft being developed for the military. The aircraft has functional requirements established against it and has allocated requirements for the engine. During the detail design phase, its determined that a unique rivet must be designed to secure a tail section fairing.

Question: Do both the engine and rivet undergo configuration identification?

	<u>Engine</u>	<u>Rivet</u>
Must be given nomenclature -----	YES -----	YES
Must be given an identification #-----	YES -----	YES
Must be identified in the product hierarchy -----	YES -----	YES
Be placed under change control -----	YES -----	YES
Be documented in the CSA -----	YES -----	YES
Be under revision control -----	YES -----	YES
Undergo separate FCA -----	YES-----	NO
Have unique requirements allocated-----	YES -----	NO

Are both the rivet and engine CIs?

Example of Forms of Product Configuration Documentation

- ❑ The Functional and Allocated Baselines are **inputs** into the design process.
 - These baselines are typically documented in the form of a system specification which defines required performance parameters.

- ❑ The Product Baseline is an **output** of the design process.
 - The Product baseline can be documented in one of three forms or formats:
 - TDP
 - Product Performance Spec
 - Commercial Item Definition

Example of Forms of Product Configuration Documentation

Bill, Mary and Roger are homeowners in need of a storage shed for their backyard. They go to the local Home Center and find the following options:



ACME Model 123



DIY Model AB344



HD Model 65-1



STEELSHED, inc
Model A-G22



Smith Mfg.
Model 3564



PLC Corp.
Model 45687

Example of Forms of Product Configuration Documentation

Bill identifies DIY Model AB344 as his choice and procures the shed from the Home Center.



DIY Model AB344

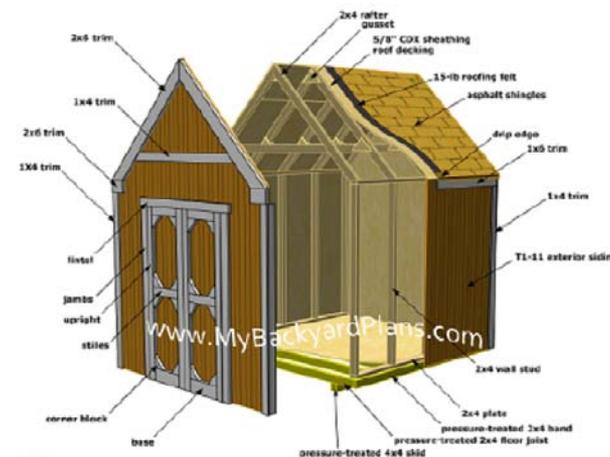
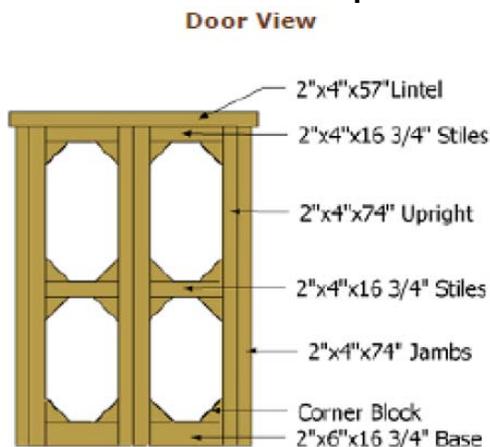
Bill procured the shed using a commercial item definition.

Example of Forms of Product Configuration Documentation

Mary wasn't happy with the choices at the Home Center and decides to build a shed herself. She goes online and finds plans and builds the shed..

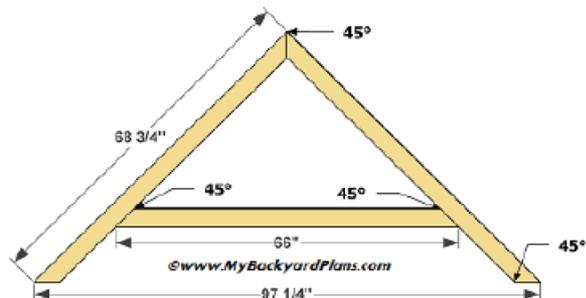


Roof Framing Details



8x8 Gable Storage Shed Material List / Cutting List

- 2- 4x4 Pressure Treated 8'- Skids
- 2- 2x4 Pressure Treated 8'- Bands
- 7- 2x4 Pressure Treated 93"- Floor Joists
- 2- 5/8" Plywood 4x8- Floor Decking
- 10- 2x4 68 3/4"- Rafters (45 degree each end)
- 10- 2x4 66" Rafter crosspiece (45 degree each end)
- 24- Gussets
- 4- 2x4 8'- Plates
- 10- 2x4 78"- Wall Studs
- 4- 5/8" T1-11 siding 4'x7'- Siding for side walls
- 4- 5/8" T1-11 siding 4'x8'- Siding for end walls



Mary procured the shed using a build to print TDP.

Example of Forms of Product Configuration Documentation

Roger also wasn't happy with the options at the Home Center, but doesn't want to build the shed himself. He goes to the neighborhood handyman Hank and gives him the following instructions:

Hank, please find and install a storage shed at the lowest cost possible with the following requirements:

- 1. At least 150 sq. ft. area.*
- 2. Door large enough for my lawn tractor.*
- 3. At least two windows or a skylight.*
- 4. May be either wood, aluminum or steel construction, but not plastic.*

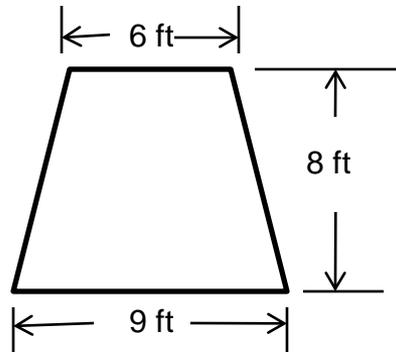
Hank the handyman searches local hardware stores as well as the internet and finds and installs a shed that meets these requirements. Whether Hank bought the shed or built it to print per his performance requirements, Roger neither knows nor cares.

Roger procured the shed to a performance specification.

Example of Forms of Product Configuration Documentation

Although Bill, Mary and Roger procured sheds using differing approaches, each has in common that the design of the shed was established before the procurement process started.

A fourth neighbor, Carter, wants a storage shed as well. He has a very small, unusually shaped yard, and wants a shed that matches the color and consistency of his house. He cannot find an existing design anywhere that meets his requirements. Carter goes to a local architect and gives him his set of requirements for the shed.



- Must fit in the space identified
- Min of two windows
- Shingles to match house
- Siding color and consist to match house
- Floor capable of supporting 500 lbs
- Wired for overhead light and min of 2-110V outlets

Carter's performance requirements constitute inputs to the architects' design process, and establish a functional baseline for the shed.