Part Reuse vs. New Parts

PSMC Spring Meeting
24-26 April 2012

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Complex Problems. Practical Solutions.

Tools Subcommittee Breakout Discussion

Objectives:

- Address CPC cost savings/avoidance questions (Ed Gladue)
  - Do SD-19 average savings apply the part reuse?
- Confirm validity of SD-19 average savings ($27,500)
  - Is $27,500 the right number?
  - Do average savings apply to all parts (simple and complex)?
- Advance PSMC Business Case development
- Augment Case for Standardization Document
- Develop White Paper on Reuse to support CPC team arguments

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Shipyard Management's Challenge

- Common Parts Catalog (CPC)
  - CPC enables and encourages part reuse
  - Need to understand potential for major saving from parts reuse
  - Need to calculate or estimate savings

- Shipyard Upper Management
  - Management questions validity of SD-19 average savings ($27.5K)
  - Management has challenged CPC Team to prove or defend estimated savings
  - CPC Team needs to convince upper management that savings are real

Benefits of Part Reuse

- SD-19 Cost Benefit Analysis
  - Average Cost of Adding a Part into a System
    - $27,500
- Challenge
  - Is this number valid when a part from one class of ship is reused on another class?
  - Is such reuse the same as not adding a part to the system?
- Examples (from DSP Case Studies)
  - Virginia Class Submarine Program
  - Hull, Mechanical, and Electrical Equipment Standardization Program
  - NAVSEA Test Equipment Standardization

SD-19 Saving Breakdown

Area	Estimated Savings	Arguments
Engineering and Design	$12,600	Reuse eliminates the engineering and design costs Engineer selects best option from available preferred parts, larger selection
Testing	$1,000	Reuse eliminates most testing requirements (unique applications may need testing) Reused part is a proven part, reliability is known, maintainability understood
Manufacturing	$2,400	Manufacturing costs are amortized and in the price of the part Manufacturing costs unique to new parts are avoided, setup, QC process, raw materiels
Purchasing	$5,200	Reuse eliminates most new part purchasing costs Sources are established, often contract are in place, availability is immediate
Inventory	$1,200	Reuse eliminates all inventory cost of a new part added to inventory NSNs assigned, supply chain established, storage in place
Logistics Support	$5,100	Reuse eliminates most logistics support costs Training in place, maintenance capability established, ILS is understood

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Part Acquisition / Selection Options

- Design a new part for the application
  - Highest cost, highest risk, longest lead time…
- Find a part in the marketplace – catalog, online, etc.
  - Market research, uncertainty, procurement, testing…
  - Random chance of selecting a preferred part
- Conduct a best value source selection process
  - RFP, proposals, source selection, FAR requirements
  - Random chance of selecting a preferred part
- Select a part from a known application (e.g. Virginia Class)
  - Preferred part, proven part, single class option, perhaps not best part
- Select a part from a preferred part database (CPC)
  - Preferred part, proven part, many Fleet-wide options, select best option

Submarine Standardization and Part Reuse

- Seawolf Class Submarine (cancelled, only 3 built)
  - Bill of Materials = 67,834 Parts
    - No Standardization, Multiple Part Numbers – Same Parts
- Virginia Class Submarine
  - Bill of Materials = 27,014 Parts $789M Cost Avoidance
    - Standardization, Part Reuse,
- Jimmy Carter Class Submarine
  - Bill of Materials = 8,907 Parts $72M Cost Avoidance
    - Formal Standardization Criteria, Part Reuse
    - 4,005 (45%) Parts Reused from Virginia
- SSGN Class Submarine
  - Bill of Materials = 6,968 Parts $80M Cost Avoidance
    - 5,789 (65%) Parts Reused from Virginia

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Hull, Mechanical & Electrical (HM&E) (Fleet repairable items)

- 180,000 different types of HM&E equipment (1988)
  - Each with unique parts lists (APLs), tech manuals, training
  - 20% of items were one-of-a-kind within the Fleet
- 8,700 new HM&E items added each year
- 28,000 new NSNs each year
  - 90% from ship construction, conversion, depot maintenance
- 80% of HM&E items installed on 3 or fewer ships
- ----------
- 150,000 different types of HM&E (2000) down 30,000
  - $15 billion savings
- 2000 new HM&E items added each year – down 6,700

HM&E Standardization

- HM&E Equipment Data Research System (HEDRS)
  - 150,000 non-developmental items
- Navy Standardization Guide (NSG)
  - HM&E standardization policies
- Amphibious Assault Ship Class Standardization/Reuse
  - 40% of HM&E used on LHD-1 was not in Navy inventory

SHIP	Total APLs	Class Unique APLs	Fleet Unique APLs
LHD-1	5,143	810	252
LHD-7	4,437	193	36
Reduction	14%	76%	86%

Savings / Cost Avoidance of Reuse

- Navy calculated initial introduction of a new pump
  - $63,000 (excluding training)
- Navy estimated average ILS cost for introducing one new piece of HM&E equipment
  - $173,851 (including training, provisioning, maintenance…
- Introducing 2000 fewer items = $348M

- Plus:
  - Improved operational readiness
  - Reduced life cycle cost
  - Better availability, reliability, interchangeability, maintainability, quality, safety, smaller footprint…

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NAVSEA Test Equipment Standardization

(Test, Measurement, & Diagnostic Equipment (TMDE)

- 312 different models of TMDE (2002) (oscilloscopes & digital multimeters)
- 71 different models of TMDE addressing one measurement / requirement category
- 13 measurement / requirement categories
  - Many TMDE items were obsolete
  - Short calibration cycles
  - Frequent maintenance and repair
- ---------- Savings
- Team reduced 312 models to 34 by standardizing $45.3 M
- Team reduced 13 categories to 3 by standardizing ($145K per model)
- Team reduced 71 models to 6 by standardizing

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Discussion Objectives

- The Case for Standardization - A and DSP Award Winners
  - Objective - DSP '*Case for Standardization'* document
    - Single existing document based on past DSP case studies, articles, and award winners integrated into coherent picture (many short stories)
    - Additional material for inclusion in the existing case
- Part Reuse White Paper
  - Objective - Stand alone white paper and/or article
    - Ammunition for CPC Team
    - Persuasive to shipyard management
- PSMC Business Case
  - Objective – Create useful input, accelerate development