



Surface Maintenance Engineering Planning Program (SURFMEPP)

DATE: 21 April 2021

PRESENTED TO:
**American Society of
Naval Engineers**

PRESENTED BY:
CAPT Stephen Sarar
SURFMEPP Commanding Officer

Informational Brief

[5780.2/5000-98]



Agenda



- **SURFMEPP Mission and Vision (What we do)**
- **SURFMEPP Footprint (Where we are)**
- **SURFMEPP Product Value Stream (How we do it)**
- **Directive Maintenance (What we're focused on)**
- **Life Cycle Investment Trends: Surface Ship Engineered Operating Cycle (SSEOC) & Life Cycle Health Assessment (LCHA) (How we grade our work)**



SEA 21 Mission Overview



SEA 21 integrates sustainment and maintenance strategies, modernization plans, training needs, and technical, logistics, and programmatic efforts to best manage the lifecycle of U.S. and partner Navy surface ships and systems from fleet introduction through transfer or disposal.



Surface Ship Modernization Program Office (PMS 407)

Leads and integrates policy, planning and execution of surface ship modernization through oversight of advanced planning of availabilities, integration of new technologies, and planning yard functions.

Surface Ship Readiness and Sustainment Program Office (PMS 443)

Provides lifecycle management, enabling surface ships to maintain operational readiness and sustain warfighting capability throughout their service life through development of programmatic, logistical, technical and engineering services and products.

Surface Training Systems Program Office (PMS 339)

Leads and integrates planning, policy, acquisition, lifecycle management, research and development and technical insertion of existing and future surface training systems.

Inactive Ships Directorate (SEA 21I)

Manages the inactivation, storage, and disposal of conventionally powered U.S. Navy ships and craft that have reached the end of their service life.

International Fleet Support (PMS 326)

Provides support and follow-on technical assistance to foreign navies and coast guards, including management of the ship transfer process, ensuring effective and efficient execution of surface ship foreign military sales.

Surface Ship Maintenance Engineering Planning Program (SURFMEPP)

Provides centralized lifecycle maintenance engineering, class maintenance and modernization planning, and manages maintenance strategies, ensuring all surface ships have an articulated, technically rigorous and engineered maintenance oversight process to achieve expected service life.



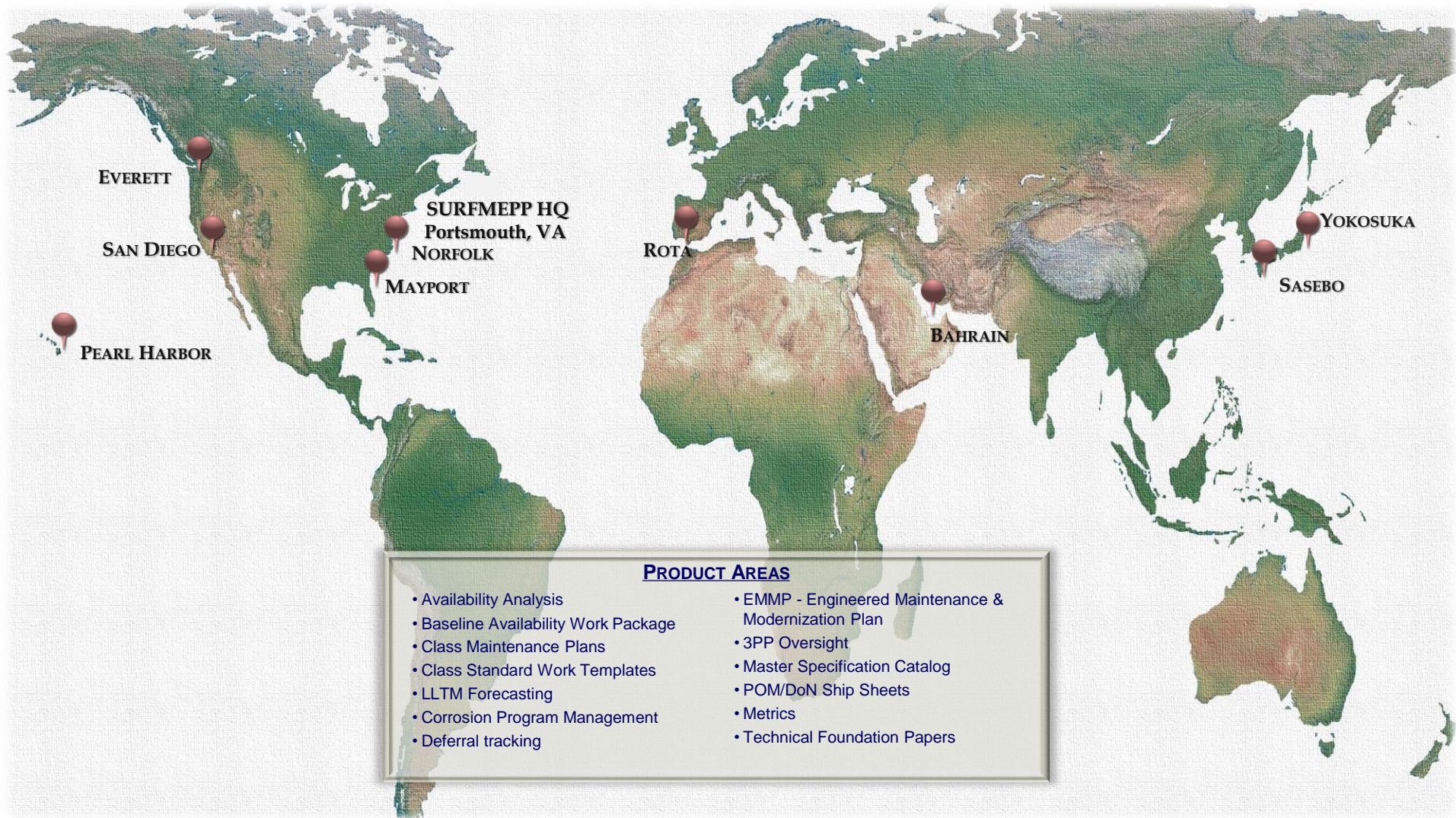
Our Mission

Enable Surface Fleet ships to meet their Expected Service Life through centralized Life Cycle Engineering, Class Maintenance, and Modernization Planning

Our Vision

Provide planning excellence to support ship readiness and expected service life.

SURFMEPP Global Footprint





Core Focus Areas & FY21 Goals



One of three Central Planning Activities providing class maintenance/modernization planning, maintenance strategy management, Baseline Availability Work Package development, and Planning, Programming, Budgeting and Execution Process support.



Key Responsibilities

- Management of Surface Ship Class Maintenance Plans (CMP)
- Preparation of hull-level “Ship Sheets” that define resources required for CNO availabilities (FYDP)
- Development of class-wide technical foundation papers to support surface ship maintenance resourcing (entire Life cycle)
- Management of Life Cycle Health Assessment (LCHA) program
- Oversight of underwater husbandry, tank and void maintenance and propulsion drive train repairs
- Development of baseline availability work packages
- Management of master specification templates used to plan depot level work

FY21 Initiatives

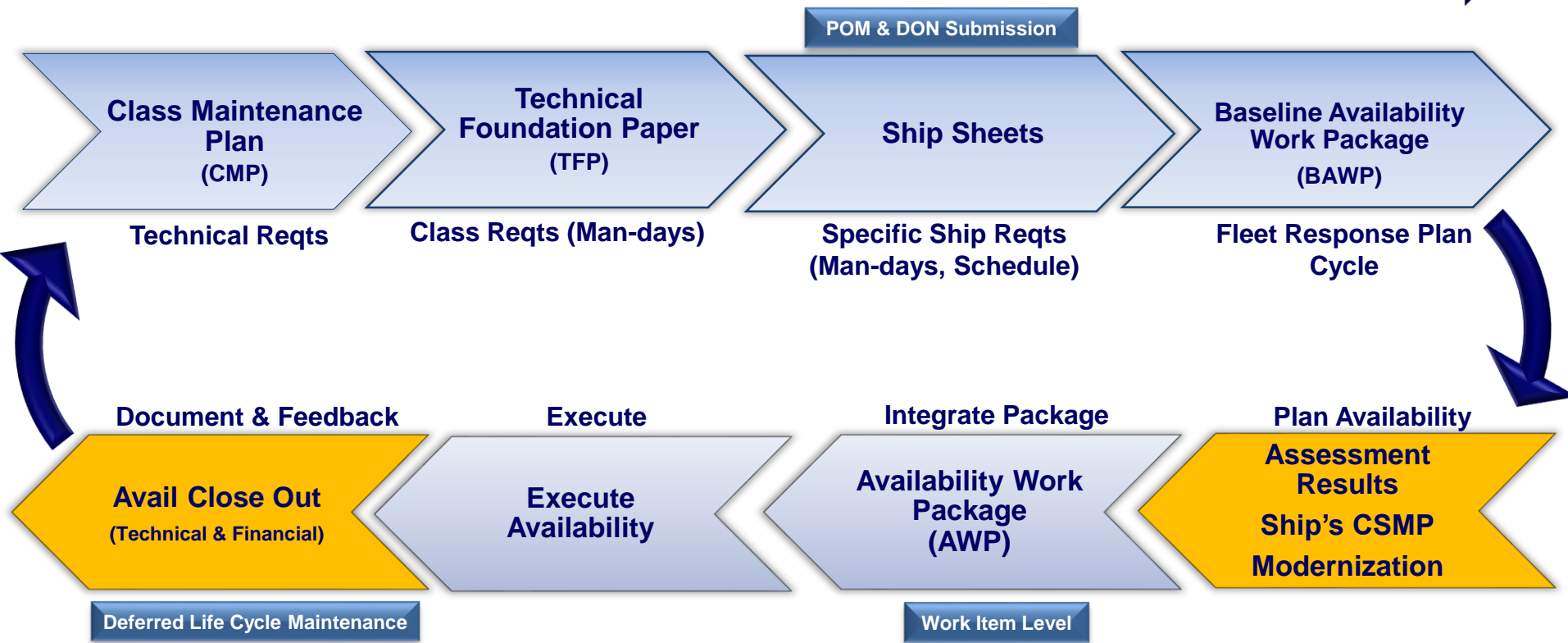
- Increase directed maintenance strategy (DMS) percentage from 50% in FY20 to 55% in FY21
- Revise DDG 51 class technical foundation paper (last updated in 2014)
- Conduct Carrier Planning Activity (CPA), SUBMEPP and SURFMEPP planning summit
- Improving RMC and ISEA execution of class maintenance plan assessments from 91% in FY20 to 94% in FY21
- Maintain “deferrals in planning” of mandatory technical requirements below 2% in FY21
- Assess effectiveness of directed maintenance strategies from a cost/sked perspective



SURFMEPP Product Value Stream



Plan Long Range Requirements into Availabilities

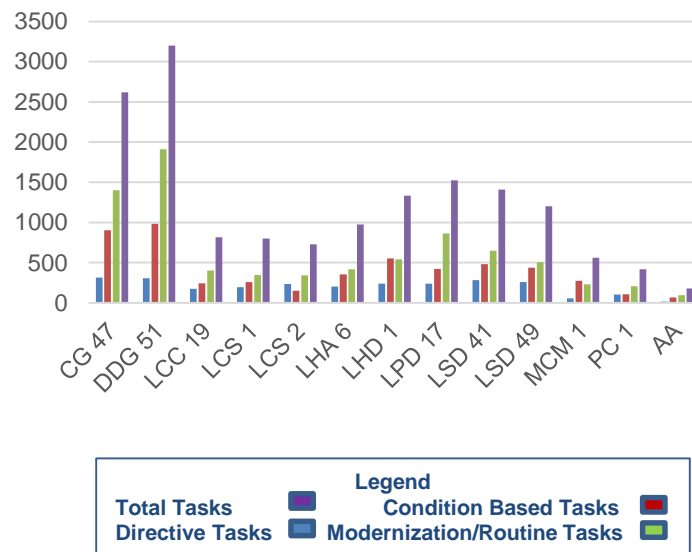


Integrate, Execute, Document and Feedback

Closed loop maintenance process to ensure ships meet Expected Service Life

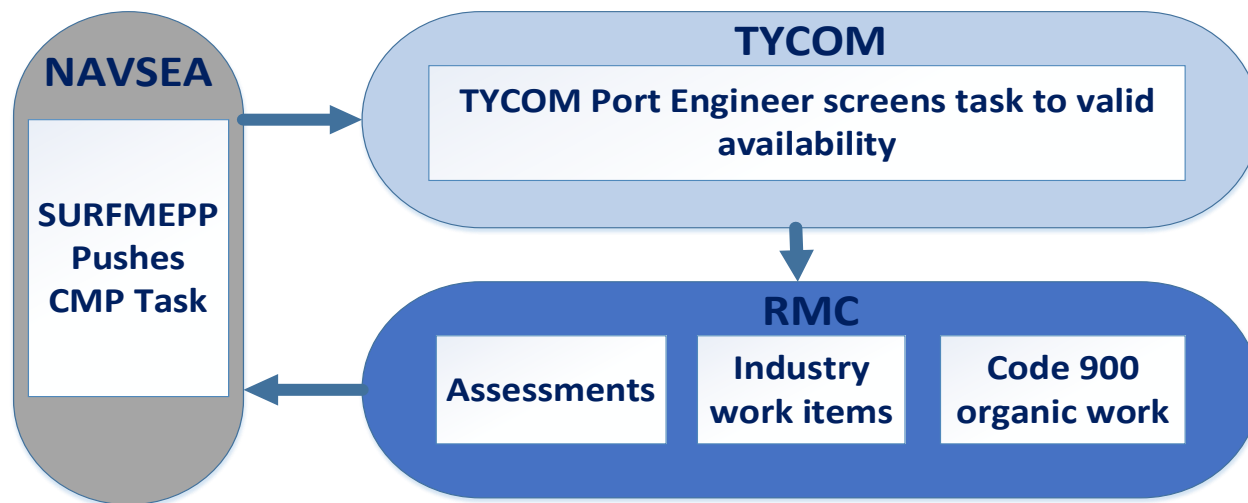
The Class Maintenance Plan (CMP) contains the repair and assessment tasks that are required to be performed for a class of ships in support of life cycle maintenance and material readiness. It is similar to an automobile maintenance manual.

- **CMP Tasks Include**
 - *Mandatory Safety Alterations*
 - *Directed Maintenance Strategies (DMS)*
 - *Condition Based Assessments*
 - *Class Advisories*
 - *Fleet Alterations Equivalent to Repairs*
 - *Depot Availability Routines/ Services*
- **12 Class Maintenance Plans covering in-service all surface ships**
- **100% effective in the husbanding and adjudication of the surface ship Class Maintenance plans since 2017**



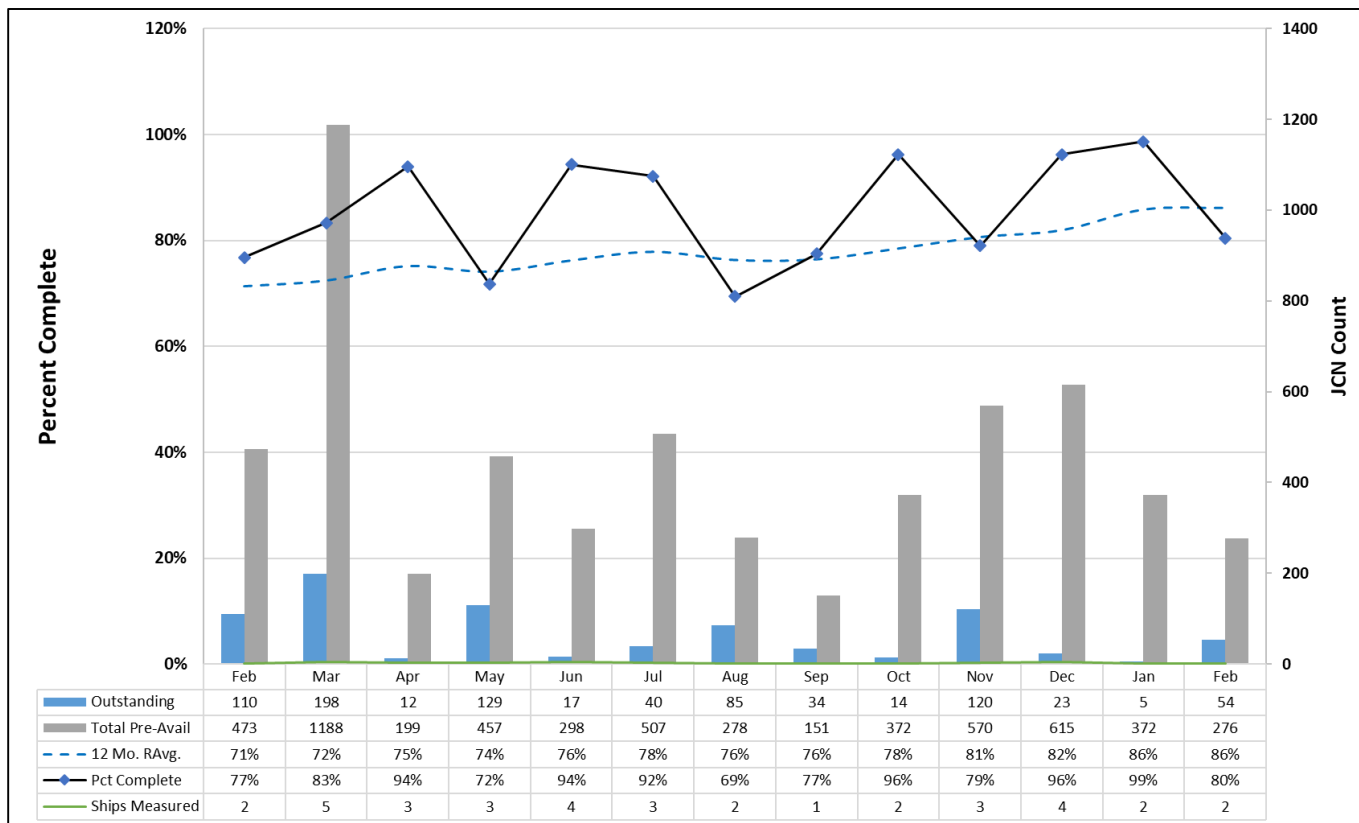
15,768 individual tasks supporting fleet maintenance planning

Class Maintenance Plan Mandatory Technical Requirements (MTR)s Flow



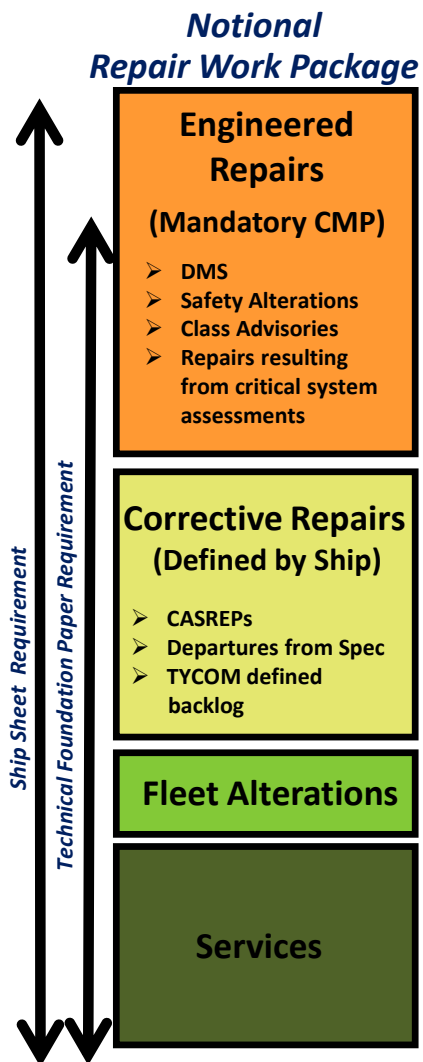
- Manage **70,000 Mandatory Technical Requirements** annually to ensure CMP is planned/executed on all ships
- Manage **20,838** Tank/Void maintenance work items supporting availability planning scheduled through FY27
- Each SURFMEPP detachment Engineer concurrently manages 7 Baseline Availability Work Packages
- Institutionalized over **250 in-stride improvements to CMP assessments, repairs, Class Standard Work Templates**
- Annually broadcast over 1900 BAWP status reports to TYCOM and NAVSEA maintenance stakeholders
- Lead the E2E process Life cycle Planning Conference, Midcycle Review Forum, and Availability Completion (C+70) Conference
- Conduct Work Specification reviews for all CNO availability MTRs to drive **standardized CMP task planning**

Sole SEA21 waterfront advocate promoting CMP task planning and execution



- Chart depicts the percentage of mandatory CMP assessments completed prior to the 80% package lock milestone
- 12 month rolling average is 86% with an increasing trend
- Trend is reported as part of NAVSEA Corporate Board Metric portfolio

Accurate and timely assessments required for On Time Delivery



Technical Foundation Papers contain the notional values to fulfill the CMP requirements for a given ship class

- Contains the notional availability duration and man-day amount
- Example: 16 months, 32k man-days

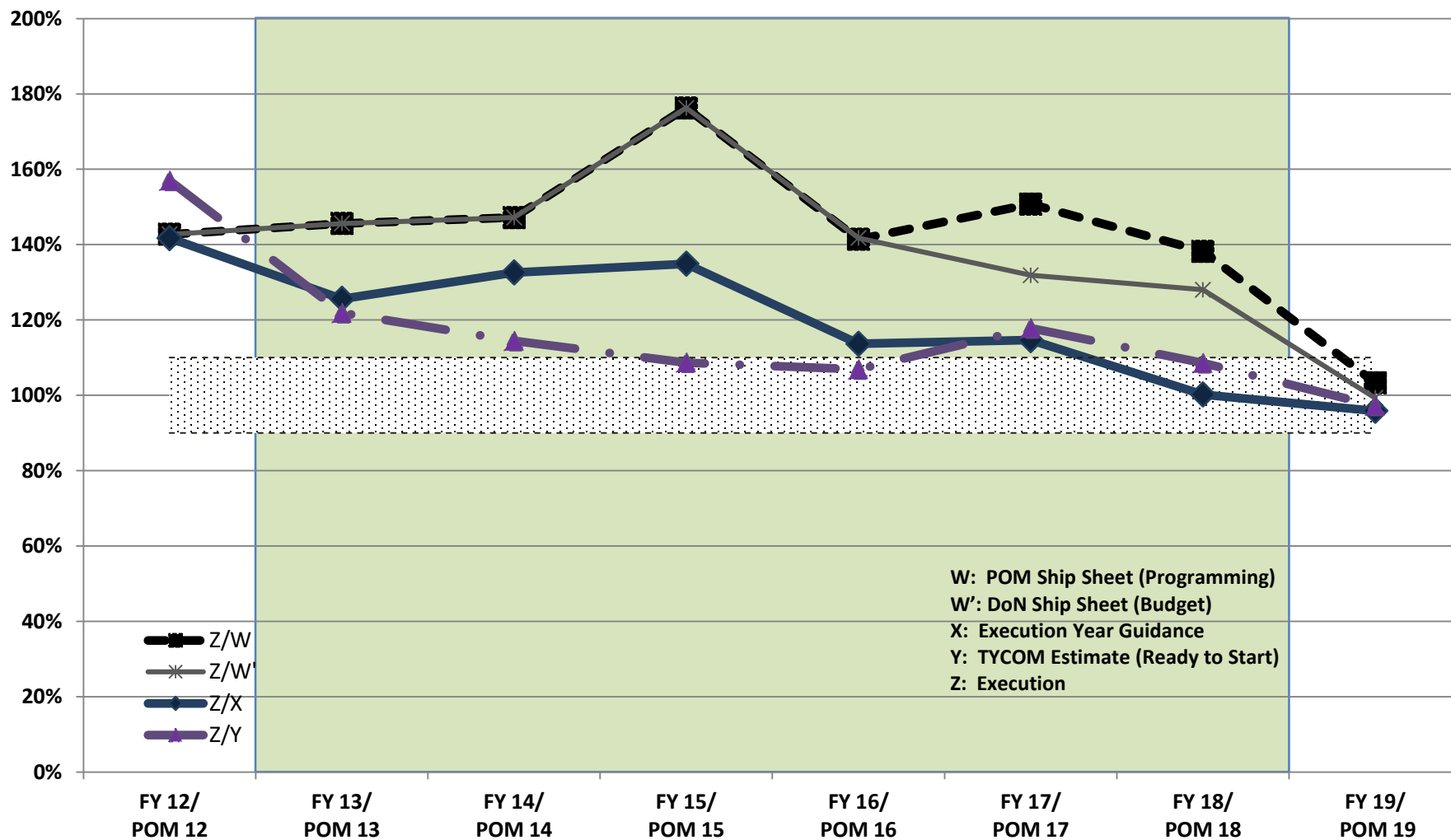
Ship Sheets contain the tailored requirement for a given hull's individual CNO availability

- Updated twice a year
- Reflects the duration and man-day value "loaded" into the workload charts

TFP's and Shipsheets are the basis of maintenance budget submissions!



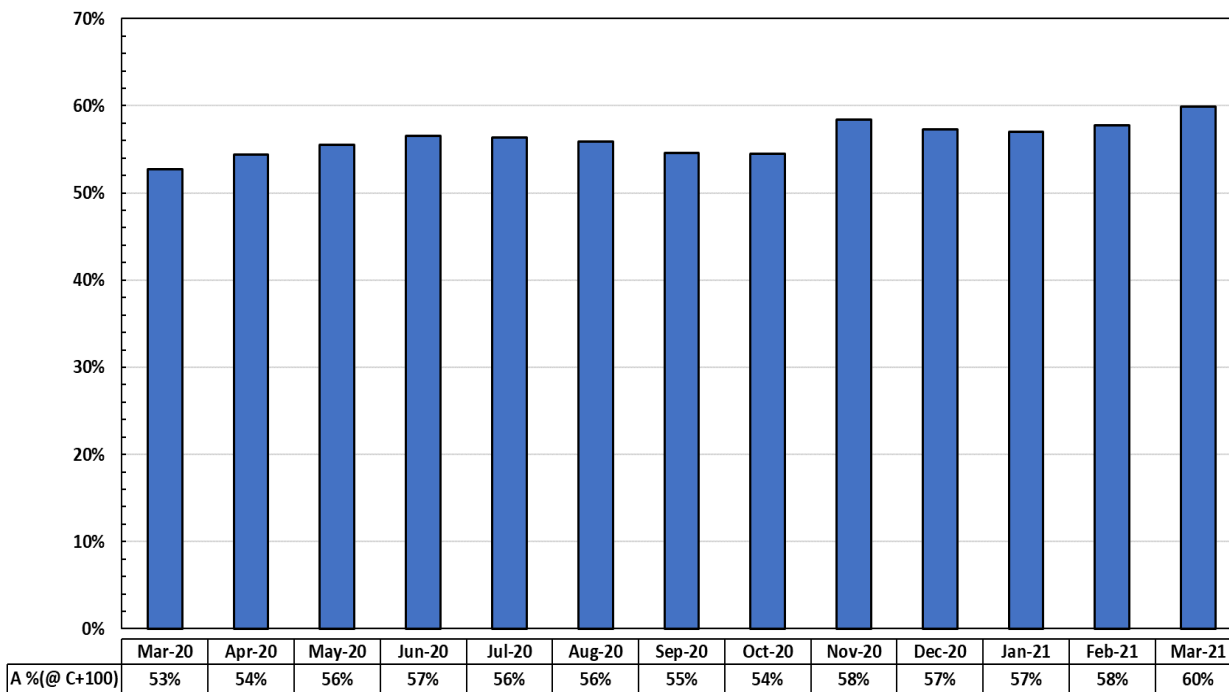
Surface Ship Budget vs Cost Trends



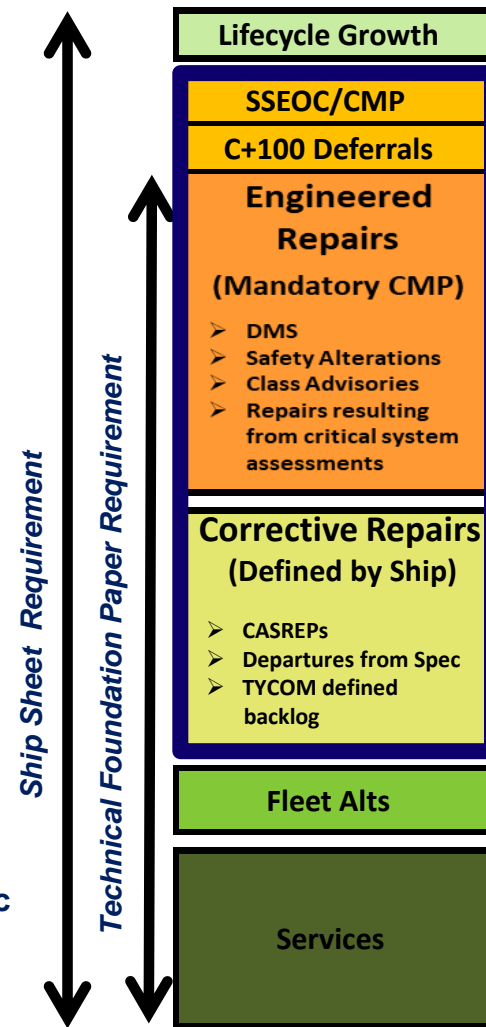
TFP's and Shipsheets improve budget predictability

Stability Through CMP Directed Maintenance

Directed Maintenance Strategies (DMS) % w/o Services



- Percentage of directed maintenance expended as compared to entire maintenance work package minus services at availability closeout past 12 Months
- SURFMEPP and NAVSEA05P studying current tank/void survey periodicities to optimize inspection periodicities while maintaining acceptable risk and programmatic requirements to align with CNO availability cycles.
- Directed Strategies are based on Reliability Centered Maintenance principles, historical data, and are funded (1B4B) through the TFPs and Ship Sheets



DMS is Improving Stability of Package/Requirement

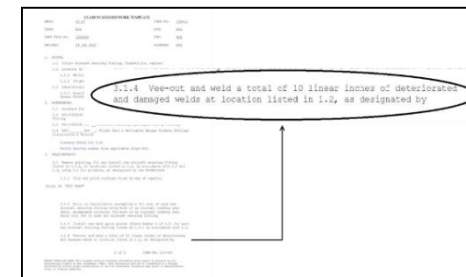
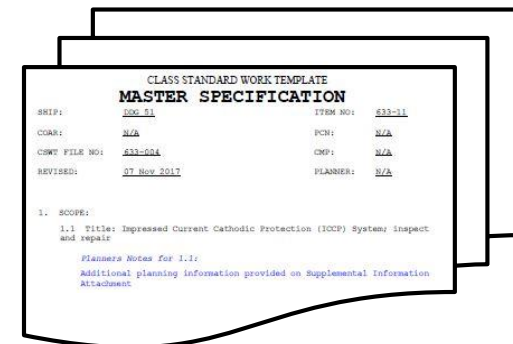


Class Standard Work Template (CWST)

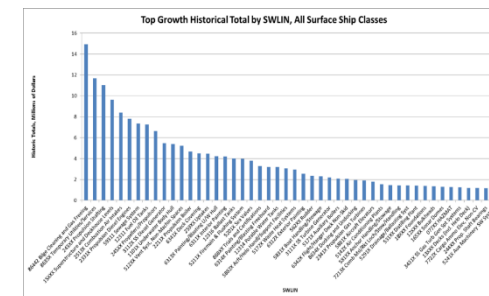


- **Used by government planning activities to develop repair contract work items**
- **Standardized to support specific repairs or support for a specific class of ship**
- **Required by NAVSEAINST 9070.9 and COMUSFLTFORCOMINST 4790.3**
- **Reduces depot planning process development timelines**
- **Standardizes LLTM requirements and promotes material forecasting**
- **Provides standard scope for repeat repairs to private industry which promotes more efficient and accurate contract proposals**
- **Incorporates availability lessons learned that reduce growth work during execution**
- **Improves cost return analysis for budget requirement development process**

**NAVSEAINST 9070.9 (Policy For Use and Maintenance of the Master Specification Catalog Templates)
 **Joint Fleet Maintenance Manual (JFMM), Vol II, Part II, Chapter 2, Appendix B
 **Master Specification Catalog contains 6,879 Class Standard Work Templates



Contains historical growth trends



Mitigates highest growth drivers

CSWTs Developed for ALL Directive Maintenance Strategies

BOAT DAVIT COMPREHENSIVE MAINTENANCE

- **CMP tasks supported by CSWTs in Master Spec Catalog (MSC)**
 - Incorporates front-loaded repairs which reduces risk to duration and growth and new work
- **Assess Boat Davits 180 Days Prior to Deployment (All Ship Classes)**
- **Weight Test Boat Davits every 24 Months (All Ship Classes, but PCs)**
- **Overhaul Boat Davits every 72M (LPD 17 & DDG51 Classes)**
- **Replace Slewing Arm David (SLAD) Wire Rope every 36M (LPD 17 Class Only)**



DIESELS

- **Diesel Directive Maintenance Strategy: Avail Specific CMP Tasks for LSD and LPD Class Main Propulsion Diesel Engines and Ship Service Diesel Generators**
- **Engine Conditions reviewed by NSWCPD (ISEA) to determine repairs required during CNO avail**
- **CMP Tasks supported by CSWTs in Master Spec Catalog (MSC)**
- **Incorporates front-loaded repairs and identification of LLTM for Fairbanks Morse Diesels**



IMPACTS TO MAINTENANCE

- **Decrease growth work potential**
- **Maximize operational availability**
- **Significant cost avoidance implications over a ship's expected service life**



CMP Directed Maintenance Strategies – Diesel Engines



Problem Statement: Diesel repair was the largest growth contributor due to

- Late identification of repair work
- Ordering of Long Lead Time Material (LLTM) *after* start of Availability

Corrective Action: SURFMEPP/ ISEA based on assessments identifies repairs and material required in support of CNO Availability prior to package lock.

Material Management: Goal is to have Long Lead Time Material on hand by A-90

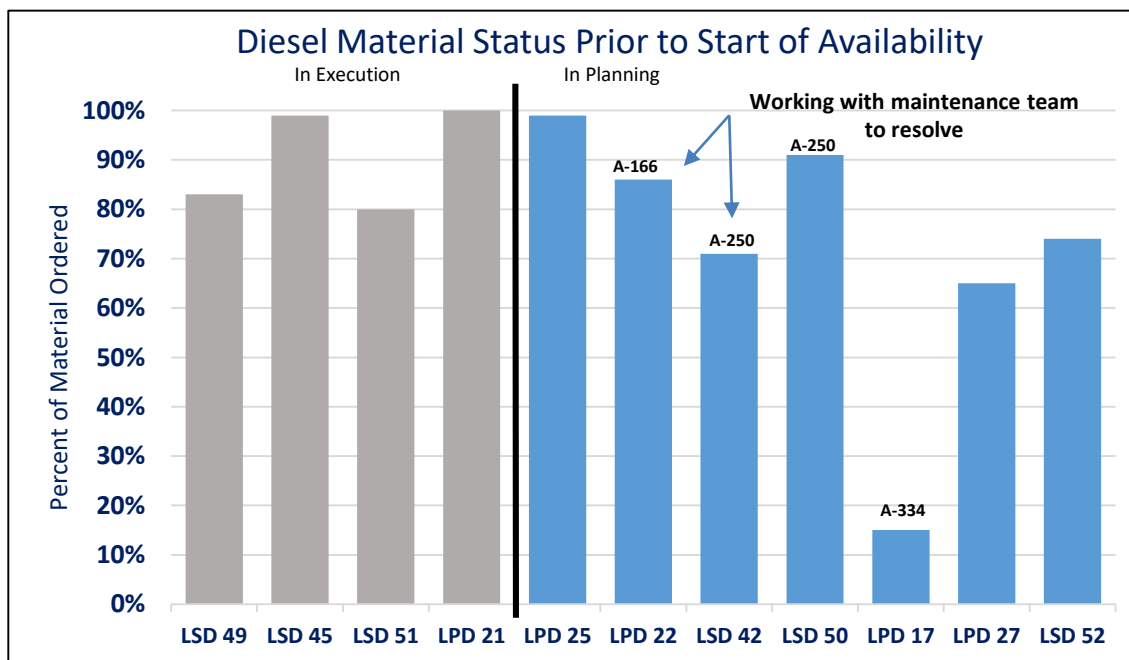
- NAVSUP/DLA orders material to meet forecasted demand based on CMP Forecast
- TYCOM funds Long Lead Time Material (LLTM)
- RMCs order material by A-365 from NAVSUP/ DLA
- SURFMEPP/ SEA 21M tracks material ordering status with RMCs

| INDUCTION PLAN | | | |
|----------------|------|------------|---|
| SHIP | FY | Avail Type | |
| HARPERS FERRY | 2020 | DSRA 2 | ✓ |
| COMSTOCK | 2021 | DSRA 3 | ✓ |
| OAK HILL | 2021 | SRA 3-2 | ✓ |
| NEW YORK | 2021 | DSRA 1 | ✓ |
| SOMERSET | 2021 | SRA 1-2 | |
| SAN DIEGO | 2021 | DSRA 1 | |
| GERMANTOWN | 2022 | SRA 4-1 | |
| CARTER HALL | 2022 | SRA3-2 | |
| SAN ANTONIO | 2022 | SRA 2-1 | |
| PORTLAND | 2023 | SRA 1-1 | |
| PEARL HARBOR | 2023 | SRA 3-2 | |



Successfully Managed Directed Diesel Engine Hulls

As of 1 April 21



DMS Strategy implemented to Reduce Growth

UNDERWATER HULL & SEA CHEST



- Structural survey includes ultrasonic testing of hull and sea chests corroded areas
- Depot planning templates include forecasted hull plating weld repair and replacement

LPD 17 BULWARKS/DECKS

- Structural failures led to running rust on ship exterior and water intrusion into adjacent compartments
- CSWT developed with front-loaded repairs and Ultra High Solids (UHS) coating every docking availability
- Composite Deck Drains incorporated



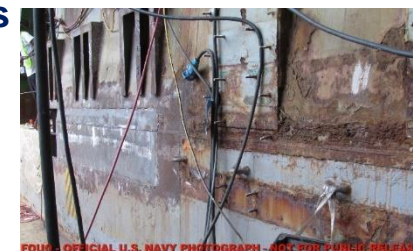
DDG 51 Transverse Bulkhead Repairs

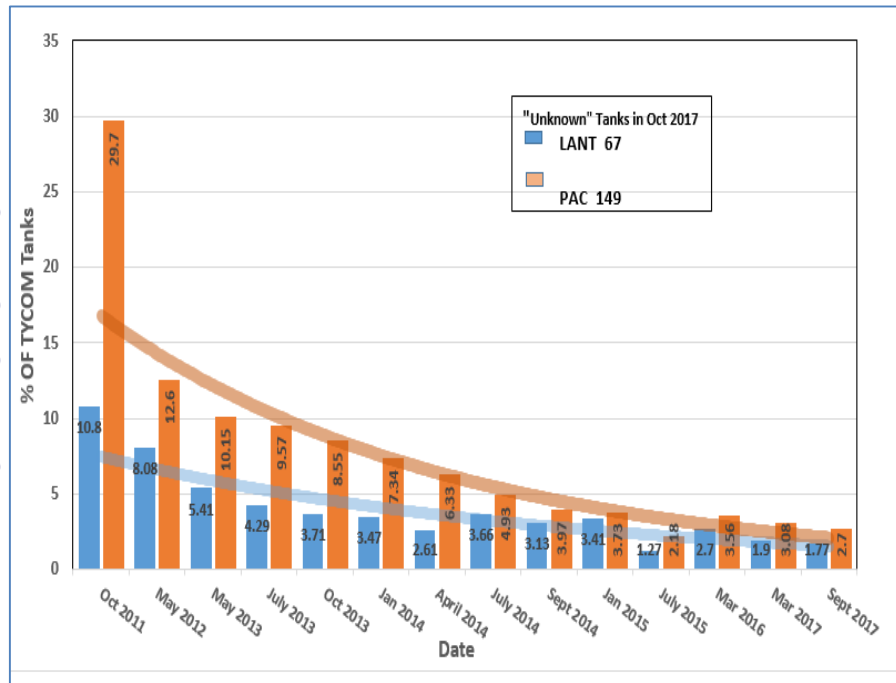
- Frame 174 and 370 Stiffener and Tank Top failures, risk to progressive flooding
- Depot planning templates include forecasted bulkhead and tank top repairs
- Mitigates growth work during execution



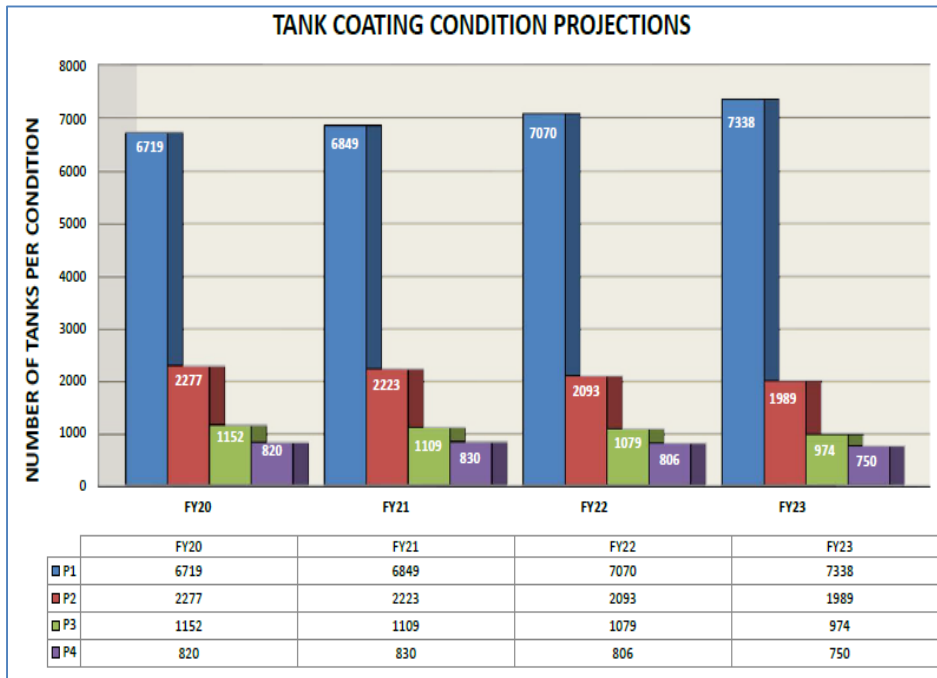
LSD/LPD/LHD Well Decks Repairs

- Structural survey includes ultrasonic testing of corroded deck and wing walls
- Planning templates include forecasted structural weld repairs, plate replacement, batter board replacement
- Strategy integrated acrosss ESL - wing walls/overheads scheduled for waterborne availabilities, well deck scheduled for dry-dockings
- Strategy integrated with scheduled ballast tank preservation/repairs





2012-2017 Legacy Coating Conditions Metric



2018-Current AF Leading Metric

- Reduced undocumented coating conditions from 30% to less than 5% fleet wide through rigorous execution of CMP tank/void condition assessments
- Implemented fleet wide tank/void preservation directed maintenance strategies based on historical assessment results that promote CNO availability on time delivery
- Developed coating condition forecasts to improve maintenance programming and to provide forecasted tank/void preservation workload in each fleet concentration area

- **Issue:**

- Propulsion shafting waterborne strut bearing lands exhibiting severe corrosion at approximately midway through service life
- Unable to assess bearing bore condition until ship is in dry-dock
- Complex bearing land weld build up and in place machining process to achieve required clearances
- Significant negative impact to dry-docking cost and schedule



- **Class Maintenance Plan:**

- Measure bearing lands when in dry-dock
- Install “prefabricated shims” on bearing housing that match taper of bearing lands



- **Way Ahead:**

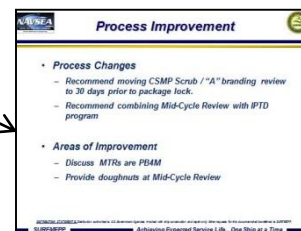
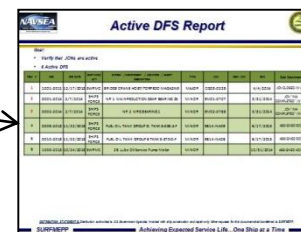
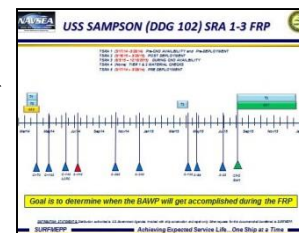
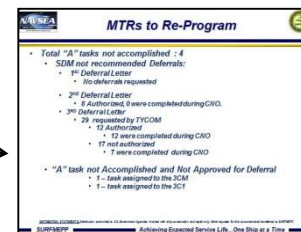
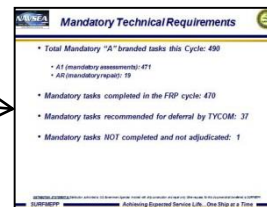
- Continue to collect strut bearing land “as found” conditions to predict when to install shims during expected service life



Preliminary failure data indicates failure at 2nd dry-docking during ESL

C+70 Closeout meeting - formal audit report issued C+100

- Review status of Mandatory Technical Requirements (MTR)
- Review MTRs to re-program
- Establish notional milestone dates for the next FRP maintenance cycle
- Review the status of Departures From Specification (DFS)
- Review recommendations for SURFMEPP process improvement
- Reviews actual expenditures vs budget and controls (W=X=Y=Z)



Timely closeout required to support Technical and Financial Planning



Life cycle Investment Trends: SSEOC & LCHA



- **Surface Ship Engineered Operating Cycle (SSEOC)**
 - Governed by OPNAVINST 3120.47, dtd 02 May 2013
 - Identifies hulls that have not met the SSEOC Criteria
 - Avails Cancelled with Life Cycle Technical Violations
 - Reprogramming Challenges with Life Cycle Technical Violations
 - Life Cycle Technical Violations
 - CNO Availability FY shifts
 - Frequency: Annually
 - Approval: SEA 00
 - Report Distribution (Sr. Level): CNO
- **Life Cycle Health Assessment (LCHA)**
 - Unique process developed by SURFMEPP & OPNAV to measures the material condition of systems to validate technical compliance, whether each hull is in a state that remediation can be accomplished within the notional duration of the next availability
 - Frequency: Monthly
 - Report Distribution (Sr. Level): Fleets

LCHA & SSEOC document life cycle investment decisions across ESL

Maintenance Strategies

- **Directed Maintenance**
 - Tanks
 - Front Loads
 - Propulsion
 - CSWT with IGE
 - Earlier Assessments
- **Corrosion Planning**
 - Alignment with Habitability Improvements
 - Structural Overlay
 - Alignment with MOD
- **E2E Cycle Strategies**
 - Sasebo Surface Incremental Availability (SIA)
 - Pre/Post larger availability
 - Rota SIA
 - Maintenance Pull Ahead
 - Avail Duration Scorecards
 - Fleet Scheduling Alignment



USS IWO JIMA

- Tanks COND 4: 7
- Additional budget and time added to avail to recover tanks (75K Man days)
- 3rd BAWP cycle with SURFMEPP oversight
- FY18 Planned Maintenance Availability AND FY21 Docking Planned Maintenance Availability: No deferrals requested
- **ON TRACK TO MEET ESL**





Summary



SURFMEPP continues to...

- **Track and plan all mandatory technical requirements to ensure that ships meet their expected service life**
- **Promote accurate surface fleet maintenance programming in support of the POM & DoN Process**
- **Analyze CNO availability execution results to improve CMP Directed Maintenance Strategies**
- **Document the compliance of adhering to the CMP with the Annual SSEOC report**
- **Promote enterprise focus on sustained life cycle maintenance investment across the surface fleet**

Significant progress since the stand up of SURFMEPP in 2009



Questions?

Win Them All.



Achieving Expected Service Life...One Ship at a Time