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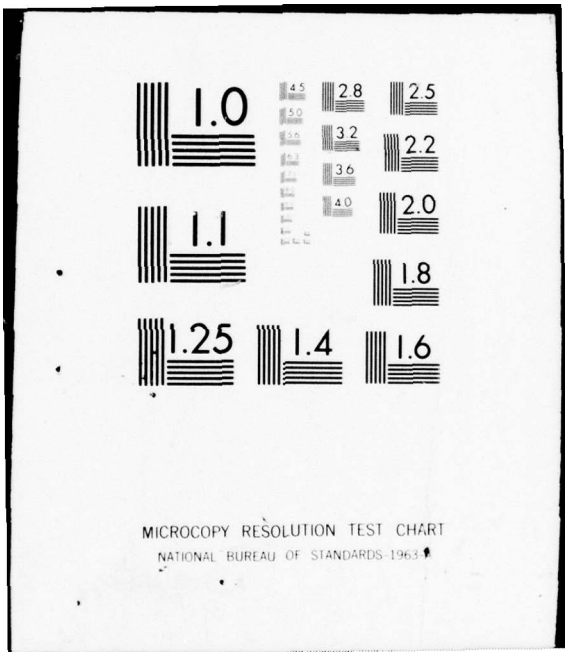
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July 1977

Prepared for

PERA(CV)
PUGET SOUND NAVAL SHIPYARD
Bremerton, Washington

Under Contract N00140-76-D-0813-0013

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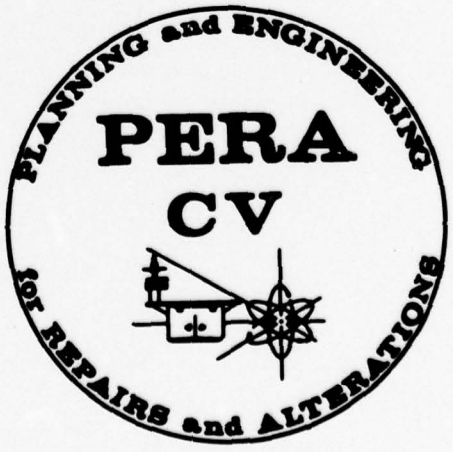

ABSTRACT

A plan of action for conducting life cycle maintenance of Aircraft Carriers is presented. Included in the plan is a description of the various tasks comprising the Life Cycle Maintenance Management concept.

LIST OF ABBREVIATIONS

AOR	– Achieved Operational Readiness
ARML	– Advanced Repair Material List
ARVC	– Alteration and Repair Verification Conference
AWR	– Alteration Work Requirement
CASREPT	– Casualty Report
COH	– Complex Overhaul
CSMP	– Current Ship's Maintenance Project
CSRR	– Combat System Readiness Review
CSRT	– Combat System Readiness Test
DATC	– Development and Training Center
FMAG	– Fleet Maintenance Assistance Group
FMP	– Fleet Modernization Program
ILS	– Integrated Logistic Support
IMA	– Intermediate Maintenance Activity
IMMS	– Intermediate Maintenance Activity Maintenance Management Subsystem
INSURV	– Inspection and Survey
IOR	– Inherent Operational Readiness
LCMM	– Life Cycle Maintenance Management
LOE	– Light-off Examination
MCA	– Machinery Condition Analysis or Material Condition Assessment
MDS	– Maintenance Data System
MI	– Material Inspection
MOG	– Material Ordering Guide
3-M	– Maintenance Material Management
OPPE	– Operational Propulsion Plant Examination
PEB	– Propulsion Examining Board
PMS	– Planned Maintenance Subsystem
POT&I	– Pre-Overhaul Test and Inspection
SARP	– SHIPALT and Repair Package

SF	– Ship's Force
SFOMS	– Ship's Force Overhaul Management System
SRA	– Selected Restricted Availabilities
TDS	– Task Description Sheet
TRS	– Technical Repair Standard
TSTP	– Total Ship Test Program
UMMS	– Underway Maintenance Management System

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PART 1

GENERAL INFORMATION

PART 1

GENERAL INFORMATION

1.1 PURPOSE

This document presents a plan of action for conducting life cycle maintenance of Aircraft Carriers. The plan includes a definition of Life Cycle Maintenance Management (LCMM); a description of the associated activities, based upon a task breakdown structure; and a set of diagrams that illustrate the important interfaces between activities.

1.2 DEFINITIONS

Life Cycle Maintenance Management is the continuous process of managing a wide variety of maintenance activities throughout a ship's life. Hence, LCMM embraces:

a. All echelons of maintenance (Ship's Force, Intermediate Maintenance Activities (IMAs), and shipyards);

b. All types of maintenance (preventive, corrective, and modernization); and

c. All categories of maintenance periods, including Complex Overhaul (COH), Selected Restricted Availability (SRA), minor availability, and underway maintenance.

Life Cycle Maintenance Management involves the systematic accomplishment of activities in the following Task Areas:

a. Development and revision as necessary of maintenance strategies

b. Establishment and revision as necessary of material condition and repair standards

c. Regular assessment of individual-ship material condition through testing, inspection, measurement, or evaluation of the ship against established standards

d. Formulation of work packages and performance of advanced planning as necessary so that the most effective use can be made of availability and maintenance periods

e. Execution of the work package during COH, SRA, minor availability, or underway maintenance

f. Implementation of a closed-loop maintenance data collection and analysis program, including 3-M reporting, departure reporting, casualty reporting, and other data input systems that may relate to Aircraft Carrier maintenance.

This process is iterative throughout the ship's life (see Figure 1-1).

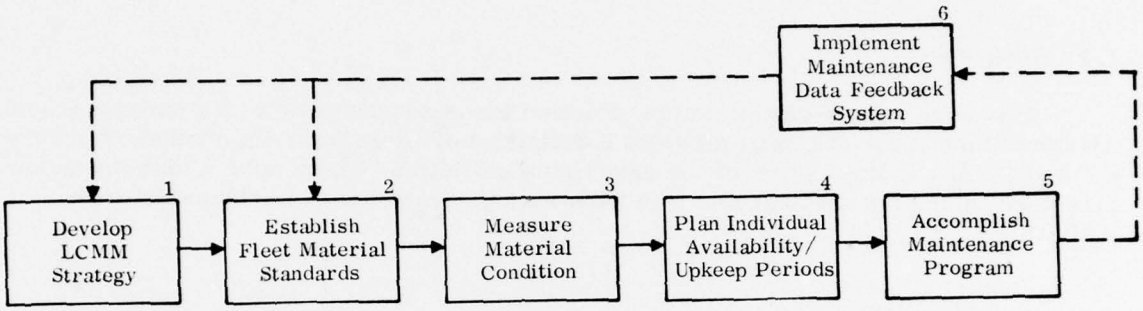


Figure 1-1. Flow Diagram of Task Areas in Carrier Life Cycle Maintenance Management Program

1.3 SCOPE OF PLAN

This plan covers the spectrum of activities essential for implementation of LCMM. Many of these activities are well established, such as development and use of the Ships Alteration and Repair Package (SARP) or implementation of the 3-M Maintenance Data System (MDS). Such activities are addressed largely by reference, with a minimum of descriptive information concerning the associated procedures. Other aspects of LCMM that are less known, or to date unknown, include the development of an LCMM strategy, the establishment of Fleet material condition standards, and the assessment of ship material condition. Therefore, emphasis is given in this plan to the procedures associated with such tasks.

1.3.1 Part 1. General

Part 1 contains background information on the LCMM concept. It itemizes the objectives toward which LCMM is directed, and provides an overview of related activities.

1.3.2 Part 2. LCMM Activities

Part 2 describes the detailed activities, or Task Elements, falling within the six Task Areas defined in Section 1.2. An outline of the detailed Task Elements is presented in the form of a task breakdown structure (Figure 2-1). Also included is a description sheet (see format, Figure 1-2) for each task element, which:

a. States the objective of the Task Element

b. Describes the approach to its conduct

c. Identifies significant milestones associated with its completion

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
Objective	
Approach	

Milestones	When Completed	Accomplishing Activity

Interface with Other LCMM Tasks

Sheet _____ of _____

Figure 1-2. Format of LCMM Task Description Sheet

d. Stipulates the organization(s) normally responsible for its accomplishment

e. Provides references to interfacing tasks.

Included in the Approach section of the sheet is a description of the procedures that will normally be used in accomplishing the task. Where appropriate, the description is augmented by reference to related documentation or appendix material contained within this plan.

1.3.3 Part 3. Interfaces

Part 3 includes graphic descriptions of the major interfaces associated with the Task Elements included in the LCMM Plan.

1.3.4 Appendix

Appendix A contains a listing of letters, Instructions, etc., pertinent to LCMM.

1.4 OBJECTIVES AND CONSTRAINTS

1.4.1 Objectives of LCMM

The overall objective of LCMM is to improve the material condition of ships to the maximum degree consistent with available resources. The objective is to be accomplished through development of an improved maintenance strategy. Related objectives are to:

a. Define, develop, and apply Fleet material condition standards based on mission requirements.

b. Develop and implement an engineered maintenance plan that considers the entire life of a ship and all echelons of maintenance.

c. Track material condition by periodic measurement of mission-accomplishment likelihood, quantity of deferred maintenance, failure rate, and other appropriate measures of maintenance effectiveness.

d. Develop and implement standards, guidelines, and methods for defining maintenance requirements, including frequency of and responsibility for accomplishment.

e. Formulate and promulgate maintenance strategy by objective analysis of all available alternatives.

f. Ensure that each individual availability or maintenance period is planned and executed in context with the total maintenance strategy.

g. Develop and implement a feedback system that supports evaluation of existing or proposed strategies.

h. Base assessments of material condition on quantitative rather than qualitative criteria.

i. Determine the optimum frequency and duration of COHs and SRAs.

j. Minimize redundancy and maximize automated information transfer between related LCMM program elements (e.g., SARP and Current Ship's Maintenance Project, CSMP).

1.4.2 Constraints

In accomplishing the foregoing objectives, certain requirements, restrictions or conditions are considered inviolate in the development and implementation of improved maintenance strategy. These include the following:

a. Operational commitments established by CNO cannot be reduced.

b. The location and capacity of depots (shipyards) assigned to Carrier maintenance is essentially fixed.

c. The level of current operational readiness cannot be allowed to degrade.

d. COHs and SRAs can only be accomplished in CONUS.

e. Capabilities for accomplishing organizational maintenance (i.e., quantity and skill level of shipboard maintenance personnel) will not vary drastically from their current level.

1.5 DESCRIPTION OF MAJOR ACTIVITIES

The six Task Areas involved in LCMM are briefly described below. A more detailed description of these activities is given in Part 2.

1.5.1 Task Area 1: LCMM Strategy Development

The LCMM concept is based on a systematic formulation of a maintenance strategy that assesses the ability of the ship to perform its assigned mission. Under the Aircraft Carrier LCMM Plan, maintenance strategy is developed in three distinct but interrelated phases. First, the basic requisites of strategy development – the definition of LCMM, its objectives, and its constraints – are established. Second, problems with the baseline strategy (as defined by the existing set of maintenance-related instructions notices, and letters) are identified and new/revised strategy developed through analysis of the alternatives. Finally, the new/revised strategy is documented and promulgated.

The initial phase is approached as a one-time effort; however, the objectives of LCMM and its constraints are reviewed periodically to ensure their continuing applicability. The second phase – the identification of problems and the development of new/revised strategy – is conducted on a continuous basis. The final phase is accomplished as required.

The first two phases of activity, as described above, are primarily accomplished by PERA(CV), with guidance and direction provided by the Type and Fleet Commanders. Execution of the third phase is the responsibility of the Fleet Commander, Type Commander, or PERA(CV) as appropriate.

1.5.2 Task Area 2: Establishment of Fleet Standards

The second area of LCMM activity involves the establishment of standards that will provide the basis for directing a ship's maintenance program. These standards fall into essentially two categories: material condition and repair. The purpose of these standards is to provide objectivity, consistency and visibility in the assessment of material condition and the planning/execution of maintenance for individual ships.

Establishment of material condition standards involves the definition of measures of maintenance effectiveness; development of performance/condition standards for inclusion in system/equipment test procedures; preparation of generalized system/equipment checklists; development of indicators of material condition; and integration of these indicators into specific test/inspection/assessment programs.

Establishment of repair standards includes the preparation of Technical Repair Standards (TRSs), Technical Manuals, Baseline SARPs, and Material Ordering Guides.

1.5.3 Task Area 3: Material Condition Assessment

In its broadest sense, material condition assessment includes any test, inspection, measurement, or analysis program designed to evaluate material condition and identify specific items of required maintenance. The basic approach to material condition assessment involves comparing observed performance against the pre-established standards discussed in Section 1.5.2. Typical Aircraft Carrier Material Condition Assessment Programs include:

a. PERA(CV) Material Condition Assessment Program based on the mission of recovery, servicing, and launching of aircraft

b. Machinery Condition Analysis (by vibration measurement) Program

c. Pre-Overhaul Test and Inspection (POT&I) Program

d. Total Ship Test Program (TSTP)

e. INSURV Program

f. Planned Maintenance System (PMS)

g. LOE/OPPE Material Inspection Program

h. Flange and Strainer Shield Inspection Program

i. Valve Inspection Program

j. Zone Inspection

k. Combat System Readiness Test (CSRT)

l. Oil Analysis Program.

1.5.4 Task Area 4: Advanced Planning

The fourth area – advanced planning of individual availability/upkeep periods – involves translating the results of material condition assessment into defined work packages accompanied by the necessary plans for their accomplishment. The accomplishment of this activity is the combined responsibility of PERA(CV) and Ship's Force, with the guidance and direction of the Type Commander. Depending on the type and nature of the availability/upkeep being planned, support is provided by the Supervisor of Shipbuilding, a shipyard, or an IMA.

Specific effort under this Task Area includes the development of routine work requests for repetitive items; refinement of the SARP incident to COH or SRA; implementation of Ship's Force Overhaul Management System (SFOMS) planning; and advance ordering of materials.

1.5.5 Task Area 5: Accomplishment of Maintenance Program

Maintenance program accomplishment includes all effort involved in the execution of a COH, SRA, minor availability, or underway maintenance. The effort involves the fulfillment of a defined work package, together with the status monitoring, quality assurance activity, and any other appropriate effort to assure effective completion of the work. Ship's Force, PERA(CV), TYCOM, and the accomplishing activity are integrally involved in this effort. The specific activities undertaken depend on the type of availability/upkeep being conducted.

1.5.6 Task Area 6: Maintenance Data Feedback

A crucial part of the Aircraft Carrier LCMM Program is the effective collection and analysis of maintenance data as required to feed back the results of experience into all aspects of LCMM. Significant constituents of the maintenance data feedback program include the 3-M System, the Casualty Reporting (CASREPT) System, and departure reports. These and other yet-undefined data would be analyzed to evaluate the effectiveness of maintenance and to refine baseline strategies and standards.

1.6 PROCEDURES FOR IMPROVING EXISTING STRATEGY

The six Task Areas included in the LCMM plan provide systematic procedures for enhancing or supplementing existing maintenance strategies. Implementation of these procedures is discussed in subsequent paragraphs with respect to the following:

a. Modifying the existing COH/SRA cycle

b. Predicting the optimum frequency of overhauling selected equipments

c. Monitoring trends in material condition by periodically measuring the quantity of deferred maintenance.

The following paragraphs are not intended to provide solutions to specific problems; rather they show how the tasks within the proposed LCMM Program interact to provide the process for solving them.

1.6.1 Modify Existing COH/SRA Cycle

Each Type Commander assists CNO in establishing the frequency and duration of Complex Overhauls and Selected Restricted Availabilities. A number of operational, and logistic factors influence the established COH/SRA cycle, including:

a. Number of ships in each Fleet

b. Number of ships committed to deployment

c. Deployment duration

d. Modernization program requirements

e. Training requirements

f. Material condition standards

g. Size of maintenance budget

h. Size and location of depot and IMA maintenance facilities.

Initial implementation of LCMM is based on the particular COH/SRA cycle currently in effect. Nevertheless it is an objective of the program to evaluate promising alternatives to that strategy and, where appropriate, to formulate improvements.

The procedure for improving the COH/SRA cycle is illustrated by the activity network shown in Figure 1-3. In general, the procedure involves the following sequential steps:

- Step 1: Determine the objectives and constraints associated with modifying the COH/SRA cycle.
- Step 2: Define the measures and the standards upon which cost and effectiveness of the COH/SRA cycle is to be quantified and evaluated.
- Step 3: Compare the existing level of effectiveness and cost against the preestablished standards.
- Step 4: Assess reliability and maintainability trends, return costs, and other significant factors.
- Step 5: Develop a recommended improved COH/SRA cycle.
- Step 6: Test the recommendation by random application.

Each of these steps is discussed in the following paragraphs.

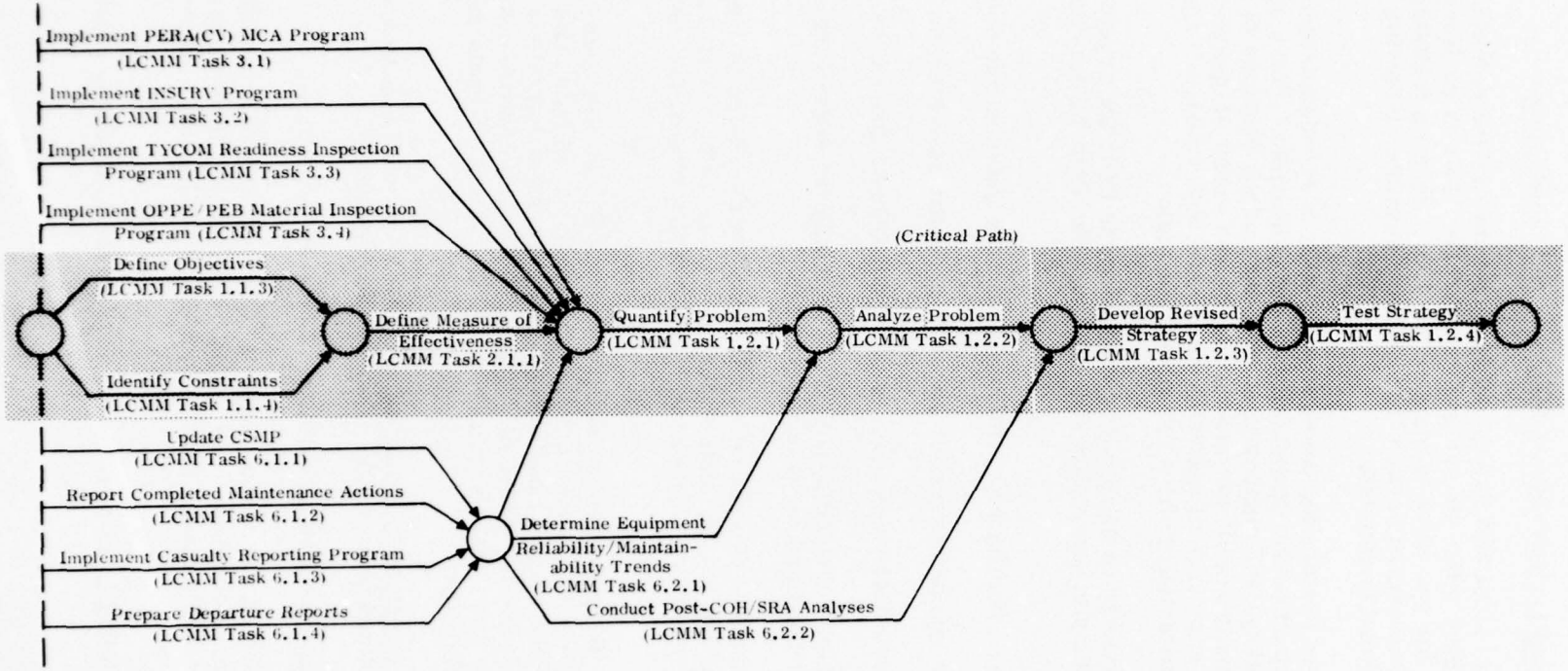


Figure 1-3. Recommended Procedure for Formulating Improved COH/SRA Cycle

1.6.1.1 Step 1: Determine Objectives and Constraints

The purpose of LCMM is to provide maximum likelihood that a ship can perform its assigned mission within its assigned resources. This is realized when the time a ship is available for operation is maximized, i.e., when its maintenance time is minimized. In this regard certain tradeoffs are possible, involving the frequency and duration of scheduled maintenance.

Many factors besides the frequency/duration of scheduled/unscheduled maintenance periods impact on the optimization of the COH cycle. For example, the availability, acceptability, and manpower cost of the various echelons of maintenance is of importance. Equally significant are the nature and extent of operational commitments. Further, the set standards of material condition – both "desired" and "minimum acceptable" – substantially affect the strategy decision.

The objectives to be satisfied by modifying the COH/SRA cycle are many and diverse. For example, the motive for modifying the COH/SRA cycle could be any of the following:

a. Improve effectiveness without increase in maintenance cost.

b. Reduce maintenance cost without significant deterioration in effectiveness.

c. Improve effectiveness and reduce maintenance cost at the same time.

d. "Optimize" cost-effectiveness by weighing the cost of improvement against the value or benefits derived.

The broad number of variables that impact on the choice of the best COH/SRA cycle, and the variety of legitimate goals to be achieved by modifying the existing strategy, place importance on the task of establishing objectives, assumptions, and constraints.

1.6.1.1.1 Aircraft Carrier LCMM Objectives. As has been stated, the specific objective of the Aircraft Carrier LCMM Program is to establish and implement an engineered COH/SRA cycle by optimizing effectiveness (measured in terms of operational readiness) in consideration of cost. Optimization involves determining the most suitable frequency and duration for scheduling Complex Overhauls and Selected Restricted Availabilities.

1.6.1.1.2 Constraints/Assumptions. It is assumed that in optimizing the COH/SRA cycle, the following constraints/assumptions prevail:

a. Existing operational commitments cannot be reduced.

b. Aircraft Carrier maintenance is to be accomplished by effective utilization of all three echelons – depot (either private or naval shipyards), intermediate maintenance (including FMAG, DATC, etc.), and organizational (Ship's Force).

c. The existing level of achieved operational availability cannot be degraded.

1.6.1.2 Step 2: Define Measure of Effectiveness

Under the Aircraft Carrier LCMM Program, the effectiveness of the maintenance program will be measured in terms of Achieved Operational Readiness (AOR), defined as the percentage of total time that the ship is capable of performing its assigned mission.

In the context of this definition, a ship is considered not capable of performing its assigned mission during COH/SRA, or at other times when either the CNO, TYCOM, or Commanding Officer designates that the ship is not capable of satisfactorily performing its mission. Such designation occurs as a result of any of the following:

a. INSURV

b. TYCOM Readiness Inspection

c. Ship's filing a CASREPT indicating inability to perform its assigned mission.

Achieved Operational Readiness is measured as an inverse function of total downtime (i.e., time spent in scheduled COH/SRA maintenance and in an unsatisfactory material condition). The Aircraft Carrier LCMM Program is intended to minimize the total downtime, as illustrated in Figure 1-4.

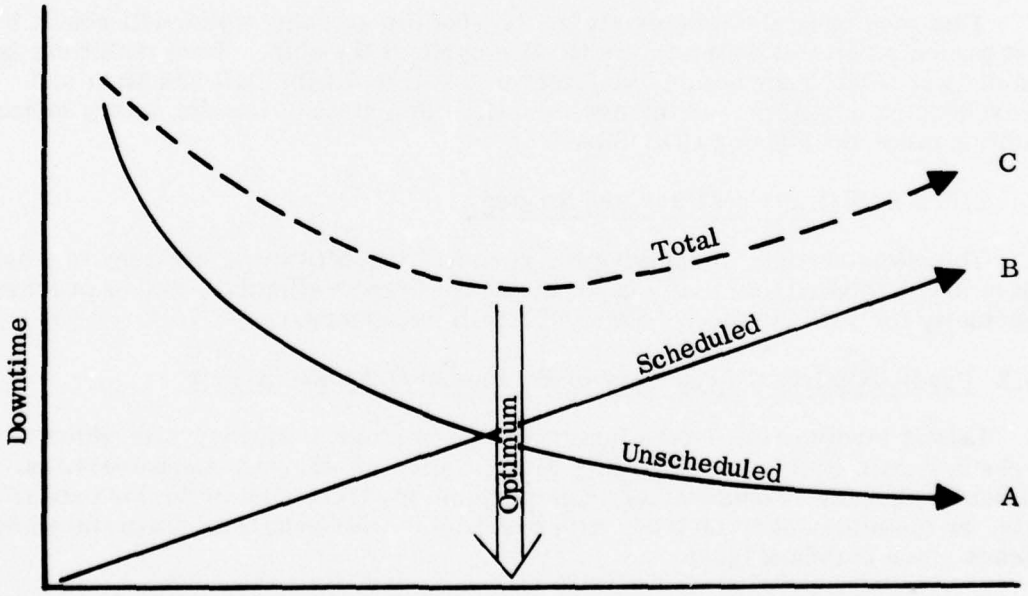


Figure 1-4. Downtime as a Function of COH/SRA Time

1.6.1.3 Step 3: Quantify Problem

In this step, the results of material condition assessment are analyzed to determine:

a. The level of operational readiness currently achieved using existing/past COH/SRA cycle strategy

b. The relationship between quantity of scheduled maintenance and time spent in unsatisfactory material condition

c. The cost of maintenance.

1.6.1.4 Step 4: Analyze Problem

In this step, alternate COH/SRA strategies are identified and the cost and achievable operational readiness for each alternative is estimated. Table 1-1 identifies the spectrum of hypothetical COH/SRA cycle strategies. The alternate strategies are expressed in terms of COH and SRA frequency/duration. The table shows, for each of several possible alternatives, the ship's inherent operational readiness, (IOR), the maximum percentage of time that it would be operationally available to perform its assigned mission.

1.6.1.5 Step 5: Develop Revised Strategy

This step consists of determining the specific strategy which will result in the least projected total downtime over the life cycle of the ship. Total downtime is the sum of 1) scheduled downtime, the interval associated with COH and SRA; and 2) unscheduled downtime, or the expected time in a state of unsatisfactory material condition other than during COH/SRA.

1.6.1.6 Step 6: Test Revised Strategy

This step consists of applying the revised COH/SRA cycle strategy to a selected ship in order to verify that the proposed change is cost-effective, and to provide an opportunity for refining the recommendation if necessary.

1.6.2 Predict Optimum Frequency of Equipment Overhaul/Repair

LCMM involves the determination of the optimum frequency with which to overhaul/repair equipment exhibiting deterioration or wearout characteristics. The optimum frequency is ascertained from periodic measurement of performance, reliability, or maintainability factors, with overhaul/repair occurring when the equipment reaches some standard level.

The objective of determining the optimum frequency is to provide useful inputs into the COH/SRA advance planning process. For example, if it is found that the optimum frequency for overhauling a given item is every 6 years, the likelihood of that item or the quantity of a group of items requiring overhaul in a particular COH/SRA can also be established.

TABLE 1-1. INHERENT OPERATIONAL READINESS ACHIEVABLE WITH VARIOUS ALTERNATIVE COH/SRA CYCLE STRATEGIES

SELECTED RESTRICTED AVAILABILITY		COMPLEX OVERHAUL								
Frequency →		Every 5 Years			Every 6 Years			Every 8 Years		
Duration, months →		9	12	15	9	12	15	9	12	15
Thrice Each COH	5	0.60	0.55	0.50	0.67	0.63	0.58	0.75	0.72	0.69
	4	0.65	0.60	0.55	0.71	0.67	0.63	0.78	0.75	0.72
	3	0.70	0.65	0.60	0.75	0.71	0.67	0.81	0.78	0.75
Twice Each COH	5	0.68	0.63	0.58	0.74	0.69	0.65	0.80	0.77	0.74
	4	0.72	0.67	0.62	0.76	0.72	0.68	0.82	0.79	0.76
	3	0.75	0.70	0.65	0.79	0.75	0.71	0.84	0.81	0.78
Once Each COH	5	0.77	0.72	0.67	0.81	0.76	0.72	0.85	0.82	0.79
	4	0.78	0.73	0.68	0.82	0.78	0.74	0.86	0.83	0.80
	3	0.80	0.75	0.70	0.83	0.79	0.75	0.88	0.84	0.81

The procedure for defining the optimum frequency of maintenance, and the manner in which this process interfaces with other tasks under the Aircraft Carrier LCMM Program, is shown in Figure 1-5. Each step in the process is discussed in the following paragraphs.

1.6.2.1 Step 1: Identify Repetitive Work Items

In this step, maintenance history is reviewed and analyzed to identify those work items which are highly repetitive or otherwise significant enough to warrant

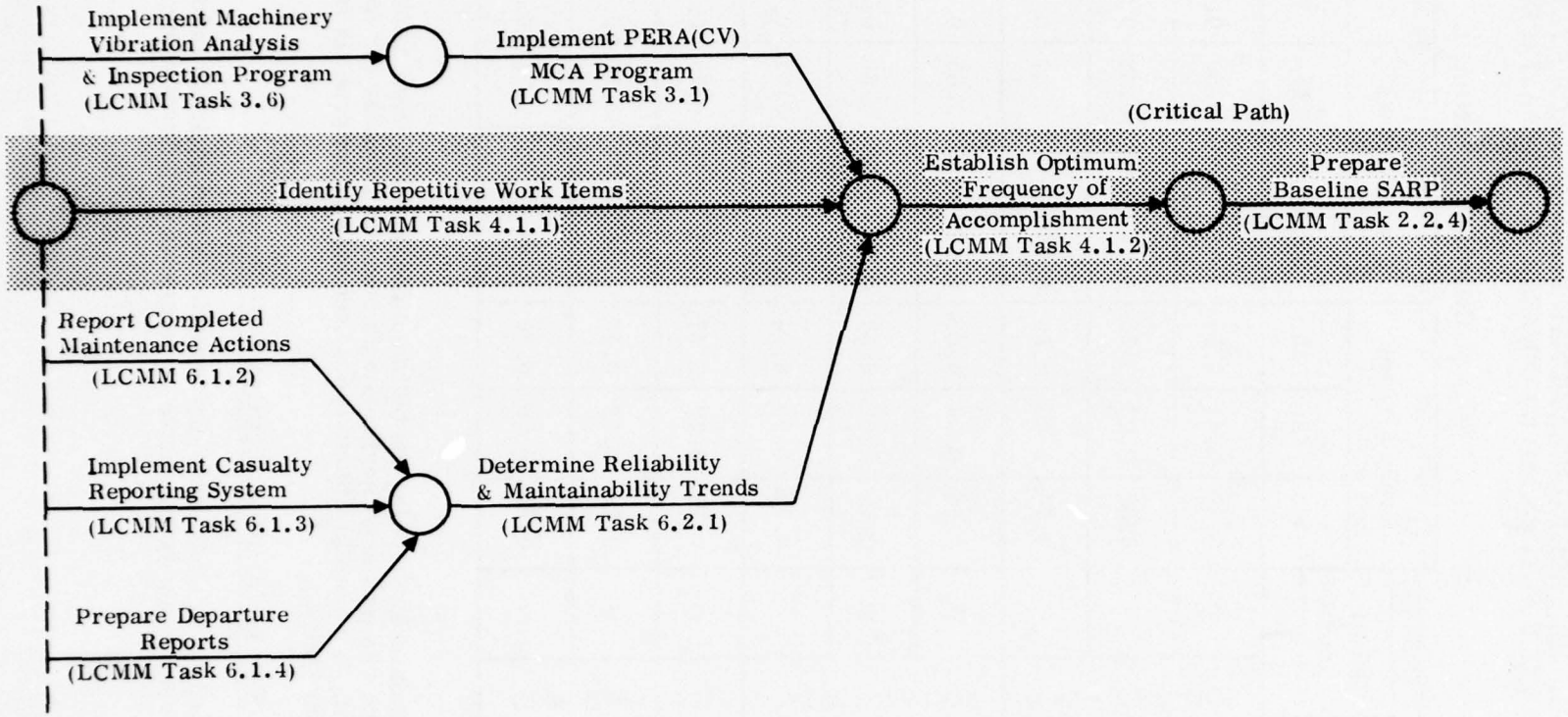


Figure 1-5. Procedure for Determining Optimum Frequency of Overhauling/Repairing Equipment

determination of optimum overhaul/repair frequency. The criteria for identifying items as warranting this determination include:

a. A likelihood of occurrence during COH of greater than 50% (as determined from past MDS or departure report history)

b. Evaluation of the item as mission-critical (from a review of CASREPT history).

1.6.2.2 Step 2: Establish Optimum Frequency of Accomplishment

This step entails a review of prior maintenance history, CASREPTs, and PERA(CV) MCA reports as necessary to determine trends in the reliability, maintainability, and performance of each item identified in step 1. Reliability will be measured in terms of CASREPT and maintenance frequency rate. Maintainability will be measured in terms of manpower expenditure rate and material cost. Performance trends will be measured in terms of vibration level as determined from the PERA(CV) MCA program. All of these factors will be measured as functions of operating time or calendar time since last overhaul/repair, as appropriate.

The optimum frequency of overhaul/repair will be established as the point at which CASREPT rate, manpower expenditure rate, or vibration has increased to a prescribed level, whichever comes first (see Figure 1-6). The prescribed level will be determined based on the cost-effectiveness considerations unique to each item.

1.6.2.3 Step 3: Prepare SARP

The optimum frequency of overhaul/repair, or where appropriate the likelihood of overhaul/repair as determined from the preceding step, will be incorporated into the SARP.

1.6.3 Track Material Condition by Measuring Quantity of Deferred Maintenance

Effective LCMM requires continuous visibility concerning both the total ship and its included systems/equipment. This visibility is necessary to support a broad variety of decisions that involve budget requests and allocation of resources to specific ships, availabilities, or jobs. Most of the decisions depend on factual information pertaining to:

a. The condition of specific systems or equipment in relation to performance capability

b. The essentiality of these systems/equipment to the ship's mission

c. The quantity of maintenance resources (labor and materials) required to restore them to a satisfactory condition.

Hypothetically, material condition deteriorates as a function of such factors as operating stress, usage, and skill level of operational and maintenance personnel. Material condition is restored during periods of scheduled or unscheduled maintenance. Figure 1-7 depicts this deterioration and restoration process over a ship's

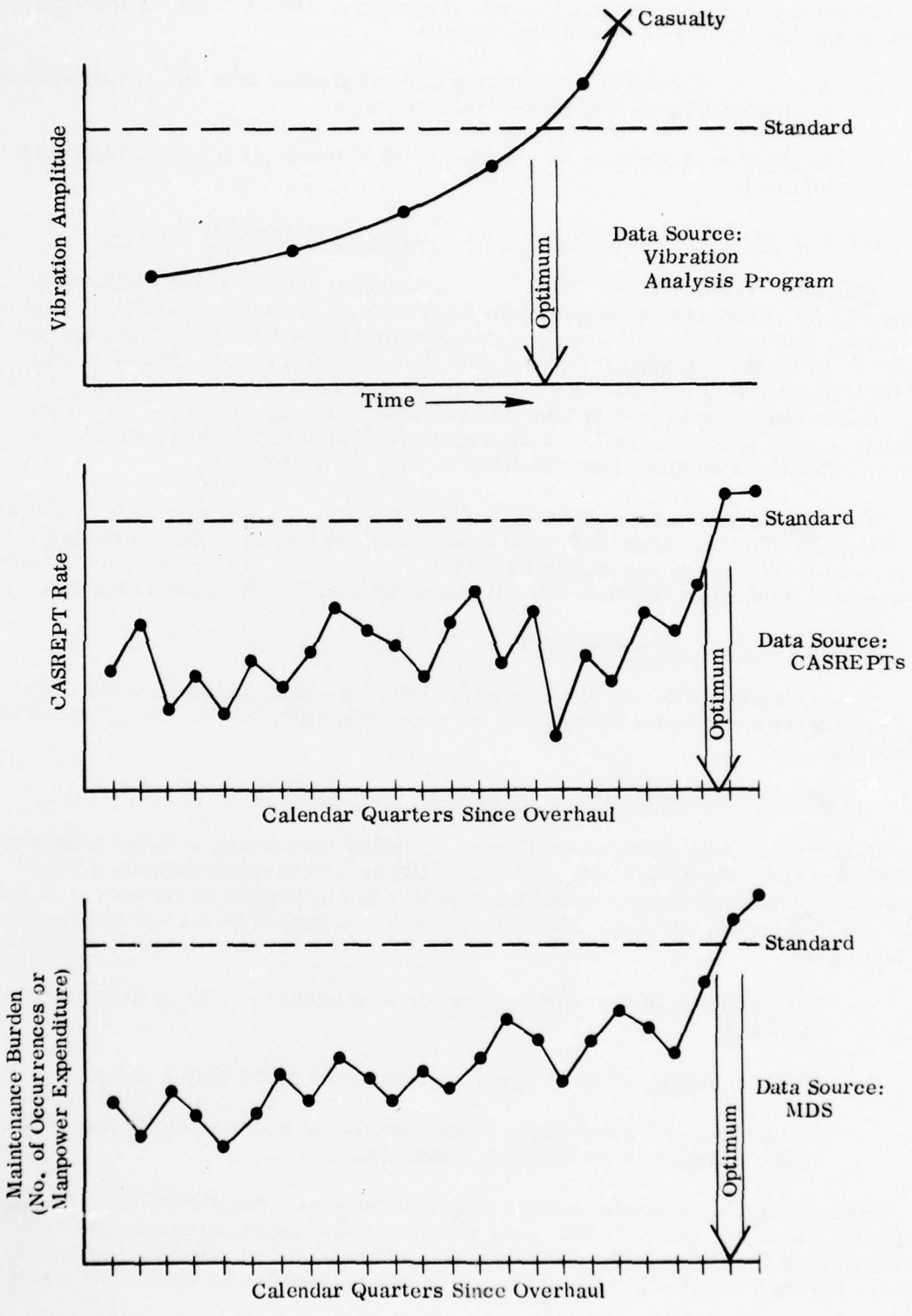


Figure 1-6. Methods for Determining Optimum Frequency of Overhaul/Repair

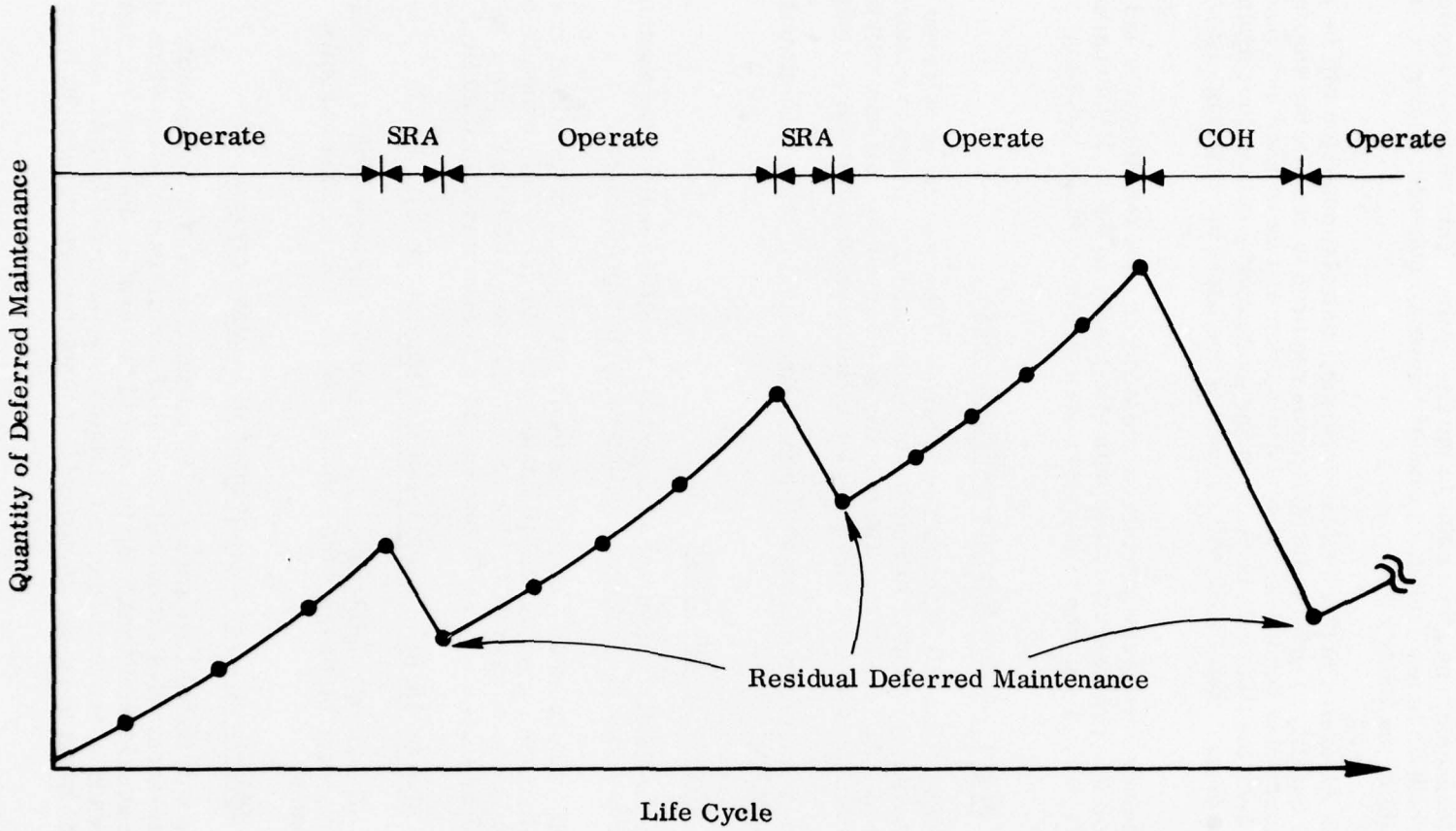


Figure 1-7. Tracking of Material Condition Over Life Cycle by Measuring Quantity of Deferred Maintenance

life cycle. In the illustration, material condition is measured as the quantity of deferred maintenance at any given point in the life cycle. This measure applies to the ship as a whole or to any included group of systems/equipment/material, based on data available in the CSMP.

Under the Aircraft Carrier LCMM Program, material condition will be measured in terms of the quantity of deferred maintenance required to restore the ship/systems/equipment to acceptable condition. Material condition will be tracked as a function of calendar time over the life cycle of the ship and evaluated by comparis n against the average for the class. The CSMP will be used as the basis for tracking material condition.

The procedure for tracking deferred maintenance over the life cycle and the manner in which this process interfaces with other tasks in the LCMM Program is shown in Figure 1-8. Each step in the process is discussed in the following paragraphs.

1.6.3.1 Step 1: Define Measure of Effectiveness

Material condition will be measured in terms of the quantity of deferred maintenance, or the estimated number of maintenance man-days necessary to restore or return an item to a desired state. The quantity of deferred maintenance will be measured both for the ship as a whole and for mission-essential systems/equipment.

Deferred maintenance includes all maintenance items, other than alterations, included in the CSMP.

1.6.3.2 Step 2: Update CSMP

Updating the CSMP consists of adding newly identified maintenance actions or deleting completed ones in accordance with 3-M System procedures.

The CSMP is updated on a continuous basis with special emphasis at selected points in the life cycle (e.g., 17 and 10 months prior to each COH, 8 months prior to each SRA, completion of each COH/SRA, 3 months prior to INSURV, prior to each TYCOM Readiness Inspection, and 3 months prior to each minor availability.

1.6.3.3 Step 3: Determine Deferred Maintenance Trends

Quantity of deferred maintenance will be tracked throughout the life cycle. Tracking will be accomplished for the ship as a whole, for mission-essential systems/equipment.

1.6.3.4 Step 4: Analyze Effectiveness of LCMM Program

This step will include evaluation of the trends observed in the quantity of deferred maintenance. Evaluation will consist of comparison of given ships against class and fleet averages; determining the rate of increase in deferred maintenance; determining trends in residual deferred maintenance (after COH/SRA); and ranking problems on the basis of cause, equipment, or other factors discernible from the CSMP.

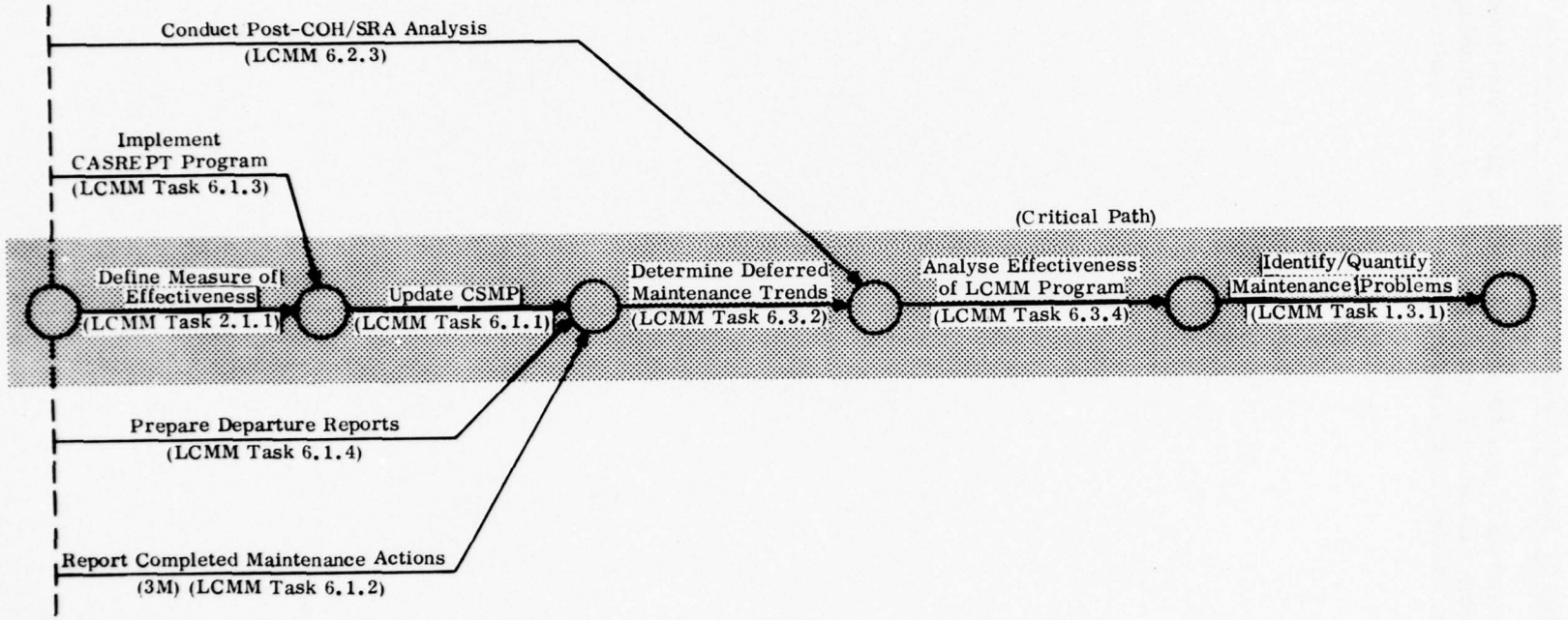


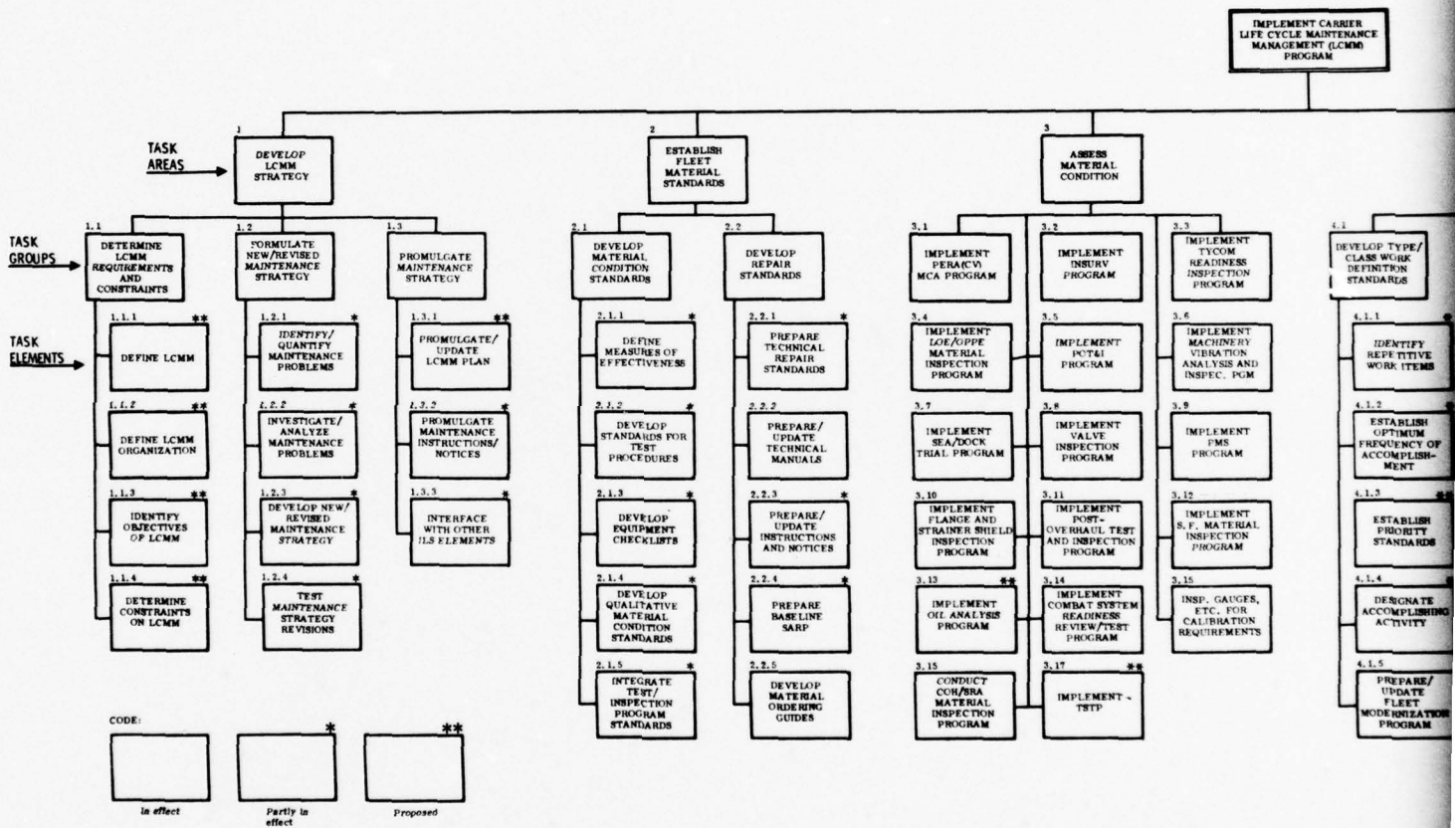
Figure 1-8. Procedure for Tracking Deferred Maintenance

1.6.3.5 Step 5: Identify/Quantify Maintenance Problems

This step consists of quantifying the specific problems identified in the preceding step. The problems will be analyzed to the extent of determining whether corrective actions necessitate revisions to existing policy or better application of the present policy.

PART 2

LCMM TASK DESCRIPTION SHEETS


IMPLEMENT CARRIER LIFE CYCLE MAINTENANCE MANAGEMENT (LCMM) PROGRAM
TASK AREAS
TASK GROUPS
TASK ELEMENTS
1 DEVELOP LCMM STRATEGY
2 ESTABLISH FLEET MATERIAL STANDARDS
3 ASSESS MATERIAL CONDITION
1.1 DETERMINE LCMM REQUIREMENTS AND CONSTRAINTS
1.2 FORMULATE NEW/REVISED MAINTENANCE STRATEGY
1.3 PROMULGATE MAINTENANCE STRATEGY
1.1.1 DEFINE LCMM
1.1.2 DEFINE LCMM ORGANIZATION
1.1.3 IDENTIFY OBJECTIVES OF LCMM
1.1.4 DETERMINE CONSTRAINTS ON LCMM
1.2.1 IDENTIFY/ QUANTIFY MAINTENANCE PROBLEMS
1.2.2 INVESTIGATE/ ANALYZE MAINTENANCE PROBLEMS
1.2.3 DEVELOP NEW/ REVISED MAINTENANCE STRATEGY
1.2.4 TEST MAINTENANCE STRATEGY REVISIONS
1.3.1 PROMULGATE/ UPDATE LCMM PLAN
1.3.2 PROMULGATE MAINTENANCE INSTRUCTIONS/ NOTICES
1.3.3 INTERFACE WITH OTHER ILS ELEMENTS
2.1 DEVELOP MATERIAL CONDITION STANDARDS
2.2 DEVELOP REPAIR STANDARDS
2.1.1 DEFINE MEASURES OF EFFECTIVENESS
2.1.2 DEVELOP STANDARDS FOR TEST PROCEDURES
2.1.3 DEVELOP EQUIPMENT CHECKLISTS
2.1.4 DEVELOP QUALITATIVE MATERIAL CONDITION STANDARDS
2.1.5 INTEGRATE TEST/ INSPECTION PROGRAM STANDARDS
2.2.1 PREPARE TECHNICAL REPAIR STANDARDS
2.2.2 PREPARE/ UPDATE TECHNICAL MANUALS
2.2.3 PREPARE/ UPDATE INSTRUCTIONS AND NOTICES
2.2.4 PREPARE BASELINE SARP
2.2.5 DEVELOP MATERIAL ORDERING GUIDES
3.1 IMPLEMENT PERA(CV) MCA PROGRAM
3.2 IMPLEMENT INSURV PROGRAM
3.3 IMPLEMENT TYCOM READINESS INSPECTION PROGRAM
3.4 IMPLEMENT LOE/OPPE MATERIAL INSPECTION PROGRAM
3.5 IMPLEMENT PCT&I PROGRAM
3.6 IMPLEMENT MACHINERY VIBRATION ANALYSIS AND INSPEC. PGM
3.7 IMPLEMENT SEA/DOCK TRIAL PROGRAM
3.8 IMPLEMENT VALVE INSPECTION PROGRAM
3.9 IMPLEMENT PMS PROGRAM
3.10 IMPLEMENT FLANGE AND STRAINER SHIELD INSPECTION PROGRAM
3.11 IMPLEMENT POST-OVERHAUL TEST AND INSPECTION PROGRAM
3.12 IMPLEMENT S.F. MATERIAL INSPECTION PROGRAM
3.13 IMPLEMENT OIL ANALYSIS PROGRAM
3.14 IMPLEMENT COMBAT SYSTEM READINESS REVIEW/TEST PROGRAM
3.15 INSP. GAUGES, ETC. FOR CALIBRATION REQUIREMENTS
3.15 CONDUCT COH/SRA MATERIAL INSPECTION PROGRAM
3.17 IMPLEMENT - TSTP
4.1 DEVELOP TYPE/ CLASS WORK DEFINITION STANDARDS
4.1.1 IDENTIFY REPETITIVE WORK ITEMS
4.1.2 ESTABLISH OPTIMUM FREQUENCY OF ACCOMPLISHMENT
4.1.3 ESTABLISH PRIORITY STANDARDS
4.1.4 DESIGNATE ACCOMPLISHING ACTIVITY
4.1.5 PREPARE/ UPDATE FLEET MODERNIZATION PROGRAM
CODE:
In effect
Partly in effect
Proposed

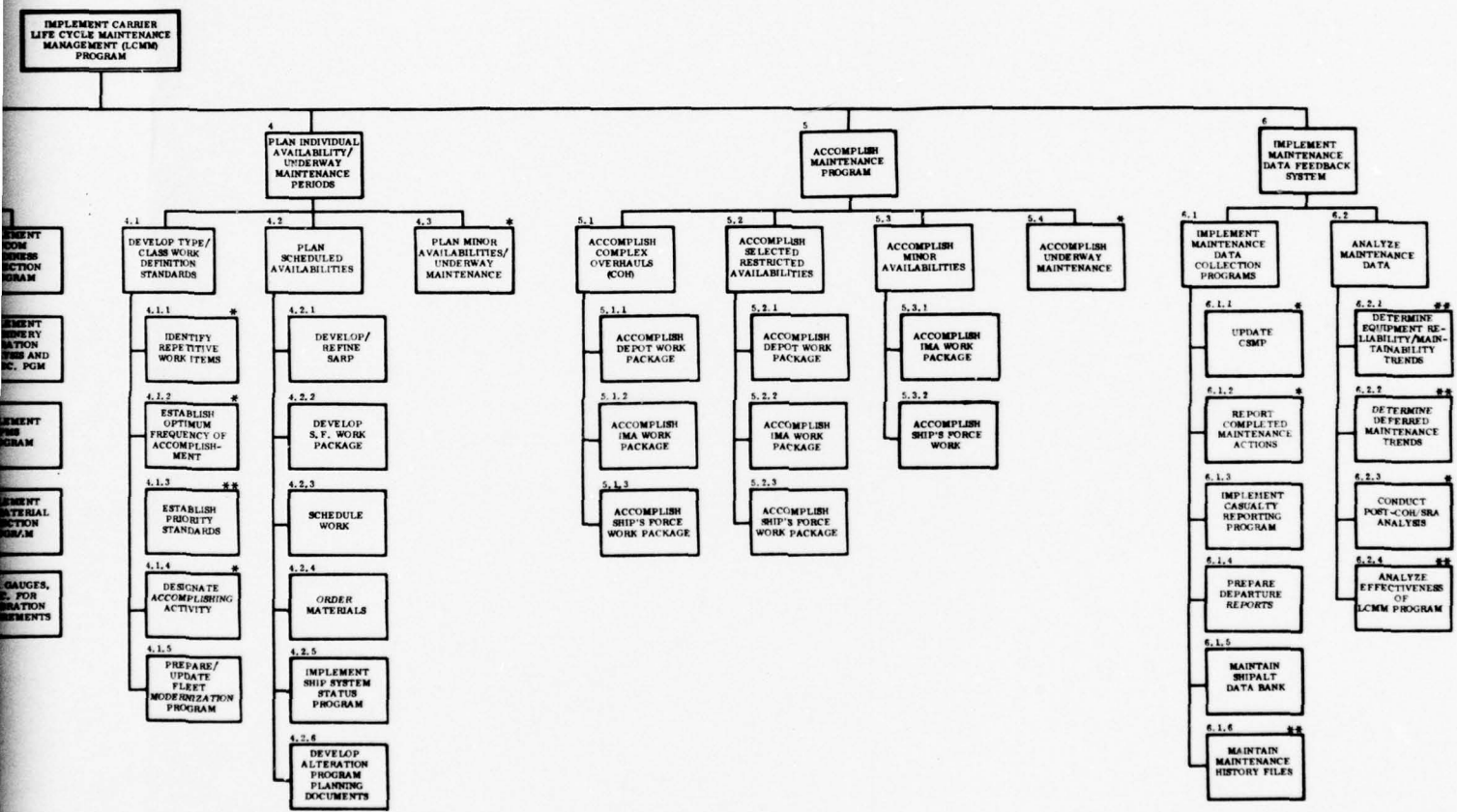


Figure 2-1. Carrier Life Cycle Maintenance Management Task Breakdown Structure

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1	DEVELOP LCMM STRATEGY

Objective

Provide an objective maintenance strategy for planning and conducting Aircraft Carrier maintenance on a life-cycle basis.

Approach

(1) Determine the objectives and constraints of the LCMM Program (see Task Group 1.1).

(2) Identify and analyze maintenance problems and formulate alternative solutions (see Task Group 1.2).

(3) Promulgate new/revised maintenance strategy (see Task Group 1.3).

Milestones	When Completed	Accomplishing Activity
(See included task element description sheets.)		PERA(CV) TYCOM Fleet Commander NAVSEA SUPSHIP Shipyard Ship's IMA Force

Interface with Other LCMM Tasks

The LCMM strategy developed under Task Area 1 provides the basis for accomplishing Task Areas 2 through 5. The LCMM strategy is developed based on the feedback of prior experience (Task Area 6).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.1	DETERMINE LCMM REQUIREMENTS AND CONSTRAINTS

Objective

Provide the basic ground rules for development and promulgation of LCMM strategy.

Approach

Determination of LCMM requirements and constraints is approached by:

(1) Defining Life Cycle Maintenance Management (Task Element 1.1.1)

(2) Determining the LCMM organization (Task Element 1.1.2)

(3) Identifying the objectives of LCMM (Task Element 1.1.3)

(4) Identifying the factors which constrain the accomplishment of LCMM (Task Element 1.1.4)

These actions are accomplished by PERA(CV) under the direction and guidance of the Fleet and Type Commanders.

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM Fleet Commander

Interface with Other LCMM Tasks

The requirements and constraints determined under this task constitute a basis for formulating and promulgating new/revised maintenance strategy (Task Groups 1.2 and 1.3).

Sheet 1 of 1

4

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.1.1	DEFINE LIFE CYCLE MAINTENANCE MANAGEMENT

Objective

Provide a common definition of Life Cycle Maintenance Management (LCMM) that will provide direction and guidance to all organizations involved with its implementation.

Approach

A definition of Life Cycle Maintenance Management has been developed by PERA(CV) and will be coordinated with COMNAVAIRPAC. The approved definition will be included, as appropriate, in all future instructions, notices, plans or other documents relating to LCMM, including the Life Cycle Maintenance Management (LCMM) Plan of Action for Aircraft Carriers (see Part I, para. 1.2 of this plan).

Milestones	When Completed	Accomplishing Activity
PERA(CV) definition of LCMM completed.	Already completed.	PERA(CV), in coordination with Type Commanders

Interface with Other LCMM Tasks

Serves as a general basis for implementing all LCMM tasks, but in particular the establishment of LCMM objectives (Task Element 1.1.3) and the identification of program constraints (Task Element 1.1.4).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.1.2	DEFINE LCMM ORGANIZATION

Objective

Develop an efficient organizational structure for implementing Aircraft Carrier LCMM.

Approach

To accomplish this activity, PERA(CV) will examine the existing maintenance organization in view of the objectives of LCMM and, where appropriate, recommend any changes thereto to the appropriate authority. As part of this activity, PERA(CV) has studied the feasibility of implementing LCMM by designation of (1) a PERA(CV) Maintenance Manager for each hull, and (2) a Ship's Maintenance Officer with department head authority.

Based upon the results of recommended organizational changes/refinements, PERA(CV) will develop an organization chart for implementing Aircraft Carrier LCMM, and describe the responsibilities of each organization, including the following:

- PERA(CV)
- Ship's Force
- Type Commander
- Fleet Commander
- Shipyard
- NAVSEA
- Intermediate Maintenance Activity
- Supervisor of Shipbuilding

Milestones	When Completed	Accomplishing Activity
LCMM baseline organization established.	One time	PERA(CV)
LCMM organization reviewed/revised.	As required	TYCOM

Interface with Other LCMM Tasks

Outputs from this task provide an input to:

(1) Promulgate/Update LCMM Plan (Task Element 1.3.1).
(2) Promulgate Maintenance Policy, Instructions, Notices (Task Element 1.3.2).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.1.3	IDENTIFY OBJECTIVES OF LCMM

Objective

Delineate the specific goals of LCMM.

Approach

PERA(CV) will prepare a descriptive statement of the objectives of the Aircraft Carrier LCMM Program. The goals will be incorporated into the Aircraft Carrier LCMM Plan and related documents as appropriate.

An initial statement of the objectives of LCMM is given in Part 1, para. 1.4.1 of this plan.

The stated objectives will be reviewed at least annually to ensure their continuing adequacy.

Milestones	When Completed	Accomplishing Activity
Preparation of LCMM objectives completed.	Already completed	PERA(CV), in coordination with Type Commanders and Fleet Commanders
Review of LCMM objectives completed.	Annually	

Interface with Other LCMM Tasks

The objectives of the LCMM program provide specific guidance in the promulgation of the LCMM Plan (Task Element 1.3.1) and general guidance in the accomplishment of all tasks.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.1.4	DETERMINE CONSTRAINTS ON LCMM

Objective

Delineate those restrictions, requirements or factors which constrain the implementation of life cycle maintenance.

Approach

PERA(CV) will review Fleet and TYCOM regulations, instructions, and notices as necessary to identify operational requirements or restrictions which impact on the manner of implementing life cycle maintenance. A listing of the significant requirements/restrictions will be prepared and coordinated with COMNAVAIRPAC/LANT. The coordinated listing will be incorporated into the Aircraft Carrier LCMM Plan and related documents as appropriate.

An initial listing of the constraints on the Carrier LCMM Program is included as para. 1.4.2 of Part 1 of this plan. The listing of constraints will be reviewed at least annually to ensure their continuing adequacy.

Milestones	When Completed	Accomplishing Activity
Preliminary listing of significant constraints completed.	Already completed	PERA(CV), in coordination with Type Commanders
Review of constraints listing completed.	Annually	

Interface with Other LCMM Tasks

Provides general guidance in the conduct of all tasks, but in particular the promulgation of the LCMM plan (Task Element 1.3.1) and policy instructions or notices (Task Element 1.3.2).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.2	FORMULATE NEW/REVISED MAINTENANCE STRATEGY

Objective

Provide recommended improvements in maintenance policy/strategy.

Approach

Recommended changes in maintenance strategy are formulated using the following four-step process:

(1) Identify maintenance problems by comparison of actual conditions against a pre-established standard (see Task Element 1.2.1).

(2) Investigate and analyze the problem (see Task Element 1.2.2).

(3) Perform cost-effectiveness tradeoffs and select the best solution to the problem (see Task Element 1.2.3).

(4) Test the improved strategy (see Task Element 1.2.4).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM Fleet Commander NAVSEA Ship's Force

Interface with Other LCMM Tasks

The recommended new/revised strategies that result from Task Group 1.2 are candidates for promulgation by instruction, notice or change in the LCMM Plan (Task Group 1.3).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.2.1	IDENTIFY/QUANTIFY MAINTENANCE PROBLEMS

Objective

Identify known/suspected maintenance program deficiencies or areas warranting improvement in maintenance strategy.

Approach

1. This task is accomplished by monitoring the results of material condition assessment (Task Area 3) and the Maintenance Data Feedback System (Task Area 6) in comparison with the objectives of the LCMM Program (Task Element 1.1.3) and Fleet Material Standards (Task Area 2). Material condition or maintenance program deficiencies so identified are analyzed to ascertain whether correction requires:

   (a) Revision of existing strategy, as defined by current TYCOM/FLEETCOM/NAVSEA instructions or letters impacting on maintenance (see Appendix A); or

   (b) Promulgation of new strategy not currently covered by instruction or letter; or

   (c) Better enforcement of existing strategy.

2. As intended under this task, "strategy" is considered to include any aspect of maintenance considered sufficiently important to warrant TYCOM/FLEETCOM/NAVSEA promulgation by instruction or letter. This would normally include matters impacting on any of the following:

   (a) Maintenance organization

   (b) LCMM objectives

- Continued -

Milestones	When Completed	Accomplishing Activity
Individual maintenance problems identified	As occurring	Fleet Commander TYCOM NAVSEA Ship's Force PERA(CV)
Type of required correction action identified	Each problem	

Interface with Other LCMM Tasks

This task is based on outputs from Task Element 1.1.3 and Task Areas 2, 3, and 6.

Problems identified under this task are analyzed in Task Element 1.2.2 or treated as part of Task Element 1.3.3 as appropriate.

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
1.2.1	IDENTIFY/QUANTIFY MAINTENANCE PROBLEMS (Continued)

(c) COH/SRA frequency and duration

(d) Maintenance data reporting

(e) Material condition assessment, including tests, inspections and examinations

(f) Material condition standards

(g) Maintenance planning

(h) Maintenance accomplishment

(i) Maintenance program analysis/evaluation

(j) Repair standards.

3. PERA(CV) is primarily responsible for identification of maintenance problems; however, all activities associated with Carrier LCMM (including Ship's Force, TYCOM, Fleet Commander, and NAVSEA) are responsible for problem identification.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.2.2	INVESTIGATE/ANALYZE MAINTENANCE PROBLEMS

Objective

Acquire insight into the nature and significance of maintenance problems as an aid to their solution.

Approach

Each maintenance problem identified under Task Element 1.2.1 for which revision to existing strategy or formulation of new strategy is required is investigated to determine its nature, extent and significance. The investigation provides background, diagnosis and visibility concerning each problem to a degree sufficient for developing a proposed solution. Investigation might include (1) trend analysis to determine whether the magnitude of the problem is increasing, decreasing or remaining constant; (2) comparative analysis to determine whether the problem is a type, class or individual ship problem; (3) sensitivity studies (for example, determining the rate at which CASREPTs vary with interval between overhaul) to determine the variation of the problem in relation to a particular parameter; (4) ranking studies, to identify the relative importance of a problem in relation to other problems; and (5) comparison of practices and effectiveness of commercial/foreign Navy maintenance programs.

The studies, investigations or analyses conducted under this task will, to the extent possible, be based on data routinely gathered under other tasks described in this plan – specifically under Task Areas 3 (Assessment of Material Condition) and 6 (Maintenance Data Feedback System). Where warranted, special data collection efforts will be used to augment the routine programs. Care will be exercised to ensure that special data collection efforts will not increase Ship's Force reporting workload.

Illustrations of typical approaches to maintenance problem analysis are provided by the case studies described in Section 1.6 of Part 1.

- Continued -

Milestones	When Completed	Accomplishing Activity
Investigation/analysis of maintenance problems completed	Once for each problem	PERA(CV)
Problem summary completed	Quarterly	

Interface with Other LCMM Tasks

This task is accomplished for each problem identified under Task Element 1.2.1.

The results of this task provide a basis for accomplishing Task Element 1.2.3 (Develop New/Revised Maintenance Strategy).

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
1.2.2	INVESTIGATE/ANALYZE MAINTENANCE PROBLEMS (Continued)

PERA(CV) will summarize the status of active maintenance problems and report to the Type Commanders.

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.2.3	DEVELOP NEW/REVISED MAINTENANCE STRATEGY

Objective

Provide recommended changes to existing maintenance policy.

Approach

Under this activity, maintenance-related problems as identified under Task Element 1.2.1 and analyzed under Task Element 1.2.2 are solved using the following approach:

(1) Identify and formulate a set of the promising solutions.

(2) Choose the optimum solution using tradeoff techniques or other analytical processes which contribute to optimization.

The first step is to provide possible alternatives to improve some aspect of Carrier material condition. While the objective is to identify as many potential solutions as possible, practical considerations dictate that only a handful be addressed.

The second step mentioned above is to compare the alternatives in an objective manner. This usually involves performing some type of tradeoff (i.e., sacrificing one desirable factor for the purpose of gaining another).

Where possible, a comparative analysis is performed for each alternative, based on the combined set of military, technical and economic factors involved. In some cases, where appropriate, the comparison consists simply of itemization of the advantages and disadvantages associated with each alternative.

Milestones	When Completed	Accomplishing Activity
New/revised maintenance strategy developed	As occurring for each problem identified	PERA(CV)

Interface with Other LCMM Tasks

Based on output from Task Element 1.2.2 (Investigage/Analyze Maintenance Problems).

Each recommended strategy change is a candidate for promulgation of new/revised policy (Task Element 1.3.2).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.2.4	TEST MAINTENANCE STRATEGY REVISIONS

Objective

Validate recommended new/revised maintenance strategy through testing prior to full-scale implementation.

Approach

The recommended new/revised maintenance strategy, as developed under Task Element 1.2.3, is tested where practical by limited application. This will verify the effectiveness of proposed changes and provide an opportunity for refining the recommended change based on actual experience.

In testing revisions, PERA(CV) coordinates with the applicable TYCOM to designate the ship(s) on which to test the recommendation, prepares a test plan, and together with Ship's Force implements the test plan, collects data, and evaluates the recommendation.

PERA(CV) is responsible for reviewing all recommended changes to strategy and determining which of these should be tested prior to full-scale implementation.

Milestones	When Completed	Accomplishing Activity
Proposed change in maintenance strategy tested	Each recommended change, where applicable.	PERA(CV) Ship's Force TYCOM

Interface with Other LCMM Tasks

The recommended new/revised strategies developed under Task Element 1.2.3 are candidates for testing under Task Element 1.2.4.

The results of testing provide an input to Task Group 1.3 (Promulgate Maintenance Strategy).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.3	PROMULGATE MAINTENANCE STRATEGY

Objective

Provide direction and guidance to all activities that participate in the implementation of Aircraft Carrier LCMM.

Approach

Aircraft Carrier life cycle maintenance strategy is promulgated through the following:

(1) The Aircraft Carrier LCMM Plan (see Task Element 1.3.1).

(2) Instructions and notices which establish maintenance policy and provide direction and guidance for its implementation (see Task Element 1.3.2).

(3) Interface with other ILS elements (see Task Element 1.3.3).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM Fleet Commander

Interface with Other LCMM Tasks

All recommendations resulting from Task Group 1.2 are candidates for promulgation.

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.3.1	PROMULGATE/UPDATE LCMM PLAN

Objective

Provide a plan of action for all major participants in the Aircraft Carrier LCMM Program.

Approach

PERA(CV) will initially develop an Aircraft Carrier Life Cycle Maintenance Management (LCMM) Program Plan. The purpose will be to disseminate the objectives of the Aircraft Carrier LCMM Program, identify associated tasks and procedures for their accomplishment, provide a schedule for work accomplishment, and designate responsibilities for work accomplishment.

The plan will consist of the following five parts, augmented as necessary by supplemental appendix material:

Part 1. General Information (including a statement of LCMM objectives and background information essential to an understanding of LCMM)

Part 2. Description of LCMM Activity (including a statement of the approach and procedures for accomplishing each task)

Part 3. Schedule

Part 4. Responsibility Assignments

Part 5. Interfaces

The initial LCMM plan as developed by PERA(CV) will be coordinated with each appropriate Type Commander.

The LCMM plan will be reviewed periodically by PERA(CV) to ensure continuing applicability.

Milestones	When Completed	Accomplishing Activity
Preparation of LCMM plan completed	One time	PERA(CV)
Promulgation of LCMM plan by COMNAVAIRPAC completed	One time	Type Commanders
Promulgation of LCMM plan by COMNAVAIRLANT completed	One time	

Interface with Other LCMM Tasks

Plan is based on outputs from Task Group 1.1 (Determine LCMM Requirements and Constraints).

Plan provides guidance and direction for conduct of all tasks in Task Areas 2 through 6.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.3.2	PROMULGATE MAINTENANCE INSTRUCTIONS/NOTICES

Objective

Document maintenance strategy for implementation by all organizations participating in Carrier life cycle maintenance.

Approach

This activity is accomplished by revising existing instructions/notices (see Appendix A) or issuing new ones to implement recommended improvements in maintenance strategy/policy.

In accomplishing this task, each approved recommendation resulting from Task Element 1.2.3 is reviewed to determine required changes or new issuances. This is accomplished by PERA(CV), Fleet Commanders, and Type Commanders as appropriate.

The set of instructions/notices promulgated or updated under this task is designed to cover all aspects of the Aircraft Carrier LCMM Program.

Milestones	When Completed	Accomplishing Activity
New/revised instructions issued	As required	Type Commander Fleet Commander PERA(CV)

Interface with Other LCMM Tasks

All recommendations resulting from Task Group 1.2 (Formulate New/Revised Maintenance Strategy) are covered by this task.

The instructions/notices issued under this task provide direction and guidance for all tasks under Task Areas 2 through 6.

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
1.3.3	INTERFACE WITH OTHER ILS ELEMENTS

Objective

Ensure that life cycle maintenance strategy is treated in proper context with the other elements within the framework of ILS.

Approach

This task is accomplished by ensuring that the elements of Integrated Logistic Support (ILS) other than maintenance are adequately considered in the implementation of maintenance data feedback (Task Area 6), identification of problems (Task Element 1.2.1) and analysis of problems (Task Element 1.2.2). The elements of ILS to be considered include spare parts provisioning, documentation, and training.

Identified problems other than those which are the responsibility of the Carrier LCMM organization will be forwarded to appropriate authority, together with any proposed solution.

Milestones	When Completed	Accomplishing Activity
ILS problems other than maintenance identified	As required	PERA(CV)

Interface with Other LCMM Tasks

ILS interfaces are based on outputs from Task Elements 1.2.1 (Identify/Quantify Maintenance Problems) and 1.2.2 (Investigate/Analyze Maintenance Problems).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2	ESTABLISH FLEET MATERIAL STANDARDS

Objective

Provide an orderly set of material condition and repair standards that will serve to assess the adequacy of ship condition and the effectiveness of the Aircraft Carrier maintenance program.

Approach

Establishment of Fleet material standards includes the following:

(1) Development of material condition standards that specify the level of performance or state of condition considered acceptable (see Task Group 2.1).

(2) Development of repair standards that describe the procedures or guidelines to be used in restoring equipment/material to satisfactory material condition (see Task Group 2.2).

Milestones	When Completed	Accomplishing Activity
(See included task elements description sheets.)		PERA(CV) TYCOM Fleet Commander NAVSEA Shipyard SUPSHIP

Interface with Other LCMM Tasks

Fleet material standards are established in consideration of the specific strategy resulting from Task Area 1.

The standards developed in Task Area 2 are used as the basis for material condition assessment (Task Area 3).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1	DEVELOP MATERIAL CONDITION STANDARDS

Objective

Provide a set of standards that will serve as a basis for determining material condition.

Approach

Development of material condition standards consists of three distinct areas:

(1) Defining quantitative indices (measures of effectiveness) as a basis for measuring material condition (see Task Element 2.1.1).

(2) Developing test standards, equipment checklists and other qualitative standards which supplement those indices described in (1) (see Task Elements 2.1.2, 2.1.3 and 2.1.4).

(3) Integrating (1) and (2) above into specific test/inspection/assessment programs (see Task Element 2.1.5).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM Fleet Commander NAVSEA Shipyard SUPSHIP

Interface with Other LCMM Tasks

The material condition standards developed under Task Group 2.1 provide the basis for assessing material condition (Task Area 3).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1.1	DEFINE MEASURES OF EFFECTIVENESS

Objective

Provide a set of indices that can serve as the basis for establishing material condition standards and for assessing degree of compliance with these standards.

Approach

This task involves the definition of parameters, attributes, or other quantitative indices that will be useful as tools for:

(1) Establishing material condition and maintenance program effectiveness standards.

(2) Assessing material condition and maintenance program effectiveness.

The task is accomplished by investigating existing requirements and practices and, from these, devising meaningful measures of effectiveness (i.e., parameters, attributes, or other indices that connote capability, effectiveness, cost, value, military worth, or other factors of significance in LCMM).

Under the Aircraft Carrier LCMM Program it is not intended that only a single measure of effectiveness be used in assessing material condition. Nor is it intended that all possible measures be addressed. The objective is to hold the number to a significant manageable few.

Certain measures of effectiveness are already defined (see Part 1, paragraphs 1.6.1.2, 1.6.2.2 and 1.6.3.1 of this plan). The purpose of the task described herein is to define additional measures.

Under normal circumstances, measures of effectiveness will be defined by PERA(CV) based on operational requirements established by CNO. Defined measures will be coordinated by PERA(CV) with the Type Commanders.

Milestones	When Completed	Accomplishing Activity
PERA initial coordination with COMNAVAIR-PAC completed	One time	PERA(CV), in coordination with Type Commanders
PERA initial coordination with COMNAVAIR-LANT completed	One time	

Interface with Other LCMM Tasks

The measures of effectiveness defined under this task provide the basis for conduct of the task elements included in Task Area 3 (Assess Material Condition).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1.2	DEVELOP STANDARDS FOR TEST PROCEDURES

Objective

Develop performance standards suitable for incorporation into equipment-level test procedures.

Approach

Existing equipment-level test procedures will be reviewed as necessary to ensure that material condition standards contained therein continue to be adequate in consideration of system-level measures of effectiveness as established under Task Element 2.1.1.

Where appropriate, performance standards for new or additional equipment not currently covered by PERA(CV) test procedures will be developed.

Milestones	When Completed	Accomplishing Activity
Sea/Dock trial test procedures developed	Complete*	PERA(CV)
POT&I test procedures developed	Complete*	NAVSEA
Post-overhaul test procedures developed	Complete*	Shipyards
Combat System Readiness Test procedures developed	Complete*	SUPSHIPS
Total Ship Test Program procedures dev.	*Update as req'd	TYCOM

Interface with Other LCMM Tasks

The outputs of this task provide a basis for conduct of those parts of Task Area 3 (Assess Material Condition) that utilize test procedures, including:

- 3.7 Sea/Dock Trials
- 3.5 POT&I
- 3.11 Post-Overhaul T&I
- 3.14 Combat System Readiness Review/Test
- 3.17 Total Ship Test Program

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1.3	DEVELOP EQUIPMENT CHECKLISTS

Objective

Provide equipment-level checklists to conduct inspections of selected equipment and material.

Approach

Existing equipment checklists will be reviewed to ensure their continuing adequacy in consideration of the measures of effectiveness developed under Task Element 2.1.1.

The catalogue of existing checklists will also be reviewed to determine if additional ones are required. Where required, such checklists will be developed.

Milestones	When Completed	Accomplishing Activity
Carrier equipment checklists developed	As required	PERA(CV)

Interface with Other LCMM Tasks

The checklists developed under this task are used in the following material condition assessment tasks:

(1) PERA(CV) MCA Program (3.1)
(2) LOE/OPPE Material Inspection Program (3.4)

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
2.1.3	DEVELOP EQUIPMENT CHECKLISTS (Continued)

Interface with Other LCMM Tasks

(3) TYCOM Readiness Inspection Program (3.3)

(4) S. F. Material Inspection Program (3.12)

(5) COH/SRA Material Inspection Program (3.16)

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1.4	DEVELOP QUALITATIVE MATERIAL CONDITION STANDARDS

Objective

Provide a set of system-level qualitative material condition standards as may be necessary to augment or supplement the measures of effectiveness (developed under Task Element 2.1.1) as a basis for assessing material condition.

Approach

This task is accomplished by reviewing the objectives of LCMM and LCMM strategy and using the results of the review to develop qualitative statements which supplement the measures of effectiveness as criteria for assessing material condition. These qualitative criteria could include any system level attribute which indicates degree of material condition. (For example, "ability to pass PEB" or "Satisfactory/Unsatisfactory, as adjudged by INSURV" are typical qualitative standards pertaining to Carrier LCMM.)

Milestones	When Completed	Accomplishing Activity
Qualitative material condition standards developed.	As required	PERA(CV) Type Commanders Fleet Commanders

Interface with Other LCMM Tasks

The output of this task is used in accomplishing designated elements of Task Area 3 (Assessment of Material Condition).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.1.5	INTEGRATE TEST/INSPECTION PROGRAM STANDARDS

Objective

Compile/develop material condition standards unique to each material condition assessment program element.

Approach

This task is accomplished by integrating system-level measures of effectiveness, equipment-level test standards, checklists, or qualitative material condition standards into specific test/inspection programs such as those described in Task Area 3.

The programs are reviewed periodically and revised as required to ensure their continuing validity or increase their effectiveness.

Milestones	When Completed	Accomplishing Activity
Standards initially developed	Once, for each program	PERA(CV) NAVSEA Shipyard TYCOM SUPSHIP
Program standards revised	As required	

Interface with Other LCMM Tasks

The outputs from this task provide the basis for conducting the task elements defined in Task Area 3 (Assessment of Material Condition).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2	DEVELOP REPAIR STANDARDS

Objective

Develop a set of criteria which provide guidance for restoring equipment/material to satisfactory material condition.

Approach

Repair standards are developed through the following tasks:

(1) Preparation of Technical Repair Standards (TRS) (see Task Element 2.2.1).

(2) Preparation/update of technical manuals (see Task Element 2.2.2).

(3) Preparation of instructions/notices or other guidance that cover maintenance procedures (see Task Element 2.2.3).

(4) Preparation of Baseline SHIPALT and Repair Packages (SARP) for individual hulls (see Task Element 2.2.4).

(5) Development of Material Ordering Guides (MOG) (see Task Element 2.2.5).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM NAVSEA Shipyard SUPSHIP

Interface with Other LCMM Tasks

Repair standards are designed to restore equipment/material to adequate condition as defined under Task Group 2.1 (Develop Material Condition Standards).

Repair standards are used in the conduct of maintenance as defined under Task Area 5 (Accomplish Maintenance Program).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2.1	PREPARE TECHNICAL REPAIR STANDARDS

Objective

Provide a set of examination, maintenance and test criteria which can be applied to systems, equipment, or components during overhaul or refurbishment.

Approach

In accomplishing this task, PERA(CV), in coordination with NAVSEA identifies the systems, equipment and components for which Technical Repair Standard (TRS) preparation is required.

An index of TRSs prepared to date is contained in Section 8000B of the CV-Type Maintenance Management Plan, Vol. I.

It is the intent that TRSs prepared under this task supplement the appropriate technical manual.

Milestones	When Completed	Accomplishing Activity
Initial set of TRSs prepared	Completed	PERA(CV) Shipyard
TRS requirements reviewed	Continuous	
New TRSs prepared	As required	

Interface with Other LCMM Tasks

Required application of TRSs incorporated in the Baseline SARP (Task Element 2.2.4).

TRSs are used in accomplishment of depot-level work during COH (Task Element 5.1.1) and SRA (Task Element 5.2.1).

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
2.2.1	PREPARE TECHNICAL REPAIR STANDARDS (Continued)

Interface with Other LCMM Tasks

TRSs prepared under this task supplement technical manuals prepared/ updated under Task Element 2.2.2.

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2.2	PREPARE/UPDATE TECHNICAL MANUALS

Objective

Provide a set of technical manuals which, together with TRSs, support effective accomplishment of system, equipment, and component maintenance.

Approach

NAVSEA continually reviews existing technical manuals and revises them or provides additional ones, where required.

The manuals prepared under this task provide repair criteria to all maintenance echelons (Ship's Force, IMAs and Shipyards).

Where appropriate existing technical manuals (see Task Element 2.2.1) are augmented by preparation of a TRS.

Milestones	When Completed	Accomplishing Activity
Initial baseline technical manuals prepared	Complete	NAVSEA
Existing NAVSEA technical manuals revised/augmented	As required	

Interface with Other LCMM Tasks

NAVSEA technical manuals are used in the accomplishment of depot work (Task Elements 5.1.1 and 5.2.1) where appropriate to augment TRSs and in the accomplishment of IMA and Ship's Force work (Task Elements 5.1.2, 5.2.2, 5.1.3, 5.2.3, and Task Groups 5.3 and 5.4).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2.3	PREPARE/UPDATE INSTRUCTIONS AND NOTICES

Objective

Provide a set of instructions and notices which, together with TRS and technical manuals, prescribe how to accomplish maintenance on equipments/components.

Approach

Issuing authorities continually review existing instructions and notices for adequacy in describing repair standards and revise existing ones or issue new ones as appropriate.

Milestones	When Completed	Accomplishing Activity
Prepare/update instructions/ notices containing repair standards	Continuous	PERA(CV) NAVSEA TYCOM Fleet Commander

Interface with Other LCMM Tasks

Preparation of new/revised instructions/notices under Task Element 2.2.3 is based on *results of Task Areas 1 (Develop LCMM Strategy) and 6 (Implement* Maintenance Data Feedback System).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2.4	PREPARE BASELINE SARP

Objective

Provide key repair information for selected equipments and systems, for use in advanced planning for Complex Overhauls (COHs) and Selected Restricted Availabilities (SRAs).

Approach

The assigned PERA(CV) Maintenance Planner prepares a Baseline SARP for each COH and SRA. The Baseline SARP is prepared in accordance with PERA(CV) Standard Operating Procedure 1862-05, Appendix B, User's Guide to Develop, Update and Print Out Baseline SARP.

The Baseline SARP is the first of four SARP documents generated by PERA(CV) during maintenance planning. It is issued at the beginning of the program, and identifies all routine work, programmed work, and predicted Class "B" Overhaul to be considered for accomplishment during the availability. Also identified are SHIPALTs and Advance Repair Material information.

Milestones	When Completed	Accomplishing Activity
COH Baseline SARP prepared	20 months before COH start	PERA(CV) Maintenance Planner for each designated hull.
SRA Baseline SARP prepared	16 months before SRA	

Interface with Other LCMM Tasks

Baseline SARP based on outputs of Task Elements 4.1.1 (Identify Repetitive Items) and 4.1.5 (Prepare/Update Fleet Modernization Program).

Baseline SARP used as a basis for accomplishing Task Element 4.2.1 (Refine SARP), incident to planning for each COH and SRA.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
2.2.5	DEVELOP MATERIAL ORDERING GUIDES (MOGs)

Objective

Provide guidance and direction for ordering materials in support of maintenance.

Approach

Under this task, PERA(CV) provides advance repair material recommendations in support of selected equipments that are candidates for overhaul. The recommendations are provided in the form of an Advance Repair Material List (ARML) based on, and supplied with, the Baseline SARP.

The ARML, issued 16 months prior to the start of an availability, is a computer generated listing that integrates specific data from the Baseline SARP with parts requirements listed in advance material data files and with current pricing and stocking policy provided from the Navy Management Data List.

Milestones	When Completed	Accomplishing Activity
Advanced Repair Material List (ARML) issued	16 months prior to each COH; 12 months prior to each SRA	PERA(CV) Shipyard

Interface with Other LCMM Tasks

Material Ordering Guides are issued together with the Baseline SARP.

The ARML provides assistance in the accomplishment of Task Element 4.2.4 (Order Materials).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3	ASSESS MATERIAL CONDITION

Objective

Provide an integrated method for assessing the material condition of all ships and identifying required maintenance.

Approach

Assessment of material condition is accomplished by integrated implementation of the set of assessment programs defined within Task Area 3.

The basic approach to this task consists of comparing actual material condition as determined through visual inspection, operation, instrumented measurement or other means with pre-established material condition standards.

The standards used in implementing the specific programs are in some cases common to more than one program. Table 3-1 illustrates in a general sense the type of standards used in each assessment program.

PERA(CV) continually reviews all elements of the Aircraft Carrier Material Condition Assessment Program to ensure that:

(1) All elements of the program are mutually compatible

(2) Redundancy in source data collection and analysis is eliminated

(3) All aspects of the LCMM program are being supported

Milestones	When Completed	Accomplishing Activity
See individual tasks		PERA(CV), Ship's Force, Shipyards, SUPSHIPS, TYCOM, PEB, INSURV Board

Interface with Other LCMM Tasks

The assessment of material condition is based on the Fleet Material Condition Standards developed under Task Group 2.1 (Develop Material Condition Standards). Results of this task provide an input to Task Area 4 (Plan Individual Availabilities/Underway Maintenance).

Task No. 3	Title ASSESS MATERIAL CONDITION (Continued)

TABLE 3-1 (Sheet 1 of 2)

Material Condition Assessment Program	Applicable Type of Standard			
	Measures of Effectiveness (2.1.1)	Test Procedures (2.1.2)	Equipment Checklists (2.1.3)	Qualitative Standards (2.1.4)
3.1 Implement PERA(CV) Material Condition Assessment (MCA) program	X	X	X	
3.2 Implement INSURV program			X	X
3.3 Implement TYCOM Readiness Inspection program			X	X
3.4 Implement LOE/OPPE Material Inspection program			X	X
3.5 Implement POT&I program		X	X	X
3.6 Implement Vibration Measurement program	X	X		X
3.7 Implement Sea/Dock Trials program		X		X
3.8 Implement Valve Inspection program			X	X
3.9 Implement PMS		X	X	X
3.10 Implement Flange and Strainer Shield Inspection program			X	X
3.11 Implement Post-Overhaul Test and Inspection program		X		X

Task No.	Title
3	ASSESS MATERIAL CONDITION (Continued)

TABLE 3-1 (Sheet 2 of 2)

Material Condition Assessment Program	Applicable Type of Standard			
	Measures of Effectiveness (2.1.1)	Test Procedures (2.1.2)	Equipment Checklists (2.1.3)	Qualitative Standards (2.1.4)
3.12 Implement S.F. Material Inspection program			X	X
3.13 Implement Oil Analysis program	X	X		
3.14 Implement Combat Systems Readiness Test program		X	X	X
3.15 Inspect Gauges, etc. for calibration requirements			X	X
3.16 Conduct COH/SRA material inspection			X	X
3.17 Implement TSTP	X	X	X	X

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.1	IMPLEMENT PERA(CV) MATERIAL CONDITION ASSESSMENT (MCA) PROGRAM

Objective

Provide PERA(CV) and the TYCOM with a quantitative, mission-related method of assessing ship's material condition on a periodic basis. A second important objective of the program is to provide a basis for: (1) evaluating existing LCMM strategy and (2) planning individual availabilities.

Approach

PERA(CV) has developed a system network showing the 25 major ship systems required for launching, recovering and servicing of aircraft. At periodic intervals, PERA(CV), with assistance from Ship's Force, inspects selected ship's systems/equipment, evaluates their performance, and measures the likelihood of accomplishing the defined mission. Assessment consists of tracking material condition and comparing against a pre-established Fleet standard.

Data resulting from the assessment are used by PERA(CV) in planning individual maintenance programs (see Task Area 4). The data also provide an input to the synthesis of new/revised maintenance strategy (see Task Group 1.2).

A detailed description of the MCA program is given in the paper "Life Cycle Maintenance Management Will Improve Aircraft Carrier Material Condition," by Glen Jurges, PERA(CV), Code 1861, 27 August 1976.

Milestones	When Completed	Accomplishing Activity
Assessment of material condition using PERA(CV) MCA program completed	As scheduled by PERA(CV)	PERA(CV) Ship's Force

Interface with Other LCMM Tasks

The output of this task provides a basis for Task Area 4 (Plan Individual Availability/Upkeep Periods) and Task Group 1.2 (Formulate New/Revised Maintenance Strategy).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.2	IMPLEMENT INSURV PROGRAM

Objective

Provide an impartial, thorough and expert assessment of a ship's material condition in terms of its ability to perform assigned missions. A second important objective is to identify required maintenance actions not previously identified.

Approach

Ship's Force prepares for INSURV in accordance with Task 2018 (Prepare for Arrival of Inspection Teams) of the CV-Type Maintenance Management Plan, Vol. I.

INSURV is conducted in accordance with INSURV Instruction 9080.2, Trials and Associated Inspections of Surface Ships. The results of the inspection are reported in accordance with INSURV Instruction 4730.8, Reports of Trials, Material Inspections and Surveys Conducted by Board of Inspection and Survey.

Milestones	When Completed	Accomplishing Activity
Commence preparation for INSURV	12 months prior to INSURV.	Ship's Force
Conduct INSURV	As scheduled by CNO.	Board of Inspection and Survey
Report INSURV results	As required.	
Identify new maintenance actions	As required.	

Interface with Other LCMM Tasks

In preparing for INSURV, a Ship's Force updates the CSMP (Task Element 6.1.1) and conducts Material Inspections (Task Group 3.12).

Subsequent to INSURV, Ship's Force again updates the CSMP (Task Element 6.1.1) to incorporate INSURV discrepancies.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.3	IMPLEMENT TYCOM READINESS INSPECTION PROGRAM

Objective

Provide the TYCOM with an assessment of ship's material condition. A second important purpose is to identify required maintenance actions not previously identified.

Approach

When appropriate, Ship's Force prepares for TYCOM Readiness Inspection in accordance with Task 2018C (COMNAVAIRPAC Readiness Inspection Team) and target event 5004 of the CV-Type Maintenance Management Plan, Vol. I.

Milestones	When Completed	Accomplishing Activity
Conduct TYCOM readiness inspection	As scheduled by TYCOM	TYCOM Ship's Force
Identify new maintenance actions	As required	

Interface with Other LCMM Tasks

In conducting TYCOM Readiness Inspection, checklists prepared under Task Element 2.1.3 and other standards developed under Task Element 2.1.5 are used. Subsequent to inspection, Ship's Force updates the CSMP (Task Element 6.1.1) to incorporate maintenance requirements not previously

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
3.3	IMPLEMENT TYCOM READINESS INSPECTION PROGRAM (Continued)

Interface with Other LCMM Tasks

identified. Where appropriate, the results of the inspection provide inputs into Task Element 4.2.1 (Develop/Refine SARP), Task Element 4.2.2 (Develop S. F. Work Requirements Package for Scheduled Availabilities) or Task Group 4.3 (Plan Upkeep/Underway Maintenance).

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.4	IMPLEMENT LOE/OPPE MATERIAL INSPECTION PROGRAM

Objective

Provide an impartial, thorough and expert assessment of the ship's administration, skill level and material condition as related to operation of its propulsion system. A second important objective is to identify required maintenance actions not previously identified.

Approach

Ship's Force prepares for Light-Off Examinations (LOE) and Operational Propulsion Plant Examinations (OPPE) in accordance with Section 5001 (Light-Off Examination Schedule) and Section 5002 (Operational Propulsion Plant Examination) of the CV-Type Maintenance Management Plan, Vol. I.

The LOEs and OPPEs are conducted in accordance with: CINCPACFLT Instruction 3540.2, 1200 PSI Propulsion Plant Examinations of Pacific Fleet Ships, and CINCPACFLT letter 03BP:WPA, Rev. 6/75, 1200 (600) PSI Operational Propulsion Plant Examination.

Based on the report prepared by the PEB, Ship's Force identifies maintenance action requirements not previously identified and records in the ship's Deficiency Management System.

PERA(CV) provides assistance to Ship's Force in preparing for OPPE/LOE.

Milestones	When Completed	Accomplishing Activity
Commence preparation for LOE/OPPE	12 months prior to LOE/OPPE.	PEB Ship's Force
Conduct LOE/OPPE	As scheduled by PEB.	
Identify new maintenance actions	As required.	

Interface with Other LCMM Tasks

In preparing for LOE/OPPE, Ship's Force conducts material inspections (Task Element 3.12).

Subsequent to LOE/OPPE, Ship's Force updates the CSMP (Task Element 6.1.1) to incorporate maintenance requirements not previously identified.

Task No.	Title
3.4	IMPLEMENT LOE/OPPE MATERIAL INSPECTION PROGRAM (Continued)

Interface with Other LCMM Tasks

Where appropriate, the results of LOE/OPPE provide inputs into Task Element 4.2.1 (Develop/Refine SARP), Task Element 4.2.2 (Develop S. F. Work Requirements Package for Scheduled Availabilities) or Task Group 4.3 (Plan Upkeep/Underway Maintenance).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.5	IMPLEMENT POT&I PROGRAM

Objective

Identify maintenance requirements for the specific COH/SRA being planned.

Approach

POT&Is are conducted for selected shipboard systems/equipment. POT&Is listed in the Baseline SARP are screened for accomplishment ten months prior to start of the availability. Funds are allocated by the TYCOM to conduct the selected POT&Is and to accomplish the expected repairs that will result from these inspections. POT&Is are accomplished by the assigned Industrial Activity and Ship's Force. Deficiencies not previously included in the CSMP are documented by the inspectors on 2K work requests. The POT&I Program is accomplished in 6 phases:

Phase 1 Ship's Force Pre-Overhaul Test and Inspection (POT&I)

Phase 2 Industrial Activity Material Inspection

Phase 3 Machinery Condition Analysis

Phase 4 Industrial Activity POT&I, Part 1 (At Sea)

Phase 5 Industrial Activity POT&I, Part 2 (In Port)

Phase 6 Industrial Activity POT&I, Drydock

The Ship's Force POT&I (Phase 1) is ideally completed prior to the commencement of the Industrial Activity Material Inspection (Phase 2) since the actions taken in Phase 2 are, to a degree, dependent upon the results of

- Continued -

Milestones	When Completed	Accomplishing Activity
Conduct POT&I	Each COH/SRA	PERA(CV) Shipyard Ship's Force SUPSHIP

Interface with Other LCMM Tasks

POT&Is are conducted using standards developed under Task Element 2.1.5 (Integrate Test/Inspection Program Standards).

The results of POT&I provide an input to Task Element 4.2.1 (Develop/Refine SARP).

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
3.5	IMPLEMENT POT&I PROGRAM (Continued)

Approach

Phase 1 discrepancy identification. Phase 3, the Machinery Condition Analysis, is best performed concurrently with Phase 4, to avoid possible duplication of effort, but can be done independently if required. The In-Port POT&I includes tests that require relatively large groups of people, special test equipment, skills, and test weights and is therefore best done alongside a pier. Phase 6, although actually conducted in drydock after the overhaul starts, is included in the plan to ensure full coverage of all systems and equipments.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.6	IMPLEMENT MACHINERY VIBRATION ANALYSIS AND INSPECTION (MVA&I) PROGRAM

Objective

Determine the material condition of selected high repair cost rotating machinery using vibration analysis techniques in lieu of "opening and inspecting" the machinery.

Approach

Under this task, selected rotating machinery is surveyed while underway to determine vibration level. In addition, a visual inspection is conducted. The vibration survey and inspection are conducted at strategic points in the life cycle, including the following:

(1) A pre-overhaul survey is conducted approximately 4 to 5 months prior to a ship's availability (SRA/COH). The resulting report is used by the Type Commander as one of the many inputs to determine the ship's repair requirements for the availability.

(2) A post-overhaul survey is conducted approximately 1 month after completion of the ship's availability. The resulting report is used to establish baseline information for subsequent surveys and quality assurance test for repaired machinery.

Ship's Force supports PERA in the conduct of the MVA&I program in accordance with the CV-Type Maintenance Management Plan, Vol. I, Task 4009E.

Milestones	When Completed	Accomplishing Activity
Pre-Overhaul MVA&I completed	4 months prior each COH/SRA	PERA(CV) NAVSEA Ship's Force
Post-Overhaul MVA&I completed	1 month after each COH/SRA	

Interface with Other LCMM Tasks

Results of pre-overhaul survey provide an input to Task Area 4 (Plan Individual Availability/Upkeep Periods).

Results of all surveys provide an input to Task Group 6.2 (Analyze Maintenance Data).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.7	IMPLEMENT SEA/DOCK TRIAL PROGRAM

Objective

Determine/verify the adequacy of material condition for selected systems/equipment.

Approach

When appropriate, sea and dock trials are conducted either during a scheduled availability or at some other strategic point to determine/verify the adequacy of material condition. Dock and sea trials conducted during overhaul are for the specific purpose of verifying the adequacy of maintenance actions taken during the overhaul.

Milestones	When Completed	Accomplishing Activity
Sea trials conducted	As required	Shipyard Ship's Force PERA(CV) NAVSEA
Dock trials conducted	As required	

Interface with Other LCMM Tasks

The results of sea/dock trials provide an input to Task Element 4.2.1 (Develop/Refine SARP).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.8	IMPLEMENT VALVE INSPECTION PROGRAM

Objective

Identify valve maintenance deficiencies.

Approach

Where applicable, Ship's Force establishes a Valve Maintenance Program in accordance with Task 4004 of the CV-Type Maintenance Management Plan.

Milestones	When Completed	Accomplishing Activity
Valve inspection completed	As scheduled by Ship's Force	Ship's Force

Interface with Other LCMM Tasks

This task is based on outputs from Task Element 2.1.5 (Integrate Test/Inspection Program Standards).

Outputs from this task feed as appropriate into Task Group 4.3 (Plan Upkeep/Underway Maintenance) and Task Elements 4.2.1 (Develop/Refine SARP),

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
3.8	IMPLEMENT VALVE INSPECTION PROGRAM (Continued)

Interface with Other LCMM Tasks

4.2.2 (Develop S. F. Work Requirements for Scheduled Availabilities), and 6.1.1 (Update CSMP).

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.9	IMPLEMENT PMS PROGRAM

Objective

Determine the material condition of ship's equipment/material and identify items requiring maintenance.

Approach

The PMS program is accomplished in accordance with governing OPNAV Fleet Commander and Type Commander Instructions and guidance.

Deficiencies in material condition identified during implementation of PMS and not previously identified are recorded in the ship's Deficiency Management System.

Milestones	When Completed	Accomplishing Activity
PMS conducted	As specified in PMS manual	Ship's Force NAVSEA Overhauling Activity

Interface with Other LCMM Tasks

Results of PMS are used to update the CSMP (Task Element 6.1.1).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.10	IMPLEMENT FLANGE AND STRAINER SHIELD INSPECTION PROGRAM

Objective

Identify discrepancies relating to flange and strainer shields and record applicable maintenance requirements.

Approach

Ship's Force identifies and inspects designated piping systems in accordance with Task 4002 (Inspect and Verify Flange and Strainer Shield Installation Program) of the CV-Type Maintenance Management Plan. Flange and strainer shield discrepancies identified through inspection are recorded in the Deficiency Management System.

Milestones	When Completed	Accomplishing Activity
Flange and strainer shield inspection completed.	As scheduled by Ship's Force	Ship's Force

Interface with Other LCMM Tasks

This task is based on outputs from Task Element 2.1.5 (Integrate Test/Inspection Program Standards).

Outputs from this task feed as appropriate into Task Group 4.3 (Plan Upkeep/Underway Maintenance) and Task Elements 4.2.1 (Develop/Refine SARP), 4.2.2 (Develop S. F. Work Requirements for Scheduled Availabilities), and 6.1.1 (Update CSMP).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.11	IMPLEMENT POST-OVERHAUL TEST AND INSPECTION PROGRAM

Objective

Verify the effectiveness of maintenance conducted during overhaul and establish a baseline of material condition.

Approach

This Task Group covers all testing and inspection: (a) conducted during the latter stages of, or immediately subsequent to, COH/SRA and (b) not covered under other Task Groups (e.g., 3.1, 3.4, 3.6, 3.7 or 3.17). The purpose of this testing/inspection is to:

(1) Verify the effectiveness of maintenance conducted during COH/SRA.

(2) Establish a baseline of material condition.

The testing is conducted in accordance with procedures as may be specified in the applicable TRS or test procedure.

Milestones	When Completed	Accomplishing Activity
Post-COH test and inspections completed.	Each COH/SRA	Ship's Force Shipyard

Interface with Other LCMM Tasks

Post-overhaul test and inspections are conducted in accordance with standards and criteria established under Task Element 2.1.2.

Post-overhaul test and inspection results provide an input to Task Elements 6.2.3 (Conduct Post-COH/SRA Analysis) and 6.2.4 (Analyze Effectiveness of LCMM Program).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.12	IMPLEMENT SHIP'S FORCE MATERIAL INSPECTION PROGRAM

Objective

Identify material discrepancies and record applicable maintenance requirements.

Approach

Ship's Force conducts routine material inspection during quarterly zone inspections, during watch, or at other times as may be designated by the ship. The inspections are conducted using procedures and guidance described in Task 4007 (Conduct Detailed Material Inspection) of the CV-Type Maintenance Management Plan. The checklists contained in Vol. II to the CV-Type Maintenance Management Plan are used in the conduct of these inspections. Discrepancies identified through this task are recorded in the ship's Deficiency Management System.

Milestones	When Completed	Accomplishing Activity
Conduct zone inspections	Quarterly	Ship's Force
Conduct other material inspections	As required	

Interface with Other LCMM Tasks

This task utilizes outputs from Task Element 2.1.3 (Develop Equipment Checklists). Outputs from this task feed into Task Element 4.2.1 (Develop/Refine SARP), 4.2.2 (Develop S. F. Work Requirements for Scheduled Availabilities), 4.3 (Plan Upkeep/Underway Maintenance), or 6.1.1 (Update CSMP).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.13	IMPLEMENT OIL ANALYSIS PROGRAM

Objective

Determine the material condition of selected rotating machinery through periodic analysis of lubricating oils.

Approach

Spectrometric Lube Oil Analysis is a process in which oil samples from selected equipment are analyzed by one of two methods – either emission spectrometry or atomic absorption – and the concentration of wear-metal in the oil is determined and recorded. The results of the tests are forwarded to the appropriate maintenance activity for action. Trending of the wear-metal concentrations for each different wear-metal allows prediction of when a particular piece of equipment will require repairs, before the equipment experiences failure. Thus, planned overhaul or repair of critical equipment can be accomplished before catastrophic failure or excessive performance or condition degradation can occur.

Milestones	When Completed	Accomplishing Activity
Oil analysis procedures developed	To be determined.	Ship's Force Shipyard
Oil analysis conducted	As required	

Interface with Other LCMM Tasks

Results of Oil Analysis are used to accomplish Task Element 4.1.2 (Establish Optimum Frequency of Overhaul), and Task Groups 4.2 (Plan Scheduled Availabilities) and 4.3 (Plan Minor Availabilities/Underway Maintenance).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.14	IMPLEMENT COMBAT SYSTEMS READINESS REVIEW/TEST (CSRR/CRST) PROGRAM

Objective

Determine the operability of combat systems and to identify required maintenance actions not previously identified.

Approach

Prior to each deployment, NAVSEA conducts a test and inspection of combat systems to determine operability and to identify maintenance required on these systems.

Ship's Force updates the CSMP where appropriate, based on the results of CSRR/CSRT.

Milestones	When Completed	Accomplishing Activity
CSRR/CSRT conducted	90 days prior to each deployment	NAVSEA Ship's Force

Interface with Other LCMM Tasks

Results of this task provide an input into the CSMP (Task Element 6.1.1).

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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.15	INSPECT GAUGES, ETC., FOR CALIBRATION REQUIREMENTS

Objective

Identify discrepancies/requirements relating to calibration of gauges, relief valves, thermometers, meters, scopes, switches, tools and instruments.

Approach

Where applicable, Ship's Force inspects all devices requiring periodic calibration in accordance with Task 4005 of the CV-Type Maintenance Management Plan. Maintenance requirements identified during inspection are recorded in the Ship's Deficiency Management System.

Milestones	When Completed	Accomplishing Activity
Calibration inspection completed.	As scheduled by Ship's Force	Ship's Force

Interface with Other LCMM Tasks

This task is based on outputs from Task Element 2.1.5 (Integrate Test/Inspection Program Standards).

Outputs from this task feed into Task Elements 4.2.1 (Develop/Refine SARP), 4.2.2 (Develop S. F. Work Requirements for Scheduled Availabilities), 4.3 (Plan Upkeep/Underway Maintenance) or 6.1.1 (Update CSMP).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.16	CONDUCT COH/SRA MATERIAL INSPECTION PROGRAM

Objective

Provide information concerning material condition and maintenance requirements specifically in support of COH/SRA advance planning.

Approach

The COH/SRA Material Inspection (MI) process is designed to provide direct support in the preparation of the Advance SARP for each COH/SRA. There are three phases to the process:

(1) Pre-MI, which consists of indoctrination of the MI team (which includes membership from PERA(CV), TYCOM, Ship's Force and the shipyard).

(2) MI, which consists of review aboard ship of work requests and related inspection of applicable systems/equipment.

(3) Post-MI, which consists of updating the maintenance planning file.

These phases are accomplished in accordance with guidance and direction specified in paragraphs 2.9, 2.10, and 2.11 of PERA(CV) Standard Operating Procedure 1862-05, Maintenance Planning Manual for Aircraft Carriers.

Milestones	When Completed	Accomplishing Activity
Conduct COH material inspection	12 months prior COH	PERA(CV) TYCOM Shipyard
Conduct SRA material inspection	10 months prior SRA	Ship's Force

Interface with Other LCMM Tasks

Results of Material Inspection are used to develop/refine the SARP (Task Element 4.2.1).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
3.17	IMPLEMENT TOTAL SHIP TEST PROGRAM (TSTP)

Objective

Provide test procedures to help determine material condition of the ship.

Approach

Ship's Force will conduct system, subsystem and equipment tests as specified by TSTP directives, when developed. Discrepancies and maintenance requirements identified from implementation of the TSTP will be recorded in the ship's Deficiency Maintenance System.

Milestones	When Completed	Accomplishing Activity
TSTP installed.	To be determined for each hull.	Ship's Force (implementation); TYCOM (establ. install. sched.); NAVSEA (devel. procedures).

Interface with Other LCMM Tasks

This task is based on outputs from Task Element 2.1.5 (Integrate Test/Inspection Program Standards).

Outputs from this task feed into Task Elements 4.2.1 (Develop/Refine SARP), 4.2.2 (Develop S.F. Work Requirements Package for Scheduled

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
3.17	IMPLEMENT TOTAL SHIP TEST PROGRAM (TSTP) (Continued)

Interface with Other LCMM Tasks

Availabilities), 4.3 (Plan Upkeep/Underway Maintenance) or 6.1.1 (Update CSMP), as appropriate.

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4	PLAN INDIVIDUAL AVAILABILITY/ UNDERWAY MAINTENANCE PERIODS

Objective

Provide systematic and timely planning for all scheduled periods of maintenance.

Approach

Specific effort under this task area includes:

(1) The development of standards for repetitive items that are to be considered as "routines" (see Task Group 4.1).

(2) Advance planning specifically in association with Complex Overhauls (COH) and Selected Restricted Availabilities (SRA) (see Task Group 4.2).

(3) Advance planning in association with maintenance periods other than COH/SRA (see Task Group 4.3).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV), TYCOM, Fleet Commander, NAVSEA, Shipyard, IMA, SUPSHIP, Ship's Force

Interface with Other LCMM Tasks

Advance planning of maintenance periods is based on the results of material condition assessment (Task Area 3).

Advance planning resulting from Task Area 4 provides the basis for Task Area 5 (Accomplish Maintenance Program).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.1.1	IDENTIFY REPETITIVE WORK ITEMS

Objective

Develop a list of work items that are significantly repetitive.

Approach

The Fleet Commanders, Type Commanders and NAVSEA review maintenance history and identify those work items which are sufficiently repetitive or significant to warrant standardization in their planning. The criteria for identifying items as warranting standardization include:

(1) Frequency of occurrence

(2) Mission essentiality

(3) Extent of maintenance burden

PERA(CV) integrates the listings of routine work items identified by each Type Commander and other sources and augments the listing by incorporating additional items as considered appropriate.

PERA(CV) reviews the integrated listing of routines and updates as appropriate.

Milestones	When Completed	Accomplishing Activity
Baseline listing of routines completed	Completed	PERA(CV) TYCOM
Listing of routines updated	As required	NAVSEA

Interface with Other LCMM Tasks

The data for accomplishing this task results from Task Elements 6.1.2 (Report Completed Maintenance Actions), 6.1.3 (Implement Casualty Reporting Program) and 6.1.4 (Prepare Departure Reports).

- Continued -

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
4.1.1	IDENTIFY REPETITIVE WORK ITEMS (Continued)

Interface with Other LCMM Tasks

The listing of routines developed in Task Element 4.1.1 is the basis for conducting Task Elements 4.1.2 (Establish Optimum Frequency of Accomplishment), 4.1.3 (Establish Priority Standards) and 4.1.4 (Establish Accomplishing Activity Standards).

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.1.2	ESTABLISH OPTIMUM FREQUENCY OF ACCOMPLISHMENT

Objective

Determine the most cost-effective frequency for accomplishing the routine items identified in Task Element 4.1.1.

Approach

PERA(CV) reviews maintenance history for each of the routine work items identified in Task Element 4.1.1. Data used in the accomplishment of this task are derived from Task Elements 6.1.2 (Report Completed Maintenance Actions) and 6.2.1 (Determine Equipment Reliability/Maintainability Trends). The purpose of the review is to determine the frequency to accomplish each routine. The determination will be based upon cost-effectiveness considerations. The procedure for determining optimum frequency of overhaul is illustrated in Part 1, paragraph 1.6.2 of this plan.

Milestones	When Completed	Accomplishing Activity
Frequency of occurrence established for routine work items	As required	PERA(CV)

Interface with Other LCMM Tasks

Task Element 4.1.2 is accomplished for each routine identified by Task Element 4.1.1, based on results of Task Elements 6.1.2 (Report Completed Maintenance Actions), 6.2.1 (Determine Equipment Reliability/Maintainability Trends), 3.6 (MVA&I Program), 3.1.3 (Oil Analysis Program).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.1.3	ESTABLISH PRIORITY STANDARDS

Objective

Provide an objective method for establishing the priority of required maintenance actions.

Approach

PERA(CV) develops the criteria and methodology required for maintenance scheduling. The standards will be based upon factors (e.g., those listed on page 9-17 of OPNAVINST 4790.4, Volume II) which consider mission essentiality, material condition, and existing and potential operational conditions and hazards.

The priority standards developed under this task will be applicable to:

(1) Repetitive work items (routines) identified under Task Element 4.1.1.

(2) Other work items as may be screened for accomplishment during COH/SRA.

Priority standards developed under this task will be coordinated with each TYCOM.

Milestones	When Completed	Accomplishing Activity
Priority standards established for routine work items	As required	PERA(CV) TYCOM

Interface with Other LCMM Tasks

Priority standards are established for routine work items identified under Task Element 4.1.1.

The priority standards established under Task Element 4.1.3 could, when so directed, be applied during accomplishment of Task 4.2.1 (Develop/Refine SARP).

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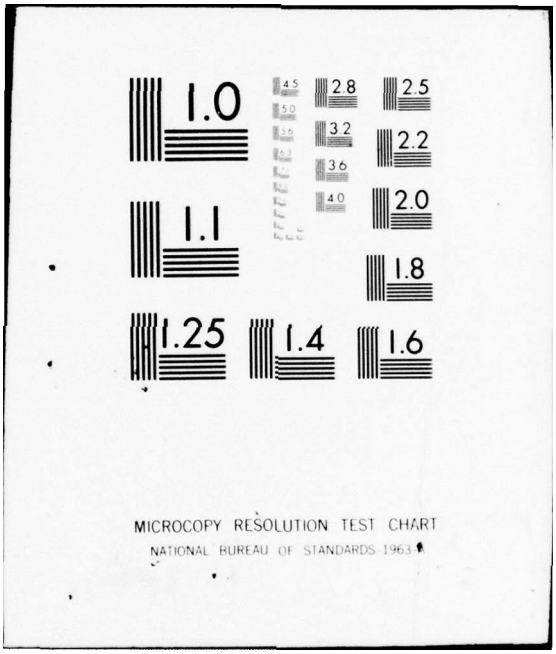
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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.1.4	DESIGNATE ACCOMPLISHING ACTIVITY

Objective

Provide a consistent and objective method for assigning responsibility to accomplish routine maintenance actions.

Approach

PERA(CV) will review each routine work item and in consideration of capabilities, facilities, cost and effectiveness, identify the organization that would best be assigned responsibility for accomplishment. The results of this task are incorporated into the Baseline SARP.

Milestones	When Completed	Accomplishing Activity
Accomplishing activity standards established for routine work items	As required	PERA(CV) TYCOM

Interface with Other LCMM Tasks

Accomplishing activity standards are established for routine work items identified under Task Element 4.1.1.

The accomplishing activity standards are incorporated into Task Element 2.2.4 (Prepare Baseline SARPs).

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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.1.5	PREPARE/UPDATE FLEET MODERNIZATION PROGRAM

Objective

Update the 5-year Fleet Modernization Program through semiannual conference.

Approach

Twice each year, CNO, NAVSEA, TYCOMs and PERA(CV) conduct a conference to update the Carrier FMP. Updating is based upon current data regarding material availability, changes in priorities and funding. The results of each conference are used in the advanced planning of individual availabilities.

Milestones	When Completed	Accomplishing Activity
FMP conference conducted	Semiannually	NAVSEA TYCOM PERA(CV) Fleet Commanders CNO

Interface with Other LCMM Tasks

The results of Task Element 4.2.5 (Ship System Status Program) support this task.

Results of this task are integrated into Task Elements 6.1.5 (SHIPALT Data Bank) and 4.2.6 (Develop Alteration Planning Documents for Individual Availabilities).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2	PLAN SCHEDULED AVAILABILITIES

Objective

Provide systematic and timely advance planning of Complex Overhauls (COH) and Selected Restricted Availabilities (SRA) to enhance their effectiveness.

Approach

Complex Overhauls (COH) and Selected Restricted Availabilities (SRA) are planned in accordance with prevailing guidance and direction, including the following:

(1) CV-Type Maintenance Management Plan, May 1976, which delineates ship's Engineering Department responsibility relative to COH/SRA advance planning.

(2) PERA(CV) Standard Operating Procedure 1862-05, Maintenance Planning Manual for Aircraft Carriers, which delineates the responsibilities of the PERA(CV) Maintenance Planner.

(3) NAVSHIPS 0905-498-4010, Commanding Officer's Overhaul Guide

Advance planning of a COH/SRA includes the following:

(1) Development/refinement of the SARP (see Task Element 4.2.1)

(2) Development of the Ship's Force work package (see Task Element 4.2.2)

(3) Scheduling of Shipyard, IMA and Ship's Force work (see Task Element 4.2.3)

- Continued -

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) TYCOM NAVSEA Shipyard IMA SUPSHIP Ship's Force

Interface with Other LCMM Tasks

The advance planning of specific COH/SRAs is based on the results of Task Areas 1 (Develop LCMM Strategy), 2 (Establish Fleet Material Standards) and 3 (Assess Material Condition).

Plans developed under Task Group 4.2 provide the basis for accomplishment of Task Group 5.1 (Accomplish COHs) and 5.2 (Accomplish SRAs).

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
4.2	PLAN SCHEDULED AVAILABILITIES (Continued)

Approach

(4) Ordering of materials (see Task Element 4.2.4).

(5) Implementing the Ship System Status Program (see Task Element 4.2.5).

(6) Developing alteration program planning information (see Task Element 4.2.6).

Sheet 2 of 2

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.1	DEVELOP/REFINE SARP

Objective

Provide a listing of authorized work items for each COH/SRA.

Approach

At strategic and timely points throughout the COH/SRA advance planning process, the Baseline SARP originally developed (see Task Element 2.2.4) is refined to reflect the currently planned program of maintenance action. The development/refinement of the SARP is an evolutionary process, which includes the following major steps, accomplished in accordance with PERA SOP 1862-05.

(1) Upon completion of material inspection the Baseline SARP is updated to add items identified during the material inspection or contained in the CSMP, resulting in the Advance SARP.

(2) Material and cost estimates are incorporated resulting in the Preliminary SARP.

(3) Results of the Alteration and Repair Verification Conference (ARVC), during which the TYCOM authorizes work for accomplishment, are incorporated, resulting in the SARP (final authorized overhaul work package).

Milestones	When Completed	Accomplishing Activity
Advance SARP issued	Each COH/SRA	PERA(CV)
Preliminary SARP issued	Each COH/SRA	Ship's Force
Alteration and Repair Verification Conference (ARVC) conducted	Each COH/SRA	TYCOM NAVSEA
SARP issued	Each COH/SRA	Shipyard SUPSHIP

Interface with Other LCMM Tasks

The development/refinement of the SARP is based on the Baseline SARP prepared under Task Element 2.2.4 and the results of Task Groups 3.3, 3.4, 3.5, 3.7, 3.8, 3.12, 3.15, 3.16 and 3.17.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.2	DEVELOP S. F. WORK PACKAGE

Objective

Provide a listing of Ship's Force work items for each COH/SRA.

Approach

The Ship's Force work package for COH/SRA is developed using criteria prescribed under Task 4011B (SFOMS Ship's Force Work Package) of the CV-Type Maintenance Management Plan, Vol. I.

Development of the S. F. work requirements package involves scoping each item, designation of responsibility for each key operation and estimating manpower requirements. These functions are normally accomplished by Ship's Force, with assistance provided by PERA(CV), using the Ship's Force Overhaul Management System (SFOMS).

Milestones	When Completed	Accomplishing Activity
SFOMS planning initiated	Each COH/SRA	Ship's Force/ PERA(CV)
SFOMS planning completed	Each COH/SRA	

Interface with Other LCMM Tasks

SARP items (see Task Element 4.2.1) designated for accomplishment by Ship's Force are incorporated into the S. F. work package.

The Ship's Force work package developed under Task Element 4.2.2 provides the basis for accomplishing Task Elements 5.1.3 and 5.2.3.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.3	SCHEDULE WORK

Objective

Coordinate all scheduled work activities.

Approach

Under this Task Element, activities assigned responsibility for accomplishing COH/SRA work packages schedule the start and completion of each element of work.

The shipyard work package is scheduled using the local Shipyard Management Information System. IMA work is scheduled utilizing the Intermediate Maintenance Activity Maintenance Management Subsystem of 3-M, or other methods as appropriate. Ship's Force work schedule is entered into the ship's SFOMS. The shipyard reviews the Ship's Force work schedule to identify scheduling conflicts.

Milestones	When Completed	Accomplishing Activity
Shipyard work package scheduled	Each COH/SRA	Shipyard
IMA work package scheduled	Each COH/SRA	IMA
Ship's Force work package scheduled	Each COH/SRA	Ship's Force/ PERA(CV)

Interface with Other LCMM Tasks

Each item in the SARP (see Task Element 4.2.1) or Ship's Force work requirements package (see Task Element 4.2.2) is scheduled for accomplishment.

The work schedules developed under Task Element 4.2.3 provide the basis for accomplishing Task Groups 5.1 and 5.2.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.4	ORDER MATERIALS

Objective

Provide, on a timely basis, the materials required to accomplish authorized work.

Approach

Each accomplishing activity (i.e., Shipyard, IMA, and Ship's Force) identifies and orders the materials necessary to accomplish authorized work.

Shipyards and IMAs order and control required material using local practices and procedures.

Ship's Force orders required material in accordance with procedures, requirements, and guidelines set forth in:

(1) Chapter 7 (Material Control) of the Maintenance and Material *Management (3-M) Manual*, OPNAVINST 4790.4, and

(2) Task 4012 (Develop Material List) of the CV-Type Maintenance Management Plan, Vol. I.

Ship's Force material control is accomplished utilizing SFOMS.

Milestones	When Completed	Accomplishing Activity
Shipyard material ordering initiated	Each COH/SRA	PERA(CV)
Shipyard material ordering completed	Each COH/SRA	Shipyard
IMA material ordering initiated	Each COH/SRA	IMA
IMA material ordering completed	Each COH/SRA	Ship's Force
Ship's Force material ordering initiated	Each COH/SRA	
Ship's Force material ordering completed	Each COH/SRA	

Interface with Other LCMM Tasks

Material ordering occurs where applicable for each work item defined under Task Elements 4.2.1 and 4.2.2.

Standard material lists developed under Task Element 2.2.5 provide an input to Task Element 4.2.4.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.5	IMPLEMENT SHIP SYSTEM STATUS PROGRAM

Objective

Provide requirements and capability analysis for key systems as necessary to support FMP update and COH/SRA planning.

Approach

Ship system status data are developed and kept updated by PERA(CV) for selected ships. The approach used is to:

(1) Determine the capacity (both existing and planned) of selected shipboard systems (air conditioning, electrical power generation, firemains, personnel accommodations, weight and stability).

(2) Determine the existing and planned demand on these systems.

(3) Identify shortfall/longfall based on a comparison of (1) and (2).

(4) Simplify data presentation to enable managers to decide on priorities of work accomplishment.

Milestones	When Completed	Accomplishing Activity
Ship system status program reports	Each FMP conference. Each COH/SRA Ship's Modernization Plan. Conf. Compl. of COH/SRA	PERA(CV)

Interface with Other LCMM Tasks

Results of this task provide an input to Task Elements 4.1.5 (Prepare/Update FMP) and 4.2.6 (Develop Alteration Program Planning Documents).

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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.2.6	DEVELOP ALTERATION PROGRAM PLANNING DOCUMENTS

Objective

Provide planning information pertaining to alterations as necessary to support COH/SRA advance planning.

Approach

PERA(CV) prepares/develops alteration planning documentation in accordance with local and NAVSEA instructions. Key alteration planning documentation generated during COH/SRA advance planning include:

(1) SHIPALT guidance request list

(2) Alteration work requirement (AWR) package

(3) Modernization

(4) 180-day letter

Milestones	When Completed	Accomplishing Activity
SHIPALT guidance request list submitted	Monthly	PERA(CV)
AWR prepared	Each alteration	NAVSEA
Modernization workbook compiled	Each COH	Shipyard
180 day letter issued	Each COH	

Interface with Other LCMM Tasks

Accomplishment of this task is based on outputs from Task Elements 4.1.5 (Prepare/Updated Fleet Modernization Program) and 4.2.5 (Ship System Status Program).

This task is accomplished concurrently with Task Elements 4.2.1 (Develop/Refine SARP), 4.2.3 (Schedule Work), and 4.2.4 (Order Materials).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
4.3	PLAN MINOR AVAILABILITIES/UNDERWAY MAINTENANCE

Objective

Provide systematic planning for maintenance actions to be accomplished at times other than COH/SRA.

Approach

Work intended for accomplishment during upkeep, minor availability or underway periods other than COH/SRA availabilities is planned by Ship's Force using local methods.

Guidance pertaining to the development of work packages for minor availabilities is provided under Task 4011 of the CV-Type Maintenance Management Plan, Vol. I.

Planning for underway maintenance is accomplished using the Underway Maintenance Management System (UMMS). Under UMMS, which is currently under development, the ship manages all shipboard maintenance using a standardized, easily understood, work-center oriented approach. UMMS is compatible with 3-M, reduces documentation and paperwork, and integrates all shipboard maintenance into a single system which:

(1) Standardizes documentation for all maintenance actions

(2) Provides for scoping, scheduling, and ordering when the maintenance action is discovered

(3) Transfers maintenance actions between SFOMS and the CSMP.

Each new maintenance action is documented by the Ship's Work Center when it is discovered, forwarded to the Maintenance Officer for screening, and then

- Continued -

Milestones	When Completed	Accomplishing Activity
Minor availability planning complete	When required	PERA(CV) TYCOM
Underway maintenance management system implemented	Continuous	Ship's Force

Interface with Other LCMM Tasks

Planning for minor availabilities and underway maintenance is accomplished in accordance with the results of Task Areas 1, 2, and 3.

Outputs from Task Group 4.3 provide the basis for accomplishing Task Groups 5.3 and 5.4.

Task No.	Title
4.3	PLAN MINOR AVAILABILITIES/UNDERWAY MAINTENANCE (Continued)

Approach

processed. The Work Center's Activity Report shows all outstanding maintenance actions under its cognizance. Work that cannot be completed in 30 days or requires outside assistance is scoped to identify the major steps, compartments where the work is located, assisting work centers, material needed, and quality assurance requirements. Work requiring less than 30 days is scheduled by the Work Center Supervisor for accomplishment. When the work is completed, it is removed from the Work Center's Report and the CSMP in accordance with 3-M procedures. Those maintenance items deferred for outside assistance or screened for Ship's Force accomplishment during an availability or overhaul are automatically entered into the CSMP and SFOMS.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5	ACCOMPLISH MAINTENANCE PROGRAM

Objective

Accomplish the maintenance programs (COH, SRA, Upkeep and Underway Maintenance) planned under Task Area 4 in the most effective manner.

Approach

This major task area involves accomplishment of:

(1) Complex Overhauls (see Task Group 5.1)

(2) Selected Restricted Availabilities (see Task Group 5.2)

(3) Minor Availabilities (see Task Group 5.3)

(4) Underway Maintenance (see Task Group 5.4)

Milestones	When Completed	Accomplishing Activity
See included Task Elements		Ship's Force SUPSHIPS Shipyard IMAs PERA(CV)

Interface with Other LCMM Tasks

This Task Area is based on the result of Task Area 4 (Plan Individual Availability, Upkeep and Underway Maintenance Periods).

Data resulting from the accomplishment of maintenance programs are recorded in the Maintenance Data Feedback System (Task Area 6).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.1	ACCOMPLISH COMPLEX OVERHAULS (COH)

Objective

Accomplish each scheduled COH as planned.

Approach

Complex Overhauls involve the accomplishment of three defined work packages:

(1) Depot work package (see Task Element 5.1.1).

(2) IMA work package (see Task Element 5.1.2).

(3) Ship's Force work package (see Task Element 5.1.3).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		Ship's Force SUPSHIPS Shipyard IMAs PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of Complex Overhauls is based on the results of all tasks under Task Group 4.2 (Plan Scheduled Availabilities).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.1.1	ACCOMPLISH DEPOT WORK PACKAGE (COH)

Objective

The objective of this task is to effectively accomplish that portion of the COH assigned to the shipyard.

Approach

The overhauling shipyard accomplishes the authorized work package in accordance with the appropriate repair standards (e.g., TRSs, work specifications, drawings, job orders, or other documentation that describes the nature, extent, or type of maintenance). In accomplishing this work, the shipyard controls its production using the local Management Information System.

Ship's Force and PERA(CV) monitors the progress of work and identifies problems. In addition, PERA(CV) monitors the accomplishment of work as necessary to provide visibility and control over work growth and to provide information necessary for evaluating effectiveness.

Milestones	When Completed	Accomplishing Activity
Shipyard COH work package commenced	Each COH	Shipyard
Shipyard COH work package completed	Each COH	Ship's Force
		PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of the shipyard work based on the results of Task Elements 4.2.1 (Develop/Refine SARP), 4.2.3 (Schedule Work), and 4.2.4 (Order Materials).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.1.2	ACCOMPLISH IMA WORK PACKAGE (COH)

Objective

Accomplish that portion of the COH work package assigned to an Intermediate Maintenance Activity.

Approach

Each assigned IMA accomplishes authorized maintenance actions in accordance with established plans.

The accomplishing IMA performs the work in accordance with applicable repair standards and controls the effort using the Intermediate Maintenance Activity Maintenance Management Subsystem (IMMS) of 3-M, or other methods as appropriate.

Accomplishment of the IMA work package is monitored by Ship's Force and PERA(CV) to identify problems and provide information necessary for evaluating effectiveness.

Milestones	When Completed	Accomplishing Activity
IMA COH work package commenced	Each COH	IMA
IMA COH work package completed	Each COH	Ship's Force
		PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of the COH IMA work package is based on requirements/plans resulting from Task Elements 4.2.1 (Develop/Refine SARP), 4.2.3 (Schedule Work) and 4.2.4 (Order Materials).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.1.3	ACCOMPLISH SHIP'S FORCE WORK PACKAGE (COH)

Objective

Accomplish that portion of the COH work package assigned to Ship's Force.

Approach

Ship's Force accomplishes authorized COH work in accordance with applicable repair standards, and controls work and material, using the Ship's Force Overhaul Management System (SFOMS).

PERA(CV) provides assistance to Ship's Force in the monitoring of work performance.

Milestones	When Completed	Accomplishing Activity
Ship's Force COH work commenced	Each COH	Ship's Force
Ship's Force COH work completed	Each COH	PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of this task is based on requirements/plans resulting from Task Elements 4.2.2 (Develop S. F. Work Requirements Package), 4.2.3 (Schedule Work), and 4.2.4 (Order Materials).

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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.2	ACCOMPLISH SELECTED RESTRICTED AVAILABILITIES (SRA)

Objective

Accomplish each scheduled SRA as planned.

Approach

Selected Restricted Availabilities involve the accomplishment of three defined work packages:

(1) Depot work package (see Task Element 5.2.1).

(2) IMA work packages (see Task Element 5.2.2).

(3) Ship's Force work package (see Task Element 5.2.3).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		Ship's Force SUPSHIPS Shipyard IMAs PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of Selected Restricted Availabilities is based on the results of all tasks under Task Group 4.2 (Plan Scheduled Availabilities).

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LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.2.1	ACCOMPLISH DEPOT WORK PACKAGE (SRA)

Objective

Accomplish that portion of each SRA assigned to the shipyard.

Approach

The assigned shipyard accomplishes authorized SRA work in accordance with the appropriate repair standards (e.g., TRSs, work specifications, drawings, job orders or other documentation) that describe the nature, extent or type of maintenance. In accomplishing this work, the shipyard controls its production using the local Management Information System.

Ship's Force and PERA(CV) monitor the progress of work and identify problems. In addition, PERA(CV) monitors the accomplishment of work as necessary to provide visibility and control over work growth and to provide information necessary for evaluating effectiveness.

Milestones	When Completed	Accomplishing Activity
Shipyard SRA work package commenced	Each SRA	Shipyard
Shipyard SRA work package completed	Each SRA	Ship's Force PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of the shipyard work is based on the results of Task Elements 4.2.1 (Develop/Refine SARP), 4.2.3 (Schedule Work), and 4.2.4 (Order Materials).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.2.2	ACCOMPLISH IMA WORK PACKAGE (SRA)

Objective

Accomplish that portion of the SRA work package assigned to Intermediate Maintenance Activities.

Approach

Each assigned IMA accomplishes authorized work in accordance with established plans.

The accomplishing IMA performs the work in accordance with applicable repair standards and controls the effort using the Intermediate Maintenance Activity Maintenance Management Subsystem (IMMS) of 3-M or other methods as appropriate.

Accomplishment of the IMA work package is monitored by Ship's Force and PERA(CV) to identify problems and provide information necessary for evaluating effectiveness.

Milestones	When Completed	Accomplishing Activity
IMA SRA work package commenced	Each SRA	IMA
IMA SRA work package completed	Each SRA	Ship's Force
		PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of the SRA IMA work package is based on requirements/plans resulting from Task Elements 4.2.1 (Develop/Refine SARP), 4.2.3 (Schedule Work) and 4.2.4 (Order Materials).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.2.3	ACCOMPLISH SHIP'S FORCE WORK PACKAGE (SRA)

Objective

Accomplish that portion of the SRA work package assigned to Ship's Force.

Approach

Ship's Force accomplishes authorized SRA work in accordance with applicable repair standards and controls work and material using the Ship's Force Overhaul Management System (SFOMS).

PERA(CV) provides assistance to Ship's Force in the monitoring of work performance.

Milestones	When Completed	Accomplishing Activity
Ship's Force SRA work commenced	Each SRA	Ship's Force
Ship's Force SRA work completed	Each SRA	PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of this task is based on requirements/plans resulting from Task Elements 4.2.2 (Develop S. F. Work Requirements Package), 4.2.3 (Schedule Work) and 4.2.4 (Order Materials).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.3	ACCOMPLISH MINOR AVAILABILITIES

Objective

Accomplish minor availabilities (i.e., those periods of assigned availability other than COH or SRA) in a cost-effective manner.

Approach

Implementation of this Task Group consists of accomplishing:

(1) The IMA work package planned for completion during the availability (see Task Element 5.3.1) and

(2) The Ship's Force work package planned for completion during the availability (see Task Element 5.3.2).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) IMA Ship's Force

Interface with Other LCMM Tasks

Minor availabilities are accomplished in accordance with plans established under Task Group 4.3 (Plan Minor Availabilities/Underway Maintenance).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.3.1	ACCOMPLISH IMA WORK PACKAGE (DURING MINOR AVAILABILITIES)

Objective

Accomplish that portion of a minor availability work package assigned to Intermediate Maintenance Activities.

Approach

Each assigned IMA accomplished authorized work in accordance with established plans.

The accomplishing IMA performs the work in accordance with applicable repair standards and controls the effort using the Intermediate Maintenance Activity Maintenance Management Subsystem (IMMS) of 3-M or other methods as appropriate.

Accomplishment of the IMA work package is monitored by Ship's Force and PERA(CV).

Milestones	When Completed	Accomplishing Activity
IMA minor availability work package commenced	Each minor availabillty	IMA
IMA minor availability work package completed	Each minor availability	Ship's Force PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of minor availability IMA work packages is based on requirements/plans resulting from Task Group 4.3 (Plan Minor Availabilities/ Underway Maintenance).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.3.2	ACCOMPLISH SHIP'S FORCE WORK PACKAGE (DURING MINOR AVAILABILITIES)

Objective

Accomplish that portion of a minor availability work package assigned to Ship's Force.

Approach

Ship's Force accomplishes authorized work during minor availabilities in accordance with applicable repair standards and controls work and material using the Ship's Force Overhaul Management System (SFOMS).

PERA(CV) provides assistance to Ship's Force in the monitoring of work performance.

Milestones	When Completed	Accomplishing Activity
Ship's Force minor availability work commenced	Each minor availability	Ship's Force
Ship's Force minor availability work completed	Each minor availability	PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of this task is based on requirements/plans resulting from Task Group 4.3 (Plan Minor Availabilities/Underway Maintenance).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
5.4	ACCOMPLISH UNDERWAY MAINTENANCE

Objective

Implement underway maintenance procedures.

Approach

Ship's Force accomplishes underway maintenance using applicable repair standards as developed under Task Group 2.2.

Work accomplishment is controlled and monitored using reports generated as part of the proposed Underway Maintenance Management System (see Task Element 4.3), and procedures delineated under Task 4016 (Develop Maintenance and Repair Control Procedure) of the CV-Type Maintenance Management Plan, Vol. I.

Milestones	When Completed	Accomplishing Activity
Underway maintenance accomplished	Continuous	Ship's Force

Interface with Other LCMM Tasks

Accomplishment of Underway maintenance is based on outputs from Task Groups 2.2 (Develop Repair Standards) and 4.3 (Plan Minor Availabilities/ Underway Maintenance).

Completed Underway Maintenance actions are reported under Task Element 6.1.2 (Report Completed Maintenance Actions).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6	IMPLEMENT MAINTENANCE DATA FEEDBACK SYSTEM

Objective

Provide a routine basis for effective feedback of maintenance history into the development of LCMM strategy and estabiishment of Fleet Material Condition Standards.

Approach

Implementation of a maintenance data feedback system consists of: (1) orderly collection, processing and storage of maintenance history (see Task Group 6.1), and (2) analysis of that data as necessary to assess the effectiveness of ongoing maintenance programs and to refine existing strategy (see Task Group 6.2).

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) Shipyard Ship's Force

Interface with Other LCMM Tasks

This Task Area consists of the generation and analysis of data resulting from implementation of Task Area 5 (Accomplish Maintenance Program).

Outputs from this Task Area are fed back into Task Areas 1 and 2.

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1	IMPLEMENT MAINTENANCE DATA COLLECTION PROGRAMS

Objective

Collect, process and store maintenance history using existing practices to the extent practicable.

Approach

Under the Aircraft Carrier LCMM Program, maintenance data are collected through the following:

(1) Updating the CSMP (see Task Element 6.1.1).

(2) Reporting completed maintenance actions (see Task Element 6.1.2).

(3) Reporting casualties (see Task Element 6.1.3).

(4) Departure reporting (see Task Element 6.1.4).

(5) Maintaining a SHIPALT data bank (see Task Element 6.1.5).

(6) Maintaining maintenance history files (see Task Element 6.1.6).

Specialized maintenance data collection efforts other than those identified above are defined as part of the appropriate Task Element covered in the LCMM Plan.

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) Shipyard Ship's Force

Interface with Other LCMM Tasks

Maintenance data collected under Task Group 6.1 is based on the accomplishment of Task Area 5 (Accomplish Maintenance Program).

Data collected under Task Group 6.1 is the basis for activity under Task Group 6.2 (Analyze Maintenance Data).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.1	UPDATE CSMP

Objective

Maintain the Current Ship's Maintenance Project (CSMP) in a continuous state of accuracy using prescribed 3-M procedures.

Approach

Ship's Force updates the CSMP using procedures specified in OPNAV INST 4790.4, Ship's Maintenance and Material Management, and related Instructions governing the 3-M program. The CSMP is the primary document for identifying what is to be repaired and by whom. Hence, it is a major source of information for describing the material condition of a ship's systems/ equipment.

In concept, the CSMP is updated on a continuous basis. For purposes of the Aircraft Carrier LCMM Program, updating of the CSMP occurs at the following points in the cycle:

(1) 17 and 10 months prior to COH start

(2) 8 months prior to SRA start

(3) Completion of each COH/SRA

(4) 3 months prior to INSURV

(5) Prior to TYCOM Readiness Inspection

(6) 3 months prior to minor availabilities

(7) No less frequently than quarterly

Milestones	When Completed	Accomplishing Activity
Update CSMP	See Approach block.	Ship's Force

Interface with Other LCMM Tasks

The CSMP provides a basic source of information for accomplishing many of the programs defined within Task Area 3 (Assess Material Condition).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.2	REPORT COMPLETED MAINTENANCE ACTIONS

Objective

Provide a history of maintenance actions completed on designated ships systems/equipment.

Approach

Ship's Force reports completed maintenance actions using:

(1) Procedures specified in OPNAVINST 4790.4, Ships Maintenance and Material Management, and related instructions governing the 3-M Maintenance Data System, or

(2) Other special procedures as necessary to augment the 3-M data base.

Milestones	When Completed	Accomplishing Activity
Completed Maintenance Actions reported	As occurring	Ship's Force

Interface with Other LCMM Tasks

The maintenance history data generated under Task Element 6.1.2 form part of the PERA(CV) Maintenance History File for each hull, and as such provided a vital source for conduct of activity under Task Group 6.2 (Analyze Maintenance Data).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.3	IMPLEMENT CASUALTY REPORTING PROGRAM

Objective

Provide data for (1) measuring/assessing material condition, (2) developing maintenance plans, and (3) analyzing trends and LCMM program effectiveness.

Approach

Ships submit Casualty Reports in accordance with applicable OPNAV, Fleet Commander, and Type Commander Instructions.

Summaries are issued on a monthly basis, or as otherwise directed.

Milestones	When Completed	Accomplishing Activity
Casualty Report Summary issued	Monthly for each hull	Ship's Force TYCOM
Casualty Reports submitted	As occurring	

Interface with Other LCMM Tasks

Casualty Report Summaries are one source of information used in conduct of activity under Task Group 6.2 (Analyze Maintenance Data) and are an integral part of the proposed Maintenance History File to be maintained by PERA(CV) for each hull.

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.4	PREPARE DEPARTURE REPORTS

Objective

Provide documented history of overhaul for a given availability.

Approach

The Shipyard or SUPSHIP assigned as accomplishing activity prepares a Departure Report for each COH/SRA. Each Departure Report summarizes labor, material, and total costs for each job accomplished during the availability. The Departure Reports are prepared and submitted in accordance with NAVSHIPINST 4790.1.

PERA(CV) utilizes the Departure Reports as a primary data source in compiling the Maintenance Profile and Maintenance History File for individual ships.

Milestones	When Completed	Accomplishing Activity
Departure Report submitted	Each COH/SRA	SUPSHIP Shipyard

Interface with Other LCMM Tasks

The Departure Reports cover each SARP item (Task Element 4.2.1) assigned to the shipyard for accomplishment.

Departure Report data are used in accomplishing Task Group 6.2 (Analyze Maintenance Data).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.5	MAINTAIN SHIPALT DATA BANK

Objective

Provide a means of storage and retrieval of SHIPALT data for CNO, NAVSEA, TYCOMs, and PERA(CV) in support of planning modernization packages for Aircraft Carriers.

Approach

PERA(CV) gathers and stores SHIPALT data from a variety of sources and provides the following programmed reports:

(1) Proposed Fleet Modernization Program (FMP) Listing, Report A-101. A numerical listing that contains the SHIPALT priorities and cost/manpower estimates resulting from the latest FMP conference.

(2) SHIPALT Data Bank, Report A-103. An ADP listing of SHIPALT information including SHIPALT number, revision, title, parts, applicable ships, SHIPALT brief, pertinent remarks, FMP status, AWR data, completion status, and return costs.

(3) Proposed FMP Listing, Report A-104. Same as A-101, except the listing is in TYCOM priority sequence.

(4) SHIPALT Status Listing, Report A-106. A summary of SHIPALTs showing applicability, completion, and cancellation status for each ship.

(5) Outstanding SHIPALT Listing, Report A-107. A summary of SHIPALTs, by ship, which have not been completed or have been cancelled.

- Continued -

Milestones	When Completed	Accomplishing Activity
SHIPALT Data Bank Reports prepared	As required	PERA(CV)

Interface with Other LCMM Tasks

Outputs from this task are used in Task Elements 4.2.5 (Implement Ship System Status Program) and 4.2.6 (Develop Alteration Program Planning Documents).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.1.6	MAINTAIN MAINTENANCE HISTORY FILES

Objective

Provide a consolidated file of maintenance and overhaul history to support advance planning.

Approach

PERA(CV) maintains a maintenance history file of selected systems/equipment for each Aircraft Carrier. The file is compiled from a variety of sources including CASREPTs, MDS, SFOMS reports, Departure Reports, MVA reports, SARPs, and other data. The file is intended to provide support in evaluating the effectiveness of the existing LCMM program and in determining the optimum frequency of overhauling/repairing systems/equipment.

Milestones	When Completed	Accomplishing Activity
Maintenance History Files maintained	Continuing, for each ship.	PERA(CV)

Interface with Other LCMM Tasks

Accomplishment of this Task Element is based on Task Elements 6.1.2 (Report Completed Maintenance Actions), 6.1.3 (Implement Casulaty Reporting Program), 6.1.4 (Prepare Departure Reports) and 3.6 (Implement MVA&I Program).

- Continued -

Task No.	Title
6.1.5	MAINTAIN SHIPALT DATA BANK (Continued)

Approach

(6) Corresponding SHIPALT Listing, Report A-109. A cross-reference index showing identical or similar SHIPALTS among CV and CVN class ships.

(7) Cost Comparison Report, Report A-110. An index showing FMP cost estimates for accomplishment of specific SHIPALTs for each ship. Also shows SHIPALT costs and percentage completion.

(8) Logistics Analysis Listing, Report A-111. A summary of programmed SHIPALTs arranged in numerical sequence.

(9) Consolidated Data Bank, Report A-112. A concise presentation of the information contained in the SHIPALT Data Bank.

LCMM TASK DESCRIPTION CONTINUATION SHEET

Task No.	Title
6.1.6	MAINTAIN MAINTENANCE HISTORY FILES (Continued)

Interface with Other LCMM Tasks

The maintenance history file is used in the accomplishment of Task Group 6.2 (Analyze Maintenance Data) and Task Element 4.1.2 (Establish Optimum Frequency of Accomplishing Routine Items).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.2	ANALYZE MAINTENANCE DATA

Objective

Provide systematic analysis of maintenance history in a form useful as feedback information for developing LCMM strategy and establishing Fleet material standards.

Approach

Analysis of maintenance data consists of:

(1) Determining equipment-level reliability and maintainability trends (see Task Element 6.2.1).

(2) Determining trends in the quantity of maintenance deferred (see Task Element 6.2.2).

(3) Conducting post-COH/SRA analysis (see Task Element 6.2.3).

(4) Analyzing the effectiveness of individual elements of the LCMM program.

Additional analysis programs not defined by the above are defined on an "as required" basis and incorporated into the LCMM plan.

Milestones	When Completed	Accomplishing Activity
See included Task Elements		PERA(CV) NAVSEA TYCOM

Interface with Other LCMM Tasks

Effort accomplished under Task Group 6.2 is based on data collected under Task Group 6.1.

The results of Task Group 6.2 are fed into Task Areas 1 (Develop LCMM Strategy) and 2 (Establish Fleet Material Standards).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.2.1	DETERMINE EQUIPMENT RELIABILITY/ MAINTAINABILITY TRENDS

Objective

Measure reliability and maintainability of systems/equipment and track these parameters as functions of time throughout the life cycle.

Approach

PERA(CV) and NAVSEA analyze maintenance history (primarily 3-M data) as necessary to quantify reliability and maintainability of systems/equipment. These parameters are measured in terms of failure/maintenance rates, maintenance burden, cost or other similar indications. The purpose of the analysis is to determine trends, isolate/rank problem areas, compare ships, or in general support specific material condition assessment programs such as those defined under Task Area 3.

This analysis will be accomplished for specific items as recommended by PERA(CV) and approved by TYCOMs and NAVSEA.

Milestones	When Completed	Accomplishing Activity
Reliability/Maintainability trends measured	Continuous	PERA(CV) NAVSEA
Listing of items to be monitored established	One time	TYCOM

Interface with Other LCMM Tasks

Analysis of reliability and maintainability trends is based on outputs from Task Elements 6.1.2 (Report Completed Maintenance Actions Using 3-M) and 6.1.4 (Prepare Departure Reports).

Results of this task support Task Elements under Task Area 3 and Task Element 4.1.2 (Establish Optimum Frequency of Accomplishment).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.2.2	DETERMINE DEFERRED MAINTENANCE TRENDS

Objective

Support budget development, allocation of assigned resources, and other decisions by providing visibility regarding trends in quantity of deferred maintenance.

Approach

Material condition will be measured periodically (at least quarterly) in terms of quantity of deferred maintenance, where deferred maintenance is the number of maintenance man-days necessary to restore an item to a satisfactory state, as defined in Task Area 2.

Measurement of deferred maintenance will be made at the following levels:

(1) The ship as a whole

(2) Mission-essential systems/equipment as defined by the Aircraft Carrier Mission Model

(3) Key items as selected by PERA(CV) or the TYCOM for exceptional management.

Deferred maintenance will be tracked throughout the life cycle of each ship.

Milestones	When Completed	Accomplishing Activity
Quantity of Deferred Maintenance determined	Quarterly, for each ship	PERA(CV) TYCOM

Interface with Other LCMM Tasks

Measurement of deferred maintenance is based on the results of Task Element 6.1.1 (Update CSMP).

The results of this task provide an input to Task Element 6.2.4 (Analyze Effectiveness of LCMM Program).

Sheet 1 of 1

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.2.3	CONDUCT POST-COH/SRA ANALYSIS

Objective

Assess the effectiveness of each COH/SRA and to identify problems warranting consideration for improvements in LCMM strategy.

Approach

Subsequent to each COH/SRA, PERA(CV), the TYCOM, overhauling activity, NAVSEA, and the ship conduct an analysis for the purpose of:

- o Determining if the COH/SRA objectives were met
- o Discussing SHIPALT and repair growth
- o Discussing permanent solutions to recurring problems
- o Identifying mission-critical deficiencies and their impact
- o Discussing material condition improvements and mission capabilities

Results of the analysis provide feedback data for conducting Task Areas 1 (Develop LCMM Strategy) and 2 (Develop Fleet Material Standards).

Milestones	When Completed	Accomplishing Activity
Post COH/SRA Analysis completed	Each COH/SRA	PERA(CV) TYCOM Shipyard NAVSEA Ship's Force

Interface with Other LCMM Tasks

Post-COH/SRA analyses are based on data resulting from Task Elements 5.1.1 through 5.1.3 and 5.2.1 through 5.2.3.

Results of this Task Element provide an input to Task Element 1.2.1 (Identify Maintenance Problems).

LIFE CYCLE MAINTENANCE MANAGEMENT TASK DESCRIPTION SHEET

Task No.	Title
6.2.4	ANALYZE EFFECTIVENESS OF LCMM PROGRAM

Objective

Provide an assessment of the effectiveness of LCMM Program elements, as an input to program improvement.

Approach

Under the Aircraft Carrier LCMM Program, PERA(CV) monitors the effectiveness of each program element and recommends refinements, additions, or deletions as appropriate. In accomplishing this activity, major indicators of program effectiveness such as cost of COH/SRA, frequency/rate of CASREPTs, estimated cost of outstanding deferred maintenance, INSURV passage rate or other appropriate parameters, will be measured and used as a basis for estimating the impact/significance of program elements.

Assessment of the effectiveness of the LCMM Program will be reported annually by PERA(CV) to TYCOMs and NAVSEA.

Milestones	When Completed	Accomplishing Activity
Effectiveness of LCMM Program Elements analyzed	Continuous	PERA(CV) TYCOM
Summary Report of LCMM Program Assessment submitted	Annually	NAVSEA

Interface with Other LCMM Tasks

Analysis of LCMM Program effectiveness is based on the data collected under Task Group 6.1 (Implement Maintenance Data Collection Programs).

Results of the analysis are used as a basis for annual update of the Aircraft Carrier LCMM Plan (Task Element 1.3.1).

PART 3

TASK ELEMENT INTERFACES

PART 3

TASK ELEMENT INTERFACES

The interfaces between Task Elements of the Aircraft Carrier LCMM Program are described on the Life Cycle Maintenance Management Task Description Sheets and illustrated by the following figures.

Figure 3-1 is an overall program activity network depicting the interrelationships between Task Groups. Activity networks depicting interfaces between Task Elements for each of the six Task Areas of the program are presented as follows:

- Figure 3-2, Develop LCMM Strategy
- Figure 3-3, Establish Fleet Material Standards
- Figure 3-4, Assess Material Condition
- Figure 3-5, Plan and Accomplish Scheduled Availabilities and Underway Maintenance
- Figure 3-6, Implement Maintenance Data Feedback System

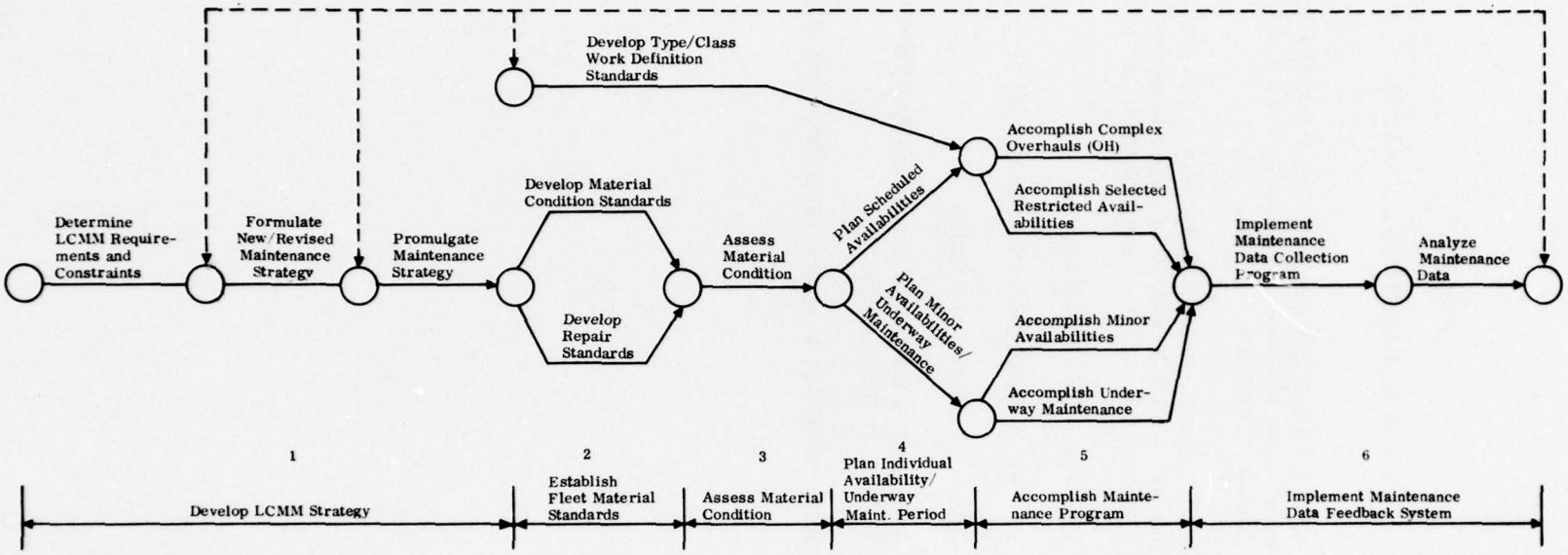

Figure 3-1. General Activity Network of Carrier LCMM Program

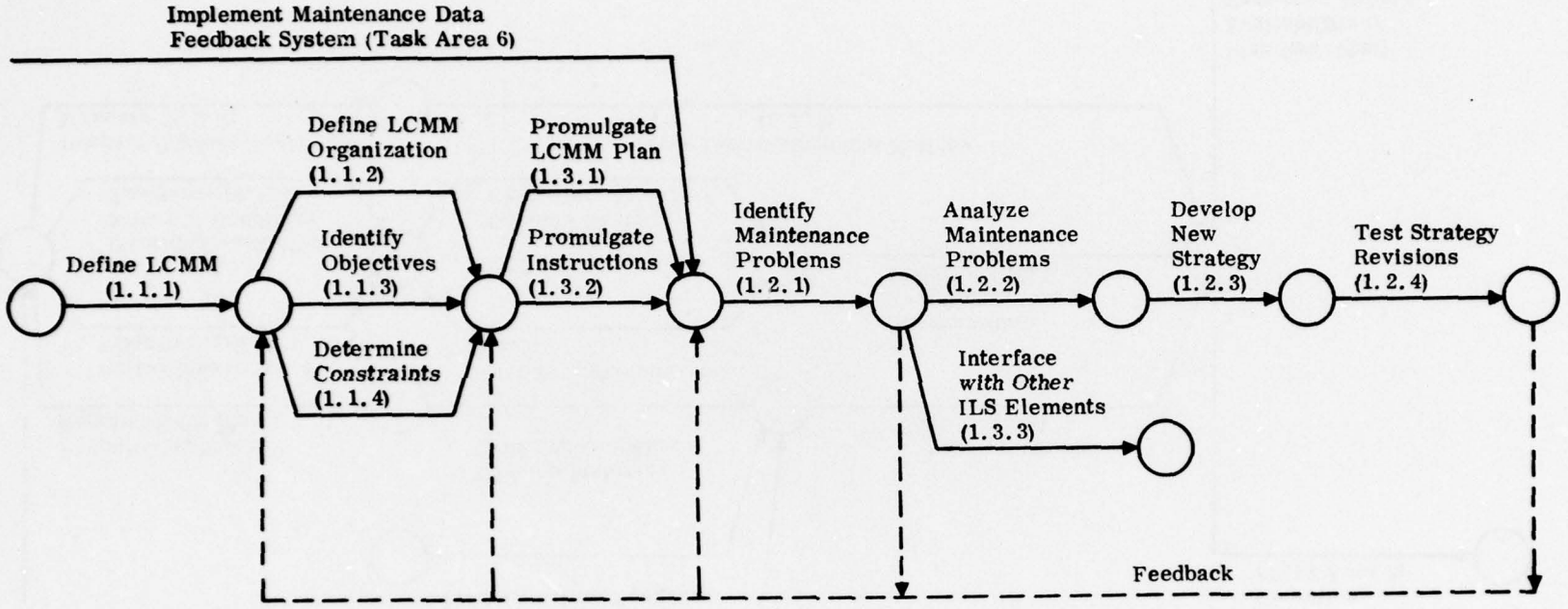

Figure 3-2. Activity Network for Development of LCMM Strategy

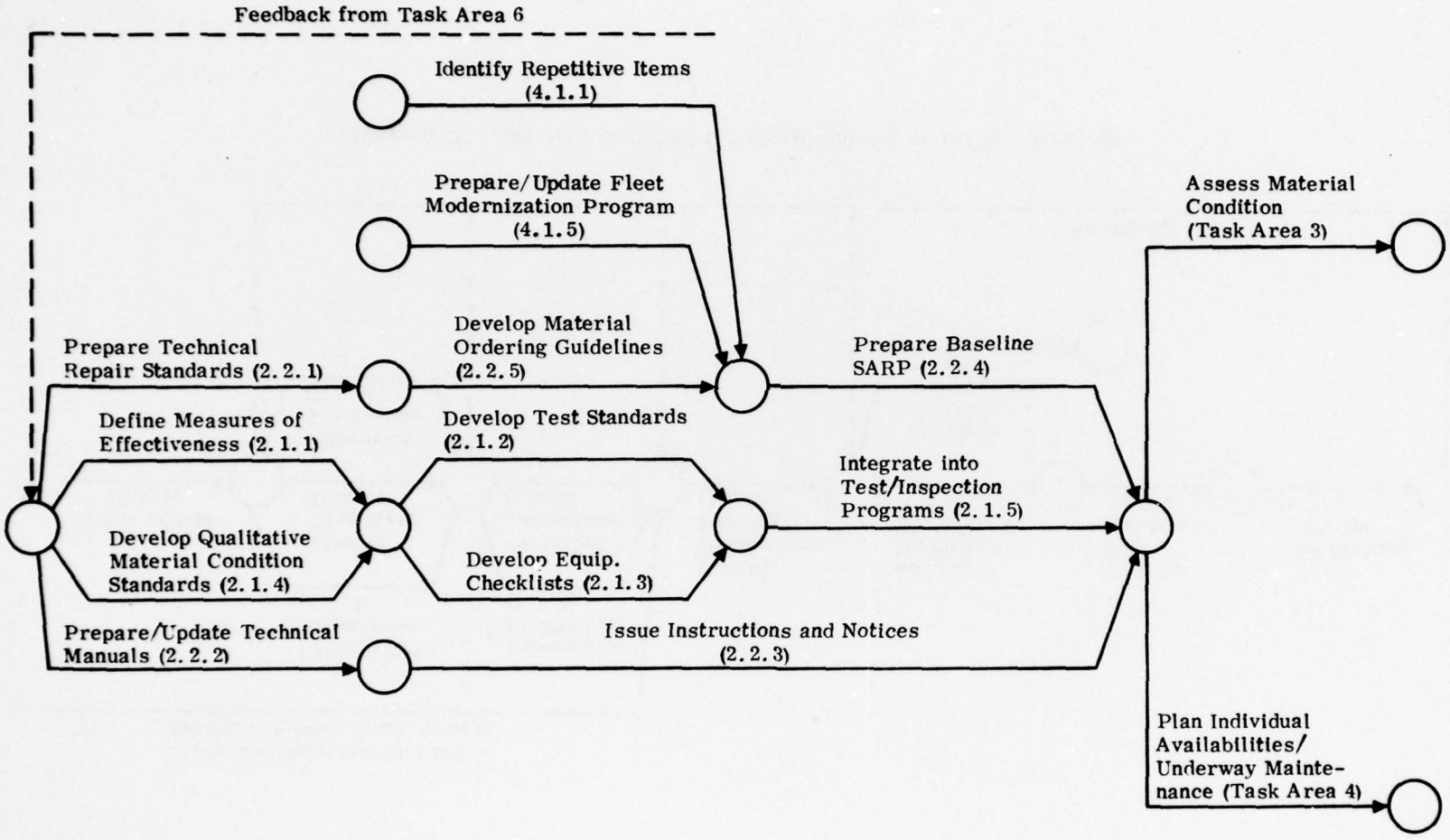

Figure 3-3. Activity Network for Establishing Fleet Material Standards

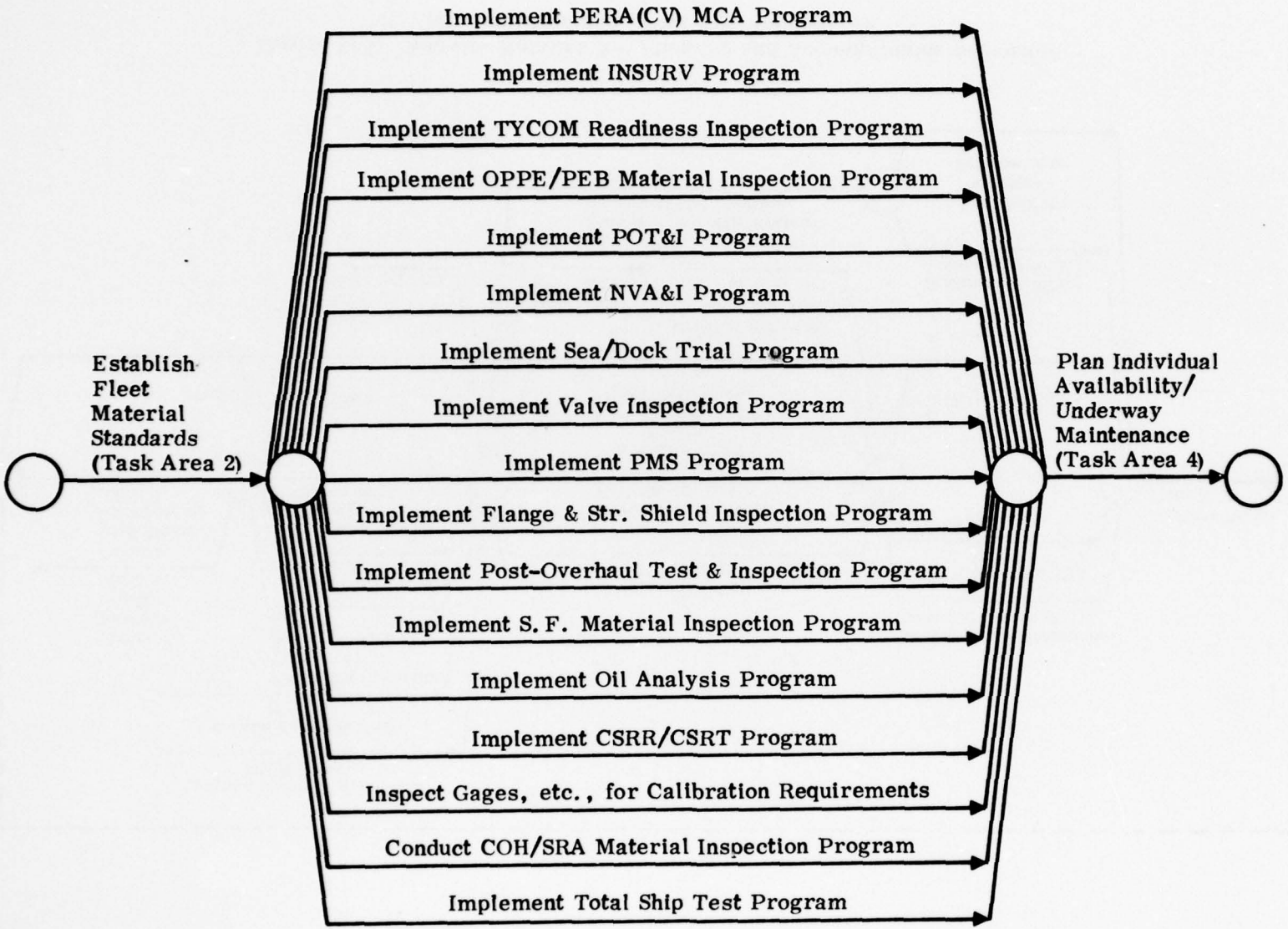

Figure 3-4. Activity Network for Assessing Material Condition

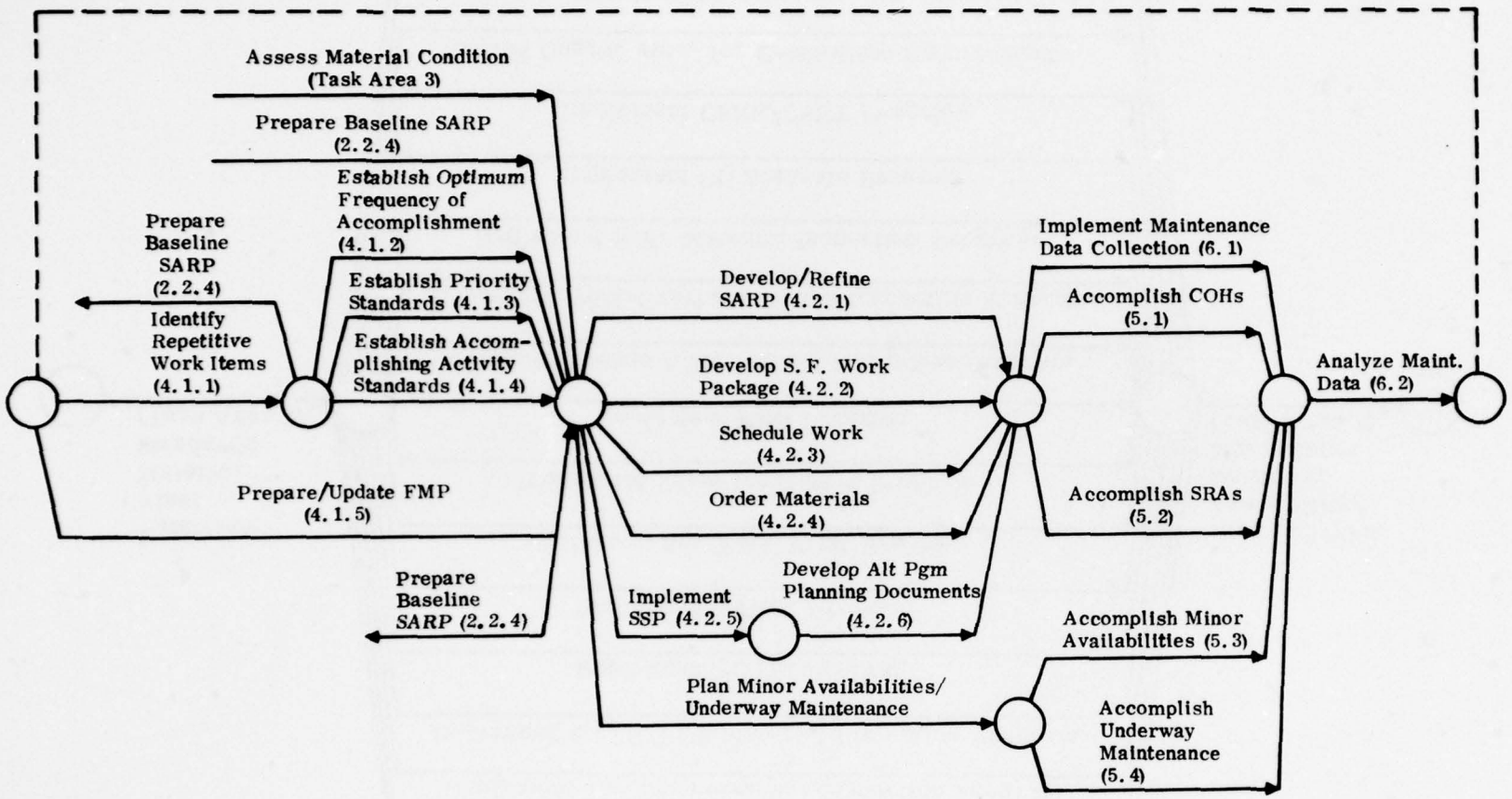

Figure 3-5. Activity Network for Planning and Accomplishing Scheduled Availabilities and Underway Maintenance

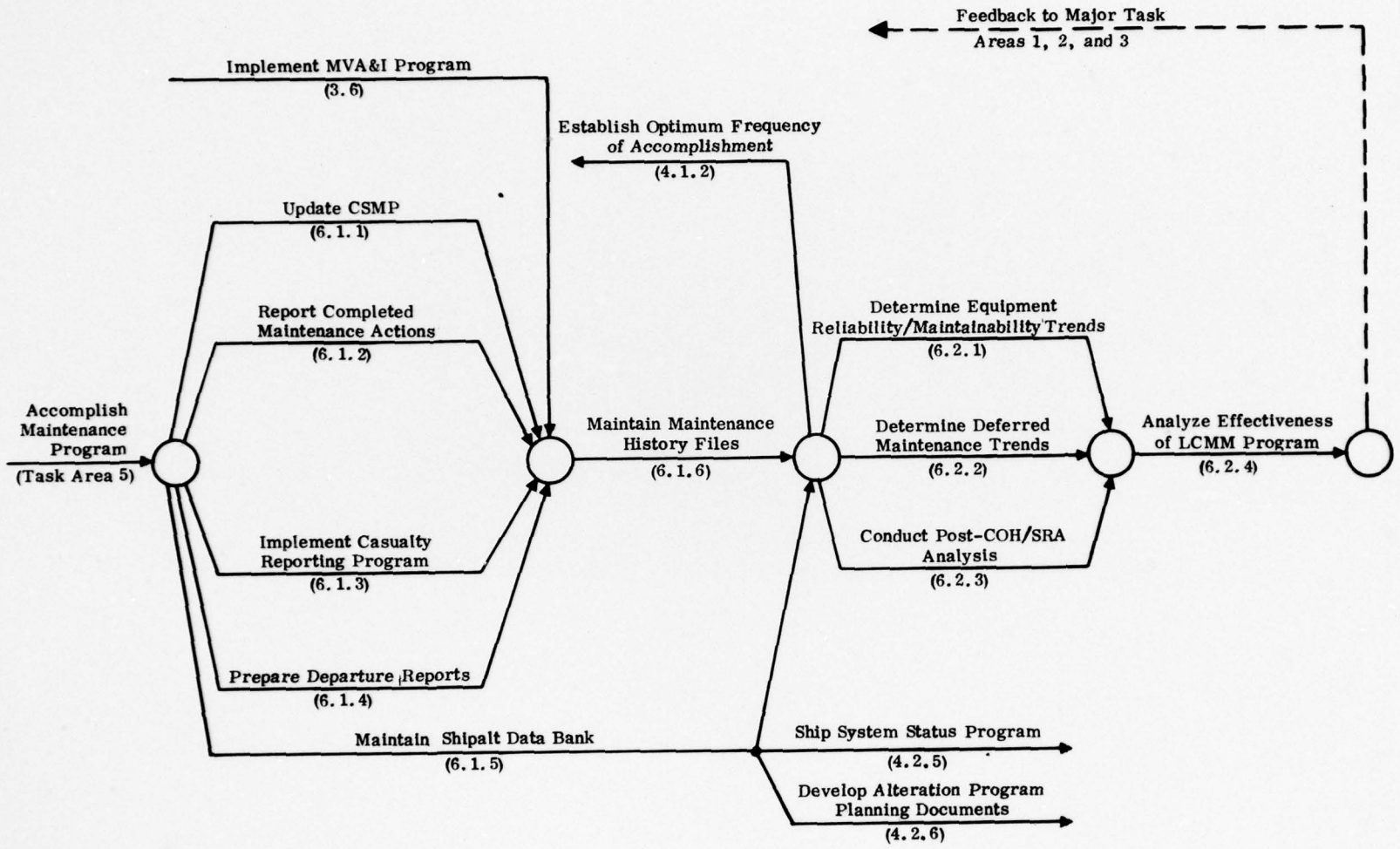

Figure 3-6. Activity Network for Implementing Maintenance Data Feedback System

APPENDIX

APPENDIX A

LIST OF INSTRUCTIONS/LETTERS RELATING TO CARRIER MAINTENANCE POLICY

A.1 CINCPACFLT Instructions

3040.4	Preparation and Submission of Afloat Casualty Reports
3540.2	1200 PSI Propulsion Plant Examinations of Pacific Fleet Ships
4700.6	Policy for Accomplishment of Intermediate Level Maintenance
4710.1	Policy for Accomplishment of Depot Level Maintenance on Ships, Service Craft and Boats
4710.5	Policy for Accomplishment of Work by Ship's Force During Overhauls and Restricted Availabilities at Industrial Activities
4710.6	Policy for Accomplishment of Ship Repair Work in WESTPAC
4730.2	Policy for Conduct of Pre-Overhaul Inspections and Shipchecks
4760.2	Responsibilities Incident to U.S. Vessels Undergoing Construction, Conversion or Modernizing
4790.1	PACFLT Policy for Navy Maintenance and Material Management (Ship) Systems (3-M)
5400.15	Engineering Department Organization Manual for Naval, Non-Nuclear, Steam Propulsion Surface Ships of the U.S. Pacific Fleet
5440.3	United States Pacific Fleet Regulations
7100.4	Monthly Summary of Fuel Inventory and Steaming Hours Report, CINCPACFLT Report 7100-2
7303.2	Material Used for Ship's Force Work
9330.2	Habitability Improvement Plan
9510.2	U.S. Navy Main Propulsion Steam Generation Plant Inspection and Certification Program
9880.1	Non-Essential Combustibles Aboard Ship; Removal of
9940.3	Shipboard Underwater Inspection and Repair Work

A.2 CINCPACFLT Letters

FF1-1 5213 Ser 43/4022Z of 1 July 1974 – Equipment Status Log

03BP:SPA Rev. 6/75--1200(600) PSI Operational Propulsion Plant Examination

A.3 COMNAVAIRLANT/NAVAIRPAC Instructions

3541.4	Material Condition
4700.1	Standard Navy Maintenance and Material Management (3M) System (Surface)
4710.1	Regular Overhauls and Restricted Availabilities
4720.1	Alteration Requests
4730.2	Inspection of Spaces and Equipment and Submission of Hull, Safety Device and Damage Control Reports
4730.4	Zone Inspection Procedure
5400.1	Standard Ship Organization and Regulations Aircraft Carrier Type
5400.2	Standard Organization for Ships of Naval Air Force, U.S. Atlantic and U.S. Pacific Fleets
9380.1	Ventilation System Cleaning
9930.2	CO_2 Extinguisher System; Replacement of Empty Cylinders

A.4 COMNAVAIRPAC Instructions

4700.1	Maintenance Instructions for Naval Air Force U.S. Pacific Fleet Ships
4790.1	COMNAVAIRPAC Shipboard Maintenance and Material Management (3-M) Manual
4790.4	Zone Inspection Program (ZIP)/Internal Work Request (IWR) System
4790.15	Shipboard Material History Records
5040.4	Periodic Carrier Readiness Inspection Program
5400.15	Naval Air Force U.S. Pacific Fleet Regulations

A.5 INSURV Instructions

4730.8 Reports of Trials, Material Inspections and Surveys Conducted by Board of Inspection and Survey

4730.11 Preparation of Deficiency Forms

9080.2 Trials and Associated Inspections of Surface Ships

A.6 NAVSEA Instructions and Notices

4700.19 INSURV Discrepancy Cards for New Construction and Conversion; Procedures for Card Conferences and Development of Post-Delivery Work Packages

4720.15 NAVSHIPS Directed Ship Maintenance Design Services; Responsibility of Forces Afloat Concerning

4790.5 Shipyard Support for Ship's Force Overhaul Management Systems (SFOMS) for CVAs and LPHs

9480 of 15 Mar 1971 – Non-nuclear Surface Ships, Boiler Blow Piping, Soot Blower Piping and High Pressure Steam Drain Piping; Maintenance Program for

9480 of 25 Oct 1974 – Flammable Liquid Piping Flange Shields

A.7 OPNAV Instructions

3540.4 1200 PSI Propulsion Examining Boards

4700.8 Trials, Acceptance, Commissioning, Fitting Out, Shakedown, and Post Shakedown Availability of U.S. Naval Ships Undergoing Construction/Conversion/Modernization

4700.16 Maintenance and Material Management

4720.2 Fleet Modernization Program (FMP) Planning Procedures

4720.76 Prohibitions of Unauthorized Alterations of Ships

4730.5 Material Inspections of Ships Conducted by the Board of Inspection and Survey

4790.4 Ship's Maintenance and Material Management (3-M) Manual

4790.6 Selected Equipment Reporting Under the Ship's 3-M System

5040.7 Naval Command Inspection Program

5040.12 Naval Command Inspection Program for Forces Afloat