



**P-501**

**Condition Based Maintenance  
Management (CBMM) Manual**

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## **FORWARD**

This Condition Based Maintenance (CBMM) Manual was developed by a combined team of Echelon II, III, and IV personnel to organize and document best management practices, processes, and strategies for inventory management, condition assessments, and requirements management in the form of standardized Maintenance Execution, Maintenance Action, and Long Range Maintenance Plans. This standardization will improve the fidelity of our Facility Condition Index (FCI) reporting and allow greater visibility on planned and executed maintenance actions across the enterprise.

This manual is a working document and as such it will undergo revisions as necessary to continue to incorporate best practices and lessons learned. It is intended to be both a resource and a training tool used in conjunction with Business Management System (BMS) processes. Therefore, it is the governing document for consistent CBMM practices for all NAVFAC echelons.

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## 7 GUIDANCE FOR ASSESSING STRUCTURES (TYPE 3 FACILITIES)

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### 7.1 Background

#### 7.1.1 Structures

Structures, Type 3 facilities, vary greatly in type and function and presenting a challenge for standardized condition assessments to establish a valid CI and FCI every five (5) years. This chapter contains instructions for performing condition assessments for structures, as classified by their respective Facility Analysis Category (FAC) codes. Since there is no OSD-approved sustainment management system (SMS) for structures, CI and FCI will be calculated based on the assessment approach defined below. It should also be stated, this instruction is not direction to the field to conduct condition assessments on all structures. This instruction is provided to support ad hoc assessments needed for project support or when specifically funded by local MUIC holders. NAVFAC, CNIC, and OPNAV will determine the overall requirement to assess non-centralized structures during FY17.

Structures vary in size and complexity. While some are similar to a typical building with building components, others are general structures supporting different mission needs such as gas-pump station islands, or rifle-ranges. Because these structures vary so much, they should be categorized into different assessment categories to limit the assessment frequency and methodology for performing and determining the condition index.

#### 7.1.2 Specialized Structures (Centrally Managed)

NAVFAC EXWC conducts condition assessments for all centrally managed specialized structures (waterfront, piers, dry docks, airfield pavement, bridges, rail, etc.). They manage the component inventory (CIMU), rate the condition and load deficiencies. The PWD interacts with EXWC through in-briefings, during the assessment process and out-briefings with the PWD. Once the on-site assessment is completed, a finalized report and CD is developed and submitted to the site. Condition information is loaded into Maximo on a quarterly basis by EXWC and NITC.

### 7.2 Non-Centrally Managed Structures Categories

Structure may vary significantly and identifying deficiencies to determine a condition may not be as easy to define. To assist and standardize how these facilities are managed and assessed in the field, we have categorized structures into the following groups for condition assessment:

- Building-Like
- Non-Building-Like
- Limited Assessment
- Non-Assessable

Detailed definitions for each category are detailed below along with a table providing methods for assessments. Later, we will assign structures by their DOD FAC-Code to the specific assessment categories.

### 7.2.1 Building-Like Structures

**Building-Like Structures** are inventoried and inspected using the same component sectioning, inventorying component types and assessment methodology as typical building components. UNIFORMAT II categories already exist for these component types. If additional categories are required, submit requests through the FEC CBMM POC for approval via the CBMM working group.

FAC-codes associated with Building-Like Structure types:

FAC-Code	FAC-Name
1444	Miscellaneous Operations Support Building
1499	Miscellaneous Operations Support Facility
2116	Aircraft Maintenance Shop, Depot
2262	Ammunition Production Facility
3901	Miscellaneous RDT&E Facility
4211	Ammunition Storage, Depot and Arsenal
4221	Ammunition Storage, Installation
4421	Covered Storage Building, Installation
7311	Fire Station Facility
7348	Car Wash Facility

Table 7-1 provides the Building-Like Structures assessment criteria.

**Table 7-1: Building-Like Structures Assessment Criteria**

<b>Assessment Frequency</b>	5-year basis	
<b>Recording CIMUs</b>	Facility could potentially contain multiple CIMUs.	
	Components will be broken up by sub-components (e.g., roofs, flooring, lighting, etc.).	
	Systems and components will comply with UNIFORMAT II assignments.	
<b>Assessment Methodology</b>	Visual (eyes-on-asset) assessment of components.	
	Inventory updates through the verification and collection of new asset sub-components (types, quantities, etc.). Establish DCR and identify deficiencies.	
	Identify and document DCR rating with identified deficiencies as required.	
<b>Direct Condition Rating (DCR) Method</b>	9-Point Rating System (same process used during the ICAP process).	
<b>DCR Definition</b> (Same DCR rating scale as used for ICAP Assessment)	<b>Green (+)</b>	Brand new or like new. Should receive this grade immediately after installation and recording of CIMU in MAXIMO. Typically within first year of installation.
	<b>Green</b>	Component is fully functional with no damage. Should receive this grade after first assessment; Typically within 1-3 years of installation.
	<b>Green (-)</b>	Slight or minimal damage/degradation but fully functional, just outside of 3 years of service life.
	<b>Amber (+)</b>	Some deterioration but fully functional without need for repairs.
	<b>Amber</b>	Definite deterioration/damage, still functional but requiring repairs to avoid further damage.
	<b>Amber (-)</b>	Moderate to significant deterioration/damage but still functioning, repairs are required to avoid replacement of asset.
	<b>Red (+)</b>	Significant deterioration/damage, service life nearing end, asset is functional but not reliable, repairs are temporary, must plan to repair or replace immediately.
	<b>Red</b>	Severe damage/degradation, almost not operational, repairs are frequent, total cost of repairs is greater than replacement value, asset is planned for replacement.
	<b>Red (-)</b>	Completely broken, non-operational, replacement is necessary, end of service life, safety hazard.

## 7.2.2 Non-Building-Like Structures

**Non-Building-Like Structure** components are inventoried and managed within MAXIMO to establish condition index (CI) and facility condition index (FCI). Typical building UNIFORMAT II categories do not fit these types of components. New UNIFORMAT categories need to be created to support the inventory and management of these assets. Non-Building-Like Structures are separated into two assessment categories to help guide assessors:

**Category 1:** The structures are visually assessed using a defined asset criteria to establish the correct rating. These include components such as recreation MWR piers, barricades, storage, etc. Table 7-2 shows FAC-Codes associated with these specific structure types.

**Table 7-2: Non-Building-Like Structures Category 1 FAC-Codes**

FAC-Code	FAC-Name	FAC-Code	FAC-Name
1114	Runway, Unsurfaced	2124	Missile Test Tower
1211	Aircraft Fueling Facility	2137	Fixed Crane Structure
1231	Vehicle Fueling Facility	2291	Construction Material Production Plant
1241	Aircraft Operating Fuel Storage	4111	Bulk Liquid Fuel Storage
1243	Vehicle Operating Fuel Storage	4121	Bulk Liquid Storage, Other Than Fuel
1244	Other Operating Fuel Storage	4231	Liquid Propellant Storage, Ammunition Related
1251	POL Pipeline	6900	Administrative Structure, Other Than Buildings
1261	Liquid Fuel Loading/Unloading Facility	7143	Miscellaneous Family Housing Support Facility
1341	Aircraft Navigation Facility	7235	Miscellaneous UPH Support Facility
1361	Airfield Pavement Lighting	7512	Outdoor Swimming Pool
1362	Airfield Lighting	7517	Recreational Pier
1381	Ship Navigation Facility	7518	Marina
1456	Missile Defense Facility	8232	Heat Gas Storage
1464	Aircraft Blast Deflector	8313	Water Separation Facility
1495	Revetment	8321	Sewer and Industrial Waste Line
1611	Harbor Control Facility	8332	Incinerator
1641	Harbor Marine Improvements	8452	Water Pump Facility, Non-Potable
1725	Training Pool and Tank	8512	Road, Unsurfaced
1733	Training Support Structure	8514	Vehicular Tunnel
1734	Observation Tower/Bunker	8525	Pedestrian Bridge
1735	Offshore Range Support Platform	8711	Storm Drainage
1795	Fire and Rescue Training Facility	8712	Retaining Structure
1796	Urban Combat Training Area, Non-Fire	8923	Vehicle Scales
1799	Confidence/Obstacle Course	8926	Hazardous Waste Storage or Disposal Facility
		8929	Miscellaneous Utility Facility

**Category 2:** These structures are not assessed visually, rather the condition is determined through conducting a review of corrective actions/work order history and interviews with personnel who use these components frequently. Table 7-3 shows FAC-Codes associated with these specific structure types.

**Table 7-3: Non-Building-Like Structures Category 2 FAC-Codes**

FAC-Code	FAC-Name	FAC-Code	FAC-Name
1458	Mechanical Security Barricade	7532	Outdoor Theater
1541	Shore Erosion Prevention Facility	7541	Recreational Camp and Trailer Park
1757	Pistol Range	8331	Refuse Collection and Recycling Facility
2135	Marine Railway	8522	Refuse Collection and Recycling Facility
4114	Landing Craft Wash Facility	8721	Boundary Fence and Wall
7130	Small Bulk Storage	8722	Security Fence
7513	Family Housing Trailer Site	8928	Loading Platform/Ramp
7514	Golf Driving Range	8999	Miscellaneous Component of Other Facility

Table 7-4 provides the Non-Building-Like Structures assessment criteria.

**Table 7-4: Non-Building-Like Structures Assessment Criteria**

<b>Assessment Frequency</b>	5-year basis.		
<b>Recording CIMUs</b>	Multiple or single CIMUs.		
	For "multiple," CIMUs may be bundled to cover only the major components. Example: Roof may typically be broken into various CIMUs to include roof covering, flashing, gutters, etc. To capture a roof in this assessment category, you would simply include all flashing and gutters under CIMU - "roof covering."		
	Systems and components will comply with UNIFORMAT II assignments.		
<b>Assessment Methodology</b>	<b>Category 1:</b> Assessment type is asset specific, see <b>Appendix D</b> for specific assessment criteria.		
	<b>Category 2:</b> Non-visual assessment type: <ul style="list-style-type: none"> <li>a) Review work order history (corrective action)</li> <li>b) Interview facility operator to identify/verify RSL</li> <li>c) Establish DCR</li> <li>d) Identify deficiencies.</li> </ul>		
<b>Direct Condition Rating (DCR) Method</b>	4-Point Rating System		
<b>DCR Definition</b>	<b>Category 1:</b> See <b>Appendix D</b> for specific assessment ratings.		
	<b>Category 2:</b>		
	<b>Green (+)</b>	Brand new or like new. Should receive this grade immediately after installation and recording of CIMU in MAXIMO. Typically within first year of installation.	
	<b>Green</b>	Component is fully functional with no damage. Should receive this grade after first assessment; Typically within 1-3 year of installation.	
	<b>Amber</b>	Definite deterioration/damage, still functional but requiring repairs to avoid further damage.	
	<b>Red</b>	Severe damage, almost not operational, near end of service life, safety hazard, repairs or replacement is necessary.	

Table 7-9 in section 0 defines the **Category (1 or 2)** of specific UNIFORMAT II assignments.

### 7.2.3 Limited Structures

**Limited** Structure components typically have low Plant Replacement Values (PRV) with long design life (generally large area structures – example sidewalks, ranges, landfills, baseball fields, etc.).

Assessment will be made once every five years. Limited structures are the easiest to assess since the general criteria to determine condition is whether or not the asset is operational. Deficiencies, when identified, will create a requirement of relatively low dollar value that will likely be executed in the current year. Table 7-5 shows FAC-Codes associated with limited structure types.

**Table 7-5: FAC-Codes for Limited Structures Components**

FAC-Code	FAC-Name
1751	Zero Range
1753	Record Fire Range
1756	Sniper Range
1758	Machinegun Range
3712	RDT&E Range Facility
7251	EUPH Tent Pad
7384	Miscellaneous Personnel Shelter
7521	Outdoor Playing Court
7522	Athletic Field
7531	Pavilion
8333	Sanitary Landfill
8524	Sidewalk and Walkway
8715	Storm Water Ponds

Table 7-6 provides the Limited assessment criteria.

**Table 7-6: Limited Assessment Criteria**

<b>Assessment Frequency</b>	5-year basis.	
<b>Recording CIMUs</b>	Single CIMU.	
	Systems and components will comply with UNIFORMAT II asset listings.	
<b>Assessment Methodology</b>	Interview facility operator or perform windshield survey to validate operational status.	
	If non-operational, identify major deficiencies required to bring asset back to operational status.	
<b>Direct Condition Rating (DCR) Method</b>	3-Point Rating System	
	<b>Green</b>	Component is fully functional/operational
	<b>Amber</b>	Component is fully functional/operational with mandated corrections required to maintain operational status
	<b>Red</b>	Component status is non-operational



#### 7.2.4 Non-Assessable Structures

**Non-Assessable** Structures may be deemed non-assessable if no deficiencies are logically determinable and the FCI is set to 100 (i.e., a parade field is a “designated” area and may receive additional grounds keeping, but there are no recognized criteria to measure a deficiency). Table 7-7 shows FAC-Codes that are associated with these specific structure types.

**Table 7-7: FAC-Codes for Non-Assessable Structure Components**

FAC-Code	FAC-Name
1492	Explosives Holding/Transfer Area
1497	Explosive Ordnance Disposal Area
1531	Marine Cargo Staging Area
1741	Maneuver/Training Land, Light Forces
1742	Maneuver/Training Land, Heavy Forces
1744	Parachute Drop Zone
1745	Parade and Drill Field
1750	General Purpose Small Arms Range
1755	Known Distance Range
1791	Aircraft Weapons Calibration Range
1793	Aircraft Weapons Range
4251	Open Ammunition Storage
4521	Open Storage, Installation
7516	Outdoor Recreation Area
7542	Miscellaneous Outdoor Recreation Facility
7603	Cemetery
9351	Dredging
9391	Other Real Property Improvements
9999	Not Real Property

## 7.3 Structures Asset Catalog

The Structures Asset Catalog lists Type 3 facilities currently inventoried in iNFADS. This list provides the designated assessment category for each facility, along with component descriptions:

### 7.3.1 Building-Like Structure Catalog

Table 7-6 lists Building-Like Structure assets with UNIFORMAT II Assignment and structure types.

**Table 7-8: Building-Like Structures Assets**

UNIFORMAT II Assignment	UFC Description
F104099	141 42 Air intelligence support center (sf) 125 20 Shed/shelter for pump station and ancillary equipment (sf)
F104099	149 86 Operations support shed (ea)
F104099	211 10 Aircraft overhaul and repair shop (navair depot) 21110-1 General
F104099	220 Production facility 226 56 Cast-high-explosives filling facility (sf)
F104099	390 RDT&E other than buildings and range facilities 390 10 Science systems facility (ea) 390 11 Aircraft systems facility (ea) 390 12 missile and space systems facility (ea) 390 13 Ships and marine systems facility (ea) 390 14 Tank and automotive systems facility (ea) 390 15 Weapons and weapons systems facility (ea) 390 16 Ammunition, explosives and toxics facility (ea) 390 17 Electronic, communication and electrical systems facility (ea) 390 18 Propulsion systems facility (ea) 390 19 Miscellaneous items and equipment facility (ea) 390 20 Underwater systems facility (ea)
F104099	421 Ammunition storage depot and installation 421 32 Inert storehouse 421 42 Smoked rum storehouse
F104099	441 10 General purpose warehouse (sf)
F104099	730 10 Fire station (sf) 73010-4 Station types 73010-5 Station classes 73010-6 Functions 73010-7 Functional areas 73010-8 Space allowance 730 11 Fire hose drying structure (ea) 730 12 Fire cart/hose drying facility (sf)
F104099	740 32 Exchange car wash (sf) 740 91 Mwr operated car wash (sf)

### 7.3.2 Non-Building-Like Structure Catalog

Table 7-6 provides a list of Non-Building-Like Structures with UNIFORMAT II Assignment, assessment category and structure types.

**Table 7-9: Non-Building-Like Structure Assets**

UNIFORMAT II Assignment	Assessment Category	UFC Description
F104001	Category 2	179 55 combat training pool/tank (ea)
F104099	Category 2	148 17 space surveillance antenna (ea) 213 73 landing craft wash rack (ea) 229 10 asphalt plant (ea) 229 20 concrete-batching plant (ea) 229 30 rock-crusher plant (ea) 714 30 family housing - other detached buildings (sf) 714 31 family housing - other detached facilities (ea) 714 32 community center (sf) 714 33 housing welcome center (sf) 750 61 recreational pier (ea) 750 60 marina/boat ramp (ea) 750 50 outdoor theater (ea) 750 39 mwr vehicle/rv/boat storage compound (sq.m./sf) 750 58 recreational campground-tent (sq.m./sf) 750 59 recreation campground - rv (sq.m./sf) 833 20 garbage grinder building (sf) 833 21 garbage grinder (tn) 730 82 recycling center (sf)
G201005	Category 1	872 30 mechanical security barricade (ea)
G204009	Category 2	690 10 flagpole/marker (ea) 690 15 saluting battery gun mount (ea) 690 30 classified material incinerator/shredder (no building) (ea)
G209999	Category 2	713 10 trailer sites for government owned trailers (sy) 713 11 mobile home park (sy)
I101014	Category 1	111 12 runway/rotary wing - unsurfaced (m2/sy)
I201001	Category 1	136 airfield pavement lighting
I301001	Category 2	134 navigation and traffic aids - other (non - ship related)
I4014099	Category 1	149 50 blast deflector fence (ea)
N1020110	Category 1	823 20 gas storage tanks (cf)
R211099 / R212099	Category 2	121 10 aircraft direct fueling station (gm) 121 20 aircraft truck fueling facility (gm) 122 10 marine fueling facility (gm)
R215099	Category 2	121 50 aircraft ready fuels storage (bl) 122 30 small craft ready fuel storage (ga)
R231799	Category 1	173 30 covered training area (sf)
R232099	Category 2	123 10 filling station (ol)
R232399	Category 2	123 30 vehicle and equipment ready fuel storage (ga) 123 40 ethanol ready fuel storage (ga) 123 50 biodiesel ready fuel storage (ga)
R253099	Category 2	125 30 surge storage (ga)
R259999	Category 1	125 16 pol pipeline pump station and ancillary equipment (ea)
R261099	Category 2	126 10 drum and can loading facility (sf)
V104099	Category 1	154 10 shallow water bulkhead and quaywall without a relieving platform (lf) 154 30 seawalls and rip rap (lf) 164 10 breakwater (lf)

		164 20 groins and jetties (lf)
V105099	Category 2	179 35 weapons range operations tower (ea)