

CONDITION
ASSESSMENT
SURVEY
(CAS)

QUICK REFERENCE GUIDE

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EXECUTIVE SUMMARY

The Office of Engineering and Construction Management (OECM) conducted a survey of existing Industry Standard Literature on real Property Condition Assessments and has compiled this quick summary guide.

It is responsible stewardship to protect the capital investment in a portfolio of facility assets against the continuous deterioration of components. The challenge is how to optimize the necessary investment to maintain the condition of the portfolio and extend its useful life.

Facility assets, at the time of construction completion, have an expected useful life based on preventive maintenance being performed at manufacturer directed intervals. A goal of facility asset management programs is to maintain the existing condition and extend the useful life, where possible, while minimizing the costs and insuring that the facility supports the organization's mission requirements. Performing facility condition assessments on a cyclical basis will provide the data necessary to produce the scientific data to justify the necessary expenditures to extend the useful life and to provide the reports necessary to show that the investments have produced the expected results.

This CAS Quick Reference Guide includes the various steps that organizations take in meeting the goals iterated above. The guide includes the qualifications that inspectors must have, the safety equipment and tools that they need and their responsibilities in planning and carrying out the inspections. Checklists are a key tool of the inspectors. There are several sources for checklists included. These lists must be adapted as needed for local use.

The Guide is intended to be a basis for discussion on the state of best practices in performance of Condition Assessment inspections. Additional information or suggestions to improve this document are invited and should be submitted through appropriate channels to the Department of Energy.

DOE INSPECTION REQUIREMENTS

The facilities inspection requirements are established by DOE O 430.1B, Real Property Asset Management. It states:

“1. OBJECTIVE. Establish a corporate, holistic, and performance-based approach to real property life-cycle asset management that links real property asset planning, programming, budgeting, and evaluation to program mission projections and performance outcomes. To accomplish the objective, this Order identifies requirements and establishes reporting mechanisms and responsibilities for real property asset management.....Paragraph 4.d.(2) Condition Assessments must be performed on all real property assets at least once during any 5-year period using inspection methods in accordance with industry standards. Some real property assets, such as those that are mission critical or safety related, may require a more frequent inspection cycle The second step in an effective facility management strategy to know the condition of your facilities and how much it will cost to replace and repair facility systems and components. The assessment or inspection process supports the vital process of identifying facility conditions that are founded on recognized, fully defined industry based inspection and deficiency standards.”

WHY CONDITION ASSESSMENT INSPECTION

Facility assets, at the time of construction completion, have an expected useful life based on preventive maintenance being performed at manufacturer directed intervals.

It is responsible stewardship to protect the capital investment in a portfolio of facility assets against the continuous deterioration of components. The challenge is how to optimize the necessary investment to maintain the existing condition of the facilities portfolio and extend the useful life when economically possible. Performing facility condition assessments on a cyclical basis will provide the data necessary to produce the scientific data to justify the necessary expenditures to maintain the existing condition, define opportunities to extend the useful life and to provide the reports necessary to show that the investments have produced the expected results.

The significant budgetary problem that portfolio managers face is how to show in a scientific way that the investment in the maintenance of facilities has an adequate Return on Investment (ROI). Proposed expenditures must compete for money that organizations could put to other good uses. When there is a reduced maintenance funding level, many valid needs remain untended, deterioration worsens, facility condition suffers, and facilities degrade at an accelerated pace. When maintenance and repair suffer the lack of funding, the amount spent on emergency service work will continue to grow. The proverbial “Death Spiral” is met when all available maintenance resources are spent on emergency service work. When this happens, the useful life of the facility is compromised.

The use of the facilities condition assessment results along with a prioritization algorithm will, over time, answer these questions:

- What investments are needed in repairs, renewals, and modernizations?
- Which investments should be made with our limited funds?
- What are the risks and outcomes of investments made and not made?
- Determine optimal time when the investment should be made?

Conducting condition assessments and producing the necessary data is the method that can be used to both justify the investment and to define and prioritize the projects required to maintain the facility asset portfolio.

Real Property Asset Managers must concern themselves with all aspects of facility life cycle costs associated with stewardship from the acquisition of a facility throughout the maintenance and operations phases. The challenge is to keep the facility in adequate condition to meet the organization's mission when resources are tight. Successful managers must extend the life of the facility by making choices on where to spend limited budget resources. A program management approach that includes reliance on facility condition assessment inspection and prioritization of needed repairs based on organization mission will help in minimizing overall organizational life cycle costs and minimizing disruptions to critical operations.

Facility Managers and their staff should have technologically enhanced access to all facility information available including life cycle projections, mission criticality, prior condition assessment, and recent repair data. It is important that the compilation of that intelligence be used in planning and carrying out the facilities condition assessment inspection program. Additionally, condition assessment inspections should be performed by qualified technical personnel that are familiar with the facility, equipment, building codes, safety requirements, etc.

QUALIFICATIONS OF CONDITION ASSESSMENT PERSONNEL

These recommendations apply to all alternatives:

- Condition inspections should be performed under the supervision of a qualified Professional Engineer.
- Condition inspections are best performed by tradesmen and engineers.
- The person performing the inspection must be trained to consider repair versus replacement, methods of repairs, energy sensitive materials, working conditions, relative life-cycle economics, sustainment, and greening initiatives in order to provide adequate data to produce a valid cost estimate for each of the Deferred Maintenance (DM) deficiencies identified.

Recommended minimum requirements:

Engineer or tradesmen that have:

- At least three years of experience in the trade field of the inspections.
- Experience in preparing cost estimates for work of a similar nature.

- Ability to read architectural drawings.
- Ability to review and write technical documents.
- Ability to discuss and support his findings when questioned.
- Familiarity with building codes local and national.

CONDITION ASSESSMENT TOOLS

Most Condition Assessment professionals rely/refer to Facility /Component Inspection Checklists.

Most Checklists are customized or updated from general checklists available from different sources such as the following:

Handbook of Facility Assessment

Author: James E. Piper

Publisher: Fairmont Press (2004)

ISBN-13: 978-0824709327

Inspection of Shore Facilities

Author: NAVFAC MO 322 Vol. II

Publisher: SN 0525-LP-542-8700

http://www.wbdg.org/ccb/NAVFAC/OPER/mo322_2.pdf

The checklists are locally developed to provide adequate inspection requirements and to acquire the data input requirements of the Asset Management System used at the field element and the DOE Deferred Maintenance structure.

Checklists should be updated periodically to reflect changing priorities and new technologies such as:

- Opportunities for Greening
- Opportunities for improved Sustainability

EXAMPLE:

Below is a general checklist for Metal Roofing. This checklist is referenced to the American Society for Testing and Materials (ASTM), E1557, UNIFORMAT II, which defines a standard classification for building elements and related site work. A localized checklist could be created which would have data recovery input requests for data not on file for the specific facility (color, manufacturer, gauge, type of sealant, age, method of access to the roof or any other data). The localized checklist would provide data recovery inputs to support the Asset Management System. This type of custom checklist also provides a ready document for training new inspectors.

General Note: The method of access and element location are important information to retain for return work or re-inspection. Accesses are often locked, require escorts, or require specific equipment. Prior planning, based on the local checklist, can make the Condition Assessment effort more efficient.

SAFETY EQUIPMENT

Safety equipment should be provided to inspection personnel as required. This equipment might include hard hats, ear plugs, safety shoes, safety glasses, gloves, coveralls and knee pads. This is not a complete list. Specific review of local and industry standard safety requirements should be reviewed to provide individual safety. Guidance on the proper use of safety equipment should also be provided to condition assessment inspection personnel. Assessment teams comprised of two employees should be standard practice when inspecting electrical, steam, dynamic systems, or other systems where there is a higher safety risk. Specialized professionals maybe required to perform specific condition assessment such as Industrial Hygienists and Safety Inspectors.

INSPECTION TOOLS

The following items will be useful during inspections:

- Employee Identification Card - to be worn
- Ladders
- Transportation
- Digital Camera
- Electronic and manual tape measures
- Electronic voice recorder
- Measuring wheel
- Lap top or Note pad / Clip board
- Inspection instructions / Checklist for specific trade and facility
- Flashlight
- Rain suit
- Tool bag with trade specific tools
- Cell Phone / Voice communications

FACILITY INSPECTION SCHEDULING CONSIDERATIONS

When developing inspection schedules, certain variables to consider are:

- Excess Facility Asset
- Leased
- Time to inspect a facility
- Team size
- Climatic conditions
- Mission Dependency
 - Mission Critical
 - Mission Dependent, Not Critical
 - Not Mission Dependent
- Mission Dependand
 - Not Critical
 - Not Mission Dependand

PREPARING TO INSPECT

Facility Managers and their staff should have technologically enhanced access to all facility information available including life cycle projections, mission criticality, prior condition assessment, and recent repair data. It is important that the compilation of that intelligence be used in planning and carrying out the facilities condition assessment inspection program. The condition assessment team should review the historical information available including repair work and actual performance of preventive maintenance that is scheduled and completed. Previously determined or deficiencies referred by the facility occupants should be inspected and validated.

Items to consider are:

- Safety requirements
- Opportunities for Greening
- Opportunities for improved Sustainability
- Security clearance for facility
 - Escorts required
- Agency's Master Plan
 - Functional changes
 - Mission changes
- Floor plans
 - Space Utilization
- Previous alterations
 - Impact
 - HVAC
 - Indoor Air Quality
- Planned/Funded maintenance projects
- Adherence to preventive maintenance performance
- Warranty Information
- Building occupants complaints
- Mission Critical
- Mission Dependency
 - Mission Critical
 - Mission Dependent, Not Critical
 - Not Mission Dependent
- Historical information
 - Repairs
 - Alterations
 - Energy use
 - Previous condition assessments

CONDITION ASSESSMENT SYSTEM COMPONENTS

System requirements to support a compliant Real Property Asset Management Program vary depending on the size and complexity of Facility Complex.

LESSONS LEARNED / BEST PRACTICES IN CONDITION ASSESSMENT EFFORTS

COMPONENT HISTORY

Component system performance data should be maintained and compared overtime to the manufacturer's performance specifications and the previously recorded data. The variances in the data may indicate an increased deterioration rate which will require more rapid replacement. Review of the adherence to the manufactures suggested periodic preventative maintenance requirements will aid in evaluating the true life expectancy of the component.

FACILITY STEWARDSHIP CULTURE

Highly successful Asset Managers have created a facility stewardship culture where professional facility managers and trades journeymen perform mental condition assessments every time they enter/exit a facility and documenting the maintenance requirements. Some of the initial assessments will be that further detailed inspection is required to determine the extent of repair/replacement required. The knowledge and available documentation of prior facility deficiencies make the periodic condition assessment process less time consuming and provides for assessment of the rate of deterioration from the last input.

INSTALLED EQUIPMENT INVENTORIES

Component systems/equipment lists should be maintained from construction completion through the warranty period until the component is replaced.

Modern technology has and will continue to offer opportunities to improve the effectiveness of the condition assessment processes such as the use of Bar Codes on individual equipment. This allows for easy access to equipment data and history including:

- Manufactures Operating Specifications
- Manufacturers Recommended Preventative Maintenance (PM)
- Actual PM History
- Recorded Performance Data
- Repair History

INSPECTION EFFICIENCIES

Most successful condition assessment inspection programs combine multiple required facility reviews such as:

- Occupational Safety and Health Act (OSHA)
- Americans with Disabilities Act (ADA)
- Hazard Storage Compliance
- Opportunities for Greening
- Opportunities for Improved Sustainability
- Opportunities for Improved Energy Use
- Opportunities for Improved Space Utilization

LEVEL OF INSPECTION

The level of inspection effort and quantity of data generation from periodic inspections should be responsibly adjusted based on the risk of compromising mission accomplishment should a failure occur at that facility or component. Responsible assignment of resources should follow the assigned facility importance whether:

- Mission Critical
- Mission Dependant, Not Critical
- Not Mission Dependant

Additional consideration should also be given to facilities in the following categories:

- Excess Facility Asset
- Assets scheduled for demolition

It is ultimately the responsibility of the site/field manager to utilize the data established by the CAS to gain an understanding of the assets functioning capability to maintain mission readiness, while considering the critically of the asset in meeting the goals of the site and the Department (DOE).

OTHER PREDICTIVE METHODS / NON-VISUAL ASSESSMENTS

Non-visual condition monitoring is used primarily in Reliability Centered Maintenance programs for tactical management of production machinery rather than for strategic planning for capital repair and replacement of building components and systems. Most building components and systems usually don't warrant the added expense of non-visual condition monitoring unless there is an operational imperative to significantly reduce the short-term risk of unexpected breakdown.

In those cases where non-visual condition monitoring of selected building components may be warranted, specific specialized predictive maintenance method may be utilized to avoid failure of key components, such as:

- Vibration Analysis
- Moisture Analysis
- Infrared Analysis
- Photo Energy Imaging
- Oil Analysis

OTHER REFERENCES / LINKS

<http://caisinfo.doe.gov/InspLinks.htm>