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Standard Practice for Equipment Management Process Maturity (EMPM) Model¹

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^{ε1}Note—Editorial changes were made throughout the text in December 2005.

INTRODUCTION

Life-cycle equipment management has a great impact on business operations of almost all entities. In fact, the success or failure on an entity may hinge on how effectively and efficiently an entity performs in the equipment management life-cycle. Entities that sustain high maturity levels will generally be more effective or competitive or both than entities with lower maturity levels in that these entities will more efficiently and effectively acquire what is needed, use and control equipment better, and dispose of equipment when no longer sufficiently suitable for operations.

1. Scope

1.1 This practice covers a process for the assessment and reporting of an entity's overall equipment management process maturity (EMPM).

1.2 The highest value is placed on continuous improvement as reflected in measured increases in maturity over time.

1.3 The EMPM model is designed to be applicable and appropriate for all equipment-holding entities, however, the EMPM may not be the only acceptable assessment model available.

1.4 It includes all aspects of equipment management.

1.5 In addition to applicability to equipment and equipment management as defined in this practice, this practice may in whole or in part be effectively applied to intangible property, real property, and material.

1.6 There is great variation across organizations regarding the internal departments that accomplish the various aspects of equipment management. Thus, all criteria are not applicable to all entities.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E2131 Practice for Addressing and Reporting Loss, Damage, or Destruction of Tangible Property

E2132 Practice for Physical Inventory of Durable, Moveable Property

E2135 Terminology for Property and Asset Management

E2219 Practice for Valuation and Management of Moveable, Durable Property

E2220 Practice for Establishing the Full Valuation of the Loss/Overage Population Identified During the Inventory of Moveable, Durable Property

E2221 Practice for Administrative Control of Property

E2279 Practice for Establishing the Guiding Principles of Property Management

3. Terminology

3.1 *Definitions:*

¹ This practice is under the jurisdiction of ASTM Committee E53 on Property Management Systems and is the direct responsibility of Subcommittee E53.05 on Property Management Maturity.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.1 *entity, n*—agency, company, organization, or institution.

3.1.2 *equipment, n*—non-expendable, tangible, moveable property needed for the performance of a task or useful in effecting an obligation. **E2135**

3.1.3 *equipment management, n*—systematic planning and control of equipment to optimize its service delivery potential and the management of associated risks and costs throughout its life-cycle in support of organizational objectives. This includes the process management and operations of acquisition or construction of the equipment; its operation, maintenance, and modification while in use; and its disposal when no longer required.

3.1.4 *operations, n*—exercise of the tasks that constitute equipment management.

3.1.5 *practice, n*—a definitive set of instructions for performing one or more specific operations that does not produce a test result. **Form and Style³**

3.1.5.1 *Discussion*—Of the several types of standards listed in the ASTM Form and Style Guide, for ASTM Standards guide, this standard is of the type designated as a practice.

TABLE 1 Functional Responsibilities

Equipment Management Process Maturity (EMPM) Model Responsibilities (O = Operations, M = Process management)																			
Internal Responsibilities in the Subject Organization (Example)	Asset Man- age- ment	Func- tional Org- ani- zation	Pro- cure- ment	Logis- tics	Con- tracts	Import/ Export	Sen- ior Man- age- ment	Re- ceiv- ing	Ware- house	Qual- ity	Fi- nance	Mate- rial Man- age- ment	Con- fig- ura- tion Man- age- ment	Pro- gram Con- trol	IT Asset Man- age- ment	Cali- bra- tion	Tool- ing Man- age- ment	TBD	
1.0 Acquisition criteria																			
1.1 Process management																			
1.2 Operations																			
2.0 Use criteria																			
2.1 Process management																			
2.2 Operations																			
3.0 Disposition criteria																			
3.1 Process management																			
3.2 Operations																			

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3.1.6 *process management, n*—planning and administering the activities necessary to achieve a high level of performance in a process and identifying opportunities for improving quality, operational performance, and ultimately, customer satisfaction. It

² From the ASTM Form and Style Guide, Available from ASTM International Headquarters, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

³ From the Form and Style for ASTM Standards guide, available from ASTM International Headquarters.

involves design, control, and improvement of key business processes. Evans and Lindsay, 1999⁴

3.2 *Acronyms:*

3.2.1 *CIP*—construction in progress

3.2.2 *EMPM*—equipment management process maturity

4. Summary of Practice

4.1 The EMPM model provides insight into the effectiveness of an entity as it acquires, uses, and disposes of the equipment necessary to the functioning of the entity. It enables a holistic approach and vision for achieving cost-effective, responsive equipment acquisition, use, and disposition. It clarifies and illuminates functional responsibilities and associated functional areas.

4.2 The functional responsibilities chart in Table 1 presents the distribution of duties as a hypothetical entity embarking on an EMPM assessment.

4.3 The equipment life-cycle as addressed in this practice encompasses three fundamental life-cycle phases: acquisition, use, and disposition.

4.4 This practice addresses two fundamental levels of equipment management activity within the entity: process management and operations.

4.5 This practice recognizes five maturity levels (see Table 2).

TABLE 2 Five Maturity Levels

Equipment Management Process Maturity (EMPM) Model	Definition	Descriptive Terms
1.0 Basic	Processes are generally ad hoc and on access. Processes that are chaotic, undocumented, and inconsistent, typically the starting point of a process.	Start of process, processes having basic framework, duties are assigned and task performers are identified.
2.0 Managed	Projects of the organization ensure requirements are managed and processes are repeated.	Defined, performed, measured, and controlled.
2.0 Structured	Processes that have been defined and are understandable, documented, and capable of being repeated.	Defined, documented, capable of being repeated, understandable, implemented.
3.0 Defined	Processes are understood at the organizational level; standard organizational processes.	Ess, standards, tools, and methods exist that are tailored for use on the projects.
3.0 Consistent	Processes that are prescribed and consistently performed at the organizational level with consistent results.	Established and prescribed, consistently performed, consistent results obtained.
4.0 Quantitative and Predictive	Sub-processes are selected that significantly contribute to overall process performance and they are controlled using quantifiable.	Systematic techniques; quantitative objectives for quality and process performance are established; special causes of variation are detected and corrected as appropriate.
4.0 Managed	Processes that are systematic, have process performance established, and are predictable.	Systematic, calculated, regulated, metrics applied, objectives established, continuous improvement.
5.0 Continuous improvement	The organization focuses on continuous improvement.	Habitually improving process performance through both incremental and technological improvements.
5.0 Optimizing	Processes that are embedded within an organization and are supported through all levels of management.	Habitual, perpetual, inherent quality, recurrent, culturally embedded, supported throughout all levels of the organization.

5. Significance and Use

5.1 *Internal*—The EMPM provides assessment results that are easy to understand and communicate. Areas requiring additional resources become apparent, and thus, can be more readily addressed. Improvement can be tracked in meaningful ways. Assessment detail allows attention to be drawn to processes of exceptional maturity and areas in which changes or additional resources, or both, are required to achieve process improvements.

5.2 *External*—Meaningful comparisons to external requirements are enabled. Comparisons of equipment management between entities in different operational or business environments become meaningful and provide insight previously unavailable.

6. Applicability

6.1 This practice may be applied to the entirety of the legal entity or a clearly defined, designated constituent part.

6.2 An entity’s equipment holdings may encompass equipment acquired by all legal means:

6.2.1 Company owned equipment,

6.2.2 Leased equipment,

6.2.3 Licenses,

6.2.4 Customer-provided equipment,

6.2.5 Seized equipment,

⁴ Evans, James J., and Lindsay, William, The W., *The Management and Control of Quality*, 1999, p. 340.

- 6.2.6 Bailed equipment,
- 6.2.7 Borrowed equipment, and
- 6.2.8 Loaned equipment.

6.3 This practice may be applied to the entirety of the entity's equipment holdings or a clearly identified subset. This designation constitutes the assessment universe for the designated entity.

6.4 To the extent this practice is applied to a limited equipment universe or is limited to a portion of the entity, these limitations should be prominently noted when presenting results of the assessment.

6.5 This practice should be applied to the designated equipment universe regardless of the internal organization acquiring, using, or disposing the equipment.

7. Levels of Equipment Management Activity

7.1 There are two fundamental levels of equipment management activity within the entity: process management and operations.

7.2 Process management encompasses criteria for the people, processes, and systems involved in equipment management for each life-cycle phase.

7.2.1 Leadership:

7.2.1.1 *Outcome/Process Orientation*—Management and control systems are based on specific desired outcomes or process-oriented metrics that encourage improved performance and effective management. (See Practice E2279.)

7.2.1.2 *Best Value Products*—Management systems are designed to deliver on a timely basis the “best value” product to the organization and its customers, while preserving the confidence of internal and external stakeholders. (See Practice E2279.)

7.2.1.3 *Personal Initiative*—Practitioners exercise personal initiative and sound business judgment in providing the “best value” services to meet the organization's needs. (See Practice E2279.)

7.2.1.4 *Lines of Authority/Accountability*—Management and control systems have clear, direct lines of authority and organizational accountability for performance and custodial care. (See Practice E2279.)

7.2.1.5 *Best-in-Class Management*—Best-in-class management practices and integrated management systems are recognized, identified, and adopted. (See Practice E2279.)

7.2.1.6 *External Interface*—Effective partnerships with external customers are established, and effective service is provided.

7.2.2 Planning:

7.2.2.1 *Strategic Plan*—Entity has developed and implemented an ongoing equipment management strategic planning process leading to a strategic plan with clear goals, objectives, and programs that is consistent with entity plans and objectives.

7.2.2.2 *Metrics*—Standard and entity specific measures have been identified and implemented. Examples of metrics that may be used include: (1) average time taken to tag and insert data into a property database upon receipt, (2) average time taken for a property custodian to recognize data accuracy and physical control upon initial receipt, (3) average annual cost of an inventory per item, (4) inventory accuracy per Practice E2132, and (5) average time taken to dispose of an item once it is declared excess.

7.2.2.3 *Financial Plan*—The entities need for equipment resources is viewed holistically, and financially planned.

7.2.3 Policy, Procedures, and Internal Controls:

7.2.3.1 *Exercise of Responsibility*—Equipment management officials may assume that if a specific strategy, practice, policy, or procedure is in the best interest of the agency, company, institution, and stakeholders and is not addressed in operating policies or a consensus standard nor prohibited by law, executive order, or other regulation, that action, in accordance with the strategy, practice, policy, or procedure, is an acceptable exercise of responsibility and authority. (See Practice E2279.)

7.2.3.2 *Sound Policies*—Entities have established policies and management systems for the acquisition of equipment.

7.2.3.3 *Reutilization*—Entity has programs to encourage the reutilization of equipment and facilitate the reassignment of equipment among organizational elements when such equipment is determined to be no longer needed for the current purpose. (See Practice E2279.)

7.2.3.4 *Consensus Standards*—Equipment management is performed in accordance with existing applicable consensus standards.

7.2.3.5 *Available, Implemented, and Enforced*—Entity has devised and maintains a system of internal management controls sufficient to provide reasonable assurances that: transactions are executed in accordance with management's general or specific authorization; transactions are recorded as necessary in conformity with generally accepted accounting principles; access is limited; and the recorded accountability for equipment is compared with existing equipment at reasonable intervals and appropriate action is taken with respect to any differences. (See Practice E2279.)

7.2.4 Personnel and Staffing:

7.2.4.1 *Adequate Staffing*—Equipment management process management and operations roles are adequately staffed to achieve the entity's equipment management goals and comply with applicable external standards, laws, regulations, and applicable agreements and contractual obligations.

7.2.4.2 *Requisite Skills*—Equipment management process management and operations staffs have the requisite skills to complete their jobs effectively. (See Practice E2279.)

7.2.4.3 *Trained Staff*—Equipment management process management and operations staffs are adequately trained and have the opportunity for continuing education and advancement.

7.2.5 Financial Management:

7.2.5.1 Funding Mechanism Information Provided—For purposes of financial accounting, all equipment purchased should be identified as a capital expenditure, held for future use, or as an operating expense. (See Practice E2279.)

7.2.5.2 Financial Accuracy—Equipment management and accounting books and records shall be kept in reasonable detail that affords reasonable assurance that the system accurately reflects the transactions and dispositions of the equipment of the owner. (See Practice E2279.)

7.2.5.3 Balances Costs and Risks—The degree to which equipment is controlled and the costs of control is commensurate with the practical consequences of a shortage (non-availability of inventory) and the critical nature of an item's loss, all in accordance with Practice E2221. (See Practice E2279.)

7.2.5.4 Best Value—Entity seeks the best value in the long term in the use and maintenance of equipment. (See Practice E2279.)

7.2.5.5 Loss/Overage Controls—Administrative controls have been established based on inventory results, and the equipment subject to such controls should be reassessed based on economic values other than acquisition costs, all as described in Practice E2219. (See Practice E2279.)

7.2.5.6 Materiality—In establishing administrative controls, the relative significance or importance of a particular matter in the context of the entity as a whole is considered. (See Practice E2279.)

7.2.5.7 Minimize Loss Consequences—Projecting the possibility and probability of loss, damage, or destruction (LDD) (as described in Practice E2131), and minimizing such occurrences, is a critical and economic factor in measuring the success of the equipment management activity. (See Practice E2279.)

7.2.6 Technology Utilization and Management:

7.2.6.1 Technology Innovation—Insertion of new technologies is consistently considered with emphasis on accurate life-cycle cost and full benefits of the technology.

7.2.6.2 Technology Implementation—Technologies with material cost benefits are implemented.

7.2.6.3 Technology Management—Technology is appropriately managed with process improvement a continuous goal.

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7.2.7 *Records and Reporting:*

7.2.7.1 *Access to Information*—Reliable equipment management system measures are in place and communicated regularly.

7.2.7.2 *Records Maintenance*—Equipment management accountability books and records are kept in reasonable detail to reflect accurately and fairly the transactions and dispositions of the equipment of the owner or owner's agent. (See Practice E2279.)

7.2.7.3 *Equipment Identification*—The entity ensures that inventory control systems identify the economic and physical characteristics of all tangible equipment that have a service life in excess of two years and have a value consistent with the guidelines in Practice E2220 or established by individual federal agencies. (See Practice E2279.)

7.2.7.4 *Summary Report Information*—Summary report information is responsibly provided to those requiring the information for decision-making and organizational management purposes.

7.2.7.5 *Records Retention*—Records are retained as required by internal policies and procedures and external requirements.

7.2.7.6 *Cross-Functional Integration*—Internal customers are satisfied with specific equipment management products and services.

7.2.7.7 *Cost and Performance Data*—Trend data used in determining cost efficiency for major equipment management processes provides feedback on those processes that are the major cost drivers.

7.2.8 *Quality Management:*

7.2.8.1 *Monitoring and Measurement of Processes*—The entity applies suitable methods for monitoring and, where applicable, measurement of the quality management system processes. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and corrective action is taken, as appropriate, to ensure conformity of the product.

7.2.8.2 *Continuous Improvement*—Continuous improvement is a primary goal of equipment management.

7.2.8.3 *Outcome Measures*—Key metrics are primarily focused on process outcomes.

7.2.9 *Risk Management:*

7.2.9.1 *Establish Liability*—Financial liability for each equipment item is established and recorded.

7.2.9.2 *Insurance*—The entity's liabilities for equipment are covered in accordance with policies and procedures and generally accepted accounting principles.

7.2.9.3 *Mitigation*—Threats and risks are reduced as a part of the entity's equipment management system.

7.2.9.4 *Security*—Identify security risk associated with items or classes of equipment and implement theft and misappropriation preventative measures and mitigation strategies.

7.2.10 *Assessments:*

7.2.10.1 *Self Assessment*—Self assessments of process management and operations are conducted in accordance with this practice and entity procedures.

7.2.10.2 *Physical Inventory*—Physical inventory is scheduled and conducted in accordance with Practice E2132.

7.2.10.3 *Metrics*—Measures of key outcomes are established, tracked, and used for process improvement activities.

7.2.10.4 *Third-Party Audits*—External certification of equipment management system achieved.

7.3 Operations focuses on processes that directly impact individual equipment and are specific to the life-cycle phase. (See Section 8.)

8. **Equipment Life-Cycle Phases—The Equipment Life Cycle Encompasses Acquisition, Use, and Disposition Phases**

8.1 *Acquisition*—The acquisition life-cycle phase encompasses the process management criteria described in Section 7 and the acquisition operations criteria in 8.1.1-8.1.8 (see Table 3).

8.1.1 *Requirements Determination :*

8.1.1.1 Establish the purpose for the specific items,

8.1.1.2 Document alignment with entity objectives,

8.1.1.3 Perform cost/benefit analysis,

8.1.1.4 Consider applicability of use of standard items,

8.1.1.5 Consider alternative sourcing and funding mechanisms,

8.1.1.6 Calculate return on investment,

8.1.1.7 Estimate total life-cycle cost, and

8.1.1.8 Mitigate disposition issues.

8.1.2 *Categorization:*

8.1.2.1 Determine cost objective and cost accounting treatment,

8.1.2.2 Determine tax categorization, and

8.1.2.3 Determine other categorization requirements, and assign proper categories.

8.1.3 *Authorization:*

8.1.3.1 Document financial authorization,

8.1.3.2 Document management authorization,

8.1.3.3 Document contractual or program authorization, and

8.1.3.4 Compile, compare, and document competing equipment priorities and plan procurement based on available funding.

8.1.4 *Procurement:*