SPEAKING THE SAME LANGUAGE: ASTM STANDARDS IN VA

Douglas N. Mitten, PE, CVS, CCE, CPP, BSCE, MEad

Doug Mitten is a professional engineer with 32 years of experience in construction operations, preconstruction services, and facility security. He is a Certified Value Specialist, Certified Cost Engineer, and Certified Protection Professional. His firm, Project Management Services, Inc. (Delaware), specializes in cost, value, and facility security studies. His committee membership in ASTM includes Building Economics E.06.81 and Security F.12. Participation in ASTM enables him to contribute to cost, value, and security standards. His project experience includes hundreds of facilities for the World Trade Center, US General Services Administration, US military, other government agencies and private sector owners and designers.

ABSTRACT

This paper explores how ASTM decision making standards, including value analysis, investment evaluation, risk assessment, terminology, cost estimating, and multiattribute decision analysis, relate to the Value Analysis profession. Value analysis will be more efficient and communication between value professionals and clients clearer if standards developed by user and producer consensus serve as a basis.

INTRODUCTION

Building owners want to maximize profits, business wants to increase revenues and decrease costs, and government agencies want to shrink budget deficits. In many cases, the best project may be the one with the lowest life-cycle costs. We need building economic standards to evaluate our progress. However, real-life projects reveal inconsistencies and inappropriate applications of economic methods. Analysts may lack the training to do economic evaluations or may be misled by "expert" recommendations.[1]

Clearly communicating the benefits and economics of value proposals is important to value professionals. In addition to speaking a common economic language, having a framework for our own work as a point of departure can be useful and save time. Value professionals are not the first to have this need. A brief overview of the history of ASTM shows how others have benefited over this century by developing and using standardized methods.

ASTM

ASTM was formed 100 years ago as a result of the railroad industry's resistance to government-produced, order-specific material specifications. There were no industry standards on the production of rails. Charles Dudley of the Pennsylvania Railroad had tried to remedy this by publishing formulas on how to make mild steel rails. Industry response was disappointing, and Dudley's conclusion led to the ASTM's principle that standards should be consensus-produced by a group of producers *and* users of the end product. The previous lack of cooperation between producers and users of steel rails had been an enormous detriment to improvement.[2]

Highly independent and decentralized technical committees develop ASTM standards. Representatives of the main parties can use this forum to discuss every aspect of the procedures. The process results in consensus building, and has been very popular amongst the engineering community. Standards are not set in stone and committees must reapprove them at least every five years. They can be modified periodically.

ASTM is not the only organization that is dedicated to standards.[3] The US government, responding to the pressing needs for standards in many industries, established the National Bureau of Standards in 1901. It is now called the National Institute of Standards and Technology. While NIST does not develop standards, much of its research and development provides input for consensus-produced standards.

Manufacturers and engineers resisted plans to have government agencies develop standards and require industry to adopt them. This led to an ASTM committee rule that producers of a product or service can not outnumber end users. Negative votes carry considerable weight and can only be overruled for good cause.

The scope of ASTM expanded over the century and continually resulted in standards in new industries. Henry Ford used the standards in automobile production. During the World Wars, a great deal of committee work was done on highly sensitive material standards. In the 1970's there was recognition that the consensus approach to standards is applicable to a broad range of problems other than traditional materials. One of the results of this expansion was the building economics subcommittee, E06.81.

ASTM SUBCOMMITTEE E06.81 ON BUILDING ECONOMICS

E06.81 has produced a wide variety of economic standards ranging from life-cycle costs to value analysis. While described as guides and standards for buildings and building systems, most are applicable to any environment where economics is a factor. They would apply to purchasing a refrigerator, developing software, or evaluating service alternatives.

The standards are developed through a consensus process which is rigorous and must deal with each minority opinion. The subcommittee can vote negative responses nonpersuasive or incorporate a change with a requirement for reballoting.

STANDARDS USEFUL FOR VALUE PROFESSIONALS

The standards include guides, standard practices, and terminology. Almost all could be useful to value professionals.

Guides

The guides provide information on deciding which standard to use. For example, the guide for Economic Methods for Evaluating Investments helps one decide which standard practice would be most appropriate for various problems. The guide Techniques for Treating Uncertainty and Risk in Economic Evaluation highlights pros and cons of seven different techniques of measuring uncertainty and risk exposure.

Standard Practices

Techniques: Standard practices teach how to use each technique. Economic measurement practices include these:

- Life-cycle costs
- Benefit-to-cost and savings-to-investment ratios
- Internal rate of return and adjusted internal rate of return for investments
- Net benefits for investments
- Payback for investments

Life-cycle costing: A very important element in Value Analysis is using life-cycle costing. By considering the cost of money in valuing proposals with higher first costs but lower life-cycle costs, projects can be more easily sold.

Life-cycle standards can minimize the many false impressions that exist today as to what LCC analysis is. People who do not understand the technique frequently use it as a "buzz" word.[4]

Multi-attribute decision analysis: ASTM E 1765 Standard Practice for Applying Analytical Hierarchy Process (AHP) to Multiattribute Decision Analysis of Investments Related to Building Systems is similar to Carlos Fallon's Combinex[5] aid to decision making. It uses a computer-based method of paired comparisons that is based upon the analytical hierarchy process. Value professionals can use it to evaluate quantitative and qualitative benefits of VE proposals.[6]

Value Analysis: At the AACE International Annual Meeting in June of 1994 there was a roundtable on a Standard Method for Value Engineering.[7] The panel generally agreed on several needs including a standard method for VE promulgated through ASTM or some similar neutral organization. In 1995 ASTM's E-1699-95 Standard Practice for Performing Value Analysis (VA) of Buildings and Building Systems was published. The standard practice describes the multi-phase formal plan, function analysis, and other critical elements of successful Value Analysis.

Terminology

The Standard Terminology of Building Economics, E 833 - 92a defines economic terms such as discount rate and real discount rate.

OTHER USES OF ASTM STANDARDS

While the primary focus of this paper has been to describe how ASTM standards can be used to produce a value study, there are other related uses:

- There are over 10,000 ASTM standards on subjects ranging from steel manufacturing to ski equipment that can be useful for the VE information phase and as references when developing proposals.
- A new standard may be needed for a recommendation of a value study.
- ASTM can continue to be a basis for developing Value Analysis standards.
- An owner could use ASTM standards to assure that Value Studies use certain processes such as the following:
  - Perform a study in accordance with ASTM E 1699-95
  - Use multiattribute decision analysis ASTM E 1765 to evaluate factors
  - Specify life-cycle costing parameters.

DISADVANTAGES OF THE ASTM PROCESS

Developing new ASTM standards is not easy. ASTM does not produce perfect standards and technological change has resulted in ASTM's requirement that standards be updated no less frequently than every five years.

If you want a new standard or a change, you or your employer may need to do a considerable amount of the work, which may consist of writing and being the champion of your issues over time. Changing and developing standards can take 2-5 years or more.

SUMMARY

ASTM Standards were created by a consensus of users and producers. If we use standard practices to make recommendations, it should be easier to understand our value proposals. Standard practices can lead to more productive studies because professionals can spend less time on process and agreed standards, and more time improving cost and function.

ASTM can be a mechanism to further develop standards related to value analysis and recommendations of our studies. While a consensus standards development process takes time, it should result in management process, products, and infrastructure that are more cost-effective. Standards created by a consensus of users and producers have more credibility than those only created by producers of a service.

REFERENCES:

1. Marshall, Harold E. (1992). "Standards in Building Economics-Why We Need Them and How to Write Them." AACE Transactions.

2. ASTM History Book- A Century of Progress, ASTM:1898-1998. "A Broader View" ASTM Standardization News, January, 1998. p.30. American Society for Testing and Materials.

3. Ibid, p.32.

4. Marshall, Harold E. "Subcommittee E06.81 on Building Economics" ASTM Standardization News, October, 1982. p.26-30. American Society for Testing and Materials.

5. Fallon, Carlos (1980). Value Analysis, Second Revised Edition. Washington DC, Miles Value Foundation.

6. Mitten, Douglas N. (1997). "Multi-Attribute Decision Analysis in Value Analysis," SAVE Proceedings International Conference, p.171-175.

7. Marshall, Harold E. (1994). "Roundtable on a Standard Method for Value Engineering". Cost Engineering, Vol. 37/No. 3. AACE International.