

THE AM COUNCIL'S ASSET MANAGEMENT MODELS – WHAT ARE THEY AND WHY ARE THEY NEEDED?

Kohler, Peter Martin.

Director of Asset Management Council

Asset Management Council, Surrey Hills, Melbourne, Victoria, Australia

e-mail: peter.kohler@amcouncil.com.au

Abstract

Recent thinking about Asset Management has focused attention on “the way of thinking about asset management” and how such thinking should assist people involved in asset management, from legislators and financiers through to engineers and the community.

To guide this thinking, the Asset Management Council (Australia) has developed a set of complementary asset management models, whose collective purpose is to present that thinking in a simple, structured and effective manner. The name of the first model is “Capability Assurance”. Further to that high level model, the AM Council has developed other fully complementary models, as a coordinated suite that presents asset management as a set of “Why, What and How” information.

The value provided by this approach can be gauged by its practical application, namely the models provide a top down perspective to the collation of existing information, such as Standards and competencies. In this way the AM Council is concurrently developing both an Asset Management Body of Knowledge and a competency set for asset management.

This presentation describes the key features of the Capability Assurance Model and presents the other related models as a suite, recognizing the integrated role of Asset Management. Further, the presentation also describes how the Asset Management Body of Knowledge is being developed and applied to provide the basis of an asset management Certification Scheme.

Keywords: Asset Management, Competencies, Certification Scheme, Models.

1 Introduction

Recent thinking about good Asset Management has focused attention on “the way of thinking about asset management” and how such thinking can assist people involved in asset management, from legislators and financiers through to engineers and the community.

To guide this thinking, the Asset Management Council (Australia) has developed a set of complementary asset management models, whose collective purpose is to present that thinking in a simple, structured and effective manner. The name of the first model is “Capability Assurance”. Further to that high level model, the AM

Council has developed other fully complementary models, as a coordinated suite that presents asset management as a set of “Why, What and How” information.

The value provided by this approach can be gauged by its practical application, namely the models provide a top down perspective to the collation of existing information, such as Standards and competencies. In this way the AM Council is concurrently developing both an Asset Management Body of Knowledge and a competency set for asset management. The same information is now being used to develop an asset management Certification scheme for people involved in asset management.

2 What is the AM Council?

The Asset Management Council (AM Council) is an operating division of Engineers Australia – Australia’s peak engineering body – incorporated by Royal Charter.

The mission of the AM Council is to promote and advance all facets of the science and practice of reliability and maintenance engineering and the engineering management of assets, and to facilitate the exchange of information and ideas related thereto. The AM Council has the following aims for asset management, reliability and maintenance engineering:

1. To enhance the character, status and interests of the discipline and those who practice therein,
2. To represent the science and practice of the discipline through community and kindred organisation links,
3. To lead and foster a cooperative strategic enterprise approach to the discipline,
4. To engender and promote world class excellence in the discipline,
5. To provide best practice information, knowledge, skills and capabilities.
6. To recognise and reward achievement.
7. To create learning pathways professionals.
8. To establish the professionalisation of the discipline.

The AM Council has established a definition and overview model. Additionally, the AM Council has developed a framework outlining the technologies and requirements that go to the asset management regime. This “Technologies Model” is used as the basis for indexing, the website, conference papers, and defining the requirements for asset management professionals.

3 What is Asset Management?

The AM Council, as an operating unit of Engineers Australia has defined asset management as:

“The lifecycle management of physical assets to achieve the stated outputs of the enterprise”.

4 What are assets?

Always in interesting question this one – assets are physical manifestations of their need – that is, assets represent the technological decision made to deliver the requirements (usually of the specification).

In many industries, this requirement is embodied as an Operational Concept Document and further refined as a Specification of some kind.

Designers therefore use assets to deliver the specification – often to the Standards referred to in the Specification. It is usual that at the Critical Design Review, that configuration management of both the functional and physical data begins formally. Associated with the physical description of each asset (drawings, parts etc) is the corresponding functional or specification information (output, capability and probability of success etc).

An asset therefore, is a physical object (described by drawings, parts, Make and Model etc) that was chosen as the hopefully, best solution at the time the decision was made, to deliver the functional requirements for the time the output is to be maintained.

4 AM Council “Capability Assurance” Model of Asset Management

While it is true that assets have always needed upkeep to maintain their function, the science behind the technical and financial decisions made has not been documented consistently. As a result, the many Standards and concepts that apply to asset management have emerged as the need necessitated. As a result, rarely, if ever, have those standards and concepts been presented as a consistent & whole process - as asset management.

As a response to this need, the AM Council developed its Capability Assurance Model of asset management – where asset management determines how best to prepare asset capabilities to deliver business outputs.

The four (4) key principles of the AM Council “Capability Assurance” model are:

- Capabilities
- Output focus
- Level of assurance
- Learning organisation

Readers are referred to the AM Council website www.amcouncil.com.au for further information on this model.

4.1 Capability

A capability of an item is the ability to do something - usually something useful consistent with what the item

was designed to deliver, and in the context of the outputs the business wants to achieve. This idea is extremely powerful within asset management because it focuses attention on the reason the item exists - its purpose and its output. It is this idea that allows us to focus both on the function of an asset and the asset itself - as two distinctly different concepts. The first, its function, is the reason the item exists and the second, the item exists only to provide its output.

These two concepts are at the heart of configuration management and indeed at the heart of any maintenance analysis. After all, if the analyst is not fully aware of the intended function and output of the item, the analyst could not possibly comprehend how the item might fail to deliver those outputs.

4.2 Output Focus

Output focus means that everything exists to provide a function to a specified level - the required output. That output should be measurable otherwise how would we know if the asset did or did not achieve it? We also need a plan to measure that output. Without a plan, we might not know that we can measure the output.

In the concept of the development of a maintenance program, this has two significant implications, first, that we must know the function and output requirements of an asset before we can begin to do any analysis; and second, that the eventual maintenance task must itself also have a specific output, and that output is measurable and further that a plan exists through which that output can be measured!

4.3 Uncertainty

Uncertainty or its more common name, risk, is an integral part of any asset management system. The modern world has not just accepted it, but fully embraced the concept as the core of its ability to manage any activity, including the use of assets.

The concept of risk provides the modern world with both the tools and the knowledge to develop maintenance programs that make the future come true, that is, give us the ability to provide a level of assurance that the asset will deliver its output when and where required.

In particular, all the major maintenance analysis tools such as FMECA, FMEA, RBD and RCM (as a small list) are all risk based, as are many others. Many other risk based tools are available. For a full description of the many available risk based tools readers are directed to AS/NZS 3931:1998 Risk analysis of technological systems - Application guide.

When applied to asset management, the concept of risk includes a couple of perspectives, namely:

- when addressing the level of uncertainty associated with the use of an asset, the term reliability (being similar to the probability of failure of the item) is used; and
- when addressing safety and other consequence types, the term likelihood (the equivalent of probability) is often used.

In whatever context, the concept of risk remains fundamental to the way in which the modern world of asset management both perceives and manages the delivery of services, and risk is the key tool used to develop and implement effective asset management programs, including maintenance plans.

And it is no co-incidence that all the tools of asset management are also all risk based in their origins. Why this is so is because the key difference between the modern world (post 1930) and its predecessor, is the use of the concept of risk and the tools that concept provides. To many people, the idea of uncertainty and the emergence of risk based tools provides the world with the tools to "make the future come true" - the very essence of an engineer's role and specifically, the very essence of a maintenance planners role - to deliver systems and equipment that work, when and where required.

4.4 Learning Culture

Associated with and a part of, any effective asset management program is the development of a complementary working culture. That culture should be designed to complement the asset management program, since the very existence of an effective asset management program depends on the way people make decisions in and interact with, that same program. In particular, that culture must embrace the concepts involved in that program, for example continuous improvement. Other aspects might include:

- Transparent decision making - for an effective safety culture; and
- Risk based decisions - the use of risk based decision making and the rules that implement such a program.

5 AM Council "Technologies Model" of Asset Management as a Process

The AM Council's Technologies Model presents a generic process that can be applied to any asset. This process includes both the development of a maintenance program and its continuing improvement - throughout the life of the item. The process also includes all the other aspects of asset management, including:

- competency analysis - leading to the development of training programs
- spares analysis - leading to the development of spares needs, holdings and rotatable pools
- operations analysis - leading to the development of maintenance and operations plans that are fully integrated
- life cycle analysis - leading to the development of financial plans, repair/replace decisions.

The one key aspect of the above process is that all decisions made and all activities performed, can be traced back to the originating need(s) - the Stakeholder need. Without that traceability any activity (maintenance

or otherwise) need not exist and the value of any activity cannot be established or justified.

The process includes the following key process areas:

- Demand Engineering - the process and decisions that affect the demand of the service (in the context of defence this can be sometimes thought of as the province of foreign affairs activities)
- Systems Engineering - the design process where all decisions are related to the need and verified and validated as part of the process
- Logistic Support - the process that determines the support need to put into effect the mission requirements of the assets - for the life of the asset. This includes Operations Management - the process that coordinates operational and maintenance activities
- Continuous Improvement - The process that measures the outputs of the system and adjusts the system as necessary
- Configuration Management - The process that changes the functional and physical baselines of the hardware and support systems.

As part of the development of that model, the AM Council has analysed many sources of asset management Standards (ISO, IEC, AS/NZS, BS and US Mil) and associated relevant asset management Standards to relevant parts of the Technologies Model. This data is also available on the AM Council website.

Readers are referred to the AM Council website www.amcouncil.com.au for further information on this model.

6 How do these Models help the AM Council?

The AM Council uses both the above models as the basis of its efforts to undertake two key projects, namely:

- Asset Management - Certification
- Asset Management Body of Knowledge

6.1 An Asset Management Certification Scheme

International Standard AS ISO/IEC 17024-2004 (1) describes criteria for organisations and schemes that certify the competency of individuals. The AM Council has selected this standard as a suitable model for its Asset Management Certification Scheme. The scope of the certification scheme is determined by the requirements of AS ISO/IEC 17024-2004; in particular AS ISO/IEC 17024 defines the technical content of the scheme and the requirement to engage with the broader asset management community. A complete scheme is directed by the standard. Documented policies and procedures, an ISO 9001 compliant management system, roles and responsibilities, code of conduct, record keeping and financial plan within the scope of the project to develop the certification scheme.

The stakeholders for the Asset Management Certification Scheme have been identified and represent a wide cross section of people and organisations within Australia. The stakeholders are the target candidate community for asset management certification along with their employers, clients and other interested and affected bodies. The target candidate community are those who provide competencies required by the scope of the Asset Management Council Body of Knowledge.

The deliverables of the project are:

- Documented policies and procedures for certification of Asset Management professionals
- A management system for the Asset Management Certification Scheme, documented to ISO 9001 standards
- Defined roles and responsibilities for personnel involved in management and execution of the Asset Management Certification Scheme
- Documented Code of Conduct for the Asset Management Certification Scheme
- Documented policies and procedures for record keeping required to administer the Asset Management Certification Scheme
- Documented alignment with similar and related national and international certification schemes

At the time of writing this paper, Phase One – Project Planning is complete and Industry sponsors have been engaged to provide financial resources to support the execution of the remainder of the project.

Phase Two Job/Practice Analysis is currently underway. The Job/Practice Analysis is essentially a bottom-up exercise. A review of the Asset Management Body of Knowledge may arise from this analysis, but analysis and review of the Body of Knowledge are outside the scope of this project. The Job/Practice Analysis has identified potential competencies for Asset Management from sources including:

- National Training Information Service (NTIS) database (Australia)
- Other Certification Programs and The Job / Practice Analysis initiatives in the public domain
- International Standards in the Asset Management Domain
- Other initiatives to engage with asset management professionals to determine desirable competencies in Asset Management

This approach has identified a total of 43,800 competencies. 99% of the identified competencies were identified from the National Training Information Service database. Many of these had been superseded. Many more were outside of the scope defined by the Asset Management Body of Knowledge and culled. Currently 380 individual competencies have been rationalised for analysis by the Asset Management Scheme Certification Working Group.

6.2 Asset Management Body of Knowledge (AMBoK)

As noted earlier, the science behind the technical and financial decisions made as part of asset management has not been documented consistently. As a result, the many Standards that apply to asset management have emerged as the need necessitated. As a result, rarely, if ever, have those standards been presented as a consistent & whole process - as asset management.

The various tools and concepts that underpin asset management should now be integrated into a continuous and holistic whole. One of the characteristics of a mature profession is a body of knowledge.

The AM Council has begun to develop an asset management body of knowledge (AMBoK) which records standards, processes and the collective knowledge about asset management. From that knowledge the AM Council has already documented definitions and models for the why and what of asset management, including the relevance to asset management of over 800 national and international Standards (integrated into a continuous whole).

When the Asset Management Council (AM Council) initiated a project to improve the asset management and engineering competencies of its members, they were unable to find such a body of knowledge. The result was a decision to develop an asset management body of knowledge to use in defining competencies, establish associated training programs and enable all people involved in asset management to be able to readily discuss all facets of asset management using a dictionary of defined terms.

The AMBoK will be of assistance to industries that increasingly need to assess and improve their asset management engineering business systems and of course, their employees. In addition, academic institutions and others may find the information useful as they define curricula for asset management engineering.

The AMBoK Committee, sponsored jointly by the AM Council and other organisations is tasked with developing an international accepted body of knowledge for asset management engineering.

The AM Council is attempting to address this issue by providing a project, that will identify and develop:

- The discipline of Asset Management, an asset management model that defines the philosophy and scope of asset management – that is, it defines both:
 - The way in which we think about asset management (the philosophy); and
 - The various entities within the asset management domain and the relationships between them.
- A Glossary of Terminology to be used in Asset Management. An Asset Management Glossary presents a set of simple, universally acceptable terms for asset management. Values are placed on the use of existing glossaries, where possible,

avoidance of proprietary or commercial definition and avoidance of redundant terminology.

- The Core Values of Asset Management The core values of Asset Management define the domain level function, objectives and guiding principles that drive the strategies and processes of asset management.
- The Knowledge Areas of Asset Management Asset Management Knowledge Areas defines the processes, such as strategy development, as well as tactics and outcomes applied in pursuit of Asset Management values.
- The Asset Management Toolset. Asset Management toolset (Standards and IT systems) defines the tools of Asset Management applied to implement the tactics.
- Make available that AMBoK for the overall benefit of the community.

This project represents the ongoing development of an AMBoK and its maturity as a professional discipline. A number of key activities and sources have influenced the direction, framework, and content of this work.

Publications that had an early influence on the structure and style of this project are:

- AM Council Capability Assurance Model^{TM1} for asset management;
- A Guide to the Project Management Body of Knowledge published by the Project Management Institute, and the Federal Aviation Administration Integrated Capability Maturity Model.
- PAS 55-1 and 2
- IEC Dependability Series of asset management Standards
- US & UK Military Standards

One of the first tasks of the committee is to develop and publish a strategy for developing a comprehensive body of knowledge for asset management; this is a multi-year project that is expected to be largely complete in 2010.

This Project presents an effort to organize and catalogue a body of knowledge for asset management and to provide a systematic, concise, and complete description of the asset management engineering discipline.

The material includes information about the methodology and sources, as well as the anticipated uses of this body of knowledge.

Asset Management has not reached the status of a legitimate engineering discipline and a recognised profession. Achieving a consensus by the profession on a core body of knowledge is a key milestone in all disciplines and has been identified by the Committee as crucial for the evolution of asset management engineering toward professional status.

The objectives of the AMBoK Project are to:

- Characterize the contents of the AMBoK;
- Identify the Knowledge Areas (KAs) structure for asset management
- Document the KAs to provide a structure for the documentation of the AMBoK;
- Promote a consistent view of asset management internationally;
- Clarify the relationship of asset management engineering with respect to other traditional engineering disciplines;
- Provide a foundation for:
 - Asset management personal competency identification;
 - Certification of individual competencies;
 - Certification of company and enterprise competencies and associated QA systems; and
 - Audits of the effectiveness of AM systems; and
 - Development and implementation of (both for an individual and an enterprise) an international system of excellence awards.

The intended audience for the AMBoK includes:

- Private and public enterprises;
- Practicing asset management engineers;
- Developers of asset management public policy;
- Professional societies and institutions; and
- Educators and researchers.

7 Conclusion

Interestingly, Australia is considered by many in the world to be at the forefront of this emerging thinking about asset management. In that regard, Engineers Australia has supported the development of the AM Council.

While the AM Council has harnessed considerable industry and community assistance with respect to its two key projects (Certification Project and AMBOK), the AM Council also wishes to continue to develop its international relationships with a view to developing a common:

- Asset Management Body of Knowledge; and
- An Asset Management Certification Scheme that has international transportability.

In that regard, the AM Council is seeking to work with all international like minded bodies to achieve that common aim.

¹ Trademark of the AM Council