



EAM Made Simple. Well, Kind of Simple. By Rob MacArthur

INTRODUCTION

When asked to pen this piece on Enterprise Asset Management (EAM), I was struck with a radical idea. I would script the definitive and all encompassing manual for EAM. Not only that, but it would be written so that an 8 year-old could understand it. As it turns out not many people involved with EAM are of that age, so I figured I'd just keep it as simple as possible.

Here it goes.

ENTERPRISE ASSET MANAGEMENT (EAM)

EAM, as you may know, stands for 'Enterprise Asset Management'. But what does it really mean? Well, that depends on who you ask.

If you ask a strategist, a consultant, RCM/TPM specialist or large industrial asset management professional to define EAM you might get an answer that includes Key Performance Indicator (KPI) tracking, Reliability Based Maintenance, and/or Total Productive Maintenance. On the other hand, if you ask the same question to a corporate process specialist or consulting firm that specializes in MRO you will get an answer that encompasses the portfolio of MRO or asset management work processes.

If the same question is asked of an IT applications professional or software vendor the response will likely be that EAM is a category of enterprise software that includes maintenance, asset management, and other types of plant applications. In contrast, a group of Engineers (either internal or contract service) would respond that EAM is really descriptive of the capture and maintenance of copious amounts of asset, inventory and other data which allows an organization to establish and manage its installed asset base.

Each of these answers is technically correct. However, the true meaning of Enterprise Asset Management encompasses all of their answers. Taken individually, each represent a partial answer, but in totality they describe the integrated concept of Enterprise Asset Management or EAM.

The Asset Manager understands this integrated concept of Enterprise Asset Management. This is the person who perspires the most whenever key EAM issues are discussed. It's also the individual responsible for maintaining maximum production capacity from installed assets at the lowest possible operating cost - balanced of course with safety and regulatory imperatives.

This person might be a corporate officer, a manufacturing executive, a plant manager, a maintenance manager, an engineering officer on a Navy ship, a facilities manager at a University, or any of a number of positional descriptions. This person might even be you.

Following are the core components of Enterprise Asset Management.

- **EAM strategy** defines how we expect to produce the highest capacity at the lowest cost. Normally this includes measurement and tracking of continuous improvement based Key Performance Indicators integrated with resource and planning optimization strategies such as Reliability Centered Maintenance and/or Total Productive Maintenance. (You might want to re-read that last sentence. Honest, it only sounds complicated.) EAM strategy is exceptionally important in the overall concept of EAM since it sets the direction and tone of where we are going with all the other elements.
- **MRO processes** is the second structural component of EAM which describes producing maximized efficiency and results within the myriad of major and minor processes. Some of these processes include inventory management, work planning and estimating, MRO purchasing, calibration management, capital projects, scheduling as well as other major and minor processes. In order to get the maintenance work accomplished, support EAM strategy objectives and capitalize upon installed EAM technologies, these processes must be engineered to the highest degrees of efficiency, and common sense.
- **EAM technologies** constitute a major enabler within EAM. They span the spectrum from high-end, enterprise-wide Computerized Maintenance Management Systems (ironically, otherwise called EAM systems), Calibration Management Software, Pressure Vessel and Valve Tracking applications, Predictive Maintenance software, Hand-held applications and so many more. The chief function of these applications is to use basic engineering data in order to provide an automated tool set to support MRO process operations, while simultaneously producing empirical data suitable for analysis and KPI tracking.

- **Engineering Data Content** represents the element-level electronic information that defines an organizations asset base, inventory stock, operations, resources and maintenance procedures. Engineering data serves as the basic building block of the overlaying technology tools, which in turn are used to support MRO processes. Fundamental EAM strategy execution is impossible without the data, systems or processes.
- **People.** The final element of EAM is people, people, and people. People are the obvious key ingredient in all aspects of the business function. People form and track the EAM strategy. People perform the MRO operations. People install, configure and maintain the EAM technologies. People create and maintain the engineering data. Finally, people turn the wrenches that maintain the assets that are operated by people who generate the products or services for which the organization exists. Obviously people are the binding element, the glue that holds the entire structural integrity of EAM together. They need to be trained, organized and deployed throughout the EAM function.

THE EAM 'ECOSYSTEM'

Having established the elements of Enterprise Asset Management, we now have the tools to discover why some organizations have been so successful with this endeavor, and others have not.

What the successful companies all have in common is treating the function of EAM as an 'Ecosystem'. Just like a natural ecosystem, balance must be maintained. For example, if we wipe out the algae population in a forest pond, shortly thereafter the small minnows will die, followed by the frogs, larger fish and local waterfowl population. Any disruptive influence on this balance produces catastrophic, unintended consequences to the whole.

Similarly, spending an enormous amount of energy and effort executing a worldwide EAM technology implementation is wonderful. However, it falls apart quickly when we realize that our legacy data is trash; or if our processes remained exactly as they were before, or our technology is incapable of producing the meaningful KPI's we seek.

Many well-intentioned organizations embark on significant EAM efforts, spending enormous amounts of money, time and effort only to realize in the final analysis that their EAM function has not improved in any real sense. They realize their data is insufficient to support the technology functions. They realize they didn't build in the capability to track mission critical KPI

information. Processes were redesigned without an eye towards how this would either improve capacity or save operating dollars. The list of possible failure scenarios is endless but in the simplest terms, each drives down to missing one, or more, components of the EAM ecosystem during the initiative.

Just like the pond analogy, EAM is a business system in which any effort, improvement or modification has to be done from a balanced perspective, taking into account all of the various components. The EAM ecosystem is composed of the previously discussed components and can be further divided according to common EAM functional areas depicted in figure [1-1].

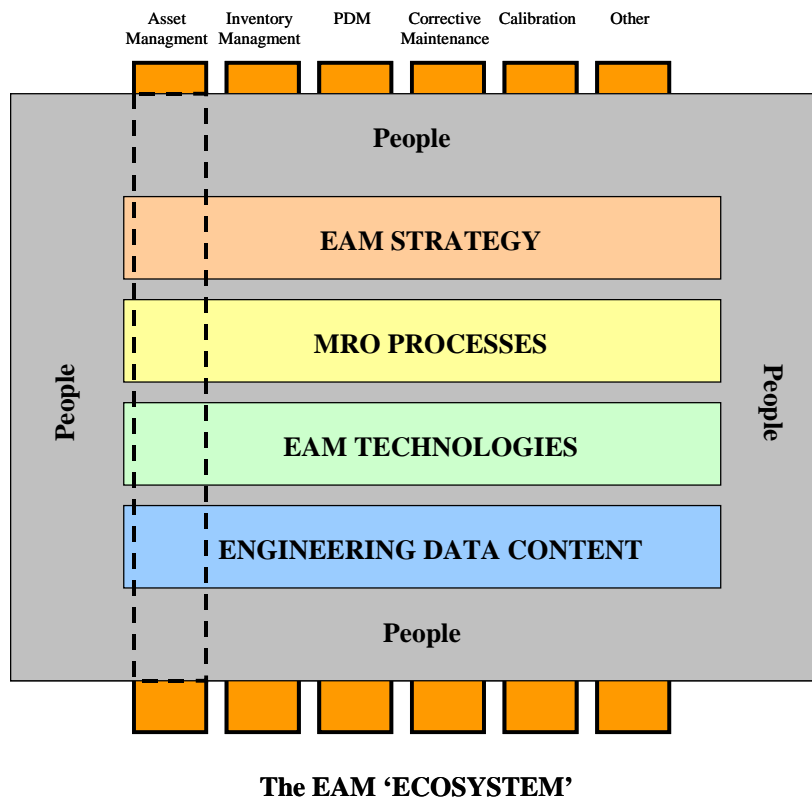


Figure [1-1]

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IMPLEMENTATION STRATEGY

These days, changes or improvements to the EAM **ecosystem** occur on an ongoing basis as companies deploy new strategies, processes, technologies or other elements, in an effort to improve their asset utilization or lower maintenance-based operating costs. This is an excellent development since EAM has historically been an overlooked function and most asset intensive organizations have room, either large or small, to improve operations while also lowering costs.

As a result, many organizations are now eagerly deploying next generation EAM technology based solutions. This allows them to implement asset management processes, develop and integrate EAM strategies, and many other forward thinking initiatives geared towards producing hyper-efficient asset utilization and capacity. This is a natural extension of the immense productivity gains the US, and other, industrial economies have experienced in the past decade.

However, it is crucial that each particular initiative be evaluated and planned up front, from the perspective of all the components of the EAM ecosystem. No single initiative is just process oriented, data oriented or technology oriented. Each initiative impacts the others. Remember, EAM is not a technology, nor a process, nor engineering. It is all of these things combined with people. It is an ecosystem.

Implementation of a world-class EAM framework has to involve a balanced and thoughtful approach to these interdependencies or it is almost certain to fail from the outset. Implementation is further complicated by other factors, which include organizational structure, cost/benefit considerations, component versus functional deployment strategies and others.

As an engineer, I like to have an organized construct, or model, in which to think. Figure [1-2] describes a partial example of an EAM matrix implementation model. The five (5) component elements of EAM serve as the vertical axis, while the major functional areas (partial in this example) of EAM are viewed across the horizontal. This breaks down the entire EAM model into modules, which can then be used to assist with conceptualizing, planning, tracking, and executing EAM initiatives. I like to think the matrix breaks a very big business area down into "bite-size" pieces, which is often helpful.

	Asset Management	Inventory Management	Calibration	PDM	Other
EAM Strategy	AM1	IM1	CAL1	PDM1	OTH1
MRO Processes	AM2	IM2	CAL2	PDM2	OTH2
EAM Technologies	AM3	IM3	CAL3	PDM3	OTH3
Engineering Data	AM4	IM4	CAL4	PDM4	OTH4
People	AM5	IM5	CAL5	PDM5	OTH5

Figure [1-2]

A fully EAM-optimized organization would have produced a solution in each one of the modular areas of the matrix across its full enterprise footprint. This might have been accomplished in one major overhaul or could have been the result of many independently originated initiatives executed over time. Of course, time doesn't stand still, so even a once fully optimized organization needs to periodically reevaluate itself to determine if new room for improvement has emerged in any one, or many, areas.

Obviously producing and deploying an EAM optimization strategy across a large asset intensive organization is no small task. However, approaching it piece by piece and considering four (4) equally important planning considerations will certainly help.

- **Precedence Order.** All of the pieces of the matrix have obvious interdependencies. However looking both vertically and horizontally some degree of precedence order can be established. For example, it is more sensible to rationalize and optimize the asset management function and base prior to trying to tackle predictive maintenance, which is really driven by installed asset base. Or along the vertical axis, does it really make sense to develop an extensive EAM KPI-based

strategy prior to ensuring you have the engineering data necessary to support this? When evaluating precedence order ask yourself the question, "Is there another matrix piece I should do first which will improve my ability to implement the module I am considering?"

- **EAM Function versus EAM Component Focus.** Do you want to try to follow either a functional or component based approach? For example, implement completely optimized MRO Inventory Management across all components before worrying about the Predictive Maintenance. Or separately implement MRO process engineering improvements across all functional areas prior to worrying about other components such as technology or strategy. This is, of course, a very complicated consideration. We should approach this with three things in mind: Modular interdependencies (we don't want to go too far implementing an EAM technology prior to engineering processes for example); ease/speed of implementation; and cost/benefit of the initiative.
- **Deployment Scale and Schedule.** The next consideration is one that the model doesn't necessarily depict, but is essential. Most organizations are made up of modules themselves - organizational divisions, geographic divisions, and/or separate plants. Consider how you would want to roll out an initiative not just across the matrix, but also across this organizational or physical structure. You might choose to use a pilot organization or plant to fully optimize and then scale this across the full enterprise, or you might choose to optimize the EAM strategy component across the full enterprise and then come back to roll another module or set of modules. Similar to the previous point, consider interdependencies, ease/speed, and cost/benefit.
- **Cost, Impact & Effort.** The final consideration is cost, impact and effort, versus intended benefit. It is the very essence of the business decision-making process. Some areas of optimization have large costs and efforts associated with them. Other areas can be significantly disruptive to ongoing operations. Consider these impacts versus the intended benefits of the initiative and prioritize accordingly.

Now that your mind is swirling with many complex, and seemingly contradictory considerations, you might want to go back to the starting point of the model. Take a simple approach to EAM optimization and then scale it accordingly. Stick with basic fundamentals discussed.

EAM is a big business function built on the aforementioned components and composed of a number of functional areas. By modeling this, we can see EAM broken down into 'bite-size', modular pieces. We also understand that EAM is an 'ecosystem' where each modular piece affects others. No one piece is any more important than any other. Despite the salesman's assurances there is no single elixir that will solve it all in one dosage. There is no magical elixir.