GenesisSolutions

"The Golden Age of Enterprise Asset Management"

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As an engineer I've been involved in maintenance and asset management for almost 20-years. I've been particularly close to the area of Enterprise Asset Management systems and technology for over 10-years. Over that time I've continued to have high hopes for a truly workable set of enterprise technologies and organizational commitment that would come together to really help take maintenance and asset management to the next level as a strategic function within industrial companies. I'm the eternal optimist. However, I've been disappointed in the past by technology and strategy. In many cases I've had a sense that the marketing got ahead of execution. I'm sure this will resonate with many readers.

I've got to tell you I'm excited about the current situation in Enterprise Asset Management. I feel from watching things and talking to customers that we, as a community, might be right on the cusp of taking maintenance to the next level.

Let me explain by going back in time and revisiting where I first learned about maintenance, in the United States Navy. The Navy is obviously an asset intensive organization with hundreds of ships, aircraft, and shore facilities. If you look at a Navy warship it really is like a manufacturing plant, albeit one that moves around a lot and packs a punch in terms of the product it delivers! A warship includes a power plant and electrical distribution, propulsion systems, heavy auxiliaries, refrigeration, air conditioning, lighting, galleys, other major systems and, of course, weapons systems.

U.S. Navy warships are grouped according to classes. For example, my last ship was the USS WASP (LHD-1), which was the lead ship of a class of five or six total LHD's. Each LHD is nearly identical in terms of equipment, manning, and operation. I won't get too specific, but as an Engineering Officer on the WASP our department numbered in the hundreds. Our responsibility was both to operate and maintain a vast engineering plant, and fix things that broke down. We lived in the world of TPM before any of us even knew what that was.

With respect to maintenance and repairs, our days were spent doing hundreds of thousands of preventive maintenance checks, repairing casualty breakdowns, and managing our paper-based maintenance program. We did our own PM scheduling and managed our repair activities but even with our significant manpower there was no way that we could perform our own reliability and maintenance program management. That job was left to a shore headquarters called Naval Sea Systems Command (NAVSEA) who had responsibility for construction, ongoing maintenance and repair of all the U.S. Navy's warships. I didn't know it at the time, but this was my first introduction to Enterprise Asset Management.

NAVSEA was our central engineering capacity. They wrote our planned maintenance program, which was standardized not only on equipment type but also on ship class. They produced and authorized our onboard spare parts allowance based upon what type of equipment we had.

NAVSEA was also the engineering command to which we reported casualty breakdowns. They in turn would help us get outside repair help from Navy maintenance depots or outside commercial service providers. Of course they tracked these casualties by equipment type and ship class, and would come back with reliability adjustments to our planned maintenance program to address recurring issues. At times this casualty reporting could also drive adjustments (up or down) to our onboard spare parts stock plan.

Lastly, NAVSEA provided us technical assistance and workload leveling services. In situations where we were in a bind trying to fix a casualty, NAVSEA would provide us with technical assistance or would find the right technical experts to help us. For major maintenance, NAVSEA would schedule us for either periodic intermediate maintenance or larger depot level maintenance periods. They would supervise the collation and determination of our work package and help ensure we got the maximum amount of deferred or casualty repair work accomplished during these periods.

Now I won't tell you it was always rosy. In my time we did all of this principally without the help of computer based systems. It was paper driven and administratively burdensome to say the least. NAVSEA was helpful most of the time but I have to admit to more than a couple times being in an engineering pump room in the middle of the night and having a few colorful adjectives to add to the NAVSEA title.

But honestly, by-and-large it was a tremendously successfully asset management structure. Based on this structure and the never failing 'can-do' attitude of my sailors and NCO's we operated the heck out of that ship; never missed a commitment, and left her better than we found her. I served on a number of ships and each was the same.

Throughout my time in the commercial industrial world I've always wondered why commercial sector companies never operated a central engineering function quite like we did in the Navy with NAVSEA. After all, a company's manufacturing plants are not unlike the warships in our Navy (except they don't move so much!). In some industries they even follow very similar equipment and configuration standards like the classes of ships in the Navy. There also never seems to be enough personnel to get everything accomplished.

I've wondered about it for years but it dawns on me that the reason that commercial companies never fully deployed this type central engineering function is principally due to the extensive administrative burden (translating to cost in the private sector) that the system placed on us. The U.S. Navy of course is a not-for-profit entity. If the Navy had been paying us by the hour we would have been rowing around in canoes for lack of money to buy ships!

Theoretically, Enterprise Asset Management computer systems like MAXIMO, SAP, DataStream or others are the solution to this problem. But here again, we've had problems. Despite being marketed as enterprise-wide systems, the earlier versions of these systems really didn't have the capacity to support scores of plants in a central database with a central system architecture-not to mention the issue of deploying common maintenance work practices and processes across an entire company. This may be debatable as there are some examples of enterprise-wide success with these earlier EAM system versions, but I would bet that even those that question the point would agree that even if it could be done, it was hard…..real hard.

Another impediment towards central engineering and asset management is the portability of these applications. This is particularly true for organizations with a distributed and mobile work force of maintenance personnel. This in particular would have been a killer for us in the Navy. How much more mobile do you want to get!

Again, some will argue that there have been hand-held EAM solutions on the market for at least a half a dozen years. I've also seen some companies do some pretty advanced things related to replication of EAM databases. But here again, whether it was technically feasible or not, it remained a very difficult technology to mass implement. The problems remained persistent:….Batch uploads and downloads, synchronization, static data replication, industrial hardened hardware…..need I go on?

So as a community of maintenance professionals, we have done what we always do. We pressed on and tried to patch together the working pieces into a strategy and architecture that worked for our companies. It has been a decade or so of some advances and some setbacks.

We have made significant progress in the area of strategy. The customers I speak to are very interested in standardizing along best work processes and further centralization the function. Asset management is an increasingly more strategic as a function. Technology and strategy had been a dual limitation in the past, but I now see a significant degree of organizational readiness on the part of our customers. Technology still needs to be worked on, but as I mentioned, I am really excited about the prospects of where we can go based on some simple underlying technological improvements.

There are three principal driving technologies that I see coming together to help us solve this problem: Web architected EAM systems, WIFI, and distributed WIFI.

EAM Systems

The first and perhaps most powerful contributing technological advancement that supports this movement within enterprise asset management is the fairly recent release and rapid adoption of web architected EAM systems (previously or otherwise known as Computerized Maintenance Management Systems). We could discuss the merits and demerits of each individual solution for days on end, however with the market advent of the newest releases of MAXIMO 5, DataStream 7i, mySAP, and new EAM releases from both Oracle and J.D. Edwards, the ability to support multi-plant enterprise EAM architectures is dramatically improved.

The EAM improvements are principally due to the new web architecture utilized for these systems. This new web architecture allows for rapid deployment of a central application architecture across multiple sites, plants and facilities using available internet, WAN and LAN network bandwidth. No longer are farms of Citrix servers required. With appropriate security access I could access my company's EAM system over the internet from my hotel room.

Additionally, these EAM systems also include multi-site setup features which support the deployment and centralization of data from multiple business units, geographies, plants, and facilities while also allowing for appropriate segregation of data to allow plants to only see and deal with their specific data.

Lastly, the increasing power and scale-ability of the underlying database platforms continues to improve. Whereas database power was seldom a limiting factor in the past, this continued increase in database volumetric and computing power also serves to directly support customer initiatives towards centralized enterprise asset management.

Of course the best testimony to the power of these new EAM versions and the driving strategies is the behavior of real industrial companies. A huge number of our large industrial customers and other companies I speak with are in the midst of upgrading or implementing new version EAM products and centralizing distributed plant databases into central EAM systems. The ones that aren't doing this have it on their planning horizons.

WIFI and Distributed WIFI

Many plants I visit now are equipped with newly installed WIFI systems supporting a variety of manufacturing and logistics systems. These WIFI systems allow for mobile device wireless connectivity to the plant's LAN. Many customers are now quickly abandoning old cumbersome hand-held batch applications in favor of simple tablet computing hardware, which wirelessly connect to systems like the plant's EAM system and allow users direct access to these applications using a regular web browser-no more cradles, batch uploads and downloads, static data replication, log files and all the other clunky parts of mobile computing. The WIFI based tablets are easy, cost-effective and provide direct access just like a mechanic using a regular workstation with retraining, virtually no implementation cost, and a lot less hassle. WIFI mobile tablets really make the concept of the mobile mechanic a reality.

Of course local plant WIFI networks don't help a really geographically distributed maintenance work force like we see in pipeline maintenance or utility T&D operations. However, I recently was reading an account regarding competing efforts by AT&T and Verizon DSL to provide metropolitan WIFI coverage for a large number of U.S. cities. The performance speeds quoted in the article were impressive as were the implementation plans of both companies. Apparently Washington, DC is currently being finished as the pilot metropolitan area with plans to deploy across every other major metropolitan area in the U.S. within a couple of years.

I call this "distributed WIFI" (for lack of a better term, although this might be technically inaccurate so don't quote me). If successful, this technology provides the final leg of the mobile maintenance worker, allowing remote maintenance crews and personnel real-time web browser access to their company's main EAM system.

The Golden Age

For the first time in a long time I now start to see the confluence of a number of executable technologies coming together with a new found strategic commitment to asset management at a huge number of industrial companies and organizations. I feel confident in my optimism; unlike other waves of technology and strategy these look simpler, implementable, and sustainable.

The key to deploying these technologies and strategies to produce real cross-enterprise asset management is normalization and standardization. This normalization is driven by the fact that we are in effect combining policy, processes, and data from multiple operating plants or facilities into a single business program and system. In order to do so companies have to standardize major MRO processes among operating plants and likewise normalize structural asset and maintenance data among these same plants.

Whereas standardization and normalization represent the largest effort involved for companies seeking to make this jump to cross-enterprise asset management, the end product of this effort drives the most significant return-on-investment, cost savings, and operational efficiency gains. These gains can be very significant and easily eclipse any of the improvements originally gained by plant level program implementations.

Enterprise Reliability Engineering:
A single plant of company XYZ might have 4 identical 250 GPM centrifugal pumps. Over the course of an operating period of a couple of years the plant might be able to produce enough meaningful transactional history to be able to conduct some reliability engineering. However, if we consider the 20 operating plants in company XYZ, we now have perhaps 70 or 80 of these same pumps. With a reference to a common equipment classification, corporate level reliability engineering can view a much broader cross section of transactional history. Meaningful transactional information can be produced in a matter of months.

Armed with this information, reliability engineering can view poor performing assets and modify planned maintenance profiles accordingly; potentially modify inventory stocking plans to carry more replacement parts; and consider OEM sourcing changes or other corrective action planning. If one plant demonstrates higher performance characteristics related to this asset classification it can be analyzed to determine what they are doing differently that can be deployed across the remaining plants. Predictive or condition based maintenance can be prescribed in the right situations.

Conversely, reliability engineering can view equipment classifications, which demonstrate high performance levels of reliability, potentially modifying planned maintenance profiles to decrease the tempo or frequency of maintenance on these assets. In some situations, reliability engineering might elect to program run-to-failure profiles for certain classifications.

The key to enterprise reliability is normalizing each plant's equipment to a master data set or equipment classification. This has three distinct advantages: First, it allows for roll-up viewing across the enterprise for transactional information, class-wide performance and reliability information. Second, it allows for linkage and ongoing maintenance of the asset records. For example, if one plant has a great spare part list for our 250 GPM pump this can be applied across all the plants at nominal effort and cost. Third, it allows for ongoing enterprise maintenance of the planned maintenance program in a manner that allows for mass updates across all the equipments in this classification.

In the past we might have performed reliability engineering at the plant level successfully. In a specific instance perhaps the plant in this example used reliability analysis to produce modifications to the pump maintenance profile producing an annual $10,000 maintenance cost savings for the plant. Under the enterprise scenario this same efficiency can now be deployed across company XYZ's plant network producing an aggregate $200,000 annual efficiency.

Enterprise Maintenance Engineering:
Wouldn't it be nice if each plant could have a group of dedicated maintenance engineers, maybe 3 or 4? This group could maintain planned maintenance programs, run reliability engineering, maintain equipment records, and spare parts requirements. It would be great, but also costly and pretty much impractical for a lot of folks. On the other hand, by using centralized cross-enterprise asset management, this provides the unique capability to have a central group of maintenance engineers (maybe more than 3 or 4 but probably not a whole lot more) that can provide this function across the entire plant network. This group can also be the same group that runs enterprise reliability engineering. This is a perfect example of a shared service. It saves money for Company XYZ and it provides a capability that otherwise would not be attainable by individual plants on their own.

System Support & Maintenance: This is perhaps the quickest cost savings element related to cross enterprise asset management. Using the centralized web EAM architecture there is no longer any need for individual plants to maintain their own EAM IT infrastructure (application servers, database servers, hand-held interfaces, etc.). Additionally each plant doesn't need to have a database administrator, system administrator and other local support costs. Centralizing the EAM system can drive significant short-term and ongoing IT cost savings. It also allows plants to focus on the business of operating and maintaining their plants rather than operating and maintaining their EAM system.

For those companies that have centralized their EAM systems there also exists an opportunity to enable a distributed architecture. The new web enabled EAM applications allow us to consolidate hardware investment and ongoing support costs. The Citrix farm can now be decompiled and redeployed. Clunky hand-held systems and interfaces can be decommissioned and replaced with web browser WIFI units.

This is a quick cost savings area but also drives ongoing annual cost savings related to decreased system, hardware, and infrastructure support and maintenance costs. This can be a significant cost benefit and improvement for many companies.

MRO Materials Management:

Bringing all plant storerooms together in a common database and common item numbering schema allows for enterprise-wide coordination of stock planning. Plant 1 of company XYZ might be carrying 4 insurance spare impellers for the 250 GPM pumps described beforehand. Plant 2 of company XYZ carries a similar amount. Plant 1 is 250 miles from Plant 2 (this is starting to sound like one of my kid's math homework questions!). The point being, that upon examining usage history and the fact that they can get the part from each other in 8 hours (rather than a red-tag expedited delivery from the vendor), the plants might elect to reduce their insurance spare stock levels for this part down to 2. This frees up working capital for Company XYZ and reduces MRO inventory carrying costs. This same examination can be conducted across all MRO inventory items, driving considerable inventory cost reductions and balancing with no negative impact on operations.

I'd also like to comment on depot stocking. A classic example of how to apply this comes from one of our customers who was operating 4 nearly identical plants each within no more than a 2-hour drive of each other. As a continuous process manufacturer, downtime for this customer was of critical importance. Each plant was maintaining an inventory of almost $2.0M of capital spares. In total these 4 plants were maintaining $8.0M of nearly identical capital spares.

By using a centralized enterprise asset management system and strategy coupled with the concept of depot level stocking this situation can be rectified producing significant cost savings for each plant at no risk to operational efficiency. Using this same example, the four plants would either select a central location to store one or two sets of capital spares that can be accessed by all four plants (a secure storage facility would do just fine), or conversely one plant might be selected to serve as the capital spares depot for all four plants. Even if we increase the capital spares stock levels to 2x original single plant levels, this reduces $4.0M of capitalized inventory and drives an annual carrying cost decrease of something probably close to $300,000 per year.

MRO Strategic Sourcing:

Strategic sourcing is all about combining a company's disparate purchasing actions, and working with dedicated suppliers to source these areas of procurement. MRO and OEM procurement items are candidates for strategic sourcing. The biggest challenge to implementing effective strategic sourcing is combining all this procurement information in order to establish buying trends and to have system support for ongoing performance tracking of the sourcing channel. By combining our plant procurement volumes we achieve higher volumes to elicit volume-driven pricing discounts and supplier involvement.

Clearly a fully centralized enterprise asset management system can play a huge role in supporting this initiative. Strategic sourcing won't be applicable to every category of maintenance and OEM purchasing activity, but it will be appropriate for many. Typical spend reduction levels of 10-15% of annual category spend are not unusual using this data-driven procurement strategy.

As you can see there exists ample business improvement opportunities related to cross-enterprise asset management. There are other more advanced areas like cross-plant work scheduling and enterprise maintenance resource planning. I'm still working on digesting these.

The normalization of multi-plant processes and data should not be under-estimated. These are not small tasks but in my opinion clearly worth the effort. In the past, the most significant challenge to realizing these efficiencies has been the readiness of technology. With the break-through and architectural simplification of these key EAM technologies, I can see a path forward now.

I'm passionate about maintenance and asset management. Our customers are too. I've always believed that the best validation of what is happening in the world of asset management is watching the behavior of our customers and listening to them. Most are quickly moving in the direction of cross-enterprise asset management or are planning to do so in the near future. There remains work to be done but I'm optimistic and excited. I hope you are too. We've been waiting for this for a long time!