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Useful Tool or Marketing Ploy?

The Society of Automotive Engineers RCM Standard

by JC Leverette

The Society of Automotive Engineers (SAE) Standard on Reliability-Centered Maintenance (RCM), SAE JA1011, continues to generate a lot of discussion wherever RCM is discussed. Not surprisingly, it was at the center of a few discussions at the recent RCM Manager's Forum in Honolulu, HI, where many leaders in the field gathered. The Forum had an interesting session dedicated to the importance of an RCM standard. The session was billed as a panel discussion focused on SAE JA1011 and its importance in the RCM world. However, the panel contained only a group of RCM experts from one particular view of the RCM spectrum. While the panel was certainly knowledgeable and presented their side of the story very well, there are other views on the need for and how an RCM standard should be used. As one of the authors of SAE JA1011 involved from beginning to release, it is my hope to provide a somewhat different perspective on its purpose and how it should be used.

In the many forums where I have seen JA1011 discussed, there are a wide range of opinions on its usefulness, its purpose, where it came from, and whether it is valuable or useless, good or evil, or none of the above. I have also seen a lot of misinformation related to JA1011, and unfortunately, discussions like the one at the RCM Manager's Forum unintentionally create an impression that JA1011 was created by and for one group of RCM proponents. My intent in writing this article is to provide two things: 1) some facts about how and why JA1011 was developed, and 2) some of my own opinions on how JA1011 should be used and not used.

The Origins of JA1011

In the early 1990's, the Department of Defense (DoD) began several initiatives to streamline their procurement process. One of these initiatives was a decision to reduce the reliance on military standards in new acquisitions because they were perceived as costly and burdensome on OEMs. Instead, DoD wanted to use commercial or performance standards. This decision was implemented by systematically canceling a large number of military standards. One of those cancelled was MIL-STD-2173, which documented the RCM process used by the Naval Air Systems Command (NAVAIR). Naturally, NAVAIR became very interested in what commercial standard would replace MIL-STD-2173.

In support of this initiative, a group called the Reliability, Maintainability and Supportability (RMS) Partnership, coordinated the efforts of various societies and organizations involved in developing standards related to reliability, maintainability and supportability. The RMS Partnership asked SAE to lead the development of a commercial RCM Standard since no acceptable commercial equivalent existed at the time. SAE was se-

lected as the relevant society for this standard because of their focus on the mobility industries and most of those involved at the time were in the aviation industry. The requirement was passed to SAE in Dallas, TX in the summer of 1994.

Shortly after accepting responsibility, SAE chartered a sub-committee to begin development of an RCM standard under its G-11 Supportability Committee. The RCM subcommittee initially consisted of representatives from NAVAIR and various DoD contractors. At the time, there was no commercial interest in the RCM standard other than the few aircraft OEMs who wanted to stay abreast of what they would be required to do while building airplanes. It was noted somewhat humorously by the attendees that the development of a "commercial" standard was being performed almost exclusively by personnel associated with the US Government and a few Government contractors.

We started down several different paths in developing this standard, including one directed by "higher-ups" in SAE to develop a "preventive maintenance" standard instead of an "RCM Standard" because, ironically, they didn't think there would be enough interest in RCM to warrant its own standard. A quote from one of the related e-mails is presented for its humor value: "We [the SAE Supportability Committee] are not interested in an 'RCM spec'. We want a 'scheduled maintenance spec'. An 'RCM spec' would be too narrow in scope. There's not enough general interest in RCM to justify SAE involvement in such a spec." Although not quite the same magnitude, this statement could go down in history as one of the worst predictions ever, right alongside the computer company executive in the early 1980's who said there would never be great use for home computers!

We also found ourselves at various times trying to correct known or perceived deficiencies in current processes, but could not agree on how to correct them. Eventually we concluded that there really was no “standard” RCM process and that a “Standard” was not the place to develop new and untried procedures. We also decided to ignore the directive to create a preventive maintenance standard and began to settle on the idea of creating a set of criteria that would allow users to determine if a given process was conforming to the original tenets of RCM as defined by Nowlan and Heap.

Late in the process, we made efforts to seek out experience from commercial industry as interest in RCM had grown. In late 1997, John Moubray and a few users of the RCM2™ process became involved. Despite some lively debates along the way, we were able to complete JA1011 in 1999. Those who were involved can attest, a lot of tears and blood were left on meeting room floors along the way. However, I believe we all felt that the final product was a carefully scoped and crafted compromise that delivered on its authors’ intent: a document that identified the original tenets of RCM as defined by Nowlan

and Heap and for the most part omitted commercial agendas.

The Purpose of JA1011

SAE JA1011 exists today because the DoD wanted a commercial standard for RCM. The primary purpose in developing JA1011 was to provide a document that DoD could reference in contracts that would ensure DoD got what they were expecting when they contracted for RCM analysis and not an abbreviated or completely different process claiming to be RCM. Although some had strong opinions on whether these “alternative” processes were good or bad, it was not the intent of the majority of the authors of JA1011 to pass judgment on all of these other processes. A couple of references to other processes did get into the standard; in hindsight they probably should have been left out. The purpose of the standard was to define the RCM process as those involved knew it, understood it, and wanted it to remain for their use.

SAE defines its standards as technical reports that are “a documentation of broadly accepted engineering practices or specifications for

a material, product, process, procedure, or test method.” Anyone who has spent time in the RCM field knows there are a large number of processes with quite a bit of variation being called RCM. Although there weren’t as many at the time JA1011 was started, it was clear that there wasn’t a single process that fit the definition outlined above. It became clear that, instead of identifying a specific process, the only alternative was to identify the common characteristics of processes that made them RCM. For these characteristics, we used the original Nowlan and Heap report, which coined the term RCM, as the basis.

The purpose of SAE JA1011 is to provide a measuring stick to compare processes to see if they adhere to the original tenets of the Nowlan and Heap report. It was intended to provide the minimum requirements of an RCM process using the principles identified by Nowlan and Heap. We envisioned that others would come up with creative solutions that improved upon the basic process. As long as they complied with the minimum elements of the standard, improvements were and are encouraged. JA1011 was not intended to lay claim to the term RCM

Best efforts without knowledge is just best efforts.

- W Edward Deming

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or determine the validity or usefulness of processes that do not comply with it. While I feel certain most of the authors believe that “real” RCM follows those principles laid out by Nowlan and Heap, most of us are under no illusion that the initials “R-C-M” can’t be used to describe any number of processes, even if they are not remotely related to the original. The solution is simple: if you want RCM to refer to SAE JA1011 compliant RCM in your application, reference it that way in a contract, request for proposal, or statement of work.

JA1011 should be used as a tool by users of RCM to decide if a given process will do what they want it to do. Like all standards, it can be “tailored” or modified to use only those elements a particular user finds useful. As a measuring stick, it can be used to identify differences in processes that do not comply. It is up to the user to decide whether those differences are good, bad, or matter at all. Users are free to use it however they wish, or not use it at all. JA1011 is not mandatory or enforceable through any vehicle other than by contract reference. There are no organizations that I am aware of currently certifying compliance with JA1011, so it is ultimately the responsibility of the user to decide whether a particular process is compliant. Claims by those that disparage other processes, saying they are not JA1011 compliant and, therefore, not as good as their own, should be viewed with suspicion. In my opinion and experience, most of those criticizing other processes have very little idea how those other processes are used and whether they are appropriate for a given application. Again, only users are qualified to make that decision.

What JA1011 Doesn't Do

One of the topics discussed by the panel at the RCM Manager's forum was what should be added to the Standard. That discussion was one of the primary motivators for writing this article, as one of their points advocated exactly the opposite position taken by the original authors of JA1011 and clearly violated the definition of what should be in a standard as described above.

The issue was how RCM analysis should be accomplished. JA1011 purposely does not address how to execute the RCM analysis process. The panel in Hawaii was advocating that JA1011 be updated to include the practice of using “facilitating meetings” with

representation from certain key groups and that all analysis decisions be made in a consensus building fashion. That JA1011 does not address this issue was well discussed, intentional, and completely agreed to during its development, even by Mr. Moubray, who was a tireless advocate of this method. There was not at the time, nor is there now, a “broad acceptance” that this is the only acceptable way to perform RCM. Our experience is quite the contrary. We have obtained high quality results using several different methods including facilitated meetings and individual analysts who solicit the required information from all relevant sources. In order to perform competent analysis, you need experience and knowledge in three main areas: technical knowledge of the equipment itself, knowledge of the operating environment and how the equipment is used, and knowledge of the RCM process and related reliability and failure principles. How these elements of knowledge are best brought together vary by situation. The decision of how to perform RCM is best made by the organization implementing an RCM program once they understand what it takes to execute the process.

There are several other topics that were discussed in the development of JA1011 and not included in it for similar reasons. Two examples are a decision logic diagram and how to decide which assets should have RCM applied to them. Those topics deserve significant discussion on their own. I'll save those for another day and another article.

In summary, JA1011 was intended to be a tool for users to evaluate all of the different RCM processes they were likely to encounter. It was developed to identify whether processes being called RCM, adhered to the original tenets of RCM as defined by Nowlan and Heap. How users use that tool and what they do with the results are totally up to them.

JC Leverette is currently the Vice-President of Engineering and Logistics at Andromeda Systems Incorporated and is leading RCM projects and other reliability and maintenance projects in a wide range of industries. Previously he was a Senior Engineer with the Naval Air Systems Command where he was involved in several RCM projects, assisted in developing NAVAIR's current processes, policies, and tools, and participated in the development of SAE JA1011. He has been involved in the RCM field for more than 18 years.

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