

CHAPTER - 7

CONCLUSION

The RCM was created by the aviation industry in 1970s. Subsequently, it found applications in many other industries and also the military. RCM is now considered the pre-eminent method for evaluating and developing a comprehensive maintenance program for an item.

Keeping in mind the benefits of RCM, the Indian Navy should switch over from the present PPM approach to the RCM approach.

Possible Apprehensions for Changing over to RCM System. In implementing an RCM program in organizations where the concept is new, there could be many apprehensions in the mind of the users and maintenance personnel. Some of the apprehensions along with the possible remedies are as follows¹³: -

(a) Run to failure shock. For many maintenance managers and technicians, allowing an item to run to failure runs counter to "conventional wisdom". It is important that they understand the concepts of reliability and turn their focus from preventing failures to preserving function.

(b) Failure to accept the "Preserve Function" principle. Most maintenance personnel traditionally have viewed their role as one of preventing failures. To effectively implement an RCM program, it is essential that maintenance personnel focus on preserving the function of an item and not preventing failures.

(c) Challenging the Past. Challenging past practices almost always invokes strong resistance, especially if the new practices are not fully understood. Training is the best way to deal with such resistance.

(d) Organization structure. The RCM process requires close coordination and cooperation among several groups of people, including designers, maintainers, logistic planners and users. Organizational structures can impede or even prevent the level of cooperation and coordination needed to make RCM a success. The concept of integrated process/product teams may facilitate and encourage cross-discipline cooperation.

(e) Threat of reduction in staff. When RCM was first implemented within the airline industry, drastic reductions in scheduled maintenance tasks were made possible. When a segment of an organization perceives that a new policy or procedure will eliminate their jobs, the natural reaction is to fight against the new policy or procedure. However, with vision and planning, management can find ways to effectively use the resources freed up by implementing RCM.

(f) Inadequate buy-in. Very often, management implements a new policy or procedure without fully supporting that policy or procedure. If either resources or management interest is insufficient, the new policy or procedure will probably fall short of expectations. The top management should support the RCM programme fully.

(g) Informal procedures. RCM is a very structured, disciplined method of developing a comprehensive and effective maintenance program. It cannot be effectively implemented on an informal or ad hoc basis. The procedures for implementing an RCM approach within an organization must be formal, documented, and managed.

(h) Inadequate data collection. Without adequate information regarding the frequency of failure or the parameters of the failure probability density function, one cannot objectively determine when a PM task should be

performed. Data that is adequate in both quantity and type (e.g., time to failure) is essential to the RCM process.

Peculiarities of Implementing RCM in Navy

Maintenance costs form a significant part of the overall operating costs in ship operations. Maintenance also affects reliability and can thus have environmental and safety consequences. The International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management) are considered to be closely associated with human demonstrated by the fact that it is the only shipboard activity to have one whole element assigned to it (i.e. ISM Code element 10) [1]. systems the sudden operational failure of which may result in hazardous situations. The SMS should provide for specific measures aimed at promoting the reliability of such equipment or systems". This is consistent with what reliability-centered maintenance (RCM) delivers. However, most of the attempts to implement RCM on ships have been done by shore-based consultants or academics. To really benefit from the process the ship staff should be able to use it in their onboard encouraged various other industries to use it to improve their maintenance practices. However, applying RCM to ships could have some hurdles. These include:

(a) Lack and portability of failure data: There is no easy access to failure data as there is no composite databank, which shares information with every one commercial sensitivity has often been the reason for data from one ship to another. While in Indian Navy there is an organization which has a repository of failure data, the data is not available to all the ships online.

(b) Basic equipment condition cannot be taken for granted: Certain equipment conditions like tightness, lubrication and cleanliness, which can be taken for granted in other industries, are constantly a source for concern in maritime industry.

(c) Shipboard personnel are rarely trained in maintenance management or risk assessment techniques especially those that require a statistical approach.

Shipboard personnel have to be "jacks of all trades" which also means that they are not likely to have any specialized background, particularly mathematical.

(d) Shipboard personnel are already overburdened: Shipboard personnel are operators as well as maintainers. A complex and long methodology is not likely to find favour with them.

(e) Ships operate far away from repair and spares facilities: The failure mode analysis should give special attention to consequences resulting from the above.

(f) Lack of "adequate" redundancy: Traditionally RCM assigns equipment with redundancy "run-to-failure". While this makes sense in other industries with its multiple redundancies, it may not be desirable in shipping where critical systems usually have only single redundancies failure of which could be catastrophic.

(g) Rigid prescriptive requirements of various regulatory bodies: Ships come under the purview of different regulatory bodies including Port State, Flag State Classification Society, etc. All these have to be accommodated in the maintenance plan.

(h) Recommendations from equipment suppliers have to be followed in the guarantee period: Non-compliance with the recommendations during this period could remove the supplier from any obligations in case of a claim.

(i) Equipment suppliers do not give a FMEA: Some industries and organizations require their suppliers to submit a FMEA of the equipment. This greatly helps implementing RCM. However, this is not the case in ship operations.

(j) RCM analysis results are unique to each operating context: The same pump working on a ship or in a system may have different functions, operating conditions, redundancies or even failure detection probabilities elsewhere. Hence the analysis has to be carried out individually for each ship and system.

(k) Ships crew keeps changing: There is a need to lay down explicit guidelines

on the way analysis is to be carried out to prevent inconsistent outcomes of the analysis of the same system carried out by different teams

Way Forward

While there are many problems associated with implementation of an RCM programme or RCM based maintenance policy, more so for the naval platforms, it is considered feasible to implement the same on naval platforms. The approach however needs to be graded. As discussed earlier, the RCM based maintenance programmes have successfully been implemented in the US and UK navies and can be replicated in the Indian Navy. The graded approach would mean starting the process for design and acquisition stage followed by the newer acquisitions in the past. While the transition stage is always the most difficult part, the long term gains which are envisaged, adequately justifies the cost, time and effort which will be required to change over to the new paradigm of ship's maintenance. A team effort with contributions from expert agencies like the design agencies, Indian Ships Maintenance Authority, Trial Agencies and the Original Equipment Manufacturers can steer the Indian Navy towards the new regime. Indian Navy interacts with all the modern and blue water navies including navies of USA, UK and Australia. The interactions take place at various technical and operational levels. Positive interactions with the navies who have either migrated to the RCM regime or are in the process of doing so would greatly help the RCM programme of the Indian Navy.