

Life Cycle Management - A Growing Trend

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ABSTRACT: There has been a growing trend in the Mining Industry to opt for Life Cycle Management programs with major suppliers of equipment. This concept has grown from simple "parts supply contracts" to "full maintenance contracts" with provision of parts and labor, along with guarantees of machine availabilities and performance, in return the supplier is paid a cost per operating hour or cost per unit produced. The concept goes beyond that of the traditional "customer - supplier" relationship, risk sharing promotes the development of a partnership with both parties striving towards a common goal - lowest cost per unit produced. The trend of privatization in many countries provides an ideal situation for the implementation of LCM's, especially as the issue of "global player" accompanies privatization. This paper presents a synopsis of this growing trend of Life Cycle Management programs and highlights the mutual benefits derived from such relationships. The history of Life Cycle Management goes back quite a way, and not always in the form we currently know. The paper starts by outlining some of the steps taken in the past by the mining industry and its suppliers to generate a workable solution in managing equipment throughout the lifecycle - moving from a situation of the OEM product being equipment and parts, to actually providing a something completely different - cost per unit of ore produced at the mine site, but more specifically - as a partner. Starting at the mine site, issues such as risk and the associated cost are discussed, guarantees offered by suppliers as well as the issue of skills availability and utilization. Optimal use of personnel as well as accessibility to maintenance practices utilized throughout the world is a key to the success of a full LCM contract. Procurement of parts, including non-OEM components can, in many cases be provided competitively by the OEM, especially with the capability to bundle everything into a LCM. The impact on infrastructure and associated costs is another key element and is also discussed. The discussion then moves to the provider of the LCM, usually it is the OEM. There are obvious certain benefits to the OEM and its greater customer base and these will be expanded upon. Critical items such as the impact of forecasting, manufacturing lead times, inventory cost and control is all discussed. The importance of machine and major component databases is highlighted from an OEM as well as a mine site perspective. Finally, hurdles to the actual implementation of a LCM contract are discussed, limiting, how to fit in with existing operations and coping with the threat of redundancy are just some of the elements that should be considered. There are limitations with implementation, especially with existing mines and these are discussed.

I INTRODUCTION

Our customers - want to be producing at the lowest cost and maximizing their profits for their shareholders. As suppliers - we want to be lowering our customer's cost and maximizing our profits for our shareholders.

Is this a dichotomy of objectives? We seem to be striving towards opposing goals, how can we both lower our costs and at the same time maximize our profits when the objective of one is achieved at the expense of the other? Or is it?

In order to produce cost effectively, the mine needs:

- Reliable equipment through
 - Service and Support for that equipment
 - Parts availability with realistic parts pricing
- Traditionally the supplier would do exactly that:
- Design and manufacture reliable equipment
 - Provide service and support on request
 - Have parts available at a warehouse, ready for the mine to order

This may work if your mine is situated close to the center where the warehouse and service or support personnel are situated. But as we know, mines are generally not situated close to main centers and in many instances, have had to create their own

communities and support infrastructures in order to operate.

The remote location of these mines resulted in the necessity for high inventory levels in order to keep the equipment operating with a high level of availability. These high levels of inventory had corresponding high carrying costs, and the mine was carrying inventory for ALL equipment. The alternative was to carry low inventory at a lower cost, but then there was the potential for associated drops in equipment availability, with resultant losses of production.

Adding to this problem is the decision as to what to actually carry in inventory, and in order not to get "caught short" the operations carried many unnecessary parts, parts that would not necessarily be needed at short notice. The extra cost of these parts just added to the cost.

A major contributor to the above was that the operation was taking all the risk with the supplier taking very little risk - other than that of warranty on parts. How best could the situation be improved? This saw the introduction of risk sharing.

2 RISK

What are the risks that we face on a day to day basis? From the mine perspective they are:

- Will my equipment be available to operate?
- Will I have the parts to repair it in the case of breakdown?
- Am I maintaining my equipment properly in order to minimize downtime?
- Are my operators making optimal use of the equipment?

From the supplier perspective they are:

- Is my equipment performing reliably?
- Are proper maintenance practices being followed to ensure ongoing reliability?
- Are my parts going onto the equipment to ensure optimal reliability?

Sharing can minimize the risks on both sides.

The operations have certain competencies, but their specialty is that of exploration and mining. Mineral exploration, mine planning, extracting and processing the ore and selling the resultant product is what they are good at.

Equipment manufacturers on the other hand design and manufacture equipment. They study component lives and try and build optimal life into these components. They also provide the service and support, the training of maintenance personnel. Does it not make sense for them to play a larger role in the performance of their equipment?

3 LIFE CYCLE MANAGEMENT (LCM)

Life Cycle Management is a very loose term, but as equipment manufacturers, we wish to support that equipment "from the cradle to the grave". That in turn generates parts and machine sales, which generates margin dollars, from which we take development dollars to improve the performance and reliability of our equipment for our customers. So as manufacturers we like to be directly involved in the support of our equipment.

Many other terms are applied to the principles of Life Cycle Management:

- R&M Contract - Repair and Maintenance Contract
- Parts supply contract
- Service contract
- MARC - Maintenance and Repair Contract

They all have one common goal, to increase the involvement of the supplier in the support of their equipment with resultant reliability and cost benefits.

The problem lies in that there is a reluctance to give up that control by the operation. A reluctance through lack of trust? A reluctance through perceived loss of control?

Early contracts started with a small amount of risk sharing, in the form of "parts supply" contracts. These contracts were set up to guarantee parts availability for agreed on prices, in return, the operation guaranteed 100% usage of the parts in the agreement. This contract was somewhat limiting, as they were usually limited to the faster moving parts. Contracts did develop to include slower moving items.

Contracts grew to include availability guarantees by the supplier. This increased the risk on the part of the supplier, and at the same time lowered the risk from the operational perspective. But at the same time, the operation was better able to plan and it benefited while the OEM benefited from the increased business.

Some contracts involved just the supply of "Service", where a representative is placed - either in a consultative capacity or to perform a more "hands on" role. This minimized the need for certain training at the mine. OEM personnel along with guaranteed availabilities contributed towards a more efficient and cost effective operation.

Contracts further grew to include supply of parts at a guaranteed cost per hour, or even supply of parts on a flat cost per hour basis, where the mine pays the supplier a cost per hour, and the supplier provides the parts.

Today we have some contracts where we provide the entire support infrastructure for our equipment, parts supply, maintenance personnel, warehouse

management, availability guarantees, support logistics for our personnel - transportation within the mine and even service vehicles for lubrication and maintenance purposes.

4 ECONOMY OF SCALE

This whole business is one of economy of scale. Could we provide the full suite of service options for one shovel in a remote location? The answer is "yes", but it would probably not be cost effective. So one has to be mindful of that.

Each LCM contract has to be judged on its own merit, and if it's not good for BOTH parties - forget it! The fact that you have only one piece of equipment from one supplier does not necessarily mean that there is no chance of an LCM - in order to achieve economies of scale there is always potential to have an LCM that involves one supplier supporting the equipment of another. This is already being done in a number of areas in the world.

In addition to running LCM's on our own products, we represent other OEM's in various parts of the world, and we operate contracts on that equipment as well, and in some operations, ONLY on that equipment.

5 SKILLS

One thing to bear in mind is that skills are required to operate these contracts. They should not be viewed as a means of transferring a problem of employing, training or retaining the necessary skills. The OEM will also try to utilize local skills as they are the most cost effective. There are instances however where one may have to resort to the use of "imported" skills but these can be expensive and are generally avoided wherever possible.

6 INVENTORY AND RISK MANAGEMENT

The management of inventory is a huge expense, not only for the skills and personnel to do it, but also for carrying costs. To minimize the carrying cost it is most desirable to have the required parts on a JIT (Just In Time) basis. Of course the logistics of getting parts to a remote site normally presents a problem and in a lot of instances the impact of NOT having a part should be evaluated. To this end the manager of the LCM conducts a risk analysis - "what's the current condition of the machine and what can potentially go wrong?" versus "what do we have in stock and where are the potential shortfalls?" In many instances more critical decisions are made in conjunction with the mine, to have a mutually beneficial support plan.

7 FORECASTING

The mining equipment business - particularly that of Draglines, Shovels and Drills is not a "fast moving consumer goods" business. Our equipment is unique, and in as much as we try to maximize parts commonality, we have to keep up with technological advancements. Our inventory therefore moves slowly in comparison to say, an automobile manufacturer. As part of our responsibility to our customers we have to manufacture and keep the required parts in stock, on the other hand our responsibility to our shareholders dictates that we minimize our stockholding. How does the LCM benefit this aspect of the business?

Since we are right at the user interface and involved with regular maintenance of the equipment with an LCM, we are in a position to determine imminent as well as longer-term parts requirements. These requirements are fed back to our manufacturing facility and we produce only the required parts as identified on the forecast. Accurate forecasting ensures we have no unnecessary parts in stock and we are able to minimize our overheads on inventory, which translates to us being able to offer competitive pricing on our parts and associated contracts.

8 CONCERNS

Perhaps the major concern with operations venturing into an LCM contract is the one of trust. There has to be a mutual trust between the parties involved. Contracts have to benefit both parties, and without the trust element the contract will be doomed to failure.

Since, as mentioned earlier, many of the mine sites have created their own communities, there is a second concern - and it is more social than business, but what will happen to the existing workforce if a contract is entered into? This may cause many operations to balk at entering into a full LCM agreement - in this instance the option could be to go for just a parts supply contract.

Many operations may view the handing over of the maintenance function as a loss of control. The trust element again comes into play here. There should be full confidence in each other for both parties.

"Greenfield" operations are perhaps a little easier to consider for LCM contracts. Communities have not been established and there is less "social" threat. Getting in at the beginning of an operation also ensures that infrastructure is set up according to the needs of the company who will be doing the maintenance.

9 SUMMARY

There can be significant advantages to LCM contracts if properly implemented. There can be limitations to what agreements are concluded in the various areas of the world, but there should be some kind of workable solution.

The operations get the benefit of reliable equipment through OEM trained personnel, inventory managed to levels appropriate with the operation and a predictable cost according to forecasts generated.

The OEM gets the benefit of long term parts and service income stream and accurate forecasting for loading their factory. Both companies benefit in the longer run.

10 THE TREND

One further measure of the success of LCM initiatives is to look at what's already out there, and is there a growing trend? At time of writing this paper, P&H MinePro Services is involved in over 60 contracts involving more than 130 pieces of equipment - these contracts range from supply of parts or labor only, to full LCM contracts. The volume of equipment we are supporting in these contracts has more than doubled since 1999.

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