Aladon

The Risk & Reliability

GLOBAL NETWORK

# RELIABILITY CENTERED SPARES (RCS)

## MEETING BUSINESS OBJECTIVES AND REDUCE RISK:

Increases Reliability
Reduces Inventory
Manages Risk
Lowers Cost

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## RCS – REDUCES INVENTORY AND COST, INCREASES RELIABILITY AND AVAILABILITY

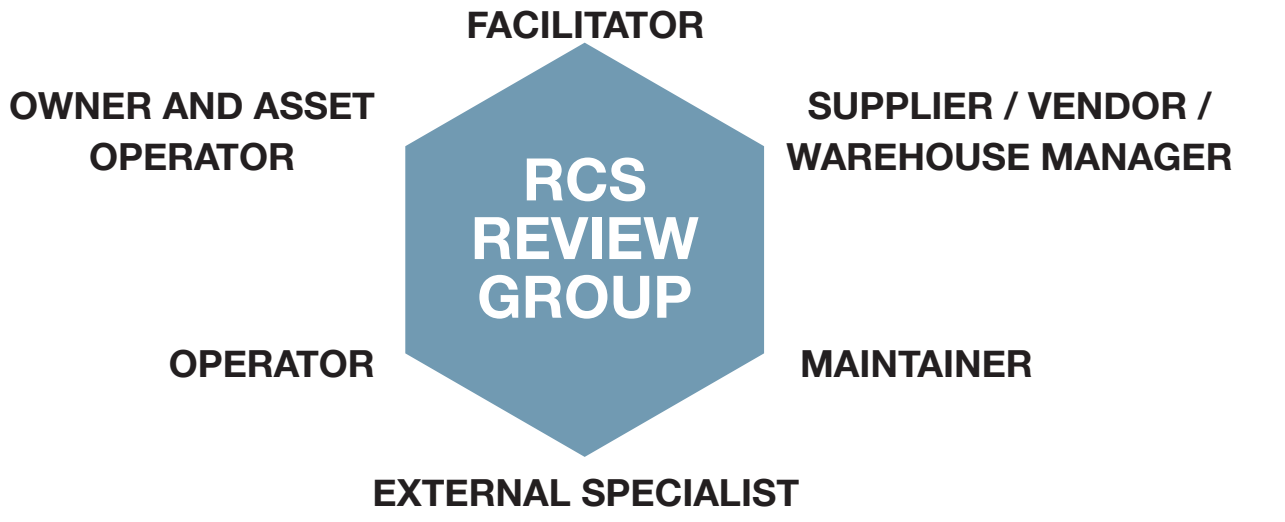
Aladon and the Aladon Network have been assisting customers improving reliability of their physical assets for more than 30 years. The Aladon Network have been applying RCM-based reliability improvement programs in more than 100 countries on every type of asset known to mankind. Aladon is the leading global Risk and Reliability Network. We've been applying RCM on operating assets for more than three decades and this experience made us realize that having a world-class maintenance program is not enough - the spare parts that supports the maintenance program is equaly important. Whether it is about achieving functional requirements, allowing continuous and safe operation or meeting the desired business objectives, reliability and availability can only be achieved when the spare parts support maintenance and operations at all levels. Our methodology addresses all these important requirements and is supported by world-class integrated software.

## WHY USE ALADON?

Aladon worked on all continents in every endeavor known to mankind and are now using that experience to offer industry-centric solutions. Reliability Centred Spares is an extension to Reliability Centered Maintenance and is based on years of experience implementing reliability improvement programs across the globe. RCS focuses on the right spare parts to support maintenance and operations at every stage of the asset life-cycle. The Aladon track record speaks volumes and includes references from leading industries around the globe. Aladon understands the challenges faced by all industries and offers a comprehensive experience-based solution which includes knowhow and information to expedite an RCS project.

## THE ALADON RCS PROGRAM OFFERS THE FOLLOWING:

- ***Reduced Inventory*** and lower part costs for all your assets
- ***Defined Business Objectives*** and ***Business Risks*** to support spare part recommendations
- ***Defined Operating Context*** - spare parts to meet specific requirements and service levels
- ***Optimized Stockholding*** to support Operations and Maintenance at all levels
- ***Spare Part Modeling and Simulation*** based and real life scenario
- ***Implementation*** and ***Sustaining Results***
- ***Improved Understanding*** of Engineering, Maintenance and Operations



## SPARE PARTS AND STOCKOUT CONSEQUENCES:

Ideally, spare part requirements should be identified during design by the engineering team responsible for process and equipment design, with the valuable and important input from Operations and Maintenance. The people who know the equipment best and who will ultimately be responsible for equipment health should be involved from the start to ensure that all stakeholder needs are considered. The core of the RCS process is based on the principles of RCM. RCM determines the best maintenance requirements for an asset (preserving its functions) in a specific Operating Context. RCS determines the spare parts required to support Operations and Maintenance in this context. Similarly to the RCM decision logic, RCS focuses on stockout effects and associated risks it poses to the organization.

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|---|---|---|
| 1 | Develop/Review Business Objectives Safety & Health, Environmental Integrity, Reliability and Availability, Service Levels, Operation Capability, etc. | The RCS Process defines the minimum amount of spare parts required to ensure that Business Risks (Physical and Economic) are managed appropriately. For this reason, the RCS process starts by defining/reviewing these Business Objectives and align Operations, Maintenance and Spare Parts with these objectives. |
| 2 | Review the information from FMEA/RCM studies for maintenance requirements and consider the maintenance tasks that would require spare parts. | Spare Parts and Inventory are stocked for two reasons, to support Operations and Maintenance at all levels. Unfortunately organizations cannot afford to keep a spare for every asset or component they own and have to use discretion when determining what to stock. The maintenance requirements ultimately determines the spare part requirements. |
| 3 | What would be the consequence if no spare part is available (stockout consequence)? | Where spare parts are required to maintain or repair equipment, the risks of not having the spare available should be assessed. Based on the consequence of the stockout, a justification can be made for keeping a spare part. The RCS process also considers Safety, Environment and Production impact. |
| 4 | Is it possible to anticipate the spare part requirement? | In order to optimize the inventory and number of parts to stock (if any), it is important to understand the characteristics of failure. If it is possible to anticipate the failure and subsequent need for spare parts, it will be possible to optimize the stocking policy. |
| 5 | How many spare parts should be kept? | Based on the Operating Context which includes Logistics, Utilization, Environment, Market Demand, Seasonal Demand, Safety Standards, etc., further optimization of the stocking policy can be achieved. |
| 6 | What if the maintenance requirements cannot be met? | If the Business Objectives and maintenance requirements cannot be met with stocking spare parts, a one-time change to the configuration or procedures may be required. |

The RCS process starts by defining or reviewing the **BUSINESS OBJECTIVES AND BUSINESS RISKS** and ultimately ensures these objectives are met and the business risks are eliminated or at least reduced to a tolerable level with the stocking policy. RCS reduces the number of spare parts drastically. The consequences of not having a spare part is driving important decisions about stocking spare parts. Furthermore, RCS focuses on optimization of spare part policies through evaluation of the technical characteristics of failure to ensure proper forecasting and inventory.

The **OPERATING CONTEXT** is developed as part of the reliability analyses and uses real life data. The factors impacting Operations and Maintenance are considered throughout the decision making process. The Operating Context is similarly important for developing a spare parts policy as it is for developing the maintenance program.

### The Operating Context should include the following:

- Safety Regulations
- Skills and Skills Availability
- Product Quality Standards
- Duty Cycles
- Number of Units Running
- Number of Units Installed
- Performance Standards
- Central Stocking or Decentralized Stocking
- Seasonal Demand
- Duty/Standby Arrangements
- Shifts and Shift Arrangements
- Logistics
- Market Demand & Raw Material Supply
- Maintenance and Repair Contracts
- Standardization
- Batch or Flow Process
- Work in Progress
- Repair Times
- Protective and Safety Systems
- Lead Times
- Warehousing
- RTBF and MTTR

The correct **SPARE PART STRATEGY** leads to increased availability and reliability to ensure safe and continued operations. The RCS process identifies spare parts based on the maintenance requirements of an asset. When spare parts are required for maintenance (proactive or reactive maintenance), the stockout effect and associated consequence justifies the stocking policies and recommendations.

The RCS process not only delivers a robust inventory program and stocking policy but ensures business objectives are met. RCS is an extension of the RCM program and when used in concert, staggering results can be achieved. Operations and Maintenance are involved in the development of the RCM-based **MAINTENANCE PROGRAM** and **SPARE PARTS** recommendations which ensures their requirements are met. It is our experience that between 40-70% of inventory is held out of fear of not having a spare part. These decisions are often made not understanding the maintenance requirements and the stockout consequences. Many spare parts are obtained as part of capital projects and is never needed or used. Furthermore, parts inventory is not optimized and parts are duplicated and kept in different locations, which leads to incorrect accounting and forecasting. RCS provides a robust process for determining the right parts and inventory to meet business expectations.

The RCS process of **SIMULATION** allows for quick and inexpensive evaluation and verification of the correct amount of spares to stock (based on consequence evaluation). It further allows for quick evaluation of alternative stocking and contracting options. Once the stocking policies have been optimized, maintenance and operations can verify that the business objectives are met, stockout risks are eliminated or reduced to tolerable levels, the maintenance program requirements are met and the spare parts policy supports operations and maintenance at all levels.

## BENEFITS OF RCS

- Stakeholder involvement throughout the process
- Increased availability and reliability
- Spare parts and inventory optimized
- Less capital tied up in inventory and stock
- Lower part cost and improved supplier relationships
- Transparency, elimination of personal preferences
- Improved contracting and logistics
- Improved forecasting and spare part justification
- Improved understanding of engineering, operations and maintenance

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