Management of spares can be difficult. The spares are often bought by projects as well as operations and maintenance personnel. They often cover multiple assets and often the quality of the inventory management is varied.

Equipment suppliers are now stocking less spares on the shelf to reduce capital, or do stock spares though at a significant cost to the client. Yet, there is a clear understanding that in order to meet required high availability targets there is a need to not only drive towards high equipment reliability, but also to ensure that if, and when, failures do occur there are good contingency plans in place, such that the required spares are available in a time frame such that this does not extend the overall maintenance repair time, Mean-Time-To-Repair (MTTR).

“We set the MTTR at the design stage, though now we’re in operation; we cannot realistically achieve it due to insufficient spares holdings - we’re aware we’re out of compliance with our SIL calculation”

Typically the required level of spares to be stocked is based on spares usage. However this approach may either result in overstocking and additional wasted spend or the greater hazard of under stocking with a potential risk of extended downtime owing to unavailable spare parts. Hence a more rigorous type of analysis is required to optimise the required spares holding based on the expected failure modes of a particular item of equipment.

For remote assets, or items with a long-lead time, the possible downtime associated with obtaining spares can be significant, if the plant / platform cannot operate safely without that particular item of equipment.

However the benefits of efficient spares management are vast. Over-arching spares management is a broad subject requiring significant resources, though it is often the initial step that companies struggle with. As with any project, the first stage is to understand the starting point.

Improving uptime and reducing capital of upstream and downstream facilities through strategic spares analysis of SCE.
ABB have developed a simple, cost effective solution to determine the project baseline. Our experience has proven that this initial phase of spares management should add the highest value; ABB have found that spares analysis of the SCE / Safety Instrumented Systems (SIS) adds the greatest value for a comparatively minor investment.

**What we offer**

ABB has developed an effective and flexible methodology for determining equipment, maintenance and spares requirements. This has been developed to meet the requirements of new or existing plants. The process is designed to ensure that an optimised spares holding is established across a plant or site in accordance with the anticipated failure modes and required maintenance activities.

**ABB spares analysis methodology**

ABB apply the following activities which are conducted as part of the review process:

- Understand any vendor service agreements and review plant maintenance records for previous failures
- Determine current platform spares inventory (both onshore and offshore)
- Identify the instrument / equipment lead times
- Conduct rationalisation of spares to identify commonality
- Conduct optimisation of spares to identify spare holdings for both onshore and offshore

**Rationalisation**

The rationalisation process is the first pass to identify potential items where financial benefits will result from identification of duplicated spares; excessive stock or nil stock.

This process reviews the existing inventory, number / type of instruments in each loop and failure records / rates. Savings may be direct (resulting from reduced inventory) or indirect (resulting from increased downtime through carrying inadequate spares or correctly identifying spares). The spares inventory may go up or down, depending on how effectively the spares have been managed to date.

**Optimisation**

Spares optimisation builds on the rationalisation process. Optimisation allows the appropriate level of spares holding for selected critical items to be calculated and the risk to be minimised. Spares optimisation is primarily focussed on reducing downtime. Spares optimisation looks at synergies (e.g. pressure transmitter with differing ranges) to maximise spare holding efficiencies.

Optimisation factors include actual lead times, and even the frequency of platform helicopter / boat arrivals for offshore facilities. This process is a key decision making tool in developing the base level for stocked spares and the location of the spares. Optimisation further factors the actual plant operation i.e. are there a select number of process trains? Does the active pump have a standby? Does the control valve have a manual bypass etc.? All of these factors need to be considered in assessment of the required spare holdings.

Finally, all existing service contracts with Main Automation Contractors (MAC) and specialist subcontractors (e.g. flow computer support) are reviewed and integrated within the overall process. The intent is not to challenge the service contracts, but to identify gaps where parties have 'assumed' ownership of an item is in the other parties' work-scope.

“Many of our operating assets have significant capital tied up in spares as stock holding. More often than not these spares are duplicated, insufficient or in many cases obsolete. On many of our legacy plants, these spares were purchased for plant that is now redundant.”