PLANNED SHUTDOWNS: OPTIMAL INTERVALS AND OPTIMAL WORK BUNDLING
HOW CAN YOU EVALUATE AND JUSTIFY...

...optimal shutdown intervals and workscopes for continuously operating systems?

...modifications or ‘pit-stop’ tasks to extend intervals between shutdowns?

...which jobs to do in unplanned shutdown ‘opportunities’?

...which inspections, maintenance tasks and engineering projects should be bundled together, and when (e.g. remote site visits or shared downtime/resources)?

Logical, transparent process

This is a combination of disciplines, training courses, decision-making processes and analytical tools for making better asset management decisions.

The SALVO Process covers all sorts of decision types such as the optimal timings and strategies for inspections, planned maintenance, replacement, modifications, spares etc. They provide methods for quantifying uncertain costs, risks, performance and intangible factors.

Used with the DST software tools, they provide instant ‘what if?’ evaluation of options and scenarios, using life cycle costing, reliability engineering and economic optimization maths independently validated by Cambridge University.

Typically reveals 20-50% scope for reduced costs, risks and system downtime.

State-of-the-art technology

DST Shutdown Optimizer™ explores and identifies the optimal bundling of work to share downtime, logistics or resources. In combination with other DST modules, it provides a comprehensive, quantified business impact of shutdown strategies and task alignments.

Using simple ‘storyboards’, these tools help you to capture expert knowledge, quantify risks and degradation patterns (with rigorous handling of uncertainty and range-estimates).

Shutdown-critical tasks are then evaluated for optimal timing or intervals, along with cost, risk and performance effects of sub-optimal timing. The bundling stage then explores shared timing, downtime and parallel work opportunities, with budget, resource and legal compliance constraints.

"Typically reveals 20-50% scope for reduced costs, risks and system downtime."
**Decision Support for Asset Management**

The SALVO multi-industry research and development project (www.SALVOproject.org) has yielded a breakthrough in quantified decision-support for work bundling and shutdown strategies. In petrochemical sites, utility networks and manufacturing plants around the world, planned downtime has been reduced by up to 50% through the **SALVO Process**.

Advanced modelling tools explore the implications of millions of potential work programmes to find the best value mix of planned expenditures, failure risks, asset performance and downtime impacts, all within any resource or timing constraints.

These 'what if?' tools, with a structured process for guided capture and quantification of expert knowledge, enable real-world knowledge and decision options to be explored and converted instantly into economic significance.

**The SALVO Process and DST toolkit enable you to:**

- Extend intervals between shutdowns
- Identify which planned maintenance/inspection tasks should be brought forward to take advantage of unplanned shutdowns
- Define optimal ‘campaign’ maintenance or work bundles and timings for remote site visits
- Identify which projects or tasks can be deferred with least risk and business impact
- Identify and eliminate ‘bottleneck’ tasks and resource constraints to deliver the optimal work programme.

The **DST Schedule Optimizer™** software uses advanced ‘Genetic Algorithms’ to find the optimal combination of tasks and timings, while retaining full transparency of costs, risks, performance, resources and compliance implications.

Further manual ‘what if?’ studies also enable real-time exploration of task deferments or re-timings, showing instantly the performance, cost and risk implications.

“**Unique, fully quantified process** to determine and justify optimal shutdown intervals and work timing/bundling.”

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**The DST Schedule Optimizer™**

![DST Schedule Optimizer](image)

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**Optimizer search progress**

![Optimizer search progress](image)
The SALVO Process was developed by a multi-sector consortium of leading asset management organisations to seek better value through disciplined, transparent and optimized decision-making. The resulting disciplines and tools have been field-proven and independently validated for over 40 decision types, as typically encountered in different stages of an asset’s life cycle.

The SALVO Process also fulfills ISO 55001 requirements for decision-making methods which demonstrably optimize costs, risks and performance over the whole asset life cycle.

SALVO Development Partners

Decision Support Tools
DST software - modular evaluators with different asset management options

Expert Facilitation
Consultancy and analysis services - provided by an international network of qualified experts.

Process Learning
Modular training courses - available in concepts and applications of the SALVO Process

Strategic Partnerships
Options are available to offer SALVO tools and services under license

- Why replace equipment when an alternative strategy may be justified?
- Is the premium for compliance or the value of intangible benefits quantified?
- How do you turn an asset performance problem into a business justification for action?
- Can you prove to budget holders which spares are worth holding and in what numbers?

Buy the Book
“Asset management decision-making: The Salvo process” is summarized in a guidebook available from www.SALVOproject.org or as an e-book from Amazon or Apple iTunes.

SALVO PROCESSES ARE AVAILABLE WORLDWIDE UNDER LICENSE AS A COMBINATION OF:

- DST Maintenance Evaluator
  Cost/benefit/risk evaluation and optimal timing/intervals for preventive maintenance, planned corrective maintenance, performance improvement and asset life extension activities.

- DST Project/Change Evaluator
  Cost/benefit/risk evaluation and ranking of one-off projects, asset modifications and changes in procedures, competencies, standards, resourcing or risk management options.

- DST Longevity Optimizer
  Evaluation and optimization of spares and materials inventory decisions, supply chain and purchasing strategies, operational standby and redundancy options.

- DST Schedule Optimizer
  Optimization of work bundling, shutdown strategies and opportunity alignments for projects, maintenance, inspections and other tasks, evaluation of resource and other constraints.

- DST Inspection Evaluator
  Cost/benefit/risk evaluation and optimal timing/intervals for inspections, condition assessments, monitoring and predictive maintenance tasks and functional testing activities.

- DST Life Span Evaluator
  Life cycle cost/risk/performance evaluation of asset purchase options, optimal timing for asset replacement, evaluation of life extension options, obsolescence and decommissioning decisions.

www.SALVOproject.org