

THE SALVO PROJECT

STRATEGIC ASSETS: LIFE-CYCLE VALUE OPTIMISATION

April 2011

- Multi-sector collaboration to research, develop and define best practices
- Develop strategies and optimize the management of aging assets
- Identify optimal timing for asset replacement
- Integrate optimal inspection, maintenance and renewal strategies
- Force the right questions to be asked
- Identify specific asset data needs and usage
- Capture and quantify 'tacit knowledge', technical & commercial expertise
- Forecast expenditure & resource requirements based on clear, risk-based justification

Case study: Evaluation of the optimal timing to replace/upgrade a digital control system (DCS) proved that the current system should be retained for at least 5 years beyond vendor 'obsolescence' advice. Apart from the large cash flow benefits of this deferment, the total life cycle 'cost of ownership' was substantially reduced compared to the plans that would otherwise have been approved.

Project Update

Bulletin 2

SALVO is well underway, and already yielding interesting results. The working groups have been addressing three priority issues so far:

- 1) An overall process map for identifying and evaluating viable options in the end-of-economic-life phase of asset management.
- 2) Development of an analytical tool to evaluate and justify individual asset renewals and their optimal timing.
- 3) Process mapping for how to avoid, or defer, the need for asset replacements (e.g. condition monitoring, enhanced maintenance, refurbishment, upgrades etc)..

The first prototypes of the first analytical processes and tools were trialed during the second half of 2010, and each case revealed (confirmed!) very



significant changes and benefits compared to existing decision-making methods. Examples ranged from filter replacement strategies in water treatment works, to pole-mounted transformers renewal timing in electrical networks, obsolescence of distributed control systems in process plant and escalator major maintenance and replacements in railway stations.

Several new organizations have also joined the project, allowing an even wider range of industry sector inputs and opportunities for the next wave of developments. New participants include: **Halcrow** and **Centrica**, as Industrial Associates, and **SAP**, **IBM**, **Mincom** and **AMT-Sybox** as Technology Associates. The latter are involved in ensuring good data integration with EAM systems.

Individual asset decision-making versus total population forecasts

To answer some questions being raised, SALVO is linking two 'levels' of asset management decision-making:

Asset populations & their requirements

There is an increasing number of modelling tools for analysing asset populations, their distribution of ages, condition, performance and degradation characteristics. Such methods are used to forecast likely patterns of required capital investment, operating costs and performance or system risks, often through simulation and sampling methods. Of necessity, they incorporate a number of embedded 'rules' or engineering judgements regarding, for example, the point where renewal is appropriate, or the level of deterioration or risk that is 'unacceptable'. These methods have proven to be very useful in forecasting total volumes, but:

- A) They need substantial configuration effort, and significant data volumes, to achieve any credibility in the resulting forecasts.
- B) They do not indicate if or when a specific asset should be optimally replaced, refurbished or managed in a different way.

Individual asset interventions

At the other extreme, correct evaluation of individual asset inspections, maintenance, modification or renewal requires local case data (that may or may not be available) plus 'tacit knowledge' about the viability of the different options and their likely effectiveness. This is certainly possible nowadays, but the analytical effort for case-by-case determination of what to do, when, for each and every asset, would result in 'paralysis by analysis'.

SALVO is mapping out the best of both approaches: namely how to target the 'weakest links' in asset systems (and groups of assets with similar criticality and urgency of attention). Then it guides the evaluation of which actions are viable, at what optimal timing, and how best to combine these activities (without 'double-counting' risks, costs and performance benefits). Finally SALVO will 'feed' upwards into total asset population forecasts with fully quantified and risk-based evidence of which specific tasks are worthwhile, when and why.



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Participants and working group activities

Core Sponsors

The core sponsors are **The Woodhouse Partnership Ltd** (project managers), **National Grid**, **London Underground**, **SASOL** and **Scottish Water**, supported by **DSTL** and **Cambridge University** on technical developments. The core sponsors provide both expertise and financial resources, and comprise the project Steering Committee.

Industrial Associates

A number of other industrial partners are involved at the working group levels, providing peer review and field trial inputs. These include **Scottish Power Energy Networks**, **Halcrow**, **Centrica** and **Forbo Flooring**.

Technology Associates

More recently, a number of technology specialists have been invited to participate - to ensure that SALVO deliverables can be embedded in common EAM and business data environments. The first group of such IT partners includes **SAP**, **IBM Maximo** and **Ellipse (Mincom & AMT-Sybex)**.

Working Group activities

SALVO has a number of parallel working groups, ranging from high-level process mapping (e.g. *how to identify candidates for analysis, how navigate the options, and force the right questions to be asked*), to technical/mathematical workstreams (such as *the correct modeling and calculation methods for*

cost/risk evaluation of different asset life cycles, particularly when data is incomplete or uncertain). At this midpoint in the project, the core 'backbone' of problem definition, options identification and discrete option evaluation is largely complete, and the next stages involve field trials of inspection, maintenance and engineering project 'solutions' to aging asset problems. Thereafter, focus moves on to consolidation of multiple activities (in the optimal way) and to data interfacing and process integration. Finally (next year) we assemble the whole story, and publish our findings. We knew that SALVO was ambitious, but it is already proving well worth the effort!

Highlights so far

After predictable challenges in bringing different large organizations together under a common collaboration agreement, the project momentum, enthusiasm and outputs have been steadily accelerating. At the first milestone workshop in November, presentations from workstreams, and from the field trials, proved convincingly that we are on the right track. **Every case study so far has**

yielded over £1M/year of potential benefits (compared to existing policy).

The process mapping team has identified 40 possible 'decision triggers' that can be used in prioritizing attention onto the most urgent and critical assets needing attention. The next step, to encourage wider consideration of risk management options or interventions, has found over 50 possible re-

sponses to the 'aging assets' concern. Of these, the first cost/risk evaluation methods developed by SALVO have addressed the often poorly-handled asset replacement decisions (and this is where the field trials have focused so far). Next on the list, for the coming 3-4 months) are the condition monitoring, enhanced maintenance and projects/refurbishment options..

We look forward to the next November milestone review....

Can I get involved still?

Even though the project is already midway through its program, there is still time and a way in which you may be able to get involved. If you are an asset owner/operator from an industry sector (public or private) that is not already represented on the project, you may be accepted as an Industrial Associate. This provides 'inside track' awareness of what is

being developed, the opportunity to review and comment on guidance materials, and the chance to perform your own field trials of the processes and tools being developed. Industrial Associates receive a 2-day induction training to bring them up to speed on existing work. If this is of interest, please contact the Project Management Office for details.

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