SMART Management system
for infrastructure assets--

Knowledge taking people further

RAMBØLL

The web based management system SMART facilitates a systematic, well organised and documented management, providing overview on planning level and practical tools on execution level. The web based concept ensures that everybody involved has access to continuously updated programs and data

Rambøll has created the web based asset management system SMART as a modern IT tool to facilitate a systematic, well documented maintenance.

SMART provides users and decision makers on all levels of the organisation with the necessary tools and information for an efficient management:
- Overview of assets and their technical properties
- Overview of condition
- Overview of maintenance needs
- Overview and management of requested, on-going and finalised activities
- Overview of short and long term budget needs
- Overview of documents
- Easy access to information

Inventory - the hierarchy of elements
The basis of any management system is the inventory of structures. In SMART the structures and their components are organised in a flexible hierarchy.

Prototypes define the types of structures that can be registered in SMART, and how they can be divided into components and subcomponents. The prototypes also define which technical data can be registered on the individual structure types and component types.

Graphical navigation in the inventory structure provides an intuitive access to the structures, also for users without profound knowledge of the assets and the principles for their registration.

Activity and Budget Management
SMART manages all activities – jobs – of the maintenance management.

The short and long term budget needs for performing the requested activities can be shown as illustrative bar charts. The charts can show the distribution among job types, job priority, or job status, and for the current year the actual cost can be shown in relation to the original cost estimate.

In the normal situation a job passes through five statuses from request to archive - from cradle to grave. The user administration defines for each user which status changes he can make.

Request
The need for performing an activity (being inspection, rou tine maintenance, repair, or other) is registered by creating a job with status **requested**. The job can be attached to any element on any level of the hierarchy.

Ranking / Budgeting
The requested jobs are handled in a ranking procedure in which it is decided which jobs to select for execution. As a help in the decision the user has a continuously updated overview of the budgetary consequences of the selections. Additionally, the condition ratings of the elements in question are shown; it is therefore easy to make sure that the most important damage is handled.

The chosen jobs get the status **selected**.

The jobs that are not selected can be left with status **requested** for future reconsideration, they can be given status **excluded**, or they can be deleted completely.

Management of different structures - separately and together

Infrastructure assets are very different in composition, complexity and size, but the sound principles for maintenance management are universal. The definition of the assets, on which the maintenance is to be managed by SMART, is based on a unique prototype concept that allows the user to apply the condition registration, activity management, budgeting, monitoring, and document management to very different structures. SMART is actually being used for managing the maintenance of structures as different as ports, roads, minor bridges, large bridges, tunnels, culverts, water supply systems, sewage systems, and wind turbines. When an installation is targeted at a limited range of structure types it is named consequently: SMART Ports, SMART Bridge, SMART Road, etc.
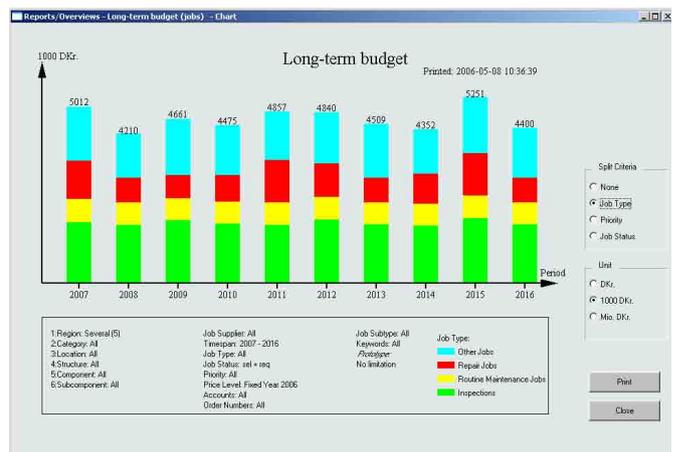
Execution

Each contractor can at any time open a checklist comprising the jobs he is supposed to perform. The user management makes sure that he can only see his own jobs. He can print the checklist, and he can print individual work orders for each job.

When he has performed the job, he changes the status to **executed** and registers closing price, actual execution date, and possible documentation such as photos, lists of actual quantities, "as built drawings", quality assurance documentation, etc.

Completion / Acceptance

The supervisor reviews the jobs that have been reported as executed. He accepts each job by changing the status into **completed**, or he returns it to the contractor by changing status into **rejected** – in which case it will reappear on the contractor's checklist with the supervisor's comments.

Archiving

When a job is completed and all registrations made, the job can be archived. In that case it will disappear from the normal job overviews, but it will still be accessible as a filed copy.

Principal Inspection

In the principal inspection module, all inspected elements are assigned a condition rating and, if relevant, a damage description and photos documenting the findings. Needs for corrective actions or further investigations are registered through shortcuts to the Activity Management module.

The Principal Inspection Report combines inventory data with actual condition registration, historic development of condition ratings, history of previously performed activities, and requested future actions – illustrated by photos.

The module also provides statistics on condition ratings of similar elements, i.e. elements created on the same prototype.
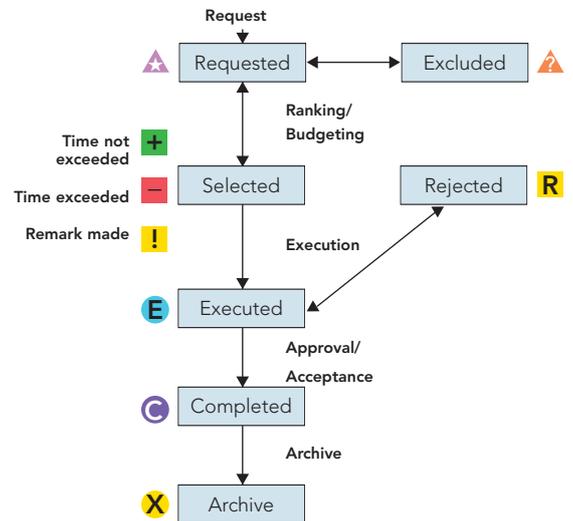
Monitoring

Monitoring data, e.g. from built-in probes, are stored, analysed and presented as data lists or charts.

Document Management

Any kind of documents – understood in the broadest sense as anything stored as a digital file – can be attached to all inventory elements, to jobs, and to principal inspection records.

There are facilities for creating multiple links to the same document, links to external documents, and to web pages.

Comprehensive search facilities make it simple to locate documents. In other words, SMART can substitute the traditional archives.
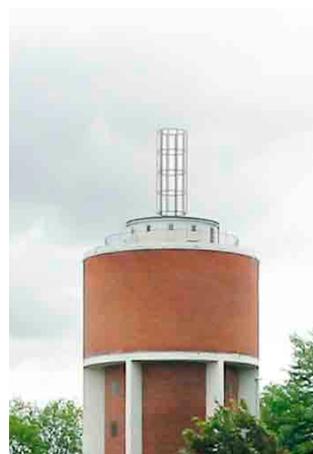
SMART Mobile

Job requests and reporting on the execution can be performed on a wireless, handheld unit - a PDA with online connection to the database.

Rambøll is a leading Nordic knowledge enterprise with activities around the world. In providing solutions we strive to create for mankind good standards of living and working and environmentally sustainable development.

We are 4200 employees who with our knowledge, experience and engagement provide solutions in everything from classic engineering and IT to environment, energy and management.

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