Use of Do c umentation and Databases for Management, Reporting, Casework, Communication and Relations with Stakeholders.

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1. Summary

Documentation databases in the cultural heritage sector are growing in importance. In addition to the classical documentation systems, like archives and libraries, new documentation systems are coming online. These systems use digitised technologies to documents the range of objects like archaeological sites, heritage environments, ruins as well as buildings and their maintenance condition. The strategy is to reduce the number of separate bases, unify technology platform (database types) , implement automatic transfer of data between applications, integrate GIS functionality's, graphic documentation (photos, maps, drawings etc.) and access via the Internet.

Documentation systems increase in importance as they become integrated in day to day operations; as tools for casework, planing and for reporting and monitoring effect of policies. The use of key indicators entails the need to extract statistical data from the systems. The demand for updated quality documentation increases. Uniformity and standardisation; in registration and representation becomes a necessity. Systems for periodic quality control and monitoring of development are integrated in operating procedures. The Internet opens for major changes in use of and access to documentation systems and important savings in operating costs.

The CH sector is chronically short of financial means for both system development and documentation. The sector is not used to thinking 'quantitatively'. Traditionally focus has been on maintenance of CH objects in a narrow framework (conservationists, architects, librarians, etc.), not on overall administration and management. A maintenance management system for protected buildings illustrates benefits to the CH administration. Savings by a rational maintenance regime of protected buildings are enormous (to the taxpayer). Similarly the challenges are great; financial means for implementation are lacking, workload to inspect all protected buildings to assess 'now' status is a large one-time investment, and it is necessary to implement administrative routines and infrastructure at regional level.

The following would be high priority for pan European co-operation:

1. Standardisation (harmonisation) of methods and representation (declaration).
2. Development and testing of possibilities of Internet.
3. Research and development of management systems for CH sector.
4. Development of common software solutions for documentation and monitoring needs.
5. Development of quantitative and statistics capabilities for analysing and reporting.

2. Documentation and databases

2.1 Inventory and strategy

The documentation of our organisation comprises an archive for official correspondence and documents, a library including specialised collections of maps etc. Both the catalogues of official archive and the library collections have over the last 10 years been entered into computer applications to facilitate search and retrieval. This is the conventional (or traditional part of the documentation).

Since 1995 the Directorate has stepped up its effort to create databases documenting the actual immovable cultural heritage objects for which we have a juridical responsibility. First this development went in the direction of creating a number of atomised, individual and specialised databases. These databases were constructed using different software platforms, could not communicate and ended up becoming obsolete and non-functional in regards to their original purpose.

The next step was, naturally, to:

- rationalise the number of databases,
- establish communication and exchange between them,
- use the internet to assure access independently of physical location,
- standardise and formalise documentation procedures for input and, finally,
- integrate the databases in the day to day working of the institution – i.e. to use them -.

In this and the coming year we will have the following **major databases** (in addition to the conventional archive and library systems):

- National building register
- Cultural heritage register
- Maintenance Management System

We still have retained some minor specialised bases like rock-art, ships (quasi base), church interiors and artefacts. But also these will gradually become integrated applications.

The databases listed on the following page reuse information from the more basic bases. This means that basic property information is exported from the National Building Register to the CH base and visa versa. And that relevant information in the CH base is exported to the Maintenance Management System. This simplifies input and updating and removes ‘double input’ workload.

The most important and cultural heritage relevant content of the major bases is:

National building register GAB **495.000 SEFRAK objects.**	• Unique identificator for property (Gnr. Bnr) • Geographic locators GIS • Owner & Adress • Building & Year of construction • Cultural heritage on property? or Protection status • Applications made for activity on house & property • SEFRAK special information. (buildings older than 1900)
Cultural heritage base **100.000 objects.**	• Automatic protections • Security zones according for CH Act § 6 • Individual protection orders • Security zones according to CH Act § 19 • Area protections • Archaeological CH • Medieval churches • Medieval church yards • Churches • Sami / Lapp CH • Ruins • Technical and Industrial CH • Historic gardens
Maintenance Management System **5.500 objects.**	**Information on protected buildings and sites** • Maintenance reports and monitoring methods support • Damages • Activities undertaken and to be executed • Pictures, drawings, maps • History / log
Statistical bases	• Used for time series and statistical analysis

2.2 Updating procedures

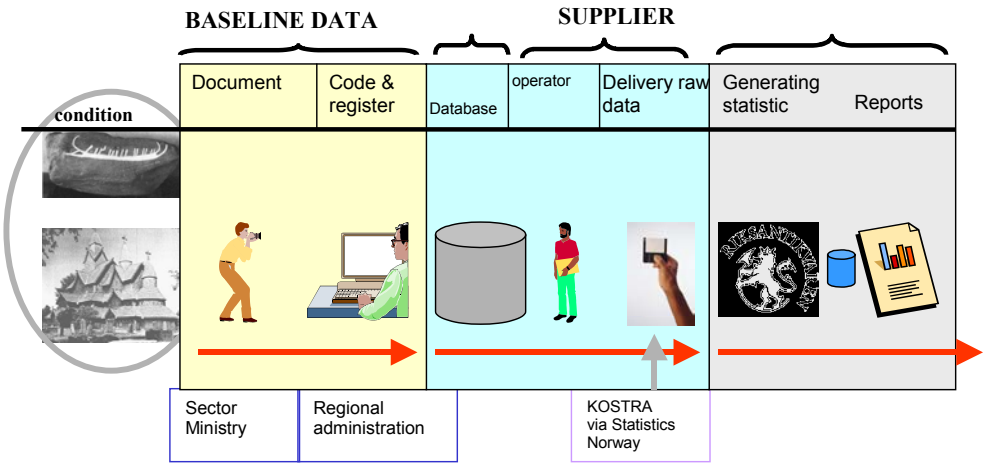


Figure 1. Dataflow - overwiev

As you can see from Figure 1., the responsibility for documentation is delegated to the regional authorities (Fylkeskommunen) of which there are 18 in Norway. This regional administrative entity has the day to day responsibility for the (immovable) heritage within its administrative borders. This is complemented by a similar responsibility which to the different Ministry's who are responsible / owners for specific buildings, sites etc. The Ministry of Communication is the owner of buildings belonging to the State Railways, The Ministry of Defence of forts and other fortifications (new and old), The Ministry of Fisheries of buildings in the harbour perimeters and the Ministry of Finance for buildings belonging to the Custom Authorities. What happens to these buildings is documented separately since they are government property and the Directorate as a government body has a special responsibility acting as proxy for the owner.

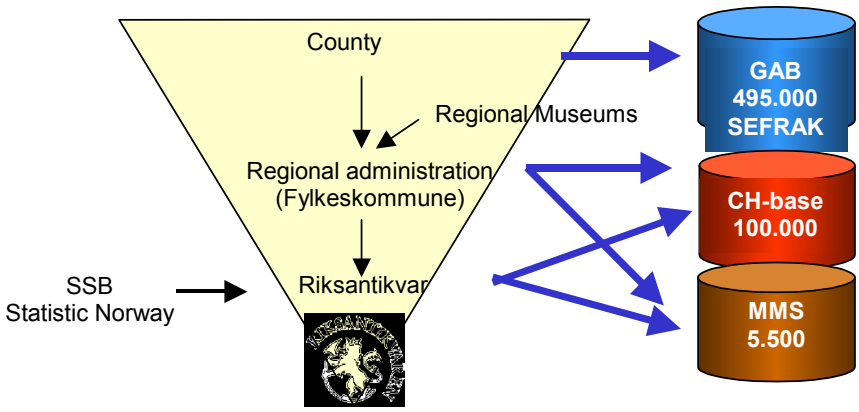


Figure 2. Distribution of responsibilities for documentation and database entries.

2.3 Documentation quality

There are 3 basic elements necessary to assure quality:

- Uniform method of collecting and compiling (codes, key words, set categories, etc.)
- Qualified personnel carry out the documentation and registration
- Monitoring - Quality checks are carried out according to given routines and time intervals

The first 2 bullet points are basic 'stuff', but in regards to the first one there is great room for improvement in the CH sector. Norway is, for example initiating the work towards a Norwegian standard for a method of maintenance inspection and documentation, in co-operation with national standardisation bodies.

Most important is that the cultural heritage administrations improve systematic monitoring. Data entered into a database at a given time – and hopefully updated at one time or the other – must be controlled as to whether the information corresponds to the actual physical condition in the field. Norway has monitoring projects for archaeological sites and for the population of older houses (SEFRAK). The aim is, through field surveys of statistically sampled objects or areas to control entries in the database and to control against 'in situ' damage or loss. For the protected houses we are working to start a systematic and periodic monitoring of maintenance conditions. First we need a controlled 'now status' for all protected buildings, then, afterwards, at given intervals we need to control a statistical sample of objects in situ and match against information contained in the database.

Such monitoring of quality control of database records is critical for documentation quality. If the discrepancy been data and field occurs in a substantial amount of cases, it is a warning signal that the documentation, in general, does not give correct information. Adequate measures to improve quality and routines must then be taken!

3. Using the documentation in the databases

It is critical, for return on the investment in documentation bases, to assure continuos updating and development, that the databases are used in the day to day work (of institutions). **Databases can not survive as passive repositories of information. To focus on use and usefulness must therefore be the guiding strategy**. What can we use it for? How can it be used? What are the specifications of demand when use is set as the critical point of departure? The answers will be different from those we receive if the starting question is the documentation as such (per se).

3.1 Case work

The documentation – databases – must be constructed for and easily accessible to the caseworker.). The caseworker must easily be able to find and retrieve a record. The documentation must contain information relevant to his / her work. The caseworker must be able to read and write (i.e.; enter information pertinent to their work and updating the record).

The databases must contain information on history/development and therefore posses a log function to track development (actions).

My experience shows that the CH administration only very recently started to see this possibility offered by the computer technology and to start to use it. Traditionalist approaches to registers (or databases) in analogue format still largely dominates the field.

3.2 Management by objectives.

Efficient management is achieving results. A manager must know to what extent he achieves. If the manager can focus achievement on a measurable objective he will be more effective, and measure actual achievement.

Since 1998 the Norwegian environmental administration (Ministry and Directorates) has worked to implement management by objectives (MbO).

> ”A running compiling of information reflecting the development of the state of the environment and effects of all applied policies (measures), by means of a cross sector system for result data, is necessary for an effective and co-ordinated policy.
>
> *Parlament paper 58, Minstry of Environment MIBU- 1998*

This system has also been applied to the CH sector as one result area. The MbO system delivers the driving force for policy management **and uses the information in the documentation systems to report and monitor results.** The documentation in the databases is the basis for the yearly reporting and documents to what degree the objectives are achieved. **The updating and quality of the information systems therefore become critical.**

A MbO system, to make it simple, demands a set of clear objectives and defined numeric parameters to measure achievement (within a given timeframe). The CH administration has the 3 objectives (O) and 5 parameters; called key indicators (I). See Annex I.

The key indicators are the bases for monitoring achievements towards set political objectives. They indicate whether we are advancing in the right direction and how our actions effect our ability to achieve objectives.

3.3 Reporting

The MbO system is the main basis for reporting. Reporting is done on a yearly basis and presented to the Parliament as part of a yearly ‘Status of the Environment Report’.

What is monitored	Parameter, Objective	Permitted max. value year / objective	Source Database
1. Archaeological	Loss	0,5 % year	CH base
2. Archaeological	Damage	n year = or n > n 1998	CH base
3. Buildings 1890 and older	Loss	0,5 % year	GAB Nat. Building Register
4. Protected Buildings, Sites	% normal maintenance condition protected buildings	100% by 2010	MMS base
5. Protection profile	Distribution & representativity main categories protected buildings & sites.	n increase weak categories by 2004	CH base

Figure 3. Reporting table

For professional reporting and analysis of data, it is necessary to have dedicated statistics software to work with time series and generate statistical tables. This is today lacking.

How much of these result data can we presently report? The MbO system and the ensuing reporting obligations cannot presently be met! Only in the case of loss of '3. buildings 1900 and older' are we today able to report satisfactorily.

For the other indicators status is as follows:

- Archaeological, loss and damage. CH base delayed due to budget cuts imposed by Ministry summer 2001. Method for sampling objects for monitoring is being developed.
- Maintenance condition protected buildings and sites. A status survey of all protected buildings has only been carried out in 2 counties. 3 further counties have started the process. The remaining 13 (72%!) have not started. MMS system is chosen but funds for implementation is lacking delayed due to budget cuts imposed by Ministry summer 2001.

For both these challenges a standardisation work is started at national level.

The Directorate also has two main sources for collecting data on development parameters relevant for the CH administrations. The main ones are:

- Reporting from county and regional levels to Statistics Norway, mandatory by law. Initiated year 2000.
- Direct voluntary reporting from regional administrations to the Directorate, which is not functioning to well.

For professional reporting and analysis of data, it is necessary to have dedicated statistics software to work with time series and generate statistical tables. This is today lacking and is a major restraint on developing sound reporting practises.

3.4 Information extraction to general public (internet publishing etc.).

The documentation in the databases constitutes an important input for information extraction. The directorate has a number of avenues to reach the public. First there are the 'traditional' brochures on and about CH. Internet publication are gradually becoming more important than analogue publication.

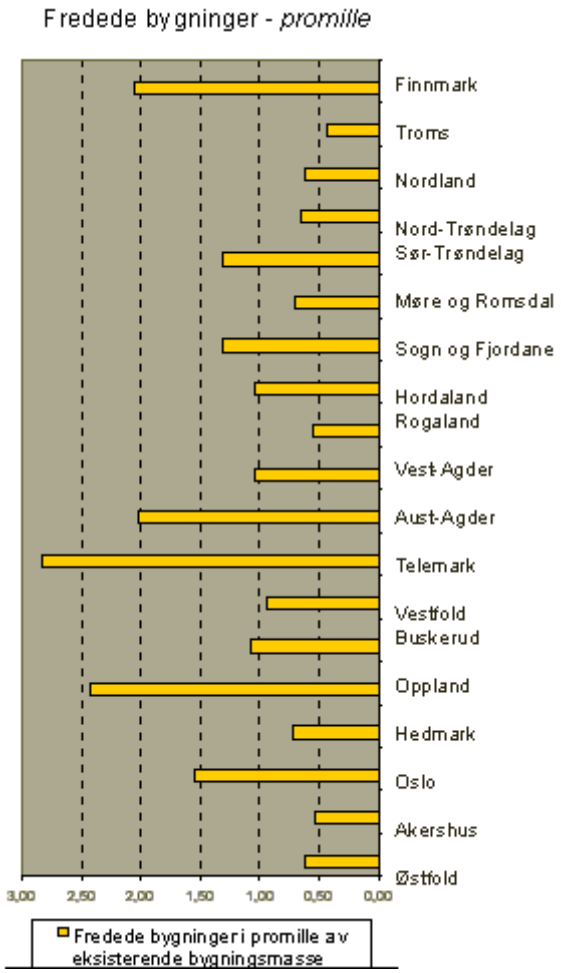
Direct access to documentation bases is assured for the National Building Register, and planned for the other major documentation systems, as they come online. There is then no need to extract information. At the site for the 'State of the Environment' we give the public direct access to a part of the information on protected buildings, by means of a search engine. http://www.environment.no/Topics/Cultural_heritage/cultural_heritage.stm

At the site for the Environment Catalogue (references) we make most of the entries as extracts from our library system. http://www.miljo.net/

Further we actively use the documentation bases to generate statistical charts and other relevant information. But here there is need for editing of results; i.e. no automatic extraction or access. Se example in Table 4.

Finally we are co-operating increasingly with statistics Norway, using national statistics and developing surveys of special relevance to CH. We also strive to use the statistical standards and terms whenever possible, so as to achieve compatibility with the most important sources of official statistics.

Table 4. Example of semiautomatic extraction - ‰ of building mass protected, by region



Source: Statistics Norway and Directorate of cultural Heritage 1999.

4. GIS – why it will be so important

Importance of GIS, and what it is used for in regards to safeguarding CH (from other social sector like industry, transport and construction).

GIS is short for geographic information system. In our case it means that we indicate the exact map co-ordinates for å given cultural heritage object. This information can be used to position the objects on a digital map. One example of a system aimed at the general public using this technique on the Internet is shown in Figure 5.

To information the general public is important but not by far as critical as safeguard the cultural heritage objects themselves. For the built cultural heritage the main dangers arise from:

- Infrastructure development. roads, rail, air, and sea
- Building and construction activities
- Enlargement of existing cultivated areas and economic incentives to promote this

Already early in the planning phase unnecessary conflict and ensuing damage to ch can be avoided. When all immovable cultural heritage objects have received digital co-ordinates they can be matched against any other planning or administrative system using the same technology. This means that infrastructure planners and authorities, when starting to plot the

track of for example a new road may be automatically warned that at such and such a point there is a conflict with a ch object. Similar warning procedures may be programmed for underground cables, water, chemical deposits etc., when the geo position is digitised.

Our strategy is to work towards data systems where compatibility between systems is such that necessary integration can easily be achieved. But it will still take some years.

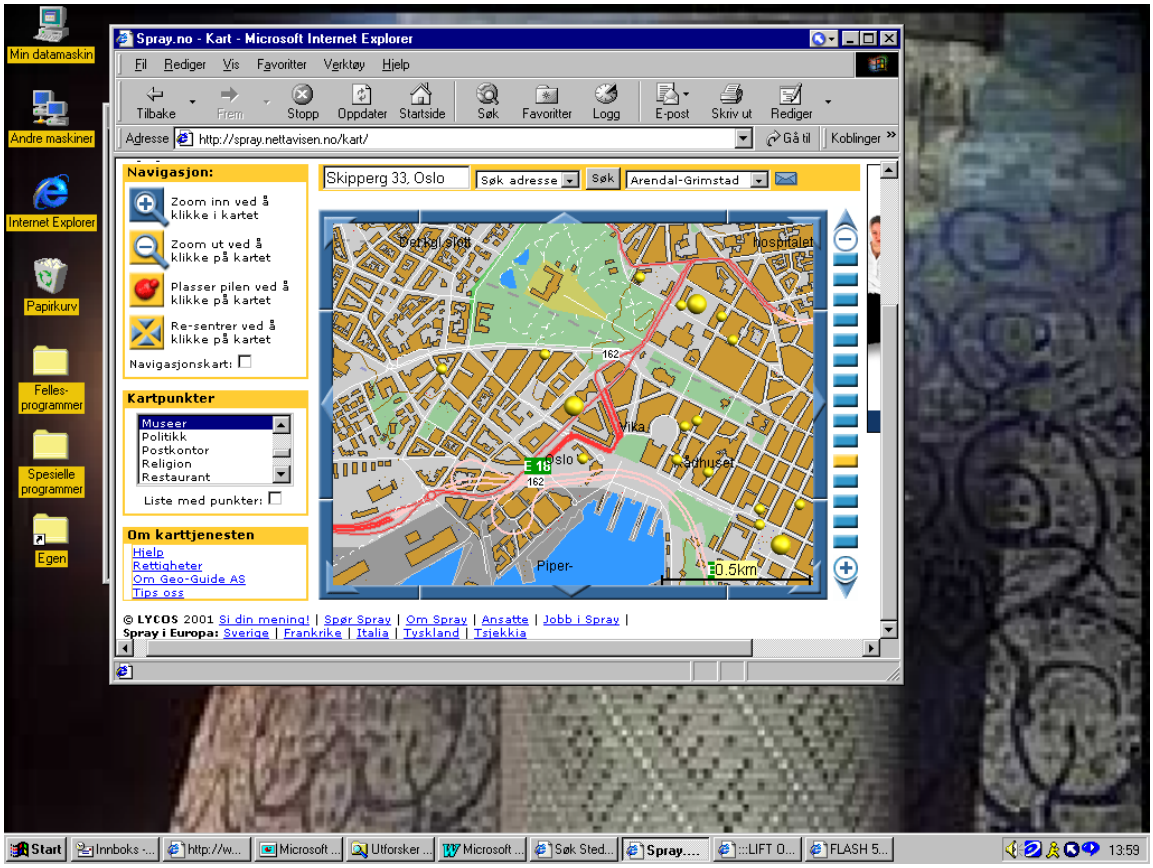


Figure 5. Screen dump from a Geoguide© application showing museums in Oslo centre

5. An illustrative case – Maintenance Management System

The documentation of the maintenance condition of protected buildings will here be used as a case to illustrate the different elements in a 'modern' documentation database and the challenges related to getting it running.

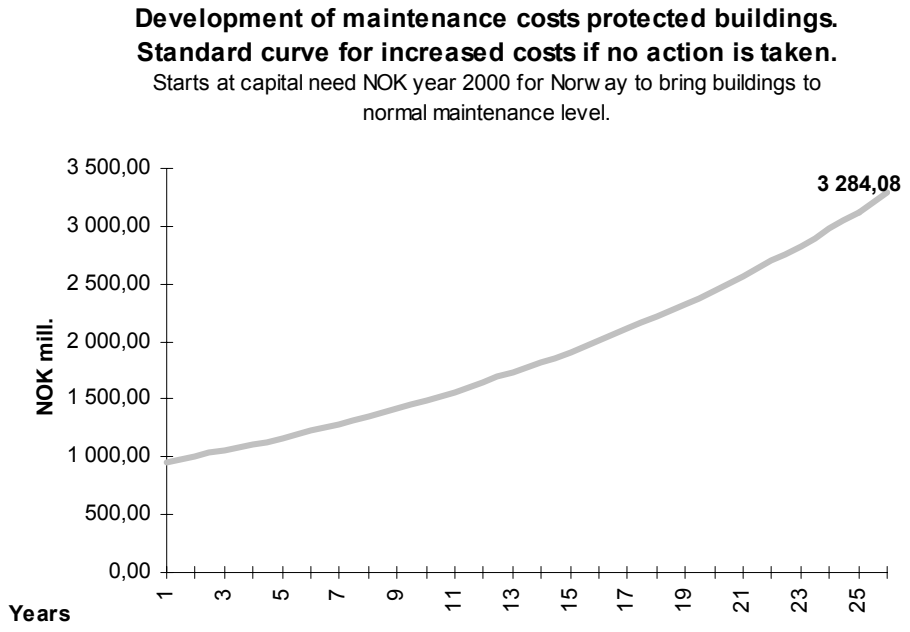
5.1 Demand and need.

Today, most national and regional authorities are lacking a uniform methodology, the needed information and a system capable of supporting an *effective management and integrated planning of condition assessment and administration of maintenance* of buildings under protection. European administrations increasingly experience the need to improve efficiency in managing heritage buildings, to assure predictability, sustainability and quality of maintenance. Administrations also feel the pressure to optimise the effects of their public sector spending. This is why the need for such a management system is becoming more acute, at both regional and national level.

Periodic maintenance and preventive maintenance are two important catch words. Such practise contributes both to maintaining the built CH and to save public spending (in the long term). There are major 'savings' to be made by improved maintenance administration. This is illustrated in Table 6, which illustrates the growth of costs of a damage, which is left to

develop without rectifying action. The curve demonstrates savings of NOK 500 million in 10 years (EURO 62.500.000), NOK 1 billion (EURO 125.000.000) over 15 years and NOK 2,2 billion (EURO 275.000.000) over 25 years. Even more important, the increased costs do not in any way improve the condition of the building after repair**, it just costs more because nothing was done in time!**

Table 6. Standard curve for development of maintenance costs without intervention



Finally the reporting obligations increase the need for a monitoring and management system.

5.2 Preconditions for operating a MMsystem

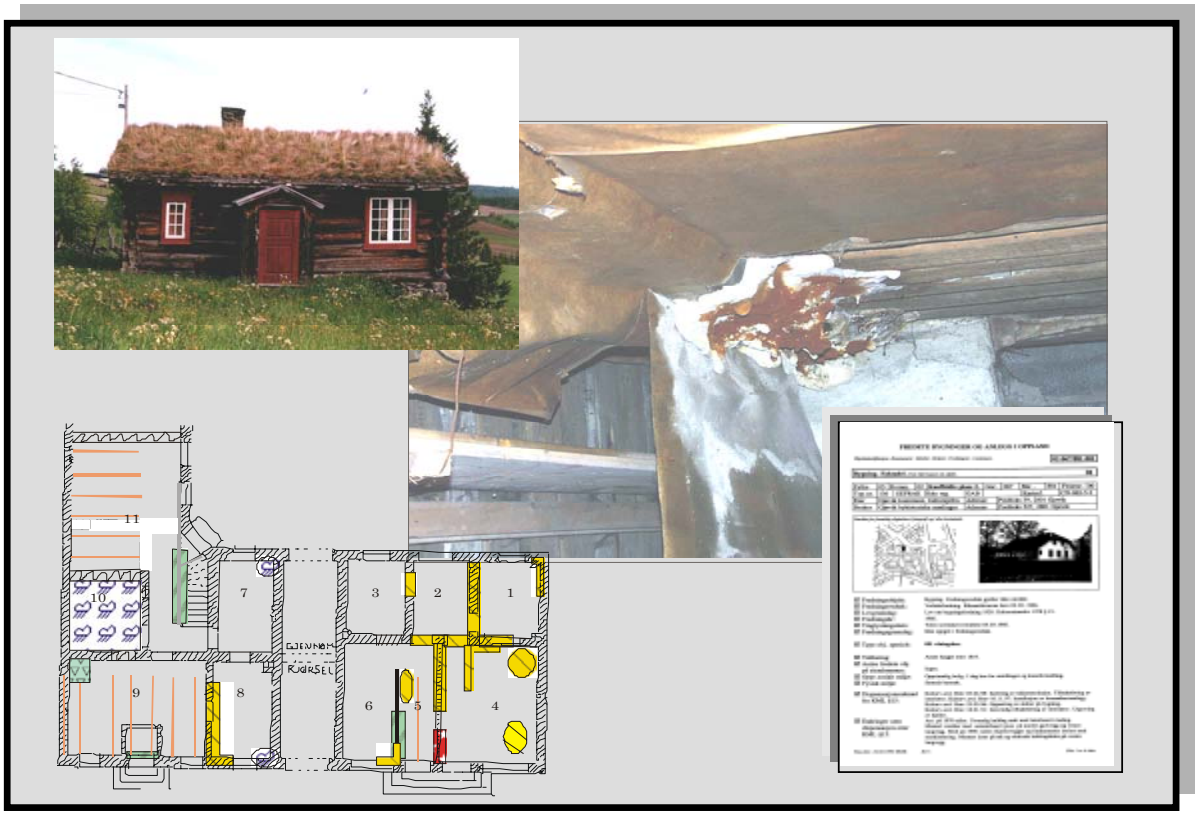
- Know maintenance status of all objects at given point in time
- Updating of log that documents actions taken and 'now' status of building (must be actively used for casework)
- Administrative system for monitor and quality control of records at set intervals
- A uniform and standardised method for maintenance assessment and documentation
- A computer-based software with the needed functionality
- Financial means

5.3 The MMS system

- MMS from a developed through 2 EU 5th framework programmes.
- Based on existing national and European standards.
- Database: Oracle. Operativsystem: Windows NT (and Win95/98/2000)
- Support damage assessment and evaluation (inspection system, damage atlas).
- No geographic restraints on access; i.e. access via www (Citrix Metaframe)
- Contain visual documentation (linked maps, pictures, drawings, etc)
- Handles GIS and map functionality. GIS system: ESRI MapObjects

- Flexible enough to accommodate special needs and to develop special functions for sites (for example technical industrial CH and ruins).

Table 7. Main documentation elements of a maintenance administration system.



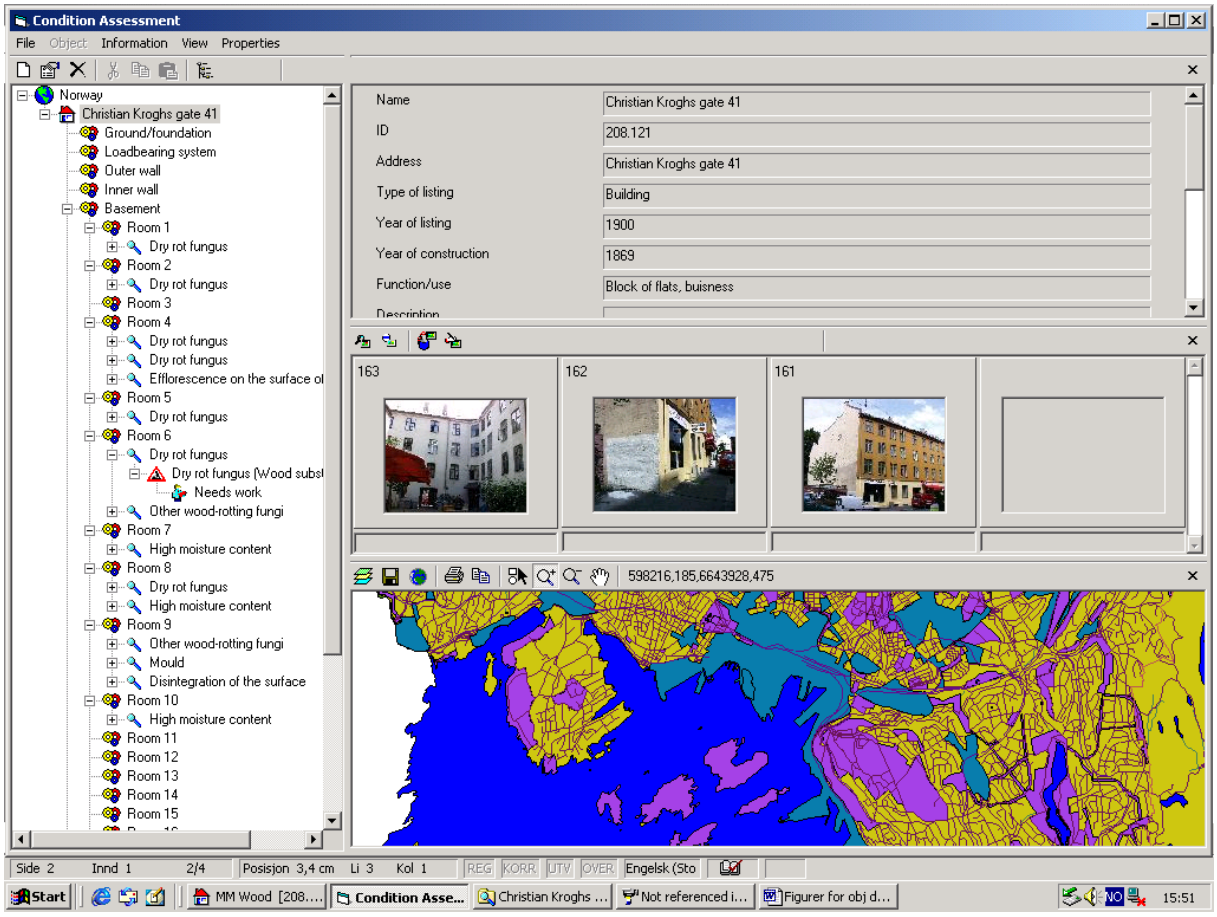
Main elements: Documentation of damage, photo of house, drawing of house (marking damage point) and uniform method for assessing, evaluating and documenting maintenance condition. In addition GIS (not illustrated).

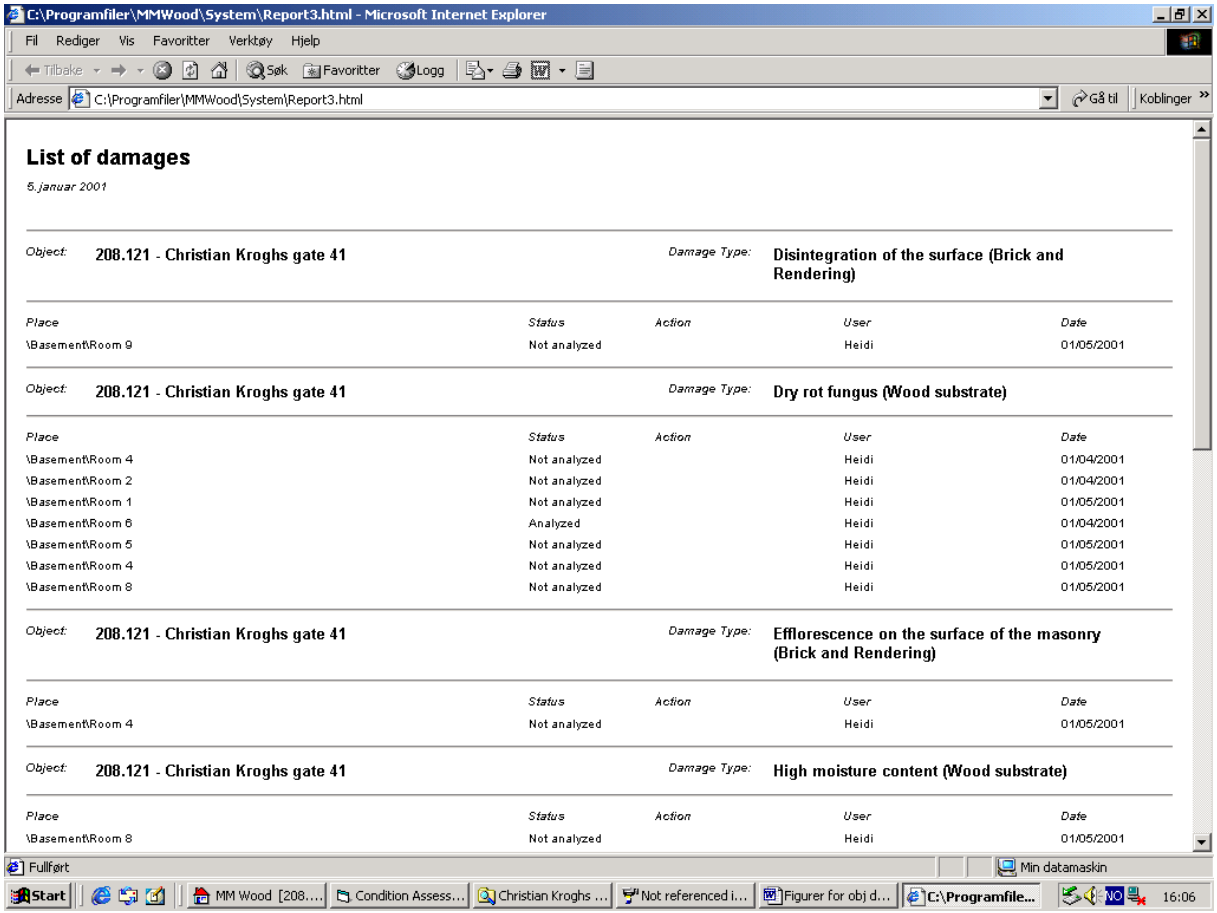
5.4 What will the system do for us?

- Allow us to monitor development, report and carry out statistical analysis
- Allow improved financial planing and allocation in longer and shorter time perspectives
- Allow improved planing of workload and need for skilled workers (craftsmen)
- Allow improved planning (also long term) for need of special materials
- Improved control of work progress and involved parties
- Allow geographically distributed access for casework at regional and national level
- Allow access to central database via laptop and modem
- Give methodological and planing assistance for maintenance assessment and periodic controls
- Give support for damage analysis, description and characterisation by use of 'Damage atlas'.
- Allow owner to access and enter information on own building
- Allow for extraction of documentation for information to general public (combination of photo, GIS, and building history)

Table 7. 2 Example screen dumps from MMS.

Nr. 1 illustrates overview level structure on the left-hand side, photo documentation, and plotting on GIS based map. Nr. 2. Illustrates management assistance by means of an investment report from the system





5.5 Where is Norway (in the process) at the present date?

This description of where we are in the process is a typical illustration of the problems faced in the CH sector in regards to implementing a system.

- System is selected – funds are lacking to test, purchase and implement
- Unified method at national level developed, process of formal standardisation initiated at national level
- Only 3 of 18 counties (regions) have completed their first status evaluation of all protected buildings within their region – funds from national level lacking.
- Overall status: Development on hold, awaiting next year's budgets or other financing.

5.6 Importance of Internet: effects and operating costs

Today it is possible, independently of geo location, through the www and the TCP-IP protocol to access any digitised information. Our strategy is that **all databases are now produced with a www interface** to allow such distributed access.

The Internet has **major effects on systems operation costs**. There is need for only one database application, subsequently for only 1 license agreement. The different institutions have no operating costs and there are no costs, or hassles connected to the transfer and updating of data from different (regional) databases to one national base. Finally there is no need for distribution or installations of new software versions at different locations.

Access to any target group can easily be catered to, reducing costs for paper publications and information professionals. Access can be regulated via the net to any selected parts of the documentation in the base, based on password checks.

6. Conclusions and areas where European co-operation would be beneficial

New documentation systems are coming online, in addition to the classical documentation systems, like archives and libraries. The present strategy is to reduce the number of separate bases, unify technology platform (database types), implement automatic transfer of data between applications, integrate GIS functionality's, graphic documentation (photos, maps, drawings etc.) and access via the Internet.

Documentation systems increase in importance as they become integrated in day to day operations; as tools for casework, planing and as for reporting and monitoring effect of policies. The use of key indicators entails the need to extract statistical data from the systems. The demand for updated quality documentation increases. Uniformity and standardisation; in registration and representation becomes a necessity. Systems for periodic quality and monitoring of development are integrated in operating procedures. The Internet opens for major changes in use of and access to documentation systems and important savings in operating costs.

Modern documentation systems hold the key to a more rational and methodological management of CH and for improved planing. From this ensue possibilities for important savings to the public sector spending.

The major challenges are:

- The CH sector is chronically short of financial means, for both system development and documentation.
- The sector is not used to thinking 'quantitatively' or to handle statistics. Management by objectives, which will come to this sector too, makes quantitative demands on the documentation bases.
- Traditionally focus has been on maintenance of CH objects in a narrow framework (conservationists, architects, librarians, etc.), not on overall management.

- Far to little co-operation between countries and ensuing ‘atomised’ national practices.

Recommendations for pan European co-operation.

1. Standardisation (harmonisation) of methods and representation. There is need to learn from each other and to compare results. This can only be done when the methods and procedures are uniform. There is an initiative in CEN to start standardisation work on CH. It is important that also procedures of importance for documentation bases be included in this work. Another area would be harmonisation in maintenance assessment and inspection of built heritage; for example documentation method, damage atlas, etc.
2. Development of common software solutions for documentation needs
3. Development and testing of possibilities of Internet. Development and research on direct access independent of geo-location, use of broadband, information extraction, metadata and necessary keywords (thesaurus) and comparative cost studies. This area is important for the governance question – good governance – and for local voluntary CH initiatives.
4. Development of quantitative and statistics capabilities for reporting and monitoring by use of documentation bases.
5. Research and development of systems for management by objectives etc. for the CH sector.

Annex I - Objectives and key indicators for Cultural Heritage management and reporting

O 3.1 The yearly loss of cultural heritage objects and cultural environments as a consequence of removal, destruction or lacking maintenance, shall be eliminated and by the year 2008 not exceed 0,5% yearly.

I 3.1.1 The yearly percentile loss of SEFRAK registered buildings.

I 3.1.2 The yearly percentile loss of registered archaeological heritage objects in the ”CH base” in a representative selection of counties.

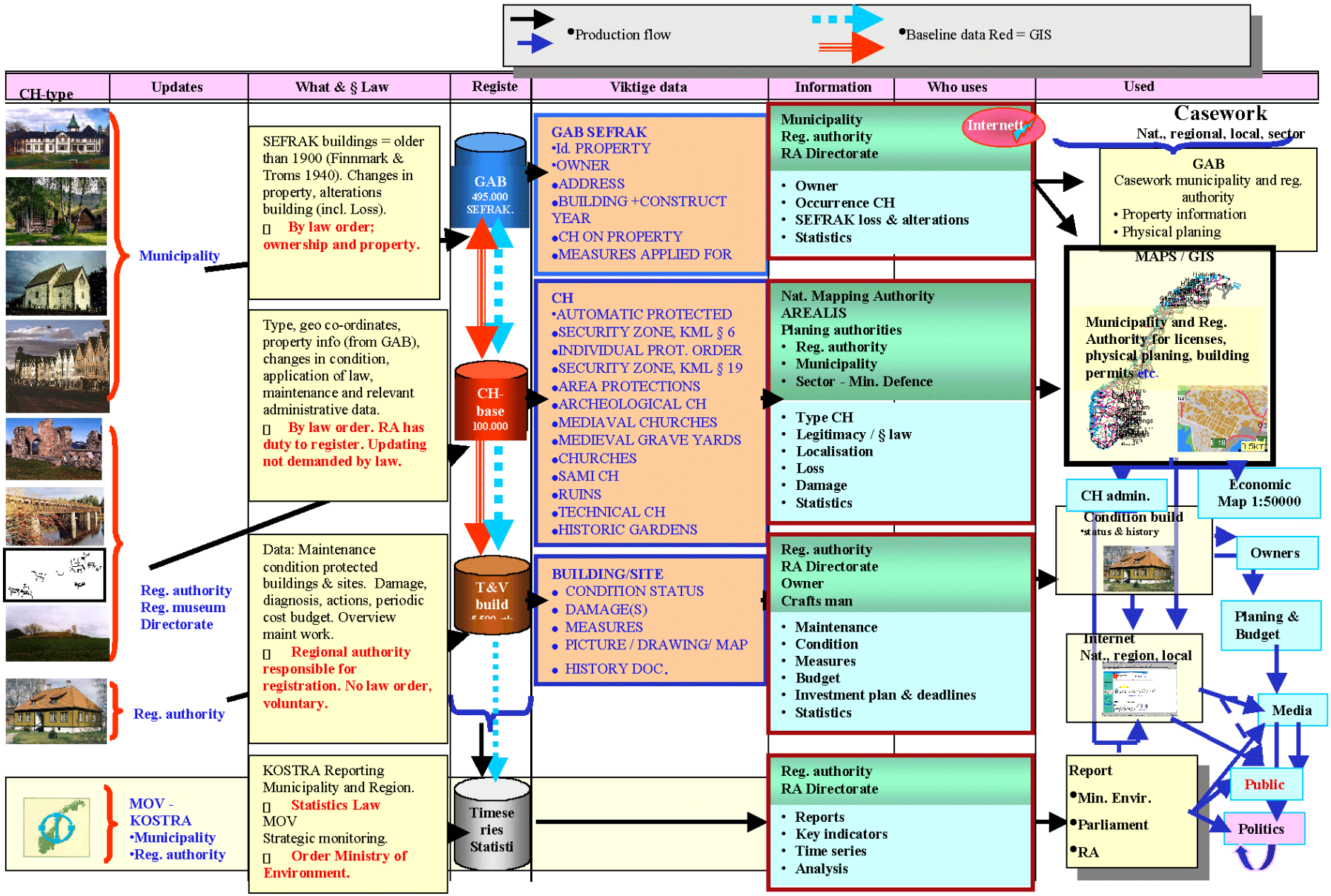
O 3.2 The representative selection of cultural heritage objects and cultural environments shall be safeguarded in a condition corresponding to the 1998 level. Buildings and sites shall all have achieved a ordinary maintenance level by the year 2010.

I 3.2.1 Share of standing buildings and sites with ordinary maintenance level. Change i relation to 1998 level.

I 3.2.2 Share of registered archaeological heritage objects in ”CH base” without new damages in a representative selection of counties. Inventory at start of the year and change in relation to 1998 level.

O 3.3 The geographic, social, ethnic and historic width of the protected cultural heritage objects and cultural environments shall be improved so that weakly represented and missing main categories are represented by more objects by the year 2004 than in 1998.

I 3.3.1 Yearly number of administrative protection decisions for each main group of cultural heritage objects and environments per year and relative to 1998 level.



Annex II – Overview of data flow and use of documentation data.