



know how books

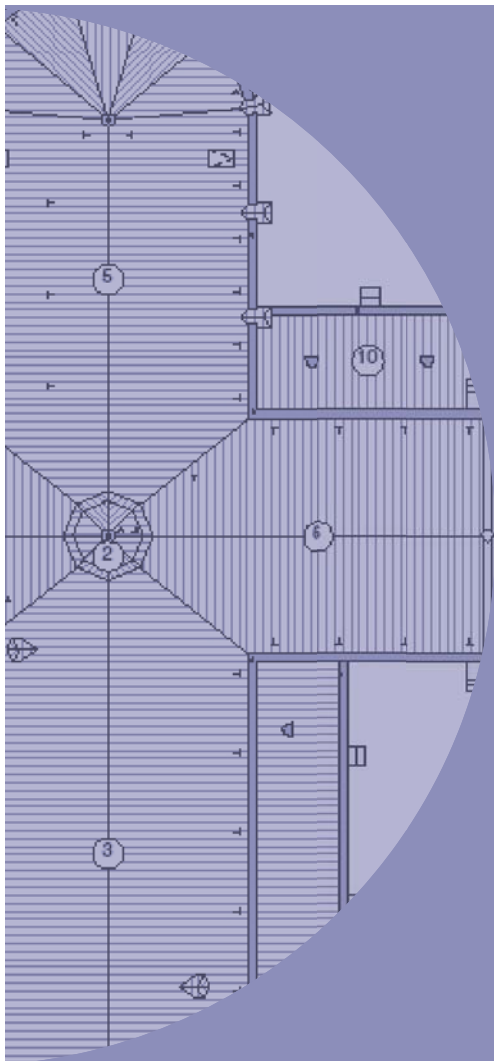
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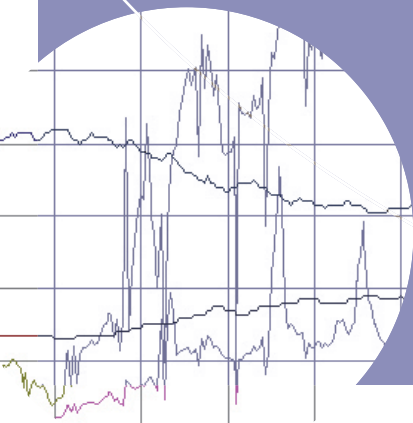
Mario Santana Quintero
Anouk Stulens
Alonzo C. Addison
Daniel Pletinckx

Editor: Daniel Pletinckx
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The Interactive Institute

Monitoring Monuments

A low-cost digital early warning system
for preventive conservation of built heritage





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Inspecting a church roof

Without preventive maintenance, small problems with monuments and buildings can quickly grow into critical issues. Monitoring is crucial for preventive conservation but often overlooked due to the lack of a simple, straightforward process.

Using low-cost digital tools, and building upon more than 15 years of experience of Monument Watch of Flanders, this KNOWHOW booklet details a straightforward, easily-replicated process for keeping an eye on buildings and monuments. This approach makes use of simple computer field collection forms, digital photography and databases to appropriately and systematically monitor and maintain built heritage. Both the well-tested monitoring process and the

operational structure of this innovative Belgian not-for-profit are described here in detail in order to help others learn from their success.

Background

Monumentenwacht Vlaanderen

The methodology in the following pages is based largely upon the successful example of *Monumentenwacht Vlaanderen* vzw (Monument Watch or MWV for short). Founded in 1991 as an *independent advisory body* for owners, managers and caretakers of the 'Built Cultural Heritage' in the Flemish Region of Belgium, the organisation's goal is to *enhance conservation* of built heritage by stimulating owners to apply *regular maintenance* and thus avoid costlier and more disruptive large-scale restoration [MWV].

Through an early warning system for decay (*regular monitoring and tracking*) combined with an appropriate response (*maintenance or repair at the right time and place*), damage is prevented and large-scale restoration can be delayed or even totally avoided. This systematic method results in a substantially lower “loss of significance” of monuments in the long term and lower costs for all stakeholders (from owners and managers to the government). For further details on the “significance” of monuments, see the “Recording Architectural Heritage” KNOWHOW booklet in this series.

Monument Watch operates on two levels:

- To stop decay through immediate action by offering a regular condition assessment of buildings and the historic interiors
- To affect a gradual change of mentality through information and sensitization

The foundation of the Monument Watch philosophy lies within ICOMOS’s Charter of Venice (1964) from which point the focus



Flemish region in Belgium

The first Monument Watch was founded in the Netherlands in 1972. Today, Monument Watch organisations are present in several European countries (the Netherlands, the Flemish Region of Belgium, Denmark, Germany,

Austria, and Hungary). Monument Watch of Flanders, the organisation in the Flemish Region, is composed of a group of six not-for-profit associations (five provincial associations and one umbrella association)

in built heritage shifts from restoration to preventive conservation and regular maintenance [CHAR].

An organisational and financial model

Monument Watch works with a *voluntary membership* — a bottom-up approach which has proven very successful. The organisation helps the owner in a positive and non-restrictive way. The objective advice is not binding, leaving the initiative for maintenance and repair with the owner. Monument Watch is not part of the government and its inspections are private. Since 1991 owners of more than 5000 buildings (50% listed monuments) have joined as members. They represent all types of structures (e.g. 1600 churches) and all kinds of owners, from private (40%) to public authorities (30%) and church councils. Since 1993 the Flemish government has offered a maintenance grant for listed monuments. As the condition survey of Monument Watch is acceptable as part of the application dossier, this has served to encourage further membership.

Monument Watch is able to offer its services at a *low cost to owners* thanks to its not-for-profit status and a subsidised financial structure based upon support from the Flemish (25%) and provincial (65%) governments, with only 10% coming from inspection fees.

The monitoring process: making regular condition reports

With the exception of calamities (such as fire, earthquakes, war, etc.) buildings generally decay gradually over time. Major problems and damage are often the result of minor issues or failures that were not discovered or taken care of in due course.

It is common knowledge that regular attention and maintenance can slow down the process of decay (or even partially prevent it). But regular maintenance requires accurate records and up-to-date knowledge of the condition of the building (monitoring) and its “needs”. This is in itself a considerable task for the owner or administrator of the building. Delicate

areas are very often difficult to reach for inspection or need a specialist’s opinion, and recordkeeping can be a challenge. This is where expertise such as that offered by Monument Watch is helpful: it has a number of carefully recruited, adequately equipped and constantly trained two-person teams at the service of building owners or administrators to conduct inspections.

Two types of monitoring inspections are important:

- *Architectural* inspections
- *Interior* (and movable artifact) inspections



Assessing the roof of a heritage place using industrial rope access techniques

As a general principle these inspection surveys should be carried out every two or three years.

Architectural inspection

Architectural inspections consist of a detailed assessment of the building from rooftop to basement, both inside and out. Special attention should be given to places that are less accessible, but at the same time especially susceptible to decay (roofs, gutters, etc.).

An architectural inspection team consists of two experts:

- A trained architect or engineer, preferably with an advanced degree in construction or conservation
- A craftsman with knowledge of historic building techniques

Recommended equipment includes:

- A voice recorder or dictaphone (today this can be built into a tablet computer and even autotranscribe notes into text)
- A field portable or tablet computer

(simplifies the note-taking and form-filling process, saving later work in the office)

- A digital camera with adequate storage and battery packs
- Binoculars
- A laser distance meter (for rapid field measurements – some models can be immediately docked to the laptop to upload measurements in the field)
- A handheld GPS device, although optional, can be useful at remote sites or those without good location maps
- A fully equipped van with ladders for access and material for small immediate repairs (tools, slates, etc.)

- Personal safety equipment (helmet, safety ropes, body harnesses, etc.)
- Specialised tools, as needed (such as strain gauges for crack monitoring, etc.)

Step 1: Preparatory work

Any inspection should be preceded by a review of building records and any previous inspection reports and risk assessments. An up-to-date inspection database can greatly simplify this process.

Step 2: Visual inspection on site – collecting information

The first step in the process is an *integral visual inspection* of the building. During this



Each inspection team has a fully equipped van

inspection the necessary data is collected for a:

- *Condition assessment and risk assessment*: the state of the building, past damages, current deterioration processes with their consequences and future risks of damage
- *Health and safety risk assessment*: the safe accessibility of all building parts and possible risks for the inspectors
- *Rooftop plan*: basic measurement of exterior roof structure
- *Maintenance assessment*: evaluation of the ongoing maintenance actions



Weathering issues affecting the building surfaces, such as humidity and plants.

Further information can be gathered on site by *interviewing the owner or caretaker*.

A *standard procedure for inspection* can be deployed using a preformatted checklist itemising all building elements (ideally on a field portable computer or tablet PC to avoid data entry later on). To prevent consequential damage, but not to enter into false competition with building contractors, it is suggested only small and *urgent repairs* should be carried out on site.

The following criteria are used to judge the state of the different parts of the building:

G = Good	No immediate repairs are necessary.
R = Reasonable	The recorded defects are not acute. However, a raised vigilance is needed in order to intervene in good time.
M = Moderate	Local defects were found. These need to be repaired in good time.
B = Bad	Urgent and thorough repair is needed.
N = Not Inspected	Those parts which could not be inspected (e.g. because of a lack of safety) - justified in the Explanation column. A fast and thorough intervention is needed.

Building part	G	R	M	B	N	Explanation
1. Roofing						
1.1. Surfaces						
1.1.1. Tiles	5%	55%	10%	30%		

Scoring report showing the scoring criteria and a row of data

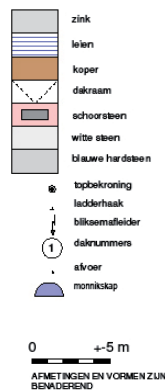
Step 3: Interpretation of the information

Later at the office, a three-part digital *status report* is drawn up. This can be as simple as a word processing template or as rich as a database. It contains three parts in the following format:

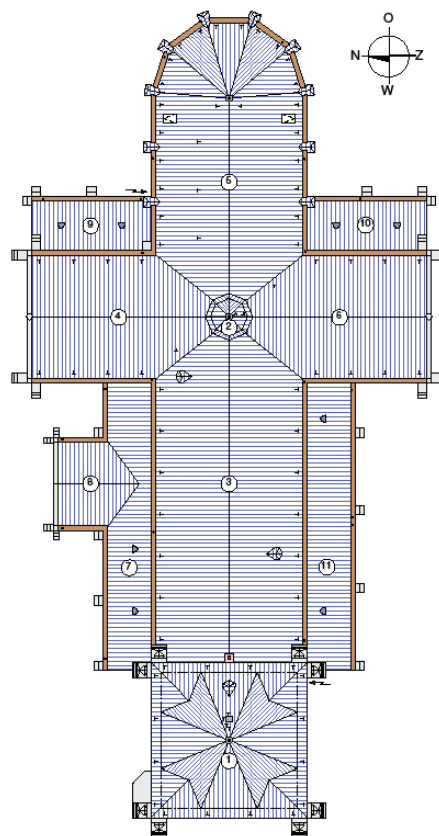
- 1) A *scoring report* with the percentages of the different condition classes (good – reasonable – moderate – bad – not inspected) and pictures (the percentages will be used for future statistic analysis)
- 2) *Recommendations* for maintenance and repair in three categories:
 1. Recommendations to improve the safe accessibility of all building parts
 2. Recommendations on the necessary works of repair
 3. Recommendations on durable and cyclical maintenance
- 3) A *rooftop plan* with indication of safety measures and localisation of critical points. This plan is not a detailed survey, but merely a sketch. It can be generated in a low cost computer aided design (CAD) programme such as Vector Works or AutoCAD LT.

Recommendations	
Works to be carried out to insure optimal accessibility and safety	Reference to detail in status report
Urgent	
In short term	
In long term	
Works to be carried out regarding preservation of the monument	
Urgent	
In short term	
In long term	
Special attention required regarding durable maintenance	

Structure of the recommendations for maintenance and repair in the report



Rooftop plan



Step 4: Managing the data

An inspection *database* is used to collate information about the owner, the caretaker, the type of building and all inspection data collected.

Step 5: Dissemination of the information - Sensitisation

A status report with colour photos and a rooftop plan is delivered to the owner by mail or email. It is very important to make an appointment on site with the owner after the delivery of the report to discuss the most important points and to highlight the weaknesses that need immediate attention. This enables the owner to better understand the maintenance priorities. At the same time, more information can be given about the techniques of maintenance and repair, on the selection of contractors (methodology) and about existing financial tools that can support the owner (e.g. government maintenance grants).

Several times a year, Monument Watch also sends owners practical brochures on

Property file:

Property name and address

Current and original function(s):

- Abbey
- Administration
- Belfry
- Dwelling
- Culture
- Health care
- Commerce
- Industry
- Castle
- Church
- Agriculture
- Vacant
- Military
- Mill

Property volume in m³

To see previous inspection reports

Information about property protection status (Listed or not listed building)

1.

Inspection:

Type of inspection:

- architectural advice
- interior advice
- architectural inspection
- interior inspection
- mill inspection
- safety & accessibility advice
- works of repair - architectural
- works of repair - interior

Hours of inspection on site per person

2.

1. Inspection database used to collect all field information. This example is in Microsoft Access, although any of the comparable free Open Source databases could also be used.

2. Example of the type of inspection that can be recorded in the database and the input of actual inspection hours on site

3. The percentages of the different condition classes (good – reasonable – moderate – bad – not inspected) give an indication of volume, are entered in the database and can be used for statistical analysis.

Inspection	Date	Type	Condition
1	1998-01-01	Architectural advice	Good
2	1998-01-01	Architectural advice	Good
3	1998-01-01	Architectural advice	Good
4	1998-01-01	Architectural advice	Good
5	1998-01-01	Architectural advice	Good
6	1998-01-01	Architectural advice	Good
7	1998-01-01	Architectural advice	Good
8	1998-01-01	Architectural advice	Good
9	1998-01-01	Architectural advice	Good
10	1998-01-01	Architectural advice	Good
11	1998-01-01	Architectural advice	Good
12	1998-01-01	Architectural advice	Good
13	1998-01-01	Architectural advice	Good
14	1998-01-01	Architectural advice	Good
15	1998-01-01	Architectural advice	Good
16	1998-01-01	Architectural advice	Good
17	1998-01-01	Architectural advice	Good
18	1998-01-01	Architectural advice	Good
19	1998-01-01	Architectural advice	Good
20	1998-01-01	Architectural advice	Good
21	1998-01-01	Architectural advice	Good
22	1998-01-01	Architectural advice	Good
23	1998-01-01	Architectural advice	Good
24	1998-01-01	Architectural advice	Good
25	1998-01-01	Architectural advice	Good
26	1998-01-01	Architectural advice	Good
27	1998-01-01	Architectural advice	Good
28	1998-01-01	Architectural advice	Good
29	1998-01-01	Architectural advice	Good
30	1998-01-01	Architectural advice	Good
31	1998-01-01	Architectural advice	Good
32	1998-01-01	Architectural advice	Good
33	1998-01-01	Architectural advice	Good
34	1998-01-01	Architectural advice	Good
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36	1998-01-01	Architectural advice	Good
37	1998-01-01	Architectural advice	Good
38	1998-01-01	Architectural advice	Good
39	1998-01-01	Architectural advice	Good
40	1998-01-01	Architectural advice	Good
41	1998-01-01	Architectural advice	Good
42	1998-01-01	Architectural advice	Good
43	1998-01-01	Architectural advice	Good
44	1998-01-01	Architectural advice	Good
45	1998-01-01	Architectural advice	Good
46	1998-01-01	Architectural advice	Good
47	1998-01-01	Architectural advice	Good
48	1998-01-01	Architectural advice	Good
49	1998-01-01	Architectural advice	Good
50	1998-01-01	Architectural advice	Good
51	1998-01-01	Architectural advice	Good
52	1998-01-01	Architectural advice	Good
53	1998-01-01	Architectural advice	Good
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56	1998-01-01	Architectural advice	Good
57	1998-01-01	Architectural advice	Good
58	1998-01-01	Architectural advice	Good
59	1998-01-01	Architectural advice	Good
60	1998-01-01	Architectural advice	Good
61	1998-01-01	Architectural advice	Good
62	1998-01-01	Architectural advice	Good
63	1998-01-01	Architectural advice	Good
64	1998-01-01	Architectural advice	Good
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77	1998-01-01	Architectural advice	Good
78	1998-01-01	Architectural advice	Good
79	1998-01-01	Architectural advice	Good
80	1998-01-01	Architectural advice	Good
81	1998-01-01	Architectural advice	Good
82	1998-01-01	Architectural advice	Good
83	1998-01-01	Architectural advice	Good
84	1998-01-01	Architectural advice	Good
85	1998-01-01	Architectural advice	Good
86	1998-01-01	Architectural advice	Good
87	1998-01-01	Architectural advice	Good
88	1998-01-01	Architectural advice	Good
89	1998-01-01	Architectural advice	Good
90	1998-01-01	Architectural advice	Good
91	1998-01-01	Architectural advice	Good
92	1998-01-01	Architectural advice	Good
93	1998-01-01	Architectural advice	Good
94	1998-01-01	Architectural advice	Good
95	1998-01-01	Architectural advice	Good
96	1998-01-01	Architectural advice	Good
97	1998-01-01	Architectural advice	Good
98	1998-01-01	Architectural advice	Good
99	1998-01-01	Architectural advice	Good
100	1998-01-01	Architectural advice	Good

3.

specific themes concerning maintenance and conservation.

Step 6: Implementation of the advice

In the case of Monument Watch, as the report is voluntary and non-binding, owners can choose to use it as they wish. Monument Watch can be a partner, but only at the request of the owner. Even if it is a listed monument, the only obligation owners in Flanders have is to maintain it in a proper way. If grants from the Flemish government are used, there are regulations to be followed for the maintenance works.

With the report, an owner can:

- Contact contractors / architects / specialists
- Adopt maintenance methods to given guidelines
- Apply for a maintenance grant

Interior inspection

An interior survey focuses on the movable contents and fixed interior elements of churches, castles and private houses.

Specialists inspect the interior of the building including wall and floor coverings, ceilings, furniture, paintings, sculptures, textiles and metal objects. This implicates a large knowledge of various materials, deterioration phenomena, preventive conservation measures, theory and practice of hands-on conservation and restoration.

Interior inspectors are typically highly qualified, with backgrounds as art historians and conservation specialists and/or restorers of paintings, sculptures and textiles. It is recommended that they work in a multidisciplinary team of two specialists.

In addition to the equipment needed for an architectural inspection, an interior inspection team will benefit from environmental monitoring tools such as light meters, relative humidity sensors, etc. Many of these tools today are digital and can record data over extended periods of time.

Step 1: Preparatory work

An inspection should be preceded by a review of existing inventories of movable artefacts (in Flanders, churches are legally obliged to keep such inventories), previous inspection reports and the risk assessment for accessibility, if present.



Interior inspection

Step 2: Visual inspection on site – collecting information

The first step of an inspection, similar to the architectural inspection, is an integral survey: a complete overview of the state and condition of the interior and its movable contents. It is important that the results of the architectural inspection are also verified so that the correlation between structural problems and consequential damage in the interior can be located. Ideally, both inspections should be carried out at the same time.



An intervention on site to show the caretaker how a silver object can be cleaned using non-corrosive products.



An inspector performing urgent conservation work on site to prevent consequential damage

Interior surveyors spend more time communicating with the owners and users of the building. It is important to assess the use, habits and procedures. The focus

is on housekeeping: what they do, why and how. On the one hand, surveyors may have to encourage regular maintenance, but on the other hand, they may need to slow down or redirect over-zealous cleaning or advise on correct products and methods. It may be necessary to set an example and to demonstrate methods, such as cleaning silver with non-corrosive products.



Apart from these interventions, interior surveyors should be trained and equipped to carry out urgent conservation works on site to prevent consequential damage.

On site, the necessary data is collected

to perform the different assessments, mainly from the recorded interview and via a thorough visual survey. On the spot, condition and damage assessments are predominant.

Monument Watch makes use of a toolbox approach, integrating different methodologies:

- *Expert assessments*: the quality of expert assessments is kept at a high level by training and “calibrating” the surveyors using a control interior.
- *Condition assessment*: the condition of objects and interiors is systematically assessed and qualified. The surveyors determine how stable the condition is and therefore how urgently conservation may be needed, which is done by predicting the rate at which an object is likely to deteriorate. The rating of ‘good’ condition means that it is ready for use and needs no action. The concept of stability is central in condition assessment and is crucial for prioritisation.

Monitoring the indoor climate

The reasons for monitoring the indoor climate are not predominantly to see whether ideal standards are reached (as opposed to museum practice). These are not always considered feasible in the context of a historic interior. The principle rationale is to interpret the damage (for example to wooden interior elements or organs) and to eliminate the cause of the damage (for example harmful heating systems). Measurements can be used in a predictive manner to assess risk (e.g. the risk of mold growth).

Monitoring of pests is carried out to detect risk or to see if an outbreak is still active. It can be a good strategy

- A *damage survey* systematically assesses and analyses damage and the effects of decay and tries to diagnose the causes. This assessment unravels cause and

to simultaneously monitor and reduce infestation as for example pheromone moth traps are both a measurement and elimination tool.

The awareness of the destructive effects of light has grown over the past decade or so. Measuring lux and UV doses allows the surveyor to predict noticeable changes to sensitive objects such as paintings and textiles. Another promising method is the use of early-warning-systems such as **LightCheck**. LightCheck is a tool that enables evaluation of the quantity of light received by an artefact. It will accurately indicate cumulative light exposure even when exposed to only dim light (such as 50 lux) for long periods [LCH].

- effect, starting from the evidence of damage.
- A *risk assessment* assesses the possible harms of theft and fire. Today, this

assessment is rather ambiguous and is subject to improvement.

- Another important tool is the monitoring of environmental conditions by measuring the exposure of the interior to light, climate conditions, insects, etc. This has become a standard part of interior surveys.

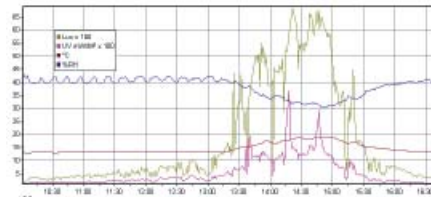
As with the architectural inspection, an interior survey should follow a standard procedure and use a preformatted digital checklist containing all fittings, fixtures and object types to inspect.



An inspector is making notes about the condition of the building using a laptop.



An Elsec data logger used to quantify the light received by an artefact.



Results from device readings on environmental monitoring (light, temperature, relative humidity)

Step 3: Interpretation of the information

In the days following the inspection, a status report is made at the office. Survey reports include recommendations for conservation and restoration, preventive measures and regular maintenance. The detailed status reports mention all elements of heritage value, qualified on a sliding scale from very bad to excellent condition.

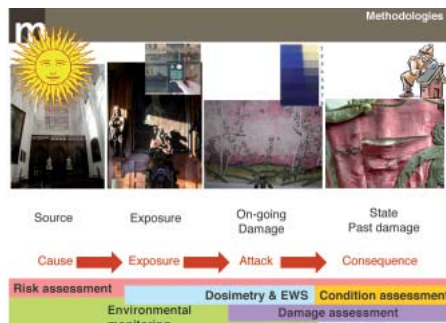
The report is built up in 3 parts:

1. A *scoring report* with the assessment of the condition (good – reasonable – moderate – bad – not measured)
2. *Recommendations* for maintenance and conservation in six categories:
 1. Conservation and/or restoration (urgent to long term, on site or not)
 2. Moulds and insects
 3. Preventive measures (location, storage, handling)
 4. Regular maintenance
 5. Correct environmental conditions (temperature, humidity, light)
 6. Protection against theft, vandalism and fire

3. Photographs of the most critical damage and diagrams/charts of environmental condition

Recommendations contain standard texts on *best practice* (for example: use padded hangers on textile, put cork behind the paintings, keep the relative humidity stable).

The report should be used as a conservation planning document. At Monument Watch the goal is to improve prioritisation of the recommendations. Until now, these



Planned methodology for interior inspection using risk assessment

were mainly based on the condition assessments, which focus on the deterioration processes and which provide the analysis of testimonies or consequences of deterioration processes in the past. Environmental monitoring, dosimetry and early warning systems provide information on the exposure, a step earlier in the chain of cause to effect.

Monument Watch intends to expand its toolbox approach in terms of predicting damage in the future by considering potential causes of damage. This can be done by integrating risk assessment, which is the exercise of assessing every potential threat from all potential causes of deterioration, and quantifying the potential negative effect in the future.

Monument Watch also wants to improve prioritisation by taking into account the relative significance of the elements and focusing on what is really important to and valued by heritage experts and the communities involved. In other words, an

object that is considered likely to degrade and is ranked with high significance can therefore be given conservation treatment first. Through this approach, the principles of Cultural Heritage Risk Assessment as promoted by ICCROM, CCI-ICC and ICN are being adopted.

Step 4: Managing the data

As with architectural inspections, the information of the interior inspection is entered into a database.

Following a SWOT analysis of Monument Watch's forms and reporting system in 2007, opportunities were found for enhancement, including:

- Improvements of the service to the custodians and members (e.g. by offering diverse report formats)
- Better prioritisation of the recommendations
- Reduction of the time-consuming reporting by the surveyors
- Central quality management
- Integration with the architectural

- surveys
- Adopting methodological improvements, such as more objective condition and risk assessment

A database application called CAT (or Condition Assessment Tool) developed by the Scottish Museum Council is being adapted at Monument Watch to allow a more systematic condition survey and integration of records for interior elements and causes of deterioration. This will support the integration of the current methodology, which is focused on a condition assessment of current damage and ongoing deterioration processes, with *integral risk assessment*.

Step 5: Dissemination of the information

The owner receives a interior inspection report, possibly together with the architectural inspection report. The focus, however, is on the communication on site with owner/manager/caretaker. Interior inspectors:

- Establish a direct relationship with owners and users
- Behave as guests, and take the local context into account
- Emphasize the importance of care by the local community custodians
- Focus on use and procedures in interviews and observations
- Focus on housekeeping
- Recognize any religious use



An interior inspector explaining a source of decay to the site manager.

Communicating with the local stakeholders and caretakers is of utmost importance, hence Monument Watch organises courses and distributes low-profile publications to raise awareness and encourage better care-taking skills.

Step 6: Implementation of the information

The inspection report allows the owner to take the following steps on a voluntary basis:

- Contact restorers / specialists
- Adapt maintenance methods to given guidelines
- Apply for maintenance grants

Statistical analysis

A database of inspection records makes it easier to analyse a wide variety of trends and patterns, helps to identify problems and measure the effectiveness of regular monitoring and maintenance programs. At a regional level, this information can be used to support monument care policy and track the evolution of the state of listed buildings.

Current state of the roofs (slates) of the inspected Churches since 2001.

Function	Building part	# Inspections	Good	Reasonable	Moderate	Bad	Not inspected
Church or chapel	1.1.2. Roof: Slates	1818	44,19	36,17	14,82	4,16	0,67

Evolution of the wooden frames and windows of houses from 2001 until 2007.

Year	Function	Building part	# Inspections	G	R	M	B	N
2001	Dwelling	5.10. Wooden frames/windows	156	28,40	28,14	36,38	7,24	0,00
2002	Dwelling	5.10. Wooden frames/windows	190	41,05	22,71	26,34	9,34	0,61
2003	Dwelling	5.10. Wooden frames/windows	252	42,16	21,49	30,20	5,32	0,89
2004	Dwelling	5.10. Wooden frames/windows	266	44,94	23,78	24,68	6,11	0,53
2005	Dwelling	5.10. Wooden frames/windows	277	49,68	19,64	21,57	7,92	1,10
2006	Dwelling	5.10. Wooden frames/windows	185	49,14	21,51	23,81	4,38	1,11
2007	Dwelling	5.10. Wooden frames/windows	65	51,54	23,62	18,08	5,77	1,08

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Table showing the current state and evolution of specific building elements

Monument Watch Flanders, as the umbrella association for the five provincial associations in the Flemish region, collects all the data from its inspections into one central database, allowing overall statistical

analysis. Since 2001, building conditions have been recorded in the database as percentages, allowing MWV to recognize *evolutions in the condition of building parts* with the possibility of differentiating

between several parameters:

- Provinces
- Year of inspection
- Function of the building
- Listed vs. not listed buildings
- Building category in m³
- Type of owner

In addition to informing the Flemish government on the evolution of the state of the listed buildings of MWV members, statistics are used internally to focus on specific problems and to choose useful themes for publications (maintenance brochures) and training.

Future developments at Monument Watch

Provide cost and planning information

The methodology described in this KNOWHOW booklet offers owners and caretakers of historic buildings a useful condition report on a building and its contents, with recommendations for repair, conservation, and maintenance. This service would be even more valuable, if it could

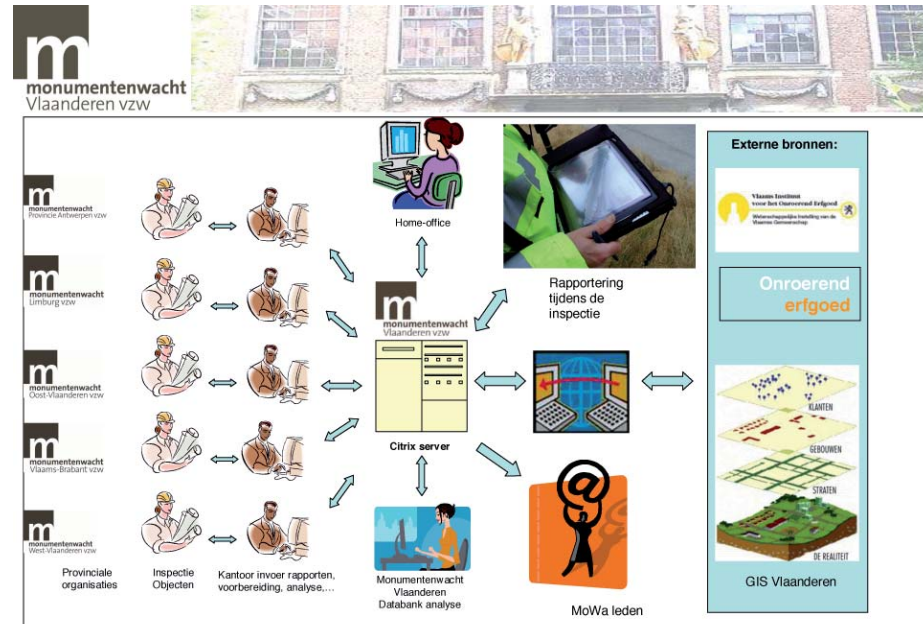
provide an overview of the costs of those works over a certain period. Monument Watch is developing a new process to provide cost calculation and short-term (10 year) maintenance planning guidance. This service should be available in 2009. To be able to offer this service, basic measurement of the building parts will be necessary in order to provide a description with measurements and calculate the costs. Digital tools will most likely play an important role in providing this service. It should be noted that this cost calculation is not intended to be a full blueprint with specifications, which will remain the responsibility of the building contractor or architect.

Improve the recording and processing of data

As Monument Watch is growing rapidly - every year, 400 additional buildings require inspection in addition to the 5000 current member structures - it is necessary to find more efficient ways to record and process inspection information, while guaranteeing

the regularity of inspection. The staff of 35 architectural and 9 interior inspectors must be enlarged, but this expansion depends on political goodwill and is not without limits.

Digital recording techniques could save time on site and *automated reporting systems* could reduce the time spent at the office. The database of Monument Watch



Database flowchart, showing a proposed architecture to improve the information flow among monument watchers and other stakeholders

currently runs locally at the five provincial associations — these five databases are uploaded in a central system once every three months. A project is underway to centralise all the information in one location, while allowing remote access. This will enable instant up-to-the-minute reporting, as well as links to other repositories (e.g. the database of listed monuments of the Flemish government) and members consulting their status reports online.

Maritime heritage

At the request of the Flemish government, a new type of inspection is being developed for historical boats. A team of specialists has been recruited and a methodology for inspection is being developed.

International Collaboration

The Raymond Lemaire International Centre for Conservation (RLICC) at the K.U.Leuven (Belgium) and Monumentenwacht Vlaanderen vzw are setting up a network of experts and practitioners as part of

an application for a UNESCO chair on “preventive conservation, monitoring, maintenance of the architectural heritage”. The network seeks to establish a forum for exchange on the latest research, practice and needs in preventive conservation [SPRE].

Others

As it is difficult for owners and caretakers to find professional building contractors that are interested in small repair works and cyclical maintenance, it is necessary to stimulate a larger maintenance offering with sufficient quality for historic buildings.

Summary

This KNOWHOW booklet presents a preventive monitoring process that has proven to be effective. The technology used is simple and cost-effective, applying digital tools to measure and document buildings and their environmental parameters. New developments within this maintenance system rely on ICT (Information and Communication Technologies) to scale

the activity, to make it more effective, to communicate more efficiently with the members and to derive statistical data and trends to influence monument care policies and decide on internal priorities.

Acknowledgements

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References

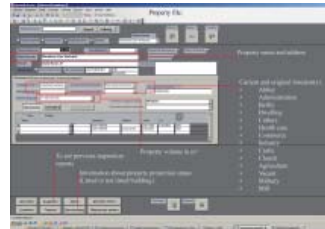
- [CHAR] <http://international.icomos.org/charters.htm>
 [LCH] <http://www.keepsafe.ca/lightcheck/>
 [MWV] <http://www.monumentenwacht.be/>
 [SPRE] <http://sprecomah.eu/network/>



TECHNOLOGY/INTERACTION

A regular inspection approach to assess threats affecting monuments, which is aimed at preventive maintenance practices. This process allows owners to have an understanding of the interventions necessary to maintain their monuments in adequate condition of conservation. The approach uses off-the-shelf technology for condition recording, including low-cost digital recording tools (e.g. cameras, laser distance meters, etc.) and portable computers. For record keeping and trend tracking, an inexpensive database package has been deployed, allowing effective generation of reports.

Monitoring Monuments



IDEAS FOR IMPLEMENTATION



Monument Watch's approach is recommended for:

- Initial condition assessment of monuments for implementing preventive maintenance strategies
- It has proven to be effective for monitoring a large number of monuments at regional and national scale
- For exteriors and interiors, other potential applications are currently being reviewed



REQUIRED COMPETENCIES

- ? Understanding of weathering processes affecting monuments (exteriors and interiors)
- ? Photography
- ? Safety protocols for accessing roofs
- ? Digital form filling
- ? Database design
- ? Data entry in databases
- ? Measuring buildings
- ? Condition assessment

SUMMARY

This KNOWHOW booklet presents a straightforward process for preventive monitoring and assessment, allowing the discovery and prevention of critical issues before they can affect monuments.

RESOURCES



- Man hours: inspection time depends on the size of the building, on average about 20 manhours
- Technology: 50,000 euro per inspection team, including training and clothing
- Cost for members for architectural inspection:
 - 40 euro membership fee per year per building
 - 25 euro per inspection hour per person
 - administration cost per report (between 10 and 40 euro)– cost for small repairs or monitoring devices
- Production costs: 180,000 euro per year per inspection team
- Optional condition assessment sensors:
 - crack meters: about 15 euro per unit (charged)
 - Elsec data loggers: 1500 euro investment cost (not charged)



Monitoring Monuments

Project team

Authors:

Mario Santana Quintero,
Raymond Lemaire International Centre for
Conservation, KU Leuven

Anouk Stulens,
Monumentenwacht Vlaanderen vzw

Alonzo C. Addison,
UNESCO World Heritage Centre

Daniel Pletinckx,
Visual Dimension bvba

Project Rapporteur:

Nele Goeminne,
Raymond Lemaire International Centre for
Conservation, KU Leuven

Project Management:

Jean-Louis Luxen,
CHEDI asbl

Daniel Pletinckx,
Visual Dimension bvba

External Reviewers:

Anne Lemaistre,
UNESCO World Heritage Centre

Christian Manhart,
UNESCO World Heritage Centre

Bill Blake,
English Heritage

Dina Bakhoun,
The Aga Khan Trust for Culture

Monumentenwacht Vlaanderen vzw
Oude Beurs 27
2000 Antwerpen
T + 32 3 212 29 50
F +32 3 212 29 51
www.monumentenwacht.be
info@monumentenwacht.be

With additional thanks to:

Koen van Balen and Luc Verpoest,
Raymond Lemaire International Centre for
Conservation, KU Leuven

Illustrations: Mario Santana Quintero

Photographs: Mario Santana Quintero and
Monumentenwacht Vlaanderen vzw

Proof-reading for booklets:

Kristi Wilson Lindroth

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Without preventive maintenance, small problems at monuments and buildings can quickly grow into critical issues. Monitoring is crucial for preventive conservation, but often overlooked for lack of a simple, straightforward process.

Using low-cost digital tools, and building upon more than fifteen years of experience of Monument Watch of Flanders, this KNOWHOW booklet outlines a practical, easily-replicable process for keeping an eye on buildings and monuments. This approach makes use of simple computer field collection forms, digital photography, and databases to appropriately and systematically monitor and maintain heritage places. Both the well-tested monitoring process and the operational structure of this innovative Belgian not-for-profit are explained in order to help others learn from their success.

The KNOWHOW booklets are an inspirational series cataloguing existing examples of a variety of projects which use ICT for the recording, display and interpretation of cultural heritage. These booklets highlight functional information covering the design, development and implementation of ideas and their solutions, and give thoughtful suggestions for alternative applications within the cultural heritage sector. The KNOWHOW booklets aim to support people working in the area of museums, heritage sites and monuments. The information covered within the booklets benefits managers, exhibition producers/curators, pedagogues and professionals working with digital restoration, as well as those working with communication and audiences. These booklets cover projects developed by the partners of EPOCH, and are divided into the following categories: MUSEUMS, HERITAGE SITES and MONUMENTS.

www.tii.se/knowhow

