



Preventive
Conservation
in Historic Houses
and Palace
Museums:
Assessment
Methodologies
and Applications

SilvanaEditoriale

Preventive Conservation in Historic Houses and Palace Museums: Assessment Methodologies and Applications

Conference of the National Museum of the Palace of Versailles (EPV), the Association of European Royal Residences (ARRE), and the Research Centre of the Palace of Versailles (CRCV)

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Assessing Risks in Historic Houses: Approaches and Benefits

Abstract

Over the years, an increasing number of heritage organizations have used some form of risk management. At a business level, it is already good practice to assess and manage financial, legal, business and reputational risks. For example, when exhibitions are planned and delivered the potential hazards that may threaten the project are taken into account. However, it is now common also to think about 'risks to cultural capital' as part of an organization's heritage management practice. Risk management is used in setting priorities and in providing arguments for decisions about affordable and adequate measures to manage and preserve heritage. It helps to answer questions such as: how do you exhibit objects responsibly? What are the priorities for the collection care plan? Are particular climatic conditions adequate? And, have appropriate security measures been taken? This presentation discusses general principles of risk assessment and management and different approaches such as a risk matrix, Cultural Property Risk Analysis Method, ABC-method, and QuiskScan. It looks at the advantages and applications of each method illustrated by case studies from historic house situations. All approaches have in common that the real benefit for organizations is the fact that all stakeholders involved in the process come to share the same insights, values and awareness and will more likely support the shared decisions.

Keywords

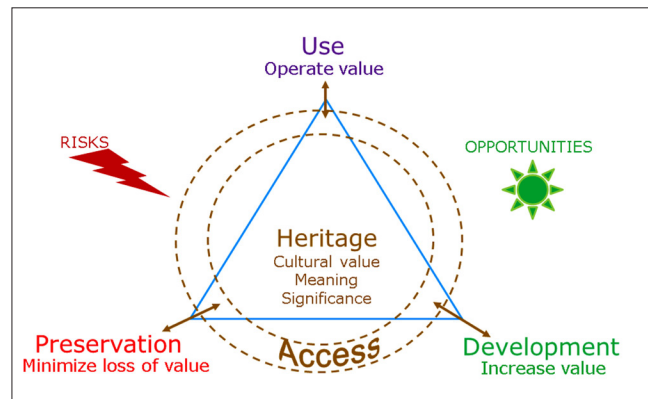
Cultural heritage, risk management, preventive conservation, decision making.

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Heritage management, can be defined as the process of making well-argued decisions about the allocation of resources to most effectively and efficiently achieve the heritage profession's objectives. The main objective is passing on the heritage that is given in our care to next generations with optimum significance, values and accessibility. The heritage management triangle distinguishes three main activities to achieve that goal: development, preservation and use. Not just of heritage assets but of the values we attribute to them (fig. 1). Heritage management is really value management. On the one hand, there are opportunities to develop value. On the other hand, there are also threats that may cause loss of value. Heritage managers need to

Fig. 1
Heritage management
triangle.



balance acting on the opportunities and reducing the risks. The process of value management is described in Brokerhof, Kemp and Bülow (2017). This presentation will focus on the risk management part.

Risk Assessment and Management

Risk can be defined as the chance of loss of value. It tries to get a grip on an uncertain future. It deals with uncertainty, both about whether or not something will happen and what the loss of value will be if it happens. Risk is usually qualified or quantified as the product of, for example, chance x effect, or likelihood x consequence, or probability x impact. Or, to state it simple: how soon or how often is a loss of value expected to occur and how bad will that loss then be?

The steps of the general risk management process are described in the international standard ISO 31000 [ISO, 2009] as shown in figure 2. Most of the approaches follow this process or use parts of it.

Determining the context involves setting the scope, determining what the heritage asset consists of and assessing its value. For that purpose several value assessments method have been developed, for example, Luger *et al.* (2014).

Identifying, analysing, and evaluating risks together form the “risk assessment” in which risk scenarios are developed, likelihood and consequence are qualified or quantified, and risks are compared or ranked to set priorities (the yellow box in fig. 2).

Risk treatment involves developing options to reduce selected risks, to determine feasibility, effectiveness, and costs of options, and to select the optimal to implement. Options can be in the area of preventive conservation (avoid and block, proper storage solutions, safe use), may involve conservation treatment (stabilisation, consolidation to avoid further decay), or may deal with safety and security, facility maintenance, or training and education. This whole process takes place with ongoing monitoring and evaluation, and communication and consultation. It is the latter that really makes risk management so interesting. It brings people, knowledge and experience together and works towards shared objectives.

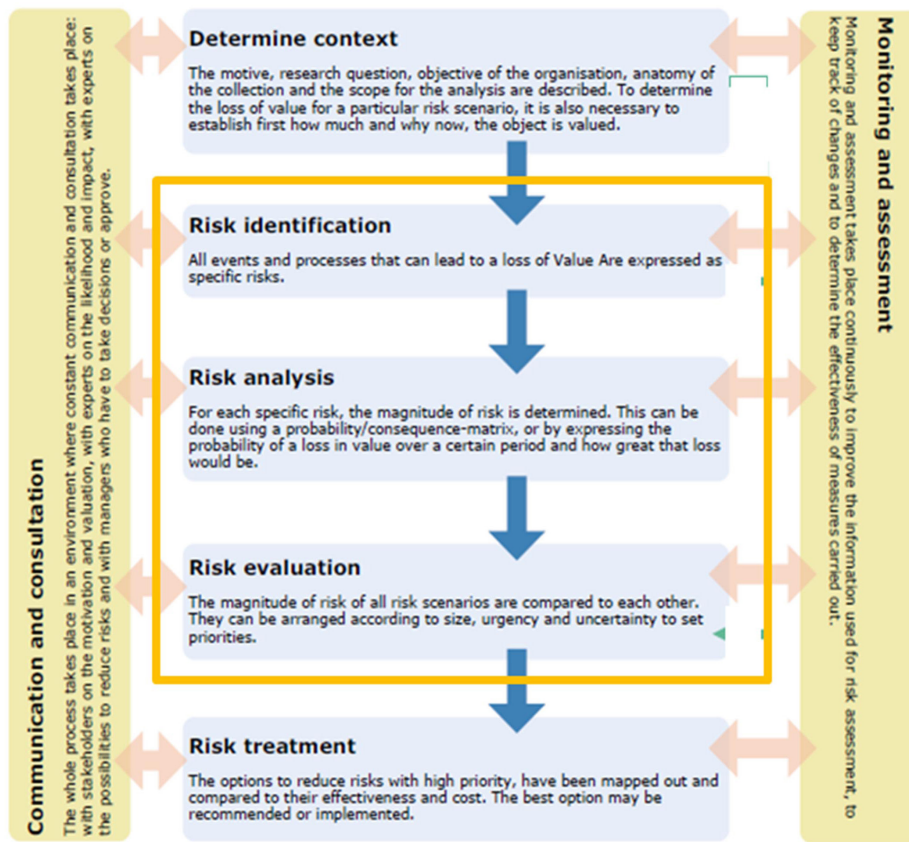


Fig. 2
ISO 31000 risk
management process.

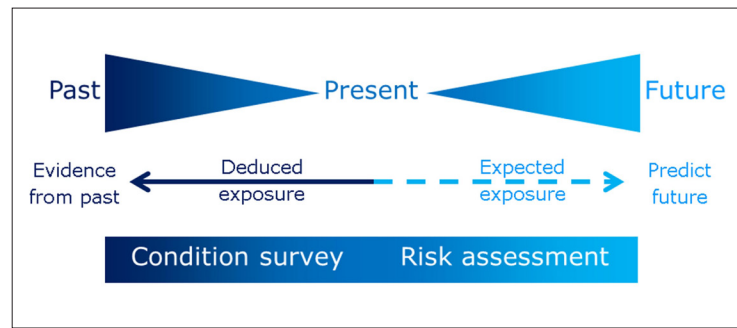
Risk assessment looks at expected exposure to threats and resulting future changes. It thus forms a logical counterpart of condition surveys, which assess present condition and correlate observed changes with past exposure (fig. 3). Risk assessment is also an extension of condition surveys. The information gained from past and present evidence is used to make predictions. Even though results from the past are no guarantee for results in the future.

Identifying Risks: Agents and Scenarios

Identifying generic and specific risks usually involves listing “all the things that can go wrong.” To structure thinking for heritage most approaches use the agents of deterioration as a classification of causes or sources of threats: physical forces, water, fire, thieves/vandals, pests, contaminants, light/UV/IR, incorrect relative humidity, incorrect temperature, and dissociation [Michalski, 1990]. Description of the agents and information about them can be found on the website of the Canadian Conservation Institute and in Brokerhof, Ankersmit and Ligterink (2017).

To analyse the risks a risk scenario needs to be developed describing what is expected to happen so that likelihood and consequence can

Fig. 3
From deduction to
prediction.



be assessed. A way to do this is thinking in a script which describes source-pathway-effect. Having such a script in mind also allows one to think about mitigation options such as avoiding the source (replace faulty electrical wires, forbid open fire), blocking the pathway (close curtains, place valuable objects in display case), or limiting the effect (have and rehearse an evacuation plan).

Why and How? Different Approaches

Conducting a risk assessment or embarking on a risk management process needs to serve a purpose. And the effort one puts into the exercise needs to be worth it. When crossing the street everyone is trained to do a fast and simple assessment which is good enough to get across in one piece. In the context of heritage management we also want to reach our goals effectively and efficiently and make the right decisions to get there. The complexity of the decision and the purpose of the outcome determine which approach is appropriate.

Choice Between Two Option: Pros and Cons

If the decision at hand is a choice between two options, comparing them on the basis of a number of relevant criteria is usually good enough. The criteria are always related to higher and lower objectives. For a historic house the question whether to use real or fake candles may concern creating a historic atmosphere and giving the visitor an enriching experience. However, other objectives are to preserve the house and provide safety for the visitors, hence have a low fire risk. There are also criteria (restrictions) concerning the budget, both for initial investments and subsequent operational costs. Listing these criteria and assessing the advantages and disadvantages of the two options, together with stakeholders, is usually enough to reach a decision (table 1). The option with the biggest gain in value (opportunist), the smallest risk (protectionist), or the most value for money (economist) will be the preferred one.

Risk Register and Risk Matrix

When more decisions are involved such as allocation of budget to act on a range of risks, a way to approach them is to list them and give

scores for chance and effect. The list thus turns into a risk register and colour codes can be used to indicate their magnitude (fig. 4). A risk matrix of categories for chance and effect visualises what makes big or smaller risks. A 3x3 matrix with categories “small,” “medium,” and “large” results in nine cells where the combination of large chance and large effect results in a big risk (red cell). While a small chance and a small effect form a small risk (blue cell). It is beneficial if the assessment team defines the matrix beforehand and agrees on acceptable and non-acceptable risks. And they will need to agree what is “small,” “medium,” and “large.” This approach is often used in business and finance. Heritage organisations may use it to assess and manage business risks. If they do, it gives the heritage asset manager an opportunity to argue in a shared language fitting the organisation’s work method [Rogerson and Garside, 2017].

Cultural Property Risk Analysis Model (CPRAM)

Robert Waller was the first to develop a risk assessment and management method specifically for cultural heritage. His work started in the 1980s and culminated in his publication *Cultural Property Risk Analysis Model* [Waller, 2003]. It is the most comprehensive approach that we know in the heritage field, which offers a deep insight into heritage and organisation and can be applied for complex situations such as drawing up asset policies and conservation strategies. It determines the magnitude of risk as a product of probability of risk scenarios happening (chance) and the loss of value for the fraction of the collection that is susceptible in that scenario (effect). All the specific risks thus get a magnitude expressed as a number between 0 and 1. The results of the risk assessment can be shown in a 3D graph plotting the magnitude of risk of all scenarios per collection unit against the agents of deterioration (fig. 5).

Trained and coached by Waller staff of museum Our Lord in the Attic in Amsterdam and RCE (ICN at the time) applied the approach

Table 1
Listing pros (+) and cons (-) of options towards various objectives or criteria.

CRITERIA	OPTION 1	OPTION 2
	REAL CANDLES	ELECTRIC CANDLES
Historic atmosphere	+++	+
Visitor experience	+++	+
Risk of fire	- - -	-
Installation costs	-	- -
Power costs	+	-
Maintenance	- -	-

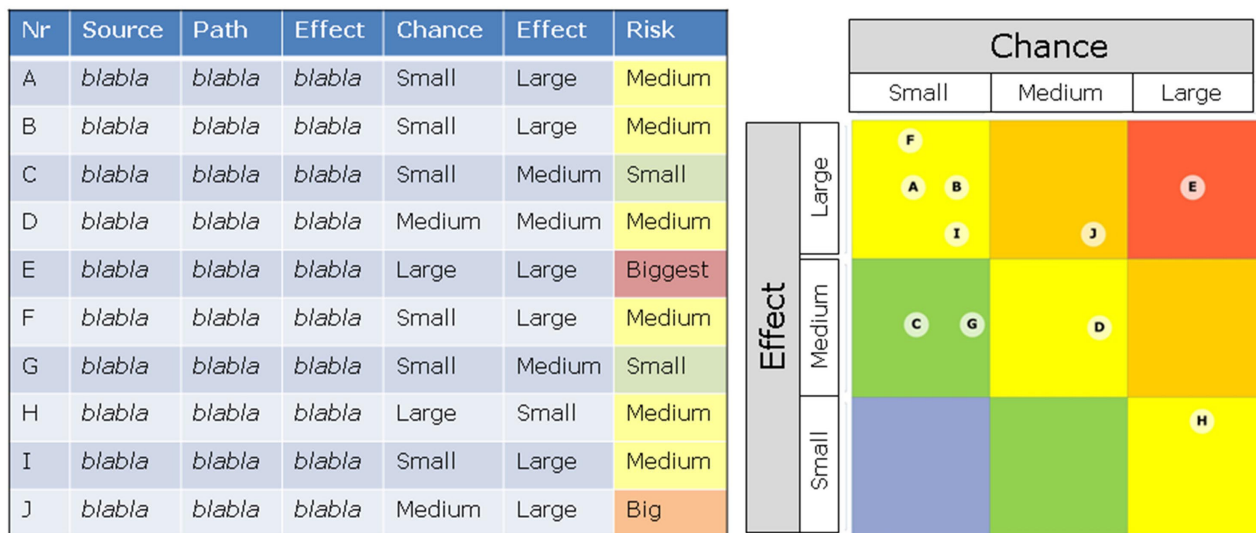


Fig. 4
Risk register and risk matrix to list and classify identified risks.

to assess the risks and develop a preservation strategy for the historic house with a hidden church in the attic (fig. 5) [Brokerhof *et al.*, 2005]. It took the combined team approximately three months to conduct the assessment. This considerable input was worth it. Not only was it a learning process for everyone, it also introduced a change in mind-set of the organisation. Everyone had a shared understanding of what the heritage asset was (a mixed collection AND a historic house), agreed on the values, understood risks and priorities and spoke the same language. The museum was also able to phrase arguments in such a way that external funders were willing to invest in thorough risk reduction plus development options. Where the original problem was fear of fast degradation of the 17th century staircase, the final solution was the redesign of the museum concept, returning the historic house to its original functions, and building an extension to house visitor facilities, supporting exhibitions, and community activities next door. The multi-million refurbishment project that ran over more than a decade had its roots in the risk assessment.

ABC-Method

During the years ICCROM, CCI, and ICN together with Robert Waller and other partners organised the international courses “Reducing risks to heritage,” Stefan Michalski developed the ABC-method (fig. 6). It uses the agents of deterioration to identify risks and develop risk scenarios which are then quantified with three scores: *A* – for “how soon/how often,” *B* – for “how bad for each affected item” and *C* – for “how much of the total heritage value.” *A* thus looks at likelihood while *B* and *C* together make up the consequence for the entire heritage asset. The magnitude of risk for each scenario is the sum of $A+B+C$ and since each can range from 1-5, the maximum magnitude of risk

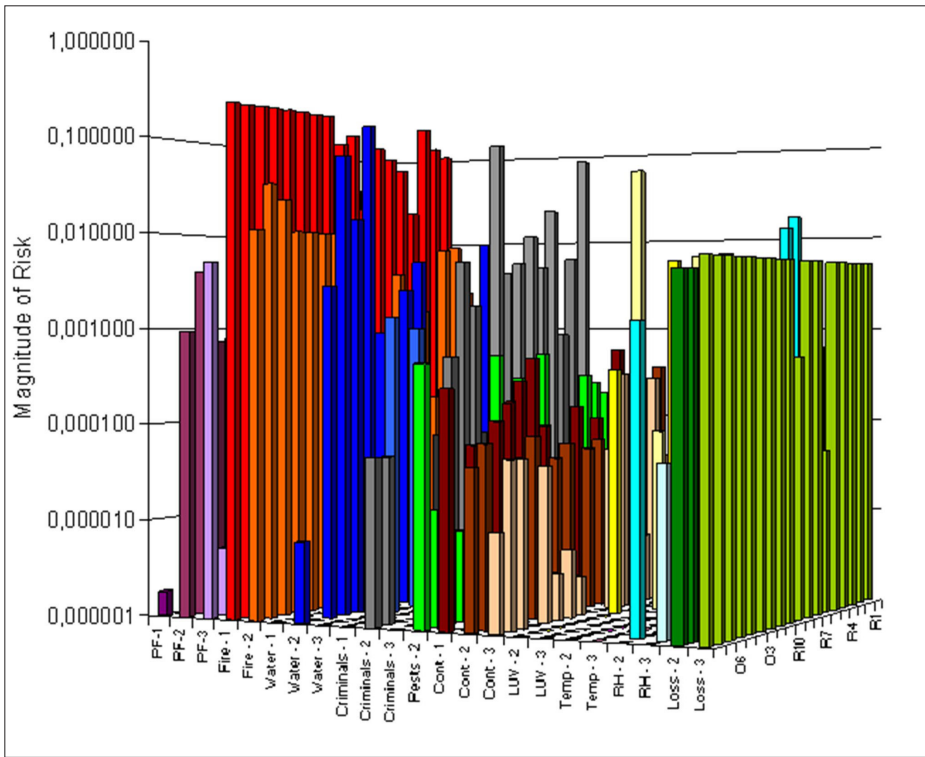
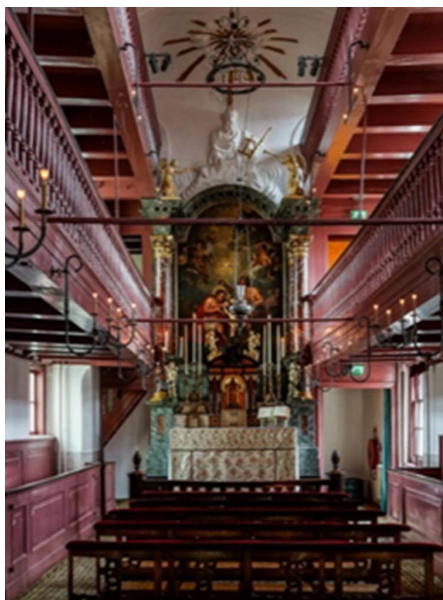


Fig. 5
Robert Waller's Cultural
Property Risk Analysis
Model applied at Our Lord
in the Attic, Amsterdam.



can be 15. There are methodological differences between CPRAM and ABC, for example the moment in the process when the overall asset or collection value comes into the ranking and decision-making. But they share the ISO 31000 set-up and the power of stakeholder involvement. The ABC-method may have an easier way of quantifying the risks and for many the resulting 2D graph is easier to interpret. Representing the magnitude of risk as stacked bar graphs of A, B and C has the additional advantage that one can easily spot the urgent risks (high A-score) and the big impact risks that may require a dedicated funding campaign (high B+C score).

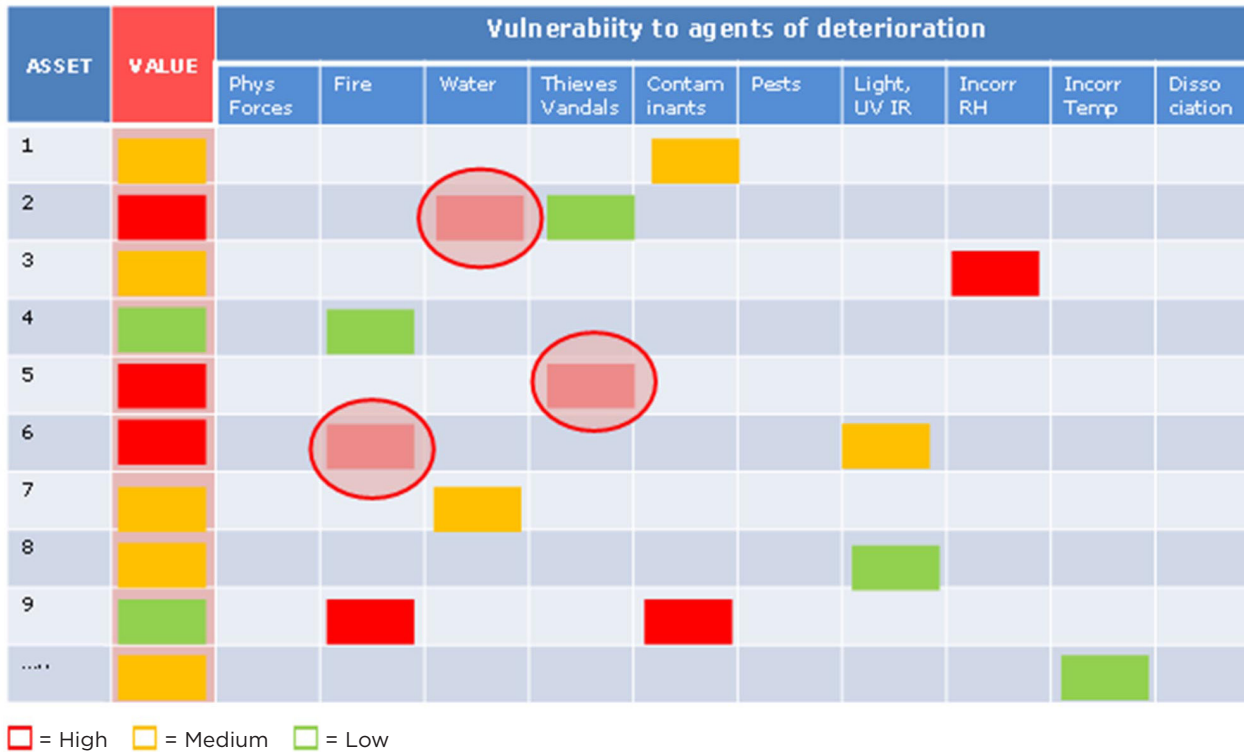
The ABC-method proved suitable in the international ICCROM-CCI-ICN courses [Antomarchi *et al.*, 2014]. The experience was that participants and students found it relatively easy to understand and an assessment could be conducted in a few days to weeks, for example during a case study in the Sibiu Open Air Museum with historic houses and interiors (fig. 6). It allowed the participants to build a thorough overview of the assets and the risks and provided the museum with the foundations for a funding campaign for the recommended improvements.

QuiskScan

Despite training, coaching, and development of tools to support both CPRAM and ABC methods, organisations fear the effort that is required to carry out a systematic and detailed risk assessment. In addition, there can be feelings of inefficiency, when at the end much work is done and only a few risks are addressed. While organisations



Fig. 6
Stefan Michalski's ABC method applied during international course at the Open Air Museum, Sibiu.



that went through the process thought it was a mind-changing experience and well worth it, many just encountered a huge threshold to start. Museum staff with limited time needed a broad-brush approach that would enable them to identify potential risks and make a case for further detailed study. The challenge was to use the risk management foundations, designing a method that would lead a museum team through a process and provide insight into their cultural asset, the hazards and potential losses, open their eyes to the integrated approach, and induce an appetite for more in just a few hours. It led to the development of a quick risk scan, the QuiskScan, which was a stepping stone to a more in-depth analysis with one of the existing methods [Brokerhof and Bülow, 2016]. The design of the QuiskScan comes from the risk maps, such as earthquake risk maps, which show on overlapping maps where important assets are located and where exposure may happen. To form a relevant risk three parameters need to overlap: value of the assets, their vulnerability, and exposure. Valuable assets that are vulnerable to an agent of deterioration can undergo an unacceptable loss of value, however, only if they are exposed to that agent (fig. 7).

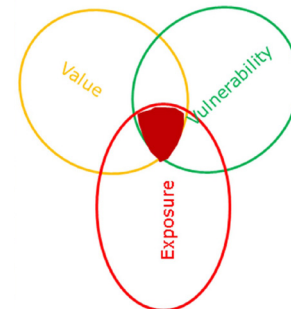


Fig. 7
QuiskScan matrix:
vulnerable value = biggest potential loss that results in the analysis of exposure to the agent of deterioration and its principle of action.

Mapping Exposure and Assets

The actual risk mapping is also sometimes used. A good book that describes the approach within the context of emergency preparedness

for communities and cities is by FEMA (2001). Figure 8 shows that drawing maps of a room showing where the valuable items are placed, how vulnerable they are for light and what the light exposure is, provides insight into which items are at risk and how relocating these items may reduce the risk. When communicating with people who are used to think visually or work with maps, such as facility staff and architects, this can be a very powerful approach to convey a message.

Combining Methods

Knowing that various approaches and methods exist allows one to not only choose the most appropriate method but also combine them. Experience shows that, when teaching preventive conservation and risk management to students, it is useful to start with mapping or a QuiskScan to select a number of risks that are subsequently analysed further with the ABC-method. It gives the students a quick overview of assets, values and vulnerabilities which allows them to then concentrate on in-situ conditions, assess exposure and determine whether and how specific risks should and can be reduced, keeping the integral view over the asset. The combined approach was published in the book *Risk Management for Collections* (Brokerhof, Ankersmit and Ligterink, 2017). The book also provides knowledge and information about agents of deterioration with a scenario scheme for each agent to assist identification and analysis of risks. Although the title suggests it is written for collections, it is also applicable other types of heritage.

In 2017, a group of 15 Master students from the University of Amsterdam applied the combined approach at the Modern Contemporary Museum (MOCO) in Amsterdam during a 1-week risk management module (fig. 9). The museum displays its art collection in a listed

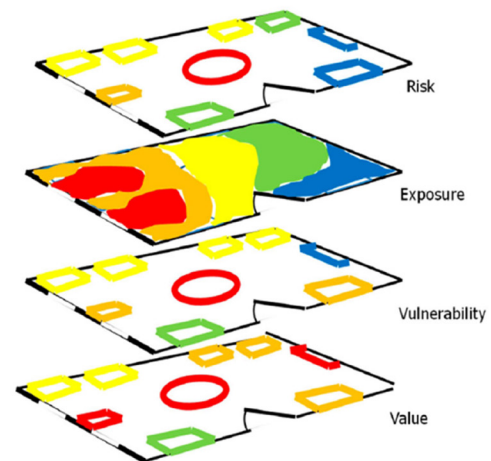
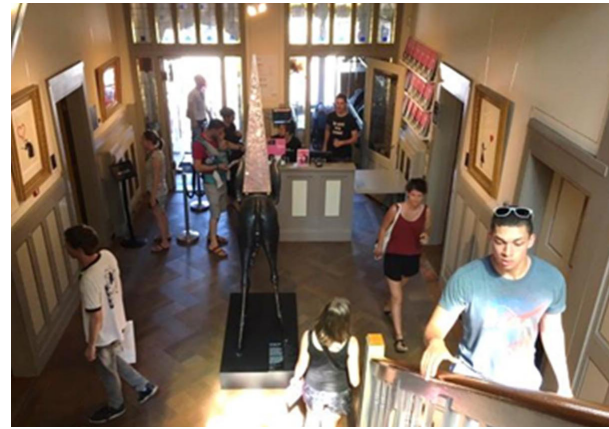
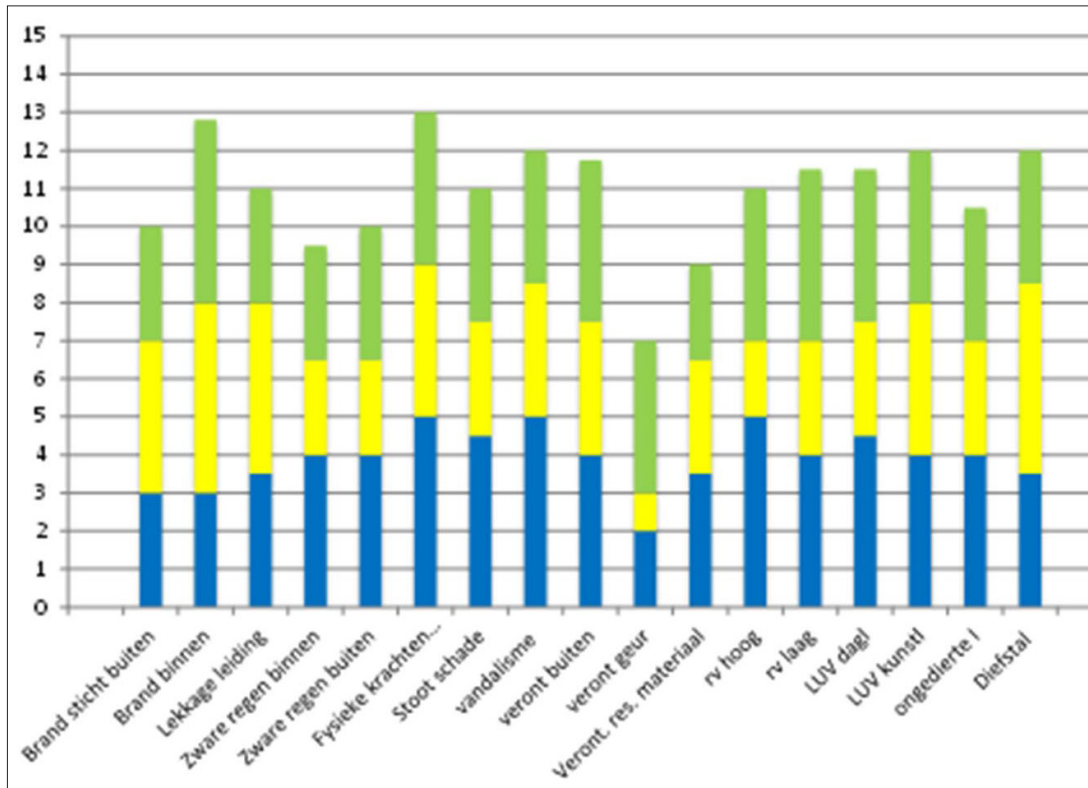


Fig. 8
Hypothetical light risks in an interior determined with stacked maps for value, vulnerability and exposure.



Deekcollectie	GW	FK	Water	Brand	C&V	Ongedier	Veront	LUV	onj RV	onjT	Disso
Werk op papier of karton	10,7										
Verf op doek	12,6										
Verf op hout	7,8										
Metaal met/zonder verf	3,7										
Steen en ops met/zonder verf	8,0										
Verf op kunststof	0,8										
Werk op perkament of leer	0,9										
Varia	5,5										
Voeren 1000 m2 = 100 st	13,7										
Wanden	12,9										
Plafonds 1000 m2 = 100 st	2,7										
Glas-ramen	2,4										
Fixtures	18,3										

Fig. 9 Application of combined methods with students at MOCO, Amsterdam.



historic house. During the week, the students were able to produce an overview of built and moveable assets, their value and vulnerability, and potential risks. They selected the most relevant risks, analysed these in more detail, set priorities, and developed options for risk reduction. Altogether they were able to make sound, practical, and useful recommendations to the museum. It showed that they were able to apply their conservation knowledge at the level of heritage management and that they were able to consider use and preservation of the historic house and the collection from a holistic perspective.

Comparison of Approaches

Considering risk assessment to support decisions or risk management to improve preservation conditions, there is not one best approach or best method. As always, each method has its strengths and weaknesses. It depends on the context in which a decision has to be made, which approach is the most appropriate or fit-for-purpose. Table 2 lists the methods that have been discussed here with some comments on time needed to conduct the assessment, what the outcome can be, and when, what or for whom to apply it.

Just like with options for risk mitigation, choosing the appropriate approach or combination of approaches is a matter of benefits and costs, is the effort that you put into it worth the outcome? The more impact the outcome of a risk management process has, the more effort is justified and probably also required (fig. 10). After all, one needs well-founded arguments to convince others of proposed actions and options. Also the opposite is true: garbage in is garbage out. Too little consideration when doing a risk assessment will not provide useful results. They are either not convincing or simply wrong.

Benefit	Large	Gold	Higher-hanging fruit	Plan properly
	Medium	Low-hanging fruit	Could be interesting	When nothing better
	Small	Quick win	Worth the effort?	Waste of energy
		Small	Medium	Large
Effort				

Fig. 10
Simple cost-benefit matrix.

METHOD	DURATION	OUTCOME	APPLICATION
Pros and Cons	Hours	Choice	Compare limited options
Register and Matrix	Weeks	Overview of risks Easy visual outcome	Make an inventory of a situation Connect with organisation, language of facilities and business administration
CPRAM	Months	Comprehensive insight Loss of value to units Priorities	Develop strategy or policy Requires data and data crunchers Outcome visualised in different ways
ABC	Weeks	Useful insight Loss of collection value Priorities	Develop strategy or policy Cost-effective mitigation Connect with bar chart readers
QuiskScan	Days	Rapid overview Rough insight Priorities	Basis for further analysis Indication of hot spots Fit for traffic light readers, managers
Mapping	Days	Visual overview Powerful insight	Assessing one or few agents Connect easily with map readers, facilities

In Conclusion

Conducting a risk assessment is a very powerful approach to gain insight in a situation and identify where improvements can be made, for example in the area of preventive conservation. The most powerful aspect of risk assessment and risk management, regardless of the approach one chooses, is the fact that they bring together people with their knowledge and experience. This feature creates a joint understanding of objectives and challenges, and generates buy-in for shared decisions.

A few rules of thumb for selecting an appropriate approach:

- keep it cost-effective;
- build up in steps;
- be aware of shortcomings and biases;
- connect to existing systems and methods;
- include as many stakeholders as possible;
- communicate and engage;
- persevere and keep going.

Table 2

Various risk assessment approaches compared by time typically required to apply properly, type of outcome and suitability for situation or audience.

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