# Writing a Disaster Plan: Identifying Risk

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## Abstract

The Koninklijke Bibliotheek (KB), the National Library of the Netherlands recently developed a disaster preparedness plan for its collection. During the process, staff encountered a number of unexpected stumbling blocks and problems. For example, the creation of the new Collections Care Department forced the postponement of certain decisions. The reconstruction plans for the library's reading rooms and a new storage depot also affected the planning process. Because the solutions identified for some other problems would have been so far-reaching, management decided to defer their execution until a later phase in the process.

Risk analyses revealed that security posed one of the most significant threats to the library, in particular, minimal staff monitoring of non-library personnel who accessed the facilities. The disaster preparedness and planning process also made clear that the Collections Care Department is essential to successfully preparing for the worst. Now almost complete, the disaster preparedness plan is rich in detail that will enable the library to respond effectively in time of emergency. At the same time, the planning process made a significant step towards the implementation of a total quality management program at the KB.

## Introduction

Not so long ago disasters, in particular natural disasters, were thought to occur only in tropical climates. A tornado, hurricane, earthquake, forest fire, landslide or volcanic eruption were acts of nature that hit without warning. Today we are wiser. First of all we know that the number of natural disasters is increasing worldwide due to global climatic changes. As a consequence, nature disturbs the inhabitants of colder climate zones more frequently (Teygeler 2000). The memory of inundated villages in Central and Northern Europe is all too fresh. At the same time we understand that many so-called natural hazards are at least partly caused by human interference. As for man-made disasters, the twentieth century with its two World Wars has been tremendous destructive to our cultural heritage, and the start of the present century does not promise any improvement. The growing consciousness of the increase in disasters, be it natural or man-made, is probably the very reason why this IFLA pre-conference 2003 was organized.

## The Netherlands

In the Netherlands, a number of hazardous events triggered the discussion of disaster preparedness at a national level. Over the last five years, the Dutch had to cope with recurrent floods that overran existing dikes, a huge explosion in a fireworks factory

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that blew away a whole residential area, a blazing disco that was packed to the doors at New Year's Eve, and withal an ever-increasing number of art thefts. In reaction, a cry for more and better safety and security dominated the media--a cry that also reached the museum, library and archive world.

Today every employer in the Netherlands has to comply with the renewed Occupational Health and Safety Act (1999). Based on the 1934 Safety Act, this law helps employers prepare their own risk assessments and thus create safer and healthier working conditions. The law changes continuously and new government policies are constantly added. Because of this law all institutions of cultural heritage must have an emergency management plan. However, in 2000 the Cultural Heritage Inspectorate found that only a few national museums and galleries could claim a detailed disaster plan. The situation in the library and archive world was not much better, if not actually worse, hence the Dutch prevention pilot organized in 2003 by the Netherlands Institute for Cultural Heritage, in which the Koninklijke Bibliotheek, the National Library of the Netherlands, also participates.

## Methods of risk analysis

The term "risk" is often confused with "hazard." A high voltage power supply or a toxic chemical may present a hazard, meaning that it presents the potential for harm. A risk is the probability or chance that a particular hazard will lead to injury. In general, uncertainty about a situation can often indicate risk, which is defined as *the possibility of loss, damage, or any other undesirable event* (Goldman, 2000). Most people desire low risk, which would translate to a high probability of success, profit, or some form of gain. The first approach to 'risk' dates back nearly 350 years (Bernstein, 1998). Blaise Pascal, a Parisian who was one of the most famous mathematicians and philosophers of his time, first propounded the principles of probability in 1654. Scribbled in the manuscript of his autobiography, Pascal set forth what has come to be known as *le pari de Pascal*, or Pascal's wager (Pascal, 2003). He began by daring to ask: "God is, or he is not. Which way should we incline? Reason cannot answer." The point the philosopher (and converted) Pascal was to make was the fact that the *probability* that God is or God is not, is irrelevant.

About 50 years later, Jacob Bernoulli wrote a letter to his friend Gottfried von Leibniz, the famous German philosopher and scientist, in which he observed: "It is strange that we know the odds of throwing a seven instead of an eight with a pair of dice, but we do not know the probability that a man of 20 will outlive a man of 60." Bernoulli proposed an experiment in which he would compare a large number of pairs of men of various ages to see if he could deduce the probabilities from that evidence (Speiser, 1955). His message rings true across the centuries. You cannot escape uncertainty. No mathematical model works to perfection. Statisticians are satisfied when they can demonstrate that a model works with only a 5 percent probability. No event is without cause, so ascribing a probability to chance, or luck, is merely assigning a number to our ignorance (Bernstein, 1998).

Ever since, philosophers and businessmen alike have tried to comprehend and analyze risk. Today risk assessment is a very common tool.

Generically, risk analysis involves the identification of risk, risk assessment, risk management, and risk communication. There are a number of distinct approaches to risk analysis. These habitually break down into two types: quantitative and qualitative. Quantitative risk analysis, also called probabilistic analysis, is one of several tools that may be chosen by the decision maker when assessing risk. It employs two fundamental elements: the probability of an event occurring and the likely loss should it occur. It makes use of a single figure produced from these elements. This is calculated for an event by simply multiplying the potential loss by the probability. It is thus possible to rank events in order of risk and to make decisions based upon this.

The problems with this type of risk analysis are usually associated with the unreliability and inaccuracy of the data. There are a great number of quantifying models to assess risks, especially in engineering and related disciplines. Providing a suitable model can be constructed and its data inputs realistically quantified, this method can provide insight into problems surrounded by uncertainty. The trend in the 21st century is toward more quantitative methods (Vose, 2001). The dominance of rational models of human behavior has led to the notion that some form of quantification of variables can guarantee safety against risk. Already a long time ago, Leibniz took a dim view of the suggestion. "Nature", he wrote, "has established patterns originating in the turn of events, but only for the most part." As patterns repeat themselves only for the most part, we must use the tools of risk management – the art of survival when our forecasts of the unknown future turn out to be wrong. In reaction to this observation, some have argued that risk is not only inevitable but also valuable and that a predictable world would be the most dangerous of all.

Qualitative risk analysis is by far the most widely used approach in business risk assessment. Probability data is not required and only estimated potential loss is used. Most qualitative risk analysis methodologies make use of a number of interrelated elements like threats, vulnerabilities and controls, and put them in a highly rational model. This tool was developed largely in recognition of the rapid changing nature of many businesses.

David Vose, writing on pest risk analysis, gives an interesting third possibility: a qualitative/semi-quantitative risk analysis with a subjective scoring system. A common approach, according to Vose, is to "mix and match," using quantitative data where available and qualitative assessment where not. As there is often uncertainty in the use of subjective estimates, it is advisable to consult experts. (Vose, 2001). The Koninklijke Bibliotheek chose this third option for its risk analysis.

## The Koninklijke Bibliotheek

### Two emergency plans

In 2001 the Koninklijke Bibliotheek outsourced the development of the emergency management plan. This plan provides response and emergency procedures for the staff and visitors. A year later, library managers realized that the plan did not contain sufficient actions for the collections, so they sought advice from an outsider to "adjust" this plan for the collections housed in the Koninklijke Bibliotheek. During the process a number of unexpected stumbling blocks and problems occurred.

The first concern was to redefine the plan following the advice of the Netherlands Institute for Cultural Heritage. The existing plan was classified as *company* emergency assistance plan, and the additional plan was classified as the *collection* emergency assistance plan. In the end, the two plans were to be joined together to the final disaster preparedness plan. This would allow the staff and consultant to pay special attention to emergency procedures for the collections. Since most of the emergency plans in institutions for cultural heritage focused on people and buildings, they directed little attention to the collections, in spite of the fact that the principal task of these institutions is to protect, preserve and secure access to that heritage (Teygeler, 2001). Just the same, the Koninklijke Bibliotheek pursues a strict policy that under all circumstances people take precedence over collections.

One could wonder whether the separation of the plan into a *company* emergency assistance and a *collection* emergency assistance plan was a good idea or not. The answer is yes and no.

It is yes, because the division allowed the consultant to concentrate fully on the collection, since the company emergency assistance plan was already finished. This way the consultant could even give some time to desk research, especially on issues that urgently required clarification, such as best freezing methods, best practices in packaging procedures for freezing purposes, methods to remove soot from fire-damaged books, and means to fight the pungent odor after a fire. Furthermore, there was time to pay extra attention to damage and salvage of modern media like optical disks, magnetic audio-visual tapes and computer disks.

Last but not least, there was sufficient time to complete the emergency plan into the smallest detail. This might sound insignificant, but it was an exceptional opportunity to make contact with many members of the staff from the top floor to the vault. After a while most of the Koninklijke Bibliotheek workers knew that a collection emergency plan was being prepared. Steadily their interest and backing grew, which is, of course, essential in the success of any plan.

However, the development of separate emergency plans also had a disadvantage. Once the layout of the collection plan was established, it was necessary to draw more and more on the company plan for details. Certain crucial matters could not be prepared without the details of the company emergency plan, for which Building and Facilities, the department in charge of the safety and security of the staff, the visitors and the building, was responsible.

In retrospect, it remained a good idea to separate the two emergency plans. It left ample room to focus on the collection, the core business of any cultural heritage institution. Still, we underestimated the dependency of the two plans.

## Qualifying and quantifying risk

Risk assessment is a must for every safety officer. The first step in planning disaster preparedness is to identify the risks. As the consequences of a calamity are entirely different for the collection than for people or buildings, it was necessary to conduct an independent risk analysis for the collections. The problem was which model to adopt. For our purposes, the third model, the qualitative/semi-quantitative risk analysis, seemed to be the most appropriate. This method fit for the purpose for which it is intended: it may include numeric data, but in technical parlance it would be considered to be qualitative.

While the Koninklijke Bibliotheek is a highly modern organization, unlike the information technology business, it is not a super commercial organization that is totally dependent on its high flexibility. The changes in the library world are not that quick, and not all the risk factors are known. They vary from library to library. This made a pure qualitative analysis less suitable. On the other hand, a pure quantitative risk analysis did not fit our purposes either, since there were no statistics available. The Koninklijke Bibliotheek did not keep any record of calamities and incidents. That is why a combination of qualitative and quantitative risk analyses was chosen.

First, key personnel at the Koninklijke Bibliotheek were asked to identify the main risks, and, at the same time, to indicate the chance of an expected incident and the estimated impact (both on a scale from 1 to 5), as well as to propose ways to prevent the calamities. Multiplying chance by impact provided a concrete number that allowed a comparison of the identified risks with one another (see Figure 1). The outcome had no significance for any rational model; it merely was an opportunity to order the identified risks. To meet the criticism of subjectivity, the results were weighed against the outcome of a brief desk study on risks in cultural heritage institutions in general. There were no disturbing deviations from the general pattern.

The general "calamity" picture of the Koninklijke Bibliotheek is a very positive one. Except for a few small-scale incidents in the past and an occasional theft, the library has been spared major disasters. The building seems to function properly, the visitors are not aggressive, and the staff is alert. Still, the library is not totally without risk. The risk assessment shows first that the depots run a comparatively great risk of flooding caused by the continuous renovation activities, by hidden flaws in the building structure, by heavy storms, or by condensation from the air-conditioning system. Second, there is a general fire risk caused by illegal smoking and again by the continuous renovation activities. Third comes a medium-to-small risk of theft by library users and non-library personnel. Finally, there is a small risk of pollution with sand, dust and debris produced by the activities of our own technical maintenance staff, as well as by staff from outside the library and by malfunctions in the air-conditioning system.

| Risk analysis (example) | | | | | |
|---|---|---|---|---|---|
| **Calamity** (cause and effect) | **Chance** ( 5 – 1 )* | **Effect** ( 5 – 1) | **Total** (chance x effect) | **Prevention** | **Comments** |
| **leakage** *water damage to objects in depot* frozen water pipes when there's a sharp frost building activities from staff outside KB | 2 3 | 2 2 | 4 6 | a) isolate water pipes b) isolate building c) move pipes d) water detector e) regular control f) emergency response kit | the water pipes are directly situated below the ceiling in the depots; the books on the top shelves will suffer the most |

5 – 1  = high – low

Fig. 1: Example of Qualitative/ Quantitative Risk Analysis for KB Collections

### Flood risks

From the risk analysis and also from experience, it was clear that the main risk to the Koninklijke Bibliotheek is flooding.  The causes can differ widely: a leaking glass pyramid in the ceiling, an ill-closed fire hose, a hidden crack in the outer wall of the underground depot, or condensation of the air-conditioning system. Some of these problems have to do with the construction of the building and others with neglect. As recurrent or hidden structural faults are difficult to tackle, management decided to increase the monitoring system in the most vulnerable depots by installing extra water detectors and more closely controlling temperature and relative humidity.  As an inundation often occurs during non-office hours and is not discovered until the next morning, an adjustment in the surveillance schedule of the security guards is under consideration.

To be better prepared for a flood, the majority of the items that compose our disaster bin (or emergency response kit) now consists of equipment and materials to counter or absorb water and to prevent the collection from getting wet.  Neglect is dealt with by raising employee awareness and increasing formal responsibility for all personnel, both insiders and outsiders.

### Fire risks

Every room in the Koninklijke Bibliotheek is fitted out with smoke detectors, and regular fire drills are held.  Nonetheless, the Koninklijke Bibliotheek runs a medium fire risk.  The biggest potential danger is the ineradicable smoking habit.  A few decades ago, the Dutch government started an anti-smoking campaign. Today smoking is prohibited in public buildings.  In private buildings, separate smoking areas are required.  The Koninklijke Bibliotheek follows a strict no smoking policy.  The whole building is off limits to smokers except for the two designated areas.  Even so, a number of cigarette butts have been found in the repositories, the toilets, private offices and the hallways. Needless to say, smoking is a serious fire threat.  Because we suspect that the illegal smokers are for the most part outside workers, special attention will be given to the strict smoking policy in all new contracts. Those contracts will also reflect the potential fire hazard of reconstruction activities.  Plumbers, welders, electricians and other workmen must always carry their own fire extinguishers on the job.

Another problem is the illegal use of often-insecure household appliances. Some employees are very persistent in making their own hot drinks and do not realize that these machines easily short-circuit and thus can cause a fire. This issue is approached by raising awareness and making clear that all employees bear responsibility for disaster prevention. A stricter monitoring system of the depots will, of course, also reduce the fire risk.

### *Theft*

In general, theft is not a major problem at the Koninklijke Bibliotheek. Nevertheless, the library is occasionally subject to visits of often international operating thieves, who apply highly sophisticated techniques to illegally acquire some of our treasures. The Koninklijke Bibliotheek is seldom confronted with staff members who steal. To counter the undesirable visits requires a number of steps. Most of them concern the Special Collections Department. Access to the reading room has been slightly rerouted, a closed circuit security system has been installed, and access to the vault has become even more restricted. To prevent theft of illustrated single pages, a precision scale has been introduced that can register the slightest change in weight of a book. Other security measures will be introduced during the reconstruction of the reading room of the Special Collections Department and the new Exposition Hall. The library has hired a security expert to look over the reconstruction plans.

### *Pollution*

In such a large building as the Koninklijke Bibliotheek-complex, which also houses several other institutes, the library's technical staff and those from the outside are always repairing or constructing something. In practice, cleaning rules are not strictly followed. It is not a serious problem, but there is room for improvement. Awareness training is needed for the library's own maintenance crew, who must be shown over and over again the negative effects of debris that attracts all kinds of insects and rodents. Tight housekeeping rules will be added to new maintenance contracts.

Every now and then the heating, ventilating, and air-condition (HVAC) system seems to leave a slight layer of black powder on a small area around certain outlet points. As the cause is unknown, extra monitoring is suggested for the time being. The installation of a whole new set of filters for the planned high-rise depot is presently under consideration.

### *Monitoring*

The most striking result from the risk analysis is the fact that almost all the threats are in some way or other caused by security, in particular, minimal monitoring of non-library personnel who access the facilities. As the depots are in constant need of engineering, frequently outside technical staff must enter the depots. Yet, the library did not follow a clear course of action. There was no standard requirement that non-library employees be accompanied, even in the high security depot. Outsiders were not required to sign a code of conduct before starting jobs at the library, nor was such a clause built into their contracts. A complicating factor is that some of the high-tech tasks are outsourced, and these companies send their staff on secondment to the Koninklijke Bibliotheek. They familiarize themselves with the building and the workers and, as a result, often consider themselves part of the library staff. The same goes for the private security service. The risk assessment clearly demonstrates that monitoring non-library workers is not only a security problem, it is also an important safety problem. In short, monitoring greatly contributes to the library's flood and fire safety. Yet that is easier said than done.

At present, the Koninklijke Bibliotheek faces a period of heavy building pressure: a new reading room for the special collections section, a new exposition hall, continuous work on the HVAC-system, groundwork for the new high-rise depot and groundwork for new construction in the neighbouring National Archives. For the ongoing work, contracts cannot be changed.

Neither is it the right moment to introduce a new monitoring system with everybody constantly running around and just about to collapse under his or her workload. The monitoring system has to be carefully planned. From that moment on, all new contracts with non-library personnel will include clear-cut guidelines on the behavior of contractors and service providers, and all outside personnel will be monitored. Already the days are over when someone in the library is trusted on his good looks only.

### *Discipline*

Another cause for concern is the undisciplined behavior of the in-house staff. Risk analysis unmistakably shows that the Koninklijke Bibliotheek workers themselves constitute a potential fire and flood risk. Illegal smoking, undesirable consumption of foodstuff (including the use of rickety household machines), and unadvisable houseplants have been detected. Overzealous employees buy their lunch at the cafeteria but consume their meals in their offices and forget to return the dishes, thus attracting insects and rodents. In one repository a refrigerator was discovered. It seemed that a small department makes their own lunch, and, as they did not have room for a fridge, they found a depot employee willing to help them out. Others feel so much at home at the library that they turn their (second) home into their castle, decorating the place with all kinds of plant life. They do not comprehend that they disrupt the pest management policy.

Fortunately, eating, drinking and smoking on the shop floor have not become an established practice. Yet measures are necessary to show personnel the consequences on the collections of their risky behavior. It is necessary to raise their awareness at the beginning of their careers. Therefore, all new employees will now receive a new code of conduct stressing hygiene and good housekeeping in their orientation packages.

## Writing disaster, taking a risk

In commencing to write a disaster preparedness plan, one undoubtedly will meet with many unexpected problems. At the start it often looks as if nothing is right anymore, and the whole organization needs to change drastically. Naturally this is a general phenomenon for all change processes. Still, the process of writing an emergency plan can be become a risky business in itself. There is always the danger of losing oneself in the many proposed alterations and forgetting the fact that any change must be taken step-by-step.

Some of the problems encountered in the process could not be solved immediately. For example, should the plan also include the digital collections? If so, should it take both hardware and software into consideration? Should it be the main focus of the continuity plan?

The Koninklijke Bibliotheek's computer-based library lending system works fine. Yet the shelf register does not allow searchers to trace a specific title to its exact spot of the bookshelf; it is not that explicit. If an emergency evacuation of the repository occurred, a more specific list would certainly help speed the process. But should we invest a great deal of money to adjust a very complicated software program, or should we accept this limitation?

One result of the recent reorganization of the library was the creation of the Collection Care Department. Up to that time the Building and Facilities Department assumed the responsibility for the contingency plan. But with the new Collection Care Department this situation changed. At the beginning of the planning process, the division of responsibilities, competences and authorities between the two departments had not taken their final shape. This affected the planning process, since some decisions had to be postponed. At the same time, it was evident that both departments would be indispensable to the success of the disaster preparedness plan.

A vital part of any disaster response plan is the initial and continuing survey of the library facility, service areas and collections. The audit or survey is necessary because it provides an overall view of conditions governing the safety and long-term preservation of the collection.

Often, action taken as a result of this survey may actually prevent a disaster from occurring. Yet how ambitious should the survey be and where does a quality management program commence? Whatever the case may be, the disaster preparedness plan is a significant step toward a total quality management program.

These problems were discussed at length at different levels in the organization. Some of the problems could be solved, others have been postponed for later resolution. In a rapidly changing society, preparation for the worst is never finished nor is a disaster response plan ever completed.

## Closing remarks

Disaster strikes anytime, anywhere. It is not subject to time and does not know any boundaries. Disasters must be managed in order to control them, or at least mitigate the effects, and risk management is a vital part in that process. However, life is not without risk. Our cultural heritage will likewise always be exposed to some form of danger, be it small or big. The only thing that can be done is to prepare for the worst and plan for the best. It should be realized that each collection, each building, and each situation is unique and that every institute has to prepare for disasters with its own unique plan.

The Koninklijke Bibliotheek put a lot of effort and resources into the development of a sound disaster response plan. It is rich in detail and will enable the library to respond effectively in time of emergency. Today, the Dutch national treasures housed in the vaults of the Koninklijke Bibliotheek are better protected than ever before.

## References

Bernstein, P. 1998. Risk at the roots. *Balance Sheet* 7(1):18-20.

Goldman, L.: Crystal Ball professional introductory tutorial. In: *Proceedings of the 2002 Winter Simulation Conference,* edited by E.Yűcescan, C.-H. Chen, J.L.Snowden and J.M.Charnes. 2002

MacLeod, A, Baker, RHA, 2002 (*unpublished*). Describing scores used in the EPPO Pest risk assessment scheme: Descriptions of scores for Entry and Establishment.

Pascal, B. 2003. *Pensées*, translated by W. F. Trotter. Mineola, N.Y.: Dover Publications.

Speiser, D. (ed.), 1955. *Der Briefwechsel von Johann I. Bernoulli.* Basel, Berlin: Birkhäuser.

Teygeler, R. 2001. *Preservation of archives in tropical climates. An an annotated bibliography.* Paris, The Hague, Jakarta: International Council on Archives, National Archives of the Netherlands, National Archives of the Republic of Indonesia.

Vose, D. 2001. *Risk analysis: a quantitative guide.* 2nd ed. Chichester: Wiley & Sons.

## Author

René Teygeler (1950) started his academic career in 1970 with his study in Sociology and Social Psychology at Utrecht University. As he developed a taste for books he started studying bookbinding. He was teaching bookbinding and graphic techniques at the Amsterdam School of Printing since 1988. In 1993 he finished his education as a book and paper conservator at the State School for Conservators, a year after he was appointed as a conservator at the Koninklijke Bibliotheek. His interests soon took him to preservation cultures outside Europe and that is one of the reasons he continued his academic training in Anthropology at Leiden University, for which he obtained an honorary degree in 1996. After a research position at the Department of Languages and Cultures of Southeast Asia and Oceania, Leiden University, he started his consultancy firm. Since he advised numerous preservation projects in the Netherlands and abroad. Among his clients are various national institutions of cultural heritage in Europe, Asia and the Middle East. René is an active member of many professional bodies and the author of over 20 publications.