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Risk Carriers- The risk faced by hand held media

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Overview

- **Risk carrier**
Definition
2007
2008
- **Risk assessment**
Background
Components
Key findings
- **Policy and Handling (briefly)**
Policy development
Training
- **Active Preservation (briefly)**
Content stabilisation

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This paper and presentation will cover a number of topics all relating to physical carriers and the risk they face for collection management experts. The paper will cover four sections relating to the recent and continuing work that is being done by the British Library's Digital Preservation Team. The first section is an introduction to the term risk carrier and what it means to the British Library. The second section is the risk assessment and is the most important part of this paper and focuses on the approach taken and the results given. The third and fourth section is future work, where I will outline to you how we propose to deal with the situation identified within the risk assessment and how the digital preservation team's content stabilisation work has already started to address the risk faced by carriers. This involves bit-stream preservation, data mining, metadata and content stabilisation work.

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Risk Carrier- definitions

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graph TD
    Customer[Customer] --> CompanyA[Company A]
    CompanyA --> CompanyB[Company B]
    CompanyB --> RiskCarrier[Risk Carrier: Documentation information management]
    RiskManagement{Risk Management} --- CompanyA
    RiskManagement --- CompanyB
    
```

risk n.

1. The possibility of suffering harm or loss; danger.
2. A factor, thing, element, or course involving uncertain danger; a hazard.

carrier n.

1. One, such as a person, business, or organization,
2. A mechanism or device by which something is conveyed or conducted.

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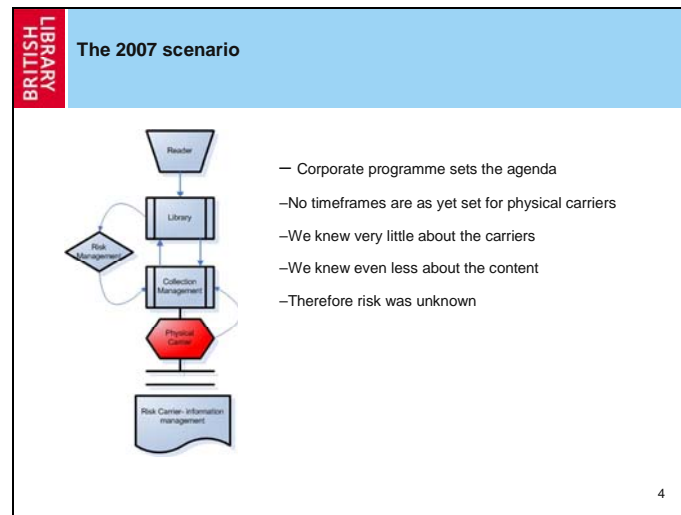
The term “risk carrier” has been chosen deliberately for this paper. The term is used in business risk management and means to move the risk from one place to another once the limit of the risk has been reached by the owner of the business. This excess risk is then monitored by a third party (generally an insurer). For example a manufacturing company’s ability to absorb risk is set

by its capital limit, once the manufacturer's risk level meets or exceeds that limit it must be transferred to a specialist insurance risk carrier.

To take the analogy into the Library world, I believe that collection experts in preservation and conservation fulfil the role of the insurer between the Public and the Library and as such the term covers not only the hand-held carrier itself, but also the people involved in carrying the risk.

In order for risk carriers to work effectively they must have all the required information, an insurer would not take on all the risk of another's unless it was presented with all the documentation relating to, level of risk, cost, value, mitigation. Yet as librarians and information professionals we do exactly that every day when we transfer the digital information onto a carrier, or take receipt of a carrier into our collections.

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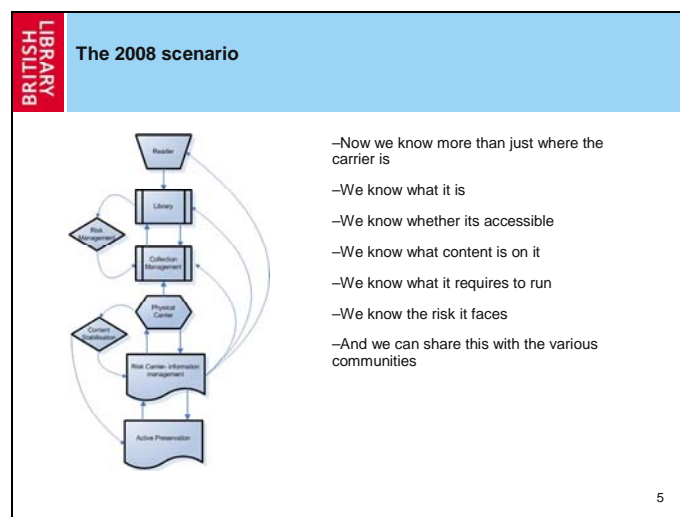


The background to the risk assessment is as follows- The British Library (BL) Digital Object Management System (DOM) and digital library is only capable of dealing with a certain number of projects and digital objects at any given time. These projects are decided by the programme board and are driven by the wider corporate programmes such as archiving of e-journals, Newspapers, Websites or sound. As such it was identified by the Digital

Preservation Team (DPT) that a significant number of handheld carriers within the BL collections may be at increased risk of obsolescence or decay due to the increased time they spend on these handheld carriers. The DPT agreed that an assessment should be undertaken to identify and address these risks.

The first thing that was obvious was we did not know anything about the carriers. This is identified by the red box in the diagram within this slide. The parallel lines indicate that no information was available to the reader, the library or more importantly the collection management staff. You will see from the arrow that some information was coming from the carrier to collection management but this was only information that the carrier existed either through the catalogue or holdings record. It did not include key information such as technical requirements, available metadata or preservation information. As you can see in the diagram Risk Management is operating at this point and as the process had started the interaction between the Library curatorial management and the collection management was starting to happen, the risk assessment was being scoped and communication plans were being started. This was phase one of the operation but the requirement was to get much more information to take the assessment to a deeper level of understanding.

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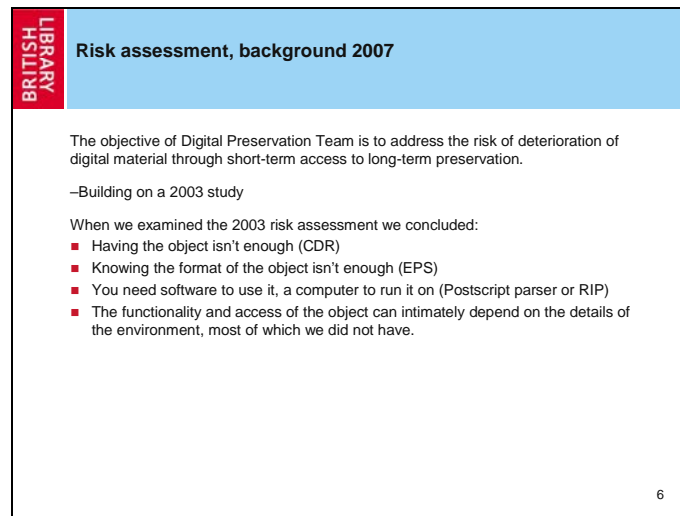


After the risk assessment concluded we can say that we achieved this deeper level and know a lot more than we did at the start. Now as well as the carriers location the risk assessment has opened up many different areas of information management and digital preservation assessment. You can see from the diagram on this slide that information is now available to readers, library staff and collection management staff. This information is available through enhanced or updated cataloguing information, or through the risk assessment procedures itself which has documented and shared the results. The risk assessment has opened up new information about software and hardware dependencies that now mean that the preservation and risk mitigation work can begin. This in turn leads us to start our active preservation initiatives, what know what we have to do with this material and we now know more about the material which might change our approach to it. Most importantly we know how at risk it is.

The Risk Assessment concluded that the BL's digital collections face an array of risks that will require action on a number of fronts. Almost all of the physical carrier collections were assessed to be at high risk.

The greatest and most imminent threat of loss is from media degradation. Failure rates for discs within the collections have reached unacceptably high levels (**up to 3%**). This new information as shown in the diagram has opened up a lot more information to all parts of the information chain and has allowed informed action to start to happen.

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Risk assessment, background 2007

The objective of Digital Preservation Team is to address the risk of deterioration of digital material through short-term access to long-term preservation.

–Building on a 2003 study

When we examined the 2003 risk assessment we concluded:

- Having the object isn't enough (CDR)
- Knowing the format of the object isn't enough (EPS)
- You need software to use it, a computer to run it on (Postscript parser or RIP)
- The functionality and access of the object can intimately depend on the details of the environment, most of which we did not have.

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The digital preservation team has a remit to secure all of the BL's digital content, so as well as the broad corporate programmes I mentioned in the introduction we must also have an awareness of what is going on within the collections. In 2003 a risk assessment had been done at the BL and it had gone some way towards identifying the types of carrier that the BL had. However as stated did not know fully what was on the carrier in question. So for example we know that we have a CDR because there is a record saying so, but we do not know what the format of the files is on it. So in this risk assessment we interrogated the disk content to discover this, additionally we documented information about the required software or hardware to run the programme or open the file.

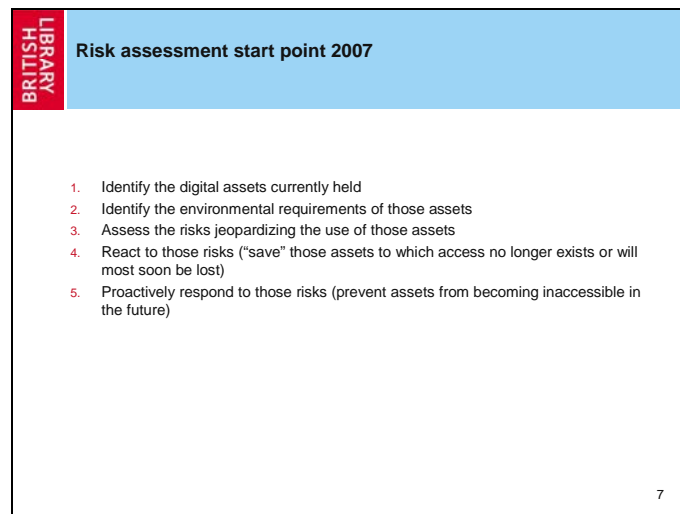
The DPT conducted the risk assessment exercise in order to assess the condition of the BL digital collections, identify strategies to mitigate those risks, and recommend and plan actions to be taken. The risk assessment methodology is based on the AS/NZS 4360:2004 standard and was applied in a representative manner across these collections.

We found substantial quantities of digital objects are stored as single copies only, on handheld media in danger of decay. This stark warning was illustrated by many examples of disc decay that have been encountered and

is backed up by the considerable evidence from our research into handheld media lifetimes. We have found pockets of the collections where the fail rate is much higher than thought, in some cases over 5% of the sample.

Digital content will continue to be lost unless action is taken now. The final report made a number of specific recommendations to mitigate the highest risks facing the BL's digital collections.

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Risk assessment start point 2007

1. Identify the digital assets currently held
2. Identify the environmental requirements of those assets
3. Assess the risks jeopardizing the use of those assets
4. React to those risks ("save" those assets to which access no longer exists or will most soon be lost)
5. Proactively respond to those risks (prevent assets from becoming inaccessible in the future)

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The process of starting the risk assessment is best summed up as follows.

The digital preservation team set out to identify the digital assets that we currently had, this involved interviewing staff within the collections and organising a questionnaire to be filled in giving us in as much detail as possible by collection area.

From here the dpt were able to identify the environmental risks, both physical environment and digital environment, the dpt has staff with skills in both collection management and Information technology which means we were able to make assessments of risk based upon climate control just as easily as technical obsolescence.

An assessment was then carried out to identify risks and how these would affect the physical carriers that had been identified, there were 23 identifiable risk which were broken into six main sections.

From this assessment we have now been react to these risks and have already begun to respond in a variety of manners to reduce the risk faced by these objects.

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Risk assessment 2007

Physical media deterioration:

- The lifetimes of physical media can be measured in years (or even months, e.g. recordable CD/DVD)
- Unlike books which can be kept for centuries in the right conditions

Technical obsolescence:

- 3.5" floppy disk drives used to be ubiquitous, now only a few have them

File format obsolescence:

- Keeping the bit stream isn't enough; we need to understand it
- Many file formats are undocumented; we can't understand the files, and need the software
- Software gets abandoned (who uses WordStar any more?) and new versions can be incompatible with old files

Environmental obsolescence:

- Keeping the software isn't enough; we need to run it
- But old hardware doesn't work, or isn't available

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Physical media deterioration is the single biggest risk faced by our digital carriers, the lifetimes of these can be measured in years only and already we are seeing serious signs of decay.

Other risk factors such as technical obsolescence were encountered however we do not find vast amounts of these. They tended to be in some of our legal deposit collections from the 1980's but were more likely to warrant individual research into them rather than wholesale solutions to our immediate problems.

File format obsolescence was again a risk but in our investigations we found that much of the content was uniform and of a low risk. We do not hold scientific or database information in significant enough quantities to be considered high risk. By far the vast majority of files were in standard formats such as TIF and PDF

Environmental obsolescence, in this case computing environment was again considered and although we did find files and software requiring older systems we felt suitably confident that if removed from the carrier that we

could stabilize this. This has been the trigger for our content stabilization work which will secure the greatest volume of material at risk.

Putting all this information together the conclusion was that the physical carrier was the most at risk, and that if we could not access the carrier then all other risks were made redundant. This somewhat obvious but crucial fact has allowed us to focus our preservation efforts in the right place.

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Risk assessment 2007

From this holdings list, we have performed a risk assessment to:

- Enumerate the risks faced
- Evaluate the likelihood and impact of each risk
- Rank holdings according to risk
- Perform risk-based triage on holdings

And longer term, from the assessment and ranking we will:

- Prioritise ingest into DOM
- Write preservation plans and take preservation actions to target the highest-risk material
 - Possibly Migrate it to less risky file formats
 - Preserve software environments (emulators etc.)
- Guide future ingest
 - Determine a set of preferred long-term preservation formats

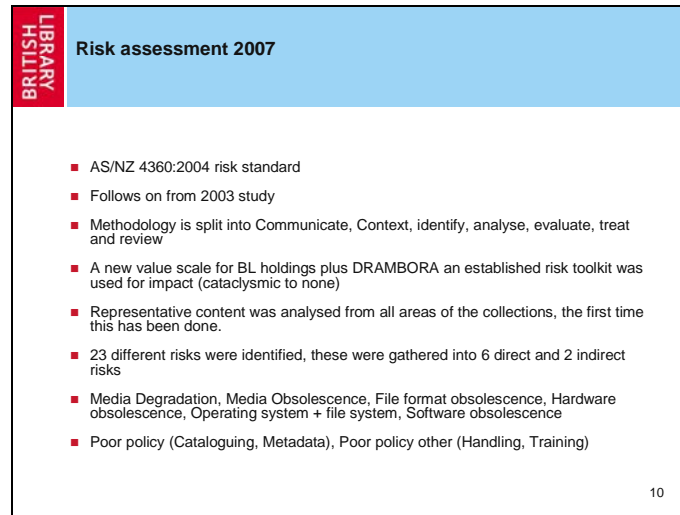
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It is only at this point that the risk assessment could really start. From the holdings list of carriers, content and environment we have been able to give a number to the risks and evaluate how likely it is that this will happen, for example how likely is it that a CDROM with an e-book comprising of PDF's is going to become obsolete? From this we have been able to start to perform a triage or first aid on the most at risk objects.

Longer term this work will feed into many different policies and strategies, these could be organizational plans or preservation plans and actions depending upon the requirements. Follow-up work from the risk assessment also includes a handling policy for all electronic content so it is handled consistently. This work is already guiding future ingest into our digital library

programme and has helped prioritize digitised newspapers as the next major content stream.

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Risk assessment 2007

- AS/NZ 4360:2004 risk standard
- Follows on from 2003 study
- Methodology is split into Communicate, Context, identify, analyse, evaluate, treat and review
- A new value scale for BL holdings plus DRAMBORA an established risk toolkit was used for impact (cataclysmic to none)
- Representative content was analysed from all areas of the collections, the first time this has been done.
- 23 different risks were identified, these were gathered into 6 direct and 2 indirect risks
- Media Degradation, Media Obsolescence, File format obsolescence, Hardware obsolescence, Operating system + file system, Software obsolescence
- Poor policy (Cataloguing, Metadata), Poor policy other (Handling, Training)

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The components of the risk assessment are based upon an existing business standard. This standard was used partly because the 2003 study had previously used it (which gave us a comparison and follow-up research) but also because it did seem to offer a broad enough definition in order for this to be applicable for hand-held carriers. The methodology allowed us the scope of tying the assessment to our library wide strategies and legal deposit responsibilities but also allowed us the ability to be able to introduce specific terms and definitions that were meaningful.

The methodology is split into seven separate sections; these are communication, context, identification, analysis, evaluation, treatment and review. This practical approach follows a linear path and the team found it fairly straightforward to use to capture all meaningful information regarding the carriers.

Although the standard was broad enough for us, and even with this good practical approach there was still the need to fill some gaps in the analysis.

The concept of value was used by the standard and for business and for those involved in insurance risk, this is quite straightforward, something has a value in currency. The value can vary over time but this is a well known calculation to those involved. For hand-held carriers within a library this is not easy. As with any collection, value is in the eye of the beholder and can be measured in many different ways, cultural, research, commercial for example, so the dpt had to devise a value scale based upon collection management criteria which was used to differentiate collection content.

As well as value, the analysis section of the standard was an area where we felt it did not quite match our needs, so after some research we decided that the DRAMBORA impact scale would be used to help us measure the risks that we found. The DRAMBORA scale devised in the DRAMBORA methodology is a toolkit and process for the risk assessment of digital repositories; although the process as a whole is not applicable to this assessment, the impact scale proved to be useful, and given that its primary aim is the analysis of digital repositories this gave us confidence in the results.

Content was then collected from all collection areas of the British Library, the study looked at representative content from Maps, Manuscripts, Music, Language and Science areas of the Library, each area had digital content either on HDD or CD/DVD and in most cases there was no common way in which the content was handled or used. This has become a key part of our follow up work and is another reason for taking this risk based approach.

23 different risks were identified by analyzing this representative sample. Many of the risks related Degradation (chemical instability of recording layer's causing deterioration of recording or mechanical failure) or obsolescence (The medium becomes inaccessible due to shifts in technology rendering it obsolete) so it was possible to place the 23 risks into 6 direct and 2 indirect risk categories. These were

Direct

Media Degradation

Media obsolescence
File format obsolescence
Hardware obsolescence
Operating system and file system obsolescence
Software obsolescence

We felt that these 6 areas contributed directly to the high risk faced by hand held carriers

Indirect
Poor Policy (cataloguing, metadata)
Poor Policy other (training and handling)

We felt that these two areas, although important, did not in themselves create a direct risk to the hand-held media.

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BRITISH LIBRARY **Definitions - Risk assessment 2007**

The AS/NZS 4360:2004 Risk Management standard defines a seven-step approach to risk management:

Communicate and consult
Communicate and consult with internal and external stakeholders as appropriate at each stage of the risk management process and concerning the process as a whole.

Establish the context
Stakeholders are identified, and the objectives of the stakeholders and the organization as a whole are established.

Identify the risks.
In this stage, the risks—that is, *what can go wrong*—are enumerated and described. We used a combination of industry analysis and real life scenarios.

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The methodology is split into 7 separate sections. For each section we followed the standard's definition, but also captured our own to illustrate what we intended to do.

1 Communicate and consult

Standard def. Communicate and consult with internal and external stakeholders as appropriate at each stage of the risk management process and concerning the process as a whole.

DPT def. Conduct meetings with Head of department to explain our requirements. Communicate with the entire library via internal media to raise awareness of the issues and this exercise.

2 Establish the context

Standard def. This step sets the scene for the analysis. Stakeholders are identified, and the objectives of the stakeholders and the organization as a whole are established. If possible, measurement criteria are established so that the impact risk has on these objectives can be determined.


DPT def. Establish contact with the key personnel, explain the development of digital preservation techniques and the importance of good collection management of hand-held carriers. Tie our requirements to the Legal deposit act 2003 and the British Library's strategy.

3 Identify the risks.

Standard def. In this stage, the risks—that is, *what can go wrong*—are enumerated and described.

DPT def. Identify the risks faced by hand-held carriers within the British Library. Use industry analysis as well as analysis of the hand-held objects that will be used in the assessment (this information has come from context interviews)

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Definitions - Risk assessment 2007

Analyse the risks
This step covers the evaluation of the impact of the risks, and the likelihood of those risks. The evaluation may be qualitative or quantitative

Evaluate the analysis
At this stage, negligible risks might be discarded (to simplify analysis), and evaluations (especially qualitative evaluations) adjusted.

Treat the risks
The options to address the risks are identified, the best option chosen, and implemented. This may include "taking no action" if no risk is sufficient.
This step was felt beyond the remit of this assessment project.

Monitor and review
It is necessary to monitor the effectiveness of all steps of the risk management process. This is important for continuous improvement. Risks and the effectiveness of treatment measures need to be monitored to ensure changing circumstances do not alter priorities.

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4 Analyze the risks

Standard def. This step covers the evaluation of the impact of the risks, and the likelihood of those risks. The evaluation may be qualitative or quantitative or some combination of the two.

DPT def. Utilize both qualitative (an event may be "likely", "unlikely", "inevitable", etc.) and quantitative analysis ("a hard drive failure will occur on average once every 100,000 operational hours") dependant upon the risk being measured.

5 Evaluate the analysis

Standard def. At this stage, negligible risks might be discarded (to simplify analysis), and evaluations (especially qualitative evaluations) adjusted. The risks are compared to the objectives of the organization, allowing a ranked list of risks to be constructed.

DPT def. Discard negligible risks based upon the requirements of the British Libraries obligation to the material i.e. If the content within the Hand-held carrier is not owned or is unlikely to be part of the BL collections, rank lower based upon evaluation.

6 Treat the risks

Standard def. The options to address the risks are identified, the best option chosen, and implemented. This may include “taking no action” if no risk is sufficient.

DPT def. This step is beyond the remit of the assessment project, so the risk analysis portion of the work will be restricted to the previous steps.

*However the completion of the risk assessment has triggered a response from the digital library programme at the BL which has resulted in the establishment of a content stabilization area for hand-held media.

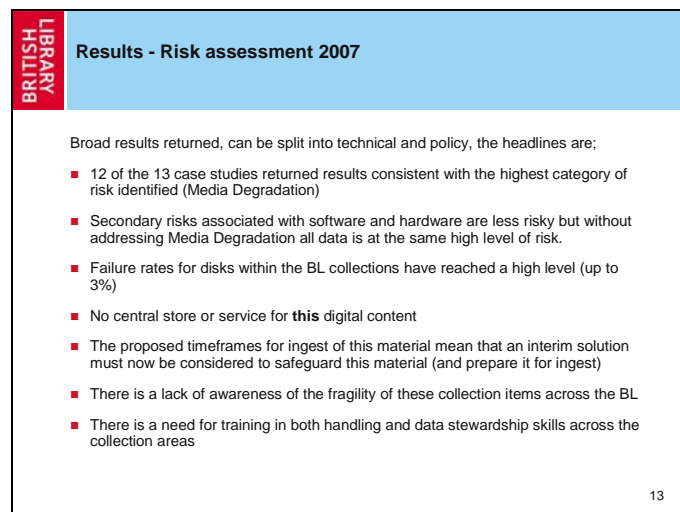
7 Monitor and review

Standard def. It is necessary to monitor the effectiveness of all steps of the risk management process. This is important for continuous improvement.

Risks and the effectiveness of treatment measures need to be monitored to ensure changing circumstances do not alter priorities.

DPT def. We will look to a Monitor, review and continuous improvement approach, we will manage the risks identified at 12 month intervals with a 24 month major review period. Risks identified as increasing within the period will be prioritized over those that have remained constant or reduced.

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Results - Risk assessment 2007

Broad results returned, can be split into technical and policy, the headlines are;

- 12 of the 13 case studies returned results consistent with the highest category of risk identified (Media Degradation)
- Secondary risks associated with software and hardware are less risky but without addressing Media Degradation all data is at the same high level of risk.
- Failure rates for disks within the BL collections have reached a high level (up to 3%)
- No central store or service for **this** digital content
- The proposed timeframes for ingest of this material mean that an interim solution must now be considered to safeguard this material (and prepare it for ingest)
- There is a lack of awareness of the fragility of these collection items across the BL
- There is a need for training in both handling and data stewardship skills across the collection areas

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The risk assessment has indicated that media degradation is our single biggest issue for hand held carriers, as I said at the start of this paper risk assessment is as much about knowledge management as it is about the carriers themselves. By conducting this research we know so much more about the content of the collection, but it's the carrier itself which place the biggest risk on future preservation or access. There are many secondary risks such as hardware and software dependencies but is the carrier we must address first.

Fail rates for this material are unacceptably high, and although in many cases the BL has some sort of back-up (paper or digital), this is not always the case so these carriers need to be cared for immediately. The corporate digital library will eventually take this material directly into its store, but while it cannot it is up to digital preservation to monitor and act on the information we now have, the flow of information has begun.

The lack of awareness of fragility and the needs for training have also been identified as just as important as any back-up or migration procedures, without this knowledge in the right people we stand a greater chance of losing information in the short to medium term and so a series of training initiatives is also underway.

The following table lists the risks and the risk rankings and the British Library digital preservation value system.

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Risk ranking - Risk assessment 2007

Risk ranking	Risk	Access type jeopardized
8	Media degradation	Bit-stream
7	Media obsolescence	
6	File format obsolescence	File/Semantic
5	Hardware obsolescence	
4	Operating system + file system obsolescence	
3	Software obsolescence	
2	Poor policy (improper cataloguing, metadata)	Semantic
1	Poor policy (other)	Semantic/File/Bit-stream

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Risk Ranking has been determined during the risk identification phase and then enumerated by using the impact scale. The higher the number the greater the significance to The British Library.

The risk categories are an amalgamation of the 23 separate risks identified placed into 8 sections.

Access type jeopardized is based upon Ensuring the long-term accessibility of digital assets is the goal of the Digital Preservation Team. There are a number of tiers of accessibility, with each higher tier dependent on the lower tiers.

Specifically:

Bit-stream preservation: The raw sequence of bits stored on a digital medium must be readable. This requires safeguarding of digital media and/or migration to more robust media as necessary.

File preservation: The bits must be interpretable as a usable digital object; this means developing or preserving suitable software/hardware to open the file, or performing migrations on the file, or some combination thereof.

Semantic preservation: The files themselves typically constitute part of a greater whole (for example, each file may represent a scanned page of a book), and to be given meaning (for example, "this is page X of book Y") requires the creation and preservation of suitable metadata. Similarly, suitable

metadata must exist to allow retrieval and discovery of the objects in the first place.

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Value - Risk assessment 2007

BL digital preservation value system

- Our obligation to preserve the material
- Estimates of the cost/effort to mitigate the risks
- Estimates of the resource available to the Digital Preservation Team
- Estimates of the cultural significance and value of the collection
- The commercial significance and value of the collection
- The need for further analysis of the collection to inform future preservation activities
- Reader and researcher needs
- Interest and demand

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As well as risk ranking it was necessary to add a value to this material by creating a scale that was meaningful to the digital preservation team. It is important to point out that this is not a scale that is used by the entire library, it is only relevant to our own work. No one criteria carries any more weight than the others although our obligation to preserve the material was the starting point for the analysis of all the hand-held carriers that we encountered. Beyond this we tried to use a good cross section of terms that were relevant and meaningful to anyone who might take an interest in this study. Over the course of two days the digital preservation team used this scale to finalize the priorities for preservation action. The following table indicates the final positioning for the major at risk collections based upon risk, value and impact.

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Risk assessment- Final Prioritisation

Priority for action	Collection
1	SDM
	Endangered Archives
	Newspapers
	Modern British/Legal Deposit
2	Maps
	e-manuscripts
	STM
	European/APAC
	Photography
	Sound ASR project
	IDP
	Music
3	Web Archiving
	VDEP
	Sound Archive (in DOM)

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The terms used in this diagram are specific to the British Library, obviously there are some broad terms which we are all familiar with such as Newspapers and Music. However there are also some more specific terms such as Endangered Archives (a UNESCO funded project) and VDEP a voluntary deposit scheme for electronic publications. However I have added the list here to show that our approach was able to distinguish between many projects of very similar technical challenges in an objective manner. I have provided two tables of technical information from the priority one collections here, but further information on the technical components is all available from the link provided at the end of this paper.

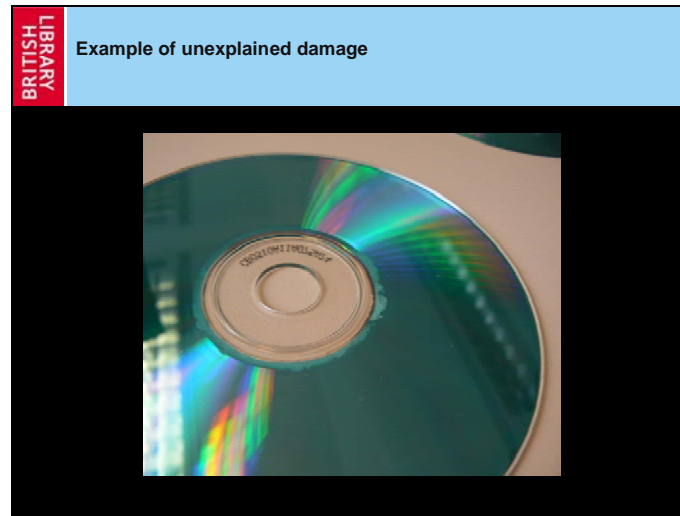
Endangered Archives

Analysis	Detail
Media carrier:	CD-Rom, DVD, HDD
Size of archive:	Archive size 3-4 TB
File formats:	File formats- TIFF, RAW, PDF, video format/s, audio format/s, and possibly other such as excel spreadsheets and word documents.
Software dependencies:	Excel spreadsheets contain key project data.
Hardware dependencies:	British Library standard 2007 image PC is adequate
Technology Themes:	Lack of a central store for this data to be moved to (as it is catalogued).
Collection Themes:	Cataloguing and control is high quality but again the danger of staff leaving could pose future risks.
Future Preservation activity:	Deeper analysis of the content required (formats, relationships etc.). Prioritisation of the archive in anticipation of it moving into an online managed store. Some work to do for the preservation team on database preservation.

Storage of Digitised masters

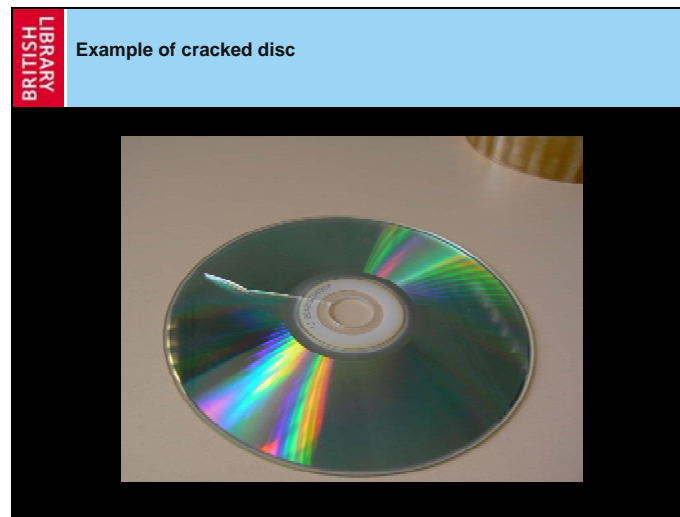
Analysis	Detail
Media carrier:	Mainly DVD, some CD, DLT, and LTO tape.
Size of archive:	No. of DVD-Rs burned = 1,670 No. of master files burned to DVD-R = 65,550 Volume of master files burned to DVD-R = 3,640 GB (not IDP) Total 23TB
File formats:	Image files, TIFF and JPG also PDF. Metadata in a number of types and quality.
Software dependencies:	None
Hardware dependencies:	British Library standard 2007 image PC is adequate LTO drives are available but perhaps not in enough numbers
Technology Themes:	Media reliability- DVD have only one copy and are already starting to fail.
Collection Themes:	Valuable collection but no clear owners, Content stream owners need to pick this up.
Future Preservation activity:	Data needs to move from DVD to an online store asap. This is a high value collection of projects. Deeper analysis required of formats and relationships to metadata objects.

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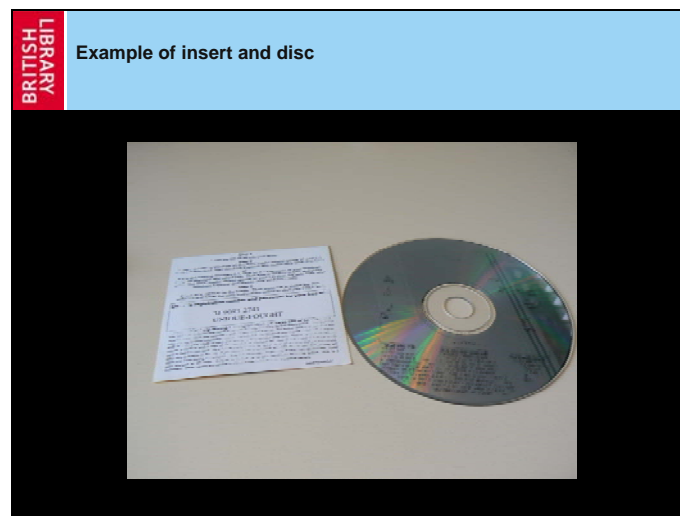
The following three pictures are of degradation that has been identified within the collection areas. This first example is of damage near the centre of the disc. Many different examples of this type of damage were encountered; a further study by our modern materials team within conservation will be doing analysis on this type of damage.

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This second example is of a cracked disc, it was within a carrier yet the carrier did not show signs of stress, it is possible this was damaged in transit or through usage.

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The third example is of disc plus insert in close contact, we found quite a few of these types of disc particularly from the period of time during the early to mid 1990's where free access to internet was provided via a coupon within the disc.

BRITISH LIBRARY Policy and handling 2008


- DPT needs to create and implement a policy that deals with all digital content consistently
 - **This reduces the variations seen in how digital material is cared for**
- BL needs to move from at-risk physical media to online hard disk-based managed storage.
 - **This addresses media deterioration, physical damage, environmental damage, and media obsolescence, and is believed to be the best long-term storage mechanism option available**
 - **This also enhances manageability of the digital collection**
- Where migration to hard disk is not immediately possible, move to climate controlled (etc.) storage to ensure that the physical media last as long as possible (and back-up)
 - **This reduces the problems due to media deterioration, physical damage, and environmental damage**

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So in summary, the risk assessment is not something that you start unless you mean to continue each year. It can be used to give you a snapshot of the type of carriers that you have, but it cannot be used to predict the future. The variations of risk from environmental, handling/usage and technical mean that the assessment must be continuously reviewed. To do this the DPT have evolved a series of initiatives. We are writing policy documentation that will consider how all digital hand-held content is stored and recorded. The aim is to have a consistent approach that will be more easily audited to ensure good collection management in the future.

We need to take action and so have already begun to move high risk material from its hand-held carrier to a secure online system. Just by moving this we create a back-up to the original, and then by adding extra technical and descriptive metadata we create a better resource to meet our other strategic needs.

Where we cannot migrate to online storage we have advised that the hand-held media is moved to climate controlled storage and is at least backed-up to another disc.



Active Preservation 2008


- **Monitor and review**
 - Annual update to the risk assessment to continuously improve the condition of the collection based digital objects. A two yearly major review also takes place.
 - Annual identification of resulting actions to mitigate risks
 - Management of the digital preservation prioritisation table
 - Key performance indicators to be drawn from the risk factors within the prioritisation table, to be monitored by the digital preservation steering group. (Ideally all risk factors should be in a continuous process of reduction)
- **Resource Plan and future work**
 - DPT will take responsibility for this effort by writing a resource plan to establish next stage activity. This will involve people, equipment, storage and policy issues.
 - Establishment of the British Library centre for digital preservation based upon this risk work.

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Monitoring and planning is key to keeping the assessment running, Failure rates for hand held carriers within the BL collections have reached unacceptably high levels (up to 3%). DPT will use a continuous improvement approach constantly reducing the level of risk and failure rate. Annually we will identify new risks and review our priority list. We will also manage the table of prioritisation to ensure that the high levels of risk identified for hand-held carriers do not increase.

We will use key performance indicators such as reduction of risk faced or number of objects preserved to show that we are actively reducing the risks that have been identified, this will provide an audit trail that can be followed for each hand-held object.

The digital preservation team has already used this risk based approach to hand-held media to inform our work for the next two years, the assessment has led to funding for a new centre for digital preservation which will use the hand-held media to run experimentation and research into the specific issues faced by electronic content on a hand-held carrier. Already we are seeing the results of this, both good and bad as we move massive amounts of electronic content from the risk carriers to our online storage systems.



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Further information is located at www.bl.uk/dp

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