

Test Research on Preservation Quality of National Archives Duplicates

Presenter : Chen, Shu-Mei

Ph. D. Student, Graduate Institute of
Library, Information and Archival Studies,
National Chengchi University

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History of Archives Act



- Legislating
 - Draft completed and reviewed in 1992.
 - President promulgated on December 5, 1999 and enforced since January 1, 2002.
- Amendment
 - On July 2, 2008, the legislators proposed to amend Archives Act Article 28, and enforced since September 1, 2008.
- Legislative purpose
 - To refine the management of archives by the government
 - To promote public awareness and use of archives
 - To optimize the functions of the archives



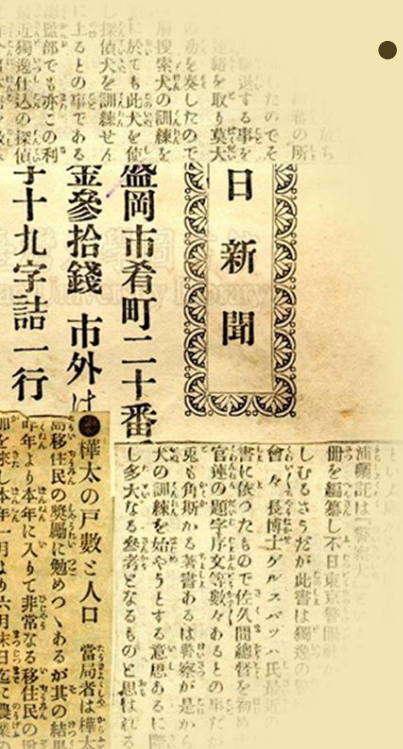
Definition of Archives

- Subparagraph (2) of Article 2 of the Archives Act
 - "Archives" shall mean written or non-written documents and records, including their attachments, which are kept in files and managed by the government agency.
- Article 2 of The Enforcement Rules of the Archives Act
 - The phrase "written or non-written documents and records, including their attachments" in subparagraph (2) of Article 2 of the Act shall mean the recorded documents and their attachments which were made by the government agency when dealing with or arising from official affairs, including but not limited to the documents, pictures, records, photographs, tapes, video tapes, microfilms, digital information or other documents or objects which can be heard, read, viewed or understood by means of technology and which are held or preserved by the government agency.



Category of Archives

- According to Retention Periods
 - Permanent records
 - Temporary records
- According to the attribute
 - National Archives
Archives which are with permanent preservation value and have been transferred to the central archives authority-in-charge to be managed.
 - Government agency records
Archives managed by the government agency.



Archives Duplication

- Archives Act Article 9
 - Archives may be stored in the form of microfilm or other methods. The implementation regulations for storing archives shall be enacted by the central archives authority-in-charge.
- The Implementation Regulations for Archives on Electronic Storage
- The Implementation Regulations for Archives Stored on Microfilm
- Digitalization is the main method of National Archives duplication.



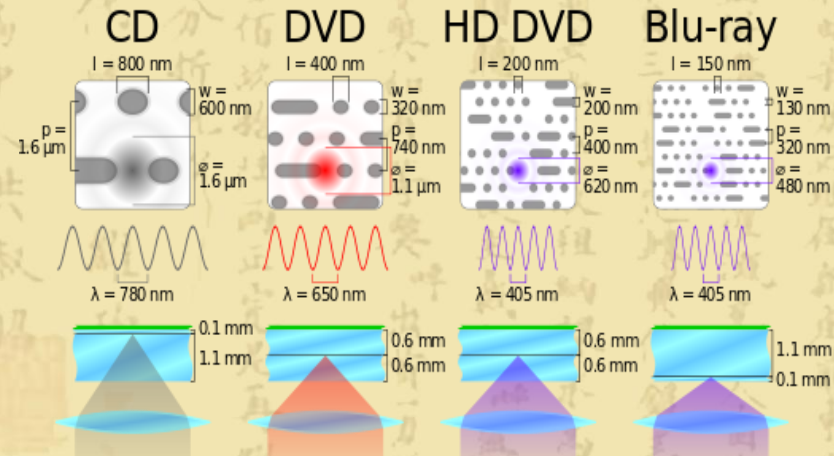
Statistics of National Archives Duplicates

- Electronic Storage (Statistics to 2013)
 - CD: 2014 pieces (all converted to DVDs in 2011)
 - DVD: 36447 pieces
 - HDD: 239 quantities
- Microfilm (Statistics to 2013)
 - Positive: 778 pieces
 - Negative: 778 pieces



Types of Discs

- CD (Compact Disk)
- DVD (Digital Versatile Disc)
- BD (Blue-ray Disk)
- Read Only
- Write Once and Read Only
- Recordable



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 益岡市肴町二十番
 重參拾錢 市外け
 権太の戸敷と人口
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Types of Disc Capacity

types	12cm	8cm
Single-sided single-layer	4.7GB (4.37GiB)	1.4GB (1.30GiB)
Single-sided double-layer	8.54GB (7.95GiB)	2.6GB (2.42GiB)
Double-sided single-layer	9.4GB (8.74GiB)	2.8GB (2.61GiB)
Double-sided double-layer	17.08GB (15.90GiB)	5.2GB (4.84GiB)

Common Size and Capacity of Hard Disk Drive



- size
 - 2.5 inches (No external power supply required)
 - 3.5 inches (Requires an external power supply)
- capacity
 - 36GB、40GB、45GB、60GB、75GB、80GB、120GB、150GB、160GB、200GB、250GB、300GB、320GB、400GB、500GB、640GB、750GB、1TB、1.5TB、2TB、2.5TB、3TB、4TB ...



Research Methods

- Conducted inventories and tests thoroughly to test the Parity Inner Errors (PIE) of DVD and the damage status of HDD tracks.
- Scope and quantities
 - DVD: produced between 2005 and 2009, a total of 18478 pieces
 - HDD: produced between 2005 and 2009, a total of 119 quantities
- Testing methods
 - DVD: PIE(Parity Inner Errors) maximum
 - HDD: HD Tune Pro to test tracks readability



Inventory Result (I)

- DVD

Year of inventory	Quantity/ piece	PIE >280	PIE 200-280	PIE <200	unreadable	partially readable	others
2013 (Percentage share)	9195 (100%)	4171 (45.36%)	660 (7.18%)	3915 (42.58%)	318 (3.46%)	130 (1.41%)	1 (0.01%)
2014 (Percentage share)	9283 (100%)	4103 (44.20%)	661 (7.12%)	4161 (44.82%)	334 (3.60%)	23 (0.25%)	1 (0.01%)
Total (Percentage share)	18478 (100%)	8274 (44.8%)	1321 (7.15%)	8076 (73.71%)	652 (3.53%)	153 (0.83%)	2 (0.01%)

Inventory Result (II)

- HDD

Year of inventory	Quantity	Bad tracks	Normal
2013 (Percentage share)	60 (100%)	1 (1.67%)	59 (98.33%)
2014 (Percentage share)	59 (100%)	2 (3.39%)	57 (96.61%)
Total (Percentage share)	119 (100%)	3 (2.52%)	116 (97.48%)

Comparison of DVD and HDD inventory results

Media forms	Number of detected	Normal	Damaged or PIE>200
DVD	18478 (piece)	10402 (56.29%)	8076 (43.71%)
HDD	119 (quantity)	116 (97.48%)	3 (2.52%)

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重參拾錢 市外け

十九字詰一行

権太の戸敷と人口 當局者は権太

移住民の奨励に勉めつゝあるが其の結果

昨年より本年に入りて非常なる移住民の増

加を来し本年一月より六月末日迄に農業者

の移住に依つたもので佐久間總督を初め

官連の題字序文等数々あるとの事だが

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The Research Findings (I)

- DVD damage rate is higher than 50%
 - Varying quality of DVD substrate
 - Less stable storage of information
 - burning process with uncontrollable internal and external factors
- Relatively Low percentage of HDD damage (average of 2.5%)
 - Still readable while having some bad tracks



The Research Findings (II)

- Require quite different repository spaces
 - One HDD only need 6 cm of storage space, which is approximately one tenth of DVDs storage space in terms of the same content storage capacity.
- DVD capacity is limited. One file-level archive would need several DVDs to store, in which case it is inconvenient for management.
 - 1 DVD: 4.7G
 - 1 HDD: 500G or more



Conclusions & Suggestions

- Original Image/Sound Files of National Archives Duplicates are for preservation purpose.
 - Storage efficiency
 - Data stability
 - Avoid to store one file-level archive in several DVDs
- Choose HDD as the primary storage media
 - DVD should convert or migrate to HDD as soon as possible
 - Off-site backup should be set up to spread the risk of loss
 - Would still require regular testing to ensure the readability of electronic storage media



Thank You Very Much



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夜經警囚作救濟

諸名家の

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したるものは百一十一戸にして内二百三十
七戸は已に渡航済となり其人口千五百七十
九人なりと面して同高六月末日現在の戸數
五千六百十五、人口四萬七千八百三十一

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富不干