

**Best practices for managing the deliverable in
video productions presented by**



Hard Disk Drives

To recycle or not to recycle?

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Hard Disk Drives: *To recycle or not to recycle?*

That is the question.

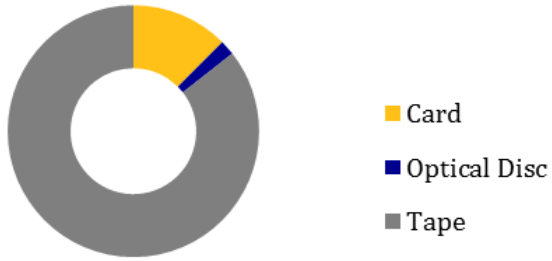
The media deliverable is essential to how the footage you've shot will be backed up on site and imported to your editing suite. At the time you book your shoot with your Crews Control production manager you also need to discuss not only the crew size and style of your shoot but also how to handle the deliverable; what media type(s), format(s), frame size(s) and frame rate(s) you want based on what your editor can import. Currently, the most popular choice is to go tapeless which usually requires a hard disk drive to store the footage captured during the shoot.

The Shifting Trend of Media Formats Used at Crews Control

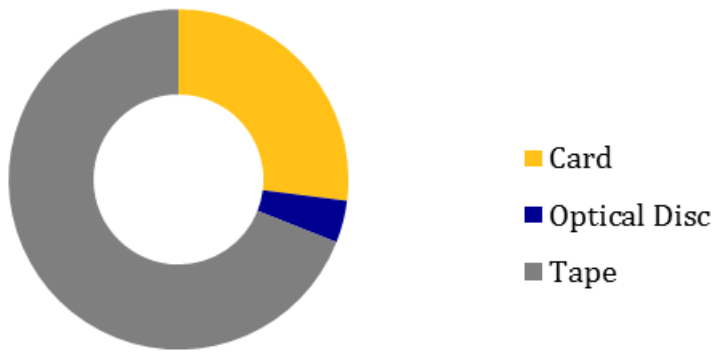
(2009-2011)

Things change very fast in the world of digital cinema and video. High definition (HD) video is progressively replacing standard definition (SD) video in professional applications and hard disk recording formats are replacing tape formats. The cost savings of digital video (DV) verses analog (tape) media has driven this trend since Sony first introduced the Digital Betacam (DigiBeta) camera format in the mid-nineties. And now with the introduction of a variety of tapeless cameras, the choice to go with a digital tapeless camera is becoming the standard. Crews Control has collected statistical data on the increase of tapeless formats where the deliverable is a hard drive. From January 2009 to December 2011, the use of camera formats that record to tape have steadily decreased a total of 36%. See diagrams:

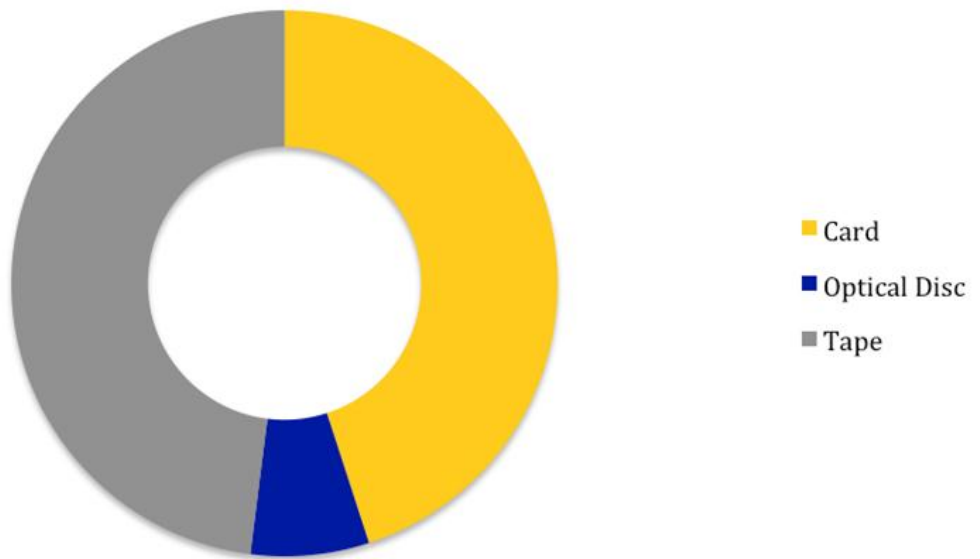
Media Type 2009



Media Type 2010



Media Type 2011



The Shifting Trend of Media Formats (cont'd.)

The shift from tape media to hard disk recording adds new technical dimensions to the postproduction process including the need for data compression, a compatible codec (compressor-decompressor), along with a hard drive with proper disk storage requirements that is portable and has its own power source. Unfortunately, the increase in tapeless shoots increases the frequency with which data loss can occur as a result of a faulty HDD or human error. Due to Crews Control strongly urging our crews to provide a new an external hard drive for every shoot, the data loss rate on our shoots is significantly less than 1% of our total shoots and is predominately caused by human error.

Causes of Data Loss

Data loss is much more common with other companies as demonstrated by Google and DeepSpar Data Recovery Systems. From the *Failure Trends in a Large Disk Drive Population* study, (Eduardo Pinheiro, February 2007), where a large disk drive population in a production Internet services deployment was analyzed, reports on the failure behavior of magnetic media stored on hard disk drives showed that the frequency of data loss errors were less often attributed to the age or utilization of the HDDs but found more often caused when scan errors occurred earlier on in the HDD's lifetime. "The drives that survive the infant mortality phase are the least susceptible to that failure mode, and result in a population that is more robust with respect to variations in utilization levels." (Eduardo Pinheiro, February 2007)

The following graph from the report below shows the annualized failure rate (AFR) for all drives observed for the study age zero to 5 years. The data reflects the percent of AFR in relation to the age of the drive was when it failed.

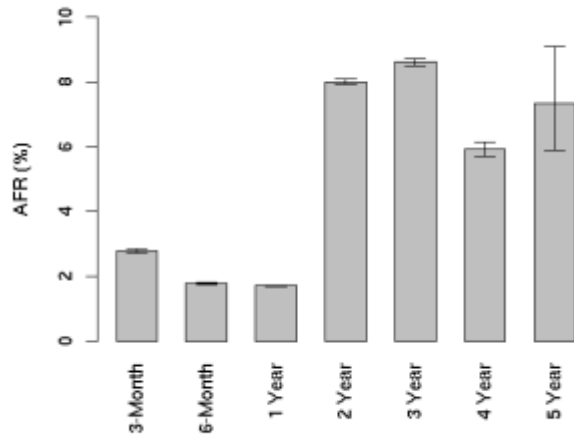
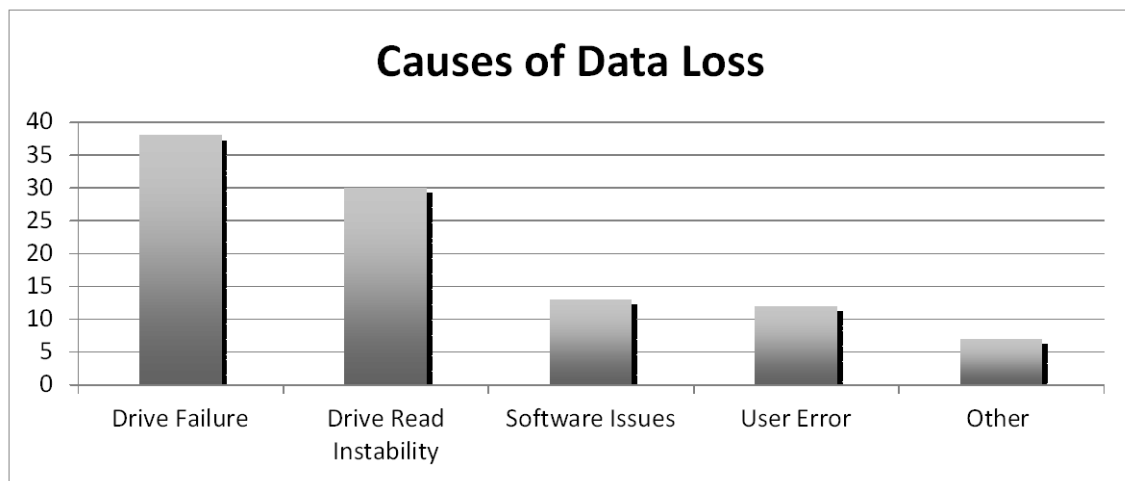


Figure 2: Annualized failure rates broken down by age groups

(Eduardo Pinheiro W.-D. W., 2007)

“Drives are 39 times more likely to fail within 60 days than drives with no such errors. First errors in reallocations, offline reallocations, and probational counts are also strongly correlated to higher failure probabilities.” (Eduardo Pinheiro W.-D. W., 2007)

By becoming familiar with the elements that affect magnetic media storage you can better manage the perils that HDDs are most susceptible to. Age, utilization, environmental exposure, and occurrence of scan errors were all found to be factors that contributed to the likelihood of data loss when Google studied their disk drive population.



(Figure 4: Causes of Data Loss (source: a survey of 50 data recovery firms across 14 countries))

In the Google study, HDD failure is the most common cause of data loss, accounting for 38 percent of data loss incidents. Drive read instability includes occasions where media corruption or degradation prevents access to the data on a disk. This explains 30% of lost data. Human error accounts for 12 percent of data loss episodes. This includes the accidental deletion of data as well as incorrectly [formatting] the HDD. (Smith, David M., Data Loss and HDD Failure: Understanding the Causes and Costs, DeepSpar Data Recovery Systems)

Liability for lost data loss

When your data is lost due to HDD failure, who is responsible? Technically, the person who supplied the HDD for the shoot is liable. Most reputable HDD manufactures offer 1 - 5 year warranties however data loss is not protected by the warranty and neither is a guarantee issued for a set period of uninterrupted or error-free operation. Knowing the age of the HDD, how many times the device has been used, what environmental conditions it has been exposed to, and who was in charge of data wrangling or creating backups are important factors that will help you avoid HDD failure. If the hard drive is new or has only been used by one producer then the information is clear, but if the HDD is older or has been used by multiple producers then whether it has been subjected to factors that will increase its risk of failure is unknown. You can limit the risks by providing the HDD or purchasing a new hard drive from your crew. Hiring a knowledgeable person to transfer the data and create a back-up copy limits the incidence of data loss due to human error.

Managing the Deliverable and Reducing Risk of Data Loss

When choosing to provide an external HDD for a video shoot there are important questions to answer:

- Does the external hard drive have sufficient storage capacity and the correct interfaces that are compatible with the chosen tapeless workflow and edit suite?
- Is the external hard drive properly formatted for data storage and importing data transfer from the computer's operating system?
- Have you hired a professional who will properly transfer and backup files?
- Is the external hard drive new or has it been used previously?

Use the correct hard drive for your project

If you are not providing the hard drive, ask for the cost of a new, formatted HDD to be built in to the rate quoted for your production and provided on your shoot. When exercising the option to provide a HDD of your own, make sure you provide one with the speed and interface that works best for your crew and their media transfer system and your production team's editing suite. Confirm these details with your crew prior to the shoot; they can advise you about which interface and formatting works with their gear. Most importantly the hard drive should be the right size to store all of your data. Use a data conversion calculator ([LINK](#)) to determine the disk storage requirements to adequately contain the data from a shoot.

Accurately Store Media Files

The option to hire an on-site Digital Imaging Technician (DIT) is also a service that can be provided by Crews Control. A DIT, sometimes also called a data wrangler or media manager, is a professional who specializes in media file transfer and storage on location to ensure all files are transferred, stored and backed up properly for postproduction. Having an experienced DIT on your production crew reduces the human error factor as it relates to HDD data loss and allows your DP to focus on what he does best; providing you with the perfect shoot. If you choose to do your own data transfer on site or are simply curious about the process, we've completed a 5 minute tutorial which guides you through the entire process. We've completed a 5-minute tutorial which guides you through the entire process of downloading the necessary drivers and plug-ins for XDCAM EX SxS media rendering on location. The tutorial, entitled SxS XDCAM EX Media Management explains how to view and transfer XDCAM EX video and audio files using your Mac with Sony's free software. Download the video tutorial from iTunes [[LINK](#)] or click to watch on Crews Control's YouTube channel [[LINK](#)].

Properly Format Hard Drives

Instructions for properly formatting a hard drive are provided by the manufacturer and included in the original packaging for the product. For a Mac the instructions are fairly simple:

Formatting a Hard Drive on Mac OS X

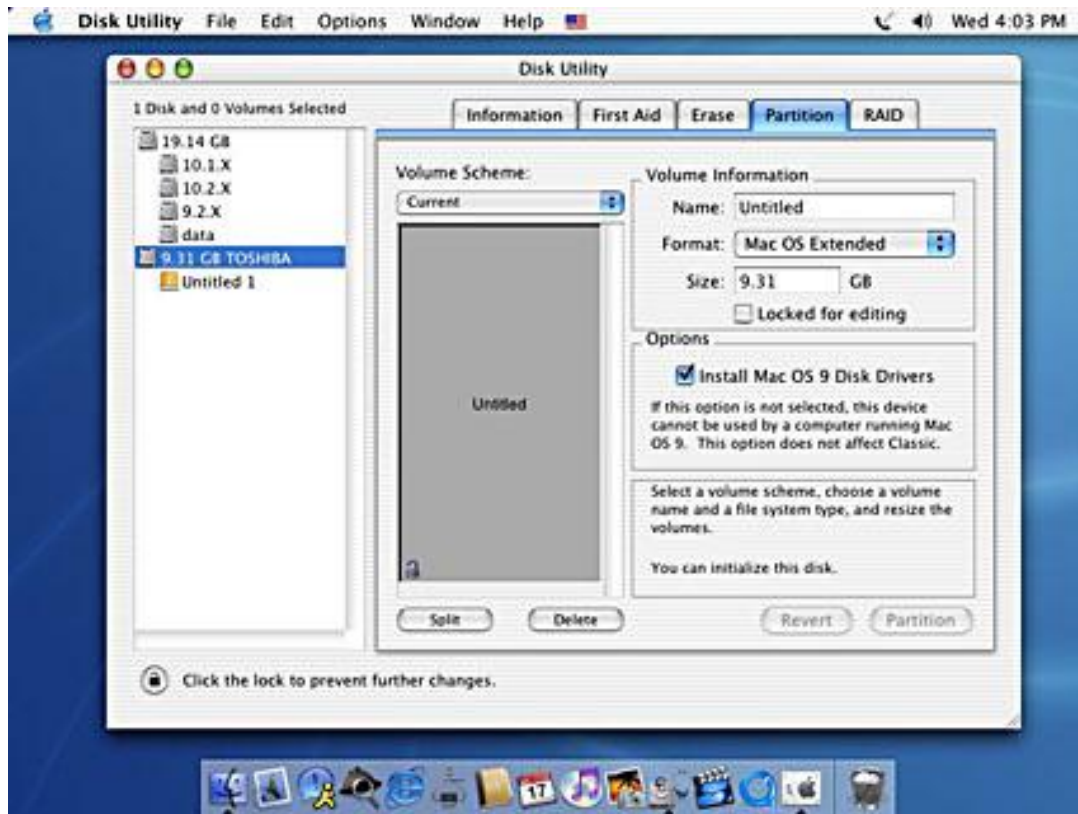
The tool used to format or reformat the hard drive on Mac OS X is the Disk Utility. You can find it inside the Utilities folder. (Formatting External Hard Drives)

1. Start the Disk Utility, which can be found inside the Utilities folder.



(Formatting External Hard Drives)

2. Select your external hard drive and prepare it according to your requirements. In general, we recommend creating one partition and formatting it using the Mac OS Extended file system. If you intend to use the drive on other Operating Systems, especially on Windows, we recommend using the MS-DOS file system instead.



(Formatting External Hard Drives)

Close the Disk Utility after you are finished and your new drive will be ready and available to use on your desktop.

NOTE: Removing partitions and formatting a hard drive will destroy all existing data on that particular disk! Make sure you have a backup of all your data in a different location prior to making any changes to the external drive. (Inxiron.com, Information Center, Formatting External Hard Drives)

Our company's issue log data reflects that 0.01% of shoot-related issues incurred was related to media transfer problems and those occurred when proper procedures were not followed. We strive to keep that number minimal by educating our clients and upholding a standard that matches Crews Control's value proposition.

Investing in an external HDD that you intend to use for multiple shoots may still be a wise choice for more. Taking the measures outlined above will significantly reduce the risk of human error and data loss.

Our advice to producers who recycle HDDs

- Clients need to ship the hard drive in its original packaging.
- The better the HDD the faster the transfer will be. USB 3.0 or FireWire 800 connections are the current gold standard in HDDs.
- Clients should always check with the crew ahead of time to make sure the HDD is compatible with the chosen tapeless workflow and edit suite.
- Clients need to replace their HDDs periodically because they aren't made to run indefinitely.
- Clients should ask the crews to hold a back up copy until they confirm that they have imported all of the video and audio files into their editing suite. The crews may charge archiving fees for holding the files but it's worth the extra security to make a second copy on site.
- Video should not be stored on an external hard drive alone. Data should be transferred as soon as possible and stored in at least 2 separate places for security.
- The client needs to be responsible for erasing all footage from the HDD after use. If the drive is not fully erased confidential data may be recoverable during future use of the HDD.
- If the HDD is returned to the crew in damaged condition due to shipping, the client is liable for the cost of the HDD.
- The crew may charge a rental fee that is almost half the cost of the HDD plus the cost of the shipping. Cost savings may be lost in borrowing a crew's hard drive in comparison to purchasing a new HDD.

Our advice to crews who recycle HDDs

Crews Control strongly encourages our crews to provide only new hard drives to our clients. If a client asks to borrow or rent an HDD from the crew, there are important risks to consider:

- Providing the HDD to the shoot is assuming liability for the footage stored on the HDD.
- If the HDD is returned to the crew in damaged condition due to shipping, the client is liable for the cost of the HDD.
- Factor in that for various reasons clients may be delayed in returning the HDD as quickly as needed.

To Our Clients and Our Crews

If you don't want all of the hard work you put into your project rejected due to audio/video technical issues, simply don't risk your production to an unreliable HDD. As a client, the cost for a new HDD can be provided can be added to the rate for your production for your convenience or you can opt to provide one whose provenance you know.

Sure you can save a few bucks asking the crew to loan you a hard disk drive but what it could cost you simply isn't worth the risk. Know your HDD's history even when choosing to recycle. Using these best practices will save your production.

About Crews Control, Inc.

Crews Control is a camera crew talent agency that provides freelance film and video crews for video shoots and on location production across the globe. Our clients include some of the world's best-known companies, broadcast and cable networks, public relations firms, government agencies and non-profit organizations. We represent only the best video production professionals in the industry. Each camera crew member represented by Crews Control is rigorously screened to ensure they meet and exceed our stringent requirements for experience, knowledge, professionalism and creativity, and are equipped with film and HD video equipment to meet our client's requirements. Our sole focus is selecting the perfect camera crew-- in any city worldwide for our clients. As staffing experts specializing in corporate video production, we provide experienced, creative and professional camera crews for outstanding video productions.

Credits

Author:

Kandy Phillips, Social Media Manager

Collaborator:

Rebekah Burns, Multimedia Manager and show host on Information Overdrive

Editors: Andrea Keating, Crews Control founder and CEO, Valerie Nolan, VP, Production

Resources

Eduardo Pinheiro, Wolf-Dietrich Weber and Luiz Andre Barroso. "Proceedings of the 5th USENIX Conference on File and Storage Technologies, FAST'07." February 2007.

Eduardo Pinheiro, Wolf-Dietrich Weber and Luiz Andre Barroso,. "(Proceedings of the 5th USENIX Conference on File and Storage Technologies, FAST'07." 2007.

Figure 4: Causes of Data Loss (source: a survey of 50 data recovery firms across 14 countries, DeepSpar Data Recovery Systems). "www.Deepspar.com." *Deepspar Data Recovery Systems*.

<<http://www.deepspar.com/wp-data-loss.html>>.

Formatting External Hard Drives. n.d. <<http://www.inxtron.com/information-center/formatting-external-hard-drives>>.

Smith, David M., Associate Professor of Economics, Graziadio School of Business, Pepperdine University. "Data Loss and HDD Failure: Understanding the Causes and Costs." n.d. <http://www.deepspar.com>.

<<http://www.deepspar.com/wp-data-loss.html>>