White Paper
Recertified Cartridges–the Hidden Risks

Overview

The concept of recycle/reuse has entered the data storage market under the name of "recertification". Cartridges that are sold as "recertified" have been procured from a source, are sometimes run through a test procedure and sold for less than new, unused cartridges.

Things can happen to tape cartridges beyond normal wear--handling damage, drive problems, or entrapped debris--that can result in lower performance or compromise the media integrity. There is not one single test that can be performed to identify the history of a cartridge and what it has been exposed to that would degrade performance. "Recertification" cannot determine whether any of the conditions below have occurred.

- Past mis-handling that could cause future problems
- The environment the cartridge has been exposed to that could be damaging
- How much the cartridge has been used and what the remaining useful life is

When it comes to your valuable data, you can't afford not to know. Imation manufactures half-inch magnetic media under rigorous process controls--over 200 individual tests--to guarantee that product specifications are met for durability and archival stability. This paper was written to help you understand what risks may be associated with the use of recertified media and how your business may be impacted.

Do you Know Where Your Recertified Cartridges Have Been?

Some technologies beg for reuse and repurposing. While some like to replace their car with a shiny new model every three years, others are happy with a well-maintained used model. Well researched and with proper care, that used car will get you where you're going and keep you safe on the way there.

But other technologies are less suited for re-use--and the market for "recertified" tape cartridges is a prime example. Using recertified tape cartridges--cartridges resold after their initial purchase, and sometimes use--can introduce unforeseen risk into IT departments. Those considering recertified tape cartridges should look at these offers with a critical eye, knowledge of the risks and how they might impact business operations.

The biggest issue with recertified tape cartridges is the loss of control by the data center and the manufacturer. You know how you have managed your data center and the cartridges within it, but when it comes to recertified media, do you know where that cartridge has been? How many times was it dropped? Where was it stored? Since recertified media no longer carries the original manufacturer's warranty, what warranty comes with it?

Things can happen to tape cartridges beyond normal wear--handling damage, drive problems, or entrapped debris--that can result in lower performance or compromise the media integrity. While most data centers follow the manufacturer's recommendations for care and handling of magnetic media and drive maintenance that will keep data safe on tape for 20 years or more, pressures to reduce operating costs make following those measures increasingly difficult. It is easy to introduce invisible errors into media that passes "recertification"--and if the integrity of the media has been compromised, there is no definitive way to know to what extent until you encounter system errors.

These problems can wreak havoc in the data center--easily negating any cost savings for the media itself.

Where do "recertifiers" get their media?

There are two primary reasons that cartridges come into the hands of recertifiers. One is when tapes experience "early life failure" due to physical damage or exposure to some type of debris or contaminant, resulting in unacceptable error performance. The second is advancing technology--a new tape drive purchase renders a current media supply obsolete for a particular user. Media recertifiers purchase these "discarded" tape cartridges, possibly run them through a testing or "recertification" process, and then resell them.

Unfortunately, recertifiers rarely know the handling history of these cartridges. How much care and attention has been paid to these tapes? Probably not much because they no longer contain important data. Old tapes are often tossed in boxes; the boxes are then transported without the standards in place to protect the media that could later hold critical data. This is not a matter of negligence--the tapes just aren't important to the owner any more.

The Value of Data

The question of whether to go with recertified tapes is one that speaks to the cost of operations and the value of an organization's data. From an operations standpoint, Gartner Group places the cost to the average data center for a job abend at $1,000. If job abends from recertified media increased by just one per week, it will cost the data center more than $50,000 in operating expense, not including the cost of any missed SLAs (Service Level Agreements) due to failure to complete a job or process on time.

Figure 1 shows a way to project the cost as a function of job reruns for 3 abends/week or 7 abends/week. The potential for degraded library performance with recertified media can cost the data center far more than the overall outlay for new media.

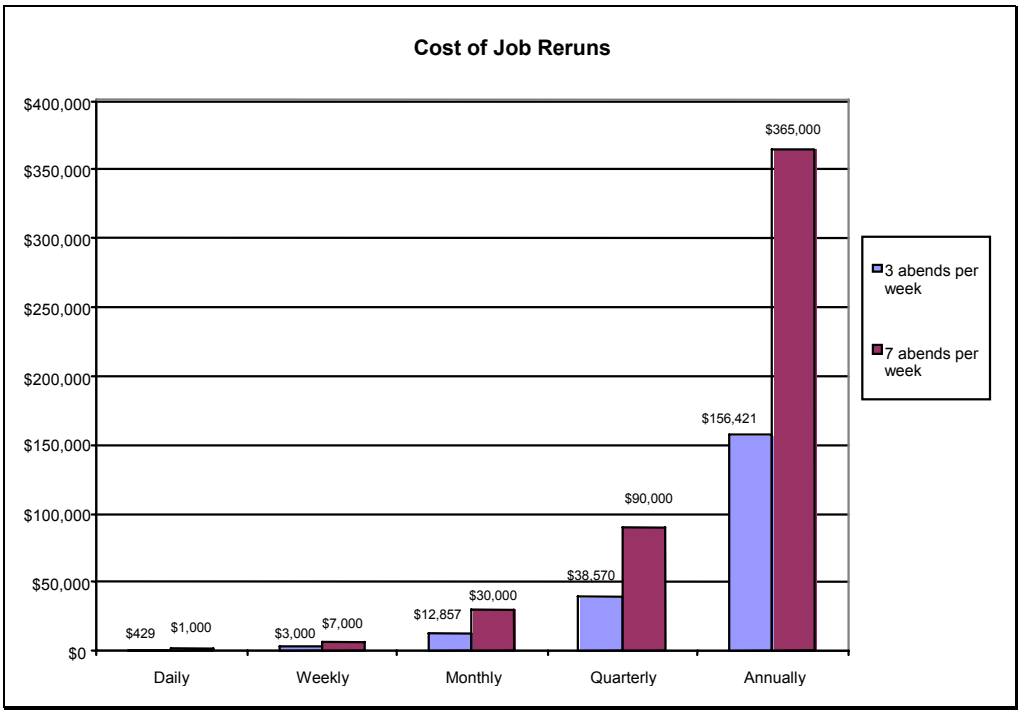

Figure 1

Care and Mis-handling—Hidden Damage in Recertified Tapes

The impact of cartridge damage due to mishandling is not well understood and most times not immediately obvious--until it's too late.

In a perfect world, cartridges would be transported, stored, handled, and placed in operating environments that are clean and impart no stress or damage to the cartridges. Under these conditions most magnetic media can last more than 25 years. However, history has shown that the most likely cause of a tape's early life failure is handling damage. Figure 2 shows a tape pack within a cartridge that has been used. Note that there are several wraps of tape that are elevated above the plane of the tape pack due to the repeated back and forth motion caused by the mechanics of file access over time. A magnified picture of the tape edge in Figure 3 shows the impact damage on the bottom edge of the

tape that may result from dropping. This may not cause a problem the first time the cartridge is used after a drop, or even the 10th time. But with each subsequent use, the damage on the edge becomes greater, creating increased debris and collateral damage to the tape. This cartridge may pass a recertifier's test, yet develop problems over time, or after additional use.

Figure 2

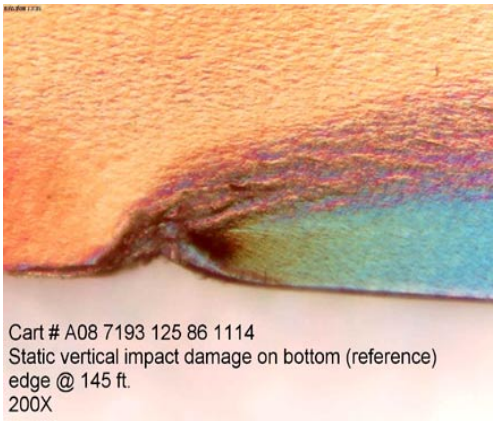

Figure 3

Handling damage of the type shown above can come from a multitude of sources. The three major contributors to this type of damage are:

- Inadvertent dropping in the operating environment;
- Shipping or transporting cartridges using insufficient packaging, and
- Inadequate drive maintenance.

Today's emphasis on cost control has reduced personnel, delayed scheduled maintenance, and increased the use of temporary workers. Operators who are rushing or trying to minimize multiple trips by carrying too many cartridges at a time increase the potential for dropped cartridges. Temporary work forces may not have received adequate training on cartridge handling procedures. Finally, higher employee turnover has reduced the level of care and handling experience in the data center.

Inadequate packaging can lead to tape edge damage when cartridges are exposed to high impact forces during shipping and transportation. The cartridge design allows the tape pack to move within its plastic shell so that the tape pack is unencumbered during the normal function of the cartridge. If the cartridge is exposed to higher than normal amounts of force, the movement of the tape pack can cause unseen edge damage.

Drive-induced damage often results from inadequate preventative maintenance procedures. Figure 4 on the left shows a tape cinch created by a drive that had not been properly maintained. Figure 5 illustrates how customer data, which should be continuous along the length of the tape, is unrecoverable in the area of the "Z" fold.

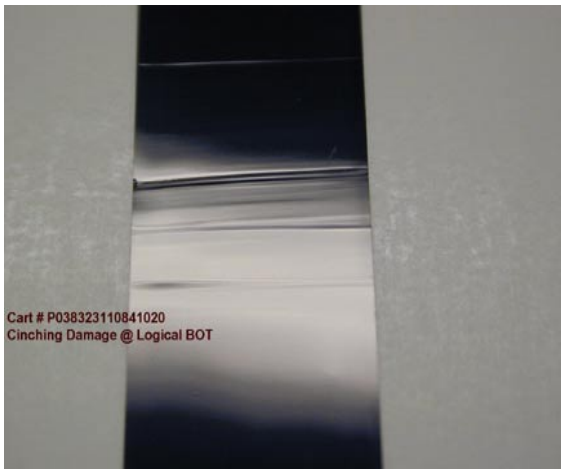

Figure 4

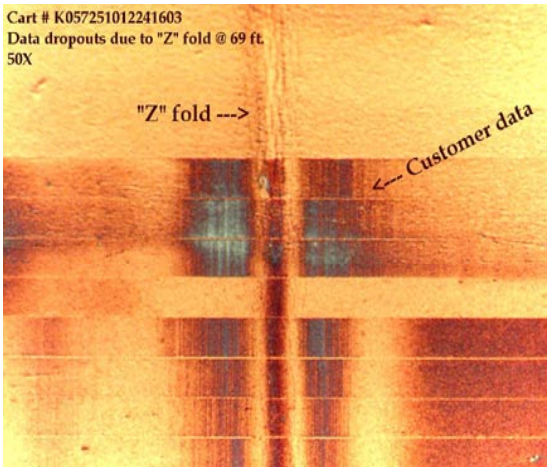

Figure 5

Debris Damage: Protect the environment

Debris is another source of early life failures for a cartridge. The major sources for debris are contamination from within the data center, debris exposure during shipping or transportation, and cross-contamination from problem cartridges. As with handling damage, the effects of debris contamination may not be immediate, and may take some time to develop. Even one piece of debris can become embossed or result in a "print through" to adjacent layers of media by distorting the base film. The tape drive has the ability to error-correct around a debris defect during writing, but after some time this "print through" effect can cause distortion to areas of the tape that were previously unaffected, creating hundreds of errors. And with the high track densities in today's tapes, debris that would likely not cause problems in 18-track tapes can have an adverse impact on high performance tapes with hundreds of tracks.

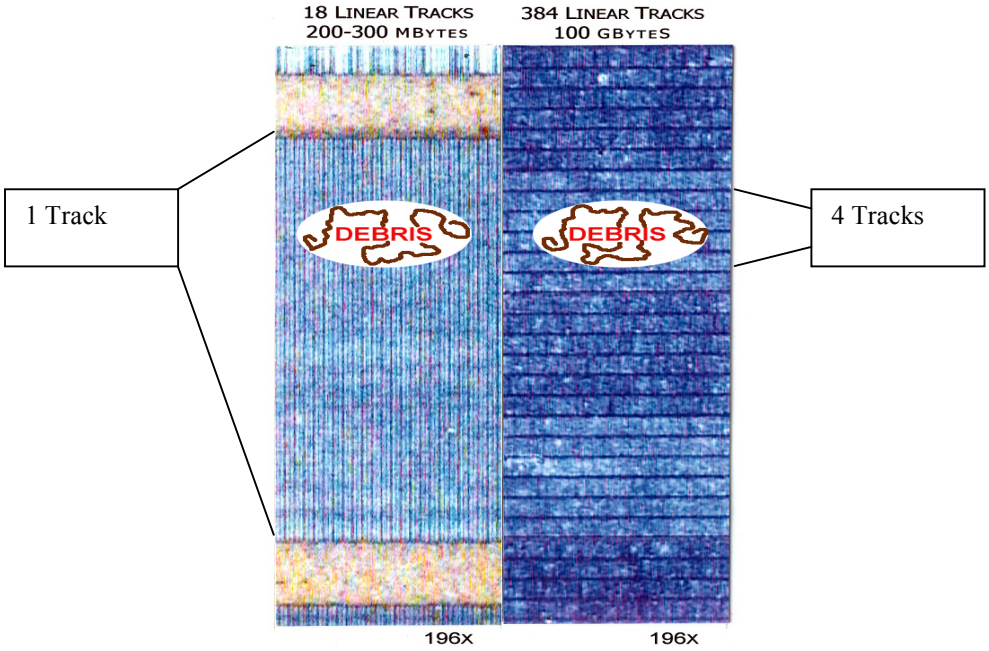

Figure 6

Companies that recertify tapes are rarely in control of how the tapes are shipped to them. Improper shipping and transportation can expose cartridges to debris from packaging materials or dirty containers or shippers. Many data centers engage third party providers for offsite storage or disaster recovery. Non-controlled environments and shipping and handling equipment are being used for cartridges that may be sources of debris to the cartridges. One cartridge in a library also can act as a source of debris to others if it has been damaged.

Critical Questions

When considering recertified media offers, you should ask yourself some critical questions on the balance between media cost and the potential costs of recertified tape issues.

How many more errors do you allow on a recertified cartridge compared to a newly manufactured one? How many errors define end-of-life for a cartridge? Buyers should be aware that recertified media may have a shorter useful life than new tapes and may likely result in poorer performance for the entire library.

Do we monitor error rates for the tape system to identify drives that need service or media that may need to be retired? The use of recertified media may cause system error rates to go up, triggering excessive drive service calls. For many data centers, these excess service calls are now billable items even if basic maintenance is included in the service contract.

What is the value of a Disaster Recovery or Business Continuity Plan if you are not able to reliably restore the critical data files? Is recertified tape suitable for these critical data sets? Some data sets must be retained for seven or more years due to legal or contractual reasons. What is the cost to the organization if you are not able to read/access these files? Would you want to store your critical data sets on what may well have been discarded or rejected media?

New Tapes Meet the Standards, And Then Some

Imation builds tape cartridges to work for many years in varied applications and environments, and it guarantees that every cartridge will exceed Imation's own published specification for error performance and durability. Newly manufactured cartridges are guaranteed to exceed the detailed requirements of ANSI and ISO specifications for performance, usability and interchange.

Imation manufactures its half-inch magnetic media under rigorous process controls to ensure the highest quality in key traits that impact error performance, durability and archival stability. In addition to testing the media quality as a new cartridge out-of-the-box, Imation performs environmental and stress testing to ensure that the product will withstand the test of time. By the time the cartridge reaches the final test point in the process, more than 200 individual process control audits or tests have been completed starting with the introduction of the raw materials into the process. There is no single test that can yield the level of confidence in product quality that this multi-level control system provides.

In the end, you could say that buying recertified media is like buying that used car – only you don't know who owned it or for how long, there are no maintenance records and there's no way to test the engine for hidden problems. It's a deal that would make most of us think twice.

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