
Comparison of HDD Destruction Methodologies

Vulnerability of Hard Drive Disks

In a hard drive, data is read from or written to a cylindrical array of rigid platters rotating at upwards of 3,600 RPM. The read head floats on a microscopically thin boundary layer of air and never comes in contact with the platters, the consequences of which would be disastrous for the read head and the surface of the drive. Minor imperfections of the surface could cause the head to crash into the surface.

If the surface of a hard drive is damaged, abraded or warped by any means, it becomes almost impossible for data to be recovered from the surface of the magnetic media. Moreover, if all the platters in the hard drive are crushed (pancaked) together, warped and mangled, both the upper and lower surfaces of each platter will be severely disfigured, rendering data recovery virtually impossible. The read head simply cannot follow the distorted contours and scarified surface of the platters. In addition, data is so tightly packed on to the surface of the platter in modern hard drives that not even Burrowing Electron Microscope (BEM) technology is capable of recovering data from a destroyed surface.

Physical deformation involves the use of tools such as sledge hammers, drills, vices, etc., to cause extreme physical damage to a storage device in order to delay, impede, or discourage an attacker from attempting to recover data from it. In the case of magnetic disks, the effectiveness of this method depends on the amount of damage inflicted on the surface of each platter (including warping of the flat surface) to make it very difficult to do a laboratory analysis. Heavily damaged hard disks with deformed disk surfaces are beyond any reasonable hope of recovery, even to adversaries with access to sophisticated laboratory analysis facilities.

Current Methodologies

Electro-mechanical systems of comparable size to the MediaVise will typically produce less than 10,000 pounds of force. Such machines must focus their limited destructive force on small areas, lines or points on the platters, leaving other areas unscathed. While folding hard drives, drilling holes in hard drives, and even punching out the core disc spindle of hard drives may make them inoperable, these methods often leave behind smooth, flat surfaces from which data can be recovered using forensic methods. Indeed, not only are entire intact segments left untouched on each platter, but entire cylinders of information may remain intact on the entire stacked array of platters.

Interlocking Crushing Plates

The MediaVise is the only hard drive destruction system to use a patented, corrugated, interlocking, hardened steel plated design. These 5.75 inch by 4.25 inch plates attack the entire hard drive, not just select points, and will damage every component of the drive including casing, circuit boards, read/write heads, and platters. This, however, requires a tremendous amount of force so that sufficient pressure can be applied on every point of the hard drive, otherwise the hard drive would not be sufficiently destroyed.

Currently, no mechanical or electrical system the size of MediaVise can produce enough force to employ a plate design that can attack all surfaces of the hard drive at one time and in one damaging crush cycle. The MediaVise overcomes this obstacle by using a hydraulic system that produces an unmatched 40,000 pounds of crushing force.

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Warping and crushing each and every platter in the drive will cause changes in the magnetic surface of the platters. Once the magnetic sequence is changed (mangled) information is lost, not even imaging software used by the experts to attempt to interpolate the lost data will be effective.



Folding

Destruction: Data along bend line completely destroyed.

Weakness: Data stored in sectors on flat outer edges can still be recovered.



Piercing

Destruction: Data surrounding puncture holes completely destroyed.

Weakness: Data stored in sectors on flat areas between hole and on outer edges can still be recovered.



Plunging

Destruction: Data around the center of the platters completely destroyed.

Weakness: Data stored in segments on flat outer edges can still be recovered.



Platter Crushed, Warped and Mangled by MediaVise's Interlocking Plates

Destruction: Complete bending, and distortion of entire platter area leading to total data loss. This means that EVERYTHING and EVERY COMPONENT on a hard drive is targeted and demolished.

Data is unrecoverable, even by Forensic means.

MediaVise is currently with the NSA pending review and certification. If approved, this will be the first Hard Drive destroyer in its class, so certified.