The hard drive uses two important principles about the magnetic fields.

When we write data onto the hard drive , it uses THE LAW OF ELECTROMAGNETIC INDUCTION and SOME MATERIAL IS MAGNETIC.

When we read data from the hard drive, it uses THE LENZ'S LAW.

How hard disk drive works:

Firstly we should know the two important part of the hard disk drive,

1. platters and media

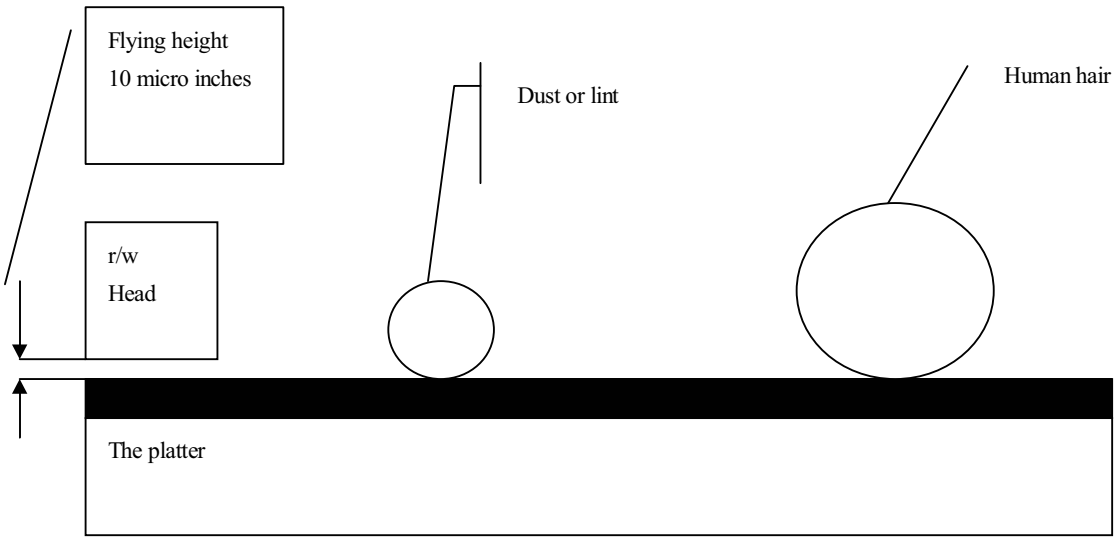
We put all of the data onto the platters. They are inside of the hard drive. There are several pieces of platter in the hard disk drive, maybe three or four. They are made of special material. The material must be strong and light. Because there are high rotation rates, when the hard disk drive working. Traditionally, people often use aluminum because it is a light material. But today, most platters are made from materials like glass or ceramic composite. These light materials have a very low thermal expansion, and compare to aluminum. They can withstand higher forces. So the platters can run faster. Older hard disk drives can run at 3600 to 5200 rpm. Today's ones can run at 7600 to 10000 rpm.

There is a layer of magnetic material on the surface of the platters. Today, thin-film media is used. Thin-film media is a microscopic layer of pure metal bonded to the substrate surface through an interlayer. Because the distance between head and platters is very small (about 10 microinches), but they can not touch with each other. So the thin-film media is very flat and is coated with a protective layer, to help survive head crashing.

2. the arm and read and write head

The arm that holds the read/write heads is controlled by the mechanism in the upper-left corner, and is able to move the heads from the hub to the edge of the drive. The arm and its movement mechanism are extremely light and fast. The arm on a typical hard-disk drive can move from hub to edge and back up to 50 times per second. It is hard to believe. But it is the truth.

Simply, The read and write head is a ferromagnetic core. It can product a variety magnetic fields through a variety current to be able to write data onto the media in ASC2. And also can product variety current though inducing the variety magnetic field on the surface of the platter to read data from the hard disk drive.



Secondly, we should know how they work together.

Whenever reading or writing, the platters are rotated at a high speed. The head and the media never touch with each other. Even if they are working. Because a little touch can cause an immense damage of head and the media` surface. When they are working, read and write head are made to float above a platter surface by suspending the heads on a layer of moving air. Just like the airplane flying in the air. But the plane does not move, the air moves. Platter rotation creates a slight cushion that elevates

When you want to read data from the hard drive. First the heads move to the area where you put the heads. That is why all hard drives seal their platter assemblies into an airtight chamber. The reason your data. And then the head can induce the variety magnetic fields and turn them into variety current for such a seal is to prevent dust, dirt, spill or stands of hair. Once they land on a platter` s surface, it can and the variety current is translated into the ASCII code, at last the code is sent to the CPU. The hair easily result in a head crash. A head crash can damage the head, the media, or both, and physical disk drive. This time the hard drive receive the code from the CPU and translate it into variety current and damage can result in an unusable drive.

the variety current product variety magnetic fields though the read and write head to made the media magnetic.

What careers are related to the use of the technology?

Electronic design engineer: the engineer can design better read and write head for the hard drive.

Structural engineer: the platter run very fast so a good structure for the hard drive is very important.

Mechanical engineer: the motor need improve endlessly with the higher rotation of the platter. The more advanced axletree should be found, which can produce less heat.

Material engineer: find better magnetic material for the hard drive. Make the thin-film media technology more mature.

Aerostatic engineer: calculate the air flow in the hard drive. Make the arm be right height up the platter when the platter is at different speed.