

Exploding Electronic Devices

Life without electronic devices, like mobile phones, computers, laptops, tablets and video games, has become unimaginable, and now the use of electronics is expanding to several other fields, namely, automobiles, space and under-water vehicles. We have been hearing about incidents involving electronic devices encountering blasts. Let us discuss the various types of explosions, their causes and precautions

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We often hear about battery explosions in laptops, mobile phones and other electronic gadgets. Having such gadgets with or around us might imply playing with a bomb waiting to explode.

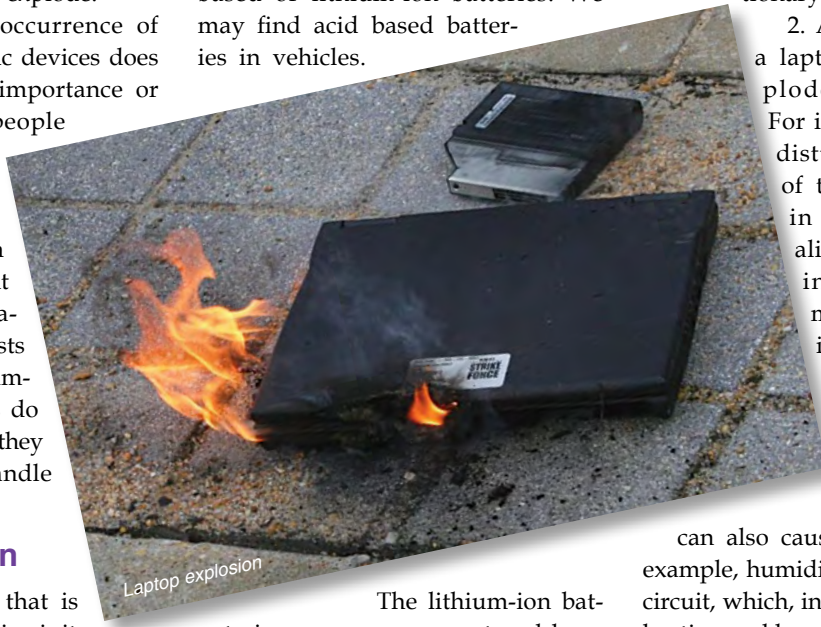
Highlighting the occurrence of such blasts in electronic devices does not undermine their importance or use. It only makes people aware about such possibilities and the precautions that might be required to avoid such mishaps. It is important to understand the reasons behind these blasts in order to minimise damage. Electronic devices do not generally blast, but they may if we do not handle them properly.

Laptop explosion

In a laptop, the part that is most prone to an explosion is its battery. The smallest part of a battery is a cell. There are minimum three cells in a laptop battery and this number can go up to 12. The more the cells, the more backup for the laptop. More cells could also mean more time for a full charge. The explosion of laptop batteries will cause more damage as these contain more than one cell. If one cell is overheated and explodes, it will trigger a sequence of blasts, where each subsequent explosion would be more dangerous. The main reasons responsible for a laptop explosion are:

1. The most important reason for

a laptop to explode is some sort of fault with the battery. To understand what could be the fault, we need to understand how the lithium-ion battery works. There are different types of batteries, of which the popular rechargeable ones are either acid based or lithium-ion batteries. We may find acid based batteries in vehicles.



The lithium-ion batteries are more compact and have one electrode and one anode, with suspended electrons in the form of liquid. When using the laptop on battery, electrons flow from the negative side of cells to the positive side (contact points), thereby providing power to it. Similarly, when charging the battery, electrons are sent back to the electrode points to prepare the battery for consumption. Plenty of factors come into play here—over-charging, over-discharging and unwanted carbon build-up, among others.

Even though a lithium battery looks simple from outside, it has

built-in mechanisms to disconnect from the device and adjacent cells in case of over-charging or other such issues. However, a faulty laptop battery would not provide such mechanisms to protect the cells; these are missing one or more such precautionary mechanisms.

2. Another reason why a laptop battery may explode is mishandling. For instance, dropping it disturbs the alignment of the electrodes. This, in turn, changes the alignment of electrons in the cells, which may create overheating—a common reason for batteries to explode.

3. The atmosphere where the laptop is being used can also cause an explosion. For example, humidity may cause a short circuit, which, in turn, results in overheating and hence, explosion.

Precautions

Just like exploding pressure cookers, laptop batteries can also be dangerous. Our safety depends on how we use them. The only mantra to stay safe is to handle the electronic device with care. Precautions can be taken to make the use of laptops safe.

1. The obvious precaution for the prevention of a laptop-battery explosion is its proper maintenance. People tend to neglect batteries as these look low-maintenance and they assume these carry safe measures of voltage. But since their design is complicated,

simple negligence, like dropping it, can trigger an explosion.

2. Do not keep a laptop plugged-in all the time. Though not an issue most of the times, it is best not to do it. To avoid the dangers of forgetting or leaving the laptop on without use for a long time, setting-up a hibernation time in a laptop is suggested so that it auto shuts down. When not using a laptop for a longer time, always remove the battery and store it in a dry place.

3. Using a power stabiliser between the laptop plug and mains is recommended. This way, at most the fuse will get damaged and the laptop will disconnect from the mains if a higher voltage burst comes along.

4. Older batteries tend to take in more power and can overheat in no time. Using an old and exhausted battery can be dangerous. Always replace a considerably old battery. Alternately, you can remove the battery and run the laptop on direct power supply. The health of a laptop battery can be checked with an easily available feature in software like Windows 7 and the use of battery-health checker or battery-maintenance software.

Mobile phone explosion

Mobile phones are treated like play-things these days; however, these flashy gadgets can also prove dangerous if not handled with care. Sometimes, the blast happens to be so bad that the victim ends up with severe disfigurement to the body or even dies. Mobile phones explode either due to being used while being charged or call bombing. Charging puts pressure on the motherboard of the phone and using it while charging increases this pressure manifold. This causes the cheap electronic components in some mobiles to explode.

Call bombing refers to calls or missed calls received from some international numbers. If one receives or calls these numbers back, and the call exceeds a certain amount of time, the phone blasts. There are bugs, or malware, found in some Android



Mobile phone after explosion

based smartphones that can also cause an explosion by exerting extra pressure on the motherboard during charging.

Precautions

1. Buy a branded phone as far as possible. Ensure that the phone has a proper IMEI number (a code that identifies each phone). Check that the number on the phone corresponds to that on the box and receipt.

2. It is considered wise to check the accessories such as earphones, battery and charger. Make sure the battery description, such as voltage value, matches that of the charger to avoid over-charging, which sometimes leads to an explosion of the handset.

3. Avoid using the phone while the battery is being charged. If you need to receive a call during this time, disconnect the phone from the charger before connecting the call. Ensure that it is not over-charged by removing the electric supply when the battery is fully-charged.

4. If the battery seems to have swollen, replace it immediately.

5. Since anti-virus software for mobile phones are not as effective, it is harmful to surf the Internet or download anything on mobile phones.

6. Avoid using public or unsecured Wi-Fi connections. A hacker could access the mobile device through an unsecured port.

7. Make sure that Bluetooth connectivity is not switched-on in public places, as it can be used to send malicious files that may corrupt the operating system.

8. In case of a drenched phone, switch it off and dismantle it by removing the battery, SIM card and memory cards. Dry each component thoroughly, but gently, with a towel until the phone is dry.

Never use a hair dryer to dry the phone. This may cause important parts to melt, while forcing water further into the phone.

Flaming television sets

Although television electronics is robust and well-tested for many years for its safety, but still, with the expansion in sophisticated electronics in newly-manufactured television sets, incidents of televisions-on-fire are occasionally being reported. However, television fires are not a new problem and the US consumer product safety commission has been keeping track of TV fires since as far back as 1992.

In that year itself, there were 1400 television fires in the US, leading to the death of 20 people, with 120 injured. If fire is not controlled at the TV level, it can spread to the whole house. Televisions should never shut-off by themselves. There is an internal circuit breaker that gets activated as a safety precaution when a component is not functioning properly. In the event of a malfunction, we do not simply turn-off and then turn the television back on. If it shuts down or makes a popping sound, there could be some severe malfunction. A loud pop, followed by the set going black, is typical of a TV showing the first sign of component failure.

Precautions

1. If the television shuts itself off (with or without a pop), the first thing to do is unplug the power cord.

2. The next step is to call the manufacturer's customer service number and report the issue.

3. In case the television catches fire, put the fire out after unplugging it. ●

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