

....AND HE BLEW THE HOUSE DOWN

Here's what happened...

The picture here is the typical result of an event that happens hundreds of times every year – **an explosion**

In this case, the “fuel” was believed to be hydrogen generated from the computer backup battery charging system seen in the background. Ventilation of this relatively small portion of the 50,000 square foot building was either not working or poorly designed. The small amounts of hydrogen released during the battery charging operation apparently accumulated and then an ignition source led to the explosion. As you can see, the roof was blown off (about 400 square feet), the damage is extensive - but, no one was in the building so – luckily - no injuries. A typical event, happens all the time!



What is an explosion?

There are lots of definitions, but the explosion above resulted from a basic combustion process.

There were three steps:

- release of a combustible material (hydrogen in this case)
- accumulation of that material in a “cloud”, and then
- an ignition source provides the “spark” for combustion.

Obviously, the larger the accumulation, the larger the explosion!

What about hydrogen?

Hydrogen is an interesting gas, it is very “light” (it will rise quite rapidly in air) and has a very wide range of flammability. A large number of hydrocarbons are combustible in a range of 2-15%; hydrogen is combustible in a range of 4-74% (by volume), which is very wide by comparison. Also, the amount of energy required to ignite a hydrogen cloud is very low. These properties, in many respects, make hydrogen an ideal material for explosions in areas where it can be confined.

So, what do you do?

In this incident, a good ventilation system would likely dilute the small amounts of escaping hydrogen to maintain a concentration below the lower flammable limit – “dilution is the solution”! Indoor battery charging operations MUST take hydrogen generation rates into account, and an appropriately designed ventilation system installed, operated and maintained.

Whenever a flammable substance is present in a confined area, release of that material creates a potential explosion scenario.