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Can gas stations explode like on TV/in the movies? Why or why not?

ELI5: Can gas stations explode like on TV/in the movies? Why or why not?

Often in movies and such you see that gas stations can explode fairly easily, with a cigarette, or by running a car into the pumps, etc. In GTA 5 you can blow up an entire gas station in seconds with a Molotov cocktail. But I remember a Mythbusters episode where they basically showed that you can't blow up a car by shooting the gas tank, so that makes me suspect that the cinematic gas station explosions can't really happen either.

Astramancer

You're correct, it's difficult to happen. Mostly you'll just get a raging fire, rather than an explosion. To get an explosion, the gasoline needs to be aerosolized in some manner, either by spraying it in a fine mist, or a pre-explosion explosion -- at which point you get a fuel-air explosion. With gasoline, you get a big dramatic fireball, but it's actually not that dangerous unless you're actually in the fireball.

Gas stations are actually built with a lot of safety features. Most of the gasoline is stored underground where it would be safe from all but the largest explosions, and the pumps are built in such a way that it would be difficult for fire to go back down (even if you discount the oxygen problem). There's also an emergency cutoff which can be manually triggered which completely shuts off the flow of gas from underground. I doubt that there's more than a gallon of gas above ground level at each pump at any given moment, and that's basically just the gas in the pipes.

So fire yes, KABOOM, no, unless circumstances are exactly right (or wrong, depending on your perspective...)

giannisc

No. I answered the same question before. There are many safety rules that a gas station has, and [if] you blew it up, it would just burn. In order to blow up, it needs to be closed somewhere, so the air could not get out and break the thing that doesn't let it get out.