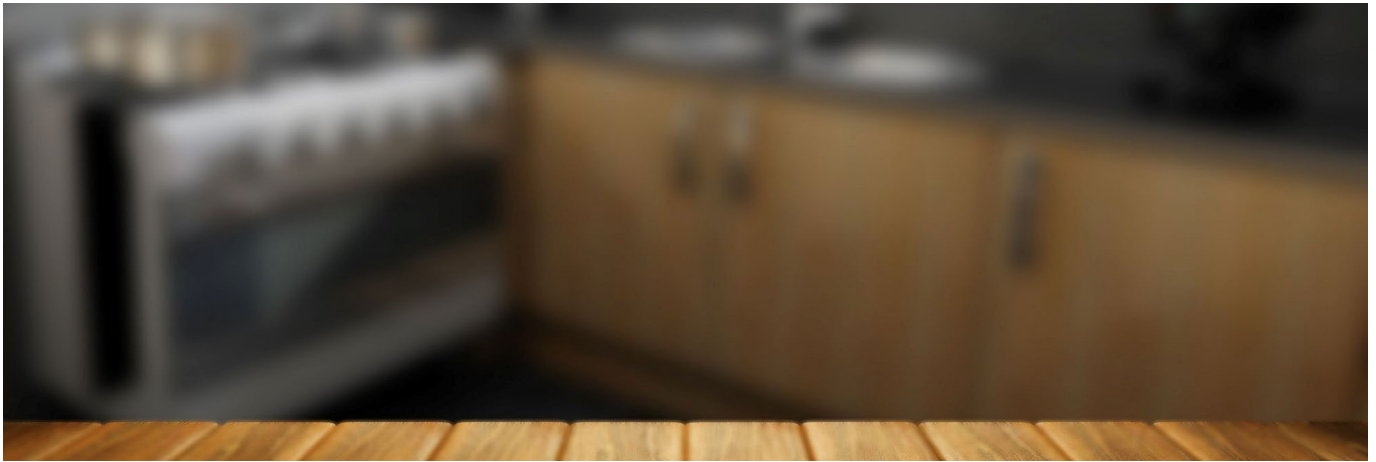


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An explosion rips a kitchen apart when an LPG cylinder explodes due to excessive heat from an electric stove plate. What happened?

A person was preparing dinner on the stove when the power went off due to load shedding. The person then took out their gas cylinder cooker, placed it on top of the stove, and continued with dinner preparations. When the power came back on, the family went off to watch TV, leaving the gas cylinder on top of the stove. The stove plate (which had not been switched off) heated the gas bottle, and it eventually exploded.

We have heard of similar stories of loss of appliances and building fires, sometimes with fatalities, all related to load shedding. Unfortunately, if reports in the public domain are anything to go by, load shedding is here to stay for another two years at least. It is, therefore, prudent that we all take necessary precautions to avoid loss of property and lives occasioned by load shedding.

Load shedding can cause direct loss of appliances and sensitive electronic equipment through switching surges. Switching surges are momentary spikes in the voltage level that occurs when power is restored following an outage, planned or unplanned (in this case, planned load shedding). These spikes may only last for a millisecond, but the more sensitive the equipment, the more likely it is to experience catastrophic failure immediately. The less sensitive equipment also faces the risk of loss of integrity with each surge and eventually fails after repeated exposure.

There is also the risk of catastrophic equipment failure that results in an explosion and/or ignition. This can result in fires causing much more damage than the loss of one appliance. If left (forgotten) in the ON position during load shedding, heat-generating appliances such as stoves and heaters can also cause direct ignition when power is restored. There is, therefore, a strong case for taking simple precautionary measures to minimise the possible hazards, both at the household level and for commercial entities.

For the residence

Unplug appliances during load shedding

The simplest precaution is to unplug all appliances of value once the power goes off and only plug them back in a few seconds after power is restored. (If no other indicator is available to alert the occupants when power is restored, it might be prudent to leave one light ON; at least a blown lamp can be replaced more easily than a TV). It is not adequate to switch the appliance off, as surge currents can sometimes "jump" across the gap in the appliance's internal switch.

Ensure all heat-generating appliances are switched OFF

Some robust appliances such as stoves, irons and heaters may not be damaged by surges but may cause worse fire damage by causing ignition when power is restored. When left ON during load shedding, it is easy to forget about them when power is restored.

In some cases, occupants may even have left the building. It is, therefore, critical to ensure that all such appliances are switched OFF once the power goes down.

Use surge protective devices (SPDs)

It is not always possible to unplug and plug back devices during load-shedding cycles for various reasons. In that case, it is worth considering the use of appropriate surge protection devices for sensitive appliances/equipment. The use of surge protective devices (surge arrestors) requires regular inspection as the devices themselves could present ignition hazards as they approach their end of useful life after several operations. If provided with an indicator light, the surge protective device should be replaced as soon as the LED stops lighting up when there is power.

For commercial operations

For safety – treat all circuits as live

For the safety of personnel, it is critical to assume that all electrical circuits are live. If work needs to be undertaken on electrical circuits/equipment during load shedding, apply the exact isolation requirements as would apply if power was on. Fatalities have been reported when embedded generators back-fed onto the grid while personnel were working on the line without isolating the load side

Ensure heating tunnels are emptied as soon as the power goes off

When the power goes off during load shedding, conveyors inside heating tunnels will immediately stop. In contrast, heat in the tunnel may remain high enough to cause the ignition of products on the belt. There should always be a procedure in place to vent the tunnel and possibly manually remove products from the tunnel.

If applicable, consider power isolation outside regular working hours

For some commercial operations, isolating non-critical circuits outside regular business hours is possible. Besides energy conservation, this also limits the number of devices/equipment potentially exposed to switching surges during power restoration after load shedding. Care should, however, be taken not to impair critical circuits such as security and fire alarm systems.

Consider UPSs for all critical process controllers

For those critical devices that cannot be isolated every time there is load shedding, consider connecting them via UPS (Uninterruptible Power Supply). While UPSs are not an appropriate substitute for SPDs, they help equalise the power supply to sensitive electronic devices and enable controlled systems to shut down. In some cases, they can provide continuous power to the equipment throughout load shedding.

Periodic inspection, testing and maintenance of electrical infrastructure

Last but not least, electrical infrastructure, like everything else, needs to be inspected, tested and maintained. When the integrity of electrical components is already compromised, chances of catastrophic failure due to surges are higher. Inspection and testing regimes vary from simple visual inspections and tightening connections to more advanced techniques such as infrared thermography. The regime is often informed by the complexity of the infrastructure and values to be protected, bearing in mind that fires may result from compromised infrastructure.

Conclusion

While it may not be viable to eliminate all risk factors related to load shedding, these recommended precautions can minimise loss.