

## InterRisk Asia Report <2024 No.01>

### Fire Accident from Electrical Short Circuit

#### [Summary]

- The short circuit is one of the major causes of fire incident in Asia, and occur due to improper management and use of electrical wiring.
- Measures to prevent electrical short circuit include checking the condition of power outlets and capacity of extended power sockets, properly installing circuit breakers, using electrical equipment that complies with safety standards, and maintaining electric fans.
- To prevent electrical short circuit, some activities need to be done as well as build awareness behavior.

### Fire Statistics in Thailand

Statistical data from Bangkok Fire and Rescue Department indicates one of the most frequent public disasters in Thailand is primarily caused by grass fires and waste burning, following by electrical short circuits as mentioned in Figure 1. (The information in below charts contain since Jan 2017 until March 2023)

Although, short circuits pose a secondary significant frequent public disaster in Thailand and other Asian Countries, their consequences can be devastating, affecting both property and lives. Hence, it is imperative to treat electrical short circuits with the utmost importance.

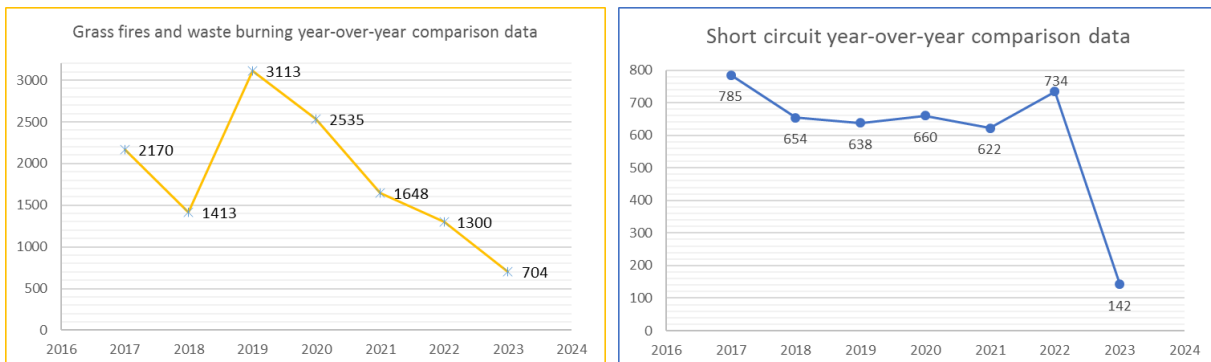


Figure 1: Year-over-year comparison data chart of grass fires and waste burning (Left) and short circuit (Right)

(Reference: Bangkok Fire and Rescue Department)

### What is a short circuit?



Figure 2: Short circuit (Reference: generated by OpenAI's DALL-E model)

A short circuit occurs when electricity finds a shortcut around the intended path in a circuit. This typically happens when two wires with different voltages come into unintended contact, or an electric conductor comes into contact with ground. The short circuit can cause several problems: causing the wires to overheat and potentially melt, creating spark when current jumps between wires. These problems can ignite nearby flammable or combustible material, posing a fire hazard. Common household electrical equipment includes electric fans, sockets, and other appliances used daily. These items can be potential sources of short circuits due to overuse or damage.

## How does short circuit occur?

Our surroundings pose many short circuits risks, particularly with basic electric equipment. Short circuits can be caused by various factor, include

- Vermin or pests chewing through wires
- Water or other fluids coming into contact with electrical wiring
- Loose connections in electrical boxes
- Old or damaged outlets, switches, lights, appliances, or other electrical devices
- Nails or screws piercing through walls and coming into contact with wires
- Deterioration of electrical cable sheathing
- Build-up or surges of electricity also contribute to these risks
- Heat from overloaded electrical equipment (An electrical overload is the condition where the load takes more current than the normal or rated current.)

Improper use of electrical equipment significantly increases the likelihood of short circuits. This includes storing equipment in unsuitable places, using nonstandard equipment, operating if for excessive period, or overloading the circuits. Any of these actions can cause overheating, damage and compromise the insulation in the circuit, leading to a malfunction of the normal circuit paths and causing short circuit, posing a fire hazard that was mentioned earlier.

## How to prevent short circuit

Short circuit can happen in many ways in any places at any time but there are some steps to follow to reduce your risk of fire from short circuit



### Check power outlet before use

Power outlet is commonly use in daily life, however, this is one of the reasons that cause short circuit. To avoid that, power outlet should be checked every time before use. If there are any signs of damage, burnt, or sparks when plugged in, it is the time to change or repair that power outlet.

Figure 3: Power outlet burnt

*(Reference: generated by OpenAI's DALL-E model)*

### Do not connect extended sockets with other extend power sockets

Each power outlet of extend socket can handle the current of appliance but not enough to handle enormous current to supply many appliances at the same time. The improper use can lead to overloading, followed by overheating and eventually result in a fire.



Figure 4: Connect extended sockets with other extend power sockets

*(Reference: generated by OpenAI's DALL-E model)*

### Installed circuit breaker

To prevent overcurrent which might lead to fire incident, circuit breaker should be installed and regularly maintenance to cut the electricity both automatically and manually in case of accident.



## Use electrical equipment with a standard approved

A manufacturing standard is established to control the quality of the product going to the market. Using equipment with a standard approved can ensure the quality of the product, including the material of goods. Moreover, products that have been tested, for example, fire resistance or overcurrent cutoff, can lower the risk of fire spreading and damaging other properties.

Figure 5: standard approved in Thailand (Reference: Thai Industrial Standards Institute (TISI))

## Prevention of short circuit on electric fan

Dust from the surroundings can accumulate in the motor, dragging the fan blades and causing heat since the motor needs to work harder against friction. Scheduling the cleaning period can regularly remove dust and reduce the risk of short circuits. The heat from the motor is also the cause of wire deterioration, resulting the short circuit. Thus, a fan should not be used over the limitation of the electrical socket's power. Additionally, avoid using a single fan to prevent heat accumulation from continuous use.



Figure 6: Electric fan accumulated by dust (Reference: generated by OpenAI's DALL-E model)

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