



BATTERY HANDLING & CHARGING SAFETY

TOOLBOX TALK: Battery Handling & Charging Safety

RATTLIR Safety Series – "Strike Before It Bites"

Purpose

Lithium Polymer (LiPo) batteries used in sUAS are highly energy-dense and require careful handling, charging, and storage to prevent failures, thermal runaway, or fire. This toolbox talk provides guidance on safe handling practices, industrial field considerations, battery fire prevention, and emergency response procedures.

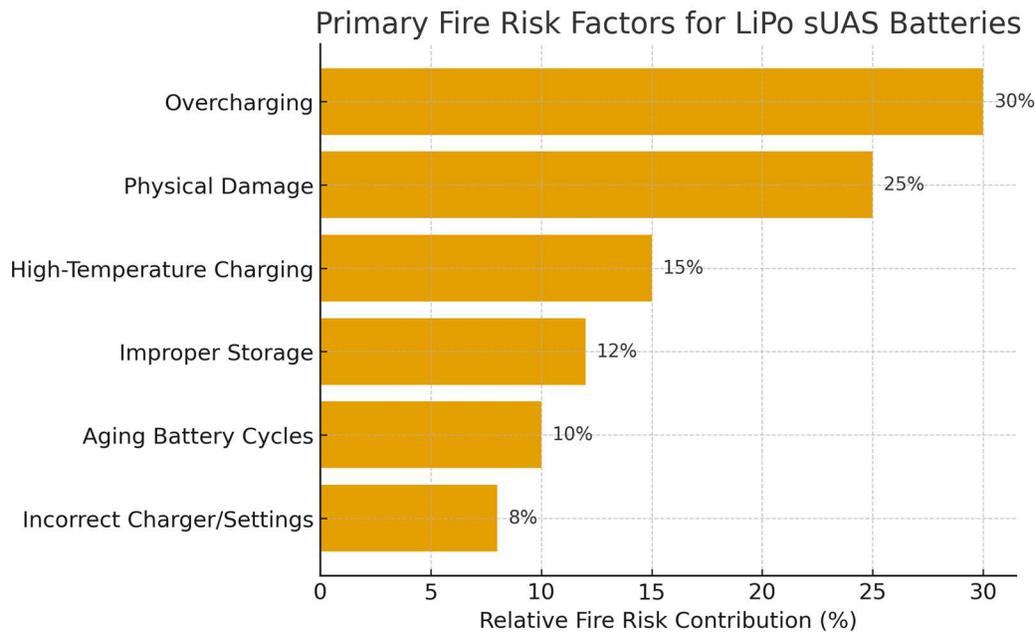


Figure 1 – Primary Fire Risk Factors for LiPo Batteries

General Battery Handling Requirements

Proper handling reduces the likelihood of mechanical damage and electrical hazards:

- Always handle batteries gently and avoid dropping, crushing, or bending packs.
- Inspect batteries before each use for swelling, cracks, punctures, or damaged leads.
- Do not continue using batteries that show signs of physical or internal damage.
- Transport batteries in protective, non-conductive containers or cases.
- Never carry loose batteries in tool bags or pockets where terminals could short.



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Battery Charging Safety Practices

Safe charging practices are critical to preventing overheating, thermal runaway, or electrical failure:

- Always charge batteries using approved chargers and correct charge settings.
- Charge batteries in a fire-resistant LiPo bag or metal container.
- Place batteries on a nonflammable surface such as concrete or tile.
- Never leave batteries unattended while charging.
- Allow batteries to cool after flight before initiating charge cycles.

Industrial and Field Charging Hazards

Charging batteries in field or industrial environments introduces additional risks that require special precautions:

- Avoid charging inside vehicles, near flammable materials, or close to energized equipment.
- Use only grounded, stable power sources when charging from generators or inverters.
- Prevent exposure to extreme temperatures – LiPo batteries degrade rapidly in cold or hot conditions.
- Secure charging areas to prevent accidental contact or equipment movement.

Battery Fire Prevention Measures

Preventing battery fires requires early detection of battery degradation and deliberate fire-mitigation steps:

- Remove from service any battery that appears swollen, soft, dented, or damaged.
- Store batteries at 30–50% charge when not in use to reduce fire risk.
- Do not charge batteries at full rate in extreme cold or heat.
- Use fire blankets, sand buckets, or Class D extinguishers in designated charging areas.
- Quarantine suspect batteries in fire-resistant containers until they can be properly disposed of.



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Emergency Response for Battery Fires

Battery fires escalate quickly, and crews must be prepared to respond safely and effectively:

- Water is effective for cooling a lithium-ion battery and suppressing the surrounding fire. However, DO NOT pack the battery in ice, because it will insulate heat and allow thermal runaway to reoccur.
- ABC Class fire extinguishers can be used.
- If a battery begins to hiss, smoke, or vent, evacuate the immediate area and allow it to burn out in a safe, isolated location.
- Notify the control room, supervisor, or emergency contact immediately.
- Do not touch the battery for several minutes after fire or venting, as cells remain extremely hot.

Battery Storage and Transport

Proper storage reduces chemical degradation, swelling, and long-term fire risk:

- Store batteries in fire-resistant bags, ammo cans, or metal cases with vent holes.
- Avoid storing batteries fully charged or fully depleted for extended periods.
- Keep batteries away from direct sunlight, heaters, or cold outdoor environments.
- Do not store damaged or questionable batteries with good batteries.

Discussion Questions

- Do you understand how improper charging or handling can lead to battery fires?
- Are you aware of the signs of early battery failure such as swelling or overheating?
- Do you have a safe charging area and the proper equipment for today's flight operations?

RATTLIR Takeaway

LiPo batteries provide exceptional performance for sUAS operations but must be treated with respect due to their sensitivity to damage, heat, and improper charging. By following strict handling practices, monitoring battery health, and preparing for fire-related emergencies, operators prevent avoidable failures. RATTLIR strikes before it bites by emphasizing proactive battery management, deliberate charging discipline, and early detection of hazards.