CASE STUDY:

FIRE PROTECTION OF OIL-FILLED SUBSTATION TRANSFORMERS

Client: Confidential UK Client
Location: Heathrow Region, United Kingdom
Sector: Electrical Infrastructure / Critical Power

CHALLENGE

In March 2025, a transformer fire at a UK National Grid substation caused an extended power outage at Heathrow Airport, resulting in widespread operational and economic disruption. International Airlines Group (IAG)— the parent company of British Airways—alone reported an estimated $56 million USD[1] impact to its operating profits from the event.

The post-incident review identified a long-standing vulnerability: inadequate fire suppression for oil-filled transformers[2]. This high-profile event triggered sweeping reviews of the UK's critical infrastructure—particularly data centers and electrical networks. It underscored the need for a fail-safe way to prevent transformer fires, as replacement lead times continue to grow, with 2024 quotes ranging from 1.5 to 4 years[3].

The client sought a way to protect live transformers from fire risk caused by oil leaks or damage—without requiring costly shutdowns or heavy equipment mobilization. The solution needed to provide passive, continuous protection once installed, operating autonomously in the event of a leak.

Key requirements

1. Eliminate ignition risk from leaked transformer oil
2. Avoid complex piping, sensors, or power systems
3. Install quickly under operational conditions
4. Optimizes full spill containment capacity

[1] Source: https://www.flightglobal.com/air-transport/london-heathrow-closure-after-substation-fire-cost-iag-around-50m/162932.article
[2] Source: https://www.bbc.com/news/articles/c2eznzp0w7ko
[3] National Infrastructure Advisory Council (NIAC). *Addressing the Critical Shortage of Power Transformers to Ensure Reliability of the U.S. Grid (Draft Report)*. June 2024.

INSTALLATION

Installation is typically simple: open Dryfoam bag and pour. This installation included some new challenges, however. Due to the zero down-time requirement and retrofit nature of the project, some areas requiring Dryfoam coverage offered poor access. To install in these areas without removing equipment, a thin layer of water was introduced into the basin to help the Dryfoam beads flow into low-clearance areas. Once the beads were in place, the water was drained, leaving the final installation of Dryfoam clean and dry.

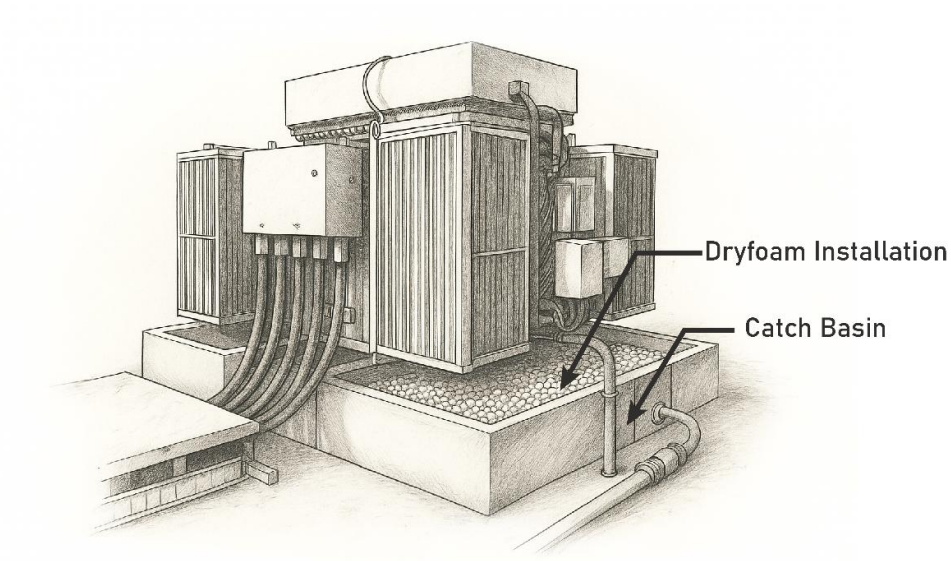

Figure 1: Dryfoam installation under active transformers (photography prohibited)

RESULTS

	Requirement	Outcome
1	Eliminate ignition risk from leaked transformer oil	Any oil leaks will now flow through Dryfoam blanket to the bottom of the catch basin, passively contained and unable to ignite.
2	Avoid complex piping, sensors, or power systems	Passive system installed with water and bags of product by hand.
3	Install quickly under operational conditions	Installation took less than one hour per transformer, despite novel installation technique used for retrofit.
4	Maintain full spill containment capacity	Dryfoam conformed to existing equipment and met full containment needs.

LESSONS LEARNED

- Novel installation method using a thin water float proved feasible when retrofitting or installing in difficult-to-access areas.
- Regulatory alignment achieved—met current fire safety recommendations for oil-filled transformer containment, a new application for Dryfoam.
- Operational confidence increased— proved that fast installation and zero downtime are possible while equipment remained operational.