

CASE STUDY — PRODUCT LIABILITY / FIRE ORIGIN AND CAUSE

Residential Fire Attributed to a Lithium-Ion Battery Pack

Matter type	Product liability and insurer subrogation following a total-loss residential fire
Retained by	Subrogation counsel for the property carrier
Issue	Origin and cause of the fire, and whether a design or manufacturing defect in the battery pack or its charger was responsible
Role	Testifying expert — origin and cause, with electrical engineering analysis

Background

A fire originating in an attached garage destroyed a single-family residence overnight. A personal mobility device had been left charging in the garage. The manufacturer asserted that the homeowner had used a non-original replacement charger and that any failure was the result of misuse rather than a defect in the product as sold.

Scope of work

- Scene examination and fire-pattern analysis conducted in accordance with the systematic methodology of NFPA 921, including hypothesis development and testing.
- Layered excavation of the area of origin with documentation of artifact positions before removal.
- Coordination of a joint evidence examination with counsel for all parties, followed by industrial computed tomography of the recovered battery pack prior to any disassembly.
- Cell-level teardown, examination for internal short-circuit indicators, separator condition and evidence of thermal runaway propagation between cells.
- Bench testing of an exemplar charger and pack, including protection-circuit behavior under overcharge and cell-imbalance conditions.
- Review of the manufacturer's design records, protection-circuit specification, cell qualification testing, and field failure and warranty history produced in discovery.

Findings

Fire patterns and the burn-through sequence placed the area of origin at the charging location, and all competing ignition hypotheses in that area — the branch circuit, the vehicle, and stored combustibles — were examined and eliminated on the physical evidence. Computed tomography and subsequent teardown identified a single cell exhibiting internal failure with propagation outward to adjacent cells, the pattern characteristic of thermal runaway initiating within the pack rather than external heating. Exemplar testing showed the pack's protection circuit did not interrupt charging under a sustained cell-imbalance condition, and that the same behavior occurred with the original charger. The replacement charger's output was within the range the pack was specified to accept. On that basis the charger substitution was not causal, and the absence of effective cell-level protection was.

Deliverables and use in the case

- Spoliation-safe evidence handling and chain-of-custody documentation from the first site visit forward.
- Origin-and-cause report with hypothesis-elimination analysis compliant with NFPA 921 methodology.
- Supplemental engineering report on the protection-circuit design and the exemplar test protocol and results.
- Testimony at deposition; the carrier recovered a substantial portion of its payout in settlement.

WORKING WITH FORWARD THINKING

How We Support Counsel

Early case assessment	A candid technical read before you commit to a theory. If the engineering does not support the claim or defense, we say so early, while that information is still useful and inexpensive.
Evidence preservation	Failure evidence is fragile and often destroyed inadvertently. We advise on preservation demands, joint inspection protocols and destructive testing agreements at the outset.
Defensible methodology	Analysis is conducted to recognized consensus standards and documented so that each step, assumption and calculation can be traced and reproduced — the standard a Daubert or Frye challenge is measured against.
Clear communication	Reports, demonstratives and testimony are written to be understood by judges and juries without an engineering background, while remaining technically precise under cross-examination.
Rebuttal work	We are frequently retained solely to evaluate an opposing expert's methodology, assumptions and calculations, and to identify where the conclusions outrun the underlying evidence.
Conflict checking	Prompt conflict clearance and a written engagement scope before substantive work begins.

Practice areas

Structural and mechanical failure analysis · Product liability and design defect · Fire and explosion origin and cause · Accident reconstruction · Materials and metallurgical failure · Construction defect · Industrial and workplace incidents · Equipment and machinery failure

Discuss a matter

Initial consultations to determine whether a matter is within our expertise are without charge. Contact us with the case posture, the technical question at issue and your key deadlines.

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