



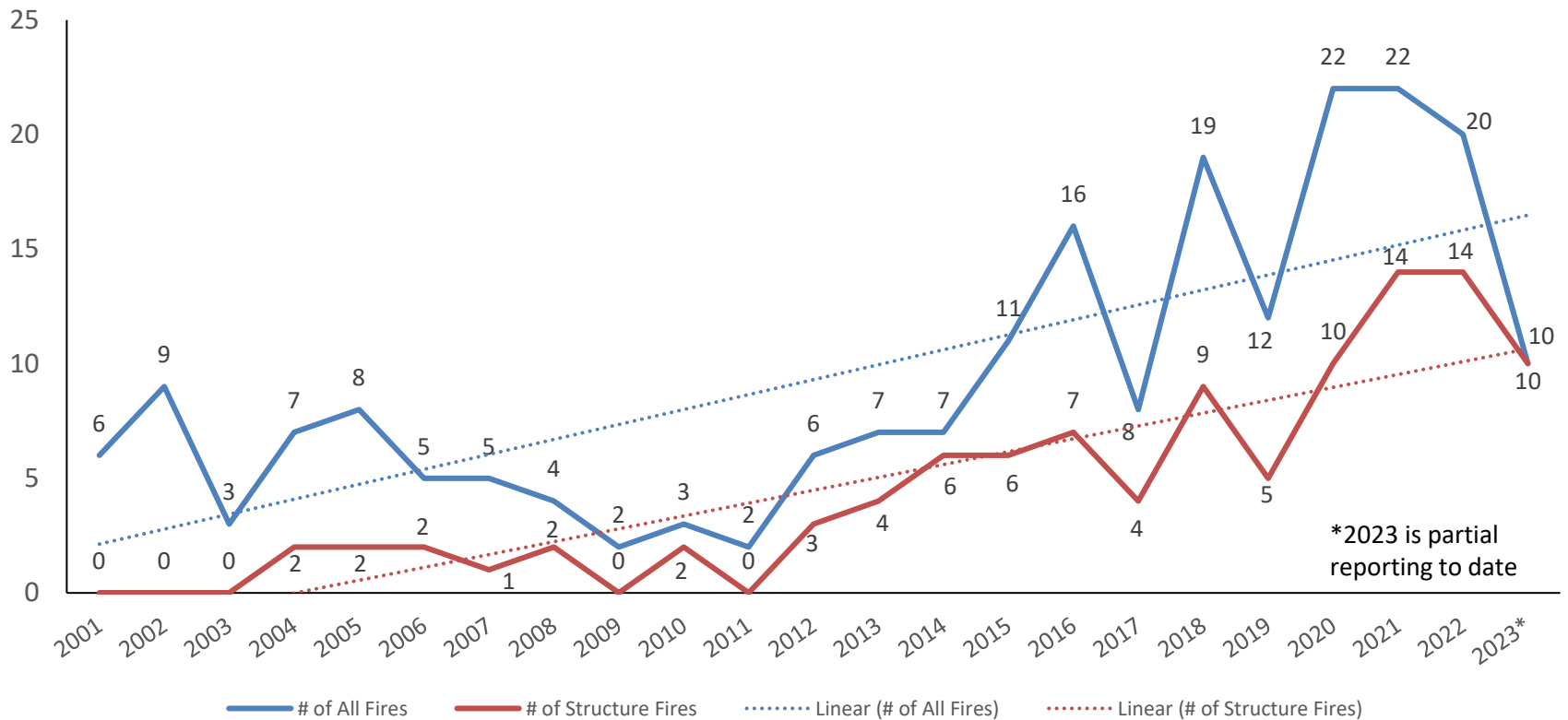
DEPARTMENT OF FIRE SERVICES

Executive Office

Documenting & Coding Lithium-ion Battery Fires

Battery Fires in MA

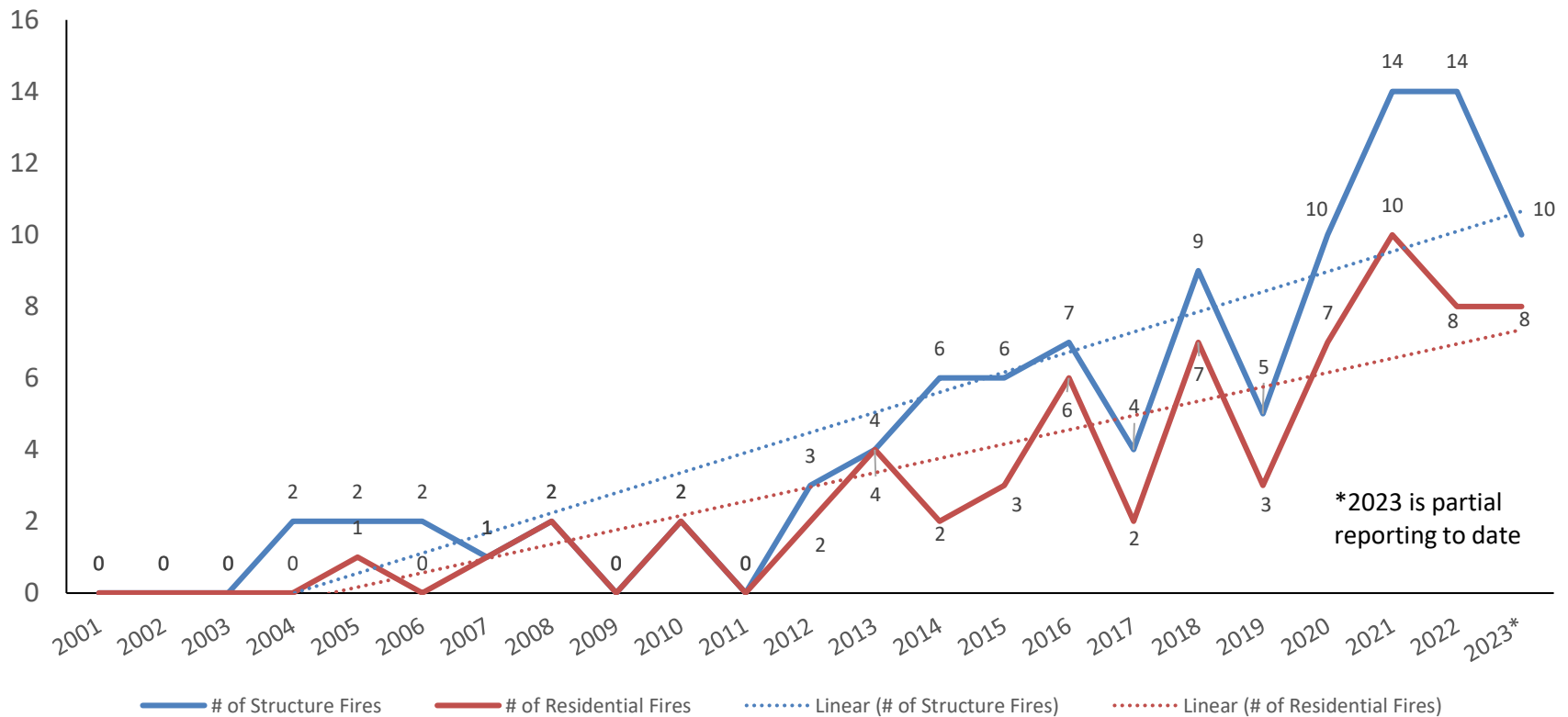
MA Battery Fires 2001 - 2023*



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Battery Fires in MA

MA Battery Fires in Structures 2001 - 2023*



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Battery Fires in MA

- NFIRS/MFIRS doesn't allow us to track this 'new' fire problem.
 - Cannot add enough codes to accurately track the problem.
- Most likely under reported.
- Need to distinguish between equipment and battery.
 - Which started the fire?
- Cannot distinguish between various types of batteries.



Lithium-Ion Battery Fires - FDNY



Bureau of Fire Investigation

Lithium Ion Fire Stats

As of September 25, 2023 @ 07:00



	<u>Investigations</u>	<u>Injuries</u>	<u>Deaths</u>	<u>Structural</u>	<u>Non-Structural</u>	<u>NYCHA Prop</u>
2019	30	13	0	23	7	N/A
2020	44	23	0	37	7	N/A
2021	104	79	4	77	27	17
2022	220	147	6	162	58	16
<i>YTD</i>						
2022	156	89	6	115	41	13
2023	200	114	14	139	61	7

2021 17 Lithium Ion fires in NYCHA properties
 2022 16 Lithium Ion fires in NYCHA properties (YTD 13)
 2023 7 Lithium Ion fire in NYCHA properties

<u>BOROUGH</u>	<u>2023</u>	<u>2022</u>
BRONX	61	51
BROOKLYN	61	62
MANHATTAN	39	49
QUEENS	39	57
STATEN ISLAND	0	1
TOTAL	200	220



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Lithium-Ion Battery Fires - FDNY



Lithium Ion Battery Fires As of September 25, 2023 @ 0700



Lithium Ion Battery Fires As of September 25, 2023 @ 0700



LITHIUM-ION BATTERY FIRES as of 9/25/2023	200
Actively Charging	76
Not charging at time	90
Unable to confirm if actively charging at time	34
E-MOBILITY DEVICE RELATED BATTERY FIRES	143
DEVICE BATTERIES	
E-Bike Batteries	53
E-Moped/E-Motorcycle	39
E-Scooter	19
HoverBoard	4
Unicycle (recalled product Begode Gotway)	2
Skate Boards	3
Rideable Toy Car	1
Unconfirmed mobility device(scooter/bike/moped)	22
Robotic Vacuum	1
Electric Golf Caddy	1
Snow Blower	1
Electrostatic Handheld Sprayer	1
Cell Phone battery	1
Vacuum	1
Leaf Blower	1
Power Tool	4
Portable charger/portable power bank	2
Homemade Solar Power Bank/Inverter	2
Vape Pens	2
unable to determine battery device	38
Automobile - Prius battery	1
Motorcycle (gas powered) - Li-Ion battery	1
MAKES & MODELS of KNOWN MOBILITY DEVICE & BATTERIES	
E-Bike - Tang Lion Model/ TS1500DT-3C serial# 102W7265322YA	1
E-Bike - TAILG unknown battery & charger	2
E-Bike - Citibike Cosmo LYFT-BAT20	1
E-Bike - Citibike unknown model, (garbage truck)	1
E-Bike - RC Fly 7 with factory original battery & charger	1
E-Bike - Fly 7	2
E-Bike - Arrow 9A	1
E-Bike - Fly 11	1
E-Bike - Fly E-Bike (bike & replacement battery)	2

Homemade Solar Power Bank/Inverter	2
Unknown portable charger	1
Unknown Vape Pen	1
Power Tool - Milwaukee Cordless Super Sawzall	1
Snow Blower - Powersmart 80V DB2805RB	1
Electrostatic Handheld Sprayer - Victory	1
Vape Pen - Suorin Air Bar Disposable	1
Portable Charger - Bestley 10K mAh Power Bank m# S109PB	1
LITHIUM-ION BATTERY FIRES (unable determine device)	
Unidentified - rubbish/sanitation/scrap yard/street/damage	25
Hoverboard and power tools - unable to determine device cause	1
Unknown - cleanup/no interview/no access	10
Lithium Ion battery inside vehicle	2
OCCUPANCIES	
Multiple Dwellings	82
Private Dwellings	33
Garage/Shed/Driveway/Alley	10
Commercial - Inside E-Bike Store	5
Commercial - sidewalk of E-Bike Store	2
Commercial - Scrap Yard/Recycling Center	3
Commercial - Supermarket	2
Commercial - Warehouse	2
Commercial - Con Ed Facility	1
Commercial - Bank	1
Nursing Home	1
Transit - Grand Central Ops Center	1
Pizzeria	1
Restaurants	11
Deli & Grocery	1
Smoke Shop	1
Vehicle - Sanitation (12 DSNY, 2 Private, 1 Parks, 1 DOT)	16
Vehicle - Dodge Sportsman Camper Van (E-bikes)	1
Vehicle - (batteries left inside of car)	3
Vehicle - Toyota Prius Traction battery pack	1
Vehicle - Flat bed of pickup truck	1
Vehicle - Inside CitiBike transport van	1
Street/Sidewalk	19
Outside Rubbish/Lot	1



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Coding Lithium-ion Battery Fires

- NFIRS/MFIRS doesn't directly allow for coding any specific type of battery fires.
 - This includes Lithium-ion batteries.
- The National Fire Data Center (NFDC) has published 2 NFIRSGrams on how to code fires with Lithium-ion batteries.
- E-Cigarette Fires
 - <https://www.usfa.fema.gov/nfirs/coding-help/nfirsgrams/nfirgram-electronic-cigarettes.html>
- Electric/Hybrid Vehicle Fires
 - <https://www.usfa.fema.gov/nfirs/coding-help/nfirsgrams/nfirgram-electric-hybrid-vehicle-fires.html>



Coding Lithium-ion Battery Fires

Coding an E-Cigarette Fire

- Heat Source = 12 – Radiated or conducted heat from operating equipment.
- Item 1st Ignited = Should be the item contacted by the battery such as a curtain or chair cushion.
- Factors Contributing to Ignition =
 - Fails during charging = 50 - Operational deficiency, other
 - Fails any other time = 40 – Design, manufacturing, installation deficiency, other
- Equipment Involved in Ignition = 229 - Battery.
 - This code is for all battery types.
 - Equipment Power Source = 12 – Batteries and low voltage (<50 volts)
 - Equipment Portability = 1 – Portable
- Always put lithium-ion battery in the narrative.
 - Spell it out (correctly).



Coding an E-Cigarette Fire

Fire Module Cause & Origin fields

D Ignition	
Area of Fire Origin	Confined to Object of Origin
21 Bedroom - < 5 persons; included are jail or prison	
Heat Source	Type of Material First Ignited
12 Radiated, conducted heat from operating equipment	71 Fabric, fiber, cotton, blends, rayon, wool
Item First Ignited	
21 Upholstered sofa, chair, vehicle seats	
Previous Tab Next Tab	
OK Cancel	



Coding an E-Cigarette Fire

Fire Module Contributing Factors and Equipment fields

Sections B - D Sections E - F Sections G - H

E1 Cause of Ignition
3 Failure of equipment or heat source

E2 Contributing Factors Add

Code	Description
50	Operational deficiency, other
40	Design/Manufacture/Installatio...

E3 Human Factors Add

Code	Description
------	-------------

Estimated Age Gender of Person

F1 Equipment Involved ☐ None

Equipment Involved in Ignition Brand

229 Battery

Model Serial # Year

F2 Equipment Power **F3 Equipment Portability**

12 Batteries and low voltage (< 50 volts) 1 Portable

Previous Tab Next Tab



Coding an Electric or Hybrid Vehicle Fire

- Electric Vehicle
 - A vehicle with electricity as a sole power source whether from an internal or external battery.
 - E.g. Overhead power lines used to power a streetcar.
 - E.g. Tesla Model S, Y or 3, Chevy Bolt, Nissan Leaf, etc.
- Hybrid Vehicle
 - Uses more than 1 means of energy, combining a gasoline or diesel engine with an electric motor.
 - E.g. Toyota Prius
 - Can include bicycles, motorcycles, cars, trucks or boats.
- The Incident Type code when the vehicle is the cause of a fire will be from the 13x series: Mobile property (vehicle) fire.



Coding an Electric or Hybrid Vehicle Fire

- The Mobile Property section is used to identify a hybrid or electric vehicle in the NFIRS report.
 - Please use the Mobile Property Model field to define “electric” or “hybrid.” **Please use proper spelling!**
- Example: A fire caused by an all electric car.
- Incident Type code 131 – Passenger vehicle fire
- Fire Module fields:
 - Mobile Property Involved = 3 – Involved in ignition & burned
 - Mobile Property Type = 11 – Passenger car
 - Mobile Property Make = OO – Other
 - Mobile Property Model = ‘Model’ (**Electric** or **Hybrid**)



Coding an Electric or Hybrid Vehicle Fire

- Fire Module Mobile Property fields

H1 Mobile Property ☐ None			
Mobile Property Involved in Ignition	Mobile Property Type		
3 Involved in ignition and burned	11 Passenger car.		
Mobile Property Make	Model		
00 Other Make	Tesla Model S (Electric)		
Licence Plate	State	Year	VIN #
123456	Massachusetts	2023	TS144455545555555
Previous Tab Next Tab OK Cancel			



Coding an Electric or Hybrid Vehicle Fire

- If the charging station is the cause of the fire:
 - If the charger is in or attached to a structure
 - Incident Type = 111 - Building fire
 - Structure Fire Module is required.
 - If charger is outside
 - Incident Type = 162 – Outside equipment fire
 - Equipment Involved in Ignition = 228 – Battery charger.
 - Equipment Brand and Model can be used to identify the specifics of the charger manufacturer.
 - Note that the charger is for an electric or hybrid motor vehicle in the Remarks/Narrative section.



Coding an Electric or Hybrid Vehicle Fire

Fire Module Contributing Factors & Equipment fields

Fire Module

Sections B - D Sections E - F Sections G - H

E1 Cause of Ignition
3 Failure of equipment or heat source

E2 Contributing Factors
Add

Code	Description
50	Operational deficiency, other
40	Design/Manufacture/Installatio...

E3 Human Factors
Add

Code	Description
------	-------------

Estimated Age Gender of Person

F1 Equipment Involved ☐ None

Equipment Involved in Ignition Brand
228 Battery charger, rectifier JuiceBox

Model Serial # Year
2JBO40IRNA-QJWX-300 2020

F2 Equipment Power
11 Electrical line voltage (> 50 volts)

F3 Equipment Portability
2 Stationary

Previous Tab Next Tab

OK Cancel



Documenting Lithium-ion Battery Fires

- Since NFIRS/MFIRS has so much trouble documenting any type of battery fires we've come up with a Lithium-ion Battery Fire Checklist.
 - It's similar to the FSC Cigarette Fire Checklist.
 - It's a fillable form.
 - Once complete you'll be able to email, fax or mail it to DFS.
 - This is in addition to the standard MFIRS report.
 - Will allow us to document & collect much more information.
 - Will be entered into a DFS database and allow us to track these types of fires in much more detail.



Documenting Lithium-ion Battery Fires

- Lithium-ion Battery Fire Checklist (con't)
- Asks for basic incident information.
- Asks for the type of equipment the battery was powering.
 - It's brand/make & model.
- Asks for information on the battery itself.
 - Brand & size
- Asks where the equipment or battery was purchased.



Lithium-ion Battery Fire Investigation Checklist

- Form FP-031
 - Need to complete header information
 - Choose 1 of the pieces of equipment
 - Enter battery information (if known)
 - Enter casualty information
 - Complete Report By
 - Email, fax or mail to DFS
-
- Incidents will be tracked
 - Data will be made available



Department of Fire Services
Commonwealth of Massachusetts

Lithium-Ion Battery Fires: Investigation Checklist (FP-031)

Fill out this form with the most probable information based on the initial results of the investigation.

Fire Date: _____ Fire Time: _____ FDID #: _____
Incident #: _____ Fire Location: _____
Number, Street/Highway, Town

Equipment Information

Brand/Make & Model

☐ Laptop Computer _____
☐ Micromobility Device (hoverboard, scooter, bike) _____
☐ Cellphone, Tablet, or eReader _____
☐ Power Tool _____
☐ Uninterrupted Power Supply _____
☐ Toy (RC car, drone) _____
☐ Vehicle (car, truck, boat, plane) _____
☐ Energy Storage System _____
☐ Battery Charger _____
Was the battery charging at the time of the fire? Yes ☐ No ☐
☐ Other _____

Battery Information

Brand: _____
Size (Voltage): _____
Did the battery cause the fire? Yes ☐ No ☐
Where was battery or equipment purchased? _____
Was the battery or equipment purchased online? Yes ☐ No ☐

Casualties

Civilian: Injuries _____ Deaths _____
Fire Service: Injuries _____ Deaths _____

FIU Case #: _____

Report by: _____
Rank, Name, Department or Agency

Submit the form by email, FAX or mail.

Email using the button on the left or send to:

MFIRS.Firesafetydivision@mass.gov

FAX to (978) 567-3199

Mail to Department of Fire Services, P.O. Box 1025, State Road
Stow, MA 01775, Attn: Fire Safety Division

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