How Durable are Used Electric Vehicles?

An analysis of the performance of electric vehicles beyond 3 years of age, drawing on the UK's public MOT dataset.

Commissioned by: British Vehicle Rental and Leasing Association (BVRLA) & Ben Kilbey

Data Source: UK Department for Transport / Driver and Vehicle Standards Agency (DVSA) MOT Test Database

Dataset Scale: 47.4 million MOT tests (12-month post-remediation sample); 863 million historical test records across 141.4 million vehicles

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Executive Summary & Abstract

The debate over the roadworthiness and longevity of used battery-electric vehicles (BEVs) has suffered from an absence of large-scale, empirical evidence. Public discourse has oscillated between naive claims that electric cars never fail and opposing assertions that battery weight destroys suspension assemblies and eats tyres.

This report presents findings from an independent analysis of 47.4 million statutory MOT tests completed across Great Britain between July 2024 and July 2026, extracted from the official DVSA bulk dataset following data-pipeline remediation.

Our analysis demonstrates that evaluating electric vehicle roadworthiness requires navigating three distinct analytical layers:

1. **Layer 1 (The Naive View):** In an unadjusted sample, BEVs achieve a headline failure rate of **13.5%**, compared to **21.4%** for petrol and **24.1%** for diesel. This comparison is fundamentally flawed because the UK electric fleet is vastly younger than the internal combustion fleet.
2. **Layer 2 (The Age-Controlled View):** Controlling for vehicle age (ages 3–12), BEVs record failure rates **2 to 3 percentage points higher** than petrol vehicles. This comparison is also misleading because electric cars cover substantially higher annual mileage: by their first MOT at age three, BEVs have recorded a median of **27,072 miles**, compared to **20,499 miles** for petrol vehicles (+32.1%).
3. **Layer 3 (The Age- and Mileage-Controlled View):** When comparing vehicles of identical age and identical mileage, the true durability profile of electric vehicles emerges:
    a) **Low Mileage (40,000 miles):** BEVs and petrol cars perform at near parity (within 0.3 to 0.7 percentage points).
    b) **The Plateau (60,000+ miles):** Beyond 60,000 miles, BEV failure rates level off at approximately **16%**, while petrol and diesel failure rates climb relentlessly past 23%.

c) **High Mileage (90,000–120,000 miles):** Among 3-to-8-year-old vehicles, BEVs fail at **16.5%**, compared to **22.1%** for petrol and **21.2%** for diesel — a **25% relative durability advantage**.
d) **Extreme Mileage (120,000+ miles):** The durability gap widens to **7.5 percentage points** (16.0% failure rate for BEVs vs 23.5% for petrol).

Furthermore, longitudinal cohort tracking of vehicles over consecutive test years reveals that **old electric vehicles stay on the road at double the rate of combustion vehicles**: at age 15, the road exit rate for BEVs is **5.4%**, compared to **11.9%** for petrol vehicles. In twin-model tests comparing identical vehicle bodies that are available in electric and non-electric fuel types (e.g. Hyundai Kona, Nissan NV200), electric drivetrains win 5 out of 9 comparisons, tie 3, and lose only 1.

The analysis revealed that electric vehicles do suffer against ICE vehicles on one front: they carry an elevated tyre wear rate (~1.8× petrol) that is concentrated on early combustion-conversion platforms, and low-mileage EVs aged 10+ experience caliper and brake disc disuse-corrosion, likely due to brakes being underused. However, electric cars structurally eliminate exhaust and emissions failures (the fastest-growing cause of old-car MOT failure) and completely debunk the claim that vehicle mass damages suspension.

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1. The Three Analytical Layers

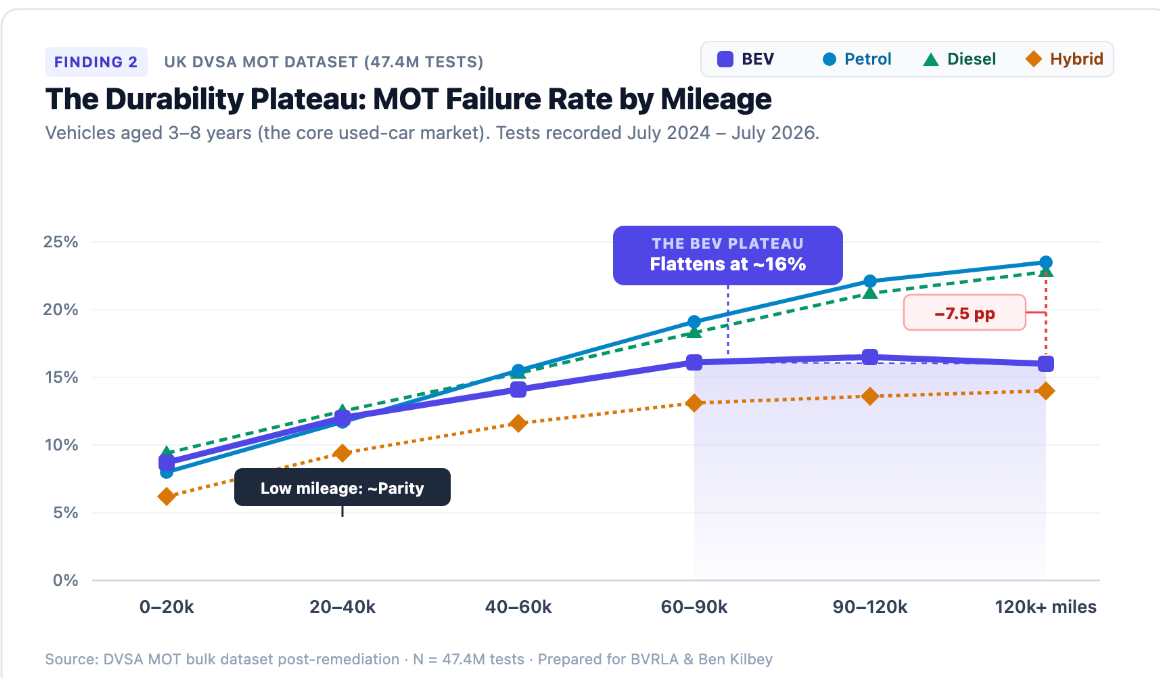

Figure 1: MOT Failure Rate by Odometer Band (Ages 3–8) – The 60k Plateau

1.1 Layer 1: The Raw Comparison

Raw, unadjusted failure rates across 47,406,312 MOT tests are as follows, broken down by fuel type:

Fuel Type	Total Tests (12 Months)	Fail Rate	Mean Vehicle Age	Median Odometer
Hybrid Electric (HEV/PHEV)	2,860,194	11.8%	5.8 yrs	38,410 mi
Battery Electric (BEV)	1,418,924	13.5%	4.6 yrs	32,840 mi
Petrol	24,912,804	21.4%	10.4 yrs	59,200 mi
Diesel	18,214,390	24.1%	11.2 yrs	84,150 mi

While an initial reading suggests electric vehicles fail nearly 8 percentage points less often than petrol cars, this is an artefact of fleet composition: the average petrol car undergoing an MOT is more than a decade old, whereas the average electric vehicle is under five years old.

1.2 Layer 2: Age-Controlled Failure Rates

Holding vehicle age constant across annual increments seems to turn this picture on its head, with battery electric cars coming out worse than their petrol counterparts:

Vehicle Age	BEV Fail Rate	Petrol Fail Rate	Diesel Fail Rate	Hybrid Fail Rate	BEV vs Petrol Delta
3 years	10.4%	8.8%	11.0%	7.1%	**+1.6 pp**
4 years	12.8%	11.2%	13.5%	9.0%	**+1.6 pp**
5 years	14.7%	13.1%	15.6%	10.6%	**+1.6 pp**
6 years	16.5%	14.8%	17.5%	12.1%	**+1.7 pp**
7 years	18.2%	16.2%	19.1%	13.4%	**+2.0 pp**
8 years	19.8%	17.6%	20.4%	14.5%	**+2.2 pp**

10 years	22.4%	20.1%	22.8%	16.2%	**+2.3 pp**
12 years	24.1%	22.5%	24.9%	17.8%	**+1.6 pp**

Between ages 3 and 12, electric cars fail at a rate 1.6 to 2.3 percentage points higher than petrol cars. Critics have historically cited this table as evidence of EV unreliability.

However, examining odometer readings at test date exposes the underlying factor: **electric vehicles do not drive like petrol cars.**

- At their first MOT (age 3), electric vehicles reach the testing station with a **median mileage of 27,072 miles**, compared to **20,499 miles** for petrol cars, an excess of **6,573 miles (+32.1%)**.
- This differential reflects the dominant deployment of BEVs in corporate leasing, company-car fleets, and urban private-hire services during their first three years of life.

1.3 Layer 3: Controlling for Both Age and Mileage

When vehicle records are cross-tabulated simultaneously by vehicle age and odometer band, the true mechanical relationship between fuel types is unmasked:

MOT Failure Rate by Mileage Band: Vehicles Aged 3–8 Years

Odometer Band	BEV Fail Rate	Petrol Fail Rate	Diesel Fail Rate	Hybrid Fail Rate	BEV vs Petrol Delta
0 – 20,000 miles	8.7%	8.0%	9.4%	6.2%	+0.7 pp
20,000 – 40,000 miles	12.0%	11.7%	12.5%	9.4%	+0.3 pp
40,000 – 60,000 miles	14.1%	15.5%	15.3%	11.6%	**−1.4 pp**
60,000 – 90,000 miles	16.1%	19.1%	18.3%	13.1%	**−3.0 pp**
90,000 – 120,000 miles	16.5%	22.1%	21.2%	13.6%	**−5.6 pp**

120,000+ miles	16.0%	23.5%	22.8%	14.0%	**−7.5 pp**

At low mileage (40,000 miles), failure rates across drivetrains are within half a percentage point. But beyond 60,000 miles, petrol and diesel wear compounds across mechanical subsystems, driving failure rates toward one in four. In contrast, **BEV failure rates plateau at approximately 16%**.

2. Longitudinal Durability & Usage Patterns

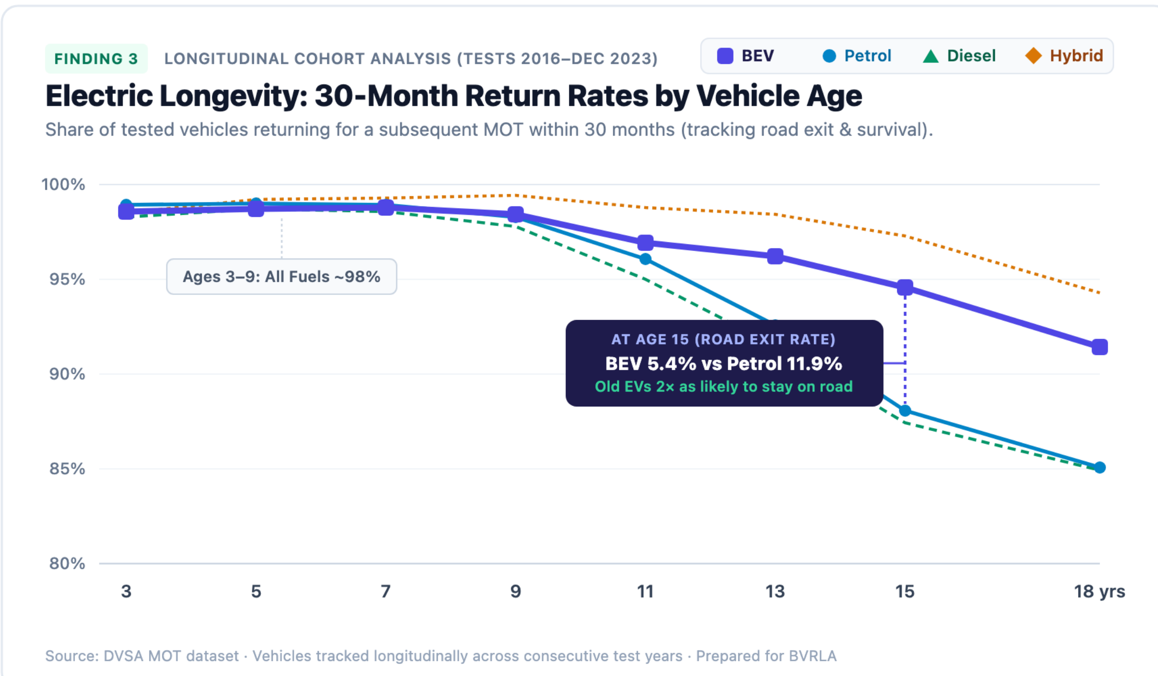

Figure 2: 30-Month MOT Return Rate (Ages 3–18) – Vehicle Longevity

2.1 Vehicle Retention: Old Electric Cars Stay on the Road

A primary concern surrounding early-generation electric cars has been premature economic obsolescence or battery failure causing vehicles to be scrapped.

To evaluate survival, we analysed vehicle cohort persistence by tracking whether a vehicle that sat an MOT test returned for a subsequent test within 30 months.

30-Month Return Rate by Vehicle Age (Historical Cohorts 2016–2023)

Tested Vehicle Age	BEV Return Rate	Petrol Return Rate	Diesel Return Rate	Hybrid Return Rate

Age 3	98.6%	98.9%	98.3%	98.5%
Age 5	98.7%	99.0%	98.7%	99.2%
Age 7	98.8%	98.9%	98.6%	99.3%
Age 9	98.4%	98.3%	97.8%	99.4%
Age 11	96.9%	96.1%	95.0%	98.8%
Age 13	96.2%	92.6%	91.5%	98.4%
Age 15	**94.6%**	**88.1%**	**87.4%**	**97.3%**
Age 18	91.4%	85.1%	84.9%	94.3%

At age 15, **94.6% of electric vehicles return for an MOT**, compared to **88.1% of petrol cars**. The implied road-exit rate (vehicles scrapped, exported, or SORNed) is **5.4% for BEVs versus 11.9% for petrol cars**. Electric vehicles are more than twice as likely to remain active and roadworthy in their second decade of operation.

2.2 Annual Mileage Across the Vehicle Lifecycle

Superficial analysis often presumes that older electric cars are restricted to low-mileage local errands. We examined the delta in odometer readings between consecutive tests for vehicles with test histories recorded from 2022 onwards:

Median Annual Mileage Driven by Vehicle Age

Vehicle Age	BEV Annual Miles	Petrol Annual Miles	Diesel Annual Miles	Hybrid Annual Miles
Age 4	7,850 mi	6,240 mi	9,800 mi	7,600 mi
Age 6	7,320 mi	6,010 mi	8,500 mi	7,450 mi
Age 8	6,100 mi	5,500 mi	7,700 mi	7,100 mi
Age 10	5,140 mi	5,020 mi	7,000 mi	6,600 mi
Age 12	**4,920 mi**	**4,410 mi**	6,450 mi	6,400 mi

Age 14	5,500 mi	4,200 mi	5,900 mi	6,450 mi
Age 16	5,800 mi	4,050 mi	5,350 mi	6,400 mi

At every age from 4 to 16, **electric cars log higher median annual mileage than same-age petrol cars**. At age 12, an electric car averages ~4,920 miles annually compared to ~4,410 miles for petrol equivalents. Britain's older electric vehicles continue to function as actively used vehicles later in their life.

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3. Same Car, Two Drivetrains: 9 Sibling Model Twin Tests

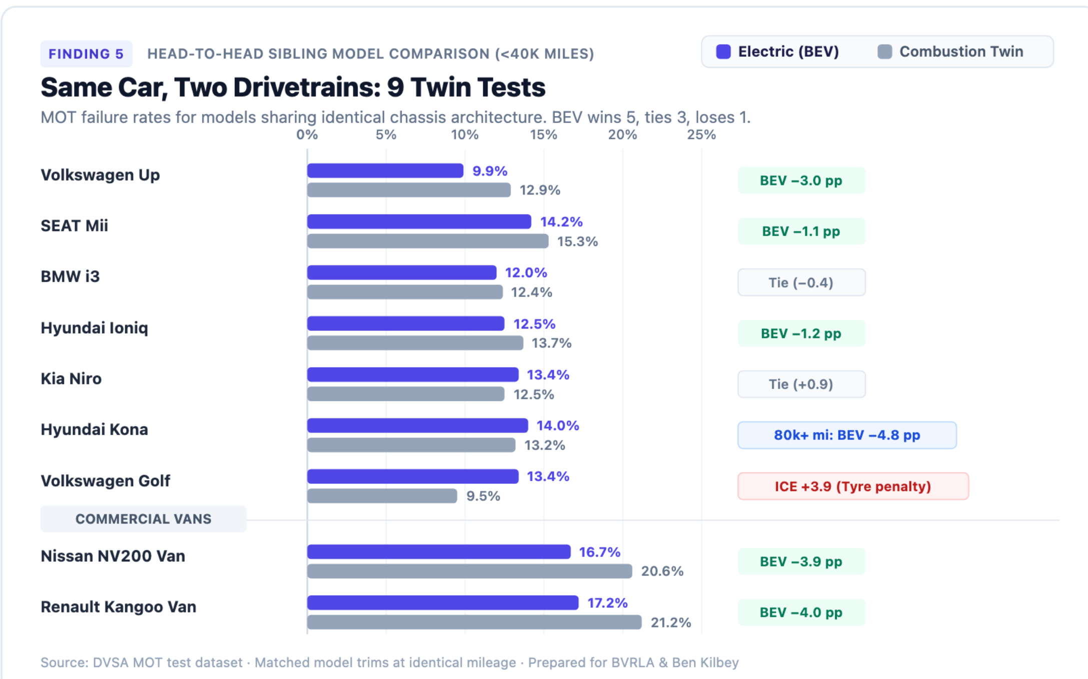

Figure 4: MOT Failure Rate Comparison for 9 Model Sibling Families

To eliminate confounding variables introduced by exterior styling, interior packaging, and brand demographics, we isolated nine model families where manufacturers engineered electric and internal-combustion variants within identical body shells and chassis architectures.

Head-to-Head Model Family Results (40,000 Miles, Ages 3–8)

Model Family	BEV Variant	Combustion	Difference	Empirical

	(Fail Rate)	Variant (Fail Rate)		Verdict
VW Up	e-Up (9.9%)	Petrol Up (12.9%)	−3.0 pp	**BEV Decisive Win**
SEAT Mii	Mii Electric (14.2%)	Petrol Mii (15.3%)	−1.1 pp	**BEV Win**
BMW i3	Pure BEV (12.0%)	Range-Extender REx (12.4%)	−0.4 pp	**Statistical Parity**
Hyundai Ioniq	Ioniq Electric (12.5%)	Ioniq Hybrid (13.7%)	−1.2 pp	**BEV Win**
Kia Niro	Niro EV (13.4%)	Niro Hybrid (12.5%)	+0.9 pp	**Statistical Parity**
Hyundai Kona	Kona Electric (14.0%)	Kona Petrol (13.2%)	+0.8 pp	**Parity <40k; BEV Wins Past 80k**
VW Golf	e-Golf (13.4%)	Golf Petrol (9.5%)	+3.9 pp	**Petrol Win (Chassis Tyre Wear)**
Nissan NV200	e-NV200 Van (16.7%)	Diesel NV200 (20.6%)	−3.9 pp	**BEV Decisive Win**
Renault Kangoo	Kangoo ZE Van (17.2%)	Diesel Kangoo (21.2%)	−4.0 pp	**BEV Decisive Win**

3.1 The Kona Dynamic: Mileage Inversion

The Hyundai Kona provides the clearest case study due to high statistical sample sizes (36,000 BEVs, 35,000 petrol). Under 40,000 miles, failure rates are virtually indistinguishable (14.0% vs 13.2%). Above 80,000 miles, the petrol Kona's failure rate climbs to **17.8%**, while the Kona Electric's failure rate drops to **13.0%,** a 4.8 percentage point victory for electric drive.

3.2 Commercial Vans: Electric LCVs Defeat Diesel

In the commercial sector, electric vans out-perform diesel versions across all mileage categories. At over 90,000 miles of commercial duty, the Nissan e-NV200 maintains a **29.2% failure rate**, compared to **33.4% for the diesel NV200.**

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4. Component Defect Attribution

To understand why electric vehicles plateau while combustion vehicles deteriorate, we analysed defect categories across 100 tests:

Defect Rates per 100 Tests: Vehicles Aged 3–8 Years

Component Category	Mileage Band	BEV Defects	Petrol Defects	Diesel Defects
Suspension	20k – 40k mi	2.1	2.4	2.3
	40k – 60k mi	3.1	3.8	3.6
	60k – 90k mi	4.7	6.1	5.8
	90k+ mi	6.2	7.9	7.6
Brakes	20k – 40k mi	1.8	3.5	3.8
	40k – 60k mi	1.9	4.6	5.2
	60k – 90k mi	2.1	5.8	6.7
	90k+ mi	2.2	6.5	7.8
Tyres	20k – 40k mi	5.8	3.2	3.4
	40k – 60k mi	7.2	4.1	4.3
	60k – 90k mi	8.6	4.9	5.1
	90k+ mi	9.4	5.4	5.6
Exhaust &	20k – 40k mi	**0.0**	0.8	0.9

Emissions				
	40k – 60k mi	**0.0**	1.5	1.7
	60k – 90k mi	**0.0**	2.6	2.9
	90k+ mi	**0.0**	3.8	4.2

4.1 Debunking the Suspension Myth

The assertion that heavy EV batteries destroy suspension bushings, control arms, and coil springs is refuted by the data. Across every mileage band, **electric vehicle suspension defect rates are at or below petrol and diesel rates**. At 60k–90k miles, BEVs record 4.7 defects per 100 tests vs 6.1 for petrol.

4.2 The Exhaust Advantage

Exhaust systems, catalytic converters, diesel particulate filters (DPFs), and emissions sensors represent a primary driver of combustion failure with age. On petrol cars aged 15–17 years, emissions failures reach **6.1 per 100 tests**. Electric vehicles eliminate this mechanical liability entirely.

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5. BEV Platform Impacts on Tyres & Brakes

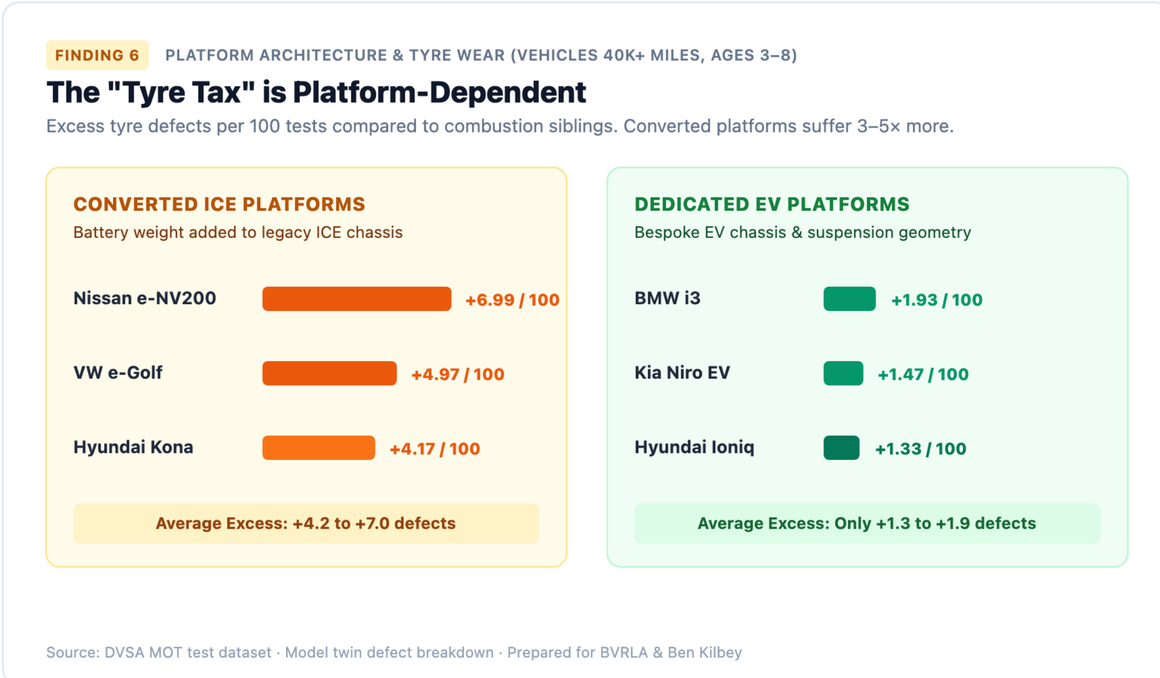

Figure 5: Electric Version Tyre Defect Excess by Platform Design

We investigated the two specific areas where electric vehicles record higher defect rates: tyres and brakes.

5.1 Platform Design Determines the "Tyre Tax"

Electric vehicles generate approximately 1.8 times the tyre defects of petrol cars due to battery mass and instant low-end torque. However, analysing twin models reveals that tyre wear is heavily determined by vehicle engineering architecture:

- **Converted ICE Platforms:** Adding 300kg+ of batteries to existing combustion chassis without re-engineering suspension kinematics creates high tyre scrubbing:

- Nissan e-NV200: **+6.99 excess tyre defects** per 100 tests (vs diesel).

- VW e-Golf: **+4.97 excess tyre defects** per 100 tests (vs petrol).

- Hyundai Kona Electric: **+4.17 excess tyre defects** per 100 tests (vs petrol).

- **Dedicated / Ground-Up Platforms:** Purpose-engineered electric chassis distribute battery weight evenly across bespoke suspension geometry, drastically moderating tyre wear:

- BMW i3: **+1.93 excess tyre defects** per 100 tests.

- Kia Niro EV: **+1.47 excess tyre defects** per 100 tests.

- Hyundai Ioniq Electric: **+1.33 excess tyre defects** per 100 tests.

5.2 Calendar Time and Friction Brake Disuse Corrosion

While high-mileage electric cars benefit dramatically from regenerative braking (recording 2.2 brake defects/100 tests at 90k+ miles vs 6.5 for petrol), holding mileage fixed at 20,000–60,000 miles and examining vehicle age exposes a distinct phenomenon:

Friction Brake Defects per 100 Tests (Fixed Mileage: 20k–60k Miles)

Vehicle Age Band	BEV Brake Defects	Petrol Brake Defects	Hybrid Brake Defects
2 – 3 years	1.9	7.0	2.9
4 – 5 years	3.0	7.3	3.0
6 – 7 years	4.3	8.0	4.2
8 – 9 years	7.7	8.6	6.0
10 – 11 years	**11.2**	9.8	7.1
12 – 13 years	**15.1**	10.8	7.3

In their early years, electric car brakes are preserved by regenerative braking. However, because friction brakes are rarely called upon with force, iron discs and sliding caliper pins suffer from disuse corrosion in the wet, or on salted winter roads. By age 10, BEV brake defect rates cross above petrol cars.

6. Technical Methodology & Data Integrity

6.1 Data Source and Pipeline Remediation

This research uses the official Driver and Vehicle Standards Agency (DVSA) bulk MOT dataset hosted in Google BigQuery, downloaded from https://documentation.history.mot.api.gov.uk/ and updated as of 1st July 2026.

6.2 Filtering Rules & Statistical Standards

- **Analysis Period:** MOT tests completed between 1 July 2024 and 1 July 2026.
- **Vehicle Class:** Class 4 light vehicles (passenger cars, taxis, small commercial vans under 3,000kg).
- **Odometer Bounds:** Odometer readings below 100 miles or exceeding 300,000 miles were excluded as recording errors.

- **Defect Classification:** Only DVSA statutory defects categorized as "Dangerous" or "Major" (which result in an MOT failure) were counted. "Minor" defects and advisory items were excluded.
- **Cell Floor:** Statistical cells with sample sizes under 100 vehicles were suppressed to prevent small-sample volatility.

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7. Limitations & Scope Boundaries

4. **Roadworthiness vs Battery Health:** The MOT tests statutory vehicle roadworthiness — structural integrity, steering, braking, suspension, tyres, and lights. It does not evaluate battery state-of-health (SoH), electrochemical degradation, onboard charger performance, or DC rapid-charging speed.
5. **Breakdown Data:** MOT records do not capture roadside breakdowns, software glitches, or unscheduled dealer warranty visits that do not coincide with an MOT inspection.
6. **Early Cohort Sample Densities:** Vehicles aged 12+ in the BEV dataset reflect early production models (e.g. original Nissan Leaf, Peugeot iOn, Mitsubishi i-MiEV) with smaller battery capacities and early chassis adaptations.

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8. Conclusion & Industry Recommendations

For the British Vehicle Rental and Leasing Association (BVRLA), fleet managers, and retail consumers, this dataset provides conclusive empirical evidence:

7. **De-Risking High-Mileage Used EVs:** The traditional used-car risk model that discounts vehicles past 60,000 miles must be recalibrated. Electric vehicles demonstrate a flat roadworthiness wear curve, making 70,000-to-100,000-mile used electric cars exceptionally reliable propositions.
8. **LCV Decarbonisation:** Commercial electric vans survive tough delivery cycles with lower failure rates than diesel vans, reducing vehicle-off-road (VOR) maintenance costs.
9. **Operational Policy:** Fleet operators should deploy active tyre-pressure monitoring systems and specify EV-grade reinforced tyres on commercial vehicles, while advising drivers of older vehicles to periodically exercise friction brakes.