

## **\*\*CASE STUDY:**

ELIMINATING ELD DATA GAPS IN HEAVY-DUTY FLEETS  
HOW PROFESSIONAL INSTALLATION REDUCED COMPLIANCE RISKS\*\*



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# PAGE 1: EXECUTIVE SUMMARY

## CLIENT PROFILE

Company: Midwest Regional Carrier (name confidential)

Fleet size: 42 heavy-duty trucks

Operation: Regional dry van, 500-mile average

Challenge: Intermittent ELD data gaps during DOT audits

## PROBLEM IDENTIFICATION

- 18 of 42 trucks showed data gaps
- Gap duration: 15-45 minutes randomly
- Potential fines: \$47,000 for hours-of-service violations
- Root cause: Installation-related, not hardware defects

## SOLUTION IMPLEMENTED

- Professional cable rerouting and shielding
- Connector replacement with proper installation
- Technician training and validation protocol
- Timeline: 45-day fleet-wide implementation

## RESULTS ACHIEVED

- Data gaps reduced by 94% (from 18 to 1 truck)
- Zero DOT violations in subsequent 90-day period
- Unexpected benefit: 0.8% fuel efficiency improvement
- ROI: 3.2 months on implementation investment

## PAGE 2: BACKGROUND & INITIAL SITUATION

### FLEET PROFILE

- Average truck age: 5.2 years
- Annual mileage: 125,000 miles/truck
- ELD system: Mixed vendor installation
- Maintenance: In-house shop, 3 technicians

### INITIAL ELD SETUP

- Installation: Performed by multiple vendors
- Cable quality: Mixed (OEM and aftermarket)
- Documentation: Incomplete installation records
- Testing: Basic functional only, no signal validation

### COMPLIANCE RISK ASSESSMENT

- Audit frequency: DOT surprise audit every 18 months
- Previous violations: 2 minor violations in past 3 years
- Risk level: Medium-high (due to data gap pattern)
- Financial exposure: \$2,500 per violation × potential 18 trucks

## PAGE 3: ANALYSIS PHASE

### DATA COLLECTION METHODOLOGY

1. ELD data analysis (90-day period)
2. Vehicle operation correlation
3. Environmental factor mapping
4. Technician interview and observation

### ROOT CAUSE IDENTIFICATION

PRIMARY ISSUES FOUND:

Issue	Trucks Affected
Cable routing parallel to starter cables	12
Insufficient strain relief at connectors	9
Multiple ground points creating loops	7
Environmental seal failures	5
Combination of factors	11

### PATTERN RECOGNITION

- Data gaps correlated with engine start events
- Intermittent issues worsened with temperature extremes
- Vibration-induced failures on specific routes
- Moisture-related issues after wash cycles

### DIAGNOSTIC FINDINGS

- Photo A: Cable chafing against metal edge
- Photo B: Corroded connector pins
- Photo C: Improper strain relief installation
- Photo D: Shield grounding inconsistency

## PAGE 4: SOLUTION IMPLEMENTATION

### PHASE 1: CABLE REROUTING & SHIELDING

Timeline: Days 1-15

Activities:

- Minimum 50mm separation from high-current cables
- Professional-grade shielded cable installation
- Proper grommet usage at all penetrations
- Secure routing every 150mm maximum

Results: 42 trucks completed

Signal noise reduction: 120mV → 15mV

### PHASE 2: CONNECTOR REPLACEMENT

Timeline: Days 16-30

Activities:

- Deutsch DT04 to HD10 upgrade where needed
- Proper CPA installation verification
- Strain relief within 25mm standard
- Dielectric grease application protocol

Results: 126 connectors replaced

Quality check: 100% continuity and retention force test

### PHASE 3: TECHNICIAN TRAINING

Timeline: Days 31-45

Activities:

- Installation checklist implementation
- Signal quality measurement training
- Troubleshooting flowchart adoption
- Documentation standards

Results: 3 technicians trained

Certification: All passed validation test

## PAGE 5: RESULTS & METRICS

### BEFORE/AFTER COMPARISON

Metric	Before	After	Improvement
Trucks with data gaps	18	1	94%
Average gap duration	28 min	2 min	93%
Monthly gap incidents	47	3	94%
Signal noise level	120mV	15mV	88%
Ground resistance	0.8Ω	0.2Ω	75%

### COMPLIANCE IMPROVEMENT

- DOT audit results: Zero violations (post-implementation)
- Data transfer success rate: 99.8% (from 92.3%)
- Unassigned driving time: Eliminated
- Driver compliance scores: Improved 22%

### ROI CALCULATION

#### INVESTMENT

- Materials: \$8,400 (\$200/truck average)
- Labor: \$6,300 (150 hours @ \$42/hour)
- Training: \$1,500
- Total investment: \$16,200

## SAVINGS & BENEFITS

- Fines avoided: \$47,000 (potential)
- Diagnostic time reduction: \$9,450/year
- Driver productivity: \$12,600/year
- Fuel efficiency gain: \$15,120/year (0.8% improvement)
- Total annual benefit: \$84,170

## PAYBACK PERIOD

- Simple payback: 2.3 months
- Annual ROI: 420%
- 3-year net benefit: \$236,310

## PAGE 6: LESSONS LEARNED & APPENDIX

### 🎓 KEY TAKEAWAYS

1. Installation quality > Product cost  
Professional installation prevents 80% of failures
2. Signal validation is non-negotiable  
Basic continuity tests are insufficient
3. Environmental factors are often overlooked  
Regular maintenance catches issues early

### 🔧 PREVENTIVE MAINTENANCE SCHEDULE

Frequency	Check
Monthly	Visual inspection during PM
Quarterly	Signal quality verification
Semi-annual	Connector pin retention test
Annual	Comprehensive validation

### 📋 APPENDIX: TEST EQUIPMENT

- Digital multimeter: Fluke 87V True-RMS
- Oscilloscope: Keysight DSOX1102G
- Torque wrench: Wiha 28515 (5-7 Nm)
- Crimp tool: Deutsch DTAT-06-00

### 💬 CLIENT TESTIMONIAL

*"The professional installation methodology and validation checklist transformed our ELD reliability. What we thought were hardware issues were actually installation problems. The ROI was immediate and substantial."*

– Fleet Maintenance Manager, Midwest Regional Carrier

 **CONTACT INFORMATION**

For technical consultation or similar implementation:

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