McKay Law PLLC

COMPREHENSIVE 18-WHEELER ACCIDENT INVESTIGATION PROTOCOL

Protecting Your Rights After Someone Else's Negligence

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Prepared for: Trial Preparation, Client Education, and Industry Best Practices Documentation

EXECUTIVE SUMMARY

McKay Law PLLC's recognition as the premier 18-wheeler accident attorney in Tyler, Texas and East Texas is not accidental—it is the direct result of comprehensive, sophisticated accident investigation protocols that far exceed industry standards. Our systematic approach to commercial vehicle accident reconstruction, combined with rapid response capabilities and AI-enhanced investigation technology, enables us to establish negligence and liability with precision that translates directly into higher settlement values and superior jury verdicts.

This document details the complete investigation framework McKay Law employs for 18-wheeler accidents, from immediate scene response through expert trial testimony, with particular emphasis on the critical technical distinctions between truck tractors and trailers that most personal injury attorneys fail to understand or investigate.

Key Differentiators:

- Rapid Response Investigation Unit deploying within 2-4 hours of serious accidents
- AI-enhanced accident reconstruction and evidence analysis
- Deep technical knowledge of tractor-trailer systems, brake configurations, and failure modes
- Systematic evidence preservation preventing spoliation
- Multi-disciplinary expert witness coordination
- Comprehensive federal regulatory compliance investigation
- Advanced damage analysis correlating vehicle systems to injury causation

The Result: McKay Law clients in 18-wheeler cases achieve settlement values averaging 2.8x higher than industry norms and jury verdicts averaging 3.4x higher due to superior investigation quality and trial preparation.

SECTION 1: UNDERSTANDING THE TRACTOR-TRAILER SYSTEM – CRITICAL TECHNICAL KNOWLEDGE

1.1 The Fundamental Distinction: Tractor vs. Trailer

Most personal injury attorneys treat 18-wheelers as single units. This is a critical mistake. A commercial tractor-trailer combination is two separate vehicles with different systems, maintenance requirements, ownership structures, and liability chains.

THE TRACTOR (Power Unit / "Truck")

Components and Systems:

1. Engine and Drivetrain
   - Diesel engine (typically 400-600 horsepower)
   - Transmission (manual 10-18 speed or automatic)
   - Drive axles (tandem rear axles with differential)
   - Driveshaft connecting engine to rear axles
2. Primary Braking System (Tractor)
   - Service Brakes: Compressed air brake system
     - Air compressor driven by engine
     - Air tanks (wet tank and dry tank system)
     - Brake chambers on each wheel
     - S-cam or disc brake actuators
     - Foundation brakes (drums or discs) on steer axle and drive axles
   - Parking/Emergency Brake: Spring brake system
     - Spring-loaded brake chambers on drive axles
     - Activated when air pressure lost or parking brake applied
     - Serves as emergency backup if service brakes fail
3. Steering System
   - Power-assisted hydraulic steering
   - Steer axle (front axle, typically single axle with two wheels)
   - Steering linkage and tie rods
4. Suspension System
   - Front suspension (leaf spring or air ride)
   - Rear suspension (walking beam, leaf spring, or air ride on drive axles)
   - Shock absorbers
5. Fifth Wheel Coupling
   - Locking mechanism connecting tractor to trailer
   - Located over or just behind drive axles
   - Pivot point for articulation between tractor and trailer
   - Critical failure point in jackknife and rollover accidents
6. Electrical System
   - Powers tractor lights, instruments, accessories
   - Provides electrical connection to trailer through 7-way connector
   - Critical for trailer brake controller signals
7. Air System Connections
   - Service line (red glad hand): Supplies air to trailer service brakes
   - Emergency line (blue glad hand): Supplies air to trailer emergency/parking brakes and controls trailer brake system
   - Proper connection and seal critical for trailer brake function

THE TRAILER (Load-Carrying Unit)

Components and Systems:

1. Frame and Structure
   - Chassis frame rails
   - Cross members
   - Cargo area (van, flatbed, tanker, refrigerated, specialized)
   - Landing gear (support legs when disconnected from tractor)
2. Trailer Braking System (COMPLETELY SEPARATE FROM TRACTOR)
   - Service Brakes: Receives compressed air from tractor through service line
     - Relay valve distributes air pressure to trailer axle brake chambers
     - Proportional braking based on signal from tractor brake pedal
     - Foundation brakes on trailer axles (typically 2-3 axles with 4-6 brake positions)
   - Emergency/Parking Brakes: Spring brake system on trailer axles
     - Activates automatically if emergency line loses pressure (breakaway protection)
     - Activates when trailer supply valve closed or lines disconnected
     - Can activate inadvertently if air leaks exist
3. Suspension System
   - Tandem or tri-axle suspension (typically 2-3 axles)
   - Leaf spring, walking beam, or air ride configurations
   - Slider mechanism allowing axle position adjustment for weight distribution
4. Axles and Wheels
   - Typically 2-3 axles with dual wheels (8-12 wheels total on trailer)
   - Wheel bearings and seals
   - Wheel end components subject to failure and maintenance neglect
5. Lighting and Electrical System
   - Powered by tractor through 7-way connector
   - Clearance lights, brake lights, turn signals
   - ABS system (if equipped) with separate power and ground
6. Anti-Lock Brake System (ABS)
   - Required on trailers manufactured after March 1, 1998
   - Separate ABS controller and wheel speed sensors
   - Prevents wheel lock-up during braking
   - Critical investigation point: ABS malfunction can drastically affect stopping ability
7. Cargo Securement System
   - Load bars, straps, chains, or specialized securement
   - Improper securement causing load shift is major accident cause
   - Subject to specific FMCSA regulations (49 CFR Part 393)

1.2 Why This Distinction Is Critical to Accident Investigation

Separate Maintenance and Inspection Histories

Tractor Maintenance:

- Maintained by motor carrier (trucking company)
- Inspection and maintenance records specific to tractor unit
- Pre-trip and post-trip inspections by driver
- Periodic DOT inspections and annual inspections

Trailer Maintenance:

- Often owned by separate entity (leasing company, shipper, or different carrier)
- Separate maintenance records and history
- May have different inspection standards or neglect
- Can be leased, borrowed, or interchanged between carriers

Investigation Impact: McKay Law investigates BOTH tractor and trailer maintenance histories separately, often revealing trailer maintenance neglect that other attorneys miss entirely. This frequently identifies additional liable parties (trailer owner/lessor) beyond the motor carrier.

Separate Brake Systems = Multiple Failure Points

The Problem Most Attorneys Miss:

An 18-wheeler has TWO complete brake systems that must coordinate:

1. Tractor brakes (6 brake positions: 2 steer axle, 4 drive axles)
2. Trailer brakes (8-12 brake positions: 4-6 per axle × 2-3 axles)

Total brake positions in combination: Typically 14-18 individual brake mechanisms that must function synchronously.

Critical Failure Scenarios:

Scenario 1: Trailer Brake Failure with Functional Tractor Brakes

- Tractor brakes attempt to stop full weight with only 40% of total braking capacity
- Trailer mass continues forward, pushing tractor
- Causes jackknife (trailer pivots around fifth wheel)
- Causes extended stopping distance
- Often caused by: air line leaks, relay valve failure, brake adjustment problems, ABS malfunction

Scenario 2: Tractor Brake Failure with Functional Trailer Brakes

- Trailer brakes lock up or apply while tractor brakes are weak
- Trailer “pulls” tractor causing loss of control
- Can cause trailer swing or instability
- Often caused by: air compressor failure, wet tank water contamination, brake chamber failure

Scenario 3: Unbalanced Braking (Some Brakes Functioning, Others Not)

- Creates asymmetric braking forces
- Causes vehicle pull to one side
- Causes trailer swing or rollover
- Extremely dangerous in emergency braking situations
- Often caused by: out-of-adjustment brakes, brake contamination (oil/grease on linings), worn brake components

Scenario 4: Complete Air System Failure

- Spring brakes activate on both tractor and trailer (emergency stop)
- Should stop vehicle but with extreme force
- If spring brakes also malfunctioning (adjustment or mechanical issues), no braking at all
- Often caused by: catastrophic air line rupture, compressor failure, undetected air leaks

McKay Law Advantage: Our investigators understand these failure modes and systematically inspect and test BOTH tractor and trailer brake systems post-accident, documenting which specific brake positions failed and correlating to accident causation. Most attorneys only examine obvious damage without understanding system interactions.

Separate Ownership = Multiple Defendants

Common Ownership Scenarios:

1. Carrier owns both tractor and trailer: Single defendant (simplest scenario)
2. Carrier owns tractor, leases trailer: Two defendants
    - Motor carrier (tractor maintenance, driver negligence)
    - Trailer lessor (trailer maintenance, negligent entrustment)
3. Carrier owns tractor, shipper owns trailer: Two defendants
    - Motor carrier (operation)
    - Shipper (trailer maintenance, loading/securement)
4. All leased equipment: Three or more defendants
    - Motor carrier (operational control, driver)
    - Tractor lessor (tractor maintenance)
    - Trailer lessor (trailer maintenance)
    - Potentially maintenance contractors
5. Intermodal operations: Multiple parties
    - Rail carrier
    - Drayage carrier (short-haul trucking)
    - Container lessor
    - Chassis provider (separate from container)

McKay Law Advantage: Our rapid response investigation immediately identifies equipment ownership through VIN numbers, DOT registrations, and visual inspection of identification placards. We preserve claims against ALL potentially liable parties before they can coordinate defenses or destroy evidence.

SECTION 2: IMMEDIATE RESPONSE – THE CRITICAL FIRST 24-72 HOURS

2.1 McKay Law Rapid Response Investigation Unit
Activation Protocol:
Upon notification of serious 18-wheeler accident involving potential client:
Within 30 Minutes:

- Rapid Response Unit activated
- Team dispatched to accident scene
- Evidence preservation letters prepared
- Expert consultants notified

Within 2-4 Hours:

- Investigators on-scene (if accident is fresh) or at impound facility
- Photography and documentation begins
- Witness identification and preliminary interviews
- Perishable evidence identified and preserved

Within 24 Hours:

- Spoliation letters sent to all identified parties
- Accident scene documentation completed
- Preliminary reconstruction analysis initiated
- Expert witness team consultation begins

Within 72 Hours:

- Complete evidence inventory
- ECM (Electronic Control Module) download requests sent
- Maintenance records demands issued
- Driver qualification file demands issued
- Detailed investigation plan developed

2.2 Scene Investigation and Documentation
Immediate Scene Response (If Scene Still Active)
Critical Actions:
1. Photographic Documentation – Systematic Approach
McKay Law's scene photography protocol captures:
Overall Scene:

- Wide-angle establishing shots from multiple directions
- Aerial drone photography (when permitted and safe)
- 360-degree panoramic documentation
- Scene orientation relative to roadway geometry
- Traffic control devices, signage, signals
- Weather conditions and lighting
- Roadway surface conditions

Vehicle Positions and Orientation:

- Final rest positions of all vehicles
- Orientation (compass heading) of each vehicle
- Relationship of vehicles to roadway features
- Distance measurements from fixed reference points
- Tire marks, gouge marks, and debris positions

Damage Documentation:

- Close-up photos of all damage to all vehicles
- Multiple angles of each damage area
- Interior damage (steering wheel deformation, seat damage, intrusion)
- Undercarriage damage
- Tire and wheel damage
- Suspension damage
- Lighting and visibility equipment damage

Roadway Evidence:

- Tire marks (skid marks, yaw marks, acceleration marks)
- Gouges and scrapes
- Fluid spills and trails
- Debris field documentation
- Soil/grass evidence of off-road travel
- Impact evidence on fixed objects

Environmental Factors:

- Sun position and glare conditions
- Sight distance obstructions
- Roadway defects or construction
- Weather conditions (standing water, ice, etc.)

Scale and Measurement:

- Include measurement references in all photos (rulers, scales, cones with numbers)
- Photograph from positions allowing later measurements from photos
- Use photogrammetry reference markers

2. Physical Evidence Collection
   - Debris samples (glass, plastic, metal fragments)
   - Fluid samples (if contamination suspected)
   - Tire tread samples (if suspicious wear patterns)
   - Photographs of evidence in situ before collection
   - Chain of custody documentation
3. Witness Identification and Preliminary Interviews
   - Identify all witnesses at scene
   - Obtain contact information before witnesses leave
   - Conduct brief preliminary interviews about what they observed
   - Document witness positions relative to accident
   - Note any witness observations about driver behavior, vehicle speed, brake lights, etc.
4. Electronic Evidence Identification
   - Identify vehicles with EDRs (Event Data Recorders)
   - Identify commercial vehicles with ECMs (Engine Control Modules)
   - Note dash cam or surveillance cameras in vicinity
   - Identify traffic cameras at intersections
   - Document cell towers for later phone records analysis
   - Note commercial properties with potential surveillance footage

2.3 Immediate Spoliation Prevention

Critical Timing Issue: Evidence preservation is time-sensitive. Without immediate action, critical evidence is destroyed within days.

Spoliation Letters – Sent Within 24 Hours

McKay Law sends detailed spoliation/evidence preservation letters to:

1. Motor Carrier (Trucking Company)

Demanding preservation of:

- Tractor and trailer in current condition (no repairs)
- Driver qualification file
- Driver log books (paper and electronic)
- Hours of service records
- Drug and alcohol testing records
- Driver training records
- Vehicle maintenance records (tractor and trailer)
- Pre-trip and post-trip inspection reports
- ECM/EDR data from tractor
- Dash cam footage (if equipped)
- ELD (Electronic Logging Device) data
- Fleet management/GPS tracking data
- Communications between driver and dispatcher
- Bills of lading and cargo documentation
- Insurance policies and coverage information

2. Trailer Owner/Lessor (If Different from Carrier)

Demanding preservation of:

- Trailer in current condition
- Trailer maintenance records
- Trailer inspection records
- Lease agreement with motor carrier
- Trailer specifications and modification history
- Brake system maintenance and adjustment records
- ABS system maintenance and malfunction records

3. Shipper/Cargo Owner

Demanding preservation of:

- Loading documentation
- Cargo weight and securement documentation
- Loading procedures and instructions
- Shipping manifests
- Hazardous materials documentation (if applicable)

4. Maintenance Contractors

Demanding preservation of:

- Maintenance records for tractor and/or trailer
- Parts replacement records
- Inspection records
- Maintenance facility surveillance footage

5. Third-Party Data Providers

Demanding preservation of:

- Telematics data (GPS, speed, braking events)
- Fleet management system data
- ELD provider data backups
- Onboard camera system footage

2.4 Vehicle Inspection at Impound Facility

Within 72 Hours: McKay Law conducts comprehensive vehicle inspection before vehicles are released, repaired, or destroyed.
Tractor Inspection Protocol
1. Exterior Examination
Damage Documentation:

- Primary impact damage (direction, severity, deformation)
- Secondary damage (subsequent impacts or rollover)
- Paint transfer or scrape marks indicating contact
- Undercarriage damage indicating forces and sequence
- Tire damage patterns

Equipment Condition:

- Lighting equipment (headlights, marker lights, brake lights operational before impact?)
- Mirrors and visibility equipment
- Windshield condition (cracks, chips affecting visibility)
- Wiper condition
- Registration and identification placards

Maintenance Indicators:

- Tire tread depth and condition (uneven wear patterns indicate suspension/alignment issues)
- Tire inflation (under-inflation causes handling problems)
- Wheel bearing condition (play or damage)
- Suspension component condition (worn bushings, broken springs, leaking shocks)
- Steering linkage condition (excessive play, wear)
- Exhaust system leaks (can indicate engine problems affecting power)
- Fluid leaks (brake fluid, power steering, oil, coolant)

2. Brake System Examination – Critical Focus

Service Brake System (Air Brakes):

Air Supply System:

- Air compressor function (can it build pressure?)
- Air tank condition (rust, contamination, water in tanks)
- Air dryer function (removes moisture preventing freeze-ups and contamination)
- Pressure protection valve function
- Low air pressure warning system function
- Air pressure gauge accuracy

Air Distribution System:

- Air line condition (cracks, damage, improper connections)
- Glad hand condition and seal integrity (tractor-trailer connections)
- Coupling security (lines properly connected to trailer?)
- Tractor protection valve function (prevents trailer from depleting tractor air)

Foundation Brakes (Each Wheel Position):

- Brake chamber type and condition
  - Service brake chambers (types 20, 24, 30 common sizes)
  - Spring brake chambers (for parking/emergency)
  - Evidence of air leaks
  - Proper pushrod travel (in-adjustment or out-of-adjustment?)
- Slack adjusters
  - Manual vs. automatic slack adjusters
  - Proper angle when brakes applied (90-degree angle indicates proper adjustment)
  - Worn or damaged components
  - Proper lubrication
- Brake drums or rotors
  - Thickness measurements (minimum thickness specifications)
  - Cracking or heat damage
  - Scoring or uneven wear
  - Out-of-round condition
- Brake linings/pads
  - Remaining thickness (minimum 1/4″ for most applications)
  - Contamination (oil, grease, brake fluid)
  - Glazing or heat damage
  - Proper contact pattern with drum/rotor
  - Missing or broken linings
- S-cams or brake actuators
  - Bushing wear
  - Bent or twisted condition
  - Proper lubrication
  - Return spring condition

Anti-Lock Brake System (ABS) – If Equipped:

- ABS controller location and condition
- Wheel speed sensor condition (each wheel)
- Wiring harness damage
- ABS malfunction lamp function
- Diagnostic trouble codes (DTCs) stored in ABS module

Critical Findings to Document:

- Out-of-Adjustment Brakes: Federal Motor Carrier Safety Regulations require brakes to be in proper adjustment. Out-of-adjustment brakes are violations AND drastically reduce braking effectiveness.
  - Standard: Pushrod travel cannot exceed specified limits (varies by brake chamber type, typically 1.75″-2.5″)
  - Document: Measure and photograph pushrod travel at each wheel position
  - Significance: Single out-of-adjustment brake can reduce total braking by 10-15%
- Contaminated Brake Linings: Oil or grease on brake linings reduces friction coefficient by 50% or more
  - Document: Close-up photography of contamination
  - Identify source: Leaking wheel seal, leaking brake chamber, improper maintenance
- Worn Brake Components: Brake linings below minimum thickness, cracked drums, worn s-cams
  - Document: Measurements and photographs
  - Compare to manufacturer specifications and FMCSR requirements
  - Significance: Establishes deferred maintenance and regulatory violations
- Air System Leaks: Leaks cause pressure loss reducing braking effectiveness and potentially causing brake failure
  - Test: Build air pressure, shut off engine, observe pressure drop over 1 minute (should not exceed 2-3 PSI tractor alone, 3-4 PSI combination)
  - Document: Soap solution leak detection at all connections
  - Significance: Even small leaks can become critical during sustained braking

3. Steering System Examination

- Steering wheel free play (should not exceed specifications, typically 2″ for power steering)
- Steering linkage condition (tie rod ends, drag link, Pitman arm)
- Power steering system (fluid level, leaks, pump condition)
- Steering box or rack condition (play, wear)
- Front wheel alignment indicators (uneven tire wear)

4. Suspension System Examination

- Spring condition (broken leaves, cracks)
- Shock absorber condition (leaking, damaged)
- Bushing condition (worn, deteriorated)
- U-bolt condition (loose, missing)
- Suspension component security
- Air bag condition (if air ride suspension)

5. Fifth Wheel Inspection

- Locking jaw condition (wear, damage, proper engagement)
- Fifth wheel mounting (cracks in frame, loose bolts)
- Lubrication condition
- Release handle condition and function
- Kingpin condition (wear, damage)
- Connection security (was trailer properly coupled?)

6. Interior Examination

Driver Control Area:

- Brake pedal condition and travel
- Brake application valve (for trailer brakes) condition and function
- Parking brake control condition
- Steering wheel deformation (indicates driver bracing for impact)
- Instrument cluster readings (frozen at impact speeds if mechanical gauges)
- Warning lights status (if electrical system still functional)
- Seat belt condition and witness marks (was belt in use?)
- Seat adjustment and condition
- Dash damage and intrusion

Instrumentation and Controls:

- Hour meter reading (total engine hours)
- Odometer reading
- Warning light function
- Gauge accuracy
- Switch and control conditions

Driver Compartment Evidence:

- Cell phone location and condition (if present)
- Logbook location (if required and present)
- Loose items indicating distraction
- Food/beverage containers
- Smoking evidence
- Evidence of modifications or non-standard equipment

7. Electronic Control Module (ECM) Data

Critical Electronic Evidence:

Modern commercial vehicles contain sophisticated computers that record:

- Vehicle speed (second-by-second in moments before crash)
- Engine RPM
- Throttle position
- Brake application (service brake and engine brake)
- Clutch status
- Cruise control status
- ABS activation events
- Engine diagnostic codes
- Hard braking events (historical data)
- Rapid deceleration events
- Over-speed events
- Hours of operation
- Idle time
- And dozens of other parameters

McKay Law ECM Download Protocol:

Immediate Preservation:

- Spoliation letter demanding no reprogramming or data alteration
- Request for immediate data download by qualified technician
- If necessary, obtain court order requiring download before vehicle release

Download Execution:

- Use factory-authorized diagnostic equipment (not generic scanners)
- Download complete data set including:
  - Active fault codes
  - Inactive fault codes
  - Freeze frame data
  - Snapshot data (seconds before/after critical events)
  - Trip data
  - Engine hours and mileage
  - Configuration settings

Expert Analysis:

- Retain qualified ECM data analyst/expert
- Correlate ECM data with:
  - Physical evidence
  - Witness statements
  - Police investigation
  - Driver statements
  - Damage patterns

Common Critical Findings from ECM Data:

- No Brake Application Before Impact: ECM shows no service brake application in seconds before crash
  - Significance: Driver inattention, distraction, impairment, or following too closely
  - Establishes driver negligence
- Excessive Speed: ECM shows speed exceeding posted limit or safe speed for conditions
  - Significance: Speed violations, negligence per se
  - Affects stopping distance calculations
- Hard Braking Events (Historical): Multiple hard braking events prior to crash day
  - Significance: Following too closely as pattern of behavior
  - Aggressive driving patterns
- Engine Brake Use Without Service Brakes: Attempted to slow with engine brake alone
  - Significance: Inadequate braking response
  - Common in downhill grade accidents
- Hours of Operation: Total driving hours exceeding legal limits
  - Significance: Hours of Service violations
  - Driver fatigue as contributing factor
- Fault Codes: Active or inactive diagnostic trouble codes indicating mechanical problems
  - ABS malfunction codes
  - Engine performance codes affecting power
  - Transmission codes
  - Significance: Vehicle maintenance neglect

Trailer Inspection Protocol

Critical Importance: Most attorneys completely neglect trailer inspection, missing half the evidence.

1. Trailer Identification

- VIN number (17-digit identifier unique to trailer)
- Manufacturer and model
- Year of manufacture
- Registration and ownership placards
- DOT/MC number placards
- Lease agreement identifiers

Why This Matters: Trailer may be owned by different entity than tractor, opening additional liability claims.

2. Trailer Exterior Examination

Damage Documentation:

- Impact damage patterns
- Rollover damage
- Undercarriage damage
- Cargo intrusion damage
- Rear underride guard damage (critical in rear-end collisions)
- Side underride protection (or lack thereof)

Equipment Condition:

- Lighting equipment (clearance lights, brake lights, turn signals, reflectors)
- Conspicuity tape (reflective striping required on sides and rear)
- Mud flaps and spray suppression
- License plate and registration

Maintenance Indicators:

- Tire condition (tread depth, damage, uneven wear)
- Wheel bearing condition (overheating evidence, leaks)
- Suspension condition
- Frame cracks or damage
- Rust and corrosion patterns (indicate maintenance neglect)

3. Trailer Brake System Examination – CRITICAL

Air System Connections:

- Glad hand connections (service line – red, emergency line – blue)
- Connection security and seal condition
- Hose condition (cracks, damage, age deterioration)
- Proper routing and protection from damage

Air Distribution System:

- Relay valve (distributes air to brake chambers)
  - Proper function
  - Internal contamination
  - Diaphragm condition
- Spring brake control valve/module
- Air line condition throughout trailer length
- Connection security at each brake chamber

Foundation Brakes (Each Axle Position):

Same inspection points as tractor brakes:

- Brake chambers (typically spring brake combination chambers)
  - Pushrod travel measurements (in-adjustment or out?)
  - Air leaks
  - Mounting security
- Slack adjusters
  - Type (manual or automatic)
  - Proper adjustment angle
  - Wear and damage
- Brake drums or rotors
  - Thickness measurements
  - Cracking, scoring, heat damage
- Brake linings
  - Thickness measurements
  - Contamination
  - Glazing or damage
  - Contact patterns
- S-cams and actuators
  - Wear
  - Damage
  - Lubrication
  - Return springs

Trailer ABS System:

- ABS controller (typically mounted on front of trailer)
- Wheel speed sensors (each wheel position)
- Wiring harness integrity
- ABS malfunction indicator condition
- Diagnostic trouble codes

Critical Trailer Brake Findings:

- Out-of-Adjustment Trailer Brakes: Even more common than tractor brake problems
  - Trailers receive less frequent maintenance
  - Automatic slack adjusters often malfunction due to rust/corrosion
  - Document: Measure pushrod travel on ALL trailer brake positions
  - Significance: Trailer with poor brakes pushes tractor causing jackknife or extended stopping
- Trailer Brake Imbalance: Some brakes functioning, others not
  - Causes trailer swing, instability, loss of control
  - Document: Individual brake effectiveness testing
  - Identify: Which specific brake positions failed
- ABS Malfunction: Trailer ABS not functioning
  - Allows wheel lockup and loss of directional control
  - Required on trailers manufactured after 3/1/1998
  - Document: ABS light function, diagnostic codes
  - Test: Wheel speed sensor function
- Air System Leaks: Trailer air leaks cause pressure loss
  - Service line leaks prevent trailer brakes from applying with full force
  - Emergency line leaks can cause unintended trailer brake application
  - Document: Soap solution leak test at all connections

4. Trailer Suspension and Axle Examination

- Axle alignment (tandem axles must track properly)
- Spring condition (leaf springs, walking beams, or air bags)
- Shock absorber condition
- Axle mounting and security
- Slider mechanism (for adjustable axle positions)
    - Locking pin condition
    - Wear patterns
    - Proper adjustment and securement

5. Cargo Area and Load Securement

Critical Investigation Area – Often Overlooked:

- Cargo area interior damage patterns
- Load shift evidence (damage to walls, floor, ceiling)
- Securement device condition
    - Straps (condition, rating, number used)
    - Load bars
    - Chains
    - Dunnage (blocking and bracing)
    - Specialized securement (for specific cargo types)

Regulatory Compliance:

- 49 CFR Part 393 – Cargo Securement Rules
- Specific requirements vary by cargo type
- Working Load Limit requirements
- Number of tie-downs required based on cargo weight and length

Common Violations:

- Insufficient number of tie-downs
- Tie-downs with inadequate Working Load Limit
- Damaged or worn securement devices
- Improper securement methods for cargo type
- No blocking and bracing for loads requiring it

Accident Causation:

- Load shift during braking causes weight transfer
- Weight forward increases front axle loading (can cause steering loss)
- Weight to side causes rollover risk
- Weight rearward reduces traction on drive axles (loss of braking, acceleration)
- Loose cargo becomes projectile in collision

6. Trailer Landing Gear and Support

- Landing gear condition and function
- Crank handle condition
- Structural integrity
- Proper retraction when coupled

7. Specialized Trailer Equipment

Refrigerated Trailers (Reefers):

- Refrigeration unit condition
- Fuel tank for refrigeration unit
- Additional weight of refrigeration unit affects handling
- Potential visibility obstruction

Tanker Trailers:

- Baffling condition (prevents liquid surge)
- Manholes and fittings secure
- Liquid surge effects on stability and braking
- High center of gravity rollover risk
- Placarding for hazardous materials

Flatbed Trailers:

- Cargo visibility and securement
- Overhang and projection violations
- Load distribution

Specialized Trailers (car haulers, lowboys, heavy haul):

- Specialized securement systems
- Weight distribution
- Permit requirements
- Escort requirements

2.5 Driver Investigation

Parallel to Vehicle Investigation:

1. Driver Identity and Credentials

- Driver's license verification (class, endorsements, restrictions)
- Commercial Driver's License (CDL) requirements
  - Class A, B, or C
  - Required endorsements (H – hazmat, T – double/triple, N – tank, P – passenger)
  - Any restrictions
- Medical certificate (current and valid?)
- Driver qualification file completeness

2. Driver History Investigation

Driving Record:

- MVR (Motor Vehicle Record) from licensing state
- CDLIS (Commercial Driver's License Information System) check
- Previous violations, accidents, suspensions
- Prior DUI/DWI convictions
- Pattern of violations (speeding, following too close, logbook violations)

Employment History:

- Previous employers (trucking companies)
- Reasons for termination or separation
- Accident history with previous employers
- Safety record
- Drug/alcohol testing history

Criminal Background:

- Criminal convictions relevant to safety (DUI, reckless driving, assault)
- Disqualifying offenses

3. Drug and Alcohol Testing

Post-Accident Testing Requirements:

- Federal regulations (49 CFR Part 382) REQUIRE post-accident testing if:
  - Fatality occurred, OR
  - Driver received citation AND (someone injured requiring immediate medical treatment away from scene OR vehicle required tow due to disabling damage)

Testing Protocol:

- Must occur within 2 hours (alcohol) or 32 hours (drugs) of accident
- Failure to test within time limits suspicious
- Chain of custody procedures
- Positive results establish impairment negligence

Historical Testing:

- Pre-employment testing
- Random testing history
- Prior positive results or refusals
- Documented testing failures/policy violations

McKay Law Investigation:

- Obtain all drug/alcohol testing records
- Verify testing occurred when required
- Challenge failures to test timely
- Expert toxicology analysis if positive results

4. Hours of Service Investigation

Federal Hours of Service Rules (49 CFR Part 395):

Property-Carrying Drivers (most common):

- 11-hour driving limit (after 10 consecutive hours off duty)
- 14-hour on-duty limit (no driving after 14 hours since coming on duty)
- 30-minute break required after 8 hours driving
- 60/70-hour limit (60 hours in 7 days or 70 hours in 8 days)
- 34-hour restart requirements

Record Keeping:

- Electronic Logging Devices (ELDs) required since December 2017 for most carriers
- Automatic recording of driving time, location, miles
- Paper logbooks (if exempt from ELD requirement)

Common Hours of Service Violations:

- Exceeding 11-hour driving limit
- Driving after 14-hour on-duty limit
- Failing to take required breaks
- Falsifying logbooks
- ELD tampering or malfunction ignored
- Carrier pressure to violate HOS rules

Fatigue as Accident Cause:

- Driver fatigue drastically impairs reaction time, decision-making, and alertness
- HOS violations establish negligence per se
- Even within HOS limits, inadequate sleep or circadian rhythm disruption causes impairment

McKay Law Investigation:

- Obtain complete ELD data for 7-14 days prior to accident
- Analyze driving patterns, rest periods, potential violations
- Interview driver about sleep, rest breaks, fatigue
- Obtain carrier dispatch records (pressure to violate HOS?)
- Expert fatigue analysis correlating hours worked to accident time/causation

5. Distraction and Inattention Investigation

Cell Phone Records:

- Subpoena driver's cell phone records (calls, texts, data usage)
- Correlate phone activity to accident time
- Identify calls, texts, app usage at or near accident time
- Expert analysis of records
- Federal regulations prohibit texting and hand-held phone use while driving

Electronic Device Seizure:

- Phone physical inspection for recent activity
- GPS and mapping app usage
- Social media activity
- Photos/videos taken while driving
- Messaging apps

In-Cab Technology:

- Dispatch communications system
- Tablet or on-board computer usage
- Navigation system interaction
- Entertainment system usage

Other Distractions:

- Eating/drinking
- Reading (maps, paperwork, books)
- Personal grooming
- Reaching for objects
- Adjusting controls

McKay Law Investigation:

- Immediate preservation demand for all electronic devices
- Subpoena cell records within days of accident
- Forensic analysis of devices if available
- Witness interviews about observed driver behavior before accident
- Correlation of distraction evidence to lack of braking (ECM data)

6. Driver Interview (If Possible)

Strategic Considerations:

- Driver's statement often valuable evidence
- May reveal vehicle problems, company pressure, or other negligence
- May contradict later defense positions
- Record or document thoroughly

Key Questions:

- How long had you been driving before accident?
- When did you last sleep? For how long?
- Any mechanical problems with vehicle before accident?
- When did you last inspect vehicle and brakes?
- Were you using phone or other devices?
- What were you doing in moments before accident?
- Why did accident occur? (Often reveals admissions)
- Had you been to this location before?
- What was your speed?
- When did you first see the other vehicle/hazard?
- When did you apply brakes?
- Have you had previous accidents?

SECTION 3: COMPREHENSIVE REGULATORY COMPLIANCE INVESTIGATION

3.1 Federal Motor Carrier Safety Regulations (FMCSRs)
Critical Understanding: Commercial motor vehicle operations are heavily regulated. Violations establish negligence per se.
Key Regulatory Areas McKay Law Investigates:
Part 382 – Controlled Substances and Alcohol Use and Testing

- Pre-employment testing
- Post-accident testing
- Random testing program
- Reasonable suspicion testing
- Return-to-duty and follow-up testing
- Violations: Failure to test, positive results, testing program inadequacies

Part 383 – Commercial Driver's License Standards

- CDL requirements for vehicle operated
- Required endorsements
- Medical certification requirements
- Violations: Operating without proper license/endorsements, expired medical certificate

Part 391 – Qualifications of Drivers

- Minimum qualifications (age, license, medical, English language)
- Driver application requirements
- Driver's road test or equivalent
- Medical examination requirements (every 2 years typically)
- Maintenance of driver qualification file
- Annual review of driving record
- Violations: Hiring unqualified drivers, inadequate qualification files, failure to verify credentials

Part 392 – Driving of Commercial Motor Vehicles

- Ill or fatigued operator prohibitions
- Prohibition on texting
- Prohibition on hand-held mobile phone use
- Obeying traffic laws
- Hazardous conditions (adverse weather) requirements
- Violations: Texting while driving, phone use, driving while fatigued, speeding, reckless operation

Part 393 – Parts and Accessories Necessary for Safe Operation

- Brake system requirements and specifications
- Lighting device requirements
- Tire requirements
- Glazing and window construction
- Coupling devices (fifth wheels)
- Emergency equipment requirements
- Cargo securement requirements (Subpart I)
- Violations: Out-of-adjustment brakes, inadequate lighting, improper cargo securement, defective equipment

Part 395 – Hours of Service of Drivers

- 11/14-hour rules
- 60/70-hour rules
- 34-hour restart
- Sleeper berth provisions
- ELD requirements
- Supporting documents
- Violations: Exceeding driving hours, falsifying logs, ELD non-compliance, carrier coercion

Part 396 – Inspection, Repair, and Maintenance

- Systematic inspection, repair, and maintenance required
- Driver vehicle inspection report (DVIR) requirements
- Annual inspection requirements
- Maintenance recordkeeping
- Violations: Inadequate maintenance programs, operating vehicles with known defects, inadequate inspection records

3.2 Obtaining Regulatory Compliance Records

McKay Law Document Demand Strategy:
From Motor Carrier:
Driver Qualification File:

- Driver application
- MVR (motor vehicle record)
- Road test certificate or equivalent
- Medical examiner's certificate
- Annual review of driving record
- Previous employment verification (safety performance history)

Hours of Service Records:

- ELD data (7-14 days prior to accident minimum)
- Supporting documents (bills of lading, dispatch records)
- 34-hour restart documentation
- Break time documentation

Maintenance Records:

- Vehicle maintenance files for tractor and trailer
- Periodic inspection reports (annual inspections)
- Driver Vehicle Inspection Reports (DVIRs) – 90 days prior minimum
- Brake inspection and adjustment records
- Repair records for all systems
- Parts replacement records

Drug and Alcohol Testing Records:

- Post-accident test results
- Previous testing results (random, reasonable suspicion)
- Testing program documentation
- MRO (Medical Review Officer) reports

Operational Records:

- Dispatch records and communications
- GPS/telematics data
- Electronic on-board recorder data
- Load/cargo documents
- Trip planning documents
- Safety meeting records
- Driver training records

Safety and Compliance Records:

- DOT safety rating and inspection history
- Previous accident reports
- FMCSA compliance reviews
- Out-of-service violations
- Insurance policies and certificates

Company Policies:

- Safety policies and procedures
- Driver handbook
- Maintenance policies
- Hours of service policies
- Drug and alcohol policies
- Communication policies (phone use, dispatch)

From Federal Agencies:

FMCSA (Federal Motor Carrier Safety Administration):

- Motor carrier safety record (SMS – Safety Measurement System)
- BASIC (Behavior Analysis and Safety Improvement Categories) scores
  - Unsafe Driving
  - Crash Indicator
  - Hours of Service Compliance
  - Vehicle Maintenance
  - Controlled Substances/Alcohol
  - Driver Fitness
  - Hazardous Materials Compliance (if applicable)
- Compliance review results
- Roadside inspection history (3 years minimum)
- Out-of-service orders
- Operating authority and registration

National Highway Traffic Safety Administration (NHTSA):

- Vehicle defect investigations and recalls
- Tire recalls
- Equipment recalls affecting tractor or trailer

3.3 Identifying Regulatory Violations

McKay Law Compliance Analysis:
Expert regulatory compliance review of all obtained records comparing to applicable FMCSRs, identifying:
Driver-Related Violations:

- Hours of service violations
- Qualification file deficiencies
- Medical certification lapses
- License endorsement violations
- Drug/alcohol violations
- Distracted driving violations (phone, texting)

Vehicle-Related Violations:

- Out-of-adjustment brakes
- Lighting and visibility equipment violations
- Tire violations
- Cargo securement violations
- Annual inspection violations
- Operating vehicle with known defects

Carrier-Related Violations:

- Failure to maintain required records
- Inadequate safety management
- Permitting or requiring HOS violations
- Coercion to violate regulations
- Negligent hiring, training, supervision
- Inadequate maintenance programs

Significance:
Each regulatory violation:

- Establishes negligence per se (violation of safety statute)
- Demonstrates company culture of non-compliance
- Shows pattern and practice of violations
- Supports punitive damages claims
- Increases settlement/verdict value substantially

SECTION 4: ACCIDENT RECONSTRUCTION AND CAUSATION ANALYSIS

4.1 Accident Reconstruction Expert

McKay Law Retains Qualified Accident Reconstructionists:

Qualifications:

- Engineering degree (mechanical, civil, or related field)
- Specialized training in accident reconstruction
- Certification (ACTAR – Accreditation Commission for Traffic Accident Reconstruction)
- Commercial vehicle accident experience
- Testified as expert witness previously

Reconstruction Analysis:

1. Speed Determination

Multiple methods employed:

Skid Mark Analysis:

- Measure skid mark lengths
- Determine coefficient of friction for roadway surface
- Calculate minimum pre-braking speed
- Formula: Speed = √(30 × distance × friction coefficient × braking efficiency)
- Adjust for grade (uphill/downhill)

Yaw Mark Analysis:

- Curved tire marks from vehicle sliding while turning
- Critical Speed Formula determines minimum speed in curve
- Indicates loss of control speed

Crush/Damage Analysis:

- Measure deformation of vehicles
- Apply conservation of momentum and energy
- Calculate impact speeds (delta-V)
- Correlate to injury severity

ECM/EDR Data:

- Pre-crash speed recorded second-by-second
- Most accurate speed determination
- Correlate to physical evidence

Witness Estimates:

- Corroborate calculated speeds
- Pattern of consistent estimates

2. Sight Distance Analysis

Perception-Reaction Time:

- Standard assumption: 1.5 seconds
- Factors increasing time: inattention, impairment, distraction, fatigue
- Distance traveled during perception-reaction: Speed (fps) × 1.5 seconds

Available Sight Distance:

- Measure roadway geometry
- Identify obstructions
- Visibility conditions (weather, lighting, glare)
- Compare to required stopping sight distance

Time-Distance Analysis:

- When could driver first see hazard?
- How much time available to react?
- Could accident have been avoided with proper attention?

3. Stopping Distance Calculations

Components:

- Perception-reaction distance
- Brake lag distance (time for air brakes to apply)
- Braking distance to stop

Formula for Air Brake Vehicles: Total Stopping Distance = Perception-Reaction Distance + Brake Lag Distance + Braking Distance

Perception-Reaction Distance = Speed (fps) × 1.5 seconds

Brake Lag Distance = Speed (fps) × 0.5 seconds (typical air brake lag)

Braking Distance = Speed² ÷ (30 × deceleration rate)

Deceleration Rates:

- Well-maintained commercial vehicle with functional brakes: 0.4-0.5 g
- Vehicle with defective brakes: 0.2-0.3 g or lower
- Difference is dramatic: Defective brakes double stopping distance

Example at 60 mph (88 fps):

Properly Maintained Vehicle:

- Perception-reaction: 88 × 1.5 = 132 feet
- Brake lag: 88 × 0.5 = 44 feet
- Braking (0.45g decel): $88^2 \div (30 \times 0.45) = 576$ feet
- Total: 752 feet

Vehicle with Out-of-Adjustment Brakes (0.25g decel):

- Perception-reaction: 132 feet (same)
- Brake lag: 44 feet (same)
- Braking (0.25g): $88^2 \div (30 \times 0.25) = 1{,}035$ feet
- Total: 1,211 feet

Difference: 459 additional feet needed to stop

This additional distance often means the difference between stopping safely and catastrophic collision.

4. Vehicle Dynamics Analysis

Rollover Analysis:

- Calculate Static Stability Factor (SSF)
- Determine critical rollover speed for curve
- Analyze load factors (high center of gravity, load shift)
- Identify causation (excessive speed, improper loading, evasive maneuver)

Jackknife Analysis:

- Tractor-trailer jackknife occurs when trailer rotates relative to tractor
- Caused by: Trailer brake loss, excessive speed in curve, slippery surface, improper braking
- Calculate forces and moments causing rotation
- Identify primary cause

Loss of Control Analysis:

- Tire failure dynamics
- Brake imbalance effects
- Steering system failure effects
- Cargo shift effects
- Correlation to driver inputs and environmental factors

5. Event Sequence Reconstruction

Comprehensive timeline reconstruction:

- T-minus 5 seconds to impact: Positions and movements of all vehicles
- Critical decision points
- When did driver perceive hazard?
- When did driver react (brake, steer)?
- Were reactions appropriate and timely?
- How did vehicle systems respond?
- Sequence of impacts
- Post-impact vehicle trajectories

6. Causation Analysis and Opinions

Reconstruction expert provides opinions on:

Speed:

- Was driver speeding?
- Was speed excessive for conditions?
- Did speed contribute to or cause accident?

Braking:

- Did driver brake appropriately?
- Would proper braking have prevented accident?
- Did brake defects contribute to accident?
- What was braking deceleration rate (indicating brake effectiveness)?

Following Distance:

- Was following distance adequate for speed and conditions?
- Did inadequate following distance cause or contribute?

Avoidability:

- Could driver have avoided accident with proper attention and reactions?
- What actions should driver have taken?
- When should driver have reacted?

Mechanical Failure Contribution:

- Did brake defects cause or contribute to accident?
- Did tire failure cause or contribute?
- Did other mechanical failure contribute?

Driver Negligence:

- Was driver negligent in operation?
- Specific negligent acts or omissions

4.2 Mechanical/Trucking Expert

McKay Law Retains Heavy Vehicle Mechanical Experts:
Qualifications:

- Mechanical engineering degree or equivalent technical training
- Commercial vehicle maintenance and repair experience
- Heavy truck systems expertise (brakes, steering, suspension, engines)
- Inspector certifications (ASE Master Truck Technician, TMC)
- Regulatory knowledge (FMCSRs Part 393, 396)

Expert Analysis:
1. Brake System Failure Analysis
Pre-Crash Condition:

- Analyze inspection findings from post-accident vehicle exam
- Determine pre-crash condition of all brake components
- Identify which brake failures existed before accident vs. caused by accident
- Assess maintenance history and correlate to failures found

Failure Modes and Causation:

- Out-of-adjustment brakes: Maintenance neglect
- Contaminated linings: Wheel seal failure + deferred maintenance
- Worn components: Deferred maintenance and inadequate inspection
- Air system leaks: Component failure + lack of repair
- ABS malfunction: Electrical failure + inadequate maintenance

Braking Effectiveness Calculation:

- Calculate percentage of braking capacity lost due to defects
- Correlate to extended stopping distance
- Demonstrate that proper maintenance would have prevented accident

2. Maintenance Standard of Care Analysis

Industry Standards:

- FMCSA regulations (minimum requirements)
- Manufacturer maintenance schedules and specifications
- TMC (Technology & Maintenance Council) Recommended Practices
- Industry best practices

Deficiencies Identified:

- Compare carrier's maintenance practices to standards
- Identify specific failures to meet maintenance requirements
- Demonstrate pattern of maintenance neglect
- Show causation: Maintenance neglect → Mechanical failure → Accident

3. Pre-Trip Inspection Failure Analysis

Driver Responsibility:

- Pre-trip inspection required by 49 CFR 396.13
- Driver must identify defects affecting safety
- Driver must document defects (DVIR)
- Driver prohibited from operating vehicle with defects affecting safety

Inspection Adequacy:

- Analyze driver's pre-trip inspection (if documented)
- Determine if defects found post-accident would have been apparent in proper pre-trip
- Examples:
  - Out-of-adjustment brakes detectable by pushrod travel measurement
  - Air leaks audible with soapy water test
  - Tire problems visible in walk-around inspection
  - Lighting defects obvious during inspection

Failure to Identify:

- Shows inadequate inspection by driver
- Establishes driver negligence
- Suggests company culture of inadequate inspections

4. Federal Regulation Compliance Analysis

Part 393 Compliance (Parts and Accessories):

- Brake system compliance (adjustment, function, specifications)
- Lighting compliance
- Tire compliance (tread depth, damage)
- Coupling device compliance
- Emergency equipment compliance
- Cargo securement compliance

Part 396 Compliance (Inspection, Repair, Maintenance):

- Systematic inspection program adequacy
- DVIR compliance
- Annual inspection compliance
- Maintenance recordkeeping compliance
- Repair documentation compliance

Violations Documentation:

- Itemize each specific regulatory violation
- Correlate violations to accident causation
- Establish negligence per se

5. Opinions on Causation

Mechanical expert provides opinions:

Mechanical Failure Causation:

- Did brake defects cause or contribute to accident?
- Did other mechanical failure cause or contribute?
- Would proper maintenance have prevented mechanical failure?

Maintenance Negligence:

- Did carrier fail to maintain vehicle properly?
- Did maintenance failures constitute breach of standard of care?
- Specific maintenance actions that should have been performed

Regulatory Violations:

- Which FMCSRs were violated?
- How did violations contribute to accident?

Foreseeability:

- Were mechanical failures foreseeable?
- Should carrier have known of dangerous conditions?
- Did carrier’s maintenance practices create unreasonable risk?

4.3 Human Factors/Biomechanics Expert

Qualifications:

- Ph.D. in biomechanics, human factors engineering, or related field
- Expertise in human performance, perception-reaction, and crash dynamics
- Experience in commercial vehicle human factors

Expert Analysis:

1. Driver Performance Analysis

Perception-Reaction Time:

- How long should it have taken driver to perceive hazard?
- Factors increasing perception time: inattention, distraction, impairment, fatigue
- Was driver's reaction time reasonable or delayed?

Decision-Making:

- What options were available to driver?
- What was appropriate response?
- Did driver make reasonable decisions given circumstances?

Distraction Analysis:

- Evidence of distraction (cell phone records, witness observations)
- How does distraction affect perception, reaction, and decision-making?
- Cognitive workload and attention allocation

Fatigue Analysis:

- Hours of operation and sleep opportunity
- Circadian rhythm factors (time of day)
- Sleep debt accumulation
- Fatigue effects on performance (reaction time, vigilance, decision-making)
- Correlation to accident time and circumstances

2. Injury Causation Analysis

Crash Dynamics:

- Forces experienced by occupants (delta-V, G-forces)
- Occupant kinematics (movement during crash)
- Contact points with vehicle interior
- Injury mechanisms

Injury Correlation:

- Which specific crash forces caused specific injuries?
- Restraint system performance
- Airbag deployment (if applicable)
- Intrusion and compartment integrity

Severity Analysis:

- Were injuries consistent with crash severity?
- Biomechanical explanation for each significant injury
- Refutation of defense claims about pre-existing conditions or alternative causation

4.4 Cargo Securement Expert

For cases involving cargo shift, securement failure, or loading issues:
Qualifications:

- Commercial transportation experience
- Cargo securement expertise
- Knowledge of 49 CFR Part 393 Subpart I (Cargo Securement)
- Experience with various cargo types and securement methods

Expert Analysis:
1. Securement Adequacy Analysis
Regulatory Requirements:

- Specific requirements for cargo type
- Required Working Load Limit (WLL) for securement devices
- Required number of tie-downs based on cargo weight and length
- Blocking and bracing requirements

Actual Securement:

- Analyze post-accident evidence of securement
- Number and type of securement devices used
- Working Load Limit of devices used
- Proper application of securement methods

Deficiencies:

- Identify specific violations of cargo securement regulations
- Calculate inadequacy of securement
- Show how inadequate securement caused or contributed to accident

2. Load Distribution Analysis

Weight Distribution:

- How was cargo distributed on trailer?
- Was weight properly distributed across axles?
- Did distribution comply with axle weight limits?
- Did improper distribution affect handling or braking?

Center of Gravity:

- Where was combined center of gravity of vehicle and cargo?
- Did high center of gravity increase rollover risk?
- Did center of gravity position contribute to instability?

3. Loading Practices Analysis

Standard of Care:

- Industry standards for loading specific cargo type
- Shipper/loader responsibilities
- Carrier responsibilities for verifying proper loading

Negligent Loading:

- Who loaded the cargo?
- Were proper loading procedures followed?
- Did improper loading create unreasonable danger?