

abs 136 code freightliner

abs 136 code freightliner, a common diagnostic trouble code (DTC) for Freightliner trucks, signals a potential issue within the Anti-lock Braking System (ABS). Understanding this code is crucial for truck owners and mechanics to ensure safe and efficient operation of their vehicles. This comprehensive guide will delve into the intricacies of the ABS 136 code, covering its meaning, common causes, diagnostic procedures, and repair strategies. We'll explore the components involved in the ABS, the specific symptoms associated with the ABS 136 code, and the systematic approach required for accurate diagnosis and effective resolution. By the end of this article, you'll have a thorough understanding of the ABS 136 code Freightliner, empowering you to address this issue proactively and maintain optimal braking performance.

Understanding the ABS 136 Code Freightliner

The ABS 136 code Freightliner is a specific diagnostic trouble code that indicates a problem detected by the truck's ABS control module. This module is responsible for monitoring wheel speed sensors and other critical braking system components to prevent wheel lock-up during heavy braking, thereby enhancing vehicle stability and control. When the ABS control module identifies an anomaly that falls within the parameters of the ABS 136 code, it illuminates the ABS warning light on the dashboard, alerting the driver to a potential malfunction. Understanding what this code signifies is the first step towards addressing the underlying issue.

What Does ABS 136 Code Mean?

The ABS 136 code Freightliner typically points to an issue related to the ABS wheel speed sensor circuit. More specifically, it often indicates a problem with the ABS wheel speed sensor itself or its associated wiring harness. This sensor's function is vital; it continuously measures the rotational speed of each wheel. If the ABS module receives erratic, missing, or no data from one or more of these sensors, it triggers diagnostic codes, including ABS 136. The exact interpretation might vary slightly depending on the specific Freightliner model and year, but the core meaning remains consistent: a detected fault in the wheel speed sensor system.

The Role of the ABS System in Freightliner Trucks

The Anti-lock Braking System (ABS) is a critical safety feature in modern commercial vehicles like Freightliner trucks. Its primary purpose is to prevent the wheels from locking up during sudden or hard braking. Wheel lock-up can lead to a loss of steering control and increased stopping distances, especially on slippery surfaces. The ABS achieves this by rapidly pulsing the brakes on individual wheels, allowing them to maintain traction and allowing the driver to retain steering control. The ABS control module, along with wheel speed sensors, hydraulic modulators, and the ABS warning light, form the core

components of this sophisticated system.

Common Causes of ABS 136 Code Freightliner

When a Freightliner truck displays an ABS 136 code, several common culprits can be responsible. Identifying these potential causes is essential for a streamlined diagnostic process. These issues often stem from physical damage, electrical faults, or wear and tear on components.

Faulty ABS Wheel Speed Sensor

The ABS wheel speed sensor is a small but crucial component responsible for detecting the rotation of each wheel. If this sensor becomes damaged, corroded, or simply fails due to age, it can send inaccurate or no signals to the ABS control module. This failure is one of the most frequent reasons for the ABS 136 code. Symptoms can include the ABS warning light illuminating, and potentially erratic braking performance or the ABS system not engaging when it should.

Damaged or Corroded Wiring Harness

The wiring harness connecting the ABS wheel speed sensors to the ABS control module is susceptible to damage from road debris, vibration, or exposure to harsh environmental conditions. Corrosion can also build up on the connectors, leading to poor electrical contact and signal interruption. A break in the wire, a short circuit, or a loose connection can all trigger the ABS 136 code Freightliner. Inspecting the entire length of the wiring harness, from the sensor to the module, is a vital diagnostic step.

Issues with the Wheel Hub or Tone Ring

While less common than sensor or wiring problems, issues with the wheel hub or the tone ring (also known as a reluctor ring) can also lead to ABS 136 codes. The tone ring is a toothed ring attached to the wheel hub or axle that the wheel speed sensor reads. If the tone ring is bent, cracked, or has debris lodged in its teeth, it can interfere with the sensor's ability to accurately read the wheel's rotation. A worn or damaged wheel hub can also cause the tone ring to become misaligned, leading to similar problems.

ABS Control Module Malfunction

In rarer instances, the ABS control module itself may be malfunctioning. This module is the "brain" of the ABS system, interpreting the signals from the wheel speed sensors and commanding the hydraulic modulator. If the module has internal faults, it can misinterpret signals or fail to process them correctly, leading to various diagnostic codes, including the ABS 136 code. However, it's generally advisable to rule out simpler causes like sensor or

wiring issues before suspecting the control module.

Diagnosing the ABS 136 Code Freightliner

Diagnosing the ABS 136 code Freightliner requires a systematic and methodical approach. Simply replacing parts without proper diagnosis can lead to wasted time and money. Utilizing diagnostic tools and performing thorough inspections are key to pinpointing the exact cause.

Using a Diagnostic Scan Tool

The first and most crucial step in diagnosing any ABS code is to connect a professional-grade diagnostic scan tool to the vehicle's OBD-II port. This tool will communicate with the ABS control module and retrieve the specific trouble codes stored. For the ABS 136 code, the scan tool can also provide live data streams from the wheel speed sensors, allowing you to observe their readings in real-time as the wheels rotate. Some advanced scan tools may even offer specific diagnostic tests for the ABS components.

Inspecting the ABS Wheel Speed Sensors

Once the code is retrieved, a thorough visual inspection of the ABS wheel speed sensors is necessary. Check for any signs of physical damage, such as cracks or breaks in the sensor housing or wiring. Look for corrosion on the sensor connector and the wiring terminals. Ensure that the sensors are securely mounted and have not been dislodged. If a sensor appears damaged or corroded, it's a strong candidate for replacement.

Examining the Wiring Harness and Connectors

Follow the wiring harness from each affected wheel speed sensor back to the ABS control module. Inspect the entire length of the harness for any signs of chafing, cuts, or damage from road debris. Pay close attention to areas where the harness might rub against the chassis or other components. Check all connectors for corrosion, bent pins, or loose connections. Using a multimeter to check for continuity and resistance in the wiring can help identify breaks or shorts.

Testing the Tone Ring and Wheel Hub

If the sensors and wiring appear to be in good condition, the next step is to inspect the tone ring and wheel hub. This may involve removing the wheel and brake assembly. Examine the tone ring for any missing teeth, cracks, or bends. Ensure that there is no dirt, rust, or other debris accumulated on the teeth that could interfere with the sensor's reading. Check the wheel hub for any signs of damage or excessive play, which could affect the tone ring's position.

Repairing and Resolving the ABS 136 Code Freightliner

Once the cause of the ABS 136 code Freightliner has been accurately identified, the appropriate repair procedures can be implemented. The method of repair will directly depend on the specific component found to be faulty.

Replacing a Faulty ABS Wheel Speed Sensor

If the diagnostic process points to a failed ABS wheel speed sensor, replacement is the standard procedure. This typically involves unbolting the old sensor and installing a new one. It's important to use a high-quality replacement part that is compatible with your specific Freightliner model. After installation, ensure the electrical connector is securely attached. Clearing the diagnostic trouble code with a scan tool is essential after the replacement.

Repairing or Replacing Damaged Wiring

If the wiring harness is found to be damaged, repairs can range from simple connector cleaning and re-pinning to complete harness replacement. For minor corrosion or loose connections, cleaning the terminals and ensuring a tight fit can resolve the issue. For broken wires or significant damage, splicing in new wire or replacing sections of the harness may be necessary. In cases of extensive damage, a full wiring harness replacement might be the most reliable solution to prevent future issues. Proper insulation and securing of any repaired wiring is critical.

Addressing Tone Ring or Wheel Hub Issues

If a damaged tone ring is the cause, it will need to be replaced. This can be a labor-intensive process, often requiring removal of the wheel hub assembly. Similarly, if the wheel hub is damaged, it will need to be replaced to ensure proper alignment and functionality of the ABS components. Ensuring the new tone ring is correctly seated and that the wheel hub assembly is properly torqued is paramount.

Troubleshooting ABS Control Module Problems

If all other components have been ruled out, the ABS control module may need further investigation or replacement. This is typically a more complex repair and may require specialized diagnostic software or guidance from Freightliner technical support. Replacement of the ABS control module often involves programming the new module to the vehicle's specific configuration, which can only be done with the appropriate diagnostic tools. Before condemning the module, ensure all other potential causes have been thoroughly investigated.

Frequently Asked Questions

What is Freightliner ABS Code 136 and what does it typically indicate?

Freightliner ABS Code 136 generally points to an issue with the ABS wheel speed sensor on the front axle, specifically the left side. This means the Anti-lock Braking System's control module is not receiving a valid signal from this sensor, or the signal is intermittent.

What are the common causes of Freightliner ABS Code 136?

Common causes include a damaged or dirty ABS wheel speed sensor, a loose or corroded connector at the sensor or ABS module, a damaged tone ring (reluctor ring) that the sensor reads, or a faulty ABS wheel speed sensor itself. Less commonly, it could indicate wiring harness damage.

How can a technician diagnose and troubleshoot Freightliner ABS Code 136?

A technician will typically start by visually inspecting the sensor and its wiring for obvious damage. They will then check electrical connections for corrosion or looseness. Using a diagnostic scan tool, they can monitor live ABS sensor data, check for other related codes, and test the sensor's resistance and output. Checking the tone ring for damage or debris is also crucial.

What are the potential symptoms a driver might experience with Freightliner ABS Code 136 active?

The most common symptom is the ABS warning light illuminating on the dashboard. The ABS system will likely be disabled, meaning it won't function during hard braking. In some cases, you might notice a slight reduction in braking performance or a feeling of the brakes being less effective, though this is not always pronounced.

What are the potential solutions or repairs for Freightliner ABS Code 136?

The repair depends on the root cause. It could involve cleaning a dirty sensor or tone ring, repairing damaged wiring or connectors, replacing a faulty ABS wheel speed sensor, or replacing a damaged tone ring. In rare cases, the ABS control module itself might need to be diagnosed and potentially replaced.

Additional Resources

Here are 9 book titles related to ABS 136 code Freightliner, with descriptions:

1. Troubleshooting Freightliner ABS Code 136: A Comprehensive Guide

This book delves deep into the common causes and diagnostic procedures for Freightliner ABS code 136. It provides step-by-step instructions for identifying faulty sensors, wiring issues, and module problems associated with this specific code. The guide aims to equip technicians with the knowledge needed to quickly and accurately resolve the underlying issues.

2. Understanding Freightliner ABS Systems: Focusing on Code 136 Manifestations

This title explores the broader context of Freightliner's Anti-lock Braking Systems, with a specific emphasis on how code 136 typically presents itself. It explains the fundamental principles of ABS operation and how deviations from normal function lead to diagnostic trouble codes. Readers will gain a foundational understanding that supports effective troubleshooting.

3. Mastering Freightliner ABS Diagnostics: Navigating Code 136 and Beyond

This advanced manual is designed for experienced diesel technicians and focuses on mastering Freightliner ABS diagnostics. It dedicates a significant portion to the intricacies of code 136, offering insights into less common causes and advanced testing techniques. The book also provides strategies for tackling related ABS codes to offer a holistic approach.

4. Freightliner ABS Code 136: Wiring Diagrams and Component Analysis

This practical guide focuses on the physical and electrical aspects of Freightliner ABS code 136. It features detailed wiring diagrams specific to various Freightliner models that encounter this code. The book also provides in-depth analysis of the individual components involved, helping technicians pinpoint failing parts with precision.

5. The Technician's Handbook for Freightliner ABS Code 136 Solutions

This concise handbook serves as a quick reference for technicians facing Freightliner ABS code 136. It presents common solutions and repair strategies in an easy-to-digest format. The book prioritizes practical advice and actionable steps for efficient repair, making it a valuable tool in any workshop.

6. Freightliner ABS Code 136: Sensor and Module Integration Explained

This title explores the critical interplay between ABS sensors and control modules in Freightliner vehicles, particularly in relation to code 136. It explains how sensor data is interpreted by the module and what happens when this integration fails. The book offers clear explanations of communication protocols and potential points of failure.

7. Preventative Maintenance for Freightliner ABS: Avoiding Code 136 Issues

This book shifts the focus from reactive repair to proactive maintenance strategies aimed at preventing Freightliner ABS code 136. It outlines regular inspection points, cleaning procedures, and component care that can extend the life of ABS systems. By understanding common failure patterns, owners and technicians can minimize unexpected issues.

8. Freightliner ABS Code 136: A Case Study Approach to Diagnosis

This title utilizes real-world case studies to illustrate the diagnostic process for Freightliner ABS code 136. Each case study presents a specific scenario, the symptoms observed, the diagnostic steps taken, and the eventual solution. This practical, problem-based learning approach helps solidify understanding and build diagnostic confidence.

9. Freightliner ABS Code 136: Advanced Troubleshooting for Electronic Braking Systems

This book offers advanced techniques for troubleshooting Freightliner ABS code 136, focusing on the electronic complexities of modern braking systems. It covers topics like CAN bus communication, module programming, and advanced diagnostic tool usage. The aim is to provide solutions for challenging and persistent ABS code 136 issues.

Abs 136 Code Freightliner

ABS 136 Code Freightliner: A Comprehensive Guide to Diagnosis and Repair

Ebook Title: Decoding Freightliner ABS 136: Diagnosis, Repair, and Prevention

Ebook Outline:

Introduction: Understanding Anti-lock Braking Systems (ABS) and their importance in Freightliners. What ABS 136 signifies and its potential impact.

Chapter 1: Diagnosing ABS 136: Step-by-step troubleshooting guide, including using diagnostic tools, interpreting data, and identifying potential causes. Common causes of the ABS 136 code.

Chapter 2: Locating and Replacing Faulty Components: Identifying and accessing relevant components. Detailed instructions for replacing faulty sensors, wiring, and other parts. Specific guidance for Freightliner models.

Chapter 3: Advanced Troubleshooting Techniques: Addressing complex scenarios, utilizing advanced diagnostic procedures, and interpreting less common causes of the code.

Chapter 4: Preventative Maintenance: Strategies to reduce the likelihood of encountering ABS 136 in the future. Regular inspection schedules and preventative maintenance steps.

Chapter 5: Legal and Safety Considerations: The importance of proper ABS functionality, legal implications of operating a vehicle with a faulty ABS system, and safety precautions.

Conclusion: Recap of key findings, emphasizing the importance of prompt diagnosis and repair of ABS 136, and providing resources for further learning.

ABS 136 Code Freightliner: A Comprehensive Guide to Diagnosis and Repair

Introduction: Understanding the Significance of ABS 136

The Anti-lock Braking System (ABS) is a critical safety feature in any vehicle, but especially in heavy-duty trucks like Freightliners. These vehicles carry significant loads and require enhanced braking control to prevent accidents. The ABS 136 code indicates a malfunction within the ABS system, potentially compromising its effectiveness. Ignoring this code can lead to reduced braking performance, increased stopping distances, and a heightened risk of accidents. This guide will provide a comprehensive understanding of the ABS 136 code, focusing on its diagnosis, repair, and prevention in Freightliner trucks.

Chapter 1: Diagnosing ABS 136: Unraveling the Mystery

The first step in addressing ABS 136 is accurate diagnosis. This involves systematically investigating potential sources of the problem. Several tools and techniques are employed:

Using a Diagnostic Scanner: A professional-grade diagnostic scanner compatible with Freightliner trucks is crucial. These scanners provide detailed information about the ABS system, including specific error codes, sensor readings, and system statuses. The scanner will pinpoint which wheel or component is triggering the ABS 136 code. Common scanners used by Freightliner technicians include the Detroit Diesel diagnostic tool and others specific to the vehicle's year and model.

Interpreting Diagnostic Data: Understanding what the scanner displays is crucial. ABS 136 itself doesn't always directly indicate the faulty component. It often points towards a malfunction within a specific wheel speed sensor circuit, a faulty ABS module, or problems with the related wiring harness. The scanner's data will provide clues like voltage readings, sensor signal strength, and other parameters to aid in narrowing down the cause.

Visual Inspection: After using the scanner, a thorough visual inspection of the affected wheel's components is necessary. This includes checking the wheel speed sensor for physical damage, corrosion, or loose connections. Inspect the wiring harness for any breaks, chafing, or water intrusion, paying close attention to areas subject to abrasion or movement.

Common Causes of ABS 136: While the specific cause varies, common culprits include:

Faulty Wheel Speed Sensor: This is the most frequent cause. Dirt, debris, or damage can interfere with the sensor's ability to accurately measure wheel speed.

Damaged Wiring Harness: Worn or damaged wiring can lead to intermittent or complete signal loss, triggering the code. Rodents chewing on wiring are a common issue.

ABS Module Malfunction: The ABS module itself can fail, leading to various error codes, including ABS 136. This requires more advanced diagnostics and potentially module replacement.

Low Battery Voltage: Insufficient voltage can affect the performance of the ABS system and cause intermittent faults.

Chapter 2: Locating and Replacing Faulty Components: Hands-on Repair

Once the faulty component is identified, replacement is the next step. This requires familiarity with Freightliner truck mechanics and safety procedures:

Accessing Components: Locating the wheel speed sensor, ABS module, or other components varies depending on the Freightliner model and year. Consult a repair manual specific to your truck for detailed instructions and diagrams.

Replacing the Wheel Speed Sensor: This generally involves removing the wheel, accessing the sensor, disconnecting the electrical connector, and carefully removing the sensor. Installation involves the reverse process, ensuring proper seating and secure connection.

Replacing Wiring Harnesses: Repairing damaged wiring involves careful tracing of the harness,

identifying the break or damage, and repairing or replacing the affected section. Splicing wires correctly is crucial to maintain signal integrity.

Replacing the ABS Module: This is a more complex procedure that usually requires specialized tools and expertise. The ABS module should only be replaced with a genuine Freightliner part or a reliable equivalent.

Chapter 3: Advanced Troubleshooting Techniques: Addressing Complex Issues

Some situations require more advanced troubleshooting:

Intermittent Codes: If the ABS 136 code appears intermittently, it suggests a loose connection or a problem that's difficult to pinpoint. This requires careful examination of wiring, connectors, and grounds. Road testing under varied conditions may help replicate the fault.

Multiple Error Codes: The presence of multiple error codes complicates diagnosis. Addressing the codes in order of severity, or using advanced diagnostic software to identify the root cause of related errors is essential.

Using an Oscilloscope: For advanced diagnostics, an oscilloscope can be used to analyze the waveform of the wheel speed sensor signal, helping to identify subtle problems not detected by a simple diagnostic scanner.

Chapter 4: Preventative Maintenance: Proactive Strategies

Regular maintenance significantly reduces the likelihood of encountering ABS 136:

Regular Inspections: Visually inspect wheel speed sensors, wiring harnesses, and ABS components during routine maintenance checks. Look for signs of damage, corrosion, or loose connections.

Cleaning Sensors: Clean wheel speed sensors regularly to remove dirt and debris that can interfere with their operation.

Protecting Wiring: Properly route and secure wiring harnesses to prevent chafing and damage. Use protective sleeves or conduit where needed.

Chapter 5: Legal and Safety Considerations: Operating a Safe Vehicle

Operating a Freightliner with a malfunctioning ABS system has serious legal and safety ramifications:

Compliance with Regulations: Many jurisdictions have strict regulations regarding the operation of commercial vehicles with faulty safety systems. Operating a vehicle with a known ABS problem can lead to fines and legal penalties.

Safety Risks: Reduced braking performance increases the risk of accidents, potentially causing serious injuries or fatalities.

Conclusion: Ensuring Safe and Reliable Braking Performance

Prompt diagnosis and repair of the ABS 136 code in your Freightliner is crucial for both safety and legal compliance. This guide provides a comprehensive approach, from initial diagnosis to preventative maintenance, equipping you with the knowledge to address this critical issue

effectively. Remember to always consult your Freightliner's repair manual and seek professional assistance if needed.

FAQs:

1. Can I drive my Freightliner with the ABS 136 code? While technically possible, it's highly discouraged due to significantly reduced braking performance and legal ramifications.
2. How much does it cost to repair an ABS 136 code? The cost varies significantly depending on the cause (sensor, wiring, module) and labor costs.
3. Can I replace the ABS module myself? It's highly recommended to have this done by a qualified technician as it involves complex procedures.
4. How often should I inspect my wheel speed sensors? Ideally, during every scheduled maintenance check.
5. What are the signs of a failing wheel speed sensor? ABS light illumination, inconsistent braking, and ABS 136 code are key indicators.
6. What type of diagnostic scanner do I need for my Freightliner? A scanner compatible with your truck's make, model, and year.
7. Can low battery voltage cause ABS 136? Yes, insufficient voltage can affect the ABS system's operation.
8. What are the legal consequences of ignoring ABS 136? Potential fines and legal action depending on your jurisdiction.
9. Where can I find a Freightliner repair manual? Online retailers, Freightliner dealerships, or specialized truck repair manuals sources.

Related Articles:

1. Freightliner ABS System Troubleshooting Guide: A broader overview of troubleshooting various Freightliner ABS system issues.
2. Understanding Freightliner Electronic Braking Systems: Explores different braking systems used in Freightliners and their components.
3. How to Test a Freightliner Wheel Speed Sensor: A detailed step-by-step guide focusing on sensor testing techniques.
4. Freightliner Wiring Harness Repair Techniques: Provides guidance on identifying and repairing damaged wiring harnesses.
5. Diagnosing and Repairing Freightliner ABS Module Failures: In-depth analysis of ABS module issues and repair strategies.
6. Preventative Maintenance for Freightliner Trucks: Covers all aspects of preventative maintenance for maximizing uptime and safety.
7. Common Freightliner ABS Error Codes Explained: A dictionary of Freightliner ABS codes and their possible causes.
8. Freightliner Roadside Emergency Procedures: What to do if your Freightliner ABS system fails on the road.
9. Legal Compliance for Commercial Vehicle Braking Systems: A detailed overview of regulations related to commercial vehicle braking systems.

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analyzed. Each chapter builds on the knowledge developed earlier for simpler designs; after finishing the book, you will know how to use R to select and analyze almost any type of probability sample. All R code and data sets used in this book are available online to help you develop your skills analyzing survey data from social and public opinion research, public health, crime, education, business, agriculture, and ecology.

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abs 136 code freightliner: Fall of Frost Brian Hall, 2008-03-27 The life of Robert Frost, brilliantly re-imagined by the author of the acclaimed *I Should Be Extremely Happy in Your Company* Called a spellbinding prose stylist(Los Angeles Times), Brian Hall drew extraordinary praise for his novel *I Should Be Extremely Happy in Your Company*, in which he captured the personal lives of Lewis and Clark. Now he turns his talents to Robert Frost, arguably America's most famous poet. Through the revelatory voice of fiction, Hall gives us an artist toughened by tragedy, whose intimacy with death gave life to his poetry-for him, the preeminent symbol of man's form-giving power. This is the exquisitely rendered portrait of one man's rages, guilt, generosity, and defiant persistence-as much a fictional masterwork as it is a meditation on greatness.

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Illustrating the fascinating interplay between physics and mathematics, *Groups, Representations and Physics*, Second Edition provides a solid foundation in the theory of groups, particularly group representations. For this new, fully revised edition, the author has enhanced the book's usefulness and widened its appeal by adding a chapter on the Cartan-Dynkin treatment of Lie algebras. This treatment, a generalization of the method of raising and lowering operators used for the rotation group, leads to a systematic classification of Lie algebras and enables one to enumerate and construct their irreducible representations. Taking an approach that allows physics students to recognize the power and elegance of the abstract, axiomatic method, the book focuses on chapters that develop the formalism, followed by chapters that deal with the physical applications. It also illustrates formal mathematical definitions and proofs with numerous concrete examples.

abs 136 code freightliner: *Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles* National Research Council, Transportation Research Board, Division on Engineering and Physical Sciences, Board on Energy and Environmental Systems, Committee to Assess Fuel Economy Technologies for Medium- and Heavy-Duty Vehicles, 2010-07-30
Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles evaluates various technologies and methods that could improve the fuel economy of medium- and heavy-duty vehicles, such as tractor-trailers, transit buses, and work trucks. The book also recommends approaches that federal agencies could use to regulate these vehicles' fuel consumption. Currently there are no fuel consumption standards for such vehicles, which account for about 26 percent of the transportation fuel used in the U.S. The miles-per-gallon measure used to regulate the fuel economy of passenger cars, is not appropriate for medium- and heavy-duty vehicles, which are designed above all to carry loads efficiently. Instead, any regulation of medium- and heavy-duty vehicles should use a metric that reflects the efficiency with which a vehicle moves goods or passengers, such as gallons per ton-mile, a unit that reflects the amount of fuel a vehicle would use to carry a ton of goods one mile. This is called load-specific fuel consumption (LSFC). The book estimates the improvements that various technologies could achieve over the next decade in seven vehicle types. For example, using advanced diesel engines in tractor-trailers could lower their fuel consumption by up to 20 percent by 2020, and improved aerodynamics could yield an 11 percent reduction. Hybrid powertrains could lower the fuel consumption of vehicles that stop frequently, such as garbage trucks and transit buses, by as much as 35 percent in the same time frame.

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The Fourth Industrial Revolution signals a sea change in the way we lead our organisations. Moving away from relational leadership and horizontal, organisationally-led development, it is imperative that business leaders are able to adapt to more networked organisations and shift away from dated assumptions of positional power. *Constructing Leadership 4.0* breaks new ground by explaining the urgent challenges facing managers and business leaders. It will teach you how to: Approach leadership development as a system rather than a programme Develop an organisational ecosystem to support leadership 4.0 Build collaborative networks Cultivate a responsive mindset through sensemaking Use non-classroom based learning methodologies for educating leaders Rooted in leadership

development methodology and underpinned by cutting-edge research, this book calls for businesses to cultivate responsive leaders through a theory of connectivism and swarm intelligence that reflects the coming cybernetic revolution.

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