



Motor Truck Engineering Handbook

James William Fitch

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The trucking industry is continually faced with spiraling costs which must be offset by more efficient application of equipment through improved methods and concepts in transportation. The fourth edition of the Motor Truck Engineering Handbook updates the basic truck engineering data from previous editions and introduces the latest advancements in electronic applications to truck powertrains and operations, assuring optimum performance and economy with a safer and cleaner environment. Useful data from official government tests on anti-lock brakes and traction enhance this edition. Likewise, environmental concerns are addressed through the use of non-polluting vehicles using alternative fuels and electrical energy. Chapter I- The Trucking Industry- Industry scope and truck facts; Registrations, revenues; Fundamentals of Metrics; IVHS. Chapter II- Selecting the Size and Type of Vehicle- Importance of proper selection for greater profits; International, federal, and state legal size and weight regulations; Chapter III- Road Performance- Significance of torque and horsepower; How to determine vehicle performance, speed, gradeability, acceleration and metrication; Factors affecting vehicle performance; Chapter IV- Fuel Economy and Operating Costs- Factors affecting fuel economy including engine design, lightweight materials, aerodynamics, radial tires, electronics, transmissions and rear axle ratios, driver ability and vehicle configuration; Fuel cost and maintenance, taxes and depreciation. Chapter V- Chassis Components- Vehicle frames, cooling systems, supporting equipment including lightweight components, electronic equipment, air shields, air cleaners and exhaust systems; Fasteners. Chapter VI- Engine Types- Diesel and gasoline power for heavy-duty vehicles; High torque concept and low rpm engines, turbochargers and charge air cooling; Chapter VII- Transmissions- Scope and function of powertrain; Selecting gear reductions for optimum performance; Determining proper gear splits; Analysis of truck gearing combinations; Selecting main and auxiliary transmission combinations; Transmissions for high torque and low rpm, fuel-efficient engines; Torque converters and automatic transmissions; Chapter VIII- Rear Axles- Operating factors influencing selection; Gearing for optimum fuel economy; Selecting axle types for desired performance; Functions and advantages of single and double reduction two-speed axles and tandems; Chapter IX- Axle Suspensions- Factors influencing selection of spring, rubber, air or solid-type suspension; Cost and weight savings; Ride and control considerations; Third axle and tri-axle suspensions; New Hendrickson suspensions, air suspension for lift axles; Electronic suspensions. Chapter X- Brakes and Retarders- Requirements for adequate braking and vehicle control; Service and emergency brakes; Types and function of control valves; Federal and state braking regulations; Conditions affecting vehicle control and directional stability; Braking theory and application; Chapter XI- Drivetrains and Drivelines -Requirements for efficient power transmission; Driveline thrust and torque considerations; Determining proper driveline angularity, torque rating, and critical speeds; Constant velocity joints; Noise and vibration control; Chapter XIII- Wheels and Tires; Factors influencing size and type of tires; Effects of inflation pressures and loads on tire life; Tire treads for better braking and stability; Hydroplaning; Tire coefficients of frictions. Chapter XIV- Alternative Fuels- Ethanol, methanol, reformulated fuels, compressed natural gas (CNG), natural gas, electric energy; Emissions, fuel economy, costs of converting, dual fuel operation; Electric vehicles, solar power, gasoline engines, LP gas engines, gas turbines, steam power. Chapter XV- Environmental Regulations- Clean Air Act, emission regulations, air contaminants and sources, EPA emission controls, Federal and state noise standards.

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