

## Competition Car Aerodynamics A Practical Handbook

In most forms of racing, cornering speed is the key to winning. On the street, precise and predictable handling is the key to high performance driving. However, the art and science of engineering a chassis can be difficult to comprehend, let alone apply. Chassis Engineering explains the complex principles of suspension geometry and chassis design in terms the novice can easily understand and apply to any project. Hundreds of photos and illustrations illustrate what it takes to design, build, and tune the ultimate chassis for maximum cornering power on and off the track.

Aerodynamics has never been more central to the development of cars, commercial vehicles, motorbikes, trains and human powered vehicles, driven by the need for efficiency: reducing carbon dioxide emissions, reducing fuel consumption, increasing range and alleviating problems associated with traffic congestion. Reducing vehicle weight makes it more challenging to ensure that they are stable and handle well over a wide range of environmental conditions. Lighter structures are also more vulnerable to aerodynamically induced vibration. Alongside this, customers demand an environment that is quiet, comfortable and maintains their vision of the world around them in all weathers. These aims must be met by designing vehicles that engage customers emotionally, promoting the brand values of manufacturers and operators. This can only be done by collaboration between designers and aerodynamicists. Examine the latest developments in vehicle aerodynamic development Explore opportunities to network and share experiences around different areas Focus on future challenges and the engineering knowledge and technology required to resolve them Discuss other areas of development including handling and stability, tyre aerodynamics and modelling, aeroacoustics and fluid structure interaction

Prepared at the request of NASA, Aeronautical Technologies for the Twenty-First Century presents steps to help prevent the erosion of U.S. dominance in the global aeronautics market. The book recommends the immediate expansion of research on advanced aircraft that travel at subsonic speeds and research on designs that will meet expected future demands for supersonic and short-haul aircraft, including helicopters, commuter aircraft, "tiltrotor," and other advanced vehicle designs. These recommendations are intended to address the needs of improved aircraft performance, greater capacity to handle passengers and cargo, lower cost and increased convenience of air travel, greater aircraft and air traffic management system safety, and reduced environmental impacts.

A comprehensive guide on how to tune, test, and win in any form of racing. Includes technical information on all areas of race car engineering, including suspension and chassis, springs, brakes, aerodynamics, engine systems, safety, driving, testing, computers in racing, and a special section on race cars of the future.

A colorful account of Le Corbusier's love affair with the automobile, his vision of the ideal vehicle, and his tireless promotion of a design that industry never embraced. Le Corbusier, who famously called a house "a machine for living," was fascinated—even obsessed—by another kind of machine, the automobile. His writings were strewn with references to autos: "If houses were built industrially, mass-produced like chassis, an aesthetic would be formed with surprising precision," he wrote in *Toward an Architecture* (1923). In his "white phase" of the twenties and thirties, he insisted that his buildings photographed with a modern automobile in the foreground. Le Corbusier moved beyond the theoretical in 1936, entering (with his cousin Pierre Jeanneret) an automobile design competition, submitting plans for "a minimalist vehicle for maximum functionality," the *Voiture Minimum*. Despite Le Corbusier's energetic promotion of his design to several important automakers, the *Voiture*

Minimum was never mass-produced. This book is the first to tell the full and true story of Le Corbusier's adventure in automobile design. Architect Antonio Amado describes the project in detail, linking it to Le Corbusier's architectural work, to Modernist utopian urban visions, and to the automobile design projects of other architects including Walter Gropius and Frank Lloyd Wright. He provides abundant images, including many pages of Le Corbusier's sketches and plans for the Voiture Minimum, and reprints Le Corbusier's letters seeking a manufacturer. Le Corbusier's design is often said to have been the inspiration for Volkswagen's enduringly popular Beetle; the architect himself implied as much, claiming that his design for the 1936 competition originated in 1928, before the Beetle. Amado Lorenzo, after extensive examination of archival and source materials, disproves this; the influence may have gone the other way. Although many critics considered the Voiture Minimum a footnote in Le Corbusier's career, Le Corbusier did not. This book, lavishly illustrated and exhaustively documented, restores Le Corbusier's automobile to the main text.

In 2006, a small unavailing university auto racing team began building a racecar that would challenge the best engineering schools in the world. With fewer people and resources than any of the top competitors, the only way they were going to win was to push the limit, go for broke, and hope for more than a little luck. By the time they got to the racetrack, they knew: In the fog of fierce competition, whether you win or lose, you learn the hardest lessons about engineering, teamwork, friendship, and yourself.

The automobile is an icon of modern technology because it includes most aspects of modern engineering, and it offers an exciting approach to engineering education. Of course there are many existing books on introductory fluid/aero dynamics but the majority of these are too long, focussed on aerospace and don't adequately cover the basics. Therefore, there is room and a need for a concise, introductory textbook in this area. Automotive Aerodynamics fulfils this need and is an introductory textbook intended as a first course in the complex field of aero/fluid mechanics for engineering students. It introduces basic concepts and fluid properties, and covers fluid dynamic equations. Examples of automotive aerodynamics are included and the principles of computational fluid dynamics are introduced. This text also includes topics such as aeroacoustics and heat transfer which are important to engineering students and are closely related to the main topic of aero/fluid mechanics. This textbook contains complex mathematics, which not only serve as the foundation for future studies but also provide a road map for the present text. As the chapters evolve, focus is placed on more applicable examples, which can be solved in class using elementary algebra. The approach taken is designed to make the mathematics more approachable and easier to understand. Key features: Concise textbook which provides an introduction to fluid mechanics and aerodynamics, with automotive applications Written by a leading author in the field who has experience working with motor sports teams in industry Explains basic concepts and equations before progressing to cover more advanced topics Covers internal and external flows for automotive applications Covers emerging areas of aeroacoustics and heat transfer Automotive Aerodynamics is a must-have textbook for undergraduate and graduate students in automotive and mechanical engineering, and is also a concise reference for engineers in industry.

294 pages, 130 black & white illustrations, size 5.5 x 8.5 inches. In 1963, Temple Press UK published a revised and expanded 4th UK edition of 'Tuning for Speed' and, in 1965, they published a reprint of that 1963 edition. Both the 1963 and the 1965 publications are identical in content and contain 294 pages, a significant increase from the previous 208 page 1960 printing. With a total of 294 pages, the revised and expanded 4th UK edition is the most comprehensive of all of the 'Tuning for Speed' editions ever published. Earlier editions only stretched to 208 pages and later editions shrunk to 260 pages (or less) as what was thought to be 'dated information' was deleted from the contents. This 'dated information' is considered valuable today by those enthusiasts interested in vintage motorcycle tuning and modification. Consequently,

this makes the revised 4th UK publication the most complete and desirable edition. Therefore, it is our pleasure to offer this reprint of the Floyd Clymer 'Revised 4th UK Edition or Second American Edition of 'Tuning for Speed' to motorcycle enthusiasts worldwide. 'Tuning for Speed' was originally published in 1948 and continuously reprinted and updated in order to keep pace with the constantly evolving range of British motorcycles and engines. While the primary focus of this publication is on 1965 and prior British motorcycles, the theory and engineering it contains is still applicable to the current crop of high revving imports. 'Tuning for Speed' is considered by many knowledgeable motorcycle enthusiasts to be one of the best books ever written on how to improve, modify and fine tune a motorcycle engine and it is often referred to as one of the 'top 10' classic motorcycle books. The Floyd Clymer association with this publication dates back to the early 1960's when he purchased the United States Publishing rights for 'Tuning for Speed' from Temple Press in the UK and, in 1967, Clymer published the 1st American edition of that title. However, by 1967, the Clymer publication had been preceded by 8 printings of the UK edition and was incorrectly identified by Clymer as a 9th edition. In fact, the 1967 Clymer publication is actually a reprint of the less desirable 208 page 1960 UK edition. However, in 1963, the 4th UK edition was revised and expanded to 294 pages (with a second identical re-print in 1965). Therefore, this 2nd American edition of the Floyd Clymer publication of 'Tuning for Speed' includes all of that valuable 'dated information' that was deleted from the later editions and is identical in all respects to the 294 page 1963/1965 revised and expanded 4th UK edition - with the exception that 7 pages of UK-based advertising to the rear of the book are not included in the Clymer publication.

Dialogue between one of the world's most experienced racing car designers and a technical author-graduate engineer on the theory and technique of racing car design and development. Contents include: The anatomy of a racing car designer; biography of Len Terry; description of nearly 30 Terry designs from clubman's sports car to Indianapolis winner; a blank sheet of paper; handling characteristics; the theoretical aspects; oversteer and understeer; practical implications; structural considerations; space-frames and monocoques; the cockpit area; the structural engine; progress and legislation; suspension; changing needs and layouts; the torsion bar; self-levelling systems; anti-dive and anti-squat; progressive-rate springing; stiffness/weight ratio; brakes, wheels and tires; influence of smaller wheels; twin-disc brake systems; attention to details; low-profile tire phenomena; aerodynamics; wings and things; intake ram effect; ground effect vehicles; the cooling system; radiator location; cooling the oil; safety and comfort; primary and secondary safety; driver comfort; materials; components-ball joints, batteries, brakes, clutches, dampers, drive-shafts, electrics, flexible bearings, flexible fuel cells, gearshift linkages, instruments, non-return valves, non-spill fuel fillers, oil and fuel pipes, Perspex mouldings, radiators, springs and steering gear; design versus development; the competition-nine other racing car designers discussed; future developments.

Guinness World Record holder John Collins teaches you how to make his world record plane. Instructions for all of the paper airplanes from his world renowned paper airplane show are included, along with internationally award winning designs.

The requirements for a competition car electrical system are significantly different from those of a standard road car. Such luxuries as electric windows and central locking are superfluous. Conversely, equipment such as emergency electrical cut-outs and fire extinguisher systems may be required. Electrical system reliability is an often-overlooked aspect of competition car design, and a common source of trouble. Here is a practical, illustrated guide to all aspects of electrical system design and implementation, essential reading for anyone running or constructing a competition car or modifying a road car for competition use.

Aerodynamics has become an increasingly significant performance enhancer over the past 50 years. Competition Car Aerodynamics 3rd Edition continues the practical, hands-on approach of its popular predecessors to cover all aspects of motorsport aerodynamics and features

yet more CFD and wind tunnel project material and case studies. Aerodynamic theory is tackled in a comprehensive yet comprehensible way by author Simon McBeath, who has been granted unprecedented access to state of the art computational fluid dynamics (CFD) techniques, as well as regular access to the MIRA full-scale wind tunnel in the UK. Photographs, graphs, CFD-generated images and wind tunnel data—much of which has appeared in the successful Aerobytes series in Racecar Engineering—are used to explain with unrivalled clarity how aerodynamic performance benefits are obtained in practice. With case studies from Formula 1, sports prototypes, Formula 3, GT and saloon cars, club single seaters and karts, this book will appeal to anyone, whether a designer, competitor, student or armchair enthusiast, wishing to gain an understanding of aerodynamics and how it can benefit the performance of all types of competition cars.

From historical background to state of the art techniques, and with chapters covering airdams, splitters, spoilers, wings, underbodies and myriad miscellaneous devices, Competition Car Aerodynamics 3rd Edition also features in-depth case studies from across the motorsport spectrum to help develop a comprehensive understanding of the subject.

A physicist explores the science of speed racing and the #1 spectator sport in America in the perfect gift for both NASCAR and science fans. Every NASCAR fan—at one time or another—asks the same question: Why isn't my favorite driver winning? This is your chance to discover how much more there is to NASCAR than "Go fast, turn left and don't crash." If you've ever wondered why racecars don't have mufflers, how "bump drafting" works, or what in the world "Let's go up a pound on the right rear and add half a round of wedge" means, The Physics of NASCAR is for you. In this fast-paced investigation into the adrenaline-pumping world of NASCAR, a physicist with a passion uncovers what happens when the rubber hits the road and 800-horsepower vehicles compete at 190 miles per hour only inches from one another. Diandra Leslie-Pelecky tells her story in terms anyone who drives a car—and maybe occasionally looks under the hood—can understand. How do drivers walk away from serious crashes? How can two cars travel faster together than either car can on its own? How do you dress for a 1800°F gasoline fire? In simple yet detailed, high-octane prose, this is the ultimate thrill ride for armchair speed demons, auto science buffs, and NASCAR fans at every level of interest. Readers, start your engines.

This set includes Race Car Vehicle Dynamics, and Race Car Vehicle Dynamics - Problems, Answers and Experiments. Written for the engineer as well as the race car enthusiast, Race Car Vehicle Dynamics includes much information that is not available in any other vehicle dynamics text. Truly comprehensive in its coverage of the fundamental concepts of vehicle dynamics and their application in a racing environment, this book has become the definitive reference on this topic. Although the primary focus is on the race car, the engineering fundamentals detailed are also applicable to passenger car design and engineering. Authors Bill and Doug Milliken have developed many of the original vehicle dynamics theories and principles covered in this book, including the Moment Method, "g-g" Diagram, pair analysis, lap time simulation, and tyre data normalization. The book also includes contributions from other experts in the field. Chapters cover: \*The Problem Imposed by Racing \*Tire Behavior \*Aerodynamic Fundamentals \*Vehicle Axis Systems and more. Written for the engineer as well as the race car enthusiast and students, the companion workbook to the original classic book, Race Car Vehicle Dynamics, includes: \*Detailed worked solutions to all of the problems \*Problems for every chapter in Race Car Vehicle Dynamics, including many new problems \*The Race Car Vehicle Dynamics Program Suite (for Windows) with accompanying exercises \*Experiments to try with your own vehicle \*Educational appendix with additional references and course outlines \*Over 90 figures and graphs This workbook is widely used as a college textbook and has been an SAE International best seller since its introduction in 1995.

John D. Anderson's textbooks in aeronautical and aerospace engineering have been a cornerstone of McGraw-Hill's success in the

engineering discipline for more than two decades. The fifth SI edition of Fundamentals of Aerodynamics continues to offer the most reliable, interesting and up-to-date resources for students and teachers of aerodynamics. Users of past editions will appreciate the continued use of design boxes, historical contents, plentiful worked examples, chapter-opening road maps and other pedagogical features that play a supporting role in Anderson's focus on fundamental concepts. NEW FEATURES \* New sections on airplane lift and drag, the blended-wing-body concept, the origin of the swept-wing concept, supersonic flow over cones, hypersonic viscous flow and aerodynamic heating and the design of hypersonic waverider configurations. \* Many additional worked examples and homework problems to provide even more key concept practice for students. \* Shortened and streamlined Part 4, "Viscous Flow".

Based on 15 years of tire research, this book presents clear, non-academic explanations of how and why tires really work. Haney provides new insight into topics such as the complexity of rubber, how a pneumatic tire generates grip, and how to tune grip and balance using the load sensitivity of tires.

Smith's Fundamentals of Motorsport Engineering provides the ultimate guide to motorsport engineering and what to expect at the racetrack, with content to suit motorsport learners from Level 3 up to degree level.

Performance and racing drivers constantly seek ways to sharpen their skills and lower their lap times. Ultimate Speed Secrets is the indispensable tool to help make you faster, whatever your driving goals. Professional race driver and coach Ross Bentley has raced everything from Indycars to World Sports Cars to production sedans, on ovals, road courses, and street circuits around the world. His proven high-performance driving techniques benefit novice drivers as well as professional racers. Ultimate Speed Secrets covers everything you need to know to maximize your potential and your car: Choosing the correct line Overtaking maneuvers Adapting to new tracks and cars The mental game and dealing with adversity Finding (and keeping) a sponsor. The pages are filled with specially commissioned color diagrams to illustrate the concepts described. Whether you are a track-day novice or a seasoned professional, Ultimate Speed Secrets will arm you with practical information to lower your lap times and help you get the best out of your vehicle—and yourself. It's the ultimate high-performance driving tutorial!

Much-needed fourth edition of strong backlist book first published in 1988 and continuously in print ever since.

Reformatted to latest 'Competition Car' style and size. Now full color throughout. Most pictures new for this edition.

Whether repairing existing components, fabricating new ones, building a race car, or restoring a classic, this is the one book to guide the reader through each critical stage.

Aerodynamics of Road Vehicles details the aerodynamics of passenger cars, commercial vehicles, sports cars, and race cars; their external flow field; as well as their internal flow field. The book, after giving an introduction to automobile aerodynamics and some fundamentals of fluid mechanics, covers topics such as the performance and aerodynamics of different kinds of vehicles, as well as test techniques for their aerodynamics. The book also covers other concepts related

to automobiles such as cooling systems and ventilations for vehicles. The text is recommended for mechanical engineers and physicists in the automobile industry who would like to understand more about aerodynamics of motor vehicles and its importance on the field of road safety and automobile production.

The field of aerodynamics has had an increasingly significant effect on performance enhancement over the past 50 years. Competition Car Aerodynamics 3rd Edition continues the practical, hands-on approach of its popular predecessors to cover all aspects of motorsport aerodynamics, with more CFD and wind tunnel project material and case studies.

Author Simon McBeath tackles aerodynamic theory in a comprehensive, yet comprehensible, way with his unprecedented access to state of the art computational fluid dynamics (CFD) techniques. McBeath also explores aerodynamics with the MIRA full-scale wind tunnel in the UK. Photographs, graphs, CFD-generated images, and wind tunnel data--much of which has appeared in the successful Aerobytes series in Racecar Engineering--are used to explain with unrivaled clarity how aerodynamic performance benefits are obtained in practice. With case studies from Formula 1, sports prototypes, Formula 3, GT and saloon cars, club single seaters, and karts, this book will appeal to anyone, whether a designer, competitor, student, or armchair enthusiast, wishing to gain an understanding of aerodynamics, and how it can benefit the performance of all types of competition cars.

Composites have been around since ancient civilisations began making bricks from clay and straw. Glass fibre, carbon fibre and aramid fibres - to name but three - are recent innovations, yet today there are few competition cars that don't have at least some components made out of one or more of these materials. However, while it is well known that glass fibre technology can be used in the home workshop, what may not be so widely realised is that more advanced fibres also lend themselves to DIY methods. This revised edition of Competition Car Composites starts by examining the materials and methods that can be used, explaining basic 'wet' and 'dry' laminating techniques, pattern making and mould construction, and the design and manufacture of components. It then goes on to cover material and technology upgrades, and how more advanced materials can be exploited to achieve improved properties and reduced weight. The use of thermoplastic materials, resin infusion methods, and, especially, 'pre-pregs' in the home workshop, are also discussed, as are the composite techniques used by top racecar constructors.

A story of the stock car racing circuit offers a behind-the-scenes tour of the sport.

The main aspects of downforce-inducing and uplift-reducing devices are explained in a thorough yet readable fashion, making this a valuable resource for competition drivers, amateur and professional constructors, and armchair enthusiasts alike. Data from major manufacturers, interviews with experts, and reports from race teams are collected here to explain the evolution of airdams, splitters, spoilers, and wings, from the earliest days of racing to the present. Other points of interest include: -- The theory of

downforce lift and drag for road vehicles -- The use of wind tunnels and computational dynamics -- Regulations and restrictions -- Case studies from Formula 1, IndyCar, Formula 3000, Formula 3, sprint cars, sports cars, dragsters, and motorcycles  
Aerodynamics is a science in itself, and is one of the most important factors in modern competition car design. This fully updated second edition covers all aspects of aerodynamics, including both downforce and drag. This complex subject is explained in down-to-earth terms, with the aid of numerous illustrations, including color CFD (Computational Fluid Dynamics) diagrams to demonstrate how aerodynamic devices work, as well as wind-tunnel studies.

Covers the development and tuning of race car by clearly explaining the basic principles of vehicle dynamics and relating these principles to the input and control functions of the racing driver. An exceptional book written by a true professional.

A thorough guide to the DIY building and modifying of a car for racing or rallying. Describes champion circuit, rally and hill-climb cars from Formula 750 to Formula 1. If you are a serious competitor in either race, rally or hill climbing this is an excellent addition to the tool box. The guide is simple, easy to follow and it is a must for any club.

Subtitled: A Practical Handbook. Capitalising on years of experience from experts and seasoned enthusiasts alike, this volume covers everything from planning, budgeting, licensing and tuition, to all aspects of getting the car and its driver into the ultimate state of preparation for competition - and keeping them that way! Emphasizes controlling costs; rules and regulations; technical information on competition cars; circuit racing, rallying, hillclimbing and sprints; self-built and pro-built engines; fuel systems, electronics, transmission systems, wheel and tires; plus safety harnesses and communications. Information necessary to put you in pole position! Foreword by Ray Mallock. Hdbd., 6 1/2"x 9 1/4", 208 pgs., 165 b&w ill.

Competition Car Aerodynamics, 3rd Edition Veloce Publishing

Formula E is leading the way for the future of motorsport, promoting electric power for a sustainable future while providing thrilling racing. Formula E: Racing For The Future, produced with the full cooperation of Formula E, gives the reader an access all areas pass to provide a fascinating insight into the series and its inner workings. The official book looks at the origins and history of Formula E, follows the evolution of the series, examines the design, engineering and technology of the cars, collects views from drivers and engineers about the challenges involved, and takes a close-up look at the organisation of a race weekend. The Formula E story: origins of the concept; its DNA of city-centre racing worldwide; anatomy of the original Spark-Renault SRT\_01E Gen 1 car; the sporting regulations; summary of seasons from the start in 2014/15. Formula E's development moves into its second phase: the new Gen 2 car introduced for the 2018/19 season, with increased range (eliminating mid-race car swaps), more power and added aesthetic flamboyance. The Gen 2 car described and analysed in detail: chassis, bodywork, aerodynamics, powertrain, battery, electrical equipment; suspension, steering, brakes, wheels and tyres, cockpit controls and safety equipment. The engineer's view (Jaguar racing technical manager Phil Charles): vehicle dynamics and car set-up; a small, well-drilled team; scrutineering and technical checks; procedures through a race weekend; the importance of braking. The driver's view (long-time Formula E driver Oliver Turvey): cockpit controls and settings; the driving challenge; the importance of the simulator; practice and

qualifying; and finally the race itself. Forewords by Jean Todt, President of the Fédération Internationale de l'Automobile (FIA), and Alejandro Agag, Chairman and Founder of Formula E. Tabular details of car specifications and season results. This is a must-have book for all fans of Formula E as well as those coming to the series for the first time and wanting to know more about it.

To make your car handle, design a suspension system, or just learn about chassis, you'll find what you need here. Basic suspension theory is thoroughly covered: roll center, roll axis, camber change, bump steer, anti-dive, ride rate, ride balance and more. How to choose, install and modify suspensions and suspension hardware for best handling: springs, sway bars, shock absorbers, bushings, tires and wheels. Regardless of the basic layout of your car—front engine/rear drive, front engine/front drive, or rear engine/rear drive—it is covered here. Aerodynamic hardware and body modifications for reduced drag, high-speed stability and increased cornering power: spoilers, air dams, wings and ground-effects devices. How to modify and set up brakes for maximum stopping power and handling. The most complete source of handling information available. "Suspension secrets" explained in plain, understandable language so you can be the expert.

Advanced Motorsport Engineering is an essential textbook for students on Motorsports Engineering courses and a handy reference those already working in the industry. The book covers advanced topics in motorsport such as diagnosing and rectifying faults in engines, chassis and transmission. Sections on composite materials and advanced engine management systems provide a complete coverage of level 3 courses. Each unit in the IMI and EAL syllabus is covered in full and illustrated with photos, diagrams and key learning points. The chapters can also be easily matched to the BTEC National course structure. Motorsport is not just about the spectacle of some of the world's most popular and famous sporting events - it also plays a crucial role in developing new techniques and technologies. Getting a qualification in motorsport could be the first step in a career in one of the most exciting and challenging sectors of high performance engineering. Andrew Livesey is the Head of the School of Engineering at North West Kent College, UK

Racecar data acquisition used to be limited to well-funded teams in high-profile championships. Today the cost of electronics has decreased dramatically making them available to everyone. But the cost of any data acquisition system is a waste of money if the recorded data is not interpreted correctly. This book updated from the best-selling 2008 edition contains techniques for analyzing data recorded by any vehicle's data acquisition system. It details how to measure the performance of the vehicle and driver what can be learned from it and how this information can be used to advantage next time the vehicle hits the track. Such information is invaluable to racing engineers and managers race teams and racing data analysts in all motorsports. Whether measuring the performance of a Formula One racecar or that of a road-legal street car on the local drag strip the dynamics of vehicles and their drivers remain the same. Identical analysis techniques apply. Some race series have restricted data logging to decrease the team's running budgets. In these cases it is extremely important that a maximum of information is extracted and interpreted from the hardware at hand. A team that uses data more efficiently will have an edge over the competition. However the ever-decreasing cost of electronics makes advanced sensors and logging capabilities more accessible for everybody. With this comes the risk of

information overload. Techniques are needed to help draw the right conclusions quickly from very large data sets. In addition to updates throughout this new edition contains three new chapters: one on techniques for analyzing tire performance one that provides an introduction to metric-driven analysis a technique that is used throughout the book and another that explains what kind of information the data contains about the track.

Modifying the Aerodynamics of Your Road Car is a unique handbook that assumes no starting knowledge of vehicle aerodynamics. It begins with simple ideas and finishes with sophisticated and effective aerodynamic modifications that work. Three major chapters cover on-road testing techniques that give you all the information you need to decide what modifications you should make - and, after you've made them, how well they work. Low-cost techniques allow you to visualize the patterns of airflow over your car so that you can actually see the problem areas that need improvement. Uniquely, you're also shown how to measure aerodynamic pressures, so you can determine which body surfaces are creating lift, drag and downforce. Want to work out where a wing should be placed? On-road testing to find that out is covered as well. The book also shows you how to measure downforce to see if that wing is actually working! If you wish to reduce drag, more than ten different areas are covered. Reducing frontal area, lowering cooling system drag, optimizing vehicle ride height and rake, reducing the strength of the wake, achieving clean airflow separation and optimizing wheel designs are all covered using the latest research findings. And if you're a performance driver, there's a major chapter devoted to reducing lift and improving stability. This chapter includes the design and development of undertrays and diffusers, wings and spoilers. The example car developed measurable downforce when fitted with an undertray and rear diffuser, something that transformed its on-road handling. The author has been writing about the aerodynamics of road cars for more than 25 years. He is also an experienced and proficient car modifier who has performed numerous aerodynamic modifications and upgrades to his own cars. The book's technical consultant, RH Barnard, is an acknowledged world leading automotive aerodynamicist. If you want a practical, hands-on guide that demystifies and explains car aerodynamics, and shows you how to make effective aerodynamic modifications to your car, this book is for you.

Based on the principles of engineering science, physics and mathematics, but assuming only an elementary understanding of these, Race Car Design masterfully explains the theory and practice of the subject. Bringing together key topics, including the chassis frame, tyres, suspension, steering and brakes, this is the first text to cover all the essential elements of race car design in one student-friendly textbook. Race Car Design: - Features a wealth of illustrations, including a full-colour plate section - Demonstrates the important role of computer tools - Uses dozens of clear examples and calculations to illustrate both theory and practical applications - Is written by an experienced author, known for his engaging and accessible style This book is an ideal accompaniment for motorsport engineering students and is the best possible resource for those involved in Formula Student/FSAE. It is also a valuable guide for practising car designers and enthusiasts.

The first book to summarize the secrets of the rapidly developing field of high-speed vehicle design. From F1 to Indy Car, Drag and Sedan racing, this book provides clear explanations for engineers who want to improve their design skills and enthusiasts who

simply want to understand how their favorite race cars go fast. Explains how aerodynamics win races, why downforce is more important than streamlining and drag reduction, designing wings and venturis, plus wind tunnel designs and more.

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