

1 - WORKSHOP 'VEHICLE DYNAMICS OF RACE CARS'

The quickest way to faster lap times!

This workshop helps engineers to improve the lap times by getting a better technical understanding of the handling of their racing car.

The basic idea behind this workshop is the fact that nowadays 99,99% of the competitors in motor racing use an existing car, be it new or used. But the question is how well do you know your car? Do you know the roll moment exact in numbers? Do you know how the roll resistance is being distributed over the front and rear axis? If you want to stiffen an axis, do you need stiffer springs or a stiffer anti-roll bar? Do you know how to measure the aerodynamic downforce and how this is distributed? What about the Ackermann geometry? etc...

'Vehicle Dynamics' is made for **engineers in professional and top-amateur racing teams** as well for **automotive students and Mechanical engineering students**, who would like to know their car better, and who would like to be able to improve the performance of the racing car **by calculations rather than 'gut feeling'**.

During the Workshop 'Vehicle Dynamics from Race Cars' the participants will learn how to measure and calculate the most important dimensions (**Spring rate, Anti-roll bar spring rate, position of Roll Centres, Motion Ratios and the position of the CofG in 3 dimensions split in the CG from the sprung mass, unsprung mass and total mass**).

Based on the results of these calculations very important values like the **Roll moment, Roll resistance and Load Transfer** will be calculated. These values are key for the balance of the car during cornering. Besides that, basic measurement methods and calculations will be shown to **determine the (aerodynamic) $C_D A$ and $C_L A$** values without visiting an expensive wind tunnel. Also the theory of **Ackermann** will be explained and a method of determining it on your car will be given. Basic calculations on the shock absorber will be shown, which allows the user to very **quickly find the initial shock setting**. Finally it is explained what steps could be taken to understand the **transient phase** in a corner (between steering-in and mid-cornering) with help from your data acquisition system.

The underlying theories of all values and measurements will be explained in a **clear manner**, expended with lots of **practical examples** as experienced by the workshops teacher Ton Serné.

The participant of this workshop will return to the team with lots of very useful calculations and good ideas to prepare the car for next season. Especially the fact that the car will be set up much better initially will save a lot of expensive and time consuming testing at the track!

Please note that only a **maximum of 14 participants** can be accepted!

Next workshop Vehicle Dynamics of Race Cars:

Wednesday January 8th, 2020. 9.00 AM till 5 PM.

Location: Regus Facilities at Birmingham Airport.

Cost Vehicle Dynamics of Race Cars:

Subscription = £ 395, - per person excl VAT.

Watch our special discounts:

2 Persons or more : 10% discount

Students : 20% discount

In case combined with Aerodynamics at Jan 9th, 2020 : 20% discount

Customers of Raceparts.biz with a valid Customer Number : 20% discount

Condition: only one discount will apply; we will always choose the highest discount.

Watch our site www.handlingracingcars.com for any other special discount.

This includes:

- Workshop of 8 hours in total.
- Workshop by a seminar leader with both 40 years practical experience as well as a thorough theoretical basis
- Handout in color print
- Coffee/refreshments during the entire workshop
- Invoice, addressed to the company or person of your wish
- Certificate

Please take care:

- we might have to charge 21% VAT to private persons.
- to companies we do not have to charge VAT as long as the field 'VAT number' in the subscription form has been filled in.

VAT rules might be subject to change due to unknown VAT-law after Brexit.

Please be aware that you will have to take care of your own hotel room.

SUBSCRIPTION

Please choose www.handlingracingcars.com and look for the subscription fields.

2 - AERODYNAMICS OF RACE CARS

This new workshop is based on the lectures to Bachelor Students of two Universities in The Netherlands. It is a four hour course. Please look at www.handlingracingcars.com for the most recent information.

This seminar is of interest for every type of car, because each car has to cope with aerodynamic drag and lift! Needless to say that this workshop is special interesting for cars with aerodynamic devices like wings, diffuser, airdam, splitter etc.

First the Basics of Aerodynamics are being explained: low air speed means high static pressure, and high air speed means low static pressure. According to this principle of Bernoulli the Pitot tube is being explained.

Next the C_L (Coefficient of Lift) and C_D (Coefficient of Drag) are being explained, and it is explained how these values can be measured on your own car without visiting a wind tunnel. Also it is shown how you could derive information about the drag from existing acquired data.

Needless to say that the principle of a wing is being explained. But this time according to recent, new understandings of the aerodynamics. A Gurney-flap is explained and its influence on the performance of a wing.

Even if your car has no wings, splitter, flat undertray or diffuser, this seminar can be an enrichment to the engineer since the influence of rake at the aerodynamics and vehicle dynamics - like the change in Roll Centre and CofG - is being explained in detail.

Known elements like Naca Ducts, the aerodynamics around a radiator etc are being discussed.

Participants of the seminar not only learn lots of basic knowledge about aerodynamics, they will also learn about many 'tips and tricks' which help to make use of the aerodynamics even if a limited budget is available.

Please note that only a **maximum of 14 participants** can be accepted!

Next seminar Aerodynamics of Race Cars:

Thursday January 9th, 2020, afternoon.

Location: Regus Facilities at Birmingham Airport.

Cost Aerodynamics of Race Cars:

Subscription = £ 195, - per person excl VAT.

Watch our special discounts:

2 Persons or more : 10% discount

Students : 20% discount

In case combined with Vehicle Dynamics at Jan 8th, 2020 : 20% discount

Customers of Raceparts.biz with a valid Customer Number : 20% discount

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WHAT WE CAN OFFER MORE:

- In-house training for your own team
- individual consultancy, performance engineering
- Support of tests at the track
- Data Engineering (MoTec and AIM)

BOOK: 'PRACTICAL COURSE VEHICLE DYNAMICS'

Together with Prof.Dr. Ralph Pütz from Germany Ton Serné published (Aug'17) a German language book titled 'Rennwagentechnik - Praxislehrgang Fahrdynamik'. The English version of this book: 'Racecar technology - Practical Course for Vehicle Dynamics' is planned.

This book has the same basic idea as the workshop Vehicle Dynamics: nowadays 99,99% of the competitors in motor racing use an existing car, be it new or used. But the question is: how well do you know your car? Do you know the roll moment exact in numbers? Do you know how the roll resistance is being distributed over the front and rear axis? If you want to stiffen an axis, do you need stiffer springs or a stiffer anti-roll bar? Do you know how to measure the aerodynamic downforce and how this is distributed? What about the Ackermann geometry? etc...

This book is a very practical, and yet theoretical detailed book which will be actually used in the workshop.

As soon as the English version of this book is available, it will be notified at www.serneRCE.com.

YOUR SEMINAR LEADER

Ton Serné finished his study Mechanical Engineering with a thesis about 'Handling of Racecars'. During and after his study he was mechanic in miscellaneous Formula classes, a.o. Formula 1 with the Ensign based Boro team (driver: Gijs van Lennep). Also he raced Formula Ford himself. During the period that he lived in Germany, Ton was team manager of the Bross Formula 3 team, with which team he won the European EFDA cup in 1987.

Later on he raced various saloon cars like Seat Ibiza and VW Golf GTi. Also he is visiting lecturer 'Vehicle Dynamics' at two Dutch universities for Automotive Studies.

Currently Ton is involved in the development of the handling (design of the suspension, geometry, dynamics of the springsystem, laptime simulation etc) of a GT4 project.

Together with Prof.Dr. Ralph Pütz from Germany he published a German language book titled 'Rennwagentechnik - Praxislehrgang Fahrdynamik' in August 2017. In English: 'Racecar Technology - Practical Course for Vehicle Dynamics'.

AND MORE....

Besides being a mechanical engineer, specialized in race car engineering, Ton Serné also is educated as a non-executive officer at the prestigious university of Nyenrode. Ton adds technical knowledge and Beta-thinking to the board. Info: SernéCM.nl .

CONTACT

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FAQ's

Q: do I know really everything about handling after this seminar?

Ton: no, I have been travelling around many racing tracks and teams during the past 40 years, and I still learn every day. It is virtually impossible to share all my knowledge in just 8 hours. But I will be teaching you how to assess the core of a problem and work towards a solution.

Q: so I can solve all of my problems afterwards?

Ton: that might be uncertain, but the seminar has been put together such that you will be able to analyse your handling, which will lead to the root cause of the problem. And as soon as you know and understand the cause, you will learn to choose the right solution.

Q: where and how long have you been giving this seminar?

Ton: this seminar is given on a regular basis in Germany (in the German language), and in The Netherlands and Belgium (in Dutch).

Please see: www.cursuswegligging.nl and www.lehrgang-strassenlage.de.

Over 500 persons were there before you! Amongst them top drivers like Max Verstappen.

Q: I do have so many questions about my car that I might not be able to post them during the seminar. How do I get my answers then?

Ton: depending on the content and quantity of the questions I will decide whether I can help you directly after the seminar or later on. In some cases it might be better to discuss the question with the car near us, so in your workshop or in the paddock during a race or test session. We need to make a separate appointment in that case.

Q: I see nothing about Data Acquisition, is that right?

Ton: that's partly right. I concentrate on the basics of handling (like inertia, weight transfer etc) such that you will be able to better understand what's happening in the suspension system. With that knowledge you will be able to better interpret the graphs and tables produced by your DA-system. But I do use graphs which are produced by MoTeC and AIM Data Acquisition System to clarify my lessons. However, my seminar is not a DA system user training.

Q: my DA system also generates data about the engine. Do you cover that too?

Ton: No. Only the handling of a racing car is being discussed.

Q: do I know all the settings (like camber, caster, tyre pressure etc) for my particular car after the seminar?

Ton: No. It is impossible to provide all of these data for all sorts of cars individually. But you will learn how to generate the right settings by yourself.

Q: for what kind of racing cars is this seminar suitable?

Ton: I concentrate mainly on saloon cars, sportscars and formula cars for racing on tracks and rally. Drivers of karts and oval racing might pick up useful things, but I am not aiming at these disciplines.

Q: I do have a thorough knowledge already. I would like to get much more theory than in this 8-hour seminar. What should I do?

Ton: You might be interested in the seminar of Claude Rouelle from Optimum-G. He offers various seminars at an academic level, which lasts three days, and are really excellent! Pls have a look at www.optimumg.com .