HOW ENGINEERS LEARN STATISTICS FROM MOTOR CYCLE TIRES !

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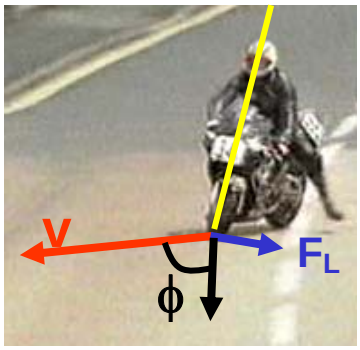
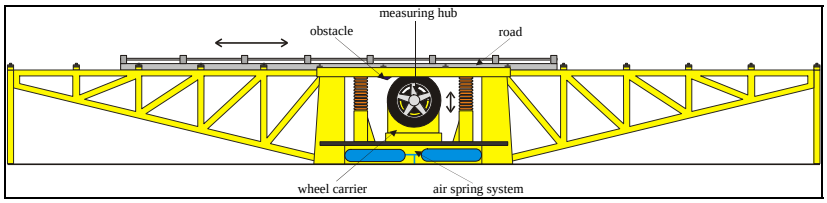
Design-Based Learning focuses on an integrated approach to problem solving and engineering design, where students are stimulated to apply concepts and insights gained from mono-disciplinary courses in a multidisciplinary way (see *eg.* Wijnen, (1999)). Its aim is to expand students' engineering competencies, while working on authentic problems using up-to-date CAE-tools. Design-Based Learning offers opportunities to enhance the students' awareness of situations where Engineering Statistics can be relevant, as for example the design of experiments or the modeling and analysis of data may be part of the solution strategy.



For 1st and 2nd years' students from the Mechanical Engineering department at the Eindhoven University of Technology in the Netherlands the basic ideas of engineering statistics and statistical/experimental reasoning are introduced through a Design-Based Learning project. In this project about 15 groups of 7 students each are (simultaneously) introduced to the problem of instability of motorcycle road handling, such as wobble. Characteristics of the motor cycle tire play an important role in this and students have to find out through real physical experiments how pressure of the tire and vertical load influence these characteristics. For conducting the experiment they can use facilities we have available in the Automotive Lab at the Mechanical Engineering department, more specifically the flat-plank experimental setup that is available for measuring both static and dynamic characteristics of tires.



The experimental set-up used in the project.

In the project a 'distributed experimental set-up' is integrated, where different groups measure characteristics at different factor-levels combinations (however with some overlap and replication, to be able to test for consistency and reproducibility of the results!). Groups have to analyze, report and comment on their own results, but in the end we combine results from all groups to build a more advanced response model and discuss (introductory) aspects of DOE. The coupling of these aspects to "physical experimentation" related to a problem that is interesting for students from Mechanical Engineering appears to be very motivating and effective.

REFERENCES

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