

Minutes Workshop “Virtual Testing (VT)”

1. Workshop Agenda

Chairman: Kambiz Kayvantash

Champion: Massimiliano Avalor

- 13.00 Welcome to participants, agenda overview, presentation of the speakers (Kambiz Kayvantash, Cranfield University)
- 13.05 Introduction (Massimiliano Avalor, Politecnico di Torino)
- 13.15 The Reality of Virtual Testing (Kambiz Kayvantash, Cranfield University)
- 13.40 Virtual Testing Visions and Demonstrations: a possible approach applied to the pedestrian case (Roberto Puppini, CRF)
- 14.05 Cost Benefit Analysis: Use of Virtual Testing (James Watson, CIC)
- 14:30 Implementation of Virtual Testing in Safety Regulations (IMVITER) (Alberto Mansilla, CIDAUT)
- 14.55 Final discussion (all participants)

2. Presentations summary

Introduction (Max Avalor, Politecnico di Torino)

There are many elements that allow stating that: “Virtual Testing is Reality”. The use of mathematical models, which are at the core of any engineering practice, is the essence of VT. It is a continuously improving process, now mature for applications. Introduction to the four presentations is outlined: the past of VT (the work done in APROSYS and previous projects), the present (possible implementation of VT in regulations and the cost-benefit analysis) and the future (IMVITER).

The Reality of Virtual Testing (Kambiz Kayvantash, Cranfield University)

Automotive is maybe the largest economic sector in the EU: in terms of R&D it surpasses all the other technological areas. However, it raises also critical problems of sustainability. VT is a tool to enhance quality of vehicles, not only regarding safety, while taking costs under control. This tool has been developed via some essential points such as: the integrated approach, stochastic models, and quality rating. The integrate approach is linked to items like: accident investigation, test protocols, simulation tools, bio-mechanics, and also physical testing (PT). Finally a roadmap was set up to plan for the future actions.

Virtual Testing Visions and Demonstrations: a possible approach applied to the pedestrian case (Roberto Puppini, CRF)

A possible vision for implementing VT in regulations, from an industrial point of view, has been outlined. It is based on an integrated approach of the physical and virtual testing. In synthesis is as follows: VT is first used (by the OEM) to examine a considerable amount of possible loading points and find the weakest ones. Then, the results are reported to the regulatory body, helping them chose the PT points. Once the tests done, a good rating can be further integrated with additional stars for VT. The approach is explained by means of a pedestrian protection demonstrator (legform).

Implementation of Virtual Testing in Safety Regulations (IMVITER) (Alberto Mansilla, CIDAUT)

This FP7 project intends to continue the work carried on in ADVANCE, VITES, and APROSYS. Some of the partner previously involved will take over (cidaut, CRF, Altair, and FAURECIA). The project will focus on improving the tools and methods for VT, on the dissemination and integration of VT in regulations, and on the cost-benefit analysis. Some demonstrators will be developed.

3. Description of the discussion

The participation was good, the conference room being nearly full. Around 50 people were attending (55 at most).

The discussion concentrated on further needs to improve VT.

J.P. Verriest highlights the importance of ergonomics to improve safety, and this is to be taken into account in VT too. The use of human models is essential to this aim, as well as for the evaluation of the countermeasures against injuries in car accidents.

J. Ambrósio suggests stepping ahead towards more affordable numerical models, which are the basis of VT itself.

K. Kayvantash emphasizes the strength of VT being a widespread methodology readily available to almost all the engineers: a few of them has experimental facilities at hand, whereas almost 100% have powerful computers and the necessary simulation codes.

R. Puppini indicates reparability as another important issue to apply VT to.

4. Conclusions, highlights, recommendations

VT has dramatically evolved during the last 10 years and it is nowadays a common and widespread tool for design. The introduction in regulations is also just round the corner.

One of the still open questions is the evaluation of costs: how to obtain costs? (affordable values) how to measure costs? how to assign costs?

Experiences achieved in the last decade, by technicians from OEM's and software development houses, researchers from Universities and research centres, are an enormous added value for the improvement of the so important automotive industry worth to be even more improved.