Communication skills

Towards lighter composite structures from analysis models to new materials

A critical review on the seminar given by Prof. Pedro M.P.R de Castro Camanho

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This paper is to review and criticize a seminar named "Towards lighter composite structures from analysis models to new materials" given by Prof. Pedro M.P.R de Castro Camanho. The purpose of this talk is to highlight the importance and the application of the computational modelling in the development composite materials, which is getting even more attention as the world is directed towards reducing the carton emissions produced by the automotive and aerospace industry through developing lighter more affordable composite materials and structures that could replace the materials normally used and hence reducing the overall carbon emissions. The presentation was well structured with an outline, catchy motivation, informative introduction, main body and finally a conclusion. In this paper, all the previously mentioned content will be criticized briefly in terms of the speech delivery and the presentation slides design.

In the introduction, Prof. Camanho introduced himself as a part of the interface institute called INGI. Then started discussing the motivation behind the interest to increase the affordability and the reproducibility of the composite structures. Then he introduced the relevance of numerical simulation for the automotive industry that needs numerical simulation to validate the new composite materials and structures produced and is also used to model the injection process needed to design the injection tools used to manufacture the composite structural components. Then he introduced the relevance of numerical simulation in the aerospace industry as to reduce the recurring and nonrecurring costs and to reduce the certification costs needed to be performed for all the aerospace structures. The introduction was well informative about the subject the aim and motivation were both clear and to the point. However, some of the slides were overcrowded and

The main body included the main computational analysis techniques used in modelling composites, some of the new concepts introduced by INGI and examples on the technology transferred from INGI to the industry. As for the analysis models, Prof. Camanho referred to 2 analysis models. First, the Micro-mechanical models used for designing new composite materials and to predict the effect of the production faults on the components like what airbus does to know whether to repair, replace or continue using a produced structure with certain defects. And second, the Meso-mechanical model which enables engineers to model whole structures and he talked about the ability of the codes developed by INGI to predict the in-situ phenomena that cannot be caught by commercial codes causing faulty results. Regarding the new concepts introduced by INGI, 2 concepts were mentioned which are the thin ply laminate concept and the locally hybrid composite laminates for bolted joints. The final part was some examples about the technology transfer between INGI and the industry such as the cohesive element formulation used by ABQUS and the damage model of the MAT262 material used by Daimler. The speech was well organized and all the work and the information mentioned was properly cited and can be easily referred to at any time. The template, the background color and the font size were all clear, however the content again was a little bit crowded, and some of the most the important charts referred to during the presentation wasn't clear enough because it was too small.

The conclusion highlighted the major points in the presentation and reached to a conclusion that any advancement in the composite material development and manufacturing can be barely noticed without the interference of computational modelling, as more cost and time will be needed to try and experiment each individual material or structure created using composites to certify it. In general, the speech of the whole presentation was well structured, the language was easy and the terms used weren't complex for someone who has no experience with composites. Prof. Camanho used various tonalities that helped in successfully grabbing the attention of the audience without any sense of boredom or loss of track of the content delivered. On the other side, I though the presentation could have been more interactive and more diverse tools could have been used such as videos to enhance the delivery of more complex content.