Contribution ID: **197** Type: **Talk**

The simultaneous Optimization of the Nose and Tail Geometry of a High Speed Train for Drag and Crosswind Stability

The national rail policy as formulated by the South African government requires that by the year 2050 all current narrow or Cape gauge main rail lines be replaced by standard gauge tracks. In addition, they require that a number of key role players, of which Transnet is but one, should work toward the implementation of high speed rail on these new tracks by the same year. The document further stipulates that the onus of responsibility of planning and developing the necessary skill in order to achieve the aforementioned, lies with these role players.

The first step that Transnet is taking to bridge this gap and move South Africa forward is called the MC25 project; a medium speed passenger commuter that will connect Gauteng and Polokwane. The aim of the project is both economic upliftment as well as a means of addressing a skills deficit with Transnet. The work that was completed was meant to address the latter, with specific focus on the external aerodynamics of a high speed train.

This project not only included a study of the external flow field surrounding a high speed train, but also the simultaneous optimization of the train nose and tail for drag and crosswind stability which were determined by the aerodynamic investigation to be the primary causes of concern for high speed trains. Due to the flow complexities and sheer magnitude of the simulations, the computing capabilities that the CHPC offered was critical to arriving at an optimal solution.

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Session Classification: HPC Applications

Track Classification: Computational Mechanics