Global Capstone Project with Chalmers, Polytechnique Montréal and Volvo Bus

DESIGN OF AN ENERGY EFFICIENT WINDSHIELD DEFROSTING SYSTEM FOR ELECTRIC TRANSIT BUSES

Background:
With the advent of hybrid and electric buses, heating and ventilation make up an important part of a bus’s total energy consumption, which poses serious challenges to design engineers. Nova Bus seeks to optimize these systems’ energy consumption while promoting driver and passenger comfort.

Set-up:
This project is conducted in partnership with Nova Bus, a Canadian-based transit bus manufacturer and part of the Volvo Group, Polytechnique Montréal and Chalmers. The student teams at the different university will cooperate via communication technology to mimic global virtual teams (GVTs) in industry. In GVTs team members are globally dispersed and work together towards a common goal. These teams offer benefits for the company such as allowing diverse expertise, round the clock progress, savings in travel cost, and improved creativity due to team diversity. The team from Polytechnique started to work in September and the team from Chalmers will join in January. The teams will have supervision from each university and Volvo Bus and Nova. The project goals are common but each team is graded by examiners at their home university. All reporting and presentations will be in English. Supervision will be carried out jointly.

Project tasks:
The project consists in designing a new energy efficient windshield defrosting system to replace the current system (heated ethylene-glycol circulating though pipes and heat exchangers).
• Learn to work in a global product development team
• Investigate different technical solutions for energy efficient windshield defrosting system for hybrid and electric buses
• Make concept selection
• Design the chosen concept including optimization within the chosen concept and choosing components. This include mechanical analyses such as CFD/thermal, dynamic and static as well as stress and fatigue analyses.
• Demonstrate virtually the operation of the system
• Build a prototype or model
• Define technical specifications of the system
The specific and jointly tasks for the Chalmers students will be outlined based on the Polytechnique students’ progress and input from supervisors at Chalmers and Volvo Bus/Nova,