

VOLVO

Company name Volvo Technology AB / Volvo Technology Corporation	Name of document ☉☉	
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Subject Master thesis proposal: One-axle lightweight haul truck		
Receiver (dept, name, location)		

Background



A compact 2x2 one-axle electric hauler with trailers adapted to current needs (such as distribution, platform and refuse) could provide a flexible platform for future city applications. The Segway Puma-like vehicle will have a very high maneuverability and also a very small foot print when running without trailer. A light weight design is probably required to keep axle pressure down and to simplify the balancing of the vehicle.

Description

The purpose of the master thesis is to make a first assessment of the feasibility of the 2x2 concept. The challenges of the concept include:

- Balancing of the hauler (e.g. to assess power need, possible actuators, effect of weight & inertia).
- Electric propulsion (e.g. calculating power needs for certain duties, motor location, wheel motor/hub motor/shaft motor).
- Range (energy storage density, possible energy storage on trailer, need for auxiliary power unit)
- Trailer interface (balancing and maneuverability with trailer connected, possibility to have several trailers)
- Safety (crashworthiness, applicable active/passive safety systems)

Project activities include:

- Literature and patent search
- Vehicle analysis and simulations for the balancing feature (using Matlab/Simulink)
- Vehicle analysis and simulation of maneuverability and other drive cases (using Simulink)
- Specification of powertrain components
- Vehicle packaging concepts

Suitable educational background

Vehicle technology, Mechatronics, Automation & control, Physics

Level of education

Masters

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Subject

Master thesis proposal: Modeling, simulation and control of heavy truck vehicle combinations

Language

Swedish or English

Starting date

Preferably August 2011

Number of students

1-2

Supervisor

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