



E|DPC-2011

Electric Drives Production
Conference 2011



1st International Conference

Electric Drives Production

September 27th – 30th, 2011
Nuremberg, Germany

TUTORIALS

Tuesday, September 27th, 2011

SIEMENS

ebmpapst

posco



brose
Technik für Automobile



UNITY
CONSULTING & INNOVATION



SEMIKRON
innovation+service



Industrie- und Handelskammer
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IEEE Joint IAS/PELS/IES German Chapter



ETG POWER ENGINEERING
SOCIETY WITHIN VDE



E|Drive-Center
Bayerisches Technologiezentrum
für elektrische Antriebstechnik



IEEE



**FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG**

TUTORIALS

Tuesday, September 27th, 2011

Increasing power consumption, CO₂ reduction, growing mobility or progressing automation – none of these future megatrends is possible without powerful electric drives. The electrification of the automobile powertrain is considered crucial, as the whole sector is facing difficulties resulting from the substitution of the conventional combustion engine. Besides advancing ideas on the

design of powerful electric drives, the organization of the manufacturing processes and systems is of great importance. The first International Electric Drives Production Conference offers an outstanding platform for the exchange of experiences for developers, researchers and potential users.

On Tuesday, September 27th 2011, vendors of product and process technologies, service providers or research organizations offer tutorials to the participants of the conference.

During the tutorials experts will provide the participants with a profound and applied know-how about a specific topic. Tutorials will be held in English or German.

Tutorial 1:

Market Potentials of Inductive Charging Infrastructures for Electric Vehicles

puls Marktforschung GmbH
E|Drive-Center, University Erlangen-Nuremberg
Energy Dynamics Laboratory (EDL),
Utah State University Research Foundation

10.00 am – 1.00 pm, Room 0.144

EUR 80,-

The aim of this tutorial is the detailed evaluation of business models and market potentials for attractive application fields that use the stationary and in-motion inductive power transfer for electric vehicles.

Tutorial 2:

Robust Innovation Roadmap: How to Cope Successfully with the Disruptive Future in the Automotive Markets

UNITY AG

9.30 am – 5.00 pm, Room 0.222/3

EUR 160,-

In this tutorial we present the fundamental thoughts and selected methodologies to systematically develop scenarios of the future automotive market. Based on these, we show how to successfully find a strategy for your company to enter the market of electric drives and cars by adapting the R&D-organisation and processes to develop these.

Tutorial 3:

Electrical Steel Sheet for Hybrid and Electrical Vehicles

POSCO

2.00 pm – 5.00 pm, Room 0.144

EUR 80,-

Electrical steel sheet is the key material for the traction motors of Hybrid electric vehicles (HEV) and electric vehicles (EV), so its proper usage contributes the dynamic performance of HEV/EV.

Tutorial 4:

Electromechanical System Simulation for Wind Energy

ANSYS Germany GmbH

10.00 am – 1.00 pm, Room 0.142

EUR 80,-

The goal of this tutorial is to introduce the participants to highly productive simulation tools that are already established in the industry, such as Maxwell 2D/3D, Simplorer, Q3D, etc..

Tutorial 5:

From Analytical Machine Design to System Simulation

MACCON GmbH

2.00 pm – 5.00 pm, Room 0.142

EUR 80,-

This tutorial will lead the audience through a full design example for an electrical machine traction drive. The design starts with given requirements, goes through an analytical pre-design with detailed finite element and thermal calculations and closes with the traction drive being modelled in a full system simulation.



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Conference venue main building of the School of Business and Economics of the University of Erlangen-Nuremberg

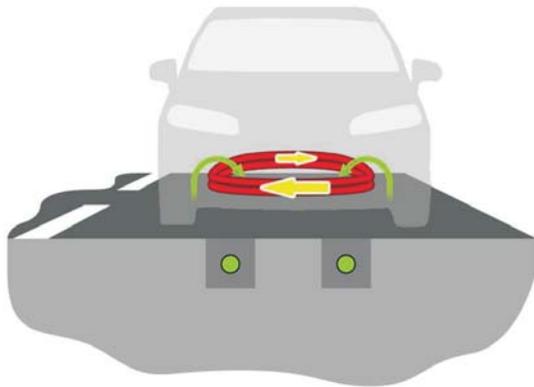
Market Potentials of Inductive Charging Infrastructures for Electric Vehicles

puls Marktforschung GmbH
E|Drive-Center, University Erlangen-Nuremberg
Energy Dynamics Laboratory (EDL),
Utah State University Research Foundation

Keywords: Inductive Charging Infrastructure | Fields of Application | Market Potentials | Electromobility

Abstract:

The worldwide growing market of hybrid and electric vehicles generates new demands for safe and convenient charging infrastructures. The option of inductive power transfer in electric vehicles offers significant potentials. In addition to an increased charging comfort, completely new approaches emerge in consequence of the possibility to charge vehicles during short stopovers or even while they are moving. Applications for this technology already exist in the industry for automated guided vehicles (AGVs) and may emerge in the next years for example for taxi cabstands; city-, port- & airport-logistics; innovative car sharing concepts. Thereby, new significant potential in Mega-Cities and for commercial business fleets are being opened up, especially in the first years of market development.



Goal:

There is a continue search for highly potential business models for electric vehicles. Inductive power transfer for electric vehicles not only offers great opportunities but also brings enormous challenges and new requirements for future mobility concepts. The aim of this tutorial is the detailed evaluation of business models and market potentials for attractive application fields that use the stationary and in-motion inductive power transfer for electric vehicles. Furthermore additional services will be defined.

Target Group:

This tutorial is designed for companies that want to explore the market of inductive charging for electric vehicles and want to get a better understanding not only about the business potentials but also about the risks that may lie in this future market.

Procedure:

A preliminary presentation will highlight the top fields of application and critical factors for a successful product design from a customer perspective. This is followed by a discussion about the market potentials by inductive charging compared to conductive charging and about the critical factors for a successful market development for inductive power transfer technology for electric vehicles e.g. the necessary power performance characteristics, efficiency, standardization, safety and system integration requirements. Therefore, the most attractive fields of application and their potentials for company's businesses will be highlighted and discussed.

Duration:

3 hours (10.00 am – 01.00 pm)

Literature:

Weßner, K.: Marktstudie – Welche Chancen haben Elektrofahrzeuge in Deutschland? Detaillierte Analyse der Marktpotenziale und Endkundenpräferenzen, Juli 2009.

Franke, J.; Risch, F.: Unternehmensübergreifende Planung komplexer Technologieszenarien am Beispiel des kontaktlosen Ladens von Elektrofahrzeugen über eine elektrifizierte Straße (E|ROAD), in: Vorausschau und Technologieplanung, 6. Symposium für Vorausschau und Technologieplanung, Heinz Nixdorf Institut, Berlin-Brandenburgische Akademie der Wissenschaften, Deutschland, Band 276, S. 255-271, 2010.

Franke, J.; Risch, F.; Kühl, A.: Produktionsprozesse für kontaktlose Ladeinfrastrukturen – Kosteneffiziente Produktion und Integration von Systemen zur kontaktlosen Übertragung von Energie in stationäre und bewegte Elektrofahrzeuge; In Zeitschrift: ZWF, Zeitschrift für wirtschaftlichen Fabrikbetrieb, Jg. 106, 2011, H.04, S. 361-365.

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**Robust innovation roadmap:
how to cope successfully with the
disruptive future in the automotive markets**

UNITY AG

Keywords: Scenario models | Product Strategy | Innovation Roadmap

Abstract:

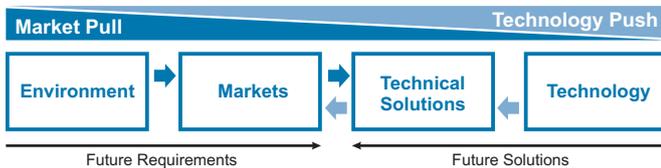
The future car will be lighter, smaller, and more ecological. This being the situation, automotive suppliers and original equipment manufacturers will have to make sure that the market position of the offered products is matching the new demands. We provide concepts to look into the future of the automotive sector in a structured way, identifying and focusing on the relevant trends and driving forces that will map its future. We also explore in greater depth scenarios and other relevant future work likely to shape developments in the sector. It draws up contrasting scenarios, which are not intended as accurate pictures of the future, but by projecting trends and ideas that are current today, we present alternate ends of a possible spectrum for the future. The tutorial concludes also 'wild card' scenarios that, should they occur, would severely threaten the future of the industry.

Therefore, the following issues are addressed in this tutorial:

1. Companies have to gain a deeper understanding of how the future might look like (Gausemeier 2009), we show how to address this strategic forecast with scenario techniques.
2. Companies will have to link possible scenarios directly to their business model or portfolio management model, and we give hints on how to decide to adopt the business model and the strategic approach.
3. Companies shall adapt their development processes, go-to-market approaches, structures and projects and we show what kind of process management for innovation and development processes successfully supports this transformation.

Goal:

In this tutorial we present the fundamental thoughts and selected methodologies to systematically develop scenarios of the future automotive market. Based on these, we show how to successfully find a strategy for your company to enter the market of electrified drives and cars by adapting the R&D-organization and processes to develop these on time, on budget and with top quality. In the end the participants will have an understanding of how to achieve a solid basis for a respective strategic orientation and the concepts



and methods required to successfully manage development and successful transformation. They also will learn how Best-in-class companies focus on the quality of their innovation and portfolio management in a way that reflects a clear understanding of the kind of value they are trying to create and the overall context in which their business actually operates. That context is changing rapidly as the global competitive landscape in the automotive industry responds. For innovative companies these changes are too good an opportunity to waste.

Procedure:

Three modules highlighting each of the three issues will guide the participants through the necessary and for SME not always standardized processes. Each part will contain a presentation, examples and exchange between the participants to guide discussion and exchange: questions might be:

- Structuring possible future developments to better understand future challenges
- Dealing constructively with future related uncertainty
- Engage in future foresight and increase the expertise in the field of scenario technique
- Develop market models based on the possible scenarios and link it directly to their business model or portfolio management model
- Redefine the business model to adopt to the changes in the automotive value chain
- Reshape goal setting for product portfolio and innovation pipeline
- Check whether your development process is capable to deliver the results you want to commit to your customer
- Identify and reinforce mandatory process steps
- Further integrate the development of the product and its production process

Target Group:

Small and medium industry companies, with their R&D and strategic chief officers that explore the market, may have product ideas and opportunities, but want to apply state-of-the-art methodology and tools to clarify how "to make it happen".

Min. 10 Participants required

Duration:

3 Modules, 2 hours each (9.30 – 11.30 am, 12.30 – 2.30 pm, 3.00 – 5.00 pm)

Literature:

- (Gausemeier 2009) Zukunftsorientierte Unternehmensgestaltung: Strategien, Geschäftsprozesse und IT-Systeme für die Produktion von morgen von Jürgen Gausemeier, Christoph Plass und Christoph Wenzelmann, Hanser 2009
- (Jung 2010) Studie ECO4Drive – Neue Antriebstechnologien erfordern neue Geschäftsmodelle für die Vermarktung, ATZ/MTZ-Konferenz „CO2 – Die Herausforderung für unsere Zukunft“ von Hans H. Jung, München 2010

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POSCO Electrical Steel Sheet for Hybrid and Electric Vehicles

Technical Research Laboratories
POSCO
Republic of Korea

Keywords: Electrical steel | Traction motor | EV | motor efficiency

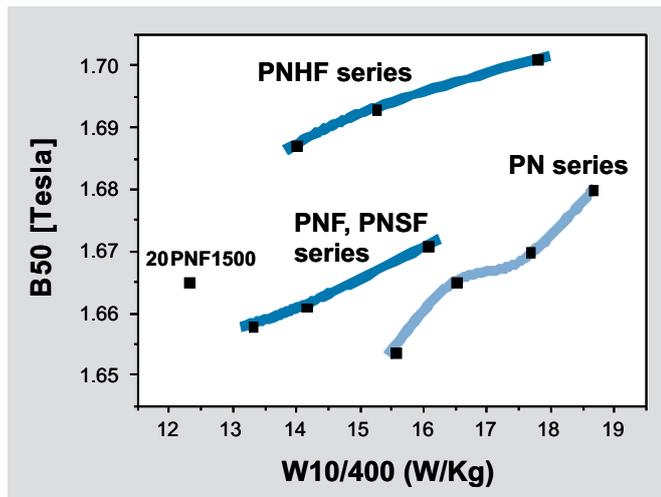


Fig. 1. Magnetic properties of POSCO non-oriented electrical steel products

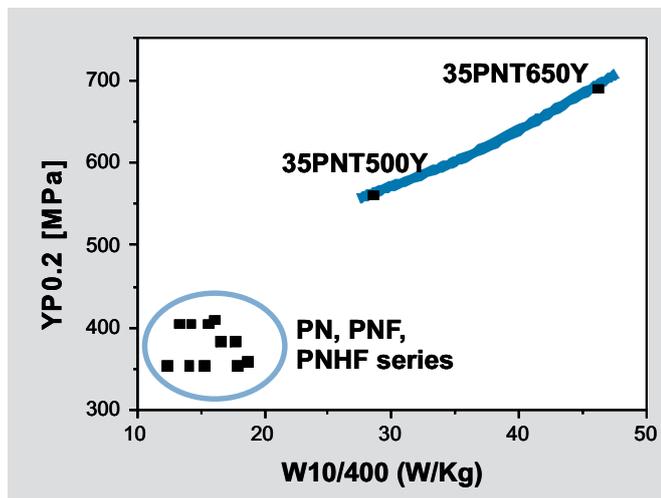


Fig. 2. Yield strength (0.2% offset) of POSCO high strength electrical steel products

Subject:

Electrical steel sheet is the key material for the traction motors of Hybrid electric vehicles (HEV) and electric vehicles (EV), so its proper usage contributes the dynamic performance of HEV/EV. Although required properties depend on vehicle requirement, a few properties are always required, such as high frequency low core loss, high flux density, high yield strength and good punchability. In order to meet those demands, POSCO developed several kinds of electrical steels; PNF series (low core loss), PNHF series (high flux density), PNT series (high yield strength) and PNSF series (good punchability). In addition, POSCO is developing other improved and customized products through Early Vendor Involvement (EVI) activities.

Details:

Customer application technique on electrical steel for Hybrid and Electric Vehicles

It is essential to work jointly with both HEV/EV maker and electrical steel to develop a traction motor for maximum efficiency which is directly connected to mileage of vehicles. POSCO is not only the material provider of optimized electrical steel for HEV/EV but also the provider of customer application technique. This technique covers from the early stage of motor design to mass production. For example, at motor design process, POSCO can provide extensive material properties both magnetic and mechanical properties, which is a key for motor design. POSCO can also propose optimal material for traction motor by doing FEM analysis to calculate motor performance. For motor production, stampability, weldability and stress relief annealing conditions can be provided.

Duration:

3 hours (2.00 pm – 5.00 pm)

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Electromechanical System Simulation for Wind Energy

ANSYS Germany GmbH

Keywords: Circuit Simulation | Finite-Element Method | Boundary-Element Method

Abstract:

Modern electric drive systems consist of a variety of technological elements. System simulation refers to the computer-aided study of the interaction of these components within the complete system. Simulation techniques used to approach these analysis include circuit simulation, finite-element method (FEM) and boundary-element method (BEM). This tutorial presents some important system simulation concepts such as the interaction of power electronics with the generator (power loss, torque oscillation) or the effect of power electronics on the grid voltage quality. The available simulation technologies will be put into context of the various analysis types using an example of a Wind turbine drive model.

Goal:

The goal of this tutorial is to introduce the participants to highly productive simulation tools that are already established in the industry, such as Maxwell 2D/3D, Simplorer, Q3D, etc. Also, in order to let the attendees gain deep insight, this tutorial emphasizes the importance of system simulation for the successful design of an electric-drive system.

Duration: 3 hours (10.00 am – 1.00 pm)

Agenda:

- 10:00 – 10:45 Overview presentation
- 10:45 – 11:00 Break / Discussion
- 11:00 – 11:45 Simulation of an IGBT Power Inverter
- 11:45 – 12:00 Break / Discussion
- 12:00 – 12:45 FEM Simulation of a PM Generator
- 12:45 – 13:00 Final Discussion

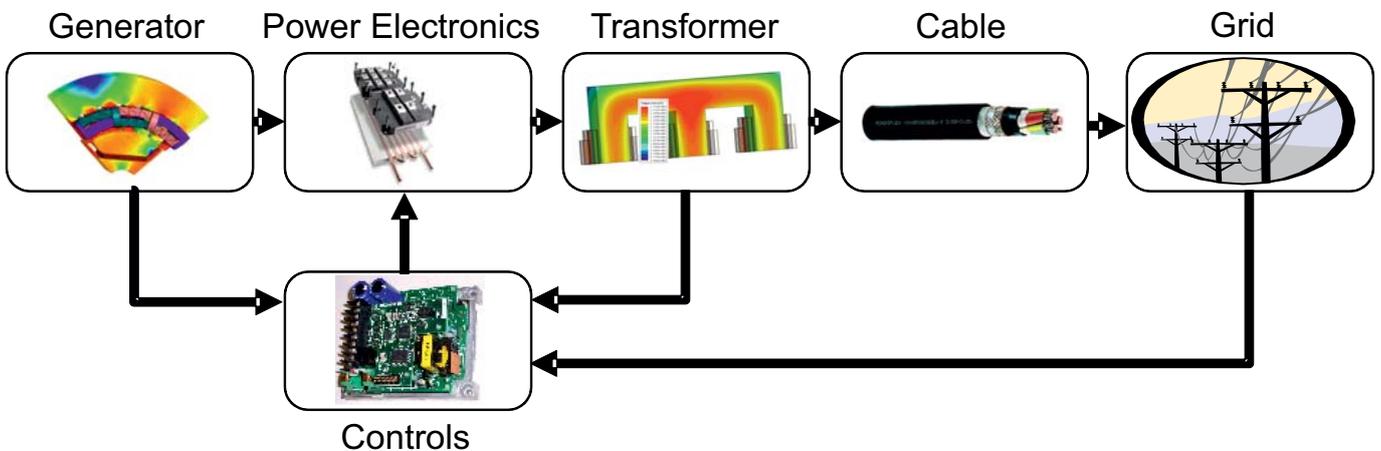
Target Group:

This tutorial is intended for technical managers responsible for the implementation of simulation technology in the development processes of their company, design engineers in the area of electromagnetic analysis and students of electrical and mechanical engineering.

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From analytical machine design to system simulation

MACCON GmbH

Keywords: Analytical and Finite Element Design of an Interior Permanent Magnet Synchronous Machine | Electromagnetic and Thermal System Simulation

Subject:

This tutorial will lead the audience through a full design example for an electrical machine traction drive. The design starts with given requirements, goes through an analytical pre-design with detailed finite element and thermal calculations and closes with the traction drive being modelled in a full system simulation.

Details:

This tutorial aims at informing electrical machine designer, system engineers and team leader/executives how to design an interior permanent magnet synchronous machine for a traction drive application from scratch and to include this electrical machine in an overall system simulation using today's state of the art software

- SPEED: Sizing and preliminary design of electrical machines,
- Motor-CAD: Lumped circuit - Thermal Analysis,
- Motor-FLOW-Eff-MAP: Creation of Efficiency and other related Contour Maps,
- Flux: Electromagnetic and thermal Finite Element Analysis and
- Portunus: Multiphysics systems simulator.

Participants will gain a systematic insight in the design and simulation process:

- Geometry, winding, material definition and first performance analysis using SPEED PC-BDC
- Reading of the SPEED PC-BDC file into Flux 2D using the Overlay technique. Calculation of the cogging torque, back emf wave form and load torque at constant speed.
- Reading of the SPEED PC-BDC file into Motor-CAD. Adding a water cooling jacket and doing a first thermal steady state analysis. Feeding back the temperatures to SPEED and recalculate the performance data. Then defining a load duty cycle and calculate the transient thermal behaviour.
- Setting up a cosimulation of Portunus and Flux 2D using PWM inverter connected to the machine.
- Running a driving cycle system simulation in Portunus. The system model covers the behaviour of the electric machine, the combustion

Duration:

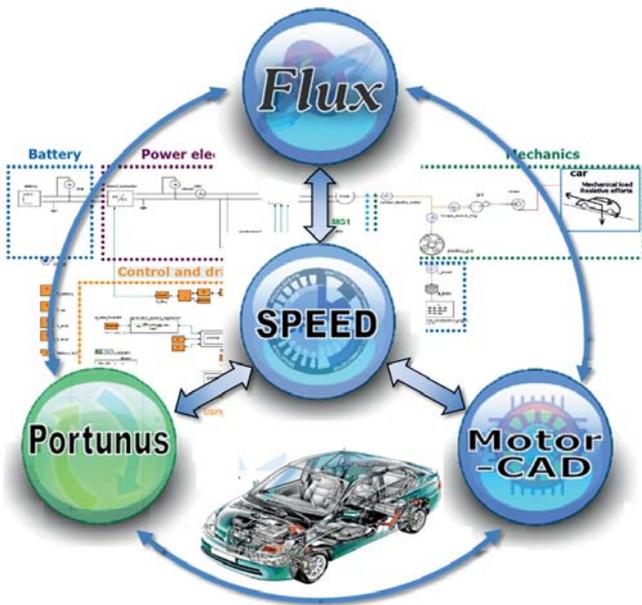
3 hours (2.00 pm – 5.00 pm)

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Dr. Markus Anders

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VENUE

The EDPC 2011 will take place at the main building of the School of Business and Economics of the University of Erlangen-Nürnberg, Lange Gasse 20, 90403 Nuremberg, Germany on September 27th - 30th, 2011. We reserved plenty parking lots as well as an underground car park. For your accommodation, several hotels are booked all over the city. For prices and reservation, please use the reservation form on our website www.edpc.eu.

Nuremberg boasts a unique mixture of tradition and modern times. Both people born here and people who moved here appreciate its extraordinary quality of life. At the same time, Nuremberg is a modern city with 500,000 inhabitants, and the centre of a prospering European metropolitan region with 2.5 million inhabitants. Its almost thousand years of history are still obvious in its cityscape.



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Fachbereich Wirtschaftswissenschaften, Kommunikation

GENERAL CONDITIONS

- All speakers and participants of the tutorials also have to register as participants of the EDPC 2011.
- The participants of the tutorials have to pay an additional fee of 80 € for a half day tutorial or 160 € for a full day tutorial.
- The tutorial fees include coffee and cold drinks in the breaks and for full day tutorials a lunch voucher for the cafeteria.

REGISTRATION

By fax: +49 (911) 58 0 58 66
By email: service@edpc.eu
Online: www.edpc.eu

For the fax registration please use the following registration form:

Salutation _____ Title _____

First Name _____ Last Name _____

Company Name _____

Department _____

Street/Unit number _____

Postal Code _____ City _____ Country _____

Phone _____ Fax _____

Mobile phone _____

E-Mail _____

CONFERENCE FEE

- o Standard Fee - 890,- € plus VAT
- o Reduced Fee* - 580,- € plus VAT

I also register for

- o **Tutorial** # ___ - 80,- € / 160,- € plus VAT
- o **Technical Tour Package** ___ - 100,- € plus VAT
- o **Evening Event** - included
- o **Guided Walking Tour** ___ - included

* Reduced fee for International Program Committee members, speakers and university members. All prices plus VAT.

CONTACT

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