

# Somaloy Update

Soft Magnetic Composite Technology

MAY 2010

## Latest trends in electric propulsion technology

Keep up to date with the latest research and industry trends in the search for new hybrid and electric vehicle propulsion systems. In collaboration with UK Magnetics, Höganäs will host a conference in the beautiful venue Dunkers Kulturhus located on the south-west coast of Sweden.

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## Höganäs PoP-bike on display in Shanghai

The first target application for the unique MPM motor is an electric bicycle - the Höganäs PoP-bike. As of May 19, the PoP-bike will be on display at the World Expo 2010 in Shanghai.

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## With 10 years of constant improvements

Material Development Manager Zhou Ye has worked with Somaloy® for more than 10 years. In this interview he shares his view on market development and about how he leads development of the next generation of Somaloy materials.

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# Latest trends in Electric Propulsion Technology



New hybrid and electric vehicle propulsion systems are constantly being developed as the demand for more environmentally friendly technology increases. During a two-day seminar, Höganäs and UK Magnetics Society provide an excellent opportunity to get an insight in the latest development within this exciting field.

The constant and rapid introduction of new electrified products with improved features is a result of extensive research and development. While each progress offers more reliable, efficient and cost-efficient solution, further technological advances are required if the goal of zero emissions is to be reached.

During the two-day seminar, arranged by Höganäs and UK Magnetic Society, the current state of the art hybrid and electric propulsion developments for vehicle applications will be presented. Applications based on new magnetic materials such as Soft Magnetic Composites (SMC) will be given specific attention.

Besides being presented with the results from the latest research studies, all participants will be given the opportunity to test drive electric vehicles and to visit the Power of Powder (PoP) application development facilities of Höganäs AB.

Dunkers Kulturhus, located in the northern harbor of the city Helsingborg, will be the venue for the seminar. About one and a half hour's drive from Copenhagen Airport, Helsingborg is the 2nd largest city in the southern state of Scania.

## Seminar fee

The fixed seminar fee includes attendance at the technical sessions, abstract booklet, refreshments, lunch on 20 September, evening seminar dinner on 20 September, lunch on 21 September, transport to and from Helsingborg/Höganäs and a plant tour of Höganäs AB. Accommodation costs are paid separately and are not included in the seminar fee.

UKMAG member organisation: £175\*

UKMAG member organisation - student: £40\*

Non-member: £225\*

Non-member - student: £50\*

\* plus 17.5% VAT

## TOUR OF HÖGANÄS AB

After lunch on Tuesday, 21 September, delegates will be transported to Höganäs by coach from

Helsingborg to view the Power of Powder Application Development Centre at Höganäs AB and participate in electrical vehicle test rides.

## Programme

### MONDAY, 20 SEPTEMBER 2010

- 1130 REGISTRATION AND LUNCH  
1300 WELCOME /INTRODUCTION  
Dr Glynn Atkinson, UK Magnetics Society and Lars Hultman, Höganäs AB, Sweden  
1330 Hybrid Drives for Commercial Vehicles, Dr Mats Alaküla, Volvo Powertrain, Sweden  
1400 Electric Vehicle Traction Machine and Generator Design Considerations, Dr Nigel Schofield, University of Manchester, School of Elec and Elec Engineering, UK  
1430 Somaloy® 5P – A New Generation of SMC Materials, Zhou Ye, Höganäs AB, Sweden  
1500 COFFEE  
1530 Electrical Torque Vectoring Device - Challenges and Opportunities, Daniel Herven, Haldex, Sweden  
1600 Novel Halbach Permanent Magnet Machines and Applications, Professor Qiang Zhu, Dept of Elec and Elec Engineering, University of Sheffield, UK  
1630 Latest Developments of the YASA Motor for Automotive Applications, Dr Tim Woolmer, Oxford Yasa Motors, UK  
1900 SEMINAR DINNER at Dunkers Kulturhus

### TUESDAY, 21 SEPTEMBER 2010

- 0830 Volvo Cars Development towards Electrification, Mr Klas Niste, Volvo Cars Sweden AB, Sweden  
0900 Höganäs MPM Motor for Direct Drive Applications, Dr Lars Sjöberg, Höganäs AB, Sweden and Dr Glynn Atkinson, University of Newcastle, UK  
0930 Diesel/Electric Driveline in Heavy Duty Drivelines, Mr Fredrik Sidahl, BAE Systems Hägglunds AB, Sweden  
1000 Dr Glynn Atkinson, UK Magnetics Society and Lars Hultman, Höganäs AB, Sweden  
1015 COFFEE  
1045 TRANSPORTATION from Dunkers Kulturhus to Höganäs AB  
1130 POWER OF POWDER APPLICATION DEVELOPMENT CENTRE, Höganäs AB  
1300 LUNCH  
1430 DEMONSTRATION of Electrical Vehicle Test Rides  
1600 END/TRANSPORTATION from Höganäs AB to Marina Plaza Hotel, Helsingborg Dunkers Kulturhus, Helsingborg

# REGISTRATION FORM

Please complete this form and return to: Jane Ward • UK Magnetics Society  
 Grove Business Centre • Grove Technology Park • Wantage • Oxon OX12 9FA  
 tel: +44 (0)1235 770652 • fax: +44 (0)1235 772295 • email: jward@ukmagsoc.co.uk

*I wish to attend the two-day seminar Developments in Electric Propulsion Technology to be held at Dunkers Kulturhus, Helsingborg, Sweden, 20-21 September 2010. [Remittance will cover technical sessions, abstract booklet, refreshments, lunch (20 September), seminar dinner (20 September), lunch (21 September), transportation between Helsingborg and Höganäs for tour of Höganäs AB]*

- cheque enclosed, made payable to "UK Magnetics Society"  
 [overseas cheques should be in pounds sterling and drawn on a UK bank]
- to pay by bank transfer: UK Magnetics Society, Barclays Bank plc, 17 Market Place, Wantage, Oxon OX12 8AG, UK  
 Account No: 50893293, Sort Code: 20-90-91. IBAN:GB98 BARC 2090 9150 8932 93, SWIFTBIC: BARCGB22  
 Please add on £10 to cover bank charges if paying by bank transfer from overseas
- please invoice me at the address below, quoting Purchase Order No.....

For payment by VISA/Mastercard/Delta/Electron/ JCB/Solo/Maestro/Switch/Amex:  Please complete BLOCK CAPITALS and return to:  Jane Ward UK Magnetics Society Grove Business Centre Grove Technology Park Wantage, Oxon OX12 9FA tel: +44 (0)1235 770652 fax: +44 (0)1235 772295 email: jward@ukmagnetics.co.uk	Card Number	<input type="text"/>
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	Mailing address of Cardholder:	<input type="text"/>
	Signature of Cardholder:	<input type="text"/>

	FEE	VAT	TOTAL
<input type="checkbox"/> UKMAG member organisation	£175.00	£30.62	<b>£205.62</b>
<input type="checkbox"/> UKMAG member organisation - student	£ 40.00	£ 7.00	<b>£ 47.00</b>
<input type="checkbox"/> Non-member	£225.00	£39.37	<b>£264.37</b>
<input type="checkbox"/> Non-member - student	£ 50.00	£ 8.75	<b>£ 58.75</b>

I wish to make a poster presentation

Surname .....

First name ..... Title (Dr/Mr/Mrs etc).....

Organisation.....

Address.....

.....

.....

tel.....fax.....email.....

# Höganäs PoP-bike on display in Shanghai

If you are planning a visit to the World Expo in Shanghai, you might also want to take a closer look at the Höganäs PoP-bike and the Modulated Pole Machine. As the first "true" electric bicycle, this high-end product will take a position currently not held by any other electric bicycle.

Reducing one's environmental impact calls for a rethinking in terms of personal transportation. Metal powder technology support such thinking as it offers entirely new possibilities to create more effective and lighter environmentally friendly products.

One kind of application that can benefit from the possibilities offered by powder technology is electric motors – both in terms of size and efficiency gains. The Modulated Pole Machine (MPM) from Höganäs is a very compact and highly efficient unique motor concept - a perfect example of how powder technology opens up opportunities for new improved electromagnetic solutions.

The first target application for the motor is an electric bicycle, the Höganäs PoP-bike. As of May 19th, the electric bicycle will be on display at the World Expo in Shanghai. The PoP-bike is a completely new kind of electric bicycle that, by combining high motor performance with an elegant design, is set to attract young and educated people living in an urban environment.

The high performance is a result of Höganäs' proprietary motor concept. The Modulated Pole Machine is mounted in the rear wheel as a direct drive solution that enables faster acceleration and better inclination climbing while simultaneously offering an extended usage of the battery charge (up to 75 kilometres).



*The Modulated Pole Machine in an "exploded" state*

The unrivalled combination of compactness and performance (very high torque density and efficiency) makes the MPM motor an exceptionally competitive solution.



*Höganäs PoP-bike with the Modulated Pole Machine mounted in the rear wheel*

Furthermore, the motor concept is a very environmentally friendly solution as it uses fewer rare-earth magnets and less copper wire than comparable motors as well as enabling a more efficient recycling.

As indicated by its name, the MPM is based on a modular design concept. By also being compatible with standard BLDC controllers,

the MPM concept is suitable for a wide range of other applications as well, for instance electric scooters, other light electric vehicles, fans, pumps and generators.

# With 10 years of constant improvements

After completing his Doctoral degree in the Swedish capital Stockholm, Zhou Ye started working with SMC materials at Höganäs. At the time for the interview with Somaloy Update, Ye is spending his 10th year at the company. As manager for material development, his main goal is still to further improve Somaloy technology.

## Describe your role as Material Development Manager at Höganäs

The biggest portion of my time is currently devoted to developing new materials - a challenge which I feel very excited about. As we have already improved our 1P and 3P series a lot, the short term focus is to work on qualifying our 5P products. We are also working on further improving the performance levels.

However, as Somaloy technology is not only about the material, I am involved with other tasks as well. By arranging and participating in conferences, we share our knowledge about Somaloy technology and whenever there is a need for more advanced customer support we provide that as well. We guarantee that our customers will obtain the properties that we have defined and this requires us to provide process and production support, for instance guidelines as well as in-house and on-site support.

## What are the major challenges you are facing in your daily work?

When I started working with Somaloy we had two major goals. We wanted to be able to perform

heat treatment at 650°C to reduce the losses, and we wanted to increase the permeability of the material. Looking at where we are today, I can be very satisfied and proud of the fact that we have been able to reach our goals. However, we are constantly pushing ourselves and I feel very confident about the future and that we will continue to offer the market even more competitive solutions.

The demands for new solutions are stemming from multiple sources. On one side, there is our internal strive to find new ways to develop materials with improved properties. On the other side, we are constantly working with and listening to the market to get a sense of what is required. It is about combining our knowledge with market demands and to be able to develop new improved solutions at attractive cost levels. We both support material selection as well as developing materials for specific applications.

## Comparing with when you started working for Höganäs – what are the major differences?

The biggest difference is the level of attention given to SMC materials. The interest has increased dramatically, especially over the last five years. I believe that the major underlying factor for this trend is the combination of an increased demand for more economical and environmentally friendly solutions, the vast improvements of the material properties, processes and designs.

## How do you spend your spare time?

I am a true family man who loves to spend time with his wife and children. I also enjoy cooking



*Zhou Ye, Material Development Manager for the ElectroMagnetic Applications (EMA) segment.*

and playing bridge. My appreciation for the Swedish environment has grown over the years and I take much pleasure in spending time walking outdoors.