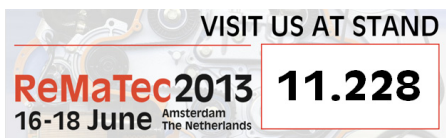


# REMANUFACTURING UPDATE

## JUNE 2013

### RESEARCH & DEVELOPMENT NEWS FROM BAYREUTH



#### Editorial

Dear Readers,

have you already booked your flight or planned your trip to Amsterdam this month? I have no doubt your answers will be „yes“ - we will meet at the ReMaTec show very soon.

Looking forward to see you again.

Yours sincerely

*Rolf Steinhilper*



→ **Rolf Steinhilper**  
University Professor  
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**BAYREUTH UNIVERSITY**  
**UP** **Chair Manufacturing and Remanufacturing Technology**

#### ReMaTec2011 Statistics

- 2,726 visits from 57 countries
- 156 exhibitors from 22 countries

Source: [rematecnews.com](http://rematecnews.com)

### ReMaTec2013 - Record-Breaking Event Ahead

Every two years the ReMaTec exhibition is taking place and so it does this year. From 16 – 18 June 2013 the World's No. 1 show for remanufacturing is held in Hall 11 of the Amsterdam RAI Convention Centre in the Netherlands.

By now 12 years have passed since the first ReMaTec exhibition took place. Over time it evolved to a must-attend event for the key players of the automotive, industrial, and heavy duty aftermarket. Besides providing information on the latest developments in remanufacturing technology and business it also serves as an educating and networking platform for reman professionals. After there was a considerable rise in visitors, exhibitors and floor space from ReMaTec2009 to 2011, the latest figures proof the upcoming ReMaTec2013 again to exceed the former shows by far. 171 exhibitors have already booked their exhibition space to present their competences on 10.000 sqm exhibition area to the visitors.

And we will again be one of these exhibitors. Regarded as Europe's leading research and technology centre for remanufacturing, we support the remanufacturing industry in any project regarding remanufacturing processes and technologies. Discover the innovative solutions we can offer for your business like our testing equipment for turbochargers and electronic power steering on display as well as the 3D re-engineering equipment. Also feel free to ask about the latest results of our current national and international

research projects:

- eCleanER: Electronic Component Cleaning Engineering for Remanufacturing
- SIRO: Sustainability in Remanufacturing Operations
- Service Engineering 2020: Development of Novel Car Service Processes
- WebDCL: Development of Technologies for Recording, Analysing and Distributing CAN or LIN Bus Communication



Booth design Bayreuth University ReMaTec2013

When finally ReMaTec2013 opens on June 16th the organizers will have created all the conditions necessary for an excellent show. From this moment it is up to each individual visitor and exhibitor to get the best out of it and make the ReMaTec2013 a success for themselves but also for the whole remanufacturing industry. So feel warmly invited to visit us at our booth and discuss your ideas with our experts!

→ **Sandra Seifert**  
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## Opportunities for Additive Manufacturing Technologies in Remanufacturing

Technical advances made in the field of additive manufacturing (AM) in the past few years lead to the fact that the industry uses these new technologies to produce not only prototypes but also serial parts.

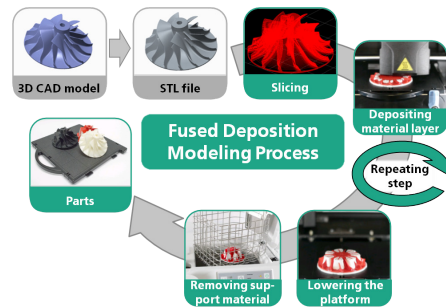
Because of the almost infinite geometrical variability of AM, the user is free in design and construction. To start production only CAD data are necessary, no tools or molds need to be held in stock. Improvements can be implemented easily by just changing the CAD data. With regard to waste reduction AM technologies are highly attractive because of their efficient material use: AM parts are build up layer by layer and aren't chip-removal machined.

The AM technologies can show their full potential in single parts, small batch series and reverse engineered parts which often appear in the reman process. Within remanufacturing AM becomes interesting when parts are undeliverable or only deliverable in too large quantities or when parts should be improved.

The Chair Manufacturing and Remanufacturing Technology at Bayreuth University owns an AM machine which is using the Fused

Deposition Modeling (FDM) technology.

FDM is one of the most used AM technologies to produce thermoplastic end-use parts and prototypes. The figure below shows the FDM process.



FDM process

1. Initial point of the FDM process is a 3D CAD model of the required component.
2. The specific software converts the STL output into 3D modeling print paths, including slicing and any needed support structures.
3. After starting the buildup the fused filament will be deposited at the modeling base accordant to the given contour of the first layer.
4. Then the platform is lowered by the thickness of one layer. A further layer is applied on the subjacent layer and both

layers are united. These steps are repeated until the complete part is created.

5. After completion of the buildup process the support material which acts as scaffolding has to be removed in an ultrasonic bath.

At the end of the FDM process a highly accurate part is available for the user. Within this FDM process layer thicknesses down to 0.254 mm can be reached. This professional AM technology uses production-grade thermoplastics, so parts are comparable to serial parts in mechanical, thermal and chemical strength.

Especially in remanufacturing this new technology helps to get required components fast and easily. Get in contact with us and benefit from our know-how to discover your advantage in progress. Our expert Markus Kafara and the technical staff member Peter Lang will be at your disposal to answer all questions regarding this innovative technology.

→ Markus Kafara  
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## Meet one of our Experts - Today: Dipl.-Ing. (FH) Alexander Nagel M.Sc.

Today we would like to introduce Dipl.-Ing. (FH) Alexander Nagel M.Sc. to you. Alexander is our expert in bus protocols as well as in developing test benches for the remanufacturing industry.

### Alexander Nagel

Age: 37

Nationality: German



**Career:** 2001-2010 engineer in hard- and software development, 2001 degree in electrical engineering, 2008 Master degree in electrical and information engineering, since 2011 research assistant at Professor Steinhilper's Chair Manufacturing and Remanufacturing Technology.

### What are your activities in remanufacturing research?

My personal research interests are process optimization, remanufacturing of automotive parts, electromobility as well as developing test benches in the field of remanufacturing.

### How did you come to remanufacturing?

Before I became a researcher I worked for a company which was a partner of the project CAN REMAN managed by the University of Bayreuth. My task was to programme the software for the test benches developed within this project. These were my first experiences in remanufacturing.

### What do you do in your free time?

I like sports, travelling and flying airplanes.

### What gives you pleasure?

Relaxing during a walk in the nature as well as completing projects successfully.

### What are your wishes for the reman industry?

I hope that our research brings suitable and sustainable benefits for the remanufacturing industry to handle present and future challenges successfully.

### Imprint

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