association of industrial laser users

Metal additive processes: new opportunities in rapid tooling, repair and cladding

Presentations, exhibition, clinic & tour

AILU Technology Workshop

Wednesday 28 February 2007

Innovation Technology Centre Rotherham UK

Courtesy NedClad

Supported by:

Photonics Knowledge Transfer Network

PowdermatriX

MTA The Manufacturing Technologies Association

namtec national metals technology centre

About this workshop

In our manufacturing economy with its large knowledge-based component, the agility of companies in bringing new products to market or regenerating high value components is a key element of an organisation's profitability. The field of additive manufacturing in metallic materials offers some emerging tools to deal with this, most specifically in the creation of rapid or novel tooling or in building up material for repair or function.

Design and production engineers will all be aware of laser based prototyping, first exploited as a quick means of checking component design, fit or function. However, recent developments have seen these and other processes mature into small batch production techniques capable of producing final components in a range of materials. Materials including plastics and ceramics and various metallic systems can be used for the repair/production of tools and dies and direct (small batch) part manufacture.

The UK has a thriving community generating technological capability in metal production technologies. This event will present some of the new commercial technologies for rapid metal production and an insight into the developments of university-based rapid manufacturing research programmes.

Robert Scudamore Workshop Chair

Robert Scudamore joined TWI in May 2000 and is the Group Manager for TWI's Yorkshire facility. He also manages the Yorkshire section of the Laser and Sheet Processes Group.
Robert has managed projects involving laser deposition, laser welding, hybrid laser/arc welding, and transmission welding of plastics. He is currently involved in laser deposition of various metals, including high temperature materials for repair and hybrid build, and fibre laser processing.

Who should attend?

> Engineers and managers from manufacturing industry looking to enhance production capabilities or simply to keep abreast of the latest developments in manufacturing.

> Job shop owners looking for new technology pathways and new opportunities in services such as tool and die repair, or small batch manufacturing runs for the engineering sector.

> Researchers in laser materials processing.

New opportunities in rapid tooling, repair and cladding

28 February 2007

Programme overview

09:00 - 09:40 Registration and refreshments

09:40 - 11:15 Presentations

Keynote presentation

Introduction to additive manufacturing processes
Stewart Williams Cranfield University

Technology generation

Computer generated holographic optics used for metal additive processes
Matthew Gibson Loughborough University

Matching the additive process and parameters to the purpose
Andrew Pinkerton Manchester University

'Fit for purpose' additive tooling material
Chris Bocking Buckinghamshire Chilterns University College

11:15 - 11:40 Refreshment break

11:40 - 13:20 Presentations

Application case studies (1)

The bridging of technology and application in laser cladding
Phil Carroll TWI

Laser applications for tool making and mould construction
Leo Sexton Laserage (Ireland)

A comparison of blown powder and powder bed processes
Jeff Allen Rolls Royce

Laser cladding in practice: applications and research aspects
Wim Husslage NedClad Technology (The Netherlands)

Tailored properties and refurbishment of parts
Robert Ganter Trumpf (Germany)

13:20 - 14:30 Lunch & **EXHIBITION**

13:30 - 14:15 Clinic*

14:30 - 15:30 Presentations

Application case studies (2)

Additive layer manufacturing
Dan Johns Airbus

User applications of direct metal laser sintering
Barry Assheton CRDM

Laser cladding repair of aerospace and IGT components
Jack Conley Huffman (USA)

15:30 - 16:30 Tour*

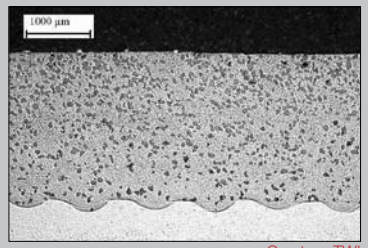
* for details see over

association of industrial AILU laser users

Opportunities with metal deposition

Direct metal laser sintered prototype of a sub-scale cylinder head

Courtesy CRDM



Tungsten carbide hard facing

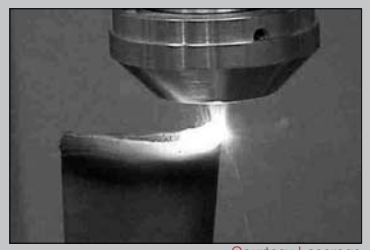
Courtesy TWI

Job shop laser cladding of a heat exchanger head

Courtesy NedClad

Nickel-Bronze sintered tool and components

Courtesy CRDM



Injection mould repair

Courtesy Laserage

Workshop information

The ITC building

Venue

The workshop will be held in Yorkshire Forward's newly-opened Innovation Technology Centre (ITC), on South Yorkshire's Advanced Manufacturing Park in Rotherham.

Delegates

On the day, delegates will receive a name badge and a pack including key slides or notes of the presentations. A buffet lunch (including vegetarian options) will also be provided together with refreshments throughout the day.

Exhibitors

The exhibition will be located on the first floor, in the area where morning refreshments and lunch are served, adjacent to the meeting room. The lift is situated by the main entrance. The Centre will be open from 08.00 for exhibitors wishing to set up their tables before registration. Table tops of 1350 x 680 mm will be provided, but not backboards. Power will be available throughout the exhibition area.

Registration

AILU members need only give their names, by phone or email to courses@ailu.org.uk. Otherwise a registration form should be completed.

Delegates who are not members of AILU or of a supporting organisation and who decide to join the Association within 10 weeks of the event will be reimbursed the difference between the member and non-member registration fee as a discount on their first year's corporate membership subscription. Full details of AILU membership can be found at www.ailu.org.uk, taking the link to 'about us'.

Travel

The ITC is located in the Advanced Manufacturing Park, Brunel Way Catcliffe Rotherham S60 5WG, close to junction 33 of the MI. The nearest railway station is Sheffield Midland, from which the ITC is a short taxi ride. A link to full directions including travel from airports can be found on the AILU web site event page for the event (http://www.ailu.org.uk/content.asp?section=Events&subsection=20070228).

Accommodation

The hotel recommended by the ITC is the Hilton Sheffield (S4 7YA; T: 0114 2525500). The special rate for the ITC is £89 BB. To book online at www.hilton.co.uk use ID number D000020161 for the discount.

Tour - DON'T MISS SEEING TWI'S NEW EQUIPMENT

TWI has been busy installing several new pieces of equipment at its South Yorkshire facility. These include a Huffman laser cladding system and a high accuracy Kuka robot-based laser cell. This equipment, in addition to the Trumpf DMD laser deposition system and the 7kW IPG Yb-fibre laser already installed, provides a significant laser deposition/cladding facility. Work being carried out includes repair, cladding, hybrid build and original part build at high and low deposition rates. Advanced structures, in terms of geometry and metallurgy, and complex 3D shapes, including some features down to 0.3mm, have all been created. The tour will showcase the equipment, provide demonstrations and exhibit samples of work carried out by TWI.

Clinic

Photonics Knowledge Transfer Network

A selection of experts will be available for one-to-one technical and/or commercial discussions over most of the lunch period. Places can be reserved upon arrival or pre-booked by contacting the AILU office.
(T: +44 (0)1235 539595; E: courses@ailu.org.uk)

AILU reserves the right to alter the programme or cancel the meeting at short notice and accepts no responsibility for the views expressed by the speakers or delegates.

REGISTRATION FORM

Metal additive processes: opportunities...
28 February 2007

Delegate information

Title ..... First name ..... Surname .....

Position: .....

Organisation: .....

Address: .....

Post Code: .....

Tel: ..... **Fax:** .....

E-mail: .....

Payment options

❑ Please invoice me

❑ I wish to pay in advance by:

1. Bank/Euro cheque in £ Sterling or EURO, payable to AILU
2. Visa/Mastercard (billing in GBP):
   Name on Card .....
   Number _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ Exp _ _/_ _

Please debit my account

❑ I wish to register as a delegate. The applicable rate is:

❑ GBP 135.00 (= £158.62 or €235 incl. VAT)
I am a member of AILU and/or one of the supporting organisations:
❑ Photonics KTN ❑ Materials KTN ❑ MTA

❑ GBP 55.00 (= £64.62 or €94 incl. VAT)
I am a full time student, unemployed or retired.

❑ GBP 170.00 (= £199.75 or €293.75 incl. VAT)

❑ I wish to register as an exhibitor. Please reserve me a table.
The applicable rate is:

❑ GBP 135.00 (= £158.62 or €235 incl. VAT)
I am a member of AILU or one the supporting organisations ticked above.

❑ GBP 170.00 (= £199.75 or €293.75 incl. VAT)

❑ I am registering as a delegate and exhibitor.
Please give me a GBP 50 (= £58.75 or €87.04 incl. VAT) discount on the total fee.

Signed: ..... Date:

Cancellations will be accepted up to 1 week before the event; otherwise the full fee may be charged.

Complete the form and return by fax or post.

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Photo courtesy Laserage