



INFORMATION

FEB 2019

SELF Launch

11 FEBRUARY 2019

On Monday 11th February 2019, Michael John Lord Whitby of Harborne in the City of Birmingham hosted the launch of the Surface Engineering Leadership Forum (SELF) during an evening reception in the Cholmondeley Room and Terrace, House of Lords, London.

In the short time SELF has been in existence, there has been much progress (including delivery of a Level 7 apprenticeship standard - Materials Process Engineer - and holding an initial summit on Digital Manufacture). SELF is primarily a make organisation, driven by the trade associations, technical institutions and specialist manufacturers who represent the coating and surface engineering industrial community together with academics, RTOs and professional engineering institutions. The Group is chaired by Dave Elliott (Surface Engineering Association - SEA) with vice chair Graham Armstrong (Institute of Materials Finishing - IMF).

We all know the importance of Surface Engineering and Advanced Coatings

Surface Engineering and Advanced Coatings is no longer seen or portrayed simply as an enabling technology or even as a special process, historically perceived as slightly detached from the product, materials or manufacturing life-cycle. Surface Engineering and Coatings is rapidly becoming a standalone industry in its own right, an essential part of modern, high productivity, integrated manufacturing and design. The industry is now re-grouping and emerging as a motivationally consolidated, focused community with collective purpose and above all a unified direction.

So why bother?

The simple answer is value added. In the UK, the industry's current turnover is estimated at £11.2bn effecting over £140bn in associated goods with a compound annual growth rate of over 11%, which by 2025 is estimated to have a turnover exceeding £25bn and will effect over £313bn of product. The industry directly employs over 46,000 people in more than 2,000 companies, 86% of which are SMEs, while supporting a further 150,000 jobs in the UK supply chain.

So what's important to SELF?

The fact that we have a unified purpose:
"To secure a robust Business Ecosystem, including suppliers, distributors, customers, competitors and government agencies, collectively involved to deliver growth through both competition and cooperation".

Continued on page 2

In Summary

Our mission: To build a robust and resilient Business Ecosystem capable of sustaining rapid future growth and increased productivity. To use our core values of Skills and Training, Research and Development, Supply Chain Integration, Resilience and Sustainability, Collaboration and Operational Performance to complete the Transformation Journey, the success of which will be measured by demonstrating Match Fit, Best in Class and then World Class in all that we do.

Dr Bryan Allcock*, FIMMM
CEO
TRL9 Limited

*SELF Board member representing the Surface Engineering Division of IOM3

SELF is supported by the following bodies: British Coatings Federation (BCF), Institute of Materials Finishing (IMF), Innovate UK-Knowledge Transfer Network, Institute of Materials, Minerals and Mining (IOM3), Manufacturing Technologies Association (MTA), Manufacturing Technology Centre (MTC), The Oil and Colour Chemists' Association (OCCA), Surface Engineering Association (SEA) and TWI.

IMF DIARY

7th JUNE 2019 - ENROLMENT
MARCH 2020 - SURFACE WORLD

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NEXT ENROLMENT DATE FOR TRAINING COURSES IS

7th June 2019

Contact
Karen Yates

Tel 0121 622 7387

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As usual I am late again in putting this column together and getting chased by Helen! But can someone tell me where the last 6 weeks have gone; it still seems like only a few days since we all came back after the Christmas break!

Institute business has been very brisk, and it's very pleasing to report a record entry of students into our study courses at the last intake at the beginning of February, which only confirms the quality of our offering! A "big" thank you to Karen for her sterling efforts on this!

My own personal work on behalf of the Institute has occupied a lot of my time during the last six weeks, hence my (usual) delay in writing this!

I have been heavily involved in the final work putting together the Surface Engineering Leadership Forum (SELF), which "officially" launched on Monday 11th February at the House of Lords. There were over 80 attendees including many Lords of the Realm, members of Parliament, and senior figures in the Materials Finishing and Surface Engineering disciplines from both Academia and Industry. The IMF were represented by our Vice-President, Professor Karl Ryder, our Science Committee Chairman, Dr Trevor Crichton and myself, although I was actually wearing several hats on the night! The evening was chaired by Michael John Lord Whitby of Harborne in the City of Birmingham, who spoke passionately about the importance of materials Finishing and Surface Engineering to the UK economy, and the relevance of the newly-formed Surface Engineering Leadership Forum in moving these industries forward. There was much networking amongst the attendees, and I was interested to note an increased interest in structured learning aimed at our industry specifics. This reinforces the interest we have seen in our courses of late.

One of the aims of SELF is to promote learning through apprenticeships, and the group recently worked with a trailblazer group in the writing of a Level 7 apprenticeship standard which has now been approved by the Institute of Apprenticeships. This is aimed at post graduate level students and will be managed initially through Cranfield University. Following on from this, SELF will look at a Level 3 scheme, which I think will more closely align with our offerings. I will be involved in the group putting this together, and will look to design a standard that can be covered by our technical courses.

SELF will, in my opinion, grow in its influence in our industry, so by being involved at the ground level, and with my being a member of its management board, we can only continue to have a driving influence on its future policies.

On the subject of education, I was invited, through our colleague Dr Paul Lansdell, by the Warwick Manufacturing Group, to give a lecture on Paints and Coatings to Prevent Product Failure, to second year undergraduates on a graduate apprenticeship course in mechanical engineering. The basis of the lecture was to examine how surface engineering can help prevent failures caused by corrosion and other external factors. Perhaps my teaching skills are improving with age, but I received some very positive comments, and have been asked to repeat this to next years students!

I've understandably left the best (sorry the beast) to last! Last Wednesday I attended the latest meeting of the REACH Cross Sector Group, which you will remember consists of representatives from multiple industries to include JLR, Kingfisher (B&Q) and technical institutes and trade associations. The group is usually joined for lunch discussions by civil servants from DEFRA, BEIS and the HSE.

The big discussions on Wednesday with the civil servants is their view and workload generated from a no-deal Brexit, and the potential implications on UK industry and availability of chemicals. I wasn't previously aware, but, as part of BEIS, there is "Department for Exiting the EU". The official from that team, Georgia Conrie, stated that it is the teams' belief that the UK will exit the EU with a trade deal, but that multiple preparations are being considered should this fail. It was made clear that there will be a UK REACH law, and that registrations of chemicals currently covered by ECHA will have to be re-lodged through the HSE. The original plan was for these to be lodged with 60 days, but it now looks as if this will be extended to 180 days! Still very little time! Chemicals covered by an ECHA recommended authorisation would also need to be re-authorised through HSE.

Full minutes of this meeting have not yet been issued, but I will circulate via Helen once I have these to hand.

I think the next few months will be very interesting, if not very challenging for all of us concerned with industry and the use of chemicals. One of the remits of the IMF is the dissemination of knowledge, so as we here of any information that it is felt our members need to be aware of, this will be circulated to the membership through Helen.

Graham Armstrong
February 2019



HMG PAINTS SUPPORT LOCAL CHARITIES



HMG Paints support local charities by taking on Great Manchester 10K Run

HMG Paints Ltd are swapping their laboratory coats for running vests to take on the Great Manchester 10K Run on 19th May 2019 supporting 4 chosen charities selected by the employees at the family business.

HMG Paints launched the initiative in 2018 focusing on local charities, by supporting The Motor Neurone Disease Association, Forever Manchester, The Cleft Lip and Palate Association and Manchester Mind, and have set a target of £6,000 via their fundraising page, www.justgiving.com/teams/HMG.

"I have been fundraising for the Motor Neurone Disease Association (MNDA) with my family and friends since my husband was diagnosed in 2017. The MNDA being one of

HMG's chosen charities has been a huge boost to us through an incredibly difficult time and it is touching to see so many of my colleagues come together to run the 10K, and raise vital funds for the MNDA as well as the 3 other fantastic charities. I can't wait to see how much we can raise together as a team." Said Alison Edmondson, Purchase Ledger Supervisor, HMG Paints. The Motor Neurone Disease Association is the only national charity in England, Wales and Northern Ireland focused on improving access to care, research and campaigning for Motor Neurone Disease, an uncommon fatal condition that affects the brain and nerves.

HMG will also be running for Forever Manchester who work with local communities to inspire and encourage projects that they want to see to make their neighbourhoods happier,

HMG PAINTS SUPPORT LOCAL CHARITIES

healthier and safer places to be. They help local people to build communities from the inside out, and galvanise the true creative, entrepreneurial spirit for Greater Mancunians to emerge and shine. "Forever Manchester is delighted to be a chosen charity for HMG Paints. It's fantastic that a local company recognises the value of supporting local grassroots community activity that makes a difference on their doorstep, where they work and where their staff and customers live. We're looking forward to working together." Commented Jean Mills, Head of Business Development at Forever Manchester. The Cleft Lip and Palate Association (CLAPA) is the 3rd charity HMG will be supporting, they work to improve the lives of people born with a cleft palate and their families in the United Kingdom. "My nephew was born with a Cleft Palate in 2013 and has been in hospital regularly ever since. I never realised the struggles of being born with a Cleft Palate and how long the effects last through life until then. I have taken part in the 10K run for CLAPA a number of times but this time, with the large group of my colleagues and friends, I am really looking forward to running for my nephew and making him proud." Anthony Kenyon, Production Operative, HMG Paints.

The final charity the company will be raising funds for is Manchester Mind. This local charity is a member of the national Mind network, and has been delivering support services since 1989. All local Minds are independent charities who raise their own funds. Manchester Mind provide support and information to over 5000 young people and adults across the city. In addition, they offer community and employer training to develop awareness and promote wellbeing.

"Supporting charities that were chosen by the people of HMG really brings everyone together and shines a spotlight on the family values that run through HMG. After our launch in 2018 we have been able to see exactly where the donations are going to go and just how much running the 10K and raising vital funds is going to help each charity nationwide and locally to HMG in Manchester." Said Gracienne Ikin, Communications Manager, HMG Paints.

In November 2017, HMG Paints were the first company to win the Corporate Social Responsibility Award at the prestigious British Coatings Federation (BCF) Annual Awards evening for their 2-year partnership with Macmillan Cancer Support.

HMG vow to continue supporting local community and charity projects utilising the company's core business activities and staff fundraising events.

HMG Paints Ltd is a family owned business situated in Manchester. Now the UK's largest independent Paint Manufacturer, HMG are proud to work alongside customers to create the very best individual service and tailored solutions for them. With a broad spectrum of knowledge and expertise HMG boast a portfolio including wet paint, powder coatings and aerosols, covering virtually every type of surface imaginable. This is all backed by an extensive 87 years' experience in developing pioneering coatings for a myriad of industries including; industrial, specialist industrial, automotive, commercial vehicle, defence, aerospace, wood finish, decorative, arts & craft, marine and rail, we have a drive to set the standards for the industry not just meet them.



are proud to be supporting



If you require further information on the press release, please contact:

Gracienne Ikin or Stephen Dyson
HMG Paints
Communications
gikin@hmgpaint.com
sdyson@hmgpaint.com
T: 0161 205 7631

INDESTRUCTIBLE PAINT – FLOOD DAMAGE REPAIR



Indestructible Paint Staff's Commitment Central To Flood Damage Refurbishment

"A remarkable demonstration of the dedication and determination of our entire workforce and I am grateful to them all."

Brian Norton, Managing Director of Birmingham-based Indestructible Paint Ltd., is clear about his view of his staff's ability to overcome the sort of difficulty which, he believes, would have seen many companies struggle to survive.

The company suffered extensive flooding in the early summer of 2018 – he understands that a month's rain fell in just two hours – which had an impact on every corner of the 60,000 sq. ft. of the company's site, where specialist performance paints and coatings are manufactured for customers worldwide.

"Everybody has pulled together to address the major clean-up operation that was required and did so without any negative effect on our services and commitments to customers," continues Brian Norton.

"Raw material storage, machinery and equipment, and office facilities were all affected when the deluge proved too much for the nearby River Cole," he explains. "Because we could immediately call all hands to the metaphorical pump, we were able to lift supplies and equipment to a higher position quickly while also relocating essential office systems to a part of the site that was less affected."

He adds that the fact that this had no impact on the company's supply and sales operations is truly remarkable and says he is proud of the input and support from all concerned.



Roger Godsiff MP (centre right) congratulates Indestructible Paint's Chairman, Doug Norton (centre left) and staff on meeting the challenges created by flooding at the company's Birmingham site.

The end of 2018 saw Indestructible Paint announce completion of the repair and refurbishment programme and the company was delighted to welcome local MP Roger Godsiff to the site to mark the occasion. "We are now taking positive steps to minimise this type of risk in the future, not only by designing our refurbished premises accordingly – for example, via the location of storage and the elevation of electrical supply and other services – but have also joined the National Flood Forum and a number of other bodies to address the issue locally," adds Brian Norton.

"Perhaps most noteworthy of all is the fact that despite the problems, not only were we able to retain our obligations to our customers, we also achieved increased business towards the end of 2018 – most notably from China and Japan. It's a flood – of new orders – that we are very happy to handle," concludes Brian Norton.

Issued on behalf of:

Indestructible Paint Ltd.
Contact : John Bourke
Tel : 0121 702 2485
Email : johnb@indestructible.co.uk
Website : www.indestructible.co.uk

Further press enquiries, contact:

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Sustainable travel is on the rise among University staff and students

7th February 2019

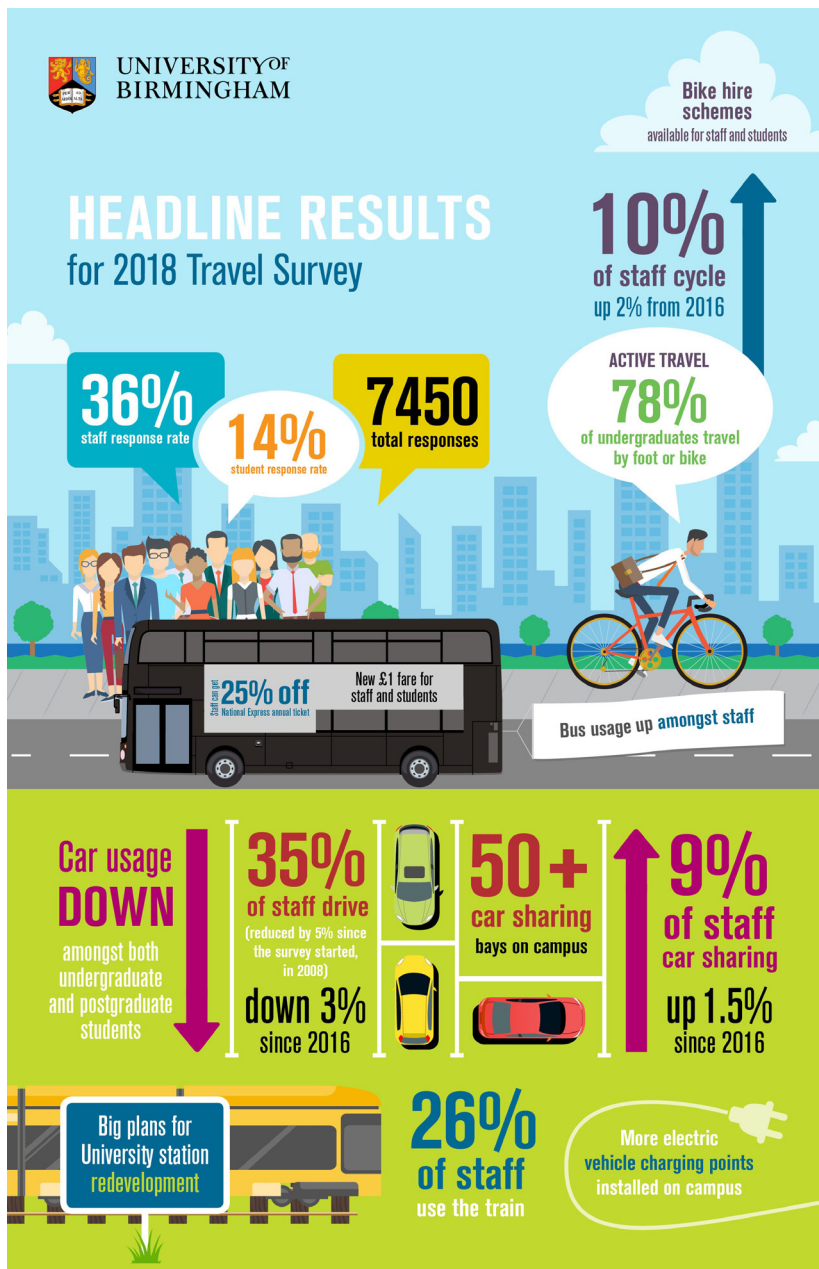
Dedicated work to promote and support sustainable travel at the University of Birmingham is having an impact, with an increase in cycling, public transport and car sharing from both staff and students.

A survey of 7,450 staff and students in 2018 shows that improvements have been made in recent years. 10% of University of Birmingham staff cycle to work every day. This is more than three times the average for Birmingham, which is 3%, and represents an increase of 2% in just two years. This is supported by bike loan schemes, dedicated and secure bike parking and specialist advice for cyclists.

9% of staff now car share, with just 35% driving as a single occupant – this is down 5% in the last 10 years. This is supported by University Carshare scheme, which gives priority parking to those who share their journey to campus. 34% of staff use public transport, with rises in both bus and train use in recent years. This has been supported by positive engagement with local bus companies around discounted rates and minor route alterations.

Not to be left out, 78% of undergraduate students travel on foot or by bike, and their single occupancy car use has almost halved in the last 10 years, to less than 5%. Sustainable Travel Co-ordinator Peter Edwards said: "We are really proud of these results, which really show the results of our hard work over the last decade. We are constantly trying to think of new ways to reduce the number of single occupancy cars on the road, always taking into account feedback from staff and students. We owe it to our immediate environment to do all we can to reduce emissions and the impact of our travel locally. We will continue to put in place measures that enable people to use sustainable travel options."

For further information, please contact Head of Communications and Engagement (Infrastructure) Sally Xerri-Brooks on 0121 414 3984 or s.b.xerribrooks@bham.ac.uk



RIDE WARWICKSHIRE: BCF'S Charity Bike Ride



Join me to raise money for cancer research on June 7th 2019 in 'Ride Warwickshire: BCF's charity bike ride'



Taking place at the Chesford Grange Hotel Warwickshire

I'm delighted to invite you to save the date for 'Ride Warwickshire, the BCF's first Charity Bike Ride' taking place on Friday 7th June 2019 to raise money for 3 fantastic charities.

The route will start at the Chesford Grange Hotel in Kenilworth, Warwickshire. Take in the scenic countryside and villages through Warwickshire and along the Fosse Way, including the famous Edge Hill Battlefields. There will be three distances available to accommodate riders of all levels - 100km, 50km & 25km. We're hopeful that with this choice of level you and a team of colleagues will be able to participate. Our aim is to raise as much money as possible for three very worthy cancer charities close to members' hearts. The charity names will follow in due course along with the JustGiving fund raising page details.

Further information will be sent out in February when registrations for the event open. This will include details on the location, dinner and overnight accommodation information for those of you that would like to arrive the evening before the event.

If you would like to find out more about the bike ride at this stage then please get in touch with Nadine Saxon, (Nadine.Saxon@bcf.co.uk). In the meantime, Ali Brown will be in touch soon with details of sponsor opportunities for the event. We do hope that you will join us for this event and raise lots of money for three very worthwhile cancer charities.

Yours sincerely
Tom Bowell

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adhesives and associated application equipment and consumables to the aerospace, defence, energy and electronics industries.

After 3 years of supplying high-tech surface coatings to India's fast-growing aerospace industry from its UK base, Pexa has now established its own company and premises in India. Pexa Aerospace Materials Pvt Ltd is located in South Bangalore close to India's main centres of aerospace production. This new facility will be a full player in the local market, receiving goods in bulk and splitting them down for local supply, stocking products to support customer programmes and moving further into value adding activities such as product mixing. In addition, it will act as the sales agent for Pexa for sales of products into India for export programmes.

Pexa is not just a distributor of high-tech materials. We work in close partnership with materials manufacturers, to ensure that we offer a comprehensive support package for the selection and use of all the products that we supply. We will be exhibiting samples at the event from three of our manufacturers, Socomore, Nycote and Global Mask. Socomore manufactures critical surface treatment products, NDT material, adhesive shims and surface coatings under the Aeroglaze® brand. Pexa are available to discuss Socomore's products together with their wide range of aerospace products and are happy to show product samples.

Nycote is a global leader in advanced coatings technologies that increase asset lifespan, reduce maintenance costs, and ensure safety for aircraft manufacturers. Their coatings are approved by major OEM's such as Airbus, Boeing, Embraer and are REACH compliant. Nycote is the only provider to offer the combined strength and flexibility of nylon with the hardness of epoxy, creating a clear and lightweight barrier to prevent corrosion and conductivity.

Global mask offers an extensive range of masking products to offer customers a complete solution for masking prior to

painting. Their product range includes a full assortment of masking products for all wet paints and powder applications. The range includes, masking tapes, masking discs, masking die cuts, masking plugs and masking caps.

Representatives on the booth:

Jim Rowbotham, Managing Director, Pexa Ltd
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Electroforming vs 3D printing – is it a disruptive technology?

Will 3D printing become a disruptive technology for one of the surface engineering's most established technologies – electroforming?

3D printing is exactly what the name implies – the formation of 3 dimensional objects by putting down material in a defined pattern. It was first conceived in the 1980's and is also known as Rapid Prototyping (RP) or Additive Manufacturing (AM). Since then it has developed into an alternative method of manufacturing complex shapes and components in metals, polymers, ceramics and glass. It is even used in one of the UK's greatest passions – food, where it is used to create complex shapes using edible constituents!

Despite being a relatively recently developed technology and still finding new markets, it is already well established in many sectors that have traditionally used electroforming, such as aerospace, manufacturing, medical applications, prototyping and tooling.

To create a part by 3D printing, the component needs to be designed on a computer and converted to a machine code that the printer can understand. This offers an immediate advantage over conventional electroforming, because the electronic design can be tested for its performance by computer simulation and Finite Element Analysis (FEA). This allows any design flaws to be identified and removed prior to any manufacturing taking place. In doing so, it reduces both time to market for any new designs and ensures the component is fit for purpose, without incurring any manufacturing costs.

Where metal fabrication is concerned, 3D printing is carried out by a generic process called Selective Laser Sintering (SLS), when it is also known as Direct Metal Laser Sintering (DMLS). The process is relatively straight forward in that a baseplate platform is coated with a thin layer of metal powder which is then partially melted, or sintered, usually by using a CO₂ or infra-red laser. The baseplate is then lowered by a discrete amount to allow it to be recoated with new powder, which is then again selectively sintered by the laser. This creates a porous structure that has a reduced bulk density of about 60% that of a fully solid component. In some circumstances, this can be used to the component's advantage, such as in prototyping an injection moulding die, where porosity can be

used to help improve the mould's thermal cycling and speed up the mould cycle time. An example of DMLS manufacture is shown in Figure 1, at turbine assembly.

Fig. 1: DMLS manufactured turbine assembly

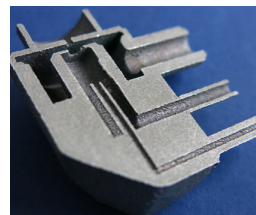


The major problems with SLS products are porosity and surface roughness. There are also numerous factors that affect the preferred particle size of materials suitable for SLS; if they are too small, the particles may have excessive flow characteristics, not sinter properly and melt. On the other hand, if they are too big, the particles create issues with surface roughness and porosity. The preferred diameter range is between 20-80µm, but this can influence the height by which the platform is moved, although a movement of about 10-40µm is generally used. One of the advantages of having a low flowing powder is that the residual material can support the structure as it is being formed.

To improve the surface finish of a 3D printed component, a technique known as Selective Laser Melting (SLM) can be used. This is very similar to SLS, but is designed for use with metals. Unlike sintering, the powder is melted, resulting in a much more dense final product (Figure 2).

Source: Sculpteo

Fig. 2: SLM manufactured valve assembly



Electroforming vs 3D printing – is it a disruptive technology?

There are an increasing number of metals being used with 3D printing technologies, but the most common are aluminium and cobalt alloys, such as AlSi7Mg0.6 and Cobalt chrome CoCrMo as well as stainless steels (316 etc), maraging steels, titanium alloys (eg TiAl4V), Inconel alloys and HastalloyX. It is also possible to use brass and sterling silver in SLM.

In SLM, the component is manufactured in discrete layers of between 30-80µm, although these layer thicknesses are becoming smaller as the equipment becomes more refined. However, unlike SLS, the powder is fully melted and therefore the process requires much higher temperatures and processing times. Because SLM fully melts the metal, it needs a higher temperature and hence greater energy; it also means that when compared against DMLS, the metal takes longer to cool down.

SLM also creates other process issues, such as those relating to metal oxidation. During the melting process, the metal becomes increasingly susceptible to oxidation, so SLM is usually done under an inert atmosphere of nitrogen or argon; any oxygen content is normally limited to below 500ppm. SLM is the technology for AM of titanium and aluminium products, as these metals are very susceptible to oxidation, which will result in a major loss in performance.

There is also increasing interest in using SLM, and SLS in the manufacture of jewellery, as it can be used to produce customised articles in gold, silver and other metals, almost “on the spot” as shown in Figure 3.

Source: Savorsilver.com

Fig. 3: Selective Laser Melted silver ring



However, the major issue with 3D printing as a substitute for electroforming is with the surface finish; the surface finish is related to the assembly platform step iteration and the particle size of the powder being used. If a very smooth surface is required, 3D printed components will inevitably require further work on it, as shown in Figure 4, where the effect of polishing a 3D printed product can be seen.

Fig 4: As manufactured and after polishing



The possible need to polish a 3D printed component puts it at a distinct disadvantage against an electroformed product. Other advantages of electroforming include its established base knowledge, the large range of engineering metals that can be used and the relatively low costs of manufacturing both prototypes and high volumes.

At present 3D printing is usually limited to small batches or prototyping of small components; this is because it does not scale up very well due to the costs of the equipment and possibly the limited range of suitable materials. However, that is not to say that in the future it will become commercially viable to manufacture large and high volume components. After all, who, in the 1870's, would have thought that the internal combustion engine would have put most blacksmiths out of business?

Trevor Crichton
Science Committee Chairman

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