



# Chapter News Letter

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Dr. Kruttika Apshankar-Kher

## EDITORIAL . . .

Dear Readers,

It gives me great pleasure to edit the ASM June newsletter. This is the first time that I have received the honour of editing a newsletter after I joined ASM Pune



Chapter half a year ago. It was decided at the onset that ASM will be publishing six newsletters per year i.e., once every two months. The newsletter will have basic information about ASM, information about news members in 'Know your member', a technical article and information about past and upcoming seminars and lectures. One newsletter can be edited by students to encourage participation from the academia.

Though we have some great people on our newsletter board, I would love to see all our members contribute a lot more for our newsletter. I am sure many of you have interesting experiences, information and technical news as well as articles which you may like to share with the ASM community. We have created an online folder where anything you find relevant can be stored and published in due course of time. We would also love you on board as an editor for one or many newsletters. Age is definitely not a barrier as we have seen in the March newsletter which was a special edition for Women's Day and was edited by a team of young women from Cummins college of Engineering under supervision of Prof. Dandekar. I look forward to your enthusiastic response!

Warm regards,  
Dr. Kruttika Apshankar-Kher

## About ASM



### About ASM

As the world's largest and most established materials information society, ASM connects you to a global network of peers and provides access to trusted materials information through reference content, data and research, education courses and international events; helping you to solve problems and improve materials related outcomes.

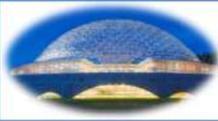
**Mission:** To gather, process, and disseminate materials information globally, through education, networking, and professional development for members, organizations served by our members, and the materials community.

**Vision:** To be the leading global resource for materials information.

The society embraces lifelong relationships with members through a virtuous circle of education, experience, and learning under the umbrella of the following core values

### Core Values:

- Integrity and transparency in all society operations
- Competent stewardship of society finances
- Exceptional service to society members
- Promotion and support for a diverse and inclusive global community of volunteers
- Continuous improvement via an adaptable and flexible organization



## From Chairman's Desk:

I feel privileged to connect with you all once again. Last four months have been very dynamic and active for our chapter. Technical Talk, Students outreach, Chapter Annual Reports, Annual Audit kept us busy. Generally, the month of May connects all of us with the new generation aspiring to become enthusiastic professionals. We connect with them, take them through Materials Engineering avenues and guide them to choose to be a Materials Engineering professional. We have been missing this opportunity - Materials Camp for last two years. This year too, due to uncertainty, we could not hold materials camp but look forward to have it during Diwali Holidays.

In line with our vision 'Focused Students Outreach', we inaugurated First MA Chapter in Pune City in PVG College of Engineering & Technology and G.K. Pate (Wani) Institute of Technology. This was part of the students' club event. The enthusiastic students participated whole heartedly. A national level competition was organised as a part of this inaugural event. You may go through more details in this newsletter.

On the other hand, our First MA chapter in CCOEW Nagpur has covered many activities like Group Discussions etc. despite quite a present, due to the Corona two different academic calendars second year & the second for window for MA chapter activities. our Students Outreach activities streamlined in days to come. We Technical Books to Govt. good will. The cost of the books members and new member, you

This year also, we have submitted health Report & Essays for deadline. I appreciate whole Committee in completing this

For nomination of three members India National Council, this is the nominations from our Executive

volunteering. We are always looking for young and new blood to take leadership positions in our chapter activities and veterans to guide them as needed. Aligned to this philosophy we nominated Ruta Barve and Yogesh Dandekar as INC Members and L D Deshpande as senior member guiding them.

To expand our chapter membership D G Chivate is focussing on Sangli, Satara, Kolhapur & the Belgaum belt. We are expecting a good response.

Change is the only constant. Our current executive committee will be entering last year of our tenure for second term. We are looking for more and more new faces and women participation in chapter activities. We appeal you to get ready to volunteer this responsibility.

Looking forward for your enthusiastic participation in Chapter activities.

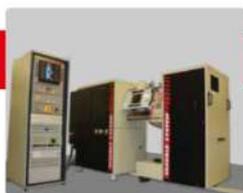


*Udayan Pathak, FASM*

disturbed academic calendar. At pandemic after effect, there are in colleges – one, for the first and other years. This allows limited Despite this logistic challenge, are in full swing and will be more gifted a set of more than 30 Polytechnic Pune as a part of was contributed by many E. C. will see more details in this issue.

our Financial Report, Chapter Chapter Award, well before the hearted involvement of Executive activity.

to represent our Pune Chapter in first time we called for Committee who are interested in



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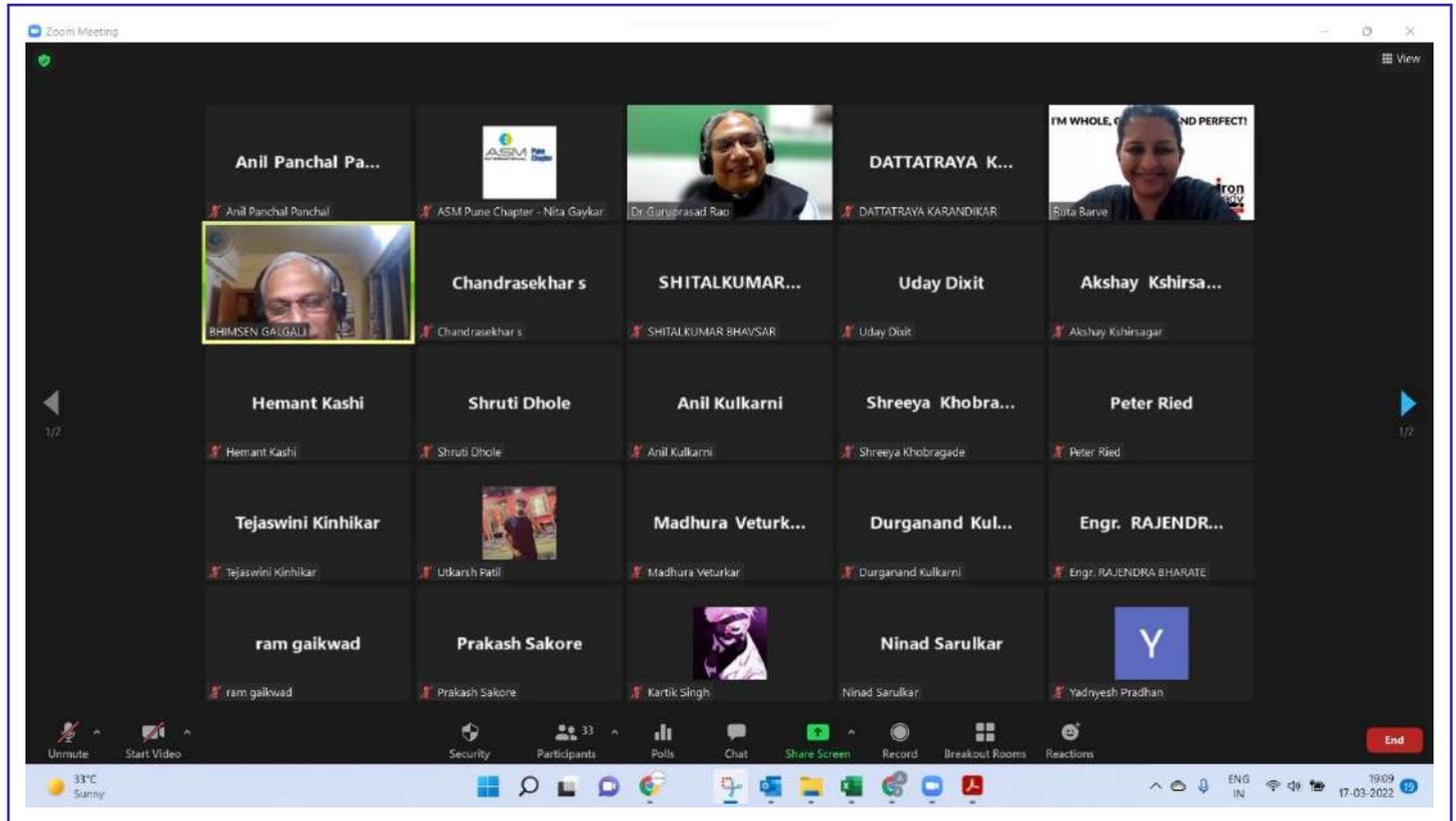
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## LECTURES AND SEMINARS

A few online lectures were held in the past three months as well as an offline lecture in June. A recap is given below.

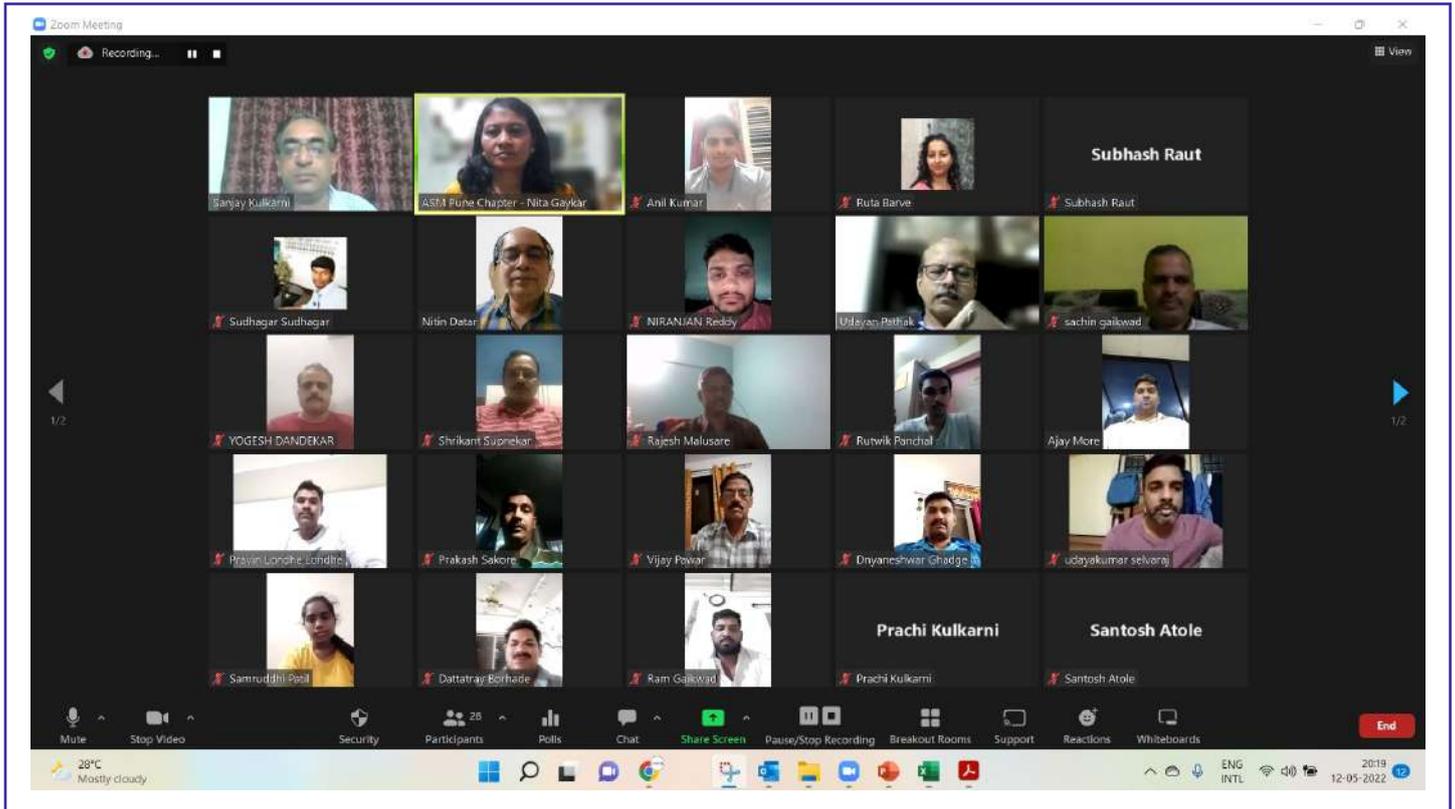
Dr Guruprasad Rao, the director of faculty of Design, MIT-WPU, Pune Kothrud campus gave us a lecture on 3D printing in metals on the 17th of March. 3D printing has been gradually evolving since 1986 and has now reached its tipping point. With steady investments into research, technology and materials, today it is offering a wide range of options to make things for the real world.



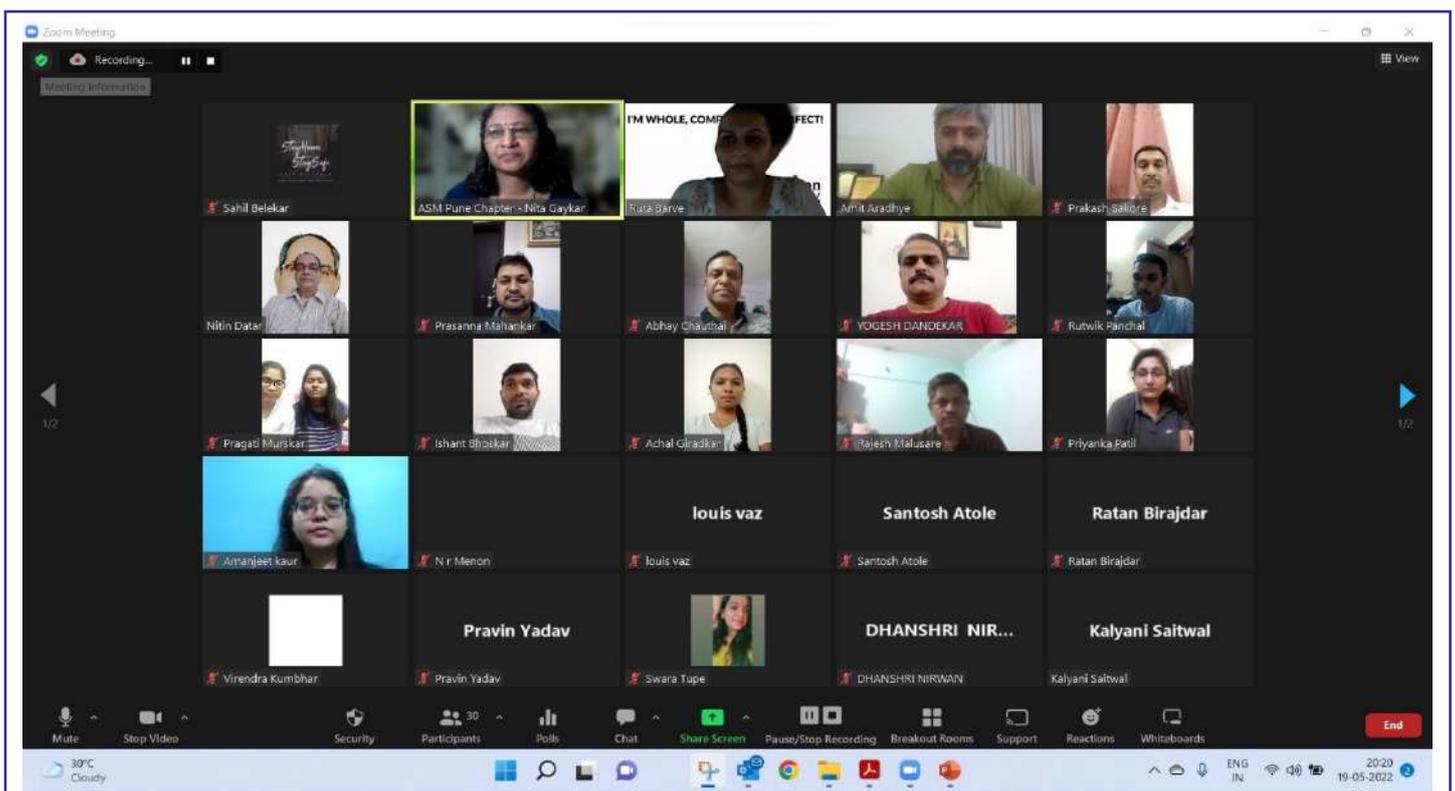
Dr Rao, a technocrat with over 32 years of experience encompassing Industry & Academia, talked about the uniqueness of 3D printing handling complex geometry and how in fact, it is being used to make things hitherto thought impossible. The talk brought out its growth over the years and how it has become an important part of New Product Development process. The talk also touched upon how Metal 3D printing is shaping. Industrial growth can only come by Metal Additive Manufacturing. Metal additive has its own challenges that limit its widespread growth across Industry verticals.

Safety is of prime importance in our workplace. Over the years, we hear horrific stories of people who lost their lives or were injured just because safety standards at their workplace were lax. On this note, a lecture on 'Heat Treatment Safety - Hazards associated with heat treating' was given by Mr. Sanjay Kulkarni. A Qualified Metallurgical Engineer with 23 years of immense experience in Heat Treatment process Operations and Quality Control in reputed manufacturing set ups, he is currently working with Eaton Fluid Power LTD.

Furnaces are mostly work at elevated temperature and the treatment atmospheres employ a wide range of potentially hazardous gases. This discussion outlined the potential hazards associated with the use of furnaces, particularly when atmospheres are used that have risks of explosions, burning, toxic effects and asphyxiation, Quench oil hazards. It also suggested ways in which those risks can be assessed and that adequate procedures and safety systems are needed to mitigate these risks and protect workplaces.



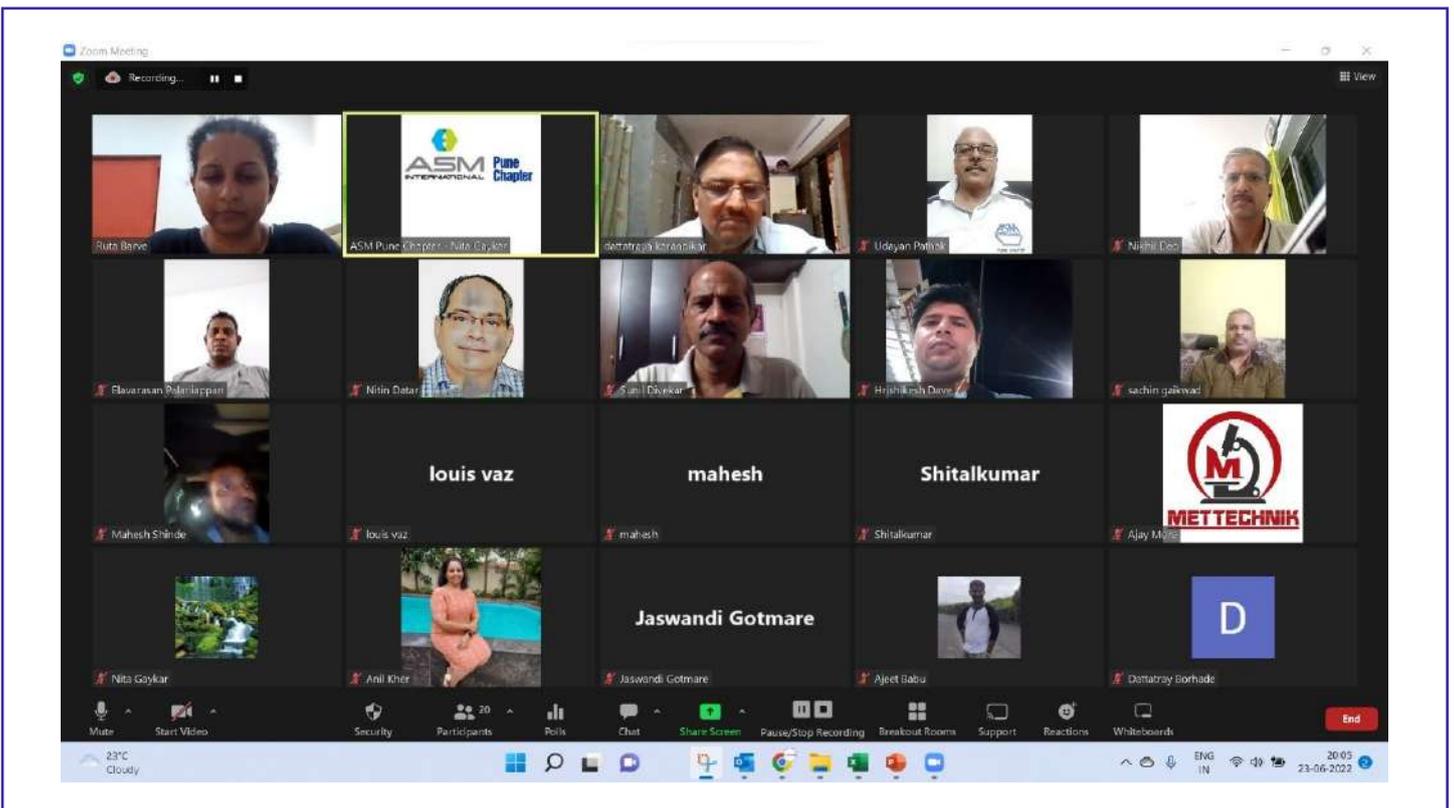
Shot Peening – from design perspective', was another lecture by Mr. Amit Aradhye on the 19th of May. A coldworking technique used to modify the mechanical properties of metals and alloys, shot peening has several interesting aspects to it. In his career span of 13 years, Mr. Aradhye (MD, Precicut) is dedicatedly involved from the very start in development of shot peening and shot blasting equipment. In this lecture, he elaborated on the benefits of shot peening, categories of shot peening equipment and their application areas, optimisation of shot peening and single stage & multi stage shot peening. He also gave an introduction to new peening technologies like peen forming, ultrasonic peening and laser peening.



After almost two years of online lectures due to the COVID pandemic, finally ASM Pune was able to organize an offline lecture on the 2nd of June in the Kale Hall, The Institution of Engineers (India) Pune Local Centre at Shivajinagar. This lecture was held in an online mode as well for people who couldn't attend physically. The lecture about 'Integrated Computational Materials Engineering in Material & Process Development for Automotive Components' was presented by Dr. Ajeet Babu, an automotive engineer from VIT, Vellore who has completed his doctorate in deformation modelling. He has with him eleven years of experience in developing right weighting automotive solutions and has been working on Lithium-Ion battery materials for the last four years. The lecture highlighted the concept of Integrated Computational Materials Engineering, the approach to reduce the number of materials development iterations, cost and time, frameworks to follow the rules of follows the chain rule of process, microstructure, property and performance relationship in materials development. Dr. Babu also demonstrated a case study on the development of lightweight propeller shaft through ICME route.



An online technical program, 'Flash carbide –A Novel Techno Economical alternative to Electroplated Hard Chrome Plating (EHC)" by Dr Dattatraya Arvind Karandikar' was also held on the 23rd of June. Dr. Karandikar has



completed his PhD from IIT Bombay and has almost 33 years of experience and 25 publications of surface engineering cum modification techniques with specialization in thermal spray technology. The lecture gave an introduction to flash carbide technology and gave its coating applications as well as benefits.

Apart from these seminars, a technical book distribution program headed by Dr. Chivate was held on the 14th of June at the Government Polytechnic Pune. Around thirty technical books were donated by ASM Pune Chapter many of which were contributed for by our own members.



## Volunteer yourself for your Chapter!

For more efficient working & expanding network of your ASM International Chapter, please support your chapter by offering your time. Lot of avenues to choose areas of your liking. Options are - Membership Development, Education Programs, Students Outreach, Member Service, Website, News Letter, Technical Program and Social Events. Contact ASM International Pune Chapter [asm.pune@gmail.com](mailto:asm.pune@gmail.com)



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Universal Hardness Tester  
DURAVISION G5 0.3 - 3000 Kgf

## hardness testing machines



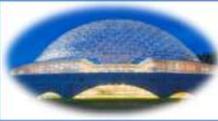
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# Gopalite® – Abrasive Wear-Resistant Coating

## The path from the laboratory to the factory floor

Bruce E. Boardman

Since the beginning of time, effective solutions to wear. The has further increased that need. abrasive material flow- through, machinery have raised the need resistance. While heat- treated ceramic inserts remain the main-scenarios, the easy-to-apply, lived coating is still the goal.

Recent developments and a new, highly wear-resist ant and cast irons that can be brush, spray), will follow the bottom, side, inner diameter, machined in the green state, will theoretical density, will survive the base part, is highly available, and is moderate in cost. (Sound like an oxymoron?)



Revankar in the laboratory.

mankind has been seeking cost-advent of mechanized farming Today, additional increases in over, or within a piece of for further increases in wear steel, hard metal platings, and stay for many wear protection flexible, inexpensive, and long-

understandings have resulted in slurry coating process for steel applied in multiple ways (dip, contour of any shape (top, outer diameter), can be sinter to better than 99.5 percent subsequent heat treatment of

### For the sake of definition

First, a brief comment on wear protection. Most wear conditions may be thought of as falling into one of two broad categories – tribological or abrasive wear. While a technically correct description would be two-body and three-body wear systems, for the purpose here tribological wear can be thought of as involving clean, lubricated systems (engines, transmission, hydraulics) and abrasive wear can be referred to as the flow of abrasive particles (sand, crop, stones) across the mating sur- faces and may involve high or low stress, ero- sion, corrosion, and/or impact events. In abra- sive wear, the strongest correlation between the materials involved and the wear rate is the ratio of the hardnesses of the abrasive and the part. When protecting with a coating, the ability to withstand the point/line contact of the wear parti- cle is just as important. (Think of thin ice on a mud puddle.) To put coatings into perspective, the thickness of a tribological coating is measured in microns while the thickness of an abrasive coating is measured in millimeters.

### In search of the perfect solution

John Deere scientist, Gopal S. Revankar, has spent a significant portion of his career addressing and applying materials solutions to wear problems. Over the last few years, through a series of failure-analysis events and the development of a root cause for wear on crop/soil engaging tools, Revankar identified changes relating to the particle size mixture and to the binders used to temporarily hold the coating prior to sintering. Changes were made to exist- ing slurry-based coating systems which resulted in significant performance enhancements (upwards of 50 percent) while reducing the coating cost by an order of magnitude over other currently available wear coatings.

### Abrasive beginnings

As with any new material and/or process, the design engineer demands performance data before committing to its use. (This time, think chicken and egg.) With limited ASTM Rubber Wheel Abrasive (G65) data and real-part field test data, the designer hesitated to make a change when things appeared to be working. It took the introduction of the John Deere STS



Coated tine used in high-productivity STS combine.

(single-tine separator) combine to get things rolling. This new combine is a high productivity machine that processes significantly more crop material in a shorter period of time. In some abrasive crops, this increased processing rate resulted in increased abrasive wear. Unfortunately, since the customer thinks in terms of hours on the machine (from the engine hour meter) rather than bushels of crop harvested, the new machine appeared to not wear as well as the old version. Now the designer had reason to make a change, the previous concerns disappeared, and the Gopalite® coating was adopted.

Currently, there are two very different machines in the Deere line that are utilizing what Deere is calling the Gopalite® coating. The STS combine now has the high wear option (see the AE50 award section for the 60 Series machine® utilizing this coating) that relies on Gopalite® coatings on the working surface of the tine and element (as well as more traditional surface conditions and treatments for other parts). The other example that will soon be in production is a Gopalite®-coated track pin bushing for the undercarriage on earthmovers. This part is coated, machined, and heat treated to provide in excess of double the wear life of traditional, state-of-the-art bushing.



Coated element used in high productivity STS combine.

Engineers within the company are now exploring many other potential uses for this coating system where abrasive wear protection is desired. The possibilities range from cultivating tools and grain delivery chutes to other pin joints and cutting blades. The greatest value will be found when there is a small wearing surface on a large expensive part or when the cost (time and material) to replace the worn part is high.

### From production process to factory floor

The biggest challenge of entire project has been the transition from a laboratory process to a robust production process ready for the factory floor. Unlike the normal progression, where the laboratory process (beakers and test tubes, one at a time) proceeds to bench scale production (a few at a time) to small scale production (dozens at a time) to full scale production, Revankar was asked to go straight from bench scale to full scale production, on the above parts, at the same time. That is where the fun started.

Actually, the initial plan was to include the small scale phase. But, when the first month's orders exceeded the projection for an entire year, the small scale stage grew into full production. Since Deere was not doing this in captive facilities, the development team ended up spending many days learning more about their various supplier partners and technology licenses manufacturing processes, equipment, and facilities than may typically be required from a more mature process.

### Lessons learned, lessons shared

Now that the process is in production, there are several lessons to be shared

- Probably most important, is that when the technologies involved are independently well developed the probability of success is relatively high;
- Initial implementation is unlikely to be error-free, so there will still be nights of lost sleep, new gray hairs (or lost ones), and difficult discussions with nearly everyone involved; and
- The small-scale production phase serves to bring the technical and manufacturing staffs together earlier in the process where events are more controllable and the risks are lower.
- The path to bring new technology into the marketplace is never easy, and there will continue to be new challenges. But anything worth pursuing is never easy, or someone else would have already accomplished it.



Coated bushing used in tracked vehicle undercarriage.

*Bruce E Boardman is Manager (Retired), Materials Engineering, John Deere Technology Centre, Moline IL USA. He was Chairman Content Development Committee and also handled various responsibilities in ASM. He visited and delivered talk in Pune Chapter*



## KNOW OUR MEMBER



### TEJAL RAMCHANDRA KARALE

- Graduate Degree: Bachelor of Engineering (Mechanical) AISSMS, Pune in 2010.
- Post graduation: Post-Graduate Program in Physical Metallurgy from COEP, Pune in 2014.
- 10 year's hands-on experience of material testing, metallography, failure analysis, internal auditor as per 17025:2017 & ISO 9001:2015, heat treatment and engineering projects.
- Currently working with ELCA Quality systems & Calibrations Pvt Ltd, Pune as a Sr. Metallurgist and Dy. Quality Manager. She is having sound knowledge of all mechanical testing, metallurgical testing, welding testing and corrosion testing as per different ASTM, IS, and NACE standards. She is also aware of ISO/IEC 17025:2017 and testing requirement as per IBR, NPCIL, WPS WPQ and QPR.
- Also, she has handled NABL audits as per ISO/IEC 175025:2017 for two different locations of ELCA.
- Publication: Published paper on "Friction stir welding of aluminum alloys" in SAE international journal and presented in conference on "Automotive materials and Manufacturing 2014" organized by ARAI.
- Ms.Tejal Karale may be contacted on Email: karale\_tejal@yahoo.co.in , Mobile: +91- 9764827487



### PIYUSH BIRBAL

Mr. Piyush Birbal is a Metallurgical & Material Science Engineer. He completed his Diploma from Govt. Polytechnic Nagpur & B. Tech from Mahatma Gandhi Institute of Technology Hyderabad. He has over 10 Year's experience in heat treatment industry. He is Branch Head at Lakshmi Vacuum Metallurgicals Pvt Ltd in Chakan. Lakshmi Vacuum Specializes in Vacuum Heat Treatment of Tools Steels and also manufactures Vacuum & Atmospheric Heat Treatment Furnaces. His hobbies including swimming and listening to music.

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Model - CLEAN-EST

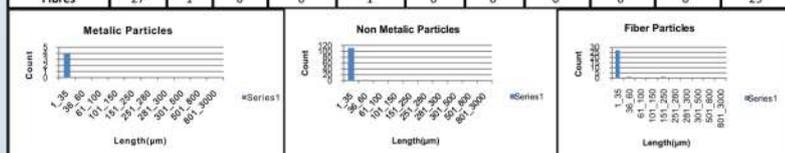
### PARTICLE TEST REPORT.

Customer	ABC		
Part No:	A124N	Recd Date:	04-Jun-18
Report No.:	1672	Department :	QA Lab
Sample ID:	ABC	Test Date:	05-Jun-18
Analysis:	Particle	Standard Specification:	As per ISO 16232
Magnification	100X	Filter paper Size:	47 mm
No. of Fields :	5	Scanning Area	30 mm



#### Particle Size Analysis

Size ranges(µm)	1_35	36_60	61_100	101_150	151_250	251_280	281_300	301_500	501_800	801_3000	Total Count
Metallic	4	0	0	0	0	0	0	0	0	0	4
Non Metallic	111	3	0	0	1	0	0	0	0	0	115
Fibres	27	1	0	0	1	0	0	0	0	0	29



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