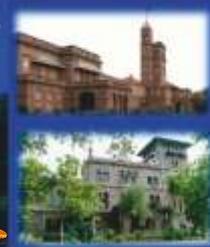


**Chapter News Letter**

Editor

Sunil P. Divekar

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EDITORIAL . . .**Sunil P. Divekar**

ASM International, Pune chapter, wishes you a happy and prosperous Diwali. I am delighted to greet you through this November 2020 Newsletter.

In the Women Materials Engineer Speaks Column, the present issue has broadened its thematic coverage through an interview with Dr. Anuya Nisal, recipient of Young Entrepreneur Award 2020 installed by The Indian National Academy of Engineering (INAE). Dr. Anuya is principal scientist in

Polymer Science and Engineering Division at CSIR-National Chemical Laboratory (CSIR-NCL) and is a 2020TEDx speaker.

Knowledge sharing through various conferences is one of the focus areas of ASM. Digital conferences are a need of the hour in the current pandemic situation and are gaining acceptance. With this background, ARAI, ASM Pune Chapter and SAE India are jointly hosting a two days online conference on "**Automotive Materials and Manufacturing 2020**" in December 2020. In an interview with students, Mr. Sanjay Nibandhe, convener, offers glimpses and views. He also shared with students his professional experiences and spoke about challenges he faced.

The technical article by Dr Bali on stress corrosion cracking presents study on the transition region between weld 182 and low alloy steel interface, under varying temperature, dissolved Oxygen (DO), and dissolved Hydrogen (DH) effect.

We are starting a new column, from this newsletter in which the chairman of various committees will speak to you on how to maximize benefits from your ASM Pune Chapter membership. Mr. P S Subramaniam, Chairman, Awards Committee is sharing his plans, methodology, challenges they foresee, the support they can give you and what they need from ASM members.

I am happy to introduce a feature on feedback about previous newsletter. We received feedback from Beth Matlock Snipes and Jatinder Singh, from ASM HQ. These responses encourage us and also provide opportunity to excel ourselves.

Mr. Lalit Kumar Pahwa features in Know Our Member column.

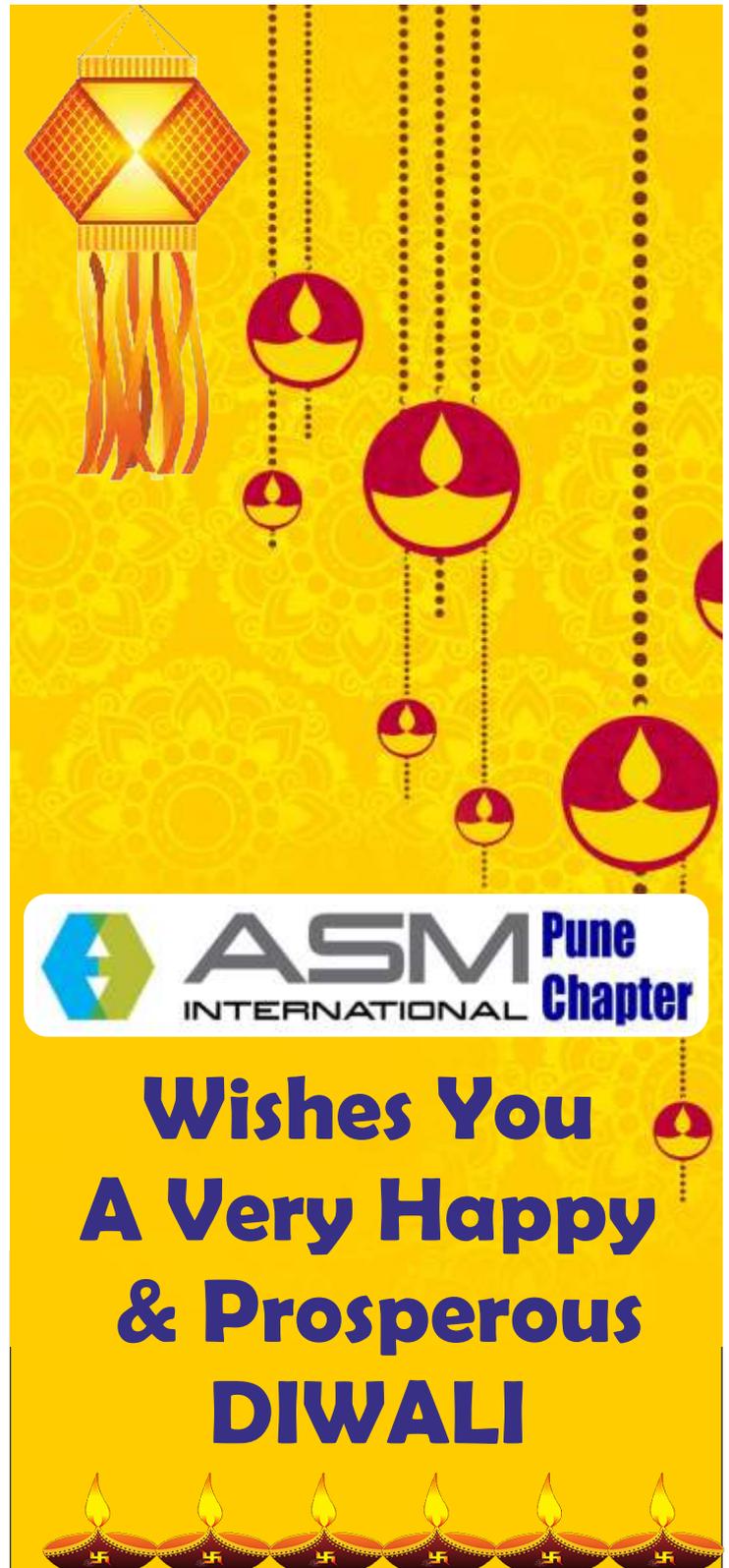
Consistent with the ASM International Pune chapter's focus, students from Cummins College of Engineering for Women have actively participated in the making of this newsletter by conducting interviews, collecting articles and formatting the present newsletter. Let us appreciate them.

I am sure you will enjoy reading this issue. Your suggestions regarding the newsletter are always welcome.

I have also introduced my editorial team in this newsletter.

Wishing once again everyone a happy and safe Diwali!

Editor
Sunil P. Divekar



**Wishes You
A Very Happy
& Prosperous
DIWALI**



WOMEN MATERIALS ENGINEER SPEAKS

Dr. Anuya Nisal, Recipient of Young Entrepreneur 2020 Award

Dr. Anuya Nisal is the recipient of the 'Young Entrepreneur Award 2020' by the Indian National Academy of Engineering. In order to draw inspiration and hear her success story Students from Cummins College of engineering for women approached her. She responded enthusiastically. She is Principal Scientist at the CSIR-National Chemical Laboratory (NCL), the co-founder of Serigen Mediproducts Pvt. ITd. (Previously known as BiolMed Innovations Pvt. Ltd.), a TEDx speaker. She is well known for her research about silk fibroin & its applications. Four students from Cummins College of Engineering for Women- Ms. Ahilya Bondre, Ms. Mrunmayi Patwardhan, Ms. Vaishnavi Sarwade and Ms. Kalyani Deshmukh, conversed with her about her journey in this field and the work she is currently doing in both research and entrepreneurship.



Interviewer: We would like to start with a quick jog down the memory lane. What drew you to the field of material science and specifically polymer engineering? Was this something you always wanted to pursue?

Dr. Anuya: I was born and brought up in Pune and have been fortunate to have parents who were extremely supportive about education. They imbibed those values in me and insisted about a good educational background. I enjoyed the applied aspect of science and enjoyed making things, which is why engineering was an obvious choice. Working in a lab was very exciting to me and chemistry was something that I always enjoyed. Specifically, I chose polymer engineering because plastics are used all around us. And even today there are a lot of issues that need to be addressed regarding whether the kinds of plastics that you use are damaging the environment and how carbon footprint of these materials can be reduced. Material science plays an important factor when we want to productize something. So there are a variety of different challenges that excite me now and keep me motivated.

Interviewer: Could you please elaborate on your research regarding silk fibroin and its subsequent uses in bone grafting? Also, could you please explain bone grafting briefly?

Dr. Anuya: I started working with silk based materials way back in 2009. India happens to be the second largest producer of silkworm silk and its use was exclusively in textiles at that time. Considering healthcare in India has a lot of challenges, the thought process was to bridge the available supply of raw material and the existent healthcare problem. We took the first few years to develop the protocols as to how we can process the silk and understand the properties of silk. We processed silk into different kinds of materials depending on its porosity and biocompatibility, and interacted with many surgeons, who gave us their feedback on the materials they had been using previously and the challenges they face. Silk has excellent thermos-mechanical properties along with biocompatibility. With inputs from the surgeons, we leveraged these properties to solve challenging tissue regeneration problems. Bone void filling was the application which silk showed significant promise as compared to other existing materials. If there is a cavity present in our bones, due to cancer or an infection or a traumatic accident, these cavities must be filled with a material that will enable new bone formation and support bone healing. Over a span of two years, the silk eventually degrades in your body, and a new bone is formed.

Interviewer: Being in the Research and Development field, what were the challenges and failures that you faced during your research and how did you overcome them?

Dr. Anuya: Failures are always a part of the process. What we are seeing now is only the tip of the work that has been done in the lab. When you begin the research, there is always a hypothesis. However, that hypothesis is

invalidated when we do our actual experiments due to some factors which cannot be anticipated / predicted at the beginning. So, understanding why the experiment fails is more important than seeing a successful result as it leads to a lot of learning and you understand a lot of things that you had not thought about earlier. Failures therefore help you grow and broaden your skills significantly as compared to successes and I view failures as a very important part of my learning process.

Interviewer: Edison had to test several different materials that could be potentially used for the filament before finalizing on tungsten. What other materials did you navigate through before finalizing on the silk fibroin?

Dr. Anuya: Our earlier thought process was that pure silk might not be able to give us the strength required for bone regeneration. We therefore did a lot of material development under silk. Eventually what worked for us was an innovative processing protocol for silk. We have been working with silk over the last decade and we are finally seeing the product in 2020, and it still hasn't been tested on humans today. So it is a long process, which takes a lot of patience and determination along the way.

Interviewer: Could you please tell us about the work you are doing through your start-up BioMed innovations and how did you delve into the field of entrepreneurship?

Dr. Anuya: BioMed is leveraging silk to make various biomedical products, one of which is the bone-graft substitutes. It has been based on silk proteins. We are making three different products currently but we have a lot of products in the pipeline. Right from my childhood, applied sciences always excited me. So I always wanted my research to go into commercial aspects. When we were working on silk in 2013-14, we had a couple of patents that we had filed and we saw potential in it. So, entrepreneurship was an obvious choice because we wanted to see it go to the market. We thought that it was worth pursuing and saw promise in our material.

Interviewer: How do you manage your time being a principal research scientist and being the cofounder of BioMed Innovations?

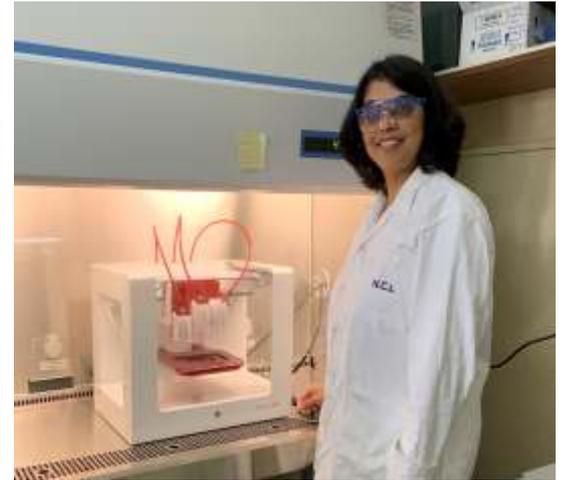
Dr. Anuya: I think building a team of like-minded people who share the same vision, and have the same passion and dedication has definitely helped me in managing my time. My team at BioMed is extremely talented and independent and I have had an excellent set of students who have worked with me in my lab at NCL. You have to learn the art of delegating your work and being able to trust and believe in your team. I also make a priority list of things to be completed and then focus on the important ones.

Interviewer: Where do you see the application of silk fibroin in bone grafting headed towards in the years to come? What are your thoughts on the future of technology in this regard?

Dr. Anuya: Because of the previous use of silk in sutures, biocompatibility of silk is very well established. Now that we have success in bones, we have looked at other ways to process silk. It is the only material which if implanted in your body, gives you the liberty to choose when it dissolves depending on how you process it. So, I feel that the future of silk for biomedical applications is very bright and there will be many companies coming up with silk-based products in the future.

Interviewer: What do you like to do when you are not working on research?

Dr. Anuya: Being the mother of two boys, it takes up a lot of time mentoring them, playing with them and talking to them. I find painting very de-stressing. I have always been a fan of art and I enjoy acrylic painting.



Interviewer: Who are some people that you can look up to that keep you motivated and what qualities in them do you wish to imbibe?

Dr. Anuya: I have been very fortunate to be at the CSIR_NCL. NCL has had some visionary leaders like Dr. Raghunath Mashelkar and their values have become the DNA of the institute. Two mentors who have made a lot of difference in my life are Dr. Ashish Lele and Dr. Premnath Venugopalan. Dr. Ashish Lele was also my PhD advisor and continues to be my friend, mentor and guide. He was the pioneer for starting the silk based work at NCL. I have learned three important qualities from him- clarity of thought, passion for your work and humility. Be it a technical or personal problem, if you have clarity of thought, then you can navigate through the challenges. I think being passionate about what you do and making a difference for society is extremely important to keep you motivated throughout your career. Despite being such a highly decorated scientist globally, Dr. Lele is extremely humble. Dr. Premnath is extremely passionate about entrepreneurship. He is the Founder Director of NCL's incubator Venture Center. I have learned a lot about entrepreneurship from him and his guidance in this journey has been extremely valuable.

Interviewer: Coming from a generation where we have a huge plethora of career options which we see through social media, what would be your advice to students struggling to choose the right career path?

Dr. Anuya: Firstly, it is very important to identify what you enjoy doing, what you want to do, what excites you, what you want to achieve and what motivates you to go to work. It should never be a situation that it's Monday morning and you don't feel like going to work. Unless you are passionate about what you want to achieve, you will never be able to give your 100% to that. It also helps to talk to people who are working in that field or profession and they will be able to paint a picture of a typical day at work. This will help you understand if this is actually what you want to do. Listen to both - your heart and mind and then take that decision.

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From Chairman, Awards Committee

Hello All,

As mentioned by our Chapter Chairman in Chapter have potential to get nominated. Need for focused, methodical approach. Recognition is one of the keys for the. Keeping in mind this thing, Executive dedicated committee - Awards Committee. committee was bestowed on me. Past Founder Member of Pune Chapter, Mr to me. Chapter Chairman and Secretary We will recommend nominations to



P Sesh Subramaniam

Typically, role of awards committees are to qualifiers for awards, seek nominations, required criteria & declare awards. totally different from conventional awards criteria for various ASM awards, identify bandwidth of activities and achievements of our chapter members and identify ASM Awards Vs Potential Chapter Nominations.

last news letter, members of ASM Pune and recognized by various ASM Awards. for this was felt at Chapter Level. Member success for to be highly engaged chapter. Committee decided to form a separate. The responsibility of leading this new Chapter Chairman Mr B R Galgali and Avinash Arankalle has agreed to support will also be members of this committee. Executive Committee.

identify areas for awards, frame rules & scrutinize the nominations against. However, our role and methodology is committees. We will study in depth the most relevant awards considering

ASM International offers various Awards for its members. In phase one, we have chosen most relevant awards for Pune Chapter members. They are as tabulated below.

Award	Criteria	Deadline
Fellow ASM (FASM)	<ul style="list-style-type: none"> outstanding accomplishment in materials science or engineering Broad & productive achievement in production, manufacturing, management, design, development, research or education FIVE years current, continuous membership 	30 November (prior to year of presentation)
Distinguished Life Membership	<ul style="list-style-type: none"> Normally for President or CEO of an organization Devoted time to advancement of materials industries Knowledge (education/experience) of the materials industries Abilities (recognized by peers) in the materials industries Award does not include posthumous selection/ ASM Past Presidents 	1 February (2 years prior to presentation)
William Hunt Eisenman Award	Achievements in industry in practical application of material science and engineering through production or engineering use Five years current, continuous membership Three statements from close associates	1 February (2 years prior to presentation)
Allan Ray Putnam Service Award	Member of ASM Recognized for outstanding contributions at the chapter and/or society level One award per year Three statements from close associates	1 February (2 years prior to year of presentation)

For more Awards & Details you may refer ASM website

<https://www.asminternational.org/membership/awards/nominate>

We have analysed and identified few weak areas for not getting awards to our chapter members. These are -

1. Last minute rush. Lack of Advance preparation
2. Lack of Projecting our achievements in a quantified manner like
 - What was achievement: cost saving one time & year on year, CAPEX / Revenue?
 - Upgradation of processes to improve quality: what % improvement, how much reduction in downtime, how much saving on resources etc.
 - Guidance to budding professionals: areas and accomplishment
3. Lack of Proper documentation e.g. capturing achievement chronologically, impact of achievements, proper documentation like paper presentation year, forum, co-auteurs etc.

The ASM Pune chapter awards committee will guide and mentor you to overcome these barriers. We welcome proposal from our members for nominations to various awards who qualify as per criteria indicated above. Also with the help of Membership Development Committee, we will identify potential members on our own.

Please send your nominations to Chairman Awards Committee at least 4 months before the deadline for the respective award. Proper Documentation preparations may take about one year, as most of us do not keep detailed documents / data handy and organized.

Nomination committee feels, we have two categories of potential members – One, the Veterans who has lot of professional accomplishments to their credit and the other younger members who can get ready in 4 – 10 years horizon for qualifying these awards with focussed efforts under guidance.

Please feel free to reach out to us. Needless to say **ONLY ACTIVE VOLUNTEERS** will be nominated by Pune Chapter.

Best Luck!

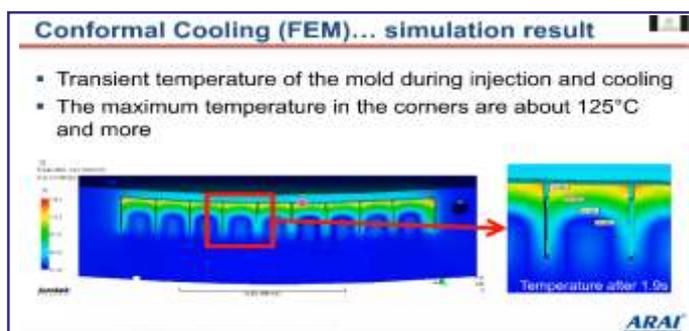
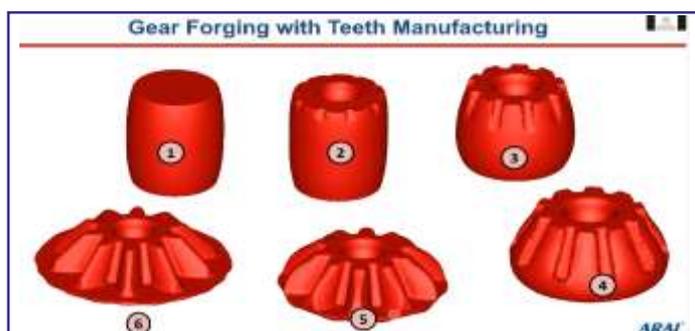
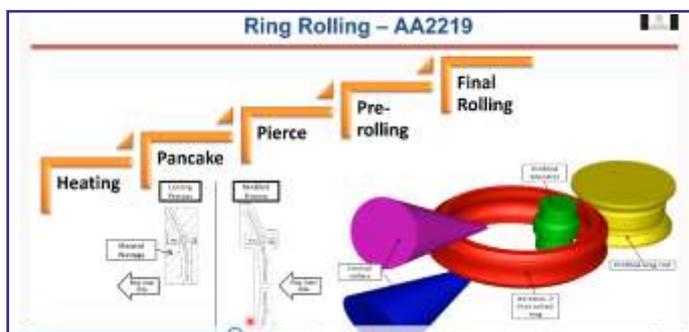
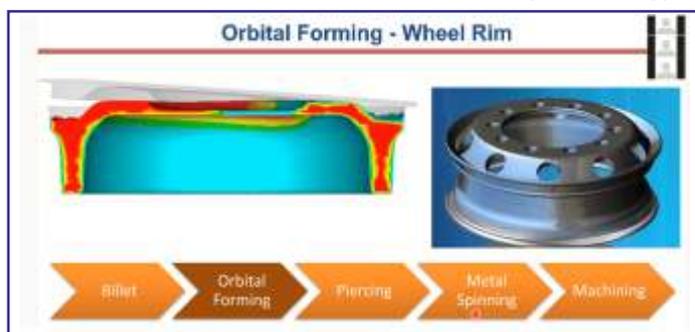
P Sesh Subramaniam

CHAPTER NEWS

ASM International Pune chapter organised a technical lecture through 'Ring central' Video conferencing platform on “Effective use of FEA in manufacturing sector”. The technical lecture was delivered on 16th October 2020, by-

Mr Satyajeet Kulkarni; Manager, Business Development and manufacturing, simulation, ARAI-EDS and Mr. Kinsuk Koley; Deputy Manager, Plastic flow simulation at ARAI.

The speakers talked on utilisation of Finite element analysis (FEA) to reduce number of trials, and covered case studies in cost reduction. The interpretation of simulation results was also covered in Metal Manufacturing. In the plastic injection moulding section, the effectiveness of conformal cooling technology was impressed upon



Interview with Mr. Sanjay Nibandhe, Convener, AM&M 2020

Mr. Sanjay Nibandhe is the Convener of the Automotive Materials and Manufacturing (AM&M) conference 2020. With an industry experience spanning more than 30 years in Automotive Industry and as the Deputy Director of ARAI-Chakan Operations, he has truly seen firsthand the auto sector grown manifold in these years.

He is also presently Chairman of SAEINDIA Western Section. Four students from Cummins College of Engineering for women - Ms. Mrunmayi Patwardhan, Ms. Ahilya Bondre, Ms. Vaishnavi Sarwade and Ms. Kalyani Deshmukh, conversed with him about the upcoming AM & M 2020 conference organised by ARAI along with ASM International Pune Chapter & SAEINDIA. This conversation is about his engineering journey till date.

Interviewer: ARAI has time and again provided a platform for the exchange of knowledge & ideas. One recent initiative being the AM&M conference which will be held in December this year. Can you please tell our readers a bit about this year's conference?

Mr. Sanjay Nibandhe: AM&M was started in 2010, with the second event was held in 2014. The AM&M 2020 conference is driven with the focus on **e-mobility, smart materials** and the need for the automotive industry to evolve with the change in technology. This forum will be very helpful for the OEM's as well as Tier 1 and Tier 2 suppliers. The conference is in virtual format this year considering the pandemic situation. Two sessions will be organised, one in the morning and the other in the evening, on the 3rd and 4th December, 2020, and we will be having many experts sharing their experience from the field of Industry & academia in India & Abroad.

Interviewer: Why do you think it is important for industry professionals to be a part of the AM and M conference?

Mr. Sanjay Nibandhe: available in the materials domain for such receive specific inputs on automotive front, sharing imperative. Optimisation which relates to better fuel emissions, is justified by happening with the with e-mobility coming up, electric drives & systems material inputs are very Hence, for the industry to to create a technological sharing through this forum



Mr. Sanjay Nibandhe, Deputy Director, ARAI

Very few platforms are and manufacturing discussion. Hence, to the materials on the of developments is in the automobile industry, efficiency and with the the new changes that are technology. Subsequently, there is a wide scope for to develop. Therefore significant or e-mobility. drive these changes and roadmap, knowledge is vital & important.

Interviewer: Can participate in the AM & M could you please tell us

students like us conference? If yes, the procedure for the

same? What benefits will the students gain by attending the conference?

Mr. Sanjay Nibandhe: A lot of new startup are emerging by students involvement in the area of e-mobility, hence understanding these concepts becomes crucial. Students can absorb the knowledge in both the manufacturing and materials field through the conference. One year down the line when things go back to normal, we plan to increase the frequency of AM&M and off course knowledge sharing process with students by means of inclusion of their research papers and contribution.

Interviewer: Considering this conference talks about the future of mobility, where do you see the automobile industry spearheading towards in terms of developing large scale solutions to our problems?

Mr. Sanjay Nibandhe: If you compare the past 10 years of Automobile Industry, there has been significant quality and technological improvement in terms of weight & cost reduction. Manufacturing technology is still important even for small scale industry which supplies the automobile parts. So I think this industry drive is on improvement of processes. People expect that the automobile should be robust with high performance. This is achieved by improvement in efficiency, weight reduction, cost effective manufacturing with large volumes. The Industry leaders are responsible to attain these goals & can exchange the thoughts in these type of conferences and other people can get a lot of inputs. The conference is targeting expertise from industries to sharing their knowledge & demonstrate technology.

Interviewer : Being a professional working in the automobile industry for 30+ years, do you think that there is a gap between the skills that are required for the industry and the skills that are possessed by students?

Mr. Sanjay Nibandhe: Today's buzz world is the "world of knowledge". Skill sets is a different perspective in it which definitely provides a large amount of scope. The trainings, assignments, projects provide ample room for these skills sets to enhance. So I think that, the students who get absorbed in the industry have lots of opportunities to work & improve. One can look for practical aspects & scope for small improvement in daily basis.

Interviewer: There are some knowledge initiatives taken up by ARAI to bridge this skill gap. Can you tell us about the work ARAI is doing in the educational field?

Mr. Sanjay Nibandhe: I will talk in 3 perspectives. ARAI Academy who normally conducts 30-35 courses in year for students and professionals. Second one being ASM: there are ASM monthly lectures & journals publications where people share their experience from their jobs. They discuss about challenges they face, through which people can enhance their knowledge. SAEI NDIA is another platform which works in the automotive mobility domain i.e. Automobile, Off Highway & Aerospace and now Electronic forum. During this pandemic period, SAE has arranged almost 100 lectures and some courses. So I believe that all three of them are trying their best that the new generation & professional get sufficient inputs.

Interviewer: When you were our age or during your initial days in the industry, was there any incident which you think was a major learning experience or a turning point?

Mr. Sanjay Nibandhe: In 1982 when I first joined Bajaj Auto. in the R&D team, I was given a challenge of making the parts designs in plastics and rubber. Since this was a technological need and that time plastics processing technics were also not adequately developed. The basic training of 8 days at CIPET Chennai was given to me, I was given an opportunity to think out of box & scope; to deliver molded products. It was a huge task. I got overview and I tried to visit the manufacturers as frequently as possible; I met those people and understood the processes knowledge. I kept myself updated with the trends and technology in my initial years and that's how I could be a person with good understanding and knowledge in that field of polymers and rubbers. So this practice has changed me a lot. It made me habit to capture details minutely & work on all the new area by spending my own energy and efforts.

Interviewer: When you were working as a deputy general manager at Mahindra and Mahindra, Nashik, you were spearheading a team of 114 members. What challenges did you face at that time?

Mr. Sanjay Nibandhe: When I was working there, I was developing multiple products together which became a challenge at that time. Me and my team were handling about 6-7 programs which were simultaneously going on. And these programs needed lots of human resource. There was also a challenge in training the new recruits because the practices and the new product development process are entirely different scenarios. Even for the prototypes, we could successfully deliver around 5 prototype vehicles in a week having different models & configurations. In general, one proto vehicle use to take 15-21 days at initial stages of product development.

Interviewer: The automobile industry has been heavily impacted by Covid19 pandemic. In what ways has the industry been impacted and what are the ways by which it can recover?

Mr. Sanjay Nibandhe: Yes, it had a huge impact. The sales and production were reduced to large scales. The total number of parts in the assembly of materials which is pertaining for one car consist approx 15000 parts, that goes together into entire vehicle level. These parts are manufactured by different industries. Everybody works together considering demand of situations. There was big impact on human resources, subsequently government has given us good support and industries have been permitted to work as quickly as possible after reopening of lockdown one and two. Industry has picked up the speed and they come up with their own ways by overcoming many challenges. The sale of the cars has been increased recently. The festive season is an added advantage. and automotive growth (15-16% YoY) is noticed in 2 & 4 wheelers market.

Interviewer: How do you ensure that you are up to date with the latest techniques and trends?

Mr. Sanjay Nibandhe: We are constantly updating and upgrading knowledge of team. Industries are coming up with multiple models and government promotions are also there. The quick response from industry side has advanced the status of India to next level. This process of upgradation is being carried out by every manufacturer for efficient way. Major emphasis on innovations & patents is given by individuals as well as students and those are adopted immediately.

Interviewer: What aspects of engineering excite you now and what keeps the flame burning?

Mr. Sanjay Nibandhe: The revolution in industry like IoT 4.0 which people are talking about is the crux of it. The significant changes with the AI techniques, the latest controls are switched to electronic components mostly. Their products with increased performance characteristics and component life and product endurance of latest technology gives high level of satisfaction. This aspect keeps me fascinated.

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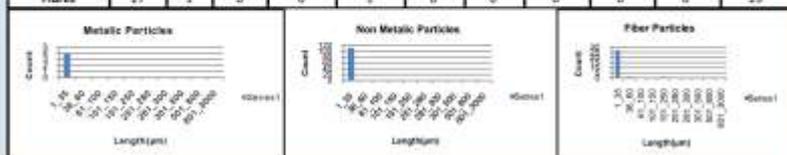
PARTICLE TEST REPORT.

Customer	ABC		
Part No:	A124N	Recd Date:	04-Jun-18
Report No.:	1572	Department :	QA Lab
Sample ID:	ABC	Test Date:	05-Jun-18
Analysis:	Particle	Standard Specification:	As per ISO 16232
Magnification	100X	Fiber paper Size:	47 mm
No. of Fields :	5	Scanning Area	10 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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Upcoming Events: Monthly Technical Lectures

Topic	Speaker	Dates
Current Trends in Induction Heat Treatment Process	Mr. Giuseppe Rubatto, Mr. Mario Cesano, Mr. Massimo Tartarotti, SAET SpA, Turin, Italy.	25 th November, 2020
Dirty Steel - Clean Steel	Prof Deepak Moghe, VNIT Nagpur.	17 th December 2020
Automotive HVAC Challenges & Opportunity for Materials	Mr Pravin Ghate, Tata Motors, Pune.	14 th January 2020

Upcoming Events:

Event Name	Dates
International conference on Automotive Materials & Manufacturing 2020	3 rd and 4 th December 2020
4 Day Global Online Proficiency Improvement (Training) Programme on Failure Analysis: Including Auto & Engine Components	15 th to 18 th December 2020

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Contact : ASM Pune Chapter asm.pune@gmail.com;

L. D. Deshpande, Chairman, Membership Development Committee l.d.deshpande@gmail.com


**Global Online Proficiency Improvement Programme
4 Day oPIP on Failure Analysis : including Auto & Engine
Components**

Workshop Overview:

Failure of Components is a disastrous experience for user as well as to manufacturer and efforts are always on to avoid such Failures in future. Hence, it is necessary to understand cause of failures. Only a systematic & painstaking analysis can lead to the real "culprit" responsible for failure. Understanding theoretical aspects of stress, failure modes, fracture mechanisms and applying this knowledge to number of failures can build the expertise over a period of time. The present training programme is designed to cover the theory as well as practical aspects of Failure Analysis.

Who can attend?

This programme is apt for those who needs to have comprehensive understanding of Failure Analysis of Auto & Engine Components

- Industry Professionals, Independent Consultants and Start-ups
- Teaching Professionals and Engineering Students
- Executives who need to work & analyse root causes of failure & quality issues

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come first
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Registration Fees :

Pricing Category	Registration fees per person (incl. 18% Goods Service Tax)
Industry Professionals	Rs. 2,400 + Rs. 432.00 = Rs. 2,832.00
ASM Members	Rs. 2,160 + Rs. 388.80 = Rs. 2,548.80

Schedule from 15th -18th December, 2020 on online Platform MS-Teams

Sr.	Session	Date	Day	Time
1	Registration & Inauguration	15- Dec-20	Tuesday	13:30-14:00
2	General Procedures for Failure Analysis	15- Dec-20	Tuesday	14:00-15:30
3	Types of Failures and Stress	15- Dec-20	Tuesday	15:30-17:00
4	Ductile & Brittle Failure	16- Dec-20	Wednesday	14:00-15:30
5	Failures of Shafts, Gears & Bearing	16- Dec-20	Wednesday	15:30-17:00
6	Failures of Tools	17- Dec-20	Thursday	14:00-15:30
7	Corrosion Failure	17- Dec-20	Thursday	15:30-17:00
8	Fatigue Failures	18- Dec-20	Friday	14:00-15:30
9	Failures of Engine Components	18- Dec-20	Friday	15:30-17:00
10	Q & A	18- Dec-20	Friday	17:00-17:30
	Assessment Test & Feedback	18- Dec-20	Friday	17:30-18:00

- Participants whose organization is in SEZ, kindly confirm for GST applicability before making the payment.
- Candidates with more than 50 % marks in the assessment test are only eligible for the certificate.
- No recordings of the training session will be provided. Hence, request you to attend all the sessions.

Mr. N. A. Deshmukh / Mr. R. M Patil
 Phone: 02135-396695 / 691 / 690 or 02135-630795 / 791 / 790
 Email: training.pga@araindia.com; nadeshmukh.pga@araindia.com;
asm_pune@gmail.com;
 Website: www.araindia.com; academy.araindia.com;

Note : ARAI reserves the right to change the dates, contents, schedule, etc. for the programme without any notice.

UPCOMING NEWS LETTER

We are pleased to inform our next newsletter will be joint News Letter with India National Council (INC), ASM International. It will be released in Jan 2021. We will get an opportunity to know about activities of INC and other Indian Chapters of ASM, apart from ASM Pune Chapter. Our chapter Chairman, Udayan Pathak, FASM will be the editor for this INC News letter.

The Contents:

- *Introduction of New INC team*
- *Message from Diana Essok, President, ASM International*
- *From Desk of Chairman INC*
- *Chapter News from all Indian Chapters*
- *Techno-Management Article,*
- *ASM Events – Pan India*



International Conference on AUTOMOTIVE MATERIALS & MANUFACTURING 2020

3rd & 4th Dec 2020 (3rd edition)



TOPICS :

MATERIALS

1. Light-weight materials
2. Advanced Material Characterization Techniques
3. Composite / Polymeric Materials
4. Surface Coating
5. Simulation, Mathematical Modelling, ICME
6. Materials for e-mobility
7. Recycling and Reuse

MANUFACTURING

1. Advanced Forming Processes
2. Advanced Metal Joining Processes
3. Process Improvements in Foundry and Forging
4. Process Design & Simulation
5. Additive Manufacturing (3D printing)
6. RP Techniques in Tooling Manufacturing
7. Industry 4.0 and Artificial Intelligence for Material Science and Manufacturing

CONFERENCE SCHEDULE :

3 rd Dec 2020		4 th Dec 2020	
Timings	Activity	Timings	Activity
	Delegate Registration – 1 day in advance		
09:00 - 09:30	Inaugural function	09:00 - 11:30	Technical Session 3 (4 paper per session)
09:30 - 11:30	Technical Session 1 (4 paper per session)	17:00 - 18:00	Technical Session 4 (2 paper / Keynote)
17:00 - 19:30	Technical Session 2 (4 paper per session)	18:00 - 19:00	Panel Discussion
		19:00 - 19:30	Valedictory

FEES STRUCTURE :

Category	Indian National (Rs.)	Foreign National (\$)
Delegates		
1. Industry	2,000	100
2. Academy Professor	1,000	75
3. Students (limited seats)	600	25

DELEGATE FEES : Delegate fees is payable by Bank transfer – NEFT / RTGS / IMPS in favour of "The Automotive Research Association of India", payable at Pune, India.

NEFT / RTGS / IMPS Details :

- Bank Name : Bank of Baroda
- Bank A/C. No. : 04470200000280
- IFSC/RTGS/NEFT Code : BARBOKARVER (0-ZERO)
- GST ID : 27AAATT1989P1ZL
- State for Operation : Maharashtra

- Note - 1. GST @ 18% as applicable will be charged extra
2. For group discount please refer our brochure or call.

Mr. Sanjay S. Nibandhe

Convener, AM&M 2020
Deputy Director- ARAI Chakan Campus
Chairman, SAEINDIA Western Section

For registration details, please contact :

Ms. Vibhavari Londhe

Office : 02135 – 396614, 630714 Mob : 9028525035
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Technical Article : Stress Corrosion Cracking of Dissimilar Metal Weld

1. Introduction

Dissimilar metal welds are used in a wide variety of components in light water reactors to weld low alloy steels to austenitic stainless steels or low alloy steels to nickel base alloys. These dissimilar welds are widely used in different parts of a nuclear plant such as pipe joints to reactor vessels. In these joints, pipes are usually austenitic stainless steel, while the vessel is low alloy steel, for which a weld metal compatible with the materials to be welded is generally used. Alloy 182 is used frequently as filler metal in the manufacture of dissimilar metal welds in boiling water reactors (BWR) to join the low-alloy steel (LAS) reactor pressure vessel (RPV) and pressure vessel nozzles to both nickel-base wrought alloy and austenitic stainless-steel components.

In recent years, incidences of stress corrosion cracking (SCC) of Alloy 182 in both BWR [1] and pressurized water reactors (PWR) [2] have been reported. The SCC of Alloy 182 weld metal in both simulated BWR [3] and primary PWR coolant environments [4] has also been confirmed by laboratory investigations. Although many investigations on SCC behavior of Alloy 182 weld metal and LAS have been performed [5-7]. A complex microstructure with varying chemical composition can evolve in the transition region between Alloy 182 weld metal and LAS due to mixing and diffusion of alloying elements between the weld and base metals, carbon migration from LAS to weld metal, segregation phenomena and different thermal histories relevant to welding parameters. Therefore, it can be anticipated that the SCC in the transition region plays an important role in the overall SCC behavior in the dissimilar weld joint. So, many studies were carried out of the SCC behavior in the transition region of an Alloy 182-LAS dissimilar weld joint [8-10].

Earlier investigation showed that the continuing crack propagation from an Alloy 182 attachment weld into the underlying low alloy steel pressure vessel steel the following conclusion drawn namely: (a) High hardness values were observed in the dilution zone adjacent to the fusion boundary, indicative of high residual stress (b) all stress corrosion cracks in Alloy 182 in high purity 288 °C water arrested at or near to the weld fusion line when the stress intensity factor was below $60 \text{ MPa}\sqrt{\text{m}}$. These arrested cracks could be reactivated from the pit however in 2 ppm oxygenated water with an increase in sulphate to 20 ppb or in 0.25 ppm oxygenated water with an increase in sulphate to 400 ppb. (c) There were combinations of stress intensity and sulphate concentration that lead to sustained crack growth as the crack advanced into the A53B low alloy steel. Tentative combinations of stress intensity factor and sulphate concentration that would sustain crack propagation in the low alloy steel. Also similar investigation for the combinations of the chloride concentrations was observed by Ritter and Kumagai et al . It is shown that chloride impurities are more deleterious than sulphate anions, to the point that $>5 \text{ ppb Cl-}$ may, depending on the stress intensity factor, give sustained propagation into the low alloy steel but it should be pointed out, however, that the chloride effect is not clearly understood.

Most studies above have shown that crack growth paths are different when initial cracks were located at different positions of the welded joints. However, the studies above were mainly limited as-welded plates, which may not reflect the real conditions made for NPPs. SCC in the transition region plays an important role in the overall SCC behavior in the DMW, therefore it can be anticipated that the transient temperature, dissolved Oxygen (DO), dissolved Hydrogen (DH) affects the SCC growth. So present work study the transition region between weld 182 and low alloy steel interface, under varying temperature, DO and DH effect.

2. Materials and Experimental Procedures

The pipe-nozzle material is low-alloy steel (SA508 Cl. 3), and the safe end pipe material is austenitic stainless steel. The weld was manufactured by applying a buttering technique and the buttering material as well as weld material is the same nickel-base alloy (Alloy182/82). The chemical composition of dissimilar metal weld joint (DMWJ) shown in Table 1.

Elements	C	Si	Mn	P	S	Ni	Cr	Nb+Ta	Mo	V	Fe
Low Alloy Steel (SA508 Cl. 3)	0.17	0.28	1.38	0.003	0.003	0.74	0.15	---	0.48	0.003	Bal
Alloy 182	0.053	0.44	6.50	0.004	0.002	98.9	14.7	1.55	---	---	7.23
316 LSS	0.02	0.48	1.4	0.02	--	11.6	17.5	---	2.08	--	--

Table 1 Chemical composition of the four materials composed of the DMWJ (weight %).

2.1 SCC Tests with 3-Point Bending Specimens

To study the crack initiation in transient condition and more accurately simulating actual plant situations Three Point Bend (TPB) SCC test was designed for crack initiation, in-situ U notch design was used.

The designed 3-point bending specimen shown in photograph of Fig.1(a) was fabricated from a DMW block. The length of the specimen, L, is 100 mm with a loading span, S, of 80 mm. The depth of the specimen, W, is 20 mm. The thickness of the specimen, B, is 10 mm. A mechanical U shape notch was made in the interface weldment region to observe the crack initiation. The notch is located in the center of the 3-point bending specimen. A U shape notch was used to cut the notch and the radius is 2 mm. The notch length is 10 mm, starting from the inner pipe surface of the across the weld metal.

The SCC tests were performed in simulated BWR water containing transient temperature and dissolved oxygen, as shown in Table 2. For more accurately simulating actual plant situations for crack initiation, in-situ U notch design was used. Crack initiation was monitored by using an Alternating Current Potential Drop (ACPD) machine (Matelect crack growth rate monitor, CGM7R), with a frequency of 10 kHz, current of 0.4 A and gain of 80%. Stainless steel probe leads for electric current and potential were spot welded to the TPB specimen for the ACPD crack initiation monitoring. The two specimens (W-01 & W-02) were testing at apparent $K = 30 \text{ MPa.m}^{0.5}$ for about ~3696 h {Fig. 1 (b)}, and still it's continued for further ACPD change.

Step	Temperature, °C	Time (h)	DO, ppm Inlet	Pressure MPa
1	27°C to 288°C	12 h	0.2	~ 9.3
2	288°C hold	168 h	0.2	
3	288 °C to 27°C	12 h	0.2	
4	27°C hold	72 h	8.3	
5	27 °C to 288°C	12 h	0.2	
6	288°C hold	168 h	0.2	

Table 2 Transient conditions of simulated BWR environment



Fig. 1 Photograph of the (a) Three Point Bend Specimen and (b) Specimen setup in autoclave with ACPD connection.

3. Results and Discussion

The crack initiation was monitored using an ACPD with a frequency of 10 kHz and current 0.4A. The crack initiation with SCC time for the TPB specimen in pure water at different temperatures, monitored by ACPD. SCC tests were performed in simulated BWR water in transient temperature and DO conditions on two specimens (W-01 and W-02) at apparent stress intensity factor, K, of $30 \text{ MPa.m}^{0.5}$. Crack initiation was not observed in either specimen, despite some oxide spallation that was observed across the interface between low-alloy steel and alloy 82 buttering after 14 transient cycles lasting 3696 hours.

ABOUT THE AUTHOR



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Dr. Bali was a post-doctoral research scientist at the Frontier Research Initiative Laboratory, New Industry Creation Hatchery Center, Tohoku University, located in Sendai, Japan. During Post-doctoral research (2011-2014), he worked on various projects which were mainly related to the corrosion issues of the Boiling Water Reactor and Pressurized Water Reactor.

KNOW OUR MEMBER

- Graduate Degree: Bachelor of Engineering (Mechanical) with Honors, 1979.
- Post Graduation: Post-Graduate Program in Business Management from Symbiosis Institute of Management, Pune, in 1982.

40+ year's hands-on multi-disciplinary managing engineering manufacturing & CEO / MD positions in several reputed Ltd and multinational corporations like Manufacturing Inc. Very wide global and technology companies. Extensively Europe, Russia, Korea, Singapore, Sri Lanka. Worked with business managers from MetalTech Pvt Ltd, implemented a project high-tech alloy on a commercial scale in India by DRDO, and is a unique science. Won several awards for G S Parkhe – MCCIA award for innovation and the SIDBI-ET MSE National Award and the prestigious Award at the Global Petroleum Show, Canada in 2019 for innovative technology product. All awards within the first 3 years of starting the project.



LALIT KUMAR PAHWA

experience of building, growing and high-technology businesses. Have held Indian companies – Tata Group, Escorts Jervis B Webb and American Axle & exposure to engineering manufacturing travelled to USA, Canada, UK, Japan, Lanka and other ASEAN countries. various cultures. Founder MD of Pahwa to manufacture high tech copper titanium Company is the only manufacturer of this the world. This alloy was developed in contribution to the world of material innovation and technology including the

READERS' FEEDBACK



Beth Matlock Snipes
 FASM, ASM Chapter
 Council Chair, 2020–2021

Your newsletter and chapter activities are superb. Thank you for sharing!

I would love to see other ASM chapters invest the time and effort that the Pune Chapter has in putting together a great program and other opportunities for the materials community.



Jatinder Singh
 Past Chair,
 ASM, Chapter Council

Chapter Newsletter is another fine example of your Chapter's ongoing activities and communications to its members. What is worth mentioning is your member highlight section, which is a very nice way to introduce your members the ASM family. I think it will be a best practice to capture for other Chapters through Chapter Council communications.

I also like your Chapter's idea of member feedback...this is a nice feature, other Chapters can emulate in their own Newsletters or on web-page

From Chairman's Desk:

Festive Greetings to all of you, your family and colleagues! Good to see that after long duration of almost nine months, slowly but steadily we are coming out of the clutches of Covid-19. Ofcourse we have to follow 'New Normal' meticulously until we come out of danger totally.

In line with our focus area of Students Outreach & Women Empowerment, Students of Cummins College of Engineering for Women (CCOEW), Pune managed this issue. Prof Sunil Divekar, Prof Yogesh Dandekar & Louis Vaz mentored them. Congratulations Team CCOEW Pune.

We are encouraged by your support for continuing our focussed approach on Knowledge Sharing, Women Empowerment, Students Focus and Collaborations. We are organising Partner with ARAI in Two Days International Conference AM&M 2020 with theme - Advances in Automotive Materials & Manufacturing for Future Mobility. This will be on digital platform. You will find more details in the news letter. Let us joined hands with Maharashtra Institute of Technology (MIT), Aurangabad for organising Trends in Mechanical Engineering also be held on Digital Platform during these collaborations, we are more details in the news letter. Let us joined hands with Maharashtra Institute of Technology (MIT), Aurangabad for organising Trends in Mechanical Engineering also be held on Digital Platform during these collaborations, we are Engineers & Indian Institute of Metals Series.

With focused efforts of our Students Outreach Committee, we have just completed process of Starting Materials Advantage Chapter at Cummins College of Engineering for Women, Nagpur. We hope to get formal go ahead from ASM HQ soon. This will be the First formal Materials Advantage Chapter. Students outreach committee has taken target of starting few more Materials Advantage Chapters in near future.



Udayan Pathak, FASM

Supporting ASM Pune Chapter members for getting ready and preparing for various ASM Awards is task taken by our newly formed Awards Committee. Mr. P S Subramaiam, Chairman Awards has elaborated their plans and approach.

Newly elected team of India National Council will be coming out two common News Letters Annually in January & July. We will merge our Jan. & June Chapter News Letter in INC newsletters and Chapter News Letter for Mar, May, Sept., Nov. will continue as it is. Most of the unique content of our Chapter News Letter will be included in INC News Letter. So you won't be loosing any connect with Chapter, instead, this INC newsletter will give you broader perspective of ASM activities Pan India.

Our Membership Development Committee is still struggling to get data from you about your expertise and volunteering. This will help us to Identify ASM support for various Govt. initiatives. Please support them. Vaibhav Chiplunkar is already in touch with you, he will contact you once again for the same.

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



ASM International Pune Chapter

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