Bangalore Chapter – News Letter

Issue 1: May 2020

ASM salutes healthcare staff, police force and all those who are putting relentless efforts to keep us safe during the Covid-19 crisis

"BE SOCIALLY RESPONSIBLE; MAINTAIN SOCIAL DISTANCING "

Council Office Bearers

Mr. Rahul Masurekar
Chairman

Mr. K S Subraya
Vice Chairman

Mr. R. B Dilip
Immediate Past Chairman

Dr. J R Nataraj
Gen Secretary

Mr. Prakash Balasubramanian
Treasurer

Mr. Panduranga
Editor News Letter

Contents

Chairman's Message

Covid -19, for us, will hopefully be a once in a Lifetime event of truly global proportions. It brought Mankind to its knees, pushed us into our shelters and gave Nature a welcome break from many of our atrocities.

However, Man's Never Die spirit and the old adage" Adversity is the Best University" have introduced us to a number of welcome changes starting from the way we eat, live, work, meet, entertain etc.

Individuals and organizations have come up with a number of initiatives to reduce the adverse impact on the vulnerable in our society and also innovations to adapt to the safety norms necessitated by the pandemic. Many of these changes are for the better and are here to stay.

After a brief stunned lull, ASM Bengaluru Chapter rebooted its agenda, in the lockdown, and resumed its activities on the Zoom and Ring Central Platforms with an EC meeting followed by a Technical Talk. The results were pleasantly surprising with record participation for both, from far and wide, and without the normal problems of venue and the commute. Easier access to members also allowed us to engage with our tasks and as a result we are presenting to you the first issue of our Newsletter. Hope you will like it.

Rahul Masurekar

Bangalore Chapter – News Letter

Issue 1: May 2020

About ASM International

ASM International formerly known as the American Society for Metals, was established in 1913 as a professional body of heat treaters. It has since evolved as an international professional body of material scientists, engineers, R&D professionals and academicians with the motto of collecting & disseminating knowledge on Materials and Processes. The worldwide network of more than 38,000 individuals is led by members, guided by members' needs and fueled by members' participation.

About ASM Bangalore Chapter:

ASM Bangalore chapter is actively involved in dissemination of materials centric knowledge among working professionals, researches and academicians. ASM Bangalore chapter began its activities in the year 2006. Since then it has dedicated itself in spreading information based on materials among various stake holders. Bangalore is a strategic center for several major automotive, aerospace, defense & R&D institutes and thousands of engineering professionals and it is imperative to educate & connecting the community in the field of Metals & Material science Technology. Under the able leadership of present chairman Mr. Rahul Maurekar – a well-known Industrialist and capable office bearers, ASM bangalore chapter is gaining wide popularity by activity involving and supporting the technological up-gradation of Engineering community.

The Prime objectives of ASM Bangalore Chapter are

1. To disseminate materials centric information among professionals by organizing seminars, lectures, one/two days' workshops
2. To bring together Scientists, Intellectuals and Professionals working in the field of materials science to exchange ideas/knowledge/information.
3. To encourage and support student chapters among various Engineering colleges in the state of Karnataka and enlighten them, the importance of materials properties, selection and its application.
4. To Promote consultancy services by ASM members to solve industry problems in the area of materials.
5. To recognize and award ASM members for their contributions to field of materials science.

ASM Bangalore chapter has members with rich expertise and professional experience with deep insight to practical applications in the field of materials science & engineering. ASM Bangalore chapter offers consultancy in the broad areas of Material selection &Characterization, foundry practices, mechanical testing, forging, heat-treatment, failure analysis, Corrosion control, Nondestructive Evaluation (NDE), process simulation to name a few.

ASM Membership

A membership in ASM gives you every imaginable edge you seek in your career.
VISIT - http://www.asmblrchapter.com/membership.php - for Benefits and Forms
Or Call Membership Chair – Mr. Krishnadas Nair – 8879233440
Or write ASM Bangalore Chapter asmblr2015@gmail.com

ASM INTERNATIONAL
Bangalore Chapter – News Letter
Issue 1: May 2020

METALS IN THE HUMAN BODIES

by Dr. B Ashok, Member-ASM

Quite often, Metallurgists understand metals as something solid, except for corrosion engineers, who well understand the liquid/ionic form of metals, which initiates corrosion. There are few areas where metals are used in liquid form as Sodium coolants, Mercury etc. In Human bodies, metals exist in liquid form as electrolytes, organometallic complex etc. Only in certain pathological states as Wilson's disease (deposition of copper in liver, eye) or siderosis (deposition of iron), metals in solid form are seen. Let's take a look of various metals in our body.

- **Sodium (Na)**. Major electrolyte of blood and extracellular fluid. Required for maintenance of pH and osmotic balance

- **Potassium (K).** Major electrolyte of blood and intracellular fluid. Required for maintenance of pH and osmotic balance. Approximately 92 gm of sodium with equal amount in both outside cell (extra cellular) and inside cells (Intracellular) is present. And there is an efficient Na-K pump which transfers sodium from low concentration in Extra cellular to higher concentration in Intracellular regions by use of ATP. Sodium helps in kidney functions and plays a crucial role in hormonal balance and BP. Potassium and Sodium together creates electric flux which aids in nerve conduction, muscle contraction including pumping of heart. Typical voltage fluctuates up to 1.2 mv. High Potassium diet would reduce BP, prevent water retention and ensure smooth heart functioning.

- **Calcium (Ca)**. Structure of bone and teeth. Also plays a role in the growth of nerve cells. Bone primarily consists of collagen, which is a salt of calcium and phosphorous. Calcium ion acts as intercellular messenger, calcium ion pump, pumps calcium against the concentration gradient by using the ATP produced in the body and helps in muscle contraction including heart muscle

- **Magnesium (Mg)**. Important in bone structure. Deficiency results in tetany (muscle spasms) and can lead to calcium deficiencies. Magnesium is needed for more than 300 biochemical reactions in the body. It helps to maintain normal nerve and muscle function, supports a healthy immune system, keeps the heartbeat steady, and helps bones remain strong. It also helps adjust blood glucose levels. It aids in the production of energy and protein.

- **Iron (Fe).** Contained in hemoglobin and myoglobin which are required for oxygen transport in the body. Part of the cytochrome p450 family of enzymes. Anemia is the primary consequence of iron deficiency. Excess iron levels can enlarge the liver, may provoke diabetes and cardiac failure. The genetic disease hemochromatosis results from excess iron absorption. Similar symptoms can be produced through excessive transfusions required for the treatment of other diseases. Heme of Hemoglobin is Porphyrin (a special structure of 4 pyroles) which holds iron. Switching of Fe from ferrous to ferric state and vice versa aids in oxygen absorption and carbon dioxide release by the cells.

- **Copper (Cu).** Contained in enzymes of the ferroxidase (ceruloplasmin) system which regulates iron transport and facilitates release from storage. A structural element in the enzymes tyrosinase, cytochrome c oxidase, ascorbic acid oxidase, amine oxidases, and the antioxidant enzyme copper zinc superoxide dismutase. A copper deficiency can result in anemia from reduced ferroxidase function. Excess copper levels cause liver malfunction and are associated with genetic disorder Wilson's disease.

- **Manganese (Mn).** Major component of the mitochondrial antioxidant enzyme manganese superoxide dismutase. A manganese deficiency can lead to improper bone formation and reproductive disorders. An excess of manganese can lead to poor iron absorption

- **Zinc (Zn).** Important for reproductive function due to its use in FSH (follicle stimulating hormone) and LH (luteinizing hormone). Required for DNA binding of zinc finger proteins which regulate a variety of activities. A component of the enzymes alcohol dehydrogenase, lactic dehydrogenase carbonic anhydrase, ribonuclease, DNA Polymerase and the antioxidant copper zinc superoxide dismutase. An excess of zinc may cause anemia or reduced bone formation Often Zn sulphate is prescribed to improve immunity.

- **Selenium (Se).** Contained in the antioxidant enzyme glutathione peroxidase and heme oxidase. Deficiency results in oxidative membrane damage with different effects in different species. Human deficiency causes cardiomyopathy (heart damage) and is known as Keshan's disease.

- **Cobalt(Co).** Contained in vitamin B12. An excess may cause cardiac failure. Vitamin B12 is essential for Red cell maturation, deficiency of which causes megaloblastic anemia and also deficient nerve conduction causing numbness. Vegetarians are prone for vitamin B12 deficiency as its main sources are from meat and to a lesser extent from milk.

- **Molybdenum(Mo).** Contained in the enzyme xanthine oxidase. Required for the excretion of nitrogen in uric acid in birds. An excess can cause diarrhea and growth reduction.

- **Chromium(Cr).** A cofactor in the regulation of sugar levels. Chromium deficiency may cause hyperglycemia (elevated blood sugar) and glucosuria (glucose in the urine).

- **Nickel (Ni).** Nickel aids in iron absorption, as well as adrenaline and glucose metabolism, hormones, lipid, cell membrane, improves bone strength and may also play a role in production of red blood cells (Wilfred, 2012). Nickel is present in RNA and DNA of our body where it functions in association with nucleic acids

Conclusions: The functioning and use of metals in the familiar metallurgical world is totally different within human bodies and essentially their presence is required for proper functioning of human body.

TABLE

Content in Human body and RDA (Recommended daily allowance) of various metals

Metal ion	Content in human body	Optimal daily intake
Na^{+}	100g	1-3 g
K^{+}	140g	2 – 5 g
Mg^{2+}	25g	0.7g
Ca^{2+}	1100g	0.8 g
Cr^{3+}	6 mg	0.1 mg
Mo^{6+}	9 mg	0.3 mg
Mn^{2+}	12 mg	4 mg
Fe^{3+}	4-5 g	10 – 20 mg
Fe^{2+}	4-5 g	10 – 20 mg
Co^{2+}	1 mg	3µg
Ni^{2+}	10 mg	6µg
Cu^{2+}	0.1 g	3 mg
Zn^{2+}	2 g	15 mg

About the Author

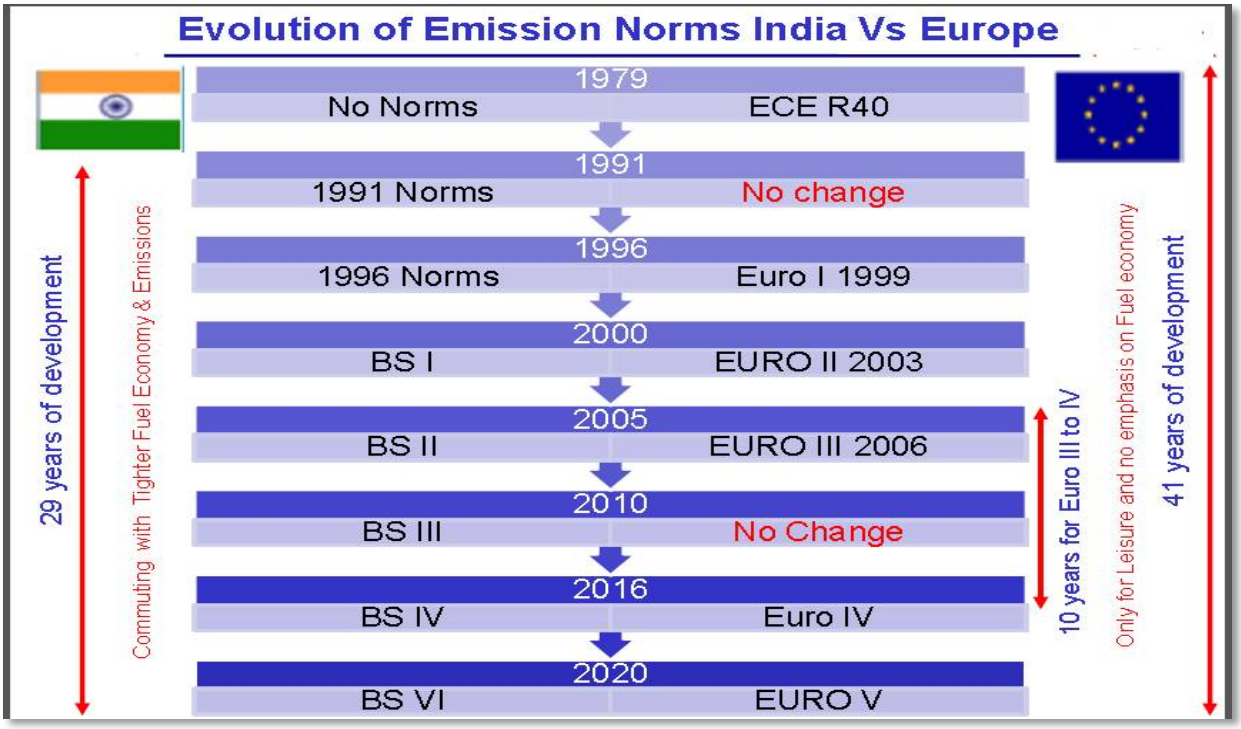
Dr. B. Ashok is Retd Deputy Project Director in ADA. He is an expert in shape memory alloys and active researcher in other aerospace materials and functional materials- its Design and application. He is very active member of ASM and has championed for its cause. He is also involved in guiding several PG students. He has several research publications to his credit.

ASM INTERNATIONAL
Bangalore Chapter – News Letter
Issue 1: May 2020

Challenges and Opportunities for Engineers: Two Wheeler BS 6 Emission Norms

by Mr. Sandur Ajith Kumar – R&D Consultant

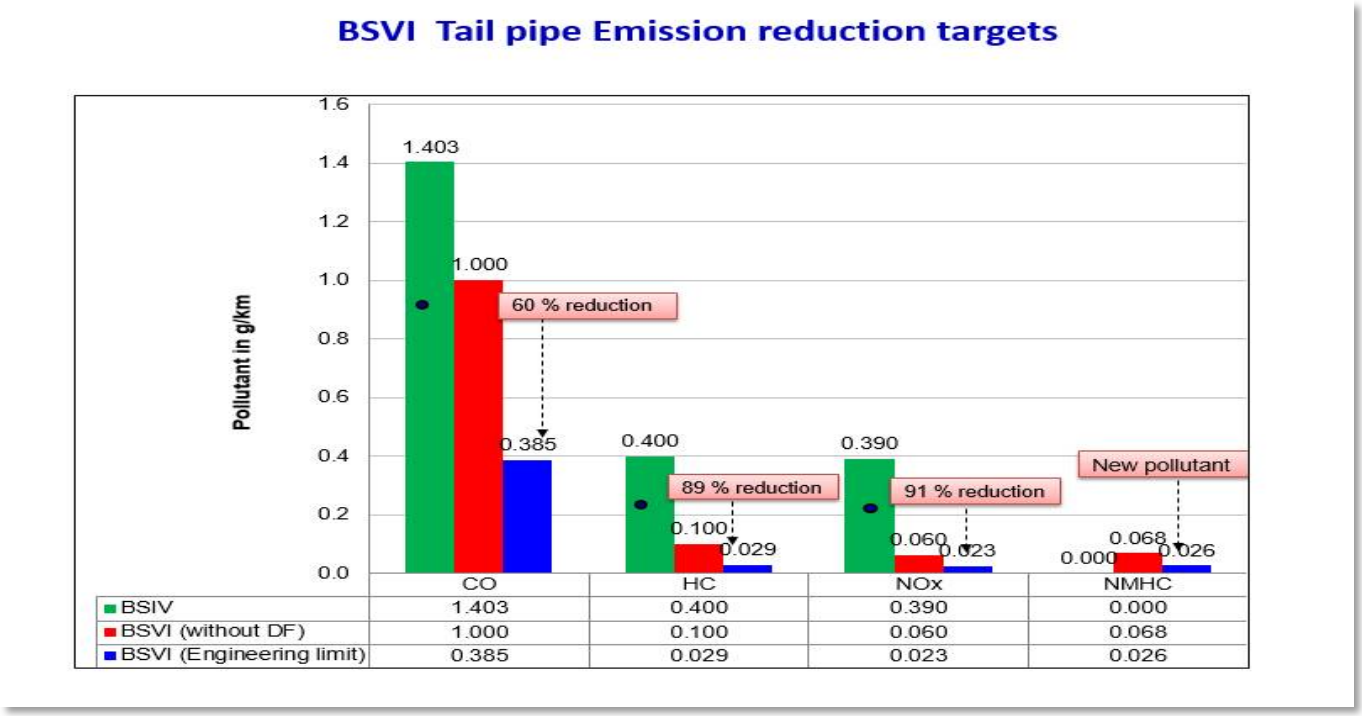
Indian Automotive industry deserve kudos and applause for reduction of vehicular emissions ahead of rest of the world. While Europe have taken 41 years to reach Euro 5 norms and yet to implement Euro 6 norms, India has taken only 29 years to reach BS 6 norms (equivalent of Euro 6 norms).



It gives enormous sense of pride to feel that Indian engineers can beat any challenge and make 'im'possible things possible. In terms of engineering language, leapfrogging from BS 4 to BS 6 (skipping BS 5 norms) within 3 years was difficult to comprehend for any 2 wheeler or 4 wheeler industry.

To provide sense of gravity of challenge, 2 wheeler norms are discussed

	gm / km , max.				Evaporative Emission Max (gms/test)	On Board Diagnostics Stage I
Norm	CO	HC	NOx	NMHC		
BS 4	1.403	0.4	0.390	-----	2.0	-----
BS 6	1.000	0.1	0.060	0.068 (New)	1.2	Identifying and reporting malfunctioning (Till 2023)
Reduction %	60	89	91		40	



Note: BSVI -Engineering limit: Typical Internal Targets set by the companies to meet the BSVI NORMS

CO – Carbon Monoxide, HC – Hydrocarbons, NOx – Nitrous oxides NMHC-Non methane hydrocarbons

Indian 2 wheeler industry has risen to the occasion quite successfully by adopting new technologies and innovations in Design, Materials and processes, as below. The list is typical; though different manufacturers may have adopted variations.

1) Combustion system improvements and optimization
2) Switch over from Carburetor to Electronic Fuel Injection system
   - Port fuel injector
   - Electronic Control system (ECU) with suitable sensors for optimum and load dependent injection of fuel thru close loop monitoring and control of parameters like Inlet air temperature and pressure, Engine RPM, Coolant temperature, Throttle opening angle, engine temperature, crankshaft position, exhaust gas evaluation (Oxygensensor) etc
3) Two catalytic convertors (Main catalytic convertor and Optional Pre- catalytic convertor)
4) Changes in Internal configuration of catalytic convertor to enhance dwell time for reactions between exhaust gases and catalysts
5) Carbon canister in fuel line to reduce evaporative emissions
6) Better sealing of external fuel lines
7) BS 6 fuel with Sulphur less than 10 ppm (Sulphur content 50 ppm in BS 4 fuel) in the Market. This is facilitated by Refineries like IOC, BPCL, HPCL etc

Similarly, Indian 4 wheeler industry also has been quite successful in by adopting newer technologies and innovations.

Besides helping reduction of emissions, fuel economy will definitely improve by more than about 5 % across all industries.

Indian engineer fraternity have accomplished which no other fraternity in the world can boast of.

About the Author
Mr. Sandur Ajith Kumar, ME (Metallurgy)
Worked in Earthmoving equipment, Tractors, 4 wheelers and presently in 2 wheeler industry. Total 36 years of industrial R&D, Production, QC and project management of Green field projects. Presently working as Consultant, R&D, High level Expert in Failure Analysis, Oils and lubricants, Value engineering, New material and process technologies, Heat Treatment, Applications of Polymer Engineering, Alternate fuels

ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Chapter Activities – 2019 - 2020

ASM Bangalore Chapter - 10 Years Anniversary Celebration
April 26, 2019 @ Bangalore Golf Club

Technical Talk on "*Failure Analysis of Engineering Components - Case Studies*"	
Date / Venue	April 26, 2019 / Bangalore Golf Club, Bangalore
Speaker	Dr. R. Raghavendra Bhat, DGM, Central Laboratory, Hindustan Aeronautics Limited, Bangalore.
Special Programme	Attendee's Include Founder Chairman – Bangalore Chapter – Dr. Raghunath – (GM HAL) Mr. Sridharan – Chairman Indian National Council - ASM Mr. Premkumar Aurora – Trustee ASM International

"Leadership Day's @ ASM Head Quarters – Materials Park	
Date / Venue	August 8 - 10, 2019 / Cleveland, Ohio
Participant	Dr. J. R. Nataraj, Treasurer, ASM (I) Bengaluru Chapter, attended the Leadership Days Programme.

ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

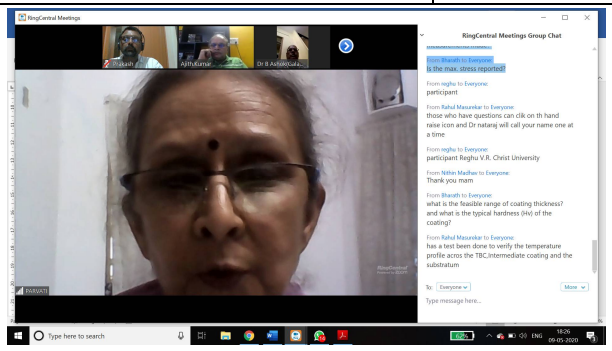
Special Events & Highlights

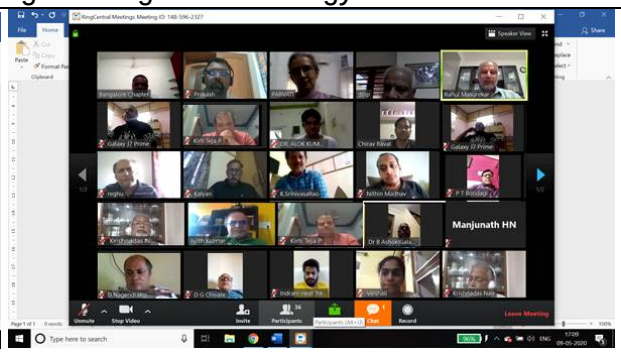
ASM Bangalore Chapter – goes ONLINE

First Zoom Meeting - Executive Council Meeting	
Date / Venue	April 18, 2020 / Zoom Meeting
Speaker / Programme	This meeting was conducted on Zoom Meeting Platform (Online Meeting) and it was well attended by record 16 members.

First ASM Bangalore Webinar – On Ring Central Platform

Technical Talk on "*Advances in Thermal Barrier Coatings and Refractories from Aluminum Dross (an industrial waste): Materials Processes, Systems and Prospects*"	
Date / Venue	May 9, 2020 / Webinar 42 Participants
Speaker / Programme	Dr. Parvati Ramaswamy Prof Dept of Mechanical & Automobile Engineering School of Engineering & Technology – CHRIST University





ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Workshops & Seminars

"Two Day Workshop on Material Testing"	
Date / Venue	August 23rd & 24th, 2019 @ MSME Seminar Hall, Rajajinagar Industrial Estate, Bangalore
Speaker / Programme	Mr. K. Devaraj, Director, MSME Development Centre, was the Chief Guest and inaugurated the event.

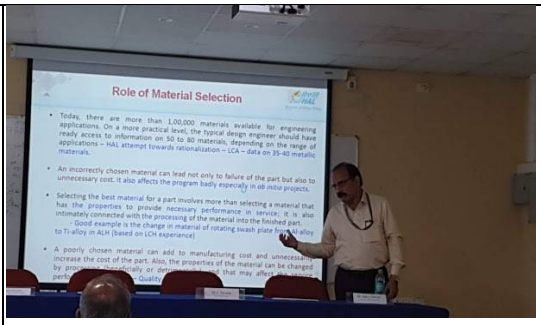
On Day 1 - August 23rd, 2019

- Introduction to Materials Testing – by Mr. V. Babu Sathian, Past Chairman
- Mechanical Testing – by Dr. R. Raghavendra Bhat, AGM, HAL,
  "(Tensile Testing: Young's Modulus, Yield Strength, Toughness); "Bend/Flattening Tests and other Topics" and "Hardness Testing and Impact Testing"
- Chemical Analysis – by Dr. B. Ashok, ADA
- NDT (LPI, MPI, Ultrasonic) - by Mr. Vishnupant Misale, Ex ISRO,
- NDT Live Demonstrations – by M/s. Pallakki NDT Excellence Centre
  "NDT (Radiography, Eddy Current & Advanced Techniques)"

On Day 2 - August 24th , 2019

- Analytical Methods – by Mr. S. S. Avadhani, CMTI
  "Portable Spectrometer"; "Emission Spectrometer"; "X-Ray Fluorescence"; "ICP-AES (inductively coupled and Atomic Emission Spectrometry); "Infrared Spectrometer" and "Advanced Analytical Methods"
- Fatigue and Creep Testing – by Mr. Ajith Sandur, Consultant with TVS,
- Lab Visit & Live Demonstrations – by M/s. Geological and Metallurgical Laboratories
  "NDT (Radiography, Eddy Current & Advanced Techniques)"

- Photo session and distribution of participation certificate to all participants



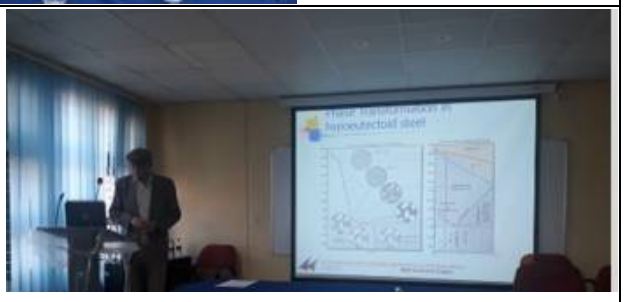
ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Workshops & Seminars

One Day Workshop on *"Metallurgy and Heat Treatment for Non-Metallurgists"*	
Date / Venue	February 8, 2020 / MSME Development Institute, Rajajinagar Industrial Estate, West of Chord Road, Bangalore
Total Participants	86 Paid Participants 7 Commercial Banner Displays
Special Highlights Panel Discussion	Panelists were - Mr. Rahul Masurekar (Moderator), Mr. K S Subraya Dr. B Ashok, Mr. Ajith Kumar Sandur, Mr. Manu Sridhar,



Programme Topics

- Basics of Metallurgy– by Mr. V. Babu Sathian, Past Chairman – MD Process Pumps
- Materials Processes – by Dr. B. Ashok, Retd Scientist ADA
- Heat Treatment Basics – by Dr. T. S. Prasanna Kumar, Retd. Professor, IIT-Madras
- Surface Heat Treatment Technologies – by Mr. R. Arumugam, Consultant
- Induction Hardening – by Mr. Manu Sridhar, EFD Induction
- Quality Assurance and Inspection Testing – by Mr. Ajith Kumar Sandur, TVS Hosur

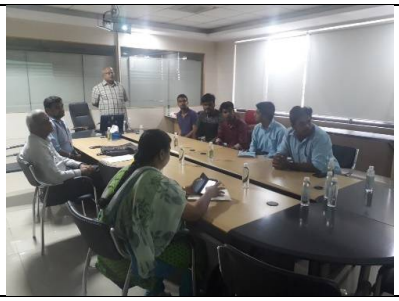
ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Student Engagements

"Cambridge Institute of Technology – Interaction with Students "	
Date / Venue	May 18, 2019 / KASSIA, Bangalore
Speaker / Programme	Dr. B. Ashok, ADE, Bangalore, made a presentation on - "How the ASM International Portal can be used/navigated for the benefit of Students?" and Mr. R. B. Dilip, Chairman, ASM Bangalore Chapter, made a presentation on "Benefits of Students Membership". Special initiative of Mr. Sagar from Cambridge Institute of Technology".

"One Day Workshop on Introduction to Materials Engineering" Exclusively for the Students Members	
Date / Venue	September 27, 2019 / MSME Seminar Hall, Rajajinagar Industrial Estate, West of Chord Road, Bangalore
Speaker / Programme	**Dr. Ashok** - *"An Overview of Engineering Materials"* **Mr. Ajit Sandur** - *"Materials Processes"* **Mr. Bindagi** - *"Advanced Material Deposition Process without Heat Input".*
The Workshop comprised of theoretical class room sessions in the forenoon and post lunch followed by Industrial visit to Foundry - M/s. Ace Designers Ltd.	





ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

ASM - IIM Technical Lecture / Talks

"Computational Materials Engineering and the Future of Structural Alloy Design and Application"	
Date / Venue	September 19, 2019 / MRC Auditorium, Materials Research Center, IISc, Bangalore
Speaker / Programme	**Dr. David Furrer, President, ASM International.** Senior Fellow, Discipline Lead, Materials & Processes Engineering Director, Manufacturing Technologies Development Pratt and Whitney, East Hartford, CT, USA
This was followed by Get-together and Dinner at New Golf Club House, Sankey Road, High Grounds, Bangalore.	

"AIRCRAFT MATERIALS - AN OVERVIEW“	
Date / Venue	January 17, 2020 / IISc, Bangalore
Speaker / Programme	Dr. Kishora Shetty, Engineering Lead - Manufacturing Technology Integration, M/s.Boeing India Pvt. Ltd

ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Technical Lecture / Talk

"Science of Rolling Contact Fatigue and its effect on Material Behavior"	
Date / Venue	June 15, 2019 / KASSIA, Bangalore
Speaker / Programme	Sri Vasanth T S, Senior Failure Analyst, SKF Technologies India Pvt Ltd, Global technical Centre India, Bangalore.

"Novel Methods of Machining for New Age Materials and Super Alloys"	
Date / Venue	December 21, 2019 / KASSIA, Bangalore
Speaker / Programme	Mr. Ashok Kumar D., Product Marketing Head, WIDIA INDIA & S. E. Asia

Mr. Ashok Kumar D

Mr. Anuraag Srivastava

"Advanced Metal Epoxy Formulations for Gap Balancing in Bridges"	
Date / Venue	February 15, 2020 / KASSIA, Bangalore
Speaker / Programme	Mr. Anuraag Srivastava, Managing Partner – Triumph Engineers & Associates Pvt. Ltd. & DIAMANT Triumph Metallplastic Pvt. Ltd.

ASM INTERNATIONAL

Bangalore Chapter – News Letter

Issue 1: May 2020

Council Meeting

"Annual General Body Meeting"	
Date / Venue	November 23, 2019 / KASSIA, Bangalore
Speaker / Programme	One of the main highlights of this meeting was that the new team of Office Bearers and Executive Council Members were elected for the tenure 2019-2021.

Executive Council Meetings was organized on the following dates

April 20, May 18, June 15, July 20, August 17,September 21,November 16 & on December 21, 2019
January 17, February 15,March 20, and on April 18, 2020 (Zoom Meeting – Online)

Chapter Activities – 2020 - 2021– Planned

1. Memberships	**Drive by Headquarter / India Task Force**
2. Monthly Technical Talks	**To improve consistency and Participation**
3. Student Outreach	**a) Events for Students – Talks + Industrial Visits** **b) Membership & Student Chapter Formation** **c) Support in Projects / Training** **d) Material Camps**
4. Major Events	**a) One/Two Days Workshops / Seminars** **b) Annual Get-together** **c) Annual General Body Meeting** **d) Hosting of INC Meeting / Visiting ASM Leaders** **e) Support to other ASM Chapters / Local Associations in their events.**
5. EC Meeting	**Every 3rd Saturday 6 pm**
6. Technical Talk	**Every 2nd Saturday 5pm if Webinar or** **Every 3rd Saturday 5pm**

ASM International -Bangalore Chapter

Visit **www.asmblrchapter.com** for more details about ASM Bangalore chapter and membership

for Advertisement
pl Call Editor - Mr. Panduranga – Mobile: +91-9686971974