



# Chapter News Letter



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**Omkar Nath Mohanty**

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## EDITORIAL . . . ✍

Dear Readers,

I feel privileged and humbled at the same time, having been invited to be the Guest Editor for the present edition. Information gleaned from past issues has left no doubt in my mind that the ASM Pune Newsletter is a benchmark in its domain; a fine job has been done by previous editors and that the bar has been raised high, creating challenges for me! For example, the Women's Special (#49 of March 2025), while focusing on the great activities by women racers, also dealt with the materials of F1 racing cars. The next issue (#50 of May 2025) focused on the application of Inconel material in valves. Similarly, the issue of July 2025 (#51) carried a comprehensive article on Liquid Feedstock Thermal Spraying by a well-known specialist in the field, Prof. Shrikant Joshi.

The ASM International, Pune Branch, can justly take pride in having arranged excellent technical lectures as well, on varied themes such as IPR/Patents, Smart Materials including Shape Memory Alloys (SMA), and so on.

All this is becoming possible because the Branch is fortunate to have been served by committed office-bearers, year after year. I wish to convey my felicitations and best wishes to the present team (Chairman: DG Chivate; Secretary: Ruta Barve; Vice-Secretary: Deepak Kulkarni; and Treasurer: Kruttika Apshankar-Kher). I have no doubt that the Branch would experience the fragrance of even greater heights under this dispensation!

Coming to the industrialized world of today, it is common knowledge that the automotive sector

plays a critical role in the economy. However, few may be aware that as much as 40 % of the economy is directly or indirectly impacted by automobiles in the advanced countries. Even in India, the **automotive industry contributes ~7-8% of India's total GDP. Within manufacturing GDP, the sector contributes over 40%**, making it one of the largest industrial segments. The automotive sector provides direct employment to ~3 million people, and over 15 million people are engaged in indirect employment (in sectors such as services, components, dealerships, logistics, etc.). The sector supports a vast supply chain including steel, aluminium, electronics, rubber, plastics, and transport services.

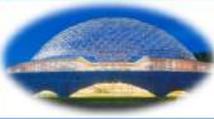


*Omkar Nath Mohanty*

The auto industry represents a strong industrial ecosystem: India is the world's largest market for two-wheelers, among the top 5 for passenger vehicles, a global hub for small cars, auto components, and affordable mobility technologies. The industry has deep linkages with sectors like metals, petrochemicals, machine tools, and IT. The sector represents a strong export segment for the country

that includes cars, two wheelers, commercial vehicles, and auto components (to 160 + countries). Automobile and component exports are valued at tens of billions USD annually, augmenting the balance of trade.

The auto sector is encouraging R&D in several technological areas, such as, auto electronics; electric mobility (EVs); special material development in steel and aluminium; clean fuels (CNG, LNG, Biofuels, Hydrogen); autonomous and connected vehicle technologies. All these spur innovations across domains of manufacturing and engineering services.



The experts on Indian economy are of the view that growth in automobile acts as a catalyst for infrastructure growth such as, road development, logistics networks, fuel infrastructure; warehousing, charging stations for EVs, and so on.

In India, the auto sector also supports MSMEs and regional development in a substantial manner. The industry has over 50% MSME participation. Clusters such as Pune, Chennai, Hosur, Gurgaon-Manesar, Sanand have grown into major industrial hubs because of automotive investments.

Further, it is common experience that automobiles enhance mobility and productivity. Thus, the workforce mobility, agricultural-to-market connectivity, goods transport efficiency, and equally important, the urban and rural connectivity are supported by automobile. All these elevate economic productivity across sectors. Finally, one observes that automobiles represent a source for significant tax revenue through: GST, excise and customs, road tax, and registration fees.

When it comes to pollution and carbon footprint, the internal combustion engines (ICE) burn petrol or diesel and emit CO<sub>2</sub>, NO<sub>x</sub>, methane, and particulate matter. The largest share of global transport emissions (transport ≈ 15–20% of global GHG emissions) is accounted for by road transport. The indirect factors of emission include fuel extraction and refining (well-to-tank emissions), road infrastructure construction and maintenance. Emissions from automotive manufacturing is energy intensive and materials heavy: steel & aluminum production represent among the most carbon-intensive industrial

sectors; battery production for EVs: mining, refining lithium, nickel, cobalt demands large energy use; paint shops: one of the biggest in-plant energy consumers due to heating and chemical emissions, etc. A conventional car can therefore emit 5–10 tons of CO<sub>2</sub>-equivalent before it is even driven (“embedded emissions”). Broadly, the EVs have higher manufacturing emissions (especially battery), and much lower operational emissions, especially when powered by renewables. Over the lifetime, EVs generally have 40–70% lower total emissions than ICE vehicles. The latter, on the other hand, have lower manufacturing footprint than EVs but contribute massive lifetime emissions from fuel combustion. It would be easy to infer that the weight of a vehicle that is primarily governed by the material of construction and design, would be of critical importance from the perspective of carbon footprint.

In consideration of the above, it has been thought appropriate to focus on some of the engineering-cum-material aspects of automobile in the Technical Article that follows.

The platform that has been created under the aegis of the ASM International Pune Chapter is a vibrant body of professional technologists, and many of them are familiar with the automobile segment, Pune being a significant hub in India. I have no doubt they would come up with their own ideas and thoughts on the subject.

With best wishes to the members of the ASM International Pune Chapter, for the New Year 2026!

*Editor*

*Omkar Nath Mohanty*

## Volunteer Yourself For Your Chapter!

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## ASM International Pune Chapter

Guruprasad, 37/4/A, 6th cross Lane,  
Prabhat Road, Pune 411004,  
Maharashtra, India.

Phone #: 91 - 020-25674455 / 0808.

Email: [asm.pune@gmail.com](mailto:asm.pune@gmail.com)

[www.asmpunechapter.org](http://www.asmpunechapter.org)



## TECHNICAL ARTICLE

### Weight Reduction in Automotive: Materials for BIW

#### 1.0 OVERVIEW

As is common knowledge, automobiles for mobility of passengers represent a dominant section of the industrial world. It would be interesting to deal with the materials, in particular the ferrous materials associated with an automobile since they represent at least 60 % of the weight of the total materials used. More so, because when it comes to emissions during the 'running time' of a vehicle, the most important consideration is the weight of a vehicle, and the fuel used for internal combustion. Over the past decades, therefore, light weighting aspects have occupied the attention of both auto designers and materials specialists.

Of the various parts of a car, the Body-in-White (BIW) that is the sheet metal bare shell structure (without closures, seats, trims, and paints) that accounts for ~ 27 % and the power train (engine plus transmission) ~ 22 %. Thus, the two segments represent a significant area for lightweighting.

Conventionally, grey iron with flaky graphite (characterized by a sharp tip) has been used for casting engine components due to its high thermal conductivity, although it possesses low strength and very low ductility. Another variety of cast iron was developed about 75 years back in which the shape of graphite is rather like 'worms' (where the tips are not sharp as in flaky graphite but rounded). It is called, **Compacted Graphite (CG) Cast Iron**, and possesses much higher toughness, strength and stiffness compared to Grey Iron, along with reasonable thermal conductivity. It thus has the potential to reduce the size of engines substantially although it has remained largely unused due to challenges of controlling the chemistry in a narrow range. Over the past two decades, the situation has changed a great deal with M/s. Sintercast of Sweden providing the hardware and software for overcoming the industrial issues; today over 2 million engines per year are produced across the globe. In India however, the CG-based engines are yet to take off.

It is the BIW that is singularly responsible for passenger safety (through crash resistance); it represents a complex engineering product demanding a combination of properties, many of which do not go together. Over the past three decades, a great deal of developments on the structure-property combination have taken place on the steel front that have made new steel-options available to the designers. In a typical modern BIW of a car, the mix of steels is **AHSS, UHSS and PHS** account for 55 - 65% while HSS and Mild Steel together represent around 35 - 45%. This clear shift towards more sophisticated steels with better strength formability combination is due to the emphasis on higher crash resistance (passenger safety) and the possibility of light weighting. If not all, a good number of these new variety of steels have now been identified also for BIW in the Indian auto sector.

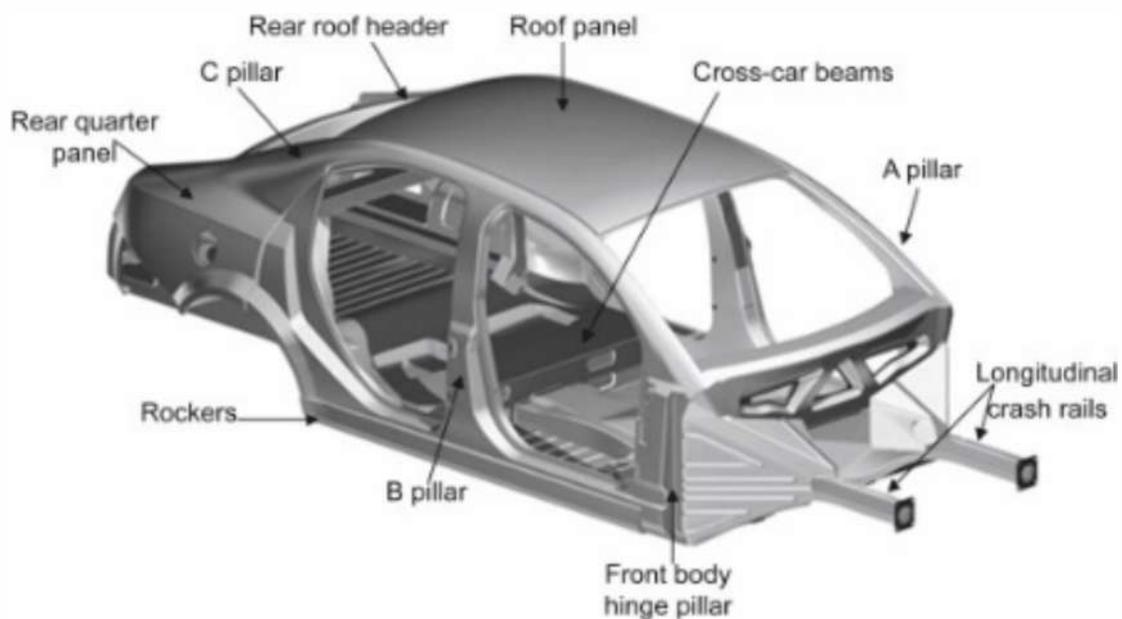
The present report deals with the sheet steels used in BIW, the focus being on new developments.

#### 2.0 THE BODY-IN-WHITE (BIW) AND NEW STEELS

The Body-in-White (BIW) refers to the welded sheet-metal structure of a car preceding painting and before adding trim, engine, or chassis components.

## 2.1 BIW in monocoque (unibody) vis-à-vis body-on-frame design

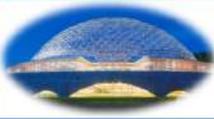
It may be useful to broadly differentiate between the monocoque (unibody) and the body-on-frame designs of BIW for a vehicle in order to appreciate the subject of steels used. From the basic construction point of view, in the monocoque design, the body and frame are integrated as a single structural shell and loads are carried through the entire body structure. In the body-on-frame design, on the other hand, a separate frame (ladder, perimeter, backbone) supports the powertrain, suspension, and body. The body is bolted on top and is non-structural or semi-structural. From the perspective of structural, unibody utilizes crumple zones, load paths, and the stress-optimized BIW offers high torsional stiffness for lower weight. A body-on-frame design on the other hand, is strong in vertical loads and offers torsional flexibility; it is helpful in uneven terrains and allows torsional twist without damaging the cabin. Generally, unibody is lighter, improving fuel efficiency and the body-on-frame is heavier. In terms of crash safety, unibody is generally better for crash energy management due to tailored crumple zones. In a body-on-frame design, the cabin protection strong in low-speed impacts, but high-speed crash energy absorption is less controlled compared to unibody. From the manufacturing standpoint, unibody requires complex stamping, spot welding and BIW assembly; it thus demands higher investment in dies and automation more suited for mass production. Body-on-frame is modular, different bodies can be mounted on the same frame, require cheaper tooling ideal for commercial vehicles, trucks, SUVs. Broadly therefore, for monocoque (unibody) cars, the BIW itself provides the main structural strength — it integrates the chassis and body. Monocoque design is more common for cars while the body-on-frame is adopted more by trucks. A simplified picture of a monocoque BIW is given below (Fig. 1).



**Fig. 1: A schematic BIW showing its major components**

In the manufacturing of the BIW a combination of complex aspects and characteristics are taken into account. In simple terms, these are:

- (i) Physical characteristics and quality (Strength, Stiffness, Durability)
- (ii) Costs (Manufacturing, Operational, Use, Maintenance)
- (iii) Ease of production (Formability, Joinability, Paintability)



- (iv) Styling and space optimization (Design Freedom, Cross Sections, Surface Quality)
- (v) Environmental impact (Energy Consumption / CO2 – emission)

**2.2 Steel-mix in a monocoque BIW**

In a typical passenger car (with conventional internal combustion engine), the BIW accounts for 25-30 % of the total vehicle weight. Modern vehicle bodies—whether unibody or shell-on-frame—have shifted toward advanced steels due to emissions & fuel-efficiency regulations, crash safety standards, weight reduction pressures, electric vehicle (EV) battery-pack protection needs, cost competition with aluminum and composites. As a result, newer generations of AHSS, UHSS, press-hardened steels, and multi-phase steels dominate current designs. A broad look at the various parts in a car and the corresponding steel types are given below (Table I – VII):

**Table I: Overall steel mix in a modern monocoque BIW**

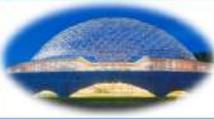
Steel Grade Category	Typical % of BIW Weight
Mild Steel (MS)	10–20%
High-Strength Steel (HSS)	25–35%
Advanced High-Strength Steel (AHSS)	25–35%
Ultra High-Strength Steel (UHSS) (including martensitic)	10–15%
Press-Hardened Steel (PHS) / Hot-Formed Steel (HFS)	5–10%
Others (stainless, special steels)	<1%

**Table II: Steel mix in car structural regions - A**  
(front crash structure: front rails, crush boxes, upper rails)

Steel grade	Use within region (%)	Why used
HSS	40–50%	Energy absorption, controlled deformation
AHSS	20–30%	Higher strength for crash load paths
Mild Steel	10–20%	Easy formability for outer reinforcements
UHSS / PHS	5–10%	Local reinforcement near cabin firewall

**Table III: Steel mix in car structural regions - B**  
(Passenger Safety Cell: A/B/C pillars, roof rails, rocker panels, tunnel)

Steel grade	Use within region (%)	Remark
UHSS (Martensitic)	30–40%	Pillars and sills for intrusion protection
PHS (Press-Hardened Boron Steel)	20–30%	B-pillar reinforcements, roof rails



AHSS	20–25%	Helps maintain cabin shape
HSS	10–15%	Secondary reinforcements

**Table IV: Steel mix in car structural regions - C**  
(Floor Panels, Underbody Crossmembers)

Steel Grade	Use (%)	Purpose
HSS	35–45%	Strength/stiffness balance
Mild Steel	20–30%	Large, stamped floor pieces
AHSS	20–30%	Crossmembers & load paths
UHSS	<5%	Local crash rails

**Table V: Steel mix in car structural regions - D**  
(Roof Panel & Roof Rails)

Steel Grade	Use (%)
HSS	30–40%
AHSS	30–40%
PHS/UHSS	10–20%
Mild Steel	10–20%

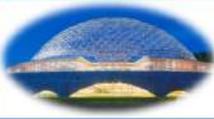
*[Roof crush standards often require PHS in the pillars & rails]*

**Table VI: Steel mix in car structural regions - E**  
(Doors: Outer panels and inner reinforcement)

Component	Typical Steel
Outer skin	Mild Steel (or Aluminium in premium models)
Door beam	UHSS / Martensitic
Inner panels	HSS

**Table VII: Steel mix in car structural regions - F**  
(Rear Crash Structure (Rear rails, bumper reinforcements))

Steel Grade	Use (%)
HSS	40–50%
AHSS	20–30%
Mild Steel	20–30%
UHSS	<10% localized



Broadly therefore, a typical modern vehicle BIW contains:

**New Steels (AHSS + UHSS + PHS) = 55–65%; Conventional Steels (HSS + Mild Steel) = 35–45%**

The above data shows a clear shift towards stronger steels (higher strength) in modern car BIW. This is due to light-weighting (for reduced emission) along with the necessity to conform to safety standards (NCAP).

*[The NCAP (New Car Assessment Programme) is an independent vehicle safety rating programme that evaluates the crashworthiness and safety performance of cars. There are regional / country ratings. The NCAP provides objective safety ratings to consumers; the ratings are usually expressed in stars (1 to 5 or 1 to 6), where more stars indicate higher safety. NCAP evaluates both adult occupant and child occupant protection, as well as pedestrian safety and safety-assist technologies.]*

### 2.3 New steels and their characteristics for use in a BIW monocoque (unibody)

It will be easier to appreciate the use of new steels, and their strength going considering various components in the monocoque (unibody) designs that rely heavily on predictable deformation and rigidity. This makes high-strength steels extremely important in specific load paths (A-pillars, B-pillars, sills, roof rails, etc.).

#### (i) Third Generation Advanced High Strength Steels (AHSS)

For A- and B-pillars, Rocker reinforcements, Roof rails, and rear longitudinal members, the manufacturers are demanding better ductility than first and second generation AHSS, for high energy absorption for frontal/side crash, and going for thinner sections for weight saving. Some of the newest mainstream steels include: 980 MPa Medium-Mn Steel, 1180 MPa TRIP/TWIP-type, and 1180/1470 MPa Q&P (Quench & Partitioning) steels.

#### (ii) Press hardened steel (PHS) steel (also known as Boron Steel 22 MnB5)

For Door intrusion beams, B-pillar reinforcements, Front bumper beams and EV battery enclosure crash rails, several new steels are in use. These include, 1500 MPa PHS (common today), 1800–2000 MPa PHS (emerging), Tailor-tempered PHS (hard + soft zones in same part) and PHS 2000 (for EV battery protection) and so on.

#### (iii) Dual-Phase (DP) Steels – Updated High-Strength Versions

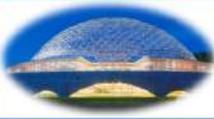
For Floor cross members, Rear rails, Suspension mounting regions, DP 980 and DP 1180 steels are being used due to high work-hardening, ideal for controlled deformation.

#### (iv) TRIP / TWIP Steels (Next-Gen)

In crash zones and crumple zone front rails, manufacturers have started the use of TRIP800–1180 MPa, and TWIP steel ~700–1000 MPa with extreme elongation to ensure high ductility and energy absorption. The manufacturers have started the use of TRIP800–1180 MPa, and TWIP steel ~700–1000 MPa with extreme elongation.

**A broad study of modern monocoques** shows that a combination of new steels is used such as, third generation AHSS, 1500 MPa PHS, DP steels and martensitic steel patches. Further, laser welding is used to produce tailored blanks using these steels.

[ It may be further noted that modern closures (hood, fender, tailgate) also make use of aluminium alloys]



## 2.4 New Steels in Shell-on-Frame (Body-on-Frame; BOF) Construction

Body-on-frame vehicles (SUVs, pickups) prioritize torsional strength, durability, towing capacity, and off-road robustness as the requisite characteristics. Their material evolution is different from what has been shown as right for monocoque design.

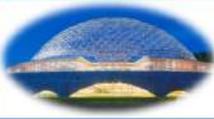
Some examples of new steels in BOF are:

- (i) **Hydroformed high strength steel frames** based on, HSLA 550–980 MPa, hydroformed martensitic rail sections and optimized closed-section boxed frames  
*[Hydroforming increases strength without significant weight penalty]*
- (ii) **New HSLA Steels: Modern frames** use: HSLA 550, 600, 700 that provide improved weldability and fatigue life. These are used for side rails, cross-members, and suspension brackets, etc.
- (iii) **Ultra-High-Strength Steels for Frames.** Some manufacturers now use UHSS for rails of 980–1180 MPa martensitic sections - Tailor-rolled or tailor-welded frame members  
*[Purpose: Crash energy management that is traditionally weaker in body-on-frame]*
- (iv) **New Frame Trends: Closed-box steel frames** (e.g. Ford F-150, Toyota Land Cruiser)  
High-strength steel ladder frames with integrated crash nodes, with composite + steel hybrid frames (*GMC Sierra/Denali new gen*)
- (iv) **Steels for EV Skateboard Platforms** (EVs require strong, thin, fire-resistant structures). Newer steels include: 2000 MPa PHS for battery protection; High-ductility AHSS for floor assemblies, High strength (1180–1500 MPa) cross-members Battery enclosures increasingly use: ultra-high-strength steel tubs and fire-resistant coated steels.

## 2.5: A Quick Comparison Table for New Steels

*Table-VIII: Comparison Table for New Steels*

Steel Type	Typical Strength	Use in Unibody	Use in Body-on-Frame	Remark
3rd Gen AHSS	800–1200MPa	✓✓✓	✓	Latest mainstream solution
PHS / Hot-formed	1500–2000MPa	✓✓✓	Rare (but increasingly used for crash)	Extreme strength, low ductility
DP Steels	600–1200MPa	✓✓	✓✓	Very common
TRIP/TWIP	800–1200MPa	✓✓	Occasional	High energy absorption
HSLA Steels	350–700 MPa	✓	✓✓✓	Backbone of BOF frames
Martensitic	1200–1500MPa	✓✓	✓	Used selectively
Tailor-Welded/Tailor-Rolled	Varies	✓✓✓	✓	Weight reduction +strength tuning



### 3.0 CLASSIFICATION OF VARIOUS AUTO-STEEL GRADES

Extensive research has been carried out (and still being done) to provide steels that fulfill the requirements of the automotive sector. Consequently, the literature available is extensive.

Descriptive terminology has evolved to describe the “First Generation” of AHSS, i.e. steels that possess primarily ferrite-based (not always though) microstructures and the “Second Generation” of AHSS, i.e. austenitic steels with high manganese contents which include steels that are closely related to austenitic stainless steels. First generation AHSS have included a variety of steels, including dual phase (DP), transformation induced plasticity (TRIP), complex-phase (CP), and martensitic (MART). Second generation austenitic AHSS include twinning induced plasticity (TWIP) steels, Al-added lightweight steels with induced plasticity (L-IP®), and shear band strengthened steels (SIP steels). Some types of AHSS have a higher strain hardening capacity resulting in a strength-ductility balance superior to conventional steels. Other types have ultra-high yield and tensile strengths and show a bake hardening (BH) behavior.

Recently there has been increased interest in the development of the “Third Generation” of AHSS, i.e. steels with strength-ductility combinations significantly better than exhibited by the first generation AHSS but at a cost significantly less than required for second generation AHSS. Approaches to the development of third generation AHSS will require unique alloy/microstructure combinations to achieve the desired properties. Results from modeling analysis have shown that the third generation of AHSS will include materials with complex microstructures consisting of a high strength phase (e.g. ultra fine-grained ferrite, martensite, or bainite) and significant amounts of a constituent with substantial ductility and work hardening (e.g. austenite).

Additional higher strength steels include press hardening (PH) steels and steels designed for unique applications that have improved edge stretch and stretch bending characteristics, these concepts used for formability.

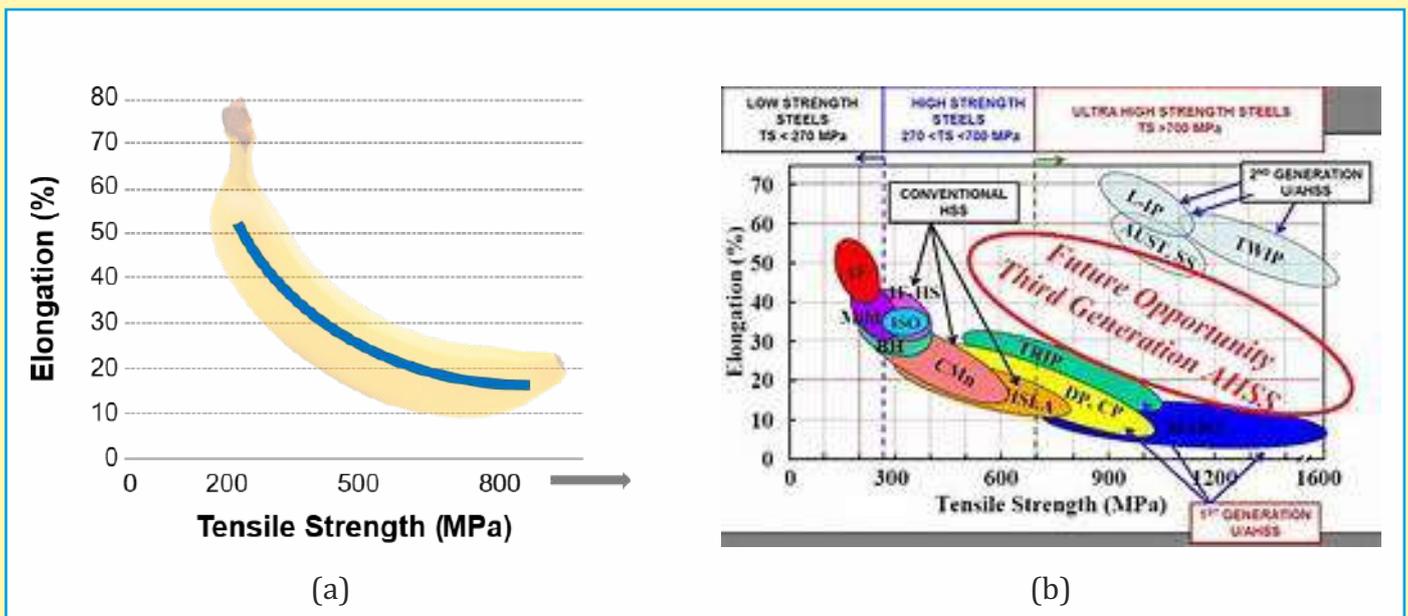
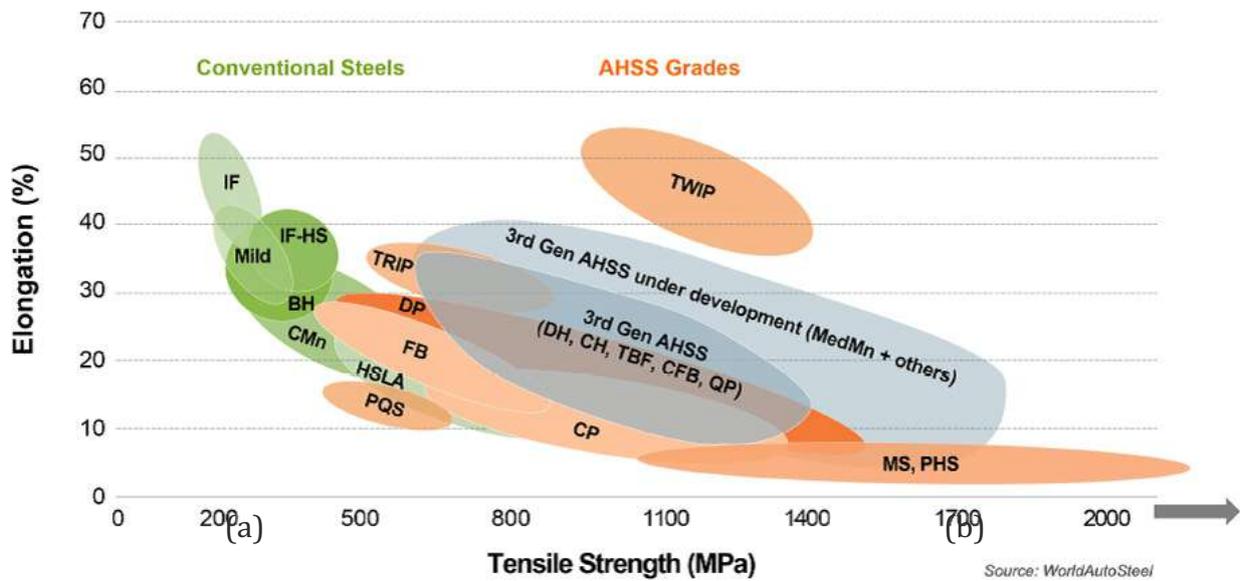


Fig.2 (a): Conceptual Banana Diagram (b) : Earlier status of various steels on a 'banana' diagram

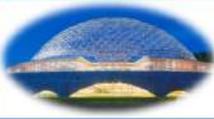
In order to show the steels on a single diagram useful to the engineering world, a simple diagram, often referred to as a Banana Diagram (Fig.2), is used, indicating the relationship between strength and ductility. The common thinking used earlier a broad inverse relationship between these properties; higher strength resulting in a drop in ductility. Over the past fifty years, research has shown that steel has the potential of combining these apparently opposite characteristics by a combination of microstructural features that in turn could be produced by a more precise processing (thermal and thermos-mechanical) routes.



**Fig.3: Global Formability Diagram (GFD) Showing Varieties of Steels (Current & Emerging); courtesy: World Steel Association**

**Table IX: Summary of various generations of auto steels and their characteristic**

AHSS Generation	Typical Steel Grades	Microstructural Features	Tensile Strength (MPa)	Total Elongation (%)	Key Characteristics	Typical Automotive Applications
First Generation AHSS	DP (Dual Phase), TRIP, CP (Complex Phase), Martensitic (MS)	Ferrite + Martensite (DP), Retained Austenite (TRIP)	600 – 1200	10 – 25	Good balance of strength & formability; work-hardening via martensite or TRIP effect	BIW structural parts, B-pillars, rails, cross-members
Second Generation AHSS	TWIP, Austenitic Stainless Steels	Fully austenitic; twinning induced plasticity	700 – 1000	30 – 60	Exceptional ductility and energy absorption; high Mn content (15–25%)	Limited use due to cost; crash-energy absorption components



Third Generation AHSS	Q&P, TBF, Medium-Mn steels	Ferrite + Martensite + Retained Austenite	800 – 1200	20 – 35	Combines high strength of Gen-1 with ductility approaching Gen-2; lower alloy cost	Next-gen BIW parts, complex stampings
Press-Hardened Steels (PHS) (often grouped separately)	22MnB5, Al-Si coated boron steels	Fully martensitic after hot stamping	1300 – 2000	5 – 10	Ultra-high strength; excellent dimensional accuracy	A-/B-pillars, roof rails, door intrusion beams
Fourth / Emerging AHSS (R&D stage)	Nano-structured steels, HEA-inspired steels	Nano-laminate / multi-phase	>1200 (target)	>30 (target)	Aims for unprecedented strength-ductility synergy	Future lightweight vehicle structures

As a result of the new developments and the emergence of the Third Generation AHSS, the diagram now looks somewhat different (Fig.3). It is now referred to as the Global Formability Diagram (GFD), although there are other names (e.g. Bubble Chart) that people associate it with.

In less than a decade, the **AHSS portfolio has nearly doubled**—from 38 commercially available grades in 2017 to nearly 70 today—giving engineers unprecedented flexibility to design lighter, stronger, and more sustainable vehicles,” says Russ Balzer, Technical Director, World Auto Steel. “The next frontier in AHSS innovation is not just about developing new grades but mastering the ones we already have—optimizing manufacturing techniques and processes to unlock their full potential in tomorrow’s passenger vehicles.

In conclusion, one can see that the number of grades of steels that have been developed for specific applications in a car body is truly impressive. More exciting developments are in the offing. One expects to see the segment developing further. One other aspect that needs to be highlighted here is the fact that the automotive designers and steel / material scientists have to work hand in hand in order to take the field to even greater heights. The Key Trends across generations are:

- Strength increases from Gen-1 → PHS → Emerging AHSS
- Ductility peaks in Gen-2 (TWIP) but at high alloy cost
- Gen-3 AHSS is the industry sweet spot for mass-market vehicles
- Shift from cold stamping → hot stamping → tailored properties

# TECHNICAL LECTURES

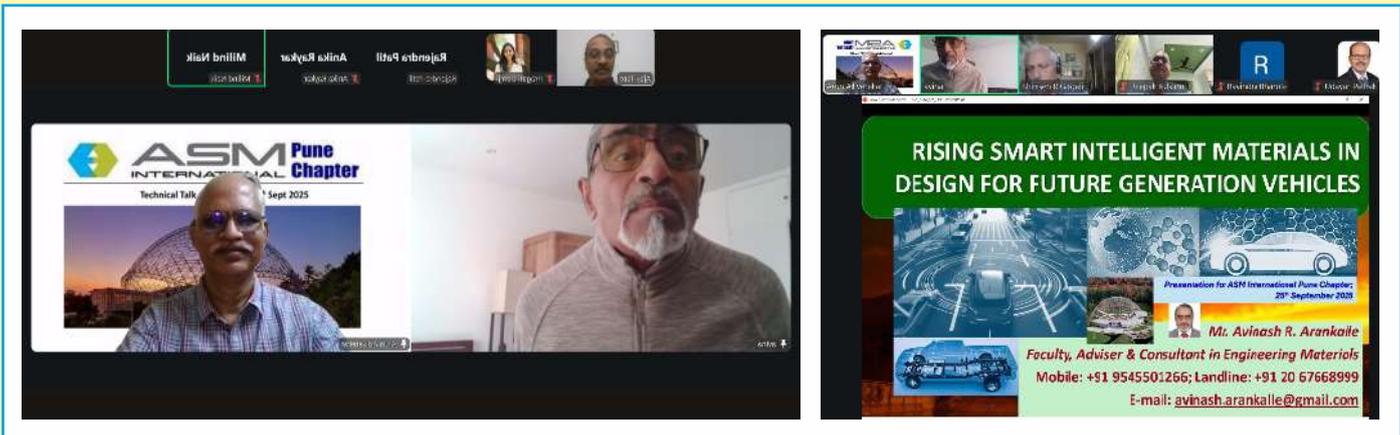
A technical lecture is being arranged every month by Mr. Adiverekar ASM International Pune Chapter. A brief of the lectures since August is given below:

The first lecture on "The unsung challenges of future competition and the role of IPR" was conducted online by Mr. Ravindra Bharole (TEAM INFINITY) on 28th August where he delivered his talk and shared his experience in IPR, worldwide IPR statistics, India patent statistics, challenges of future competitions, roll of IPR in business growth, patent application filing properties and structure, the procedures for the grant of patents, copyrights, design, trademark, GI, trade secrets and examples related to these. Around 15 people including Executive Committee (EC) members & Students from Cummins college Pune - Material Advantage Chapter, were present.

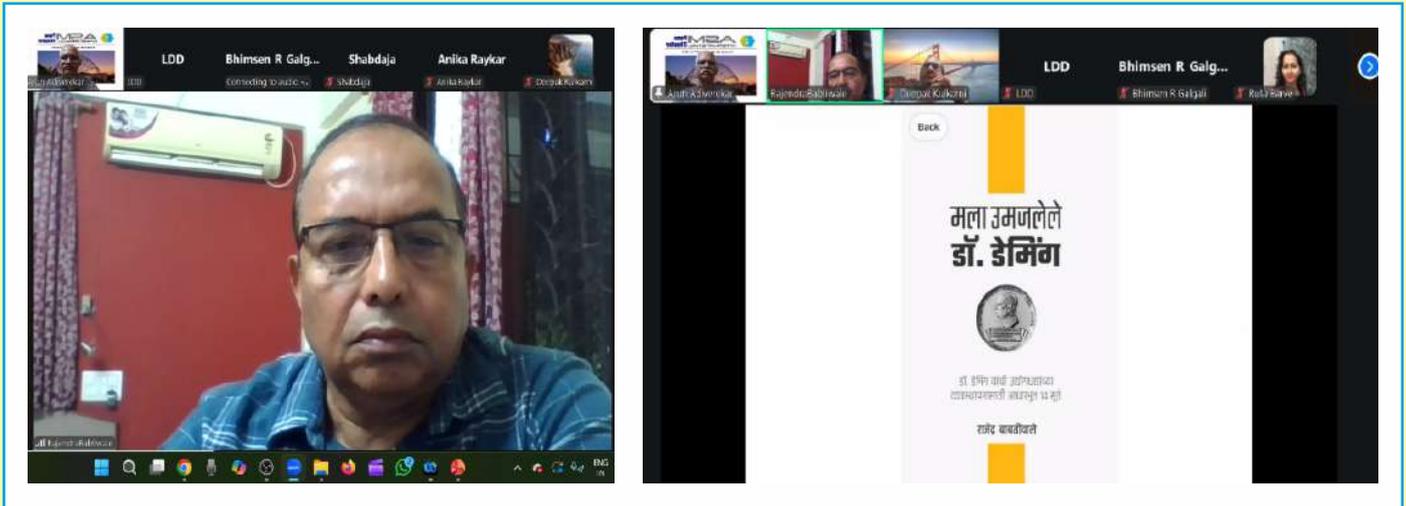


The vote of thanks was given by Ms. Anika Raykar, a student from the MA chapter of CCOEW, Pune.

The second online technical talk about 'Rising smart intelligent materials in design for future generation vehicles' was given by Mr. Avinash Arankalle on the 25th of September 2025. The speaker shared his experience and research on smart materials covering the path to innovative smart intelligent materials, their types and their benefits. He also elaborated on Shape Memory Alloys (SMA), piezoelectric materials, electrostrictive, magnetostrictive materials, electro-rheological (ER) materials and the auto applications of all these materials. A total of 24 participants were present for the lecture. The vote of thanks was given by Ms. Pragati Demji, a student from the MA chapter of GIT college of engineering, Belagavi.



The third online technical talk was given by Mr Rajendra Babtiwale on 'Dr Deming's Philosophy for Survival and Excellence' on 30th October. Mr. Babtiwale is associated with Anaar consultancy group ([www.Anaar.com](http://www.Anaar.com)) in Detroit, USA to spread Dr Deming's philosophy to 'Become Globally Competitive'. He is also the author of the book 'मला उमजलेले डॉ. डेमिंग' in Marathi on Dr. Deming's 14 principal to manage businesses successfully.

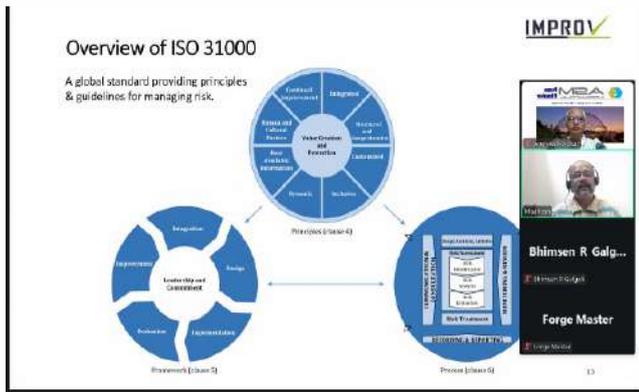
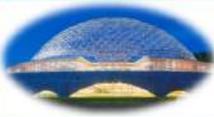


The speaker shared Dr Deming's 14 Principals for Management and elaborated in detail with industry practices/ examples and his experience in the manufacturing industry and IT sector. He concluded the session with guiding of Anaar Roadmap which covers all 14 Principles of Dr Deming's Philosophy. ASM International Pune's EC members, Individual members, Tech Committee members & Students from ASM Material Advantage Chapter i.e. more than 20 participants were present during this Tech Talk Session. The session was very informative & interactive, ended with the appreciation from the present industry members. The vote of thanks was given by Ms Anika Raykar Student from MA Chapter from CCOEW, Pune.

The online technical talk held on 25th November was delivered by Mr Mahesh Deosthale (Consultant-IMPROV Consulting and Knowledge solutions Pvt ltd) on 'Risk Management made easy for Materials Professionals'. The speaker shared an overview of ISO 31000 (a global standard providing principles & guidelines for managing risk), key success factors for Matured Risk Management Practices, how to integrate ISO 31000 and ISO 9001(Quality Management), risk responses and key risk techniques e.g. Swiss cheese model and the Johari window. He also discussed two case studies on implementation of risk management principles and took poll questions during the session which engaged the audience effectively.

Mr. Mahesh Deosthale specializes in Program and Project Management, Risk Management, and IT Service Management, with a proven track record in solution design and driving improvements for organizations worldwide. He holds multiple professional credentials, including ISO 31000 Risk Manager, NIST Risk Management Implementer, PRINCE2 Approved Trainer, GDPR Data Protection Officer, and a Post-Graduate Diploma in Cyber Law. A total of twenty-two participants were present during this Tech Talk Session. The vote of thanks was given by Ms Anika Raykar Student from MA Chapter from CCOEW, Pune.

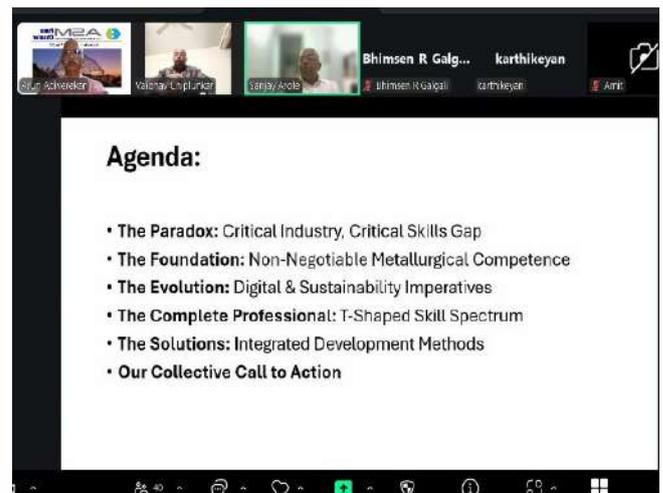
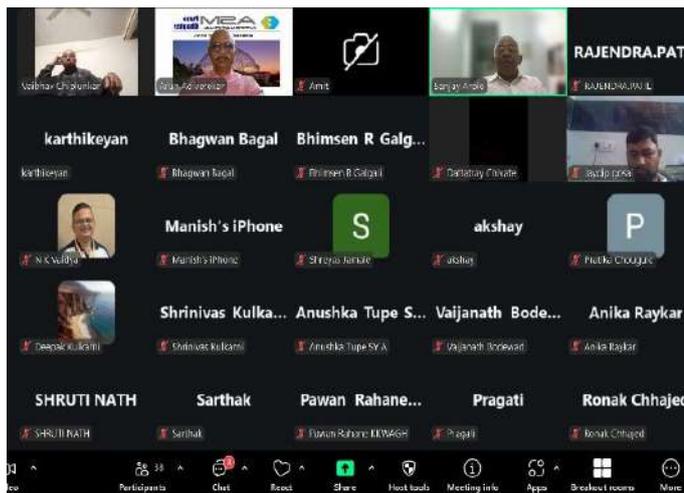
The last technical talk of 2025 was held online on the 26th of December. Dr. Sanjay Arole gave the talk on



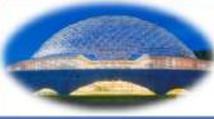
'Skill Development for Enhanced Employability in Materials and Metallurgical Industries'. Dr. Arole specializes in the areas of Automotive Materials, Manufacturing Processes, Product Design, Component Development, Quality Assurance, Failure Analysis. He has previously worked at Symbiosis Skills and Professional University as Advisor and Sr. Director School of Automobile Engineering; at Symbiosis Skills and Professional University for 6 years. He also has ten years of experience in Volkswagen and seventeen years with Bajaj Auto in the field of materials engineering. Apart from this, he has also worked with Eaton and NRB bearings.

Dr. Arole talked about various areas of skill development like the Paradox - Critical Industry, Critical Skill Gap, non-negotiable metallurgical competence, digital and sustainability imperatives, T- Shaped skill spectrum, Integrated Development methods and gave a collective call to action. He elaborated on essential digital competence required for all professionals (Tier 1), specialists (Tier 2) and experts (Tier 3). He also shared the ROI of comprehensive skill development for companies and individuals.

All the online technical lectures were recorded and the recordings are available on request with ASM



office if anyone wants to view them.



## ANNUAL GENERAL MEETING 2025

AGM of ASM Pune Chapter was held on 21st Aug 2025 between 6 to 7 pm in a hybrid mode (offline and online).

Attendees: Offline: Mr. Rahul Gupta, Mr. R T Kulkarni, Mr. D G Chivate, Mr. Vaibhav Chiplunkar, Mr. Deepak Kulkarni, Mr. Vineet Marathe, Mr. Y S Gowaikar, Dr. Kruttika Apshankar-Kher, Mr. Manoj Rathod, Mr. Ajay Tare, Ms. Ruta Barve and Devika.

Attendees: Zoom: Mr. L D Deshpande, Mr. Arun Adiverekar, Mr. Rajendra Patil, Mr. Sandeep Deshmukh, Mr. Udayan Pathak, Mr. Yogesh Dandekar

In this meeting Chapter Activity report was presented by Ruta Barve which included activities conducted on M & MT, Women's Day program, GPP students program, technical talks in 2024 to 2025. Chapter's Financial Balance Sheet was presented by Mr. Rahul Gupta, previous chairman of the chapter and the balance sheet was accepted. CA Anand Deshpande was appointed as an auditor for next financial term. Promotion of chapter activities on social media platforms like LinkedIn will be taken care of by Mr. Deepak Kulkarni and Ms. Ruta Barve.

As the term of previous office bearers of the chapter was ending, election was held in Aug 2025. Mr. R T Kulkarni acted as election officer and he declared results of this election.

### **New Chapter EC is as follows as elected;**

**Chairman - Mr. D G Chivate**

**Vice Chairman - Mr. Hemant Zaveri**

**Secretary - Ms. Ruta Barve**

**Joint – Secretary - Mr. Deepak Kulkarni**

**Treasurer - Dr. Kruttika Apshankar-Kher**

**Members - 1. Mr. Lalit Kumar Pahawa**

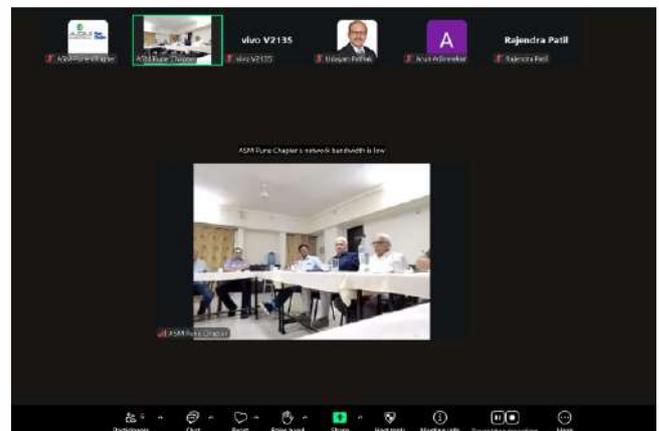
**Members - 2. Mr. L D Deshpande**

**Members - 3. Mr. Rajendra Patil**

**Members - 4. Mr. Udayan Pathak**

**Members - 5. Mr. Arun Adiverekar**

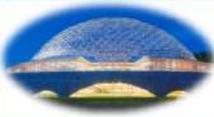
**Mr D G Chivate presented vote of thanks.**

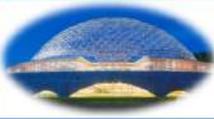


## Annual day – 21st September

The Annual Day of the ASM International Pune was held on the 21st of September. The event started with registration and welcome of all the guests followed by introduction of the speaker, Mr. Gowaikar who is also a member of the Executive Committee. Founder of Metatech Industries, Mr. Gowaikar gave his technical talk on 'Advanced Metallography (Machines, parameters, consumables and case studies). The presentation touched various metallography techniques like abrasive and diamond sectioning, various moulding, grinding and polishing methods, microscopy, micro hardness, characterization advantages and limitation of each process. Consumable and machine selection, sample preparation and case studies were discussed in detail.

After the question-and-answer session, ASM initiatives for the year were presented to the audience. The spouses of all EC members and Devika Bhandare (staff) were felicitated. The vote of thanks was given by Kruttika Apshankar-Kher. There was a networking dinner after this.





## Training programs

A skill development program on heat treatment theory and practices was conducted at KLS GIT ASM chapter from 3 to 7 Nov 2025. The students conducted three different heat treatment processes – quenching, annealing and normalizing on two different varieties of steel namely mild steel and EN8. On the second day, the microstructures were then viewed and analyzed using specialized software wherein they observed the changes in grain structure that occurred due to different heat treatment processes. On the third day (5th November 2025), a factory visit was conducted to PTP-CNC, where the students observed industrial heat treatment being done on a large scale. They also heat treated another set of mild steel and EN8 samples in the factory. On day four, the mechanical properties and microstructures of the laboratory-prepared specimens were compared with the industry-treated specimens.

On the last day of the heat treatment workshop, the students attended an informative talk and presentation conducted by Dr. Sanjeev Inamdar, the owner of PTP CNC Industry. During the session, he explained in detail how different heat treatment processes are carried out in the industry. He also discussed the principles behind these processes with the help of the Iron-Carbon Diagram, which illustrates how temperature and carbon content affect the structure and properties of steel. The students gained a clear understanding of phase transformations, critical temperatures, and the significance of the microstructural changes that occur during heating and cooling. The session helped them connect theoretical knowledge of heat treatment with its practical industrial applications.





## Industry visits

A freshers' welcome program, technical talk and an industry visit was arranged by the Mechanical department of GIT on the topic 'Composites: The future of engineering and global career opportunities on the 9th of December. The speaker was Mr. SM Kulkarni, Dean and former head of the department of mechanical engineering, NITK Surathkal.



## New MA Chapter

A new Materials Advantage Chapter was started in September 2025 at Maratha Mandal Belgavi. This is the 8th MA chapter associated with ASM International Pune Chapter, which incidentally has the maximum number of MA chapters. Welcome to our new friends!





***ASM International Pune Chapter  
wishes all its members a very happy and  
knowledgeable New Year 2026 !***



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