



MIDHANI MANTHAN



A Quarterly Publication by Mishra Dhatu Nigam Limited

CMD Message



Dr. SK JHA

Dear Colleagues,

Congratulations to every member of the MIDHANI family for a record performance in all functional areas; Production, Marketing, Quality, Process Assurance, Maintenance, Procurement, HR, Health, Safety & Environment, Finance, etc., and for achieving the highest ever production for the year 2020-21. Even though the last financial year was full

of challenges & we had to make our way through a deadly pandemic, we did not let our production targets get affected.

Despite Covid-19 being around us throughout the year and still continuing, we have performed well collectively and have moved forward with new determination, and are scaling newer dimensions of success. With new projects and new opportunities under Aatma Nirbhar Bharat, now, the new MIDHANI is getting ready for the next level of success. We will move forward with state-of-the-art facilities, but if we do not remain safe & healthy, efforts to achieve our goals will not yield the results that we expect.

Dear Midhanians, I would like to once again appeal to you that we need to be very cautious in the present circumstances. In view of the surge in Covid-19 cases, we have made emergency tie-ups with few hospitals to provide Covid In-patient treatment to our employees who get affected by Coronavirus. We are distributing Masks, Sanitizers, etc. from time to time. Shop floors and departments are being sanitized regularly. Staggered office timings have been implemented. The employees who are suffering from chronic diseases and pregnant women employees have been exempted from coming to the office for a certain period. In this pandemic situation, the MIDHANI management assures every employee that the Management is with you, it is for you. Let us all ensure that we will follow Covid Appropriate Behavior and also educate others to follow it. I must say that Health is Wealth.

I offer my deepest condolences to the irreplaceable workforce that we have lost in this pandemic. May God give strength to their family.

I look forward to your continued support in the new financial year. I wish all employees and their family members safety, good health & prosperity.

Join hands and embark on a journey of NEW MIDHANI.

Jai Hind!!!

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IIM TATA GOLD MEDAL



A proud moment for all MIDHANIans

Dr. S.K.Jha, CMD, MIDHANI, has been bestowed with the IIM Tata Gold Medal Award in the AWARD CEREMONY organized virtually by the Indian Institute of Metals & IIT Bombay on the occasion of 58th National Metallurgist Day and 74th Annual Technical Meeting 2020 on 24.02.2021. He dedicated the award to all MIDHANIans for their dedication to the organization and their valuable cooperation in developing various



alloys to serve the Nation. The Award Ceremony was attended by Dr. Jha along with Sr. Officials of MIDHANI. Shri N. Gowri Sankara Rao, Director (Finance), and Dr. Upendar Vennam also graced the occasion. The editorial panel of Midhani Manthan congratulates Dr. Jha for his great achievement.



FTCCI & SKOCH AWARDS

Report by V.K. Sudarsshan, DM (SPD)

FTCCI Awards

About FTCCI:

Federation of Telangana Chambers of Commerce and Industry (FTCCI) plays an active role in the economic development of Telangana State. FTCCI liaises between trade, industry, and government, participating & suggesting to the government on policy aspects of the industry, labor, energy, environment, direct & indirect tax, etc.

FTCCI Award:

MIDHANI was bestowed with the FTCCI award under two categories; (1) Excellence in Industrial Productivity (2) Excellence in Research & Development during FTCCI Excellence Awards ceremony held on 23rd Jan 2021 at KLN Prasad Auditorium FTCCI Hyderabad.

1. Excellence in Industrial Productivity (Award is for improvements in productivity of inputs and capital). Highlights of the award submission (FY 2016-17 to FY 2018- 19) are:

- a. Productivity per employee: Rs 1.03 Cr. (highest among defence PSUs) in FY 2018-19



Dr. Sanjay Kumar Jha, C&MD MIDHANI receives FTCCI Awards for "Excellence in Industrial Productivity" from Shri K T Rama Rao, Hon'ble Minister for Industries, MA & UD, IT, E&C Government of Telangana.



Shri Gowri Sankara Rao, D(F) MIDHANI receives FTCCI Awards for "Excellence in Research & Development" from Shri KT Rama Rao, Hon'ble Minister for Industries, MA & UD, IT, E&C Government of Telangana.

- b. Specific consumption of electricity (KWHr/T of production): 1530 in FY 2016-17 and specific consumption of LPG (MT/T of production): 0.126 in FY 2018-19
- c. Robust financial performance: Turnover to the capital employed ratio: 95.94 % in FY 2016-17 and operating profit margin: 24.58 % in FY 2017-18.
- d. Cost reduction and efficiency improvement has been a focus area at MIDHANI and has resulted in cost savings of around Rs. 20 Cr. during the 3 year period

Group photo of FTCCI Awards



- 2. Excellence in Research & Development (Award is for research/technology developed and commercialized including process and product development efforts). Highlights of the award submission (FY 2016-17 to FY 2018-19) are:
 - a. Developed more than 400 grades of Special Steels, Superalloys, Titanium Alloys and Composite Armour for critical applications in Defence, Space, and Energy sectors
 - b. Alloy / Product Development:
 - (i) Indigenous design and supply of isothermally forged Titanium alloy high-pressure compressor (HPC) discs for Adour engine of Jaguar aircraft. HPC disc is the first product to be indigenously developed and used in the aeronautical sector.
 - (ii) Large size cast products (74 kg titanium) indigenously designed, developed & supplied for naval application for the first time in the country under "Make in India" program.
 - c. Process Development / Improvement:
 - (i) Superni 625 and Superfer 800H grade developed through cost-effective melting process route for use in oil and gas, power sector applications
 - (ii) 3% yield improvement in 6.5T VIM heats achieved by using insulating hot tops in place of conventional exothermic hot tops.

SKOCH Awards



About SKOCH: SKOCH Group is India’s leading think tank dealing with socio-economic issues with a focus on inclusive growth since 1997. The group companies include a consulting wing, a media wing and a charitable foundation. The organization engages with fortune-500 companies, state-owned enterprises, government, SMEs & community-based organizations.



SKOCH Award:

MIDHANI received the SKOCH Order of Merit and SKOCH Gold Award for “Modernization and Diversification of Product & Process at MIDHANI” under the “Corporate Excellence” category during the 71st SKOCH Summit held on 20th Feb 2021.

Highlights of the award submission are:

a. Modernisation

- Modernization & up-gradation of the facilities to sustain in the cost-competitive market

b. New Technology / Process

- Value added to an existing product by introducing new technology/process such as Titanium Casting for Naval application, Isothermal Forging for aerospace applications, etc.

c. Talent

- Innovative schemes/ programs in Talent Management, Employee Development & Employee welfare initiatives undertaken (Tamhankar Trophy for Young Managers, etc.)

d. Centre of Excellence

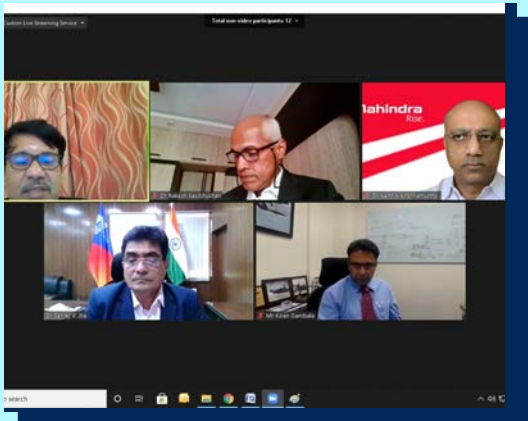
- “Center of Excellence - Special Materials” set up to promote innovation, creativity, and research at MIDHANI

e. Diversification & Expansion

- Entry into new business areas like spring, metal powder, and armour products
- Established multi-location company from single location unit



WEBINAR BY CII



PARTICIPATION

Dr. SK Jha, CMD, MIDHANI has expressed his views as a Panelist in an Exclusive Plenary Session of the webinar on "Strategic Manufacturing to achieve Global Competitiveness" organized by CII during its SR Annual Regional Meeting and Industrial Reset Summit on Mar 06,2021.

CERTIFICATE OF APPRECIATION



Right to Left: Dr. SK Jha, CMD, MIDHANI; Dr. G. Satheesh Reddy, Secretary, DD (R&D) and Chairman, DRDO; Dr. Dasharath Ram, DS & Dir., DRDL; MSR Prasad, DS, DG, M & SS; V. Rajashekar, VSM, Dir., DMDE; Patrick D'Silva, Project Dir., LRSAM; Chandrasekhar Maheshwari, Former Project Dir., LRSAM

MIDHANI received a CERTIFICATE OF APPRECIATION from DRDL for its valuable contribution towards the production of LRSAM MISSILES. Dr. Sanjay Kumar Jha, CMD, MIDHANI received the certificate from Dr. G. Satheesh Reddy, Secretary, Director of Defence (Research & Development), and Chairman, DRDO in the flag-off ceremony of the MISSILES to the Indian Navy on Feb 14, 2021.

Poetry Recitation Competition

Shri Rohit Nigudkar, SM, Fin. and Shri Vijay Kumar Choudhary, Crane Operator, Melt shop received



First and Second Prize respectively in the poetry recitation competition organized by the Dakshin Bharat Hindi Prachar Sabha, Khairtabad, Hyderabad on 27.02.2021.

BEST EMPLOYEE OF THE YEAR 2020

Report by **MP. Ramesh, DGM, HR-CPS**

The "Best Employee of the Year" award was given on the various factors including APAR ratings, attendance, punctuality, outstanding performance/contributions in the respective areas, overall contribution to the company, etc. The list of employees awarded for the Year 2020 on Jan 26, 2021 is as follows:



1. Shri Srinivas Panithared
Mgr., Forge Shop
2. Shri Nishank Kumar Jain
SM, Titanium shop
3. Shri Krishnamraju Mantena
Eng Gr-I, Utilities
4. Shri B. Ravinder
Jr. Engineer, PI
5. Shri G.T. Naidu
Master Technician, HT Shop
6. Shri P. Anjaiah
JA-A, F & A
7. Smt. Thanmaya Ratnagiri
Jr.Tech.-A, Fasteners
8. Smt. Sultana Qamar
Assistant-A, QCL
9. Smt. K. Udaya Chandrika Kavuri
Mgr., R&M (Elect) HRM



- (i) Shri P.Mosen, B&WD Shop
- (ii) Shri Vishwanath Chary, R&M (M)-PII
- (iii) Shri M.Ramulu, P II (Grinding)
- (iv) Shri M. Venu Gopal Rao, SMG Shop
- (v) Shri Shri G.Balaswamy, QM

'MIDHANI MERIT SCHOLARSHIP' FOR THE WARD OF MIDHANI EMPLOYEE

Report by M.Venugopal Swamy, Sr.Exe. Gr. II

“MIDHANI Merit Scholarship Policy” has been introduced from the year 2015-16, for the wards of MIDHANI employees who are studying in a class from 1st to 10th and who have secured merit marks and stood 1st and 2nd rank in the final examinations in the previous academic year class in BPDVA School. The eligible students have been awarded a Merit Scholarship of Rs. 6,000/- and Rs. 3000/- Per annum respectively. The awards have been given on 26th January which was started from 2017 onwards for the academic year 2015-16. It gives us immense pleasure to submit here that till 2019-20 (2015-16: 18 students; 2016-17: 20 students; 2017-18: 21 students; 2018-19: 20 students; 2019-20: 20 students) total 99 wards of our employees have been benefited with the policy.

The list of awardees under the MIDHANI Merit Scholarship Policy for the academic year 2019-20 is as follows:

Sl.No	Name of the Student	Parent Name	Class / Section	Staff No.	Rank	Amount (Rs)
1	S. Jahnvi D/O	S. Venkata Santosh Kumar	1 B	5546	First	6000/-
2	Aarav Singh S/O Bhardwaj	Prashanth Bharadwaj	1 B	5023	Second	3000/-
3	K. Abhinav Reddy S/O	K. Vijaya Bhaskar	II C	5300	First	6000/-
4	Y. Aswini D/O	Y. Vijay Kumar	II C	5279	Second	3000/-
5	Shasita Jain. D/O	Nishank Kumar Jain	III B	0671	First	6000/-
6	B.M. Kamlesh S/O	B. Murugan	IIIB	5031	Second	3000/-
7	T. Yashwanth Sai Chandra S/O	T. Lokeshwar Rao / Suneela Sajja	IV C	5126	First	6000/-
8	G. Sudeepthi D/O	G. Sudheer	IV B	5191	Second	3000/-
9	Prachiti Nigudkar D/O	Rohit Nigudkar	V D	0678	First	6000/-
10	K. Sai Shreshta D/O	K. Ravindranath	V A	5439	Second	3000/-
11	M.S.N.S.V. Sahishnu S/O	M.V.L.N. Nammalvar	VI D	5539	First	6000/-
12	Peddi Reddy Hansika D/O	P. Vijaya Bhanu	VI C	5396	Second	3000/-
13	Kush P. Warad S/O	Praveen Sambappa Warad	VII D	0547	First	6000/-
14	Anoushka Sen D/O	Supartha Sen	VII C	0673	Second	3000/-
15	G. Sal Charan S/O	G. Satyanarayana	VIII B	4492	First	6000/-
16	Shivam Chouhan S/O	Dan Singh	VIII C	4560	Second	3000/-
17	Janagam Anuhya D/O	Janagam Anjaiah	IX B	5425	First	6000/-
18	Kavya Ramteke D/O	Dinesh Ramteke	IX C	5531	Second	3000/-
19	Prachi Dwivedi D/O	Shashi Kumar Dwivedi	X B	0449	First	6000/-
20	R. Aishwarya D/O	R. Naraiah	X A	4526	Second	3000/-

PARIVARTHAN : BATCH -II (MID CAREER TRAINING PROGRAMME)

Report by P. Sunil Kumar, DM, HR & Admin.

Upon successful completion of Mid-Career Training Programme, Batch-I in the month of December 2020, MIDHANI Training & Development has conducted Batch -2, for the next set of the cross-functional team across the organization for middle-level management executives during the period between 11 Jan 2021 to 25 Jan 2021. The training program was inaugurated with a theme "PARIVARTAN" on



11 Jan 2021 at 10:30hrs at the Centre of Excellence building within the hands of Shri D.GopiKrishna, GM(P&M), Shri RamaRamesh Babu GM(Melts), Shri Supratha Sen, GM(vigilance), and Shri S.Narsinga Rao, AGM(Admin), convenor of the Mid-Career Training program along with other senior officials were present for the inauguration ceremony.

The training framework was designed for Two weeks of classroom sessions which includes 2 days on the preventive vigilance module. The participants were trained by various internal and external faculty and also subject matter experts on various topics related to self-development, team development, and organizational development respectively.



Post concluding on the last day, a closing ceremony of the Parivartan training program, the valedictory program was conducted on 25 Jan 2021 from 15:00hrs at MIDHANI.



Training & Development Department Centre of Excellence building and Chief guest of the function was, Shri N. Gowri Shankar Rao- Director (Finance), Dr. Uppendar Vennam, CVO, Shri A. Ramakrishna Rao, General Manager(HR), Shri Debashish Dutta, General Manager(PMO) Shri Supratha Sen, GM (vigilance), and other senior employees graced the occasion and complimented Shri S. Narsinga Rao,

AGM (Admin) and Shri P.Sunil Kumar, DM (HR &Admin) for their meticulous planning, organizing, conducting, and completing successfully the mid-career



career training programme. Training & Development dept presented glimpses of entire two weeks of the participant's learnings, feedback, attendance summary, and faculty ratings, etc with a pictorial presentation to the audience. All the participants also expressed their views, thoughts, feedback on the program,



thanking the management for taking such a wonderful initiation on this well-organized systematic training program. At the end of the closing ceremony, all the participants were honored with a certificate of participation.

Quiz Competition - Grab the opportunity !!!

You can win a cash prize of Rs. 1000/-

HOW ???

Check your Intranet mail for the questionnaire.

The questions are from the latest issue of MIDHANI MANTHAN.

FLAGGING OFF CEREMONY

Superfer 800 (Alloy 800) SG Tubes



The consortium of MIDHANI and NFC has indigenously manufactured and delivered the first consignment of Superfer 800 (Alloy 800) SG Tubes to BHEL, Trichy on 15.02.2021 for GHAVP 1&2.

Dr. SK Jha, CMD, MIDHANI and Dr. Dinesh Srivastava, C & CE, NFC are flagging off the vehicle

Indigenously Manufactured Impellers

The flag-off ceremony of Indigenously manufactured impellers for uranium processing made of Nickel Super Alloy “Superni 600” to Uranium Corporation of India Ltd(UCIL) was held on 16-Mar-2021. ~75 officers and staff participated in the event. Dr. SK Jha, C&MD, Shri N. Gowri Sankara Rao, D (F), and Shri MS Rao, GM, UCIL graced the occasion.

In the event, Shri D. Gopikrishna, GM (P&M), Shri Debasish Dutta, GM (PMO), Shri AK Sharma, AGM (PPC), Shri SK Dwivedi, AGM (SBD), Shri P.Babu, AGM (Marketing) were also present.



Dr. Sanjau Kumar Jha, C&MD, MIDHANI handed over indigenously manufactured Impellers to Shri MS Rao, GM, UCIL.

First Consignment of High Temperature Alloy

Report by UV Gururaja, AGM (AMD)



MIDHANI on 20/March/2021 despatched its first consignment of high-temperature alloy for the country's indigenous Kaveri dry engine program powering unmanned combat aerial vehicle(UCAV). The supply of the first batch was flagged off by Shri APVS Prasad, CE, (CEMILAC), DRDO, and Dr.Sanjay Kumar Jha, Chairman & Managing Director at MIDHANI. The consignment was containing Nickel base superalloy (Superni 263A) and

titanium alloy (Titan 31A) forged bars thoroughly qualified in airworthy certification requirements. These materials go for various class I & class II components of the engine. Manufacturing of these materials is with 75% indigenous content. 1st consignment was manufactured and certified successfully in mission mode within 2.5months. Balance supplies are also planned meticulously in subsequent months.



Speaking on the occasion C&MD MIDHANI congratulated the MIDHANI team for their wonderful effort & thanked airworthy certification agencies Shri B Saha, RD, RCMA(M) Hyderabad, and Shri Jaiganesh, RD, AQA (GW & M), for enormous support to make the fast track supply. CE, CEMILAC has stressed the requirement of acquiring material life data from users for indigenous material, so that indigenous content in the airforce can be increased.

INAUGURATION OF DIGITAL CLASSROOM

Dr. SK Jha, CMD, MIDHANI has inaugurated Digital Classrooms in the BPDVA School, Kanchanbagh, Hyderabad on 05.03.2021. It is sponsored by MIDHANI under CSR with a view to promoting digital education. Tata Class Edge is the implementing partner. Shri N Gowri Shankar, Dir. (Fin.) and Shri A Ramakrishna Rao, GM (HR) also graced the occasion. The training program was also conducted for the teachers by Tata Class Edge.



The teachers appreciated the facility provided by MIDHANI to BPDVA school and also assured to make effective use of the technology. MIDHANI believes that there will be a significant change in the teaching style and also hope to see a positive impact on the student's performance.

VIP VISITS**AUSTRALIAN HIGH COMMISSIONER TO INDIA**

The Australian High Commissioner to India, The Hon Barry O'Farrell AO visited MIDHANI and had a discussion with Dr. SK Jha, CMD, Shri N. Gowri Sankara Rao, Dir. (Fin.), and other senior officials for possible collaboration with MIDHANI in the area of Special Materials on 11.03.2021.

AERO INDIA 2021

Report by Anvesh Kotha, DM (Mktg.)

MIDHANI showcased a varied range of indigenously manufactured products for Aerospace and other strategic sectors in the 13th edition of Aero India 2021 in Bengaluru from 3rd Feb to 5th Feb 2021 with thrust on "Aatmanirbhar Bharat Abhiyaan" and "Make in India". Some of the products that were displayed at MIDHANI's main Stall were Investment Casting Valves, Titanium HPC Disc, Mi 17 Helicopter Armouring Panels, Fasteners, Rings and Bars of different alloys, etc. For the first time, MIDHANI used Kinomo 3D Holographic Display to showcase its various



Products. In Kinomo 3D Holographic Display, the projection unit creates images that are perceived by viewers as 3D holograms floating in space. MIDHANI's contribution for various prestigious Aircraft platforms and indigenization of critical material and components of Super Alloys, Titanium Alloys and Special Steels has been highlighted through 3D displays.

Some of the Products that were displayed through 3D Holographic Display are 5 Stages of HPC Discs for Aero Engine, Aero materials being supplied for Tejas, Jaguar, Sukhoi, MIG Aircrafts, Armouring Solutions for Mi-17 Helicopters, HPT Discs for Turbo Engine, Various Components for GSLV & PSLV, 450 Kg Bomb Shell, Titanium Seawater filters, Titanium OLFs, BHABHA Kavach, Bulletproof Helmet, Armoured Vehicles and Components for T-90 & T-72 Tanks.

MIDHANI Stall at India Pavilion:

In line with the theme of India Pavilion "Rotary Wing Platforms", MIDHANI displayed Mi 17 Helicopter Model along with a 3D Holographic Display showcasing Armouring solutions being provided by MIDHANI for Mi 17.



08 MOUS were signed:

MIDHANI Signed 08 MOUs with diverse business partners for collaboration for new alloys development, carrying out joint research, exploring new business opportunities, etc. The crucial MOUs that were signed are with HAL for the development and production of composites raw materials; with Lockheed Martin, USA for identifying potential business/ investment opportunities; with Jiangyin Uni-Pol Vacuum Casting India Pvt. Ltd, Pune for new alloy development and production for aerospace and automobiles applications; with Select Arc, France for new alloy development and supply of high performance materials for welding applications for European market etc.

03 Newly Developed products Launched:**1. High Pressure Compressor Discs for Aero Engine**

Midhani has developed Titanium Alloy High Pressure Compressor Discs for Aero Engine with the support of DMRL, DRDO. Five different stages of discs were manufactured using the Isothermal forging process. These discs are being supplied to Hindustan Aeronautics Ltd, Bengaluru.

2. Grid Fin Component for Gaganyaan

Midhani has indigenized Titanium Alloy Grid Fin block with high Specific Strength & greater system stability. These blocks are being supplied to Human Space Flight Centre, ISRO, Bengaluru for prestigious Gaganyaan Program.



Honorable Raksha Mantri visited MIDHANI stall

3. Bulkhead Frame for future fighter Aircraft

Titanium alloy bulkhead frame block for rear fuselage has developed by MIDHANI and supplied to Defence Metallurgical Research Laboratory DMRL, Hyderabad.

Seminar conducted by MIDHANI & PHDCC:



MIDHANI & PHDCC together have conducted a seminar on "Critical and Strategic Materials in Aerospace and Defence". The Seminar was also attended by Dr. G Sateesh Reddy, SA to RM, Dr. Ajay Kumar, Defence Secretary, Shri B Saha, RD (RCMA-MAT), Shri MZ Siddique, Director (GTRE).

Dignitaries visit to MIDHANI's Stall:



Shri Jayesh Ranjan, (PS - (I&C)&(IT), Telangana)



Meeting with Lockheed Martin, USA

About Aero India 2021

Aero India-2021 was the World's first ever Hybrid Aero and Defence Exhibition. In order to maximize the reach and participation, the event was organized in a hybrid format with a concurrent Virtual Exhibition. Over 600 exhibitors (including 78 foreign ones) attended physically and another 108 in virtual mode. 3,000 Business-2-Business meetings were conducted during the event and representatives from 63 foreign countries were in attendance.

Certificate Of Commitment



MIDHANI has been conferred with "Certificate Of Commitment" on securing "4 STAR RATING" for commitment towards Environment, Health & Safety from CII. The certificate was given in the CII-SR Excellence Awards for the year 2020 on March 25, 2021.

WEBINAR BY MOD



A webinar on "Budget Announcement 2020-21, Galvanizing efforts for Aatma Nirbhar Bharat" was organized by MOD on Feb 22, 2021. Hon'ble PM Shri Narendra Modi Ji has



delivered the Keynote address. Hon'ble RM Shri Rajnath Singh Ji and Dr. Ajay Kumar, Secretary of, Defence also expressed their views on developing Aatma Nirbharta in the field of Defence. Dr.SK Jha, CMD, MIDHANI & Officials of MIDHANI attended the webinar.

CELEBRATIONS

REPUBLIC DAY CELEBRATION



MIDHANI celebrated India's 73rd Republic Day on 26th Jan. The celebration commenced at 8.30 am with a guard of honor by TSPF. Dr. SK Jha, CMD hoisted the flag and addressed the gathering.



Employees sang patriotic songs. The function was concluded with a prize distribution ceremony. Dr. SK Jha, CMD, Shri N. Gowri Sankara Rao, D(F), A. Ramakrishna Rao, GM (HR), Presidents of MOA, NUS, and representatives of workmen presented the cash awards, certificates and mementos to the best employees and Casuals and best academic performer students of DAV School.

IPS, NISA

Report by Col. Ashwani Kumar, DGM (Marketing)



MIDHANI is manufacturing Armouring products under Atma Nirbhar Bharat. Shri CV Anand, IPS, Director, NISA visited MIDHANI and had a discussion with Dr.SK Jha, CMD on the Protection Equipment required by CISF. Shri N. Gowri Sankara Rao, D(F) and Col. Ashwani Kumar, DGM, I/c Rohtak & KAPP also graced the occasion.

Col. Ashwani Kumar, DGM, I / c Rohtak and KAPP briefed the team of NISA led by Shri Anand about Armor products such as Armoured Bus, Bullet Proof Morcha, Bhabha Kavach, Bullet Proof Patka, Bullet Proof Vest, Sentry Post, Bullet Proof, etc. manufactured indigenously by MIDHANI. Shri Anand appreciated the facilities available at MIDHANI and expressed his gratitude towards the dedicated efforts made by MIDHANI to make India self-reliant.



VISHWA HINDI DIWAS



On the occasion of Vishwa Hindi Diwas 'Hasya-Vyangya, Kavi Sammelan' was organized on 09.10.2021 at MIDHANI. At the outset, Dr. Sanjay Kumar Jha, CMD welcomed all the poets. While addressing the gathering he emphasized the importance of organizing Vishwa Hindi Diwas and said that this type of celebration can be very effective for the promotion of Hindi as the language of communication at the International level.



From left to right: Shri Praveen Pranav, Shri N. Gowri sanakara rao, Dir. (Fin.), Dr. SK Jha, CMD, Dr. Rishabh Deo Sharma, Ms. Anuradha Pandey, Dr. Puneet Kumar Dwivedi, Shri Narendra Ray, Shri Venugopal Bhattad, Smt. Ratna Kumar, Vasudev and Dr. B.Balaji.

The employees of Midhani should take up the challenge of technical writings in Hindi and set the model for other offices. The Hindi language will get more publicity if science and technology books are made available in this vernacular language. Shri N. Gowri Sankar Rao, Director (Finance) also graced the occasion. MIDHANI poets along with the famous poets from various parts of India recited their compositions and enthralled the audience.



Rishabh Deo Sharma, Narendra Rai, Venugopal Bhattad, Praveen Pranav, Dr. Puneet Kumar Dwivedi, K. Madhava Rao, Dr. B. Balaji and Vijay Kumar Chaudhary were the poets who entertained the audience with their popular poems. The 'Hasya-Vyangya Kavi



Sammelan' was anchored by Ms. Anuradha Pandey, Hindi Officer, ASL, DRDO.

INTERNATIONAL WOMEN'S DAY

Report by A.R. Rashmi, Mgr., HR



Mishra Dhatu Nigam Ltd. (MIDHANI) has celebrated "International Women's Day 2021" on 08.03.2021 by conducting outbound training for all women employees. The program was inaugurated by Dr. S K Jha, Chairman & Managing Director, MIDHANI. The training program titled WE LEAD TEAMS (Women Empowered (WE) Lead Teams) has been organized for MIDHANI women employees. It is a customized program based on

The requirement of the group and accordingly covered activity based learning on the topics like development of self belief, how to face challenges in executing a task, techniques to motivate team, conflict resolution, how to handle failures and process of learning from them, handling teams to be peak performing teams, process of communication



with teams and how to maintain resilience to complete the task. Also had interactive session with C&MD, where women employees expressed gratitude to management for extending their support at all times especially during COVID pandemic by granting flexi working hours to women employees. All women employees have actively participated in the program.



NATIONAL SAFETY DAY

Report by M. Malla Reddy , Mgr., SF & E

SAFETY IS EVERYONE'S RESPONSIBILITY

The 50th National Safety Week celebration was organized at MIDHANI with a theme "Learn From Disaster And Prepare For a Safer Future" from 4th to 10th March 2021. During the week, various activities such as Pinning of Safety Badges, Safety Pledge, Display of Safety Posters, Slogans, and Essay writing competitions and Guest Lectures on "Safety on Material Handling and General Safety Precautions" and "Disaster Management" was



conducted. A large number of employees participated in all the programs with enthusiasm. The programs were conducted by



following the covid-19 protocol.

The closing ceremony and felicitation function of the National Safety Week Celebration was organized on 20.03.2021. The Special Principal Ms. I. Rani Kumudini, IAS, Special Principal Chief Secretary, Govt. of Telangana was visited MIDHANI as Chief Guest for the Valedictory Function.

She discussed with

Dr. SK Jha, CMD, Shri N.Gowri Sankara Rao, Director (Fin.), Dr. Upender Vennam, IPoS, CVO, and other Senior Officials of the organization on the facilities available in MIDHANI about the production of Special Alloys and Materials. The Chief Guest distributed the prizes to the winners of the competitions. ~75 officials attended the Valedictory Function.



ARTICLES

Improvement of magnetic properties of Fe-Co-V alloy (Softcomag 49A) through the controlled hot working process.**K. RamReddy, Asst Manager (R&D)****Introduction:**

Softcomag 49A (equivalent to 2V-Permendur) is a soft magnetic alloy with high saturation magnetization, low magnetocrystalline anisotropy, high curie temperature (950°C), and associated higher magnetic permeability. Softcomag 49A is an equiatomic iron-cobalt alloy with 2% vanadium. This particular alloy is relatively costly and therefore used for specialized applications requiring the magnetic properties exhibited by this material. Main applications are transformer cores, electric generators in aircraft, receiver coils, relay switches, and storage cores. Magnetic properties of this material depend on the chemical composition and purity of the alloy, and the presence of impurities will deteriorate the magnetic properties drastically. Magnetic properties such as magnetic permeability and coercivity are structure sensitive in nature and are affected by the processing conditions of the material. Processing this alloy is extremely difficult due to its tendency to form an ordered brittle phase below 730°C. Strict control of temperature is required during hot working to avoid cracking. This alloy can be manufactured into various forms of bars, rods, plates, and sheets by hot working. Very thin strips (<0.2mm) can be produced by cold rolling using special heat treatment.

Problem Statement:

Midhani has vast experience in manufacturing softcomag 49 semi-finished products such as forged/hot rolled bars and hot/cold rolled sheets and strips. Its main concern is poor magnetic properties (mainly magnetic permeability and coercivity) in hot rolled products. Magnetic properties of previous heats processed into various forms were analyzed to study the property variation as a function of the processing route. The difference is observed in final magnetic properties among forge, hot roll, and cold-rolled products. Cold-rolled products showing better magnetic permeability compare to forge and hot-rolled bars. In hot rolled conditions the maximum magnetic permeability obtained is in the range of 3000 – 5000, which is lesser than the minimum specified value (7000). From the chemical analysis reports and metallographic examination, it is confirmed that the heats processed having no inclusions and the chemical composition obtained is within the specified limits. So it is assumed that the poor magnetic properties in hot-rolled products were due to inappropriate processing conditions. In the present experiment, hot rolling parameters such as soaking temperature, rolling reduction, and finishing temperature are modified and strictly controlled to study their effect on final magnetic properties and also to optimize these parameters to obtain desired magnetic properties.

Experimental Procedure:

Vacuum induction melted heat of softcomag 49A (F7137) was used in the present experiment. The ingot was hot forged at 1100°C to 100mm round bars and ground to 85mm to remove the scale. After grinding, bars were hot rolled to 30mmØ (F7137A) and 50mmØ (F7137B) sizes. Hot rolling was carried out after soaking at 1000°C for 1hr min. The soaking temperature specified in the process sheet was 1090°C, to maintain lower finish temperatures, the soaking temperature was reduced to 1000°C.

During rolling, start and finish rolling temperatures were measured. More than 50% reduction was maintained in both sizes to ensure sufficient deformation in the material. In 30Ø bar, the finish pass was given around 780°C which is slightly lower than specified (800°C), whereas in 50Ø the finishing temperature maintained a little higher (840°C) to study the effect of finishing temperature. After rolling to the required sizes, the samples were prepared for magnetic properties testing. Ring samples with dimensions 50ODX42IDX10H (in mm) for 50Ø and 30ODX25IDX10H for 30Ø and cylindrical samples with dimensions 10ØX25L were prepared from both 30 and 50Ø bars to measure the magnetic properties of the material. Minimum three numbers of samples were prepared to check the consistency in values. Heat treatment of samples was carried out at 850°C for 4 hrs in a dry hydrogen atmosphere using a retort furnace available at PM shop, Midhani. After holding for 4hrs the samples were cooled in the furnace at the rate of 120°C/hr to room temperature. After completion of heat treatment, the samples were tested for magnetic properties at the magnetic testing laboratory, QCL, Midhani. Few more samples were heat treated and tested at RCI Hyd, to check the consistency in properties. The heat treatment cycle used was the same except the atmosphere is a vacuum.

Results & Discussion:

After subjecting to final heat treatment, the samples were tested for magnetic properties at QCL, Midhani, and at RCI Hyd. The results obtained were reported in table 1. From the obtained results it is confirmed that there is a significant improvement in magnetic properties after modification of hot rolling process parameters. Saturation induction (B_s) and residual induction (B_r) values remained almost unaltered irrespective of processing condition since these are chemistry-dependent properties and are not structure sensitive in nature, whereas magnetic permeability and coercivity showed significant improvement after modifying the hot rolling parameters.

Property	Typical Value	30Ø	50Ø
Saturation Induction (B_s) (Tesla)	=1.95	2.212	2.203
Residual Induction (B_r) (Tesla)	1	1.756	1.660
Coercive Force (H_c) (A/m or Oe)	=160 (2 Oe)	70 (0.89)	73.6 (0.93)
Max Permeability (μ_{max})	7000	12262	9636

Table 1: Magnetic properties (average) of 30 and 50Ø experimental hot rolled and annealed samples

From the results obtained, we can observe that the finish rolling temperature and rolling reduction are affecting the magnetic properties significantly. Even though the soaking temperature may not be affecting the magnetic properties of the material, it is reduced to 1000°C to facilitate the rolling in lower temperatures which helps to induce some deformation strain in the material by reducing the effect of dynamic recrystallization. In addition to this, the finishing temperatures were maintained lower to induce some strain in the material during processing. As we know that the functional properties of any material will depend on its microstructure and the extent of recrystallization after heat treatment. Fully recrystallized microstructures will show better functional properties than partially recrystallized or deformed microstructures. In the present experiment, 30Ø hot rolled bar was showing better magnetic properties than 50Ø hot rolled bar. The reason could be lower finishing temperature and higher rolling reductions. The finishing temperature in 50Ø hot rolled bars maintained was higher compared to 30Ø.

Lowering the finishing temperature in 50Ø bars may have shown further improvement in magnetic permeability. Finishing at higher temperatures has led to dynamic recrystallization of the material, which resulted in the partially recrystallized microstructure. The rolling reduction in 30Ø bars is more than 50Ø bars which helped in maintaining sufficient strain in 30Ø bars to facilitate complete recrystallization during final heat treatment.

The results from the present experiment were compared with previously hot rolled bars of various sizes (22, 50 & 70Ø) from different heats, which were soaked at 1090°C and hot rolled without any strict control of hot rolling parameters. Magnetic properties of 22, 50, and 70Ø previously hot-rolled bars were reported in table 2, showing poor magnetic permeability & coercivity. After analysis, it is found that the extent of recrystallization that occurred was not complete. The heat treatment cycle followed is the same as the present. The lower extent of recrystallization occurred in 70Ø bars and the magnetic permeability obtained is lower than other conditions. This could be due to lesser rolling reduction and higher finishing temperatures. In 22 and 50Ø hot-rolled bars the rolling reduction is higher but the finishing temperature maintained was very high. Due to this, the magnetic properties are degraded.

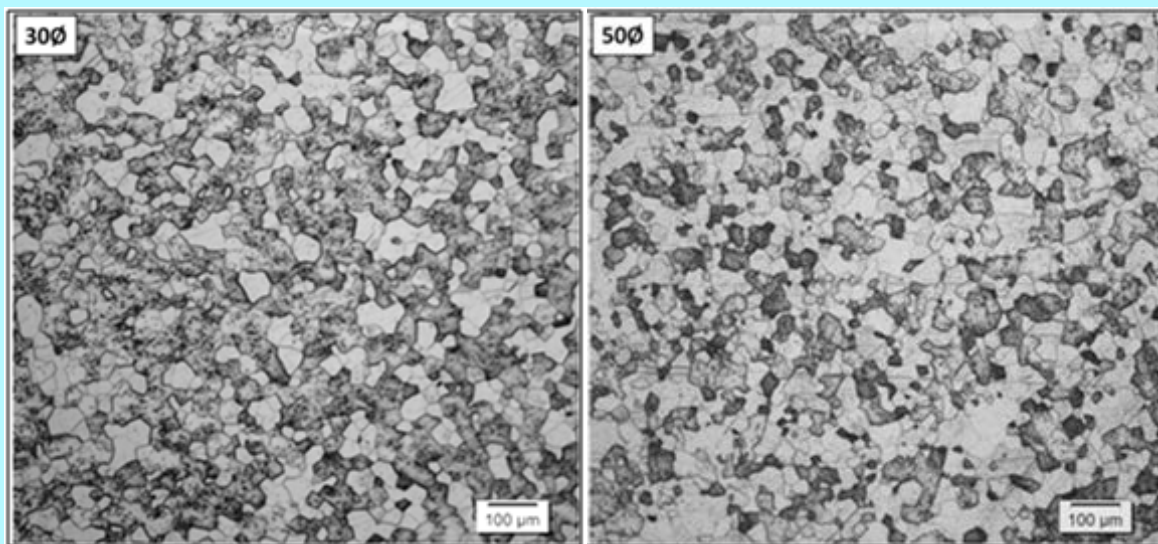


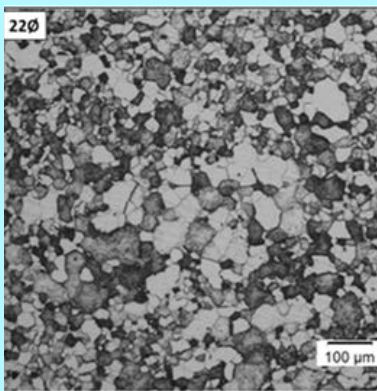
Fig 1: Optical micrographs of 30 and 50Ø experimental hot rolled and annealed samples

The effect of finish temperature can be clearly observed when comparing the magnetic properties of experimental hot rolled bars and 22, 50Ø previously hot rolled bars. In previously hot rolled bars the finish temperature was maintained in the range of 900 – 950°C which is higher than the present finish temperature. Lowering the finish temperature to the range of 800 – 850°C may result in better magnetic properties. To study the effect of rolling reduction, similar comparison was made with 50Ø experimental hot rolled and 70Ø previously hot rolled bars. The rolling reduction in case of 30Ø bars was about 85% whereas in 50Ø and 70Ø hot rolled bars were 58 and 22% respectively. The 70Ø hot rolled bars showed poor magnetic permeability compared to 50 and 30Ø experimental rolled bars. This is mainly due to higher rolling temperatures and smaller rolling reductions (in case of 70Ø) and higher finishing temperatures. In 22Ø and 50Ø previously hot rolled bars, the finish rolling temperature was very high (~950°C) resulted in no strain retaining in the material. Due to this the as rolled microstructure remained same or partially recrystallized during final heat treatment which resulted in magnetic anisotropy in the material.

Microstructure of 22Ø hot rolled and heat treated material shown in fig 2 revealing partially recrystallized microstructure with nonuniform grain distribution after final heat treatment. This may be due to insufficient strain in the material after hot rolling, which is the result of higher finishing temperatures. These are the main reasons identified that previously hot rolled material not showing better magnetic properties even though the chemical composition and purity of the alloys were in the specified limits.

Property	Typical value	Previously hot rolled & Annealed	
		F 6859-22Ø	F 6696A-50Ø
Saturation Induction (B_s) (Tesla)	=1.95	2.056	2.296
Residual Induction (B_r) (Tesla)	1	1.781	2.096
Coercive Force (H_c) (A/m or Oe)	=160 (2 Oe)	124 (1.56)	162 (2.04)
Max Permeability (μ_{max})	7000	3594	5913

Table 2: Magnetic properties of 22 and 50Ø hot rolled & annealed bars



Following the same modified parameters, a larger quantity of material was rolled to various sizes (28, 45 and 50Ø) for multiple orders. The hot rolled bars were heat treated and tested for magnetic properties to check the consistency and the results obtained were reported in table 3. From the results, it is confirmed that this modification of hot rolling parameters has shown significant improvement in final magnetic properties. Further studies on phase formations during final heat treatment and the effect of ordering in the material may help further improvement in magnetic properties.

Fig 2: Optical micrograph of 22Ø hot rolled & annealed material

Property	Typical value	28Ø HR-Annealed	45Ø HR-Annealed	50Ø HR-Annealed
Saturation Induction (B_s) (Tesla)	=1.95	2.26	2.23	2.23
Residual Induction (B_r) (Tesla)	1	2.03	1.87	1.77
Coercive Force (H_c) (A/m or Oe)	=160 (2 Oe)	71 (0.9)	62 (0.78)	81 (1.02)
Max Permeability (μ_{max})	7000	11679	10890	7455

Table 3: Magnetic properties of bars, hot rolled with modified parameters

Conclusion:

From the present study it can be concluded that not only alloying and purity of the material but also the processing conditions will affect the final magnetic properties significantly. Hot rolling parameters such as rolling temperature, rolling reduction and finishing temperature have to be carefully controlled to achieve the desired level of magnetic properties. Hot rolling at lower temperatures has improved the final magnetic properties of the material. Along with controlling rolling temperature, sufficient reduction should also be given to enhance recrystallization during final heat treatment. For higher output sizes ($\geq 70\text{Ø}$), this can be achieved by maintaining higher input sizes ($\geq 110\text{mm}$). The finish rolling temperature needs to be strictly controlled and maintained in the range of 800-850°C to get the required magnetic properties.

HEARTFELT CONDOLENCES

We are saddened by the sudden demise of our dear colleagues



We offer our heartfelt condolences to the families of Smt. P.Saritha, Shri MVLN Nammalvar, Shri George Vincent Michal.

You will be deeply missed by everyone in the organization and always remain in our hearts. Your dedication and commitment towards your work can never be forgotten.

There is no goodbye for us, your memories shall be cherished forever.

ॐ द्यौः शान्तिरन्तरिक्षं शान्तिः पृथिवी शान्तिरापः शान्तिरोषधयः शान्तिः ।
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FEEDBACK

Special Edition on 47th MFD 2020; Jul-Dec 2020

The magazine has turned out very beautifully. The best part is, it is circulated via an intranet which is accessible to all the employees. Good luck and best wishes for all future magazines.

With Best Regards,
Rama Mallika
Junior Assistant-A,
Purchase

Excellent work on the concept & design of the Magazine. Considering that it has been done in-house, it needs to be applauded by all MIDHANIANS. I also congratulate all the content creators for this version & the previous version.

All the best.
VK Sudarsshana
DM (SPD)

पत्रिका को देखकर बहुत अच्छा लगा।
अच्छा काम कर रहे हैं आप।

सादर
एनवीएस पवन कुमार
प्रबंधक, वित्त एवं लेखा विभाग

Nice compiling of the data, facts & information in the magazine.

Regards,
Prateek Sharma
Manager (SMG)

Compilation of Data/information, n reports, everything is excellent. It looks a lot of hard work is behind making it. Super!!!
Malla Reddy, Sr. Exe. (Retd.), Vigilance

The MIDHANI MANTHAN has come out very nicely with excellent coverage. Keep it up.
A Ramakrishna Rao
GM (HR)

I, first of all, congratulate you for coming up with a six months special edition. It is evident after going through the magazine that a lot of hard work has gone into it. Designing it 'in-house' in itself is a great achievement. I appreciate the Editorial Panel and thank Editorial Board for all the efforts. I am fortunate to be a part of it. I Hope, the next issue will be a bigger success.

Thanks & Regards,
Deepak Parthasarathy, DM (HR)

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