



# MIDHANI MANTHAN

A Quarterly Publication by Mishra Dhatu Nigam Limited



## CMD Message



**Dr. SK Jha**

I hope you and your loved ones are safe and healthy. You are aware that the company's operations in the beginning of the financial year was impacted by the second wave of the COVID-19 pandemic. Due to your dedication & determination towards the company's growth, we have recovered in the later part of the period ended 31st December 2021. We

moved rapidly to adapt ourselves, and responded to the changing needs to deliver the best. On the basis of our assessment of the recovery and our ability to face the challenges, I would like to say that as an organization we believe that together we will not only be successful in making the journey ahead pleasant, but we will create history by setting new records.

We have recorded highest ever sales of Rs. 859.49 Cr. for FY 2021-22 compared to Rs. 813.23 Cr. for FY 2020-21 even with disruption in production activities due to the second wave of COVID-19 pandemic. The impact of pandemic on production could be mitigated with better planning and execution. We have also recorded 28.13%, 5.76% and 6.02% growth in VOP, PAT and PBT respectively with compare to previous FY 2020-21. We have commenced production at our Armor unit setup in Rohtak. The first consignment of Bullet Proof Jackets manufactured by Armoring Unit Rohtak was flagged off for the Army personnel. We have flagged-off the first consignment from our WPM to Integral Coach Factory for LHB coaches. It's a good sign for the growth of MIDHANI.

We have been awarded with Telangana State Intellectual Property Award and Best Performance Award by CII & Telenagana State Global Linker and the Indian Institute of Metals respectively.

I wish many more feathers will be added to MIDHANI's progress in coming days.

Seasonal Greeting to all MIDHANIans!

Jai Hindi

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## #Amrit Mahotsav

### Exhibition of MIDHANI Products for Public Display

‘Exhibition of MIDHANI Products for Public Display’ was setup by MIDHANI from 13th to 19th December, 2021 at its establishments at Hyderabad,



Telangana and Rohtak, Haryana. The exhibition was setup as a part of “Azadi ka Amrut Mahotsav” i.e. celebrations of nations 75 Years of Independence. The exhibition was inaugurated virtually by Hon’ble Raksha Mantri, Govt. of India, Shri Rajnath Singh Ji in the presence of senior officials of DDP, MoD along with other 73 exhibitions and 7 curated museums at various locations on Dec 13, 2021.

Exhibition showcased the growth and journey of MIDHANI and its contribution to Atamnirbhar Bharat over the years. The capabilities and the products developed for various strategic programmes of Defence, Space and Energy Sector of the country were displayed during the period. The display included innovations in R&D, manufacturing process, raw materials & advancement in Special Steel, Titanium Alloys and Super Alloys, Bullet Proof Jacket, Vest, Helmet, Patka, Shield, Composite Armour set for Mine protected vehicle, BP Morcha, Bomb shell, Shape memory alloy, Carbon fiber, 3D powders, High Pressure Engine disc, Virgin raw materials, Titanium valves, Titanium filters, Titanium castings for space & Navy, Bio-implants, Fasteners, Springs and Railway axles etc. The display of products was open from 10 AM to 5 PM daily between 13th to 19th December 2021.

The Valedictory program of weeklong public exhibition of MIDHANI products was organized on 19th December 2021. Hon’ble Governor of Telangana & Hon’ble Lt. Governor of Puducherry, Her Excellency, Dr. Tamilisai Soundararajan presided over the program as ‘Chief Guest’. While addressing MIDHANI, the Hon’ble Governor congratulated company’s varied endeavours in ‘Atmanirbhar Bharat’ program and she praised the indigenization efforts put in by MIDHANI. Hon’ble Governor appreciated the critical role played by MIDHANI in ensuring availability of key materials for space, defence and energy sectors to avoid dependence on foreign supplies. Her Excellency, Dr. Tamilisai Soundararajan heaped praises on MIDHANI for supplying bio-medical implants to the needy under their Corporate Social Responsibility initiatives and this specifically



enthralled her as she is a doctor by profession. Chairman & Managing Director Dr. S K Jha thanked the Hon’ble Governor of Telangana for accepting the invitation and taking time out of her busy schedule to visit MIDHANI. He said that Aatma Nirbharta is the only way forward. Atmanirbhar Bharat which translates to 'self-reliant India' or 'self-sufficient India', is the vision of Hon’ble Prime Minister of India Shri Narendra Modi ji of making India "a bigger and more important part of the global economy", pursuing policies that are efficient, competitive and resilient, and being self-sustaining and self-generating. He further added that MIDHANI has supplied special metals and alloys to various national programs of space, Defence and Energy sectors. Few examples include GSLV, PSLV, Chandrayaan, Mangalyaan, Gaganyaan, Light Combat Aircraft, Kaveri



Engine, Advance Ultra Super Critical Programme etc.  
The public exhibition of MIDHANI at both the locations,



received an overwhelming response. Around 20,000+ footfall was recorded during the week long exhibition in Hyderabad and around 5000+ people visited the exhibition at Rohtak. At the Hyderabad Unit, Guest Lectures were organized on Metallurgical topics by eminent speakers from reputed organizations and metallurgy background, students from various engineering colleges and school students were invited to attend it. A special session for women employees was also organized during the week. General public, local engineering / polytechnic/ degree colleges and school students were sent invitations for walk-in visits. More than 50 colleges and more than 50 schools have visited the exhibition during the past 7 days.

This was a rare opportunity for the common people to see marquee defence products displayed at a single location.

This was made possible by the initiative taken by Department of Defence Production (DDP), Ministry of Defence (MoD), Government of India, by dedicating a week i.e. 13th-19th Dec for showcasing defence products at different locations across the country by various defence establishments. During the week a drawing competition was organized for school students and prizes



were distributed. Shri N Gowri Sankara Rao, Director (Finance), offered the Vote of Thanks. Senior Officials and employees of MIDHANI were also present during the program.

## #Shradhanjali

MIDHANI deeply mourns the unfortunate demise of General Bipin Rawat, Chief of Defense Staff (CDS), his wife and other personnel.



## Webinar on “Artificial Intelligence”

MIDHANI organized a webinar on “How to kick start a career in Artificial Intelligence and Machine Learning”



**MIDHANI**  
In commemoration of India@75  
मिश्र धातु निगम लिमिटेड  
MISHRA DHATU NIGAM LIMITED  
A Govt. of India Enterprise,  
Ministry of Defence  
Presents  
**WEBINAR**  
on  
**Artificial Intelligence**  
by  
  
**Ms. K. Lakshmi Prasanna**  
Deputy Manager  
IT, MIDHANI

e-Certificate  
will be given on Participation

**HOW TO JUMP START YOUR  
CAREER IN ARTIFICIAL  
INTELLIGENCE AND MACHINE  
LEARNING**

**Chief Patron**  
Dr. SK Jha, CMD, MIDHANI

**Patron**  
A. Ramakrishna Rao, GM (HR)

**Advisor**  
P. Sasidharan, GM (ES)

**Date: 08.07.2021**  
**Time: 11.00AM Sharp on Cisco Webex.**  
**Link will be shared in registered WhatsApp group.**  
**For more details please contact**  
**covener of the Webinar:**  
Dr. Saurabh Dixit,  
Mgr, R&D:  
9182308124  
Dr. B. Balaji,  
DM, HCC&C:  
8800920391

for the students of Engineering and Degree colleges under “Azadi ka Amrit Mahotsav” on 08.07.2021. The guest of the webinar Mr. Ramakrishna Rao, General Manager (HR) and P. Sasidharan, General Manager (ES) expressed their views about the utility and need of artificial intelligence in manufacturing industries while keynote speaker K. Lakshmi Prasanna, DM (IT) delivered an informative lecture in detail on the working, application and training of Artificial Intelligence.

## Corporate Office of Utkarsh Aluminum Dhatu Nigam Ltd. (UADNL)

On July 02, 2021, Dr. SK Jha, CMD, MIDHANI & CEO, UADNL inaugurated Corporate Office of Utkarsh



Aluminum Dhatu Nigam Ltd. (UADNL) in MIDHANI premises. Shri N. Gowri Sankara Rao, Director (Fin.) and Sr. Officials of MIDHANI were also present on the occasion.

## Collaboration of MIDHANI with Radio Mirchi for ‘Azadi Ki Awaz’ program

In order to share the ‘story of MIDHANI’ with a wider audience, Dr. S. K. Jha, CMD (MIDHANI) gave an exclusive interview for Azadi Ki Awaz in Radio Mirchi on 18.08.2021 as part of celebrations of “Azadi ka Amrit



Mahotsav”. The interview inspired everyone and the story of MIDHANI resonated with the common people of the country. He also commented on the valuable contribution being made by MIDHANI for a self-reliant India.

## Skill Development and Training Program for ITI students

Shri N. Gowri Sankara Rao, Director (Finance), MIDHANI inaugurated a "Skill Development and Training Program" organized by MIDHANI for ITI apprentice trainees in ‘Commemoration of 75 years of India's Independence’ on 09.08.2021. MIDHANI planned to organize the training program batch wise as a one-day workshop. This was the first batch in which Building Self Confidence & Motivating, Basic Essential / Technical Skills for Success, Behavioural &



Communication Skills, Employability Skills, Challenges & Opportunities and Safety Awareness Programme were the topics. Shri S. Narasinga Rao, AGM (Admin), Shri D. Praveen Verma, SM (PPC), Shri B. Murugan, DM (TIS & AT), Shri Naga Pavan Kumar



BHSV, DM (HR) and Shri M. Malla Reddy, DM (Fire, Safety & Environment) were the faculty members. The program was concluded with Rashtragaan.

## **NIPUNA 2021-DRIVING THE DRIVERS**

Shri N. Gowri Sankara Rao, Director (Finance)



inaugurated and addressed the participants of a Unique Skill Development Training Programme "NIPUNA



2021-DRIVING THE DRIVERS" organized by MIDHANI Under "Atmanirbhar Abhiyaan" in

commemoration of 75 years India's Independence on 08 Aug 2021. More than 75 Drivers have participated in the training program. The overall structure and objective of the training program were purposely designed with Tag Line: Safety, Awareness, Duties & Responsibilities, which will help the drivers to enhance their skill and area of expertise to perform their day-to-day duties. The training module framework with one day workshop was compiled in coordination with M/s Automobile Service Provider Academy (ASPA). Shri S. Narsinga Rao, AGM (Admin) and Convener of training Programme, Dr.Srinivas Puppala, Dy. Transport Commissioner, Adilabad District, DTO, Govt of Telangana and Shri Vikrant Mohan , Founder & Chairman , ASPA were the dignitaries graced the event and congratulated all the participants, and complimented MIDHANI Training & Development department TEAM for unique skill development training program. Shri P Sunil Kumar, DM (HR&Admin.), and Shri VK Sudarsshah, DM (SPG) were the organizing team officials.

## **#Shubharam**

### **Big Blue Button is rolled out at MIDHANI**

Dr. SK Jha, CMD MIDHANI and Dr. Upender Vennam, IPoS, CVO jointly rolled out 'Big Blue Button', an



advanced open source web conferencing and online teaching and learning platform in MIDHANI's intranet system as a part of Azadi Ka Amrit Mahotsav on 25.09.2021. This application supports real time sharing of audio, video, slides (with white board controls), chat and screen. Instructors can engage with remotely located students within the network with polling, emojis, multi-user whiteboard and breakout rooms. This facility now is expected to provide all in MIDHANI, a free and very effective platform for web conferencing and online

teaching and learning for which the organization till now was dependent on paid internet based services with much less functionality.

### Foundation stone of TITANIUM SHOP-II

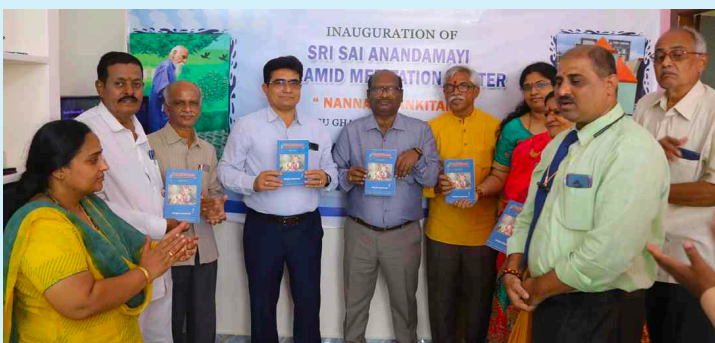
Dr. SK Jha, CMD, MIDHANI laid the foundation stone of "TITANIUM SHOP-II" in presence of Shri N. Gowri



Sankara Rao, Director (Finance), Sr. Officials, and workmen representatives of MIDHANI on July 15, 2021. The production capacity of the shop is 1500T Titanium Ingots per annum.

### Gazal Album was Released

On 22.11.2021, Telugu gazal video album "NANNAKU ANKITAM" was dedicated to MIDHANI . The album



has been released by Dr. S.K. Jha, CMD, MIDHANI and Shri N. Gowri Sankara Rao, Director (Finance). The gazals were written by retired employee of MIDHANI, Shri K. Madhava Rao, Retd. Executive & Ex.President, MEA, MIDHANI.

### #KaushalVikas

### Comprehensive Executive Development Course (EDC) 'LAKSH 2021' for NUS

The three days Comprehensive Executive Development Course (EDC) for NUS promotees under probation was conducted from 01 Nov 2021 to 03 Nov 2021. The training objective and framework was designed in such a way that it will help the participants to scale up to the next



level on behavioral and functional core competencies. The theme of the training was "LAKSH 2021: Goal Setting, Vision, Team Work, Capacity Building"

### Logo : "PARIVARTHAN" has been released

Dr.Sanjay Kumar Jha, C&MD , Shri N.Gowri Sankara



Rao, D(F) & Dr.Upender Vennam , CVO inaugurated Mid-Career Batch 3 training for Middle Level Management

Executives. On the occasion, training theme Logo : "PARIVARTHAN" was released by the dignitaries. The training objective was Strategy, Team Work, Leadership, and Collaboration. The training program was conducted from 13th to 25th Sept. 2021.

## A valedictory function of Mid-Career Training Program



A valedictory function of "Mid-Career Training Program for Mid Level Management: PARIVARTAN" was organized by T&D MIDHANI under the guidance of CVC on 24.09.2021. The Chief Guest of the program Dr. SK Jha, CMD, MIDHANI and Guest of Honour Dr. Upender Vennam, IPoS, CVO felicitated all the participants. MIDHANI Senior officials have graced the occasion and appreciated the team work of T&D. During the program, participants also gave their valuable feedback.

## Hindi workshops

Hindi workshops are being organized regularly for the employees of the company in compliance with the instructions of the Department of Official Language, Ministry of Home Affairs, Government of India under the aegis of Official Language Implementation Committee,



MIDHANI. The objective of the programme is to discuss and to inculcate the simple techniques of using Hindi in day to day official work and to overcome the associated difficulties faced by employees while working in Hindi. The programme covers all aspects of Functional Grammar, Usage of Standard Hindi Script, Use of General Administrative and Technical Terminology, Functional aspects of Translation, Noting & Drafting, Official Language Policy of the Govt. of India, etc. Efforts are also being made to In order to remove hesitation towards doing official work in Hindi, total 65 employees were trained in the 05 workshops organized from July'21 to Dec'21. The faculty members of these Hindi workshops were – Smt. Bela, Assistant Director, HTS; Shri Kazim Ahmed, Assistant Director (Official Language), RCI; Dr. Ravichandra, Senior Faculty, HTS; and Shri Ambadas, Sr. Faculty (Retd.), HTS.

## #AatmaNirbharBharat

### MIDHANI despatches Titanium and Super alloy products to LCA & ALH program of HAL

On 09.09.2021, Mishra Dhatu Nigam (MIDHANI) a Defence Public Sector undertaking flagged off a



consignment of Titanium and Superalloy products to Hindustan Aeronautics Limited for LCA & ALH programs. The consignment was flagged off by Shri R Madhavan, C&MD HAL, Dr SK Jha , C&MD, MIDHANI and Shri N. Gowri Sankara Rao, Director (Finance) MIDHANI. MIDHANI has been supplying various critical raw materials and products of Titanium Alloys, speciality alloys, superalloys, special steels to meet the strategic needs of HAL, Space, Defence and Nuclear power programs of India.

### **MIDHANI & NFC has flagged-off SG Tubes to BHEL Trichy**

MIDHANI & NFC flagged off its second consignment of SG Tubes to be supplied to BHEL Trichy on 31.08.2021. This is the second supply in the present calendar year and



third is also expected to be completed by December 2021. MIDHANI has been supplying various critical products viz. lattice tubes, end fittings and has developed a number of specialty alloys, super-alloys, special steels to meet the strategic need of Space, Defense and Nuclear power programs of India. Motivated by the Hon'ble Prime Minister's 'MAKE IN INDIA' concept, MIDHANI and NFC together participated in a global tender for supply of critical Steam Generator (SG) tubes to M/s. BHEL (Trichy) and had won the tender. It may be worth noting here that, In the past, either SG Tubes in the final finished condition were procured from foreign vendors or converted indigenously by importing the critical forged/rolled input raw material. Further, there are only a few notable manufacturers around the globe who have the capability to produce these tubes. In India MIDHANI/NFC combine is the only manufacturer having this capability to manufacture right from raw material forged billets to the required SG Tubes.

### **Flagged-off the first consignment from New Wide Plate Mill (WPM)**



On 05.11.2021, Dr. S.K. Jha, CMD, MIDHANI and Shri Y. Prasad Babu, Dy CMM (SD), ICF, Chennai flagged-off the first consignment from MIDHANI's New Wide Plate Mill (WPM) to Integral Coach Factory for LHB Coaches. It's a good sign for the growth of MIDHANI that our WPM started its businesses transaction. The WPM is funded by DRDO, OFB & MIDHANI.

### **#MaanSamman**

### **Telangana State Intellectual Property Award**

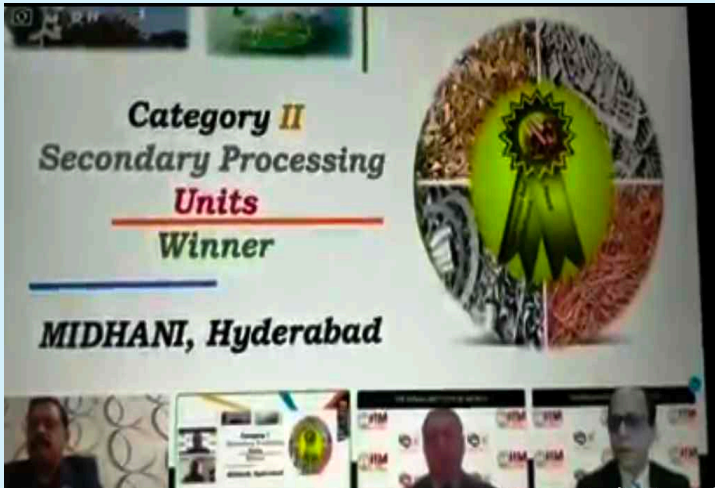


MIDHANI was conferred with 'Telangana State Intellectual Property Award' for the Best IP Portfolio in the PSU category by CII and Telangana State Global Linker.

Dr. S. K. Jha, CMD, MIDHANI received the award from Shri K.T. Rama Rao, Hon'ble Minister for Industries, MA & UD, IT, E&C Govt. of Telangana on 08.11.2021.



## Best Performance Award



MIDHANI was honored with "Best Performance Award" by The Indian Institute of Metals under the category II "Secondary Processing" in an online award ceremony on 14.11.2021. Shri D. Gopi Krishna has received the award on behalf of MIDHANI.

## Best Development Programme in Public Sector Award

MIDHANI was conferred with an award "Best Development Programme in Public Sector for Middle-



Level Management", at National Awards for Excellence in Training & Development by World HRD Congress in the ceremony on 27.08.2021.

Shri Supartha Sen, General Manager (Vigilance), MIDHANI addressed the gathering at National Awards event organised by World HRD Congress on 27.08.2021. It is notable that MIDHANI was awarded with "Best Development Programme in Public Sector for Middle-Level Management" in the ceremony.

## Rajbhasha Gaurav Puraskar to the technical article of MIDHANI



In the Hindi Diwas function organized by the DOL, MHA, under the chairmanship of Hon'ble Union Home & Cooperation Minister Shri Amit Shah Ji, Dr. B. Balaji, DM, HC & CC, MIDHANI was honored with "Rajbhasha Gaurav Puraskar" under the Non-Hindi speaking Region for the year 2020-21. Dr. Balaji Was given this award for his technical article "Armouring Ke Utpadan Men Agrani MIDHANI" (Hindi) by Union State Minister for Home Affairs Shri Ajay Kumar Mishra and Shri Nishith Pramanik.

## #SevaParomaDharmah

### Vehicle sponsored to Akshaya Patra Foundation

On 03.08.2021, Dr. S. K. Jha, C&MD, MIDHANI handed over a vehicle sponsored by MIDHANI to Akshaya Patra



Foundation under Corporate Social Responsibility. The said vehicle is a custom-designed vehicle worth Rs 17 lakhs for delivering food to the schools and also for taking up COVID Feeding activities.

Shri N Gowri Sankara Rao, Director (Finance), Dr.

Upendra Vennam, IPoS, Chief Vigilance Officer – MIDHANI, Shri A Ramakrishna Rao, General Manager (HR) were also present on the occasion. Akshaya Patra Foundation Team Shri Yagneshwara Prabhu, Vice President-Hyderabad Akshayapatra Chapter, Ms. Rajini Sinha, State Head, Shri Avinash Allam, Sr. Manager have expressed their gratitude to MIDHANI for their dedicated support in feeding nutritious food to the Government School Children of Telangana State. The inauguration event was organized by the CSR team, Ms. AR Rashmi, Mgr, HR & Shri M. Venugopal Swamy, Sr. Executive.

## Automatic PSA Oxygen Generator Plant sponsored to Osmania General Hospital

Dr. S. K. Jha, C&MD, MIDHANI inaugurated Automatic PSA Oxygen Generator Plant to Osmania General



Hospital, Hyderabad sponsored by MIDHANI under Corporate Social Responsibility on 18.12.2021. Shri N Gowri Sankara Rao, Director(Finance), and other Senior Executives of MIDHANI. Dr. B Nagendar, Superintendent, Osmania General Hospital, Dr. Triveni, Addl. Superintendent, Dr. Seshadri, Civil Surgeon - RMO, Dr.Pandu Naik, Prof HOD Anesthesia and medical fraternity of the hospital were also present in the inaugural ceremony.

## #Samaroh

### Independence Day celebration

On 15 August 2021, 74th Independence Day was celebrated in MIDHANI with great enthusiasm. The national flag was hoisted by the CMD MIDHANI Dr. SK Jha followed by National Anthem. On the occasion



Dr. SK Jha addressed the gathering. In his address he said that we MIDHANI should always be ready to cooperate with our forces in protecting the freedom of our country. Special metals produced by MIDHANI plays an important role in the manufacturing of essential weapons. We have to keep developing our products indigenously under the



AtmaNirbhar Bharat. On this occasion, students from SC, ST and OBC studying in BPDVA School, MIDHANI were awarded with cash prizes for their excellent performance in the academics and the winners of various sports competitions organized on the occasion of Independence Day were also honored with mementos. Shri Prateek Sharma, Manager, SMG, played the tunes of patriotic songs on the synthesizer, Smt. Smita Kumari, Technician, Shri Vijay Nath Kushwaha and Shri P. Gopi, Technician and Dr. B. Balaji, Deputy Manager sang patriotic songs in cultural program.

## National Doctor's Day

On the occasion of National Doctor's Day, MIDHANI expressed its gratitude to the medical fraternity for their selfless contribution during Covid crisis.



MIDHANI management took this opportunity to appreciate and applaud the proactive efforts taken up by the Doctors and Medical team of MIDHANI to combat the crisis situation during pandemic.

## Hindi Diwas

The Hindi Diwas 2021 was concluded at Mishra Dhatu Nigam Limited (MIDHANI), a GoI enterprise under the

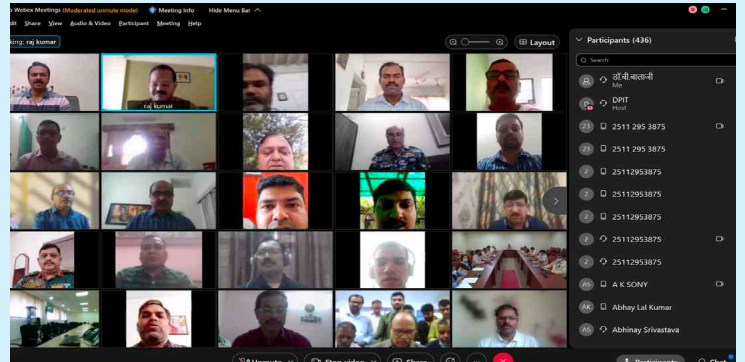


MOD. Presiding over the program, Dr. S. K. Jha, CMD said that apart from doing the daily work of the office in Hindi, employees should try to do scientific and technical writings in Hindi. On this occasion the chief guest of the program Dr. Nareshbala, Deputy Director, Hindi Teaching Scheme, MHA, Director (Finance) of Enterprises, N. Gowri sankar Rao and senior officers have graced the occasion. In the program, winners of Hindi competitions were awarded with cash prizes,

rolling trophy 'Midhani Rajbhasha Garima Puraskar' to the Quality Management Department for excelling in all competitions and cash prizes and certificates to 46 employees who did office work in Hindi during the year 2020-21

## Rashtriya Ekta Diwas

Rashtriya Ekta Diwas 2021 was celebrated in MIDHANI



on 31.12.2021. Tribute was paid to Sardar Vallabhai Patel, the 'Iron Man of India' and 'Architect of United India', by administering pledge with Shri Raj Kumar, Secretary (DP) and organizing Unity Bike Rally on 31.10.2021.



## Vigilance Awareness Week

The Vigilance Awareness Week - 2021 was observed by MIDHANI from 26.10.2021 to 01.11.2021 with the



theme “Independent India @ 75 : Self Reliance with Integrity; “स्वतंत्र भारत @ 75 : सत्यनिष्ठा से आत्म निर्भरता”. In order to ensure the social distancing norms, various Quiz competitions on topic like “Atmanirbhar Bharat”, “MIDHANI Purchase Policy & Procedures 2020”, “Anti-corruption drive” were conducted in on-line mode. In line with directive from CVC, online Vendor meet, and Walkathon were also conducted and a skit “Jo Na Dikhe Vaha Nahin Hota Hai Kya” was also played by employees to motivate stakeholders across society to fight against corruption. During the valedictory program "Jagruti" in house magazine was also released by the dignitaries and prizes were distributed to the winners of the competitions held during the week .

## National Constitution Day



National Constitution Day was observed in MIDHANI on 20.11.2021. To mark the occasion, MIDHANI officials read the Preamble of the Constitution of India. A



guest lecture by Shri Naumene Surparaj Karlapalem, Advocate, High Court of Telangana and Andhra Pradesh was also organised. MIDHANI employees also

participated in an online quiz organized by the Ministry of Parliamentary Affairs.

## Swachhta Pakhawada



Swachh Bharat Pakhawada was organized at MIDHANI with great enthusiasm from 01-15 Dec 2021. During the pakhawada, various activities such as cleanliness drive at Factory premises & Township, disposal of Scrap & e-waste, closing of old files, plantation, fumigation of insecticides were taken up. One webinar on “An insight into Environment Pollution and Its Management, Essay Writing competition for school students and Mini-Marathon have been conducted to bring swachhta awareness among the employees and school children.

*Continue on Page No. 14*

## #AtithiDevoBhava

### Visit of MCEME Officers

Instructional Visit of Officers from MCEME to MIDHANI On 24.04.2021, Instructional Visit of Officers



from Advance Mechanical Engineering Course (OANE-77 PT-II) from Military College of Electronics and

Mechanical Engineering(MCEME) Secunderabad. The visiting Team headed by Lt Col A.P.Singh , Shri Ashok K Panda, Executive Engineer Course Control Officer.

The visit facilitated by Training & Development department along with an interaction with Col.Ashwani Kumar, Addl.General Manager, Shri Beura Barada Prasad, Dy.General Manager (BD) & Col N.Seshagiri Rao, Senior Manager(Security) on various manufacturing products, Technology and process in MIDHANI.

### Visit of Joint Secretary (P&C/DIP), Ministry of Defence, Govt. of India

Shri Anurag Bajpai, JS (P&C/DIP), Ministry of Defence, GoI had visited MIDHANI on 26.08.2021. He had a meeting with Dr. SK Jha, CMD, MIDHANI and Sr. Management on ongoing and future projects of MIDHANI. He also visited the newly established Wide Plate Mill, 8T VIM and Spring Mill.



Shri Anurag Bajpai, Joint Secretary (P&C/DIP), Ministry of Defence, Government of India also planted a sapling in the land of MIDHANI's new Titanium Shop.

### Visit of Lt Gen TSA Narayanan, AVSM, Commandant MCEME, Sec'bad (Telangana)

Lt Gen TSA Narayanan, AVSM, Commandant MCEME, Sec'bad (Telangana) visited MIDHANI on 20.07.2021.



He had a discussion with Dr.SK Jha, CMD, MIDHANI, and Shri N. Gowri Sankara Rao, D (F) about manufacturing facilities and R&D for defence applications. The guests were accompanied by Shri Rama Ramesh Babu, GM (Melts) during their visit to MIDHANI plant.

### #Pratinidhitva

#### Webinar on Indian Alloy Steel

On 24.07.2021, Dr. SK Jha, CMD, MIDHANI was an expert panelist for the Webinar on "Indian Alloy Steel"



organized by Metalogic PMS. He shared the virtual dais with Gopalakrishnan Ganesan, Deputy Secretary, Ministry of Steel, GOI; Sridhar Krishnamoorthy, Managing Director, Arjas Steel; RK Goyal, Chairman, Saarloha and Managing Director, Kalyani Steels Ltd.; Ramchandra Dalvi, Director Technical, Sunflag Steel, Dr. Anil Dhawan, Executive Director, ASPA. Ms. Monica Bachchan, Founder, Metalogic PMS was Moderator. Dr.Jha has expressed his views on Indian Alloy Steel in general and especially the contribution of MIDHANI in the production of alloys and special steels.

## MIDHANI officials participated in DRDO workshops



MIDHANI officials participated in a workshop on “Personal Effectiveness in Project Management” and “DRDO Policies for Procurement & Project Administration” on 21st and 28th of Oct 2021 respectively. The workshop was organized by DRDL-DRDO on the occasion of Diamond Jubilee Celebrations of DRDO.

## #Jagrukata



A talk on POSH Act-2013, Awareness and Sensitization Programme on prevention of Sexual Harassment of Women at Work Place on 09 Dec 2021 was organized for women employees of MIDHANI. Mrs. Geeta Goti, Joint Secretary – Women Forum of HCSC was the guest speaker.

## #Samaroh *(Cont..from Page No. 12)*

### Quality Month



Quality Month for the year 2021 was organised by Quality Management Department on the theme “Sustainability: Improving our products, people and planet” during the month of November 2021. Various initiatives for process improvements at shop floors, lecture series on Quality and other competitions were conducted to sensitize and create awareness on the importance of Quality related activities. Valedictory function was presided by Shri APVS Prasad, Chief Executive (CEMILAC) and Dr. S.K.Jha, C&MD (MIDHANI) in presence of Shri. N.Gowri Sankara Rao, Director (Finance) MIDHANI, Shri. Akhish Pathak,

Regional Director (RCMA) and other senior officers from MIDHANI. On this occasion Shri V.S Ramagopal, AGM (I/c QM & AMTL) emphasized on the importance of continual improvement of quality in Midhani products for sustainable operations and business.

# #Article

## Utilization of Statistical Analysis Methods for Calculating Minimum Mechanical Properties of Aerospace Metallic Materials

Vamsi Krishna Parimi (AM-AMD)

### Introduction

In general material has to meet the minimum mechanical properties in different directions of metal flow, which are specified in the international specifications such as AMS/ASTM/etc. For round products there will be longitudinal and transverse directions whereas for flat products there is one more direction called short transverse. It is seen that for Titan31 alloy wide plate form, yield strength and ultimate tensile strength values were not available in international specifications including MMPDS handbook for short transverse direction. Therefore an exercise has been carried out using tensile test data of Titan31A 120mm thick forged plates to find out the minimum specification values in short transverse direction. These plates were manufactured for 5th generation aircraft's structural air frame material. Calculations were done using statistical analysis methods inline with Metallic Materials Properties Development and Standardization Handbook (MMPDS-01,2003).



Fifth generation Fighter aircraft Model exhibited at Aero India 2013



Titan31A forged annealed plate (Finish forging of plate in 6000T press is depicted at the corner)

Brief description of MMPDS guidelines is to be discussed to understand insights of the statistical methods. This handbook is the primary source in USA and many other countries of statistically based design allowable metallic materials and joints used by aerospace industries. Analysis methods can be used to define both room temperature and high temperature mechanical properties such as tensile, compression, shear, fatigue, fracture toughness, elongation, elastic modulus, creep and stress rupture. Design minimum properties can be calculated by direct or indirect statistical methods. Minimum sample size required for direct computation of T99 and T90 values (from which A and B basis properties are established) is 100. These 100 data points must be from min 10heats and lots. A T99 value is statistically computed, one sided lower tolerance limit, representing 95% confidence lower limit on the 1st percentile of the distribution. Similarly, a T90 value is a statistically computed, one sided lower tolerance limit, representing a

95% lower confidence limit on the 10th percentile of the distribution. If the sample can't be described by Pearson/Weibull distribution, T99 and T90 values must be computed by nonparametric (distribution free) means, with min of 299 data points. Wrought products often shows variation in mechanical properties with thickness or direction. Therefore variation of properties with the thickness is done through regression analysis for both direct and indirect properties.

There are mainly three types of mechanical properties, which are S basis, A basis and B basis. 1) S basis value is actually estimated A basis value which specification minimum value. Whenever sufficient data is available, validity of the S basis (estimated A basis) shall be verified. If A basis exceeds S basis value, major suppliers and users of the materials gets benefited. If in the rare case, A basis less than S basis, then S basis value will be replaced by A basis. 2) B basis-atleast 90% of population of values is more than calculated value with 95% confidence. 3) A basis- Lower value of either calculated T99 or specification minimum (S basis). At least 99% of population of values is more than calculated value with 95% confidence.

### Methodology

For calculation purpose, data points from 6 heats were utilized and it is assumed all the data points were taken from single mill source and passed through same processing, heat treatment, having same product form and structurally homogeneous. Total of 79 data points resulted out of these 6 heats for ST direction are shown in Table 1.

Procedure followed in the statistical computation of design allowables has been illustrated in *Figure 1*.

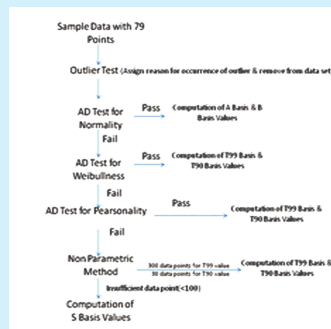


Figure 1: Flow chart illustrating methodology of calculation

0.2% YS(MPa)						UTS(MPa)					
823	818	783	847	967	942	887	980				
827	820	806	831	966	944	883	982				
829	818	832	820	973	943	908	969				
827	826	787	826	969	943	903	963				
831	826	786	828	967	960	888	982				
829	823	804	826	968	962	887	963				
843	812	856	851	968	959	1001	961				
838	812	853	826	968	949	932	971				
841	838	881	881	966	956	1011	963				
869	803	854	848	946	963	973	972				
798	803	855	819	944	944	968	978				
800	833	823	825	943	943	968	960				
807	803	826	824	940	954	954	966				
806	843	827	821	939	946	955	964				
809	828	827	835	937	965	961	964				
807	840	825	831	942	947	966	976				
805	797	829	821	928	961	966	979				
802	806	823	827	920	932	973	961				
835	800	840	820	961	896	966	968				
816	779	841		897	973	963					

Table 1: Input data points of YS and UTS from Six heats

Figure 1: Flow chart illustrating methodology of calculation

## Results & Discussion

Sample data was tested for outlier by Grubb's test using Minitab software and shown in Figure 2. Out of 79 data points of YS, one value 924MPa was found to be outlier. However, appropriate reason for eliminating the outlier was could not be found. Hence, further calculations were preceded with complete data points including the outlier. Whereas during outlier test for 79 UTS data points, no outlier was found.

To determine the form of distribution using parametric method, Anderson Darling (AD) tests have been carried out. AD statistic values were taken from Minitab software results/excel results. Based on calculations done for AD tests for Normality, Weibullness and Pearsonity (Tables 2-4), it is found that sample data doesn't follow any of those distributions.

AD statistic equation for assessing ND

The "Anderson-Darling" test statistic is

$$AD = \left[ \sum_{i=1}^n \frac{1-2i}{n} \left[ \ln(F_{\phi}(Z_{(i)})) + \ln(1 - F_{\phi}(Z_{(n-i)})) \right] \right] - n$$

where  $F_{\phi}$  is the standard normal distribution function\*. If

$$AD > 0.752(1 + 0.75/n + 2.25/n^2)$$

Then, population doesn't follow ND

AD statistic equation for assessing WD

Define the A-D statistic as

$$AD = - \sum_{i=1}^r (C_i \ln F_{i-2F_i}) + \frac{r^2}{n} \ln F_{r-1} - 2r F_{r-1} + \frac{n}{2} F_{r-1}^2 - \frac{n}{2} F_1^2$$

if

$$AD \geq \begin{cases} 0.3951 + 4.186 \times 10^{-5} n & \text{(Uncensored)} \\ 0.2603 + 4.182 \times 10^{-5} n & \text{(20 percent censored)} \\ 0.1761 + 1.842 \times 10^{-5} n & \text{(50 percent censored)} \end{cases}$$

Then, population doesn't follow Weibull distribution.

AD statistic equation for assessing ND

AD statistic equation for assessing WD

AD statistic equation for assessing PD

$$AD = - \sum_{i=1}^n \left[ \frac{(2i-1)}{n} \ln(F_{X,S,q}(X_{(i)})) - 2F_{X,S,q}(X_{(i)}) \right] - \frac{3n}{2}$$

where

$$F_{X,S,q}(x) = \begin{cases} H \left[ \frac{4}{q} \left( \frac{x-\mu}{\sigma} \right) \right] & q > 0.1265 \\ 1 - H \left[ \frac{4}{q} \left( \frac{x-\mu}{\sigma} \right) \right] & q < -0.1265 \end{cases}$$

If the AD is greater than the critical value of

$$0.3167 + 0.034454 \cdot \ln(n) \cdot [\exp(q) - 1]^2$$

then the data are rejected by the Anderson-Darling test for Pearsonity.

AD statistic equation for assessing PD

When the form of distribution is not known then it is recommended in MMPDS-01 to go for Non parametric method of analysis for determining the lower bound values. Calculated values were shown in Table 5. Min of 29 values sufficient for computation of T90 values, which comes out to be YS of 786MPa and UTS 887MPa. Whereas computation of T99 values requires min of 299 values. As sample contains only 79 data points, T99 values comes out to be YS of <779MPa and UTS of <883MPa and exact values were not known. Henceforth non parametric method gives a qualitative directive based on statistical calculation that specified minimum of YS & UTS should be <779MPa & 883MPa respectively.

$$I_{99} = n/100 - 1.645\sqrt{99n/10000} + 0.29 + 19.1/n, \text{ for } n \geq 299$$

$$I_{90} = n/10 - 1.645\sqrt{99n/100} + 0.23, \text{ for } n \geq 29$$

		Minimum S = $\bar{X} - s \cdot k_{99}$
$\bar{X}$	=	Sample Mean
S	=	Standard Deviation
$K_{99}$	=	One-sided tolerance-limit factor corresponding to a proportion at least 0.99 of a normal distribution and a confidence coefficient of 0.95 based on the number of specimens (see Table 9.10.1)

Finally, as exact lower bound values were not able to calculate using above methods, and when sample data contains less than 100 points, MMPDS-01 gives directive to calculated S basis values which is basically estimated A basis value in case of lack data points. S basis calculation assumes the population follows normal distribution. This results in S basis value for YS & UTS as 766MPa & 883MPa. It shows that statistically calculated design allowable for YS & UTS are lower than internationally specified values of YS-827MPa, UTS-896MPa for longitudinal/transverse directions.



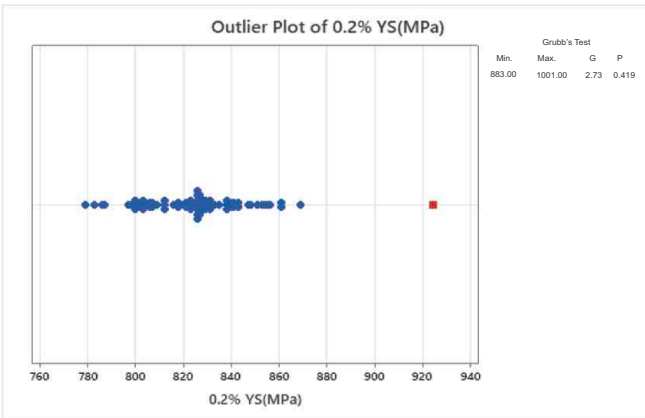
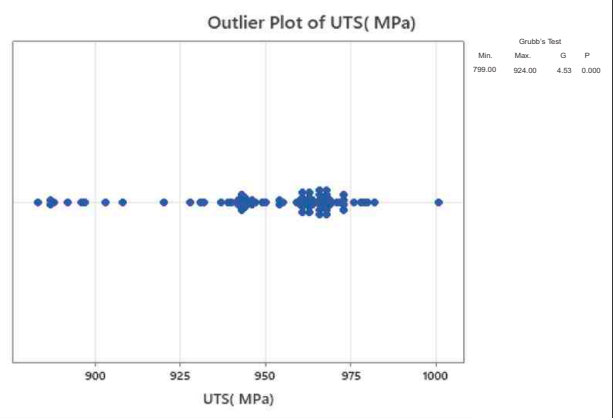


Figure 2. a) Outlier plot for YS data



b) Outlier plot for UTS data

Table 2: AD Test for ND data

Property	AD	RHV=0.752/(1+0.75/n+2.25/n <sup>2</sup> )	ND Follows? (AD>RHV)
YS	1.05	0.744	No
UTS	4.45	0.744	No

Table 3: AD Test for WD data

Property	AD	RHV=0.3951+4.186*10 <sup>-2</sup> n	WD Follows? (AD>RHV)
YS	5.14	0.398	No
UTS	2.04	0.398	No

Table 4: AD Test for PD data

Property	AD	RHV	Test Passed? (AD>RHV)
YS	75.46	0.67	No
UTS	43.22	0.38	No

Table 5: lower bound values calculated using Non Parametric Method

Property	r90	T90	r99	T99
YS	3	786	<1	<779
UTS	3	887	<1	<883

Table 6: S basis values

Property	Mean	SD	S Basis Value
YS	825.38	21.79	766
UTS	951.65	25.16	883

## Conclusions

- Statistical analysis methods mentioned in MMPDS handbook can be used to determine the design allowables for different grades/forms of aerospace materials being manufactured in Midhani.
- It is concluded that YS of 766MPa and UTS of 883MPa are minimum guaranteed properties in ST direction of Titan31A 120mm thick forged annealed machined wide plates.
- Whenever available data set contains minimum of 100 data points, lower bound values can be calculated provided that data follows any of the Weibull/Pearson distributions.
- If data set contains minimum of 300 data points, lower bound values can be calculated using Non parametric method when the distribution of data is not known.

## Acknowledgements

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## References

- Chapter 9, MMPDS-01 : Metallic Materials Properties Development and Standardization (MMPDS). [Washington, D.C.] : [Columbus, Ohio]: Federal Aviation Administration; Battelle Memorial Institute [distributor], 2003.
- Aeronautical Materials Specification 6931A, SAE, 2007

## #Unnati

### DPC (Executives, NUS & Non-Executives)



Departmental Promotions with respect to Executives, Non Unionized Supervisors and Non-Executive employees for the year 2021 was conducted in time and the promotion orders were issued w.e.f. 01 July 2021. It was a joyful moment all the promoted employees. Total 65 employees (57 Executives & 08 NUS) and 120 Non-executive employees were promoted to next higher grade in DPC 2021

First time in MIDHANI, Fast Track Promotion Channel was introduced. Through the scheme 02 non-executive employees were promoted to NUS (Non-unionized Supervisors) from WG-VI (Junior Assistant) to E0 (Junior Executive). In DPC-21, through normal channel of

promotion scheme for NUS(Non-unionized Supervisors), 04 Non-executive employees were promoted from Wage group 10/ 11 to E0/ E0-1( Junior Executive/ Engineer Grade -I.)



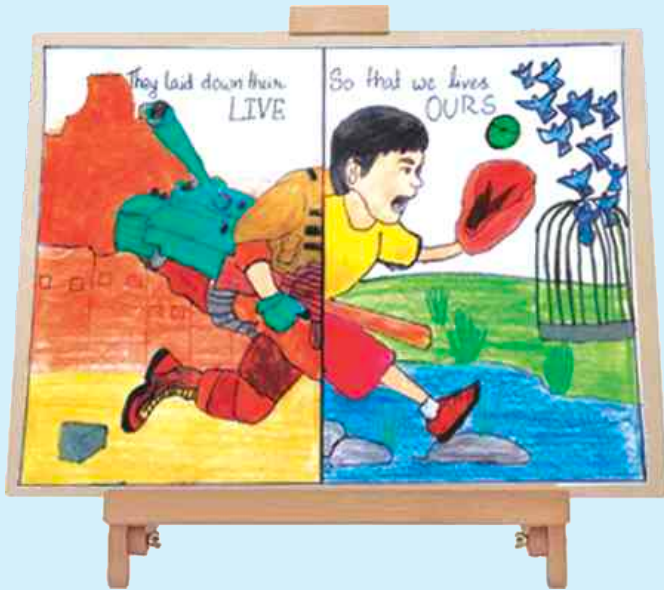
## Congratulations

'MIDHANI Manthan' editorial board congratulates Master **Ankolu Chandra Sekhar**, S/o Ankolu Satyanarayana, DGM(Prod-III) for his excellent performance in 1st Year Intermediate Examinations. He has secured 460 Marks out of 470 Marks with 97.87% in the 1st Year Intermediate Exams conducted by Telangana State Board of Intermediate Education, Hyderabad.



## Glimpses of Best Drawings

Drawing competition for the school students was organized during the 'Exhibition of MIDHANI Products for Public Display' under the aegis of 'Azadi Ka Amrit Mahotsav' from 13-19 Dec' 2021. Students of BPDVA School, MIDHANI have won the Best Drawing prizes.



Swadin Sing Patra  
Class-IV



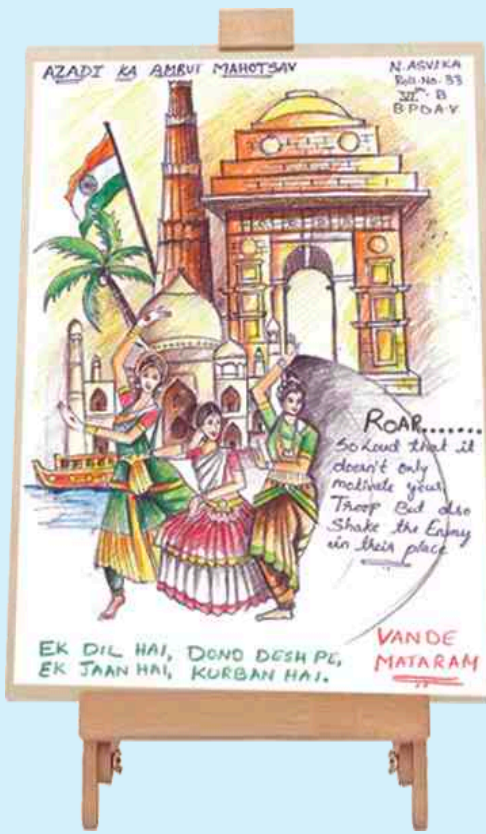
P. Sravya  
Class-V



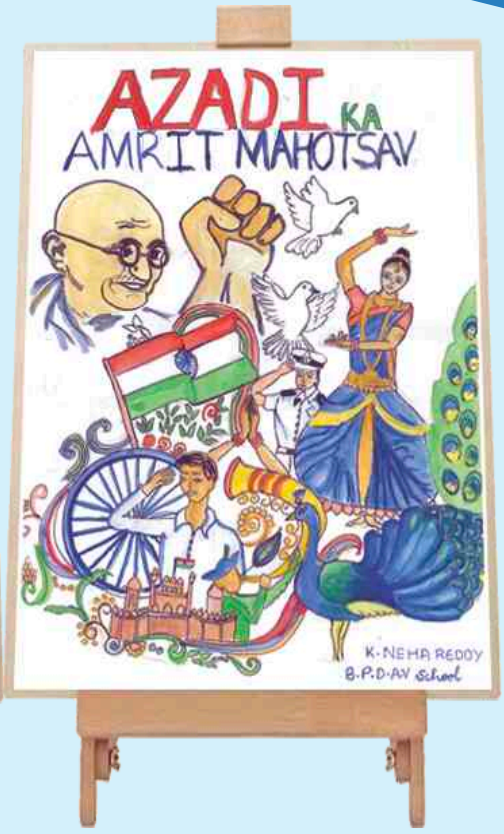
K. Kusuma Bhawani  
Class-X



**K. Prajanand Reddy  
Class-V**



**N. Ashvika  
Class-VI**



**K. Neha Reddy  
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