



Maharaja Agrasen Institute of Technology, Delhi Department of Mechanical and Automation Engineering

Department of Mechanical & Automation Engineering and Department of Mechanical Engineering, Maharaja Agrasen Institute of Technology organized an online webinar on the topic '**Tribological behaviours of magnesium alloy sector shape pad with surface modification**' on **08th January 2022**. The event was started with the welcome address of Prof. Neelam Sharma, Director, MAIT who enlightened us with her inspirational and encouraging words. She emphasized the significance of research for the benefit of the students and the faculty.

The main theme of the event was based on the research work carried out by Dr. Sumit Joshi during his PhD. Dr. Sumit Joshi is working as an Assistant Professor in the Department of Mechanical and Automation Engineering (MAE) and Mechanical Engineering (ME) at Maharaja Agrasen Institute of Technology, New Delhi. Dr Sumit is awarded with the Ph.D. degree from Delhi Technological University (DTU), New Delhi in the year 2021. He has done his M.Tech in Production Engineering in the year 2016 from DTU only. Dr. Sumit has been involved in research on materials characterization, surface engineering and tribology of Machine Elements. He has authored many research papers in International Journals and Conferences of repute.

Dr. Sumit Joshi presented a very informative talk on '**Tribological behaviours of magnesium alloy sector shape pad with surface modification**'. The lecture focuses on the adoption of Friction Stir Processing (FSP), a surface modification technique, for enhancing the properties of Magnesium alloys. The talk started with the introduction of various types of magnesium alloys and their applications. Further, the principle of FSP was very well explained along with the supporting literature. Dr. Sumit listed the various types of equipment utilized for achieving the research objectives. The speaker briefly explained the influence of microstructural features obtained after FSP on the mechanical and tribological properties of magnesium alloys. The FSP produced magnesium alloys was further explored for the thrust bearing applications. The lecture concluded with the future scope of the research work. The speaker stressed the studies of magnesium alloys at elevated temperature applications.

Finally, the webinar was ended with a Q & A session. More than 100 participants attended for the same and the event was a grand success.

MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY
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DEPARTMENT OF MECHANICAL AND AUTOMATION ENGINEERING & DEPARTMENT OF MECHANICAL ENGINEERING

Presents
Webinar Series

Tribological Behaviours of Magnesium Alloy Sector Shape Pad with Surface Modification

Dr. Samit Joshi, Speaker

Dr. V.N. Mathur, Head, Department of Mechanical and Automation Engineering

Dr. Vaibhav Jain, Head, Department of Mechanical Engineering

An Online webinar on "Tribological Behaviours Of Magnesium Alloy Sector Shape Pad With Surface Modification"

WELCOMES YOU

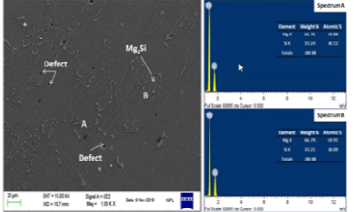
Prof. (Dr.) Neelam Sharma
 Director
 Maharaja Agrasen Institute of Technology, Delhi

Prof. Sharma has completed her PhD. in Electronics Engineering from U.P. Technical University (Lucknow). She did her B.E. (Hons.) in ECE from Thapar Institute of Engineering and Technology in 1985. She has guided 3 PhD's and many Dissertations and Projects. Her areas of research include VLSI Design & Technology, Nanotechnology, CAD, VHDL and Computer Architecture. She has published 75 papers and 5 books and has completed many Projects in Collaboration with World Bank, AICTE, MHRD and GGSIPU.

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Microstructural analysis of cast AS21A alloy

The microstructural findings of AS21A alloy were in good agreement with the literature since PM was prepared through the casting route, that's why it was obvious for the evolution of coarse Mg₂Si precipitates in the matrix. Further, casting defects particularly porosity and voids were present in the parent material.



SEM with EDS of cast AS21A alloy

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Grid of participant video feeds.

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Sector shape pad: Wear Characterization

- The pad material of babbitt alloy was further studied for the wet wear analysis at different pressure values.
- In power generating machinery, thrust loads provide average bearing pressure of 2-5 MPa [154]. Therefore, in the present study wet analysis was carried out at the pressure values of 1.98, 2.58, 3.18 and 3.78 MPa.
- Apart from this, other parameters which were set during the wear test are the sliding velocity of 1 m/s and sliding distance of 1000 m.
- Similarly, wet wear analysis was also performed on the FSPed cast AS21A alloy for comparison purposes

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Conclusions

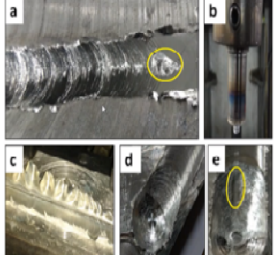
Following were the major conclusions during the entire experiment:

- The hybrid Taguchi-GRG-PCA approach successfully optimized the FSP of cast AS21A alloy. The optimal level of process parameters was selected based on the highest GRG value and was found to be: Rotational Speed of 800 rpm, Travel Speed of 50 mm/min and Shoulder Diameter of 20 mm. ANOVA results exhibited the significant process parameters as rotational speed (71.27 %) followed by the shoulder diameter (13.99 %) and travel speed (11.44 %). Furthermore, a confirmation experiment shows the improvement in GRG value by 0.0374.

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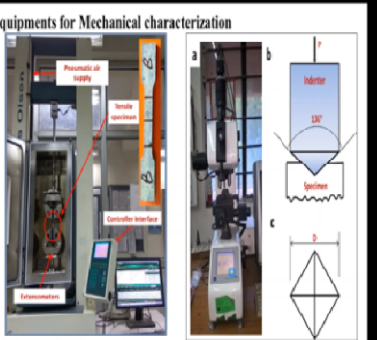
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Defects encountered during preliminary experiments



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Equipments for Mechanical characterization



Universal Testing Machine (UTM) set up (Tinius Olsen H50K5)

Vicker's microhardness tester (Model: FM-e7, Future Tech, Japan)