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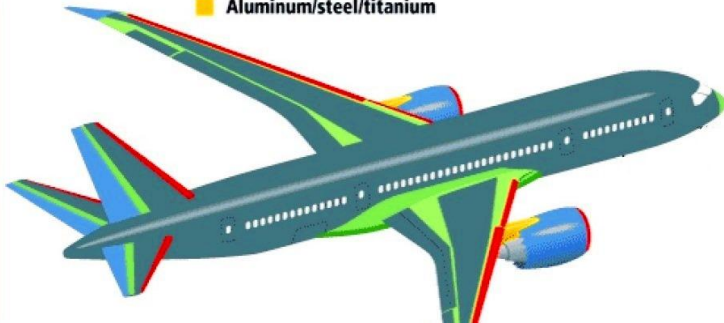
The Role of Composites in the Aviation Industry

Fibreglass is the most common composite material, and consists of glass fibres embedded in a resin matrix. Fibreglass was first used widely in the 1950s for boats and automobiles. Fibreglass was first used in the [Boeing 707](#) passenger jet in the 1950s, where it comprised about two percent of the structure. Each generation of new aircraft built by Boeing had an increased percentage of composite material usage; the highest being 50% composite usage in the yet-to-be-released [787 Dreamliner](#).

Boeing 787 Dreamliner

Materials used in 787 body

- Fiberglass
- Aluminum
- Carbon laminate composite
- Carbon sandwich composite
- Aluminum/steel/titanium



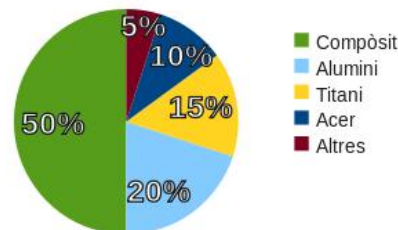
Boeing's 787 Dreamliner will be the first commercial aircraft in which major structural elements are made of composite materials rather than aluminum alloys. There will be a shift away from archaic fibreglass composites to more advanced carbon laminate and carbon sandwich composites in

this aircraft. Problems have been encountered with the Dreamliner's wing box, which have been attributed to insufficient stiffness in the composite materials used to build the part. This has led to delays in the initial delivery dates of the aircraft. In order to resolve these problems, Boeing is stiffening the wing boxes by adding new brackets to wing boxes already built, while modifying wing boxes that are yet to be built.

Factors of Composite Material Usage

Weight reduction is the greatest advantage of composite material usage and is one of the key factors in decisions regarding its selection. Other advantages include its high corrosion resistance and its resistance to damage from fatigue. These factors play a role in reducing operating costs of the aircraft in the long run, further improving its efficiency. Composites have the advantage that they can be formed into almost any shape using the moulding process, but this compounds the already difficult modelling problem. A major disadvantage about use of composites is that they are a relatively new material, and as such have a high cost. The high cost is also attributed to the labour intensive and often complex fabrication process.

Boeing 787 Dreamliner
Distribució de materials



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Research Papers Published in Journals :

- ✚ M.Gopi Krishna, K.Praveen Kumar, Asst. professor J.Babu Rao, NRMR Bhargava, K.Vijaya Bhaskar, "Deformation Studies on A2024/Flyash/SiC Hybrid Composites", International Journal of Engineering Research & Technology (IJERT) Vol. 2, Issue 10, 2013, ISSN: 2278-0181, pp 3772-3776.
- ✚ Radhika. S., Asst. professor Rao, C. S. and Pavan, K. K. , "A study and performance evaluation of evolutionary optimization techniques for multi-objective master production scheduling problems", Journal of Production Research and Management Volume 3, Issue 2(2013), pp 12-22. ISSN: 2249 – 4766.
- ✚ S.Radhika, D.Sameer Kumar, D.Swapna, Asst.Professors "Vikor method for multi criteria decision making in academic staff selection", Journal of Production Research and Management Volume 3, Issue 2(2013), pp 30-35. ISSN: 2249 – 4766.
- ✚ Radhika.S., Asst.Professor, Rao,C.S., and Pavan.K.K., "A Differential Evolution based Optimization for Master Production Scheduling Problems" , International Journal of Hybrid Information Technology Vol.6, No.5 (2013), pp.163-170 , <http://dx.doi.org/10.14257/ijhit.2013.6.5.15>
- ✚ D. Sameer Kumar, S. Radhika Asst. professors and K. N. S.Suman: "MADM Methods for Finding The Right Personnel in Academic Institutions", International Journal of u- and e- Service, Science and Technology Vol.6, No.5 (2013), pp.133-144 <http://dx.doi.org/10.14257/ijunesst.2013.6.5.12>.
- ✚ G.Chaitanya, Assoc. professor B. Ravi Sankar Asst. professor "A Genetic Algorithm based Optimising Scheme to enhance the performance of Automobile Radiator" International Journal of Lean Thinking (IJLT), Vol. 4 No.2, P.P. 33-42, December 2013.
- ✚ V.Tara Chand, P.Nanda Kishore, B.Ravi Sankar, Asst.Professors, "Thermodynamic Analysis of Gas Turbine Power Plant", International Journal of Mechanical Engineering Research & Applications, Vol. 1 (04), P.P. 73-77, September 2013.
- ✚ V.Tara Chand, B. Ravi Sankar and J. Rangaraya Chowdary , Asst. professors "Exergy Analysis of Gas Turbine Power Plant", International Journal of Engineering Trends and Technology (IJETT), Vol. 4 issue 9, P.P. 3991-3993 , September 2013.
- ✚ V.Tara Chand, B. Ravi Sankar Asst. professors and M. Ramanjaneya Reddy "First Law and Second Law Analysis of Gas Turbine Plant", International Journal of Mechanical Engineering and Research, Vol. 3 No.4, P.P. 415-420, September 2013.
- ✚ V.L. Srinivas, M. Zammerudhin, M. Ravi Kumar, B. Ravi Sankar , Asst. professor and K. Ravindra , Prof & HOD , "Parametric Analysis of Friction Stir Welding on AA6061 Aluminum Alloy", International Journal of Mechanical Engineering and Research, Vol. 3 No.5, P.P. 557-563, September 2013.
- ✚ Dr. B.Ramgopal Reddy, Assoc . prof , Prof. K.Ramji and Prof. B.Satyanarayana, "Analysis of Stress Concentration in Carbon Nanotube Reinforced Composites", International Journal of Advances in Science and Technology(IJAST), Vol.7(1), pp: 45-52, 2013.
- ✚ Dr. B.Ramgopal Reddy, Assoc . prof , Prof. K.Ramji and Prof. B.Satyanarayana, "Non-linear Response of Multiscale Composite Panels", International Journal of Engineering Research and Technology (IJERT), Vol.2(8), pp: 541-550, 2013.
- ✚ Neha Nag K., Ch. Deva Raj, Asst . professor , Kolla Srinivas , Professor and Mastan Rao P., "[Optimization of Gripper by Using Ant Colony Metaphor](#)" , *Research Journal of Engineering Sciences*,2(8),1-6(2013) .
- ✚ Sulaiman Hassan, Kavi Kumar, Ch Deva Raj, Asst . professor , Kota Sridhar , "[Design and Optimisation of Pressure Vessel Using Metaheuristic Approach](#)" , *Journal of Applied Mechanics and Materials* , Volume 465-466(2014) , Pages 401-406. Available online from 19/12/2013.
- ✚ Ch Deva Raj, Asst . professor , Sulaiman Haji Hassan, Kavi Kumar , Kota Sridhar , "A Hybrid Metaheuristic Algorithm For Pressure Vessel Optimization", *Engineering & Technology Procedia*, Vol. No. 1 (2013) p. 7-12.
- ✚ N.Surekha, Deva Raj.Ch , Asst . professor Dr.Srinivas Kolla, professor , Kota Sridhar , "Optimization of Principal Dimensions of Radial Flow Gas Turbine Rotor Using Ant Colony Algorithm" , *Engineering & Technology Procedia*, Vol No. 01 (2013) p. 01-06
- ✚ Reddy Sreenivasulu, Asst . professor "Optimization of Surface Roughness and Delamination Damage of GFRP Composite Material in End Milling using Taguchi Design Method and Artificial Neural Network" , *Journal of Procedia Engineering* (Elsivier Publishers) ISSN:1877-7058, Vol 64, pp785-794, 2013.

- # Reddy Sreenivasulu, Asst . professor Goteti Chaitanya, Assoc . Prof “Comparative Study on Resistance Spot Welding (RSW) and Friction Stir Welding (FSW) of dissimilar alloys: Review” International Journal of Advanced Scientific and Technical Research (ISSN:2249-9954),Issue3,Volume5,Sept-Oct2013 , pp325-333
- # Goteti Chaitanya, Assoc.Prof, Reddy Sreenivasulu, Asst.Professor “NDT Techniques to Investigate Fracture in Continuous Fiber Reinforced Composite Structures- Review” International Journal of Current Engineering and Technology (ISSN:2277-4106),Vol3,No4 , pp1271-1275,Oct 2013.
- # D.V.V. Krishna Prasad , professor “Influence of Cutting Parameters on Turning Process Using ANOVA Analysis” , *Research Journal of Engineering Sciences* , Vol. 2(9), 1-6, September (2013) , ISSN 2278 – 9472
- # C.Srinivas, Assoc.Professor Chittaranjan Das.V, Professor “Modelling and simulation of multi AGV in a factory layout”, International Journal of Scientific research and Reviews, (IJSSR), 2(4), October – December 2013. Pp:177-187.
- # C.Srinivas, Assoc.Professor Ramji K, Stayanarayan.B, Naveen Ravela, “Simulation based layout design of large sized multi-row FMS”, Journal of Engineering & Architecture, 1(1), June 2013. Pp:01-20.
- # S.B.Venkata Siva, R.I. Ganguly, G. Srinivasarao , professor and K. L. Sahoo, “ Machinability of aluminium metal matrix composite reinforced with in-situ ceramic composite developed from mines waste colliery shale” – Materials and Manufacturing processes (Taylor and Francis), Vol. 28, No.10: 2013, 1082-1089.
- # Venkata Siva S. B, K. L. Sahoo, R. I. Ganguly, R. R. Dash, S. K. Singh, B. K. Satpathy, G. Srinivasarao, professor “ Preparation of Aluminium Metal Matrix Composite with a Novel In-situ Ceramic Composite Particulates, Developed from Waste Colliery Shale Material” – Metallurgical and Materials Transactions B (Springer),Vol. 44, No.4, 2013, 800-808.
- # V.Nageswarareddy, R.Vidyasagarraju, B.Dineshbabu, R.Meenakshireddy and G.Srinivasarao, professor “Performance and Emission analysis on single cylinder diesel engine using dual fuels”- International Journal of Engineering Research and Technology, Vol. 2, No.9, 2013, 1267-1274.
- # V.Nageswarareddy, G.Narasaraju, and G.Srinivasarao, professor “The effect of supercharging and rice bran oil bio diesel as as additive in diesel-ethanol blends for diesel engines”- International Journal of Engineering Research and Science & Technology, Vol. 2, No.9,2013, 101-108.
- # V.Nageswarareddy, G.Srinivasarao , professor and K.Thirupatireddy, “Study of engine Performance and exhaust gas emission characteristics of a 4 stroke CI engine operated with various blends of biodiesel and rice bran oil”- International Journal of Engineering Research and Science & Technology, Vol. 2, No.4,2013, 1-11.
- # NVVS Sudheer , KK Pavan , “ Effect of High heat transfer rate MQL in turning of Aluminum metal matrix composites and evolution of optimization of process parameters” , International review of applied engineering and research , Vol 3. No 3 (2013) pp:189-199 . ISSN : 2248-9967

Research Papers Published in Seminars/Conferences/Workshops

- # Radhika.S., Asst.Prof Srinivasa Rao.Ch., and Karteeka Pavan.K. attended and presented a paper titled, “A New Teaching-Learning-Based Optimization Method for Multi-Objective Optimization of Master Production Scheduling Problems”, in the proceedings of International Conference on Advanced Engineering Optimization Through Intelligent Techniques (AEOTIT), held at S.V. National Institute of Technology, Surat – 395 007, Gujarat, during July 01-03, 2013. Pp 459-463.
- # Radhika.S.,Srinivasa Rao.Ch.,and Swapna.D , Asst . professors “ A Review on MPS Using Meta-Heuristic Methods” in the proceedings of National Conference on Innovations in Engineering & Technology (NCIET) held at Gudlavalleru Engineering College, Gudlavalleru, during 27- 28 December 2013. Pgs 199-205, ISBN: 978-1-4276-5484-7
- # Goteti Chaitanya, Assoc.Prof E.Anusha, A.Abhinav, M.Suraj and K.Anuraju, “A review of adhesively bonded FRP composites ” Proceedings of 4th Naional conference on advances in ME (AIM 2013) at Vasavi College of Engineering, Hyderabad Nov 7-8 , 2013 , pp 62-66 ISBN : 978-93-82570-16-5
- # Reddy Sreenivasulu, Asst.Professor V.Sivaramakrishna, “Optimization of Delamination Damage of GFRP Composite during End Milling using Taguchi Method, S/N Ratio and ANOVA” in the proceedings of the 4th National Conference on Advances in Mechanical Engineering (AIM-2013), Organized by Mechanical Engineering Department, Vasavi College of Engineering, Hyderabad on 07th – 8th November 2013, pp269-272, ISBN:978-93-82570-16-5.
- # S.Kalyana Chakravarthy, Reddy Sreenivasulu, Asst.Professor Bhavani K.V. S, V.Rajendra Prasad, Y.Redankamma, “Study of Failure mode in Resistance spot welding of Al 2024 alloy and AISI304 Sheets” in the proceedings of National Conference on Frontiers in Mechanical Engineering (FIME-2013), Organized by Mechanical Engineering Department, Moulana Azad National Institute of Technology ,Bhopal on 29-31stAugust, 2013, pp215-218,ISBN:978-93-83083-27-5.
- # P. Sreenivasa Rao , Dr Ch.V.S.PameswaraRao , Dr K. Ravindra , Professor & HOD “Experimental Studies On Wire Selection For Machining With Wire EDM” , “ in the proceedings of National Conference on Innovations in Engineering & Technology (NCIET) held at Gudlavalleru Engineering College, Gudlavalleru, during 27- 28 December 2013. Pgs 196-198, ISBN: 978-1-4276-5484-7

- Reddy Sreenivasulu, Asst. Professor "Optimization of Surface Roughness and Delamination Damage of GFRP Composite Material in End Milling using Taguchi Design Method and Artificial Neural Network" at International Conference on Design and Manufacturing, (IConDM-2013) organized by Indian Institute of Information Technology Design & Manufacturing (IIITD&M), Kanchipuram, Chennai on 18-20 July 2013.
- K Praveen Kumar, Asst. Professor M Gopi Krishna, J Babu Rao and NRM. Bhargava "Fabrication and Characterization of 2024 Aluminium-High Entropy Alloy Composites", 67th Annual Technical Meeting of The Indian Institute of Metals, organized by Department of Metallurgical Engineering, Indian Institute of Technology (Banaras Hindu University) Varanasi-221 005, India during November 12 – 15, 2013.
- Srinivasarao, G. professor, "Design optimization of cutting parameters for turning Al 6061 alloy", Published in the Proceedings of 2nd International Conference on Industrial Engineering (ICIE 2013), organized by S.V. National Institute of Technology, Surat 20 – 22nd November. 2013.
- NVVS Sudheer, "Effect of High heat transfer rate MQL in turning of Aluminum metal matrix composites and", Published in the Proceedings of 2nd International Conference on Industrial Engineering (ICIE 2013), organized by S.V. National Institute of Technology, Surat 20 – 22nd November. 2013

Department Activities

Seminars/workshops organized by the department :

Department of Mechanical Engineering is organized DST Sponsored National Seminar on "Futuristic Trends of Nano Composites and Their Fabrication (FTNCF - 2013)" during 6-7th September 2013. A Total Number of 139 participants across INDIA were participated. Dr. Tata Narasinga Rao, ARCI, Hyderabad & Dr Pawan Kumar Jain, ARCI, Hyderabad are acted as Chief Guest and Guest of Honour. Dr. V. Chittaranjan Das, Professor is the coordinator while D. Sameer Kumar, Asst. professor is the co coordinator.

Guest Lectures Delivered by the Faculty :

G. Srinivasa Rao, Professor Chaired a Session on 'Facility planning and Management' in the 2nd International Conference on Industrial Engineering (ICIE 2013), at S.V. National Institute of Technology, Surat, 20 – 22nd November, 2013.

NVVS Sudheer, Professor Chaired a Session on 'Artificial Intelligence in Improving productivity' in the 2nd International Conference on Industrial Engineering (ICIE 2013), at S.V. National Institute of Technology, Surat, 20 – 22nd November, 2013.

Dr. N.V.V.S. Sudheer, Associate Professor delivered a guest lecture on "Thermal aspects in Machining" at Tirumala Engineering College, Narasaraopet on 09-11-2013.

Guest Lectures organized by the Department:

"Taguchi and Response Surface Methodology" by Sri K. Satyanarayana, NIT Warangal on July 10th 2013. Plenary lectures during FTNCF – 2013

Research Degree Conferred on the Faculty :

Dr. B.Ravi Sankar, Asst. Professor has been awarded Ph.D. from Andhra University, Visakhapatnam for his thesis entitled "Experimental Investigations on the performance of Al₂O₃ – water nano fluid as radiator coolant in an Automobile Engine" in September 2013.



Student Corner

Results Analysis:

	Total Appeared	Total Passed	Pass percentage
IV/IV II sem	122	117	95.90
III/IV II sem	135	115	85.19
II/IV II sem	207	163	78.74
I/IV II sem	175	125	71.43

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