Personal Information

Rabindra Kumar Patel
Date of Birth: 15/08/77
Nationality: Indian
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Education

2003-2008 8.67/10 (CPI) PhD Mechanical Engineering, *Numerical study of the damping behaviour of polymer matrix composites.* Indian Institute of Technology Kanpur
2000-2002 8.63/10 (CPI) MTech Mechanical Engineering, *Three dimensional transient temperature distribution Finite Element model for butt-weldments.* Institute of Technology-BHU
1996-2000 71.2 % (Marks) BE Mecahnical Engineering, *Design of solar water heating system for university swimming pool.* University of Roorkee (now IIT Roorkee)

Achievements

Scholarship in Doctoral
Executive Trainee NTPC 2002
Scholarship in Master's
Graduate Aptitude Test in Engineering (GATE) qualified in 2002, percentile 99.88, with all india rank *twenty.*

Skills

IT
Operating systems: Unix, Linux, DOS, Windows

Languages known: Fortran-77, Fortran-90, C
Packages: Latex, MS office

Technical
Finite Element softwares: Abaqus, Ansys, Nastran
Programming: MATLAB
Package: Autocad

Work Experience (Research)

Doctoral work
Numerical study of the damping behaviour of polymer matrix composites.
Vibration and noise suppression problems are in aerospace, automobile and railways etc. Structural vibrations fall in the range of 0.1-10kHz for a general kind of load. Ideal damping of vibration should be for complete range of frequency. There are many methods used to suppress the vibration and noise. These are active, passive, magnetic and particle dampers etc. In these passive damping is simple and cost effective. In this high damping material is used in the form of layers. So it would be best to have material of high damping with wide application frequency range. In this work we attempt to establish a numerical scheme for determining the overall damping response of a range of polymeric composites. The broad goal is to identify material combinations and microstructural morphologies that render the composite to have a high peak damping response over a large frequency range without significantly sacrificing its strength. To this end we have formulated a unitcell, small deformation based Finite Element technique for determining the overall damping response of a composite, given its microstructural morphology. Our results show that the general procedure for widening the damping response over a large frequency range involves engineering the morphology of viscoleastic-viscoelastic composites with the constituents having appropriate relaxation times. In cases where the particulates added have sizes in the nanometer range, significant volume fractions of interphases develop around the particulates. Presence of these viscoelastic interphases sensitively determines the overall damping response of the nanocomposite. In fact, we demonstrate how the overall damping behavior of a nanocomposite bears the signature of the properties of the interphase region.

Master's work
Three dimensional transient temperature distribution Finite Element model for butt-weldments.
As welding is important means of joining metals and alloys. The welding process has inherent nature of uneven heating and cooling of the parts to be welded. That results in unwanted distortion and residual stresses. To overcome these shortcomings pre or post or both heat treatment is required. For necessary heat treatment to be done, it is required to know the temperature distribution in the parts with time. So three-dimensional Finite Element (FE) model has been made for transient temperature distribution in butt weldments. Model had been varified with the experiment carried out here. It was found that model was in good agreement with the experiment. Study of temperature distribution in the butt weldments have been done with the help of model for varius steels.

Undergraduate project work

Design of solar water heating system for university swimming pool.
Main aim of designing this solar water heater for swimming is to utilize the unconventional solar energy for heating of water. So that the swimming pool can be used in winter season also. In this design 53 % of total energy was coming from the sun. Rest of the heating was done from the auxiliary system.

Teaching Experience

Past academic responsibilities: (in Indian Institute of Technology Kanpur)
Teaching Assistant form period 2003-2005 (Material Testing Lab., Engineering drawing, Intoduction to manufacturing processes)
Tutor in Engineering Drawing 2nd semester in year 2005-2006
Tutor in Engineering Drawing 2nd semester in year 2006-2007
Teaching Assistant from period 2007-2008 (Automation and Control Lab., Engineering Drawing)

Publications: Journals, Conferences, Seminars

1. R.K. Patel, B. Bhattacharya and S. Basu (2008), Numerical study on the damping behaviour of polymer matrix composites, *Open seminar*, IIT Kanpur.

2. R.K. Patel, B. Bhattacharya and S. Basu (2008) Effect of interphase properties on the damping response of polymer nanocomposites, *Mechanics Research communications* 35 pp. 115-125.

3. R.K. Patel, B. Bhattacharya and S. Basu (2007) A finite element based investigation on obtaining high material damping over a large frequency range in viscoelastic composites, *Journal of sound and vibration* 303 pp. 753-766.

4. R.K. Patel, B. Bhattacharya and S. Basu (2006) A finite element based investigation on obtaining high material damping over a large frequency range in viscoelastic nanocomposites, *Proceedings of the second international conference on computational mechanics and simulations ICCMS-06 held at IIT Guwahati*, 8-10 Dec. vol. II, pp. 2067-2073.

5. R.K. Patel, B. Bhattacharya and S. Basu (2005), Numerical study on the damping behaviour of particulate composites, *State of the art seminar*, IIT Kanpur.

6. R.K. Patel, B. Bhattacharya and S. Basu (2004) Numerical study of damping behavior of polymer matrix particulate composites, *Proceedings of first international congress on computational mechanics and simulation ICCMS-04 held at IIT Kanpur*, 9-12 Dec. vol. II, pp. 451- 458.

References

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