DVVP College of Engg

CASH PAYMENT Voucher

No. : **135** Dated : **6-Jun-2018**

Particulars	Amount
Account :	
Seminar Exps - Mech	**3,000.00**
Through :	
Cash	
On Account of :	
paid to shri. Markad K.M an account of seminar expenses.	
Amount (in words) :	
Indian Rupees Three Thousand Only	**₹ 3,000.00**

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DR. V.V.PATIL COLLEGE OF ENGINEERING Ahmednagar

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Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

DR. VITHALRAO VIKHE PATIL COLLEGE OF ENGINEERING, AHMEDNAGAR.

Ref.No.CEA/ESTT/2018/ 12910 Date:-07/05/2018

OFFICE ORDER

Shri.K.M.Markad, Asstt.Prof. [Lecturer] in Mech. Dept. will be depute to Pune on 20th May 2018 to attend International Conference on Civil and Mechanical and Industrical Engineering [ICCMIE] & present paper organized by Asian Society for Academic Research, Pune.

He is entitled for T.A. & D.A. & registration fee as per the rules after submit of proper feedback.

Principal,
College of Engineering,
Ahmednagar

Copy to:-
1] Shri.K.M.Markad [Through HOD]
2] H.O.D., Mech. Deptt.
3] Account Section

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5/6/2018.

Dr. Vithalrao Vikhe Patil
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Mechanically induced buckling analysis of CNT reinforced laminated composite plate

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Abstract

In the composite analysis it is necessary to study the fiber volume fraction effect as a performance parameter. New numerical results are generated for rectangular laminated plates uniformly loaded along X & Y direction which serve to quantify the effects of length to thickness ratio, number of layers, material anisotropy and fiber orientation. Buckling analysis of laminated plate is studied with and without single (CNT) by mindline plate theory. Out of plane shear plane deformation avoided just for simplicity of the analytical solution. Initially for the selected material properties of glass epoxy, the different volume fraction has been found. Various volume fraction selected as an input of the MATLAB code, and normalized buckling load was found out. The buckling load was simulated.

Keywords: laminate, composite, CNT, buckling.

Introduction

As we know, there are certain restriction for using isotropic or conventional material. It is because lack of their presence or because of ability to use them in particular application. This is the reason behind study of composite materials. Composites are nothing but combination of different material, and composite material is the combination of two or more material which are insoluble in each other, it may be in same or different phases. Particularly composite materials are of two types, powder and laminated respectively. In this paper, study is based on laminated composite plate along with its buckling analysis.

Capacity to take high/enough load, it may be compressive, tensile or shear based on application, make the composite material different from the others. Lots of experimental, analytical study already done over the buckling analysis of composite beam, plates and shell.

But it is so much essential to study the elasticity approach behind the buckling analysis to study the different members. Because it is very obvious that structural members which are under compressive load they may prone to buckle. So to study the buckling strength of the laminated composite plate, the elasticity &macro mechanical approach of laminated composite is utilized with the MATLAB. Some new results has been studied with different parameters and discussed in details.

Engineering material may fail because of creep, fatigue, alternate stresses, bending, buckling etc. Buckling takes place in columns, plates, shells, and other structures of regular or irregular geometry. Here, particularly study focused on buckling of laminated plate with and without CNT. Critical buckling load is the minimum load at which the equilibrium is disturbed.

In the present analysis micromechanical approach based on elasticity method is used. The main reason to use micromechanics approach is that for evaluation of equivalent material properties of composite by assuming matrix and fibers separately is that we can tailor the material properties at any location to increase strength and toughness of composite by changing the appropriate volume fraction of fibers.

Analysis of laminated composite plate for the buckling has been performed [1] and critical load for symmetrical layups was determined. Along with it, the effect of CNT orientation, aspect ratio over the critical buckling load was demonstrated. Haque and Ramasetty's [2] have proposed useful analytical model to analyze and predict axial stress, interfacial shear stress along the CNT embedded in matrix materials and stress transfer in SWCNT reinforcement in polymer matrix composite .

Mindlin [3] clearly redefined the equations by expressing the two rotations (Ψx, Ψy) and the deflection (w) in terms of three potentials. Then Mindlin et al. [4] expressed the solutions for simply supported rectangular plates and studied coupling of modes for the case of one pair of parallel edges free and the other pair simply supported. Special attention was given to the high modes and frequencies of vibration which were beyond the range of applicability of the classical theory of thin plates.