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Appendix A

$$\bar{k}_{11} = -(\mathrm{A}_{11}\mathrm{a}^2 + \mathrm{A}_{66}\mathrm{b}^2),\ \bar{K}_{12} = -(\mathrm{A}_{12}\mathrm{ab} + \mathrm{A}_{66}\mathrm{ab})$$

$$\bar{k}_{13} = (B_{11}\,\mathrm{a}^2 + B_{12}\,\mathrm{b}^2 + 2B_{66}\,\mathrm{ab})\,\mathrm{a},\ \bar{k}_{14} = [(\Omega B_{11} + \mathrm{E}_{11})\,\mathrm{a}^2 + (\Omega B_{66} + E_{66})\,\mathrm{b}^2)],$$

$$\bar{k}_{15} = [\Omega B_{12} + \mathrm{E}_{12} + \Omega B_{66} + E_{66}]\mathrm{ab},\ \bar{k}_{22} = (\mathrm{A}_{66}\mathrm{a}^2 + \mathrm{A}_{22}\mathrm{b}^2),$$

$$\bar{k}_{23} = (B_{22}b^2 + B_{12}\,\mathrm{a}^2 + 2B_{66}\,\mathrm{ab})\,\mathrm{b},\ \bar{k}_{24} = [\Omega B_{66} + \mathrm{E}_{12} + \Omega B_{12} + E_{66}]\mathrm{ab},$$

$$\bar{k}_{25} = [(\Omega B_{22} + \mathrm{E}_{22})b^2 + (\Omega B_{66} + E_{66})\,\mathrm{a}^2)],\ \bar{k}_{33} = [\mathrm{D}_{11}\mathrm{a}^4 + (2\,\mathrm{D}_{12} + 4\,\mathrm{D}_{66})\,\mathrm{a}^2\mathrm{b}^2 + \mathrm{D}_{22}\mathrm{b}^4],$$

$$\bar{k}_{34} = [(\Omega D_{11} + F_{11})\,\mathrm{a}^2 + (\Omega D_{12} + F_{12})b^2 + 2(\Omega D_{66} + F_{66})b^2]\,\mathrm{a},$$

$$\bar{k}_{35} = [(\Omega D_{12} + F_{12})\,\mathrm{a}^2 + (\Omega D_{22} + F_{22})b^2 + 2(\Omega D_{66} + F_{66})\,\mathrm{a}^2]\,\mathrm{b},$$

$$\bar{k}_{44} = [\Omega(\Omega D_{11} + F_{11})\,\mathrm{a}^2 + (\Omega F_{11} + H_{11})\,\mathrm{a}^2 + \Omega(\Omega D_{66} + F_{66})b^2 + (\Omega F_{66} + H_{66})b^2 + \Omega^2\,\mathrm{A}_{55} + 2\Omega K_{55} + L_{55}],$$

$$\bar{k}_{45} = [\Omega(\Omega D_{12} + F_{12}) + (\Omega F_{12} + H_{12}) + \Omega(\Omega D_{66} + F_{66}) + (\Omega F_{66} + H_{66})]\,\mathrm{a}\,b,$$

$$\bar{k}_{55} = [\Omega(\Omega D_{22} + F_{22})b^2 + (\Omega F_{22} + H_{22})b^2 + \Omega(\Omega D_{66} + F_{66})\,\mathrm{a}^2 + (\Omega F_{66} + H_{66})\,\mathrm{a}^2 + \Omega^2\,\mathrm{A}_{44} + 2\Omega K_{44} + L_{44}]$$

Appendix B

$$\bar{K}_{11} = -(A_{11}a^2 + A_{66}b^2),\ \bar{K}_{12} = -(A_{12}ab + A_{66}ab)$$

$$\bar{K}_{13} = (B_{11}\, a^2 + B_{12}\, b^2 + 2B_{66}\, ab)\, a,\ \bar{K}_{14} = [(\Omega B_{11} + E_{11})\, a^2 + (\Omega B_{66} + E_{66})\, b^2)],$$

$$\bar{K}_{15} = [\Omega B_{12} + E_{12} + \Omega B_{66} + E_{66}]ab, \quad \bar{K}_{22} = (A_{66}a^2 + A_{22}b^2),$$

$$\bar{K}_{23} = (B_{22}b^2 + B_{12}\, a^2 + 2B_{66}\, ab)\, b,\ \bar{K}_{24} = [\Omega B_{66} + E_{12} + \Omega B_{12} + E_{66}]ab,$$

$$\bar{K}_{25} = [(\Omega B_{22} + E_{22})b^2 + (\Omega B_{66} + E_{66})\, a^2)],\ \bar{K}_{33} = [D_{11}a^4 + (2\,D_{12} + 4\,D_{66})\, a^2b^2 + D_{22}b^4],$$

$$\bar{K}_{34} = [(\Omega D_{11} + F_{11})\, a^2 + (\Omega D_{12} + F_{12})b^2 + 2(\Omega D_{66} + F_{66})b^2]\, a,$$

$$\bar{K}_{35} = [(\Omega D_{12} + F_{12})\, a^2 + (\Omega D_{22} + F_{22})b^2 + 2(\Omega D_{66} + F_{66})\, a^2]\, b,$$

$$\bar{K}_{44} = [\Omega(\Omega D_{11} + F_{11})\, a^2 + (\Omega F_{11} + H_{11})\, a^2 + \Omega(\Omega D_{66} + F_{66})b^2 + (\Omega F_{66} + H_{66})b^2 + \Omega^2\, A_{55} + 2\Omega K_{55} + L_{55}],$$

$$\bar{K}_{45} = [\Omega(\Omega D_{12} + F_{12}) + (\Omega F_{12} + H_{12}) + \Omega(\Omega D_{66} + F_{66}) + (\Omega F_{66} + H_{66})]\, a\, b,$$

$$\bar{K}_{55} = [\Omega(\Omega D_{22} + F_{22})b^2 + (\Omega F_{22} + H_{22})b^2 + \Omega(\Omega D_{66} + F_{66})\, a^2 + (\Omega F_{66} + H_{66})\, a^2 + \Omega^2\, A_{44} + 2\Omega K_{44} + L_{44}]$$

Appendix C

$M_{11} = -I_0$, $M_{13} = I_1 \text{a}$, $M_{14} = -I_3$, $M_{22} = -I_0$, $M_{23} = I_1 \text{b}$, $\text{M}_{25} = -I_3$
$M_{33} = -I_0 - I_2(\text{a}^2 + \text{b}^2)$, $M_{34} = I_4 \text{a}$, $M_{35} = I_4 \text{b}$, $M_{44} = \text{M}_{55} = -I_5$

About the author

The author, Surya Dev Singh, son of Mr. Shishir Kumar Singh and Mrs. Ruma Devi, was born on 08th September, 1994 at Surtapur, Ghazipur District, Uttar Pradesh. He graduated in Civil Engineering in the year 2015 from Abdul Kalam Technical University. Thereafter, he obtained his master's degree (M.Tech) in Civil Engineering in the year 2018 with a specialization in Structural Engineering from the Department of Civil Engineering, National Institute of Technology, Uttarakhand, India. In January 2019, he joined the Ph.D. program at Indian Institute of Technology (BHU), Varanasi in the Department of Civil Engineering, and this research wok is carried out during this period.

List of Publications from the Thesis

- Singh, S. D., and Sahoo, R. (2020). “Static and free vibration analysis of functionally graded CNT reinforced composite plates using trigonometric shear deformation theory.” *Structures* (Vol. 28, pp. 685-696). Elsevier.
- Singh, S. D., and Sahoo, R. (2021). “Analytical solution for static and free vibration analysis of functionally graded CNT-reinforced sandwich plates.” *Archive of Applied Mechanics*, *91*(9), 3819-3834.
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- Singh, S. D., and Sahoo, R. “Structural modelling of functionally graded carbon nanotube reinforced composite plate using finite element method.”
- Singh, S. D., and Sahoo, R. “Finite element modelling of functionally graded carbon nanotube reinforced composite plate using non-polynomial trigonometric function based on inverse hyperbolic sine function.”
- Singh, S. D., and Sahoo, R. “Soil-Structure Interaction Modelling of Functionally Graded CNT Reinforced Composite Plates: An analytical solution.”
- Singh, S. D., and Sahoo, R. “Analytical modeling to analyze the Soil-Structure Interaction of Functionally Graded CNT Reinforced Composite Plates.”

- Singh, S. D., and Sahoo, R. “Detail structural analysis of functionally graded carbon nanotube reinforced composite plate resting on Pasternak’s elastic foundation using finite element method.”
- Singh, S. D., and Sahoo, R. “Soil structure interaction of carbon nanotube reinforced composite plate: A detail structural investigation.”
- Singh, S. D., and Sahoo, R. “Stability and free vibration analysis of functionally graded carbon nano-tube reinforced sandwich plates in non-polynomial framework.”
- Singh, S. D., and Sahoo, R. “Non polynomial framework for buckling and free vibration analysis of functionally graded carbon nano-tube reinforced sandwich plates: An analytical solution.”
- Singh, S. D., and Sahoo, R. “Soil-Structure Interaction Modelling of Functionally Graded CNT Reinforced Composite Plates: An finite element analysis.”