

## Accepted Manuscript

Analytical model for flexural response of two-layered composite beams with interfacial shear slip using a higher order beam theory

Jie Wen, Abdul Hamid Sheikh, Md. Alhaz Uddin, Brian Uy

PII: S0263-8223(17)31189-3  
DOI: <https://doi.org/10.1016/j.compstruct.2017.10.023>  
Reference: COST 8998

To appear in: *Composite Structures*

Received Date: 13 April 2017  
Revised Date: 21 September 2017  
Accepted Date: 9 October 2017

Please cite this article as: Wen, J., Sheikh, A.H., Uddin, d.A., Uy, B., Analytical model for flexural response of two-layered composite beams with interfacial shear slip using a higher order beam theory, *Composite Structures* (2017), doi: <https://doi.org/10.1016/j.compstruct.2017.10.023>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Analytical model for flexural response of two-layered composite beams with interfacial shear slip using a higher order beam theory**

Jie Wen<sup>a</sup>, Abdul Hamid Sheikh<sup>a,\*</sup>, Md. Alhaz Uddin<sup>a</sup> and Brian Uy<sup>b</sup>

<sup>a</sup> *School of Civil, Environmental & Mining Engineering, The University of Adelaide, SA 5005, Australia*

<sup>b</sup> *School of Civil Engineering, The University of Sydney, NSW 2008, Australia*

**ABSTRACT**

An exact analytical model based on a higher-order beam theory (HBT) is developed for an accurate prediction of the flexural response of two layered composite beams with partial shear interactions. This is achieved by taking a third order variation of the longitudinal displacement over the beam depth for the two layers separately. The deformable shear connectors joining the two different material layers are modelled as distributed shear springs along the beam length at their interface. The principle of virtual work is used to derive the governing equations which are solved analytically using a Navier type solution technique. To assess the performance of the proposed model, numerical examples of composite beams are solved using the model. The results predicted by the model are compared with published results and the numerical results produced by a one dimensional finite element model based on HBT as well as a detailed two-dimensional finite element modelling of composite beams.

**Keywords:** Composite beams; Partial shear interaction; Higher order beam theory; analytical solution; Flexural response

---

\* Corresponding author:

Email: [abdul.sheikh@adelaide.edu.au](mailto:abdul.sheikh@adelaide.edu.au)

Tel: +61-8-8313-6450; Fax: +61-8-8313-4359

Download English Version:

<https://daneshyari.com/en/article/6704895>

Download Persian Version:

<https://daneshyari.com/article/6704895>

[Daneshyari.com](https://daneshyari.com)