increase in stiffness.

7) It can be established that the Rule Base-Fuzzy-GA hybrid combination has been found to be more accurate and its output as relative crack location and relative crack depth are at close proximate with that of experimental result with minimum deviation.

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NOMENCLATURE

U_i	additional displacement due to bending and axial load
J	strain energy release rate at crack section
a_1	crack depth
α_{ij}	components of local flexibility matrix per unit width
P_1, P_2	axial and bending load respectively
K_{11}, K_{12}	stress intensity factors of mode-I due to load P_1 and P_2 respectively
E	Young's modulus of elasticity of the beam material
σ_i	stress at crack cross section due to axial and bending load
B	width of the beam
L	length of the beam
W	depth of the beam
L_1	location of crack
$U_{1(x\,t)}$, $U_{2(x\,,t)}$	longitudinal amplitudes along the beam
$Y_{1(x\,t)}$, $Y_{2(x,t)}$	transverse amplitudes across the beam
K_{ij}	local stiffness matrix
A_i	equation constants
$\bar{U}_1, \bar{U}_2$	normal functions defined for the system
M_i	compliance constants
$\overline{Y_1}, \overline{Y_2}$	normal functions defined for the system
F_i	experimentally determined function

Greek symbols

ν	Poisson's ratio
φ	relative crack depth
γ	relative crack location
ω	natural circular frequency
ψ	characteristic equation of the system