

Parametric Analysis of Nonlinear Behavior of Tubular Members under Lateral Dynamic Loads

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ABSTRACT

Non-linear behavior of tubular members with axial pre-load is studied against dynamic lateral impact. Nonlinear behavior of these members would be due to material non-linearity (NLM) or geometric non-linearity (NLG). Study of the curves of load displacement of arbitrary tubular member by analytical solutions indicates that changes in parameters such as pipe thickness, magnitude of axial pre-loading, and end conditions of the member under study has significant affect on their residual strength subject to application of dynamic lateral impact. Based on this analysis, a reliable method for calculation of residual strength of tubular member is proposed. The results of the comparison between the two methods using quasi-static and dynamic analyses are shown in a diagram. In addition, to measure the reliability of the model it has been validated using available test results from the literatures.

KEYWORDS

Tubular members, Lateral dynamic load, Nonlinear behavior, Residual strength, Offshore structures.

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[] Smith

[] Ellinas

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[] Ellinas, Valsgard

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t= mm

L= mm D= mm

[] Pacheco

$\gamma \leq L/D \leq$

$D/t \leq$

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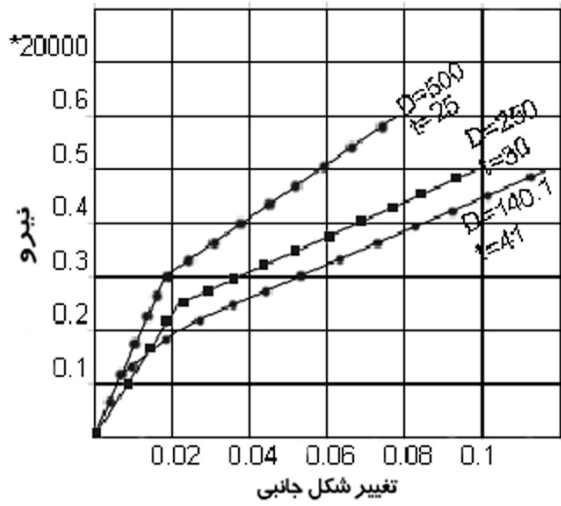
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[] Harding, Zeiniddini





Density= / e (Kg/mm³)

Poisson's ratios= /

Material yield stress= (N/mm²)

Modulus of elasticity (E)= e (N/mm²)

Tangent modulus (Et)=E/

L= mm

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	(N)	(mm)	(mm)
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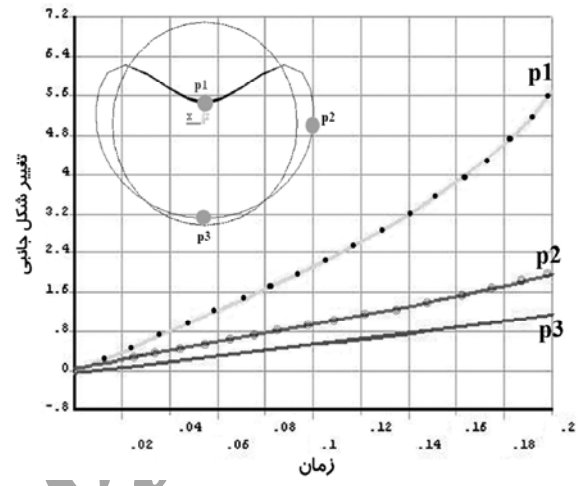
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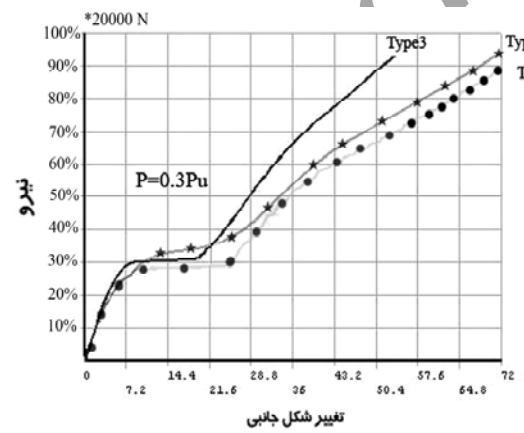
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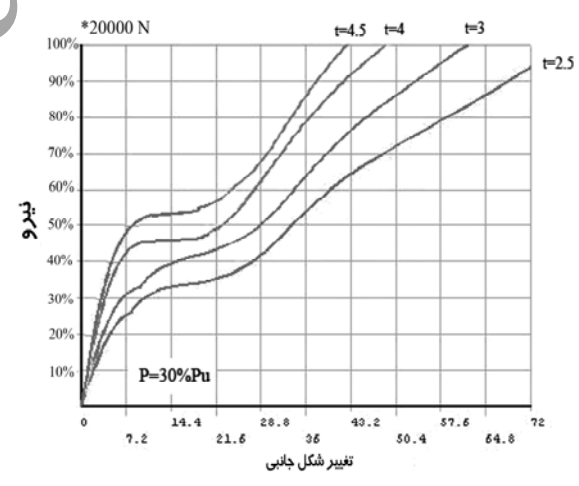
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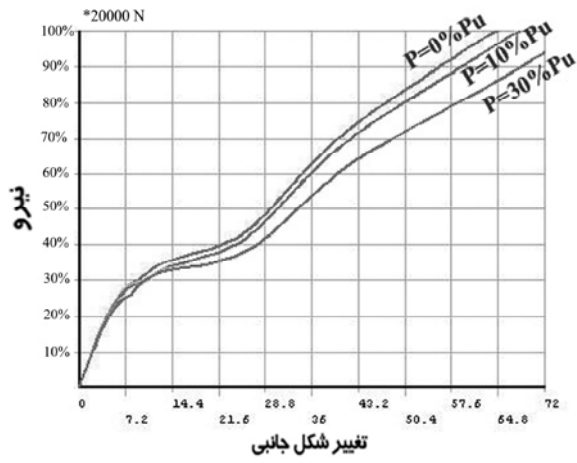
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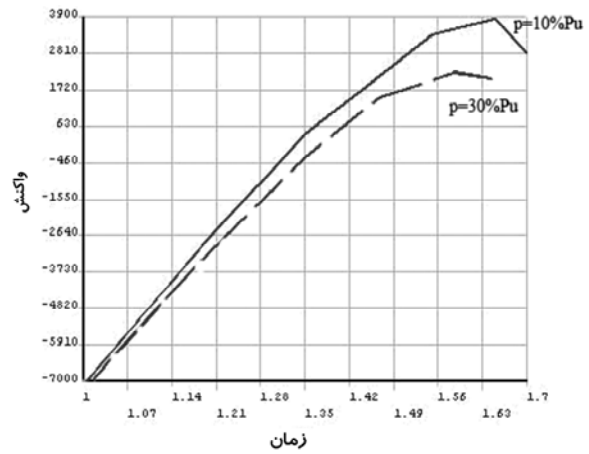
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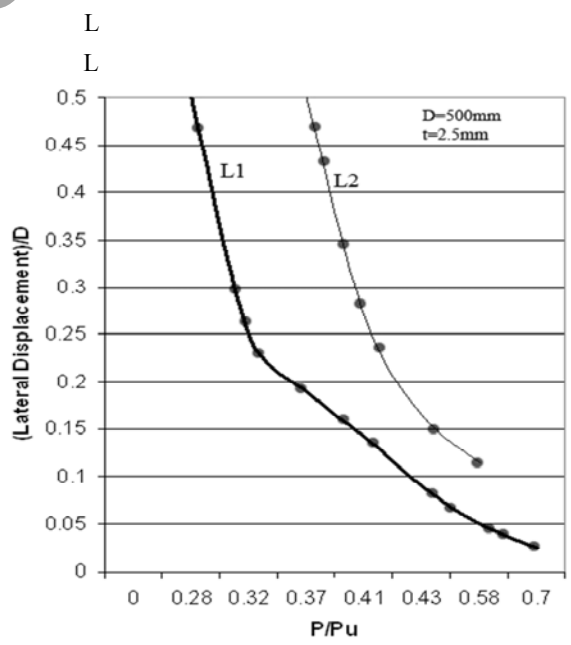
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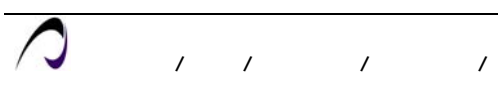
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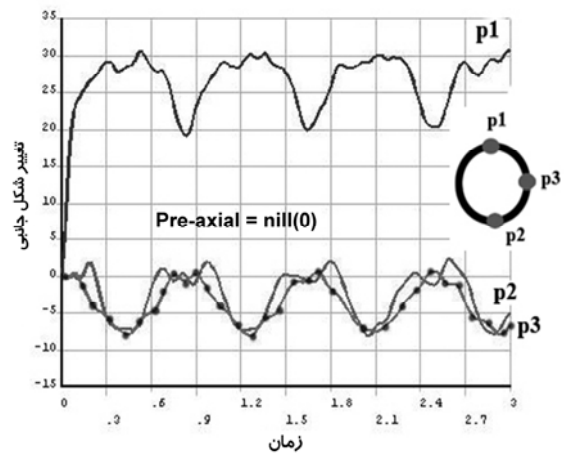
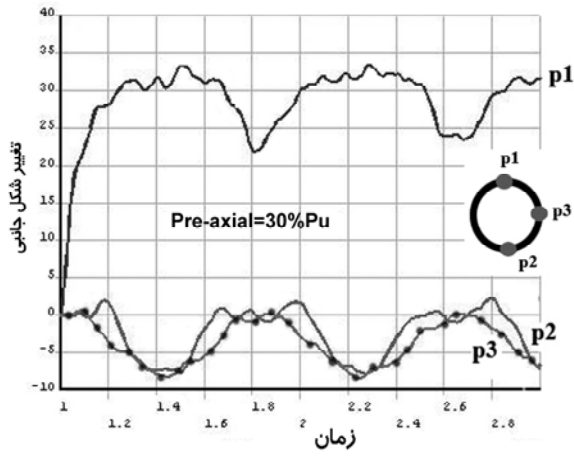
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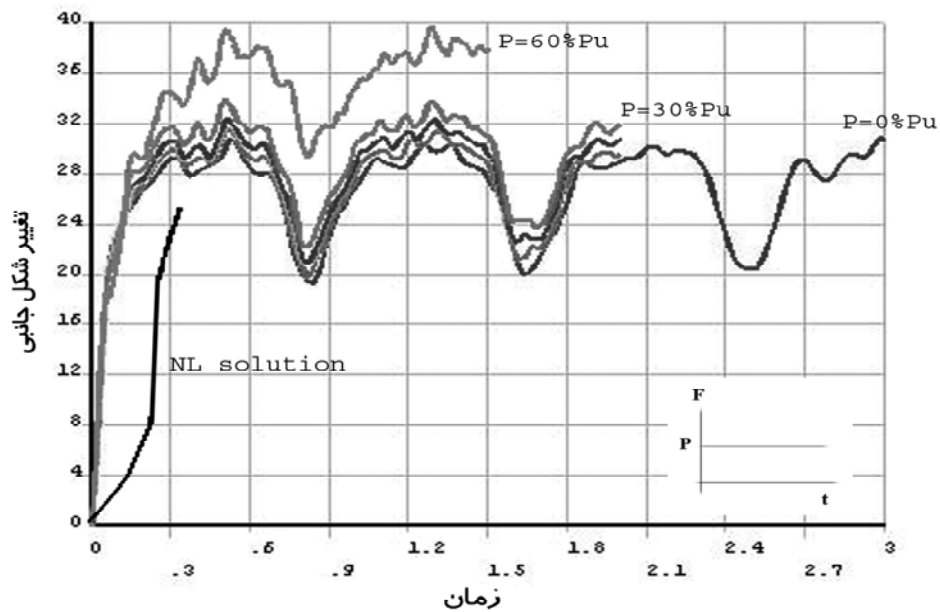
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