

In the Name of God

Curriculum Vitae

Seyed Alireza Jalali

Marital status: Married with a 7-year-old son.

Born: 1984-Delijan, Markazi Province, Iran

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EDUCATION

- PhD, Structural Engineering, Department of Civil and Environmental Engineering, Amirkabir University of Technology (www.aut.ac.ir), (Feb 2011 - Jan 2017).
Dissertation title: “Developing an Improved Hysteresis Behavior for Seismic Collapse Assessment of Steel Plate Shear Wall System”.
- Master of Science, Structural Engineering, Department of Civil and Environmental Engineering, Amirkabir University of Technology (www.aut.ac.ir), (Sep 2007 - Jan 2010).
Thesis title: “Seismic Demand Assessment of Steel Moment-Resisting Frames with Side-Plate Connections”.
- Bachelor of Science, Civil Engineering, Department of Civil Engineering, Tabriz University (www.tabrizu.ac.ir), (Oct 2003 - Sep 2007).

PUBLICATIONS:

- Journal Papers:
 1. Seismic demand assessment of self-centering steel plate shear walls, S.A. Jalali, E. Darvishan, Journal of Constructional Steel Research, 2019 (<https://doi.org/10.1016/j.jcsr.2019.105738>)
 2. Developing a new deteriorating hysteresis model for seismic collapse assessment of steel plate shear walls, S.A. Jalali, M. Banazadeh. Thin-Walled structures, 2016 (<https://doi.org/10.1016/j.tws.2016.05.008>)
 3. Computer-based evaluation of design methods used for a steel plate shear wall system, S.A. Jalali and M. Banazadeh. The Structural Design of Tall and Special Buildings, 2016 (<https://doi.org/10.1002/tal.1290>)
 4. Seismic performance assessment of steel moment frames with generic Locally Reinforced connections, S.A. Jalali, M.

- Banazadeh, E. Tafakori, A. Abolmaali. Journal of Constructional Steel Research, 2011 (<https://doi.org/10.1016/j.jcsr.2011.03.008>)
5. Probabilistic seismic demand assessment of steel moment frames with side-plate connections, S. A. Jalali; M. Banazadeh; A. Abolmaali; E. Tafakori. Scientia Iranica 2012 (<https://doi.org/10.1016/j.scient.2011.11.036>)
 6. Risk-based optimal retrofit of a tall steel building by using friction dampers, Ehsan Tafakori, Mehdi Banazadeh, Seyed Alireza Jalali and Mohsen Tehranizadeh. The Structural Design of Tall and Special Buildings, 2011 (<https://doi.org/10.1002/tal.720>)

- Conference paper:
 - *Seismic performance of reduced beam section moment frames incorporating record-to-record uncertainties*. M. Banazadeh, S. A. Jalali and A. Abolmaali. 9th US National and 10th Canadian Conference on Earthquake Engineering; Toronto, Canada; July 25-29, 2010.
- Teaching Experiences:
 - Two semesters of teaching in Shahab-e Danesh Higher Educational Institute, Qom, Iran. Taught courses: Design of reinforced concrete structures, Strength of Materials, Technical English Language
 - Teaching “nonlinear structural modelling methods, in practice” to post-graduate students in Amirkabir University of Technology, Tehran, Iran.
 - Providing consultancy to post-graduate students aiming to undertake structural analysis dissertations, Omran-Elm-Afzar Research and Educational Group (www.omranelmafzar.ir)

COMPLETED COURSES

- Master courses:
 - Advanced engineering mathematics,
 - Elasticity and plasticity,
 - Linear finite element method,
 - Structural dynamics,
 - Theory of shells and plates,
 - Advanced concrete structures,
 - Renovation & strengthening of structures,
 - Nonlinear structural analysis,

- Structural reliability
- PhD courses:
 - Plastic analysis & design of structures,
 - Mechanics of composite materials,
 - Theory of plasticity, Creep, Fatigue & Fracture Mechanics,
 - Non-Linear Finite Element

FIELDS OF EXPERTISE (in brief)

- **Nonlinear Finite Element Analysis**
 - Expert in theory and application of Micro and Macro Finite Element (FE),
 - A developer and expert user of OpenSees software¹ with analysis experiences including²:
 - ✓ steel and reinforced concrete (RC) moment frames with distributed and lumped plasticity approaches,
 - ✓ steel plate shear walls (SPSWs),
 - ✓ RC shear walls,
 - ✓ metallic (triangular added damping and stiffness, TADAS) dampers,
 - ✓ friction dampers,
 - ✓ friction and lead-rubber isolation systems,
 - ✓ concentric and eccentric braced frames subject to buckling,
 - ✓ Self-centering systems employing re-centering action of posttensioning cables,
 - ✓ Self-centering systems employing shape-memory alloys
 - ✓ RC members strengthened using FRP laminates
 - ✓ Expert in performing Micro FE analyses using ABAQUS
 - ✓ Expert in employing the Python language for developing parametric models in ABAQUS³ program.
- **Development of Nonlinear Finite Element Software**

¹ Using the programming capabilities of OpenSees, all mentioned models have been developed in a parametric form.

² Some of these activities have been conducted as part of my professional carrier as teaching and consultation in numerical research methods and have not been published in form of research papers. However, all the materials developed for these studies and other studies mentioned throughout this document are available and I would be ready to present the works in full detail.

³ This ability is being employed in a study to predict ductile damage of SPSW specimens considering geometry variations and aleatory uncertainties.

- Development of an object-oriented Micro FE program (using C++) as the project of a doctoral course,
- Development of several objects and commands in OpenSees program including⁴:
 - ✓ a new uniaxialMaterial class (SPSW02) to represent hysteresis behavior of thin steel plates incorporating in-cycle and cyclic deteriorations⁵,
 - ✓ a new uniaxialMaterial class (BucklingStrut) to simulate axial buckling of bracing members without using geometric transformation, element meshing and initial imperfection,
 - ✓ a new super-element which relies on a section flow rule to model flexural-axial yielding of beam-column members through lumped plasticity method
 - ✓ new “maxDuctility” and “Energy” options for fiber section and element recorders,
 - ✓ new ResidNode, ResidElement and ResidDrift recorder types that record residual response at the end of analysis and eliminate the need to recording full response history,
 - ✓ new “logCommands” command that exports a text file containing only the OpenSees model definition commands (excluding TCL commands) generated using a TCL script
- **Seismic Performance and Reliability Assessments**
 - Development of a series of TCL scripts for assessing probabilistic performance of structures within incremental dynamic analysis (IDA) procedure and using Hunt-Fill algorithm,
 - Development of a series of TCL scripts for assessing the effect of modeling uncertainties using response surface-based Monte-Carlo method,
 - Development of a series of TCL scripts for performing adaptive and modal pushover methods,
 - Development of a MATLAB script for extracting damage index of 3-d RC moment frames,
 - Familiar with the gradient-based reliability methods such as first order reliability method (FORM) and first-order-second-moment reliability method (FOSM).
- **Optimization Studies**
 - Optimal configuration of metallic dampers for seismic rehabilitation of an irregular steel structure using genetic algorithm,

⁴ These capabilities and commands are not still implemented in official version of OpenSees and will be provided as a custom build of OpenSees upon request.

⁵ Please see the paper: “Developing a new deteriorating hysteresis model for seismic collapse assessment of steel plate shear walls”, S.A. Jalali, M. Banazadeh

- Optimal design of steel structures using colliding bodies optimization (CBO).
 - Optimal design of steel structures with asymmetric plan using particle swarm optimization (PSO)
 - Optimal retrofit of steel moment frames using thin infill plates and based on a target collapse probability against maximum considered earthquake
- **Progressive Collapse Study**
 - Progressive collapse assessment of a 3-dimensional steel structure subjected to sudden column removal
- **Programming Expertise**
 - Development of an AutoCAD-based application (using C++ language and ObjectARX⁶ technology) for simulating the industrial process of design, fabrication and assembly of Nuform Building System⁷: a system of pre-fabricated pre-finished polymer stay-in-place formworks for RC load-bearing walls.
 - Development of CADSees: an AutoCAD-based graphical post-processor for OpenSees software.
 - SPSWDesigner: a CSI ETBAS plugin developed using C# language that performs iterative design of steel plate shear wall system following capacity-based method of AISC 341-10⁸,
 - ParallelIDA: a network based master-client application for parallel performance of IDA using computers on a cluster⁹.

POTENTIAL INSTRUCTOR OF MASTER AND PHD COURSES:

- Bachelor courses:
 - Statics
 - Dynamics
 - Strength of materials: I and II
 - Structural Analysis: I and II
 - Design of RC structures: I and II
 - Design of Steel Structures: I and II

⁶ www.autodesk.com

⁷ A Canadian product formerly known as royal building system (RBS). An Iranian company had bought the license of this building system for manufacture and construction in Iran. See: www.nuformdirect.com and www.rbsiran.com

⁸ Please see paper: "Program-based evaluation of design methods used for a steel plate shear wall system"

⁹ This program implements the Hunt-Fill algorithm using .NET TCP clients in C#. The object-oriented structure of the program uses the Master-Worker concept proposed by D. Vamvatsikos in "Performing incremental dynamic analysis in parallel".

- Application of computers in civil engineering
- Technical Language
- Master and PhD courses:
 - Advanced engineering mathematics,
 - Elasticity and plasticity,
 - Linear finite element method,
 - Structural dynamics,
 - Nonlinear structural analysis,
 - Structural reliability
 - Nonlinear Finite-Element
 - Plastic analysis & design of structures,

PROFESSIONAL EXPERIENCES

- Head of Research and Development, Bastanpol structural consultants Co., Jan 2015-2018,
- Head of structural design, Tehran Pars Royal Co., Tehran, Iran, June 2010-Jan 2013

LANGUAGE SKILLS

- English
 - Fluent in oral communication
 - Professional in academic writing
 - Holding a 7 overall score in the IELTS test (Reading: 7.5, Writing: 7, Speaking: 7, Listening: 7) dated 2011
- Persian
 - Native and professional user