Juan Manuel Orozco Henao

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portfolio: manuelorozco.com

Professional Profile

Junior Structural Engineer supporting structural design and engineering computation workflows. Background combines finite-element modeling, production of structural deliverables for permitting, and applied research in structural reliability and uncertainty quantification. Strong focus on bridging Structural Engineering and Software Engineering through automation (Python/MATLAB), reproducible engineering tools, and data-driven methods for analysis and decision-making.

Areas of Interest

- Structural Engineering (*reinforced concrete, steel, structural masonry*)
- Structural Reliability and Bayesian Inference
- Engineering Software Development (*automation, APIs, reproducible pipelines*)
- Machine Learning and Computer Vision applied to Civil Engineering
- Structural Monitoring and Digital Image Correlation (DIC)

Technical Skills

- **Structural / Engineering Software:** ETABS, AutoCAD, Revit, RAM Connections, Idea StatiCa, DCCAD, Mathcad, Simulink
- **Programming & Data:** Python, MATLAB, Microsoft Excel
- **Productivity:** Microsoft Suite (Word, PowerPoint, Excel)

Experience

Ingescon S.A.S. — Structural Engineer Intern / Junior Structural Engineer (Support), Cali, Colombia   Oct 2025 – Present

- Delivered structural design of reinforced concrete, steel, and structural masonry systems from architectural drawings to final structural deliverables for permitting submission.
- Developed finite-element models to estimate demands and internal forces, enabling design checks, detailing, and coordinated structural plans.
- Built Python automation tools using the ETABS API to streamline modeling, result extraction, and design workflows, reducing design time per project by up to **30%** while maintaining high-quality deliverables.
- Supported seismic vulnerability assessment workflows for microbiological laboratory facilities through coordinated field data collection and structural characterization activities.
- Developed engineering Excel templates aligned with **ACI**, **AISC**, and **NSR-10** for structural element design checks, including verification steps to ensure correctness and usability.

Universidad del Valle (G-7 Research Group) — Research Monitor / Research Assistant, Cali, Colombia   2023 – 2025

- Produced fabrication of concrete mixes and preparation of cylindrical specimens for compression testing, as well as construction of reinforced concrete beams for experimental programs.
- Assisted instrumentation of specimens with multiple sensor types and coordinated experimental testing activities under controlled laboratory conditions.
- Contributed to computer-vision and machine-learning oriented workflows to quantify uncertainty in material mechanical properties using experimental data.
- Implemented data-processing scripts in **MATLAB** and **Python** for experimental analysis, emphasizing repeatability, traceability, and clear reporting of results.

Projects

Undergraduate Thesis: Quantification of Uncertainty in Mechanical Properties of Concrete and Steel
<div align="right">2024 – 2025</div>

- Developed Bayesian inference workflows to estimate and quantify uncertainty in material properties, with emphasis on concrete cylinder test data.
- Implemented probabilistic models using **PyMC** to calibrate parameters and characterize variability, supporting reliability-oriented interpretation of experimental results.

Education

B.Sc. in Civil Engineering, Universidad del Valle, Cali, Colombia
<div align="right">Apr 2020 – Nov 29, 2025</div>

- High-quality accredited program.

Specialization in Structural Engineering, Universidad del Valle, Cali, Colombia
<div align="right">Feb 13, 2026 – Dec 2026 (expected)</div>

- Postgraduate specialization focused on structural analysis, design criteria, and advanced engineering practice.

English Program (B2)
<div align="right">Sept 2013 – Dec 2017</div>

- Completed B2-level adult program with academic emphasis (**480 hours**).

Publications / Conferences

Conference Presentation, XI National Congress of Seismic Engineering (CNIS XI), Armenia, Colombia
<div align="right">Nov 2024</div>

- **Title:** *Characterization of Uncertainty in Reinforced Concrete Elements: Evaluation of Experimental Techniques*.

Languages

- Spanish (Native)
- English (B2 Certified)