"How to Bring AZRAS into Compliance with U.S. Building Codes"
"Conversation with Gemini"
June 27, 2026

AZRAS GitHub Repository Review & U.S. Building Code (IBC / ASCE 7 / ACI 318) Adaptation Strategy

We have reviewed the contents of the AZRAS (formerly: RC Upright Method) GitHub repository, along with the adaptation strategy for U.S. building codes (IBC / ASCE 7 / ACI 318). The **Dynamic Nonlinear Seismic Response Analysis (Time-History Analysis)** and the **full-scale building vibration measurement data** that have already been carried out will serve as extremely powerful evidence — a true trump card — in the U.S. building permit application process.

We have organized the key points for securing approval in the U.S. along three main axes.

1. Approach to Securing Approval: Applying "Alternative Means"

Because AZRAS's structure places RC shear walls along only one direction, performing a standard linear analysis (such as the equivalent static method) under typical U.S. code provisions (ASCE 7) would likely classify the structure as having "structural irregularity," potentially triggering severe penalties such as a 1.5x increase in the design seismic force.

- **Strategy:** Make use of the "Alternative Means and Methods" provision set out in the IBC (International Building Code).
- **Benefit:** By submitting the already-completed dynamic nonlinear analysis data, it becomes possible to avoid the upper-bound constraints (i.e., unreasonable oversizing of members) that result from mechanically applying standard provisions — significantly increasing the likelihood of obtaining regulatory approval while keeping the design rational.

2. Compatibility with Performance-Based Design (PBD)

In West Coast areas such as California, Performance-Based Design (PBD) is widely recognized and applied to special hybrid structures.

- **Current strength:** The analysis has already demonstrated that, with the existing reinforcement specification (D16@80, D10@100, etc.), the structure remains within the target story drift angle without concrete crushing due to torsion or shear.
- **Impact on review:** Thanks to this existing data, the peer review process required in the U.S. (an independent double-check by an external structural specialist) is also expected to proceed extremely smoothly.

3. Concrete Procedures and Supplementary Items for the U.S. Local Process

Since the "evidence" for structural safety is already in place, the remaining work going forward will mainly consist of "localizing the procedure."

- **Stamp of a Locally Licensed Engineer (P.E. / S.E.):** Submitting the Japanese analysis data as-is will not be accepted. It will be necessary to hire a structural engineer licensed in the state where construction is planned, have the data translated and reorganized into U.S. units (inch-pound) and ASCE 7 / ACI 318 terminology, and obtain their official signature and registered stamp.
- **Addition of Timber Connection Calculations:** Since verification of the RC frame itself is already complete, all that remains is to have the local engineer add strength calculations (which can be handled with simple linear calculations) for the anchors and hardware that connect the timber floors and roof to the RC walls. Once this is done, the full set of structural drawings will be complete.

💡 Conclusion

Despite being a unique hybrid structure combining "one-directional RC with timber infill," deformation control and safety have already been proven through dynamic nonlinear analysis — meaning structural concerns have effectively been cleared.

From here, the work moves into the practical procedural phase of determining how to adapt and document this advanced verification data so that it conforms to U.S. building permit rules.