

Comparison Table of Key Features

Aspect	ATENA	Abaqus	LIMFES	InfoGraph	ANSYS
Concrete Specialization	Yes, C/RC focus [1]	No, general-purpose [2]	Yes, concrete bridges [3]	Partial, RC focus [4]	No, general-purpose [5]
Nonlinear Analysis	Robust, explicit cracks [1]	Advanced, cracks smeared [6]	High fidelity, cracks explicit [7]	Intermediate, cracks smeared [4]	Advanced, cracks smeared [8]
Material Modeling Depth	High, multiple built-in models [9, 1]	Moderate, one built-in model [10]	High, research-grade [11]	Moderate, simplified [4]	Moderate, user-calibrated [8]
Ease of Use/Learning	Easy, concrete-centric GUI [1]	Steep, general GUI [2]	expert-only	Easy, user-friendly GUI [4]	Moderate, mixed GUI/script [5]
Research vs Industry	Excellent research, specialized industry [1]	Excellent research, good industry [2]	good research, specialized industry [3]	Limited research, strong industry [4]	Excellent research [5]
Design Code Support	Minimal, indirect [1]	None	None, assessment only [3]	Extensive, direct code checks [4]	None
Multiphysics Support	Concrete-specific multiphysics [1]	Comprehensive, multiphysics [2]	Limited	Structural fire analysis [4]	Comprehensive, multiphysics [5]
Community & Support	Dedicated, concrete-specific [1]	Huge, general FE [2]	Small, internal use	Moderate, European [4]	Huge, general FE [5]

Table 1: Comparison of key features for concrete FE analysis software.

References

- [1] ATENA — Cervenka Consulting. Available: <https://www.cervenka.cz>
- [2] Abaqus Documentation, Dassault Systèmes.
- [3] LIMFES, RWTH Aachen/H+P Ingenieure GmbH.
- [4] InfoGraph GmbH, Structural Analysis Software. Available: <https://www.infograph.eu>
- [5] ANSYS Documentation, Ansys Inc.
- [6] Concrete Damaged Plasticity Model, Abaqus Manuals.
- [7] Bažant’s Microplane Model M4.
- [8] SOLID65 Element Documentation, ANSYS Manuals.
- [9] ResearchGate Discussions on Concrete Models in FE.
- [10] Calibration of Concrete Damaged Plasticity Parameters, Abaqus.
- [11] IABSE Workshop, Helsinki 2015. Microplane models for concrete.