

SOCIAL SCIENCE: This passage is adapted from the article "Virtually Rebuilt, A Ruin Yields Secrets" by Sam Lubell (©2002 by The New York Times Company).

Everyone knows that the Roman Colosseum is an architectural marvel. Built so that thousands of people could be ushered in and out in minutes, it is a testament to the genius of Roman engineering. Or is it? By reconstructing the building with three-dimensional computer modeling and then virtually "walking through" it, researchers have discovered dark, narrow upper hallways that probably hemmed in spectators, slowing their movement to a crawl.

Such three-dimensional modeling is turning some of archaeology's once-established truths on their heads. Because 3-D software can take into account the building materials and the laws of physics, it enables scholars to address construction techniques in ways sometimes overlooked when they are working with two-dimensional drawings.

The Colosseum, a vast four-story oval arena, was built from around A.D. 70 to 80. It once held as many as 50,000 spectators. Earthquakes and the ravages of time have destroyed much of the building, but an impressive amount, including most of its facade, still stands.

Dean Abernathy, a doctoral student who helped reconstruct the Colosseum, confronted the issue of the third-level hallways. His model drew on the findings of a team of experts on Roman architecture assembled by the University of California at Los Angeles who had studied similar amphitheaters, drawings of the Colosseum and records of the building's construction and expansion. The team also examined what was left of the upper hallways, an area that had previously been all but closed to researchers.

Bernard Frischer, a classics professor at UCLA and director of its Cultural Virtual Reality Lab, said that researchers have generally held that the entire Colosseum was a masterpiece of circulation, with people able to enter and leave in as little as 10 minutes. After touring the virtual Colosseum, now he is not so sure. "Most scholars just never focused on the problem of circulation throughout the building," he said. "They assumed that each of the floors was going to look like the bottom," which is spacious and well lighted.

Such reconstructions have challenged traditional thinking about other sites as well. Analysis of UCLA models suggests that the Roman Senate may have been poorly ventilated and lighted and had inferior acoustics. The models also raised some new questions about the Temple of Saturn, whose design may have been altered centuries after its construction.

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Passage II

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