

Summary: Designing for Artificial Gravity

Two common faulty assumptions about artificial gravity are: assuming that gravity will mimic Earth's as long as it's 1 g, and believing any rotation will be extremely uncomfortable with an unacceptable adaptation period. The reality lies between these extremes.

Architects must recognize that the gravity won't be Earth-normal even with 1 g centripetal acceleration, unless the radius is very large. Individuals will likely need an adaptation period, which is also required for microgravity. Experiments show that most people adapt to 3 rpm rotations with ease and even up to 6 rpm can be comfortable, suggesting lower mass, kinetic energy, and cost.

However, architects should help inhabitants adapt to the rotating environment by being aware of rotation, Coriolis accelerations, and cross-coupled head rotations. Design should include visual cues to help inhabitants stay oriented to the rotation direction, minimizing discomfort.

For cylindrical modules, three orientations are considered: axial, tangential, and radial. Each has unique challenges like Coriolis effects, floor curvature, and stability issues. Axial orientation reduces Coriolis effects, while tangential orientation, though less dynamically stable, is recommended for better adaptation.