Revolutionary buildings

Engineering: Clever construction techniques could usher in a new architectural era in which entire buildings are capable of rotating.

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In biology almost nothing revolves freely. An owl's head, for example, can twist so far round that it faces backward, but when the bird wants to look forward again, it must turn its head back the way it came. There is a reason for this. Animals are wired up internally by blood vessels, nerves, intestines and so. Evolution has not yet come up with a way of keeping these links intact while allowing different parts of the body to revolve independently of one another. And this is not just a biological problem. Even human engineers have difficulty with it, which is one reason why revolving buildings—with their need for water, sewerage, gas and electrical connections—are so rare. But that could now be changing.

The simplest approach to such a building is what might be called the owl solution—in other words, incomplete rotation. This allows fixed but flexible connections to be used. Some years ago Bill Butler, an amateur architect, used this trick in a house in Snow Creek, California. Water and gas are delivered, and sewage removed, via vertical steel pipes in the non-rotating base. Rubber hoses connect the uprights to their mates in the mobile part of the building. The house's ability to rotate is thus limited only by the length of the hoses at full stretch. In the case of Mr Butler's dwelling, that allows it to sweep out an arc of 120º.

Two other Californians, Al and Janet Johnstone, however, have gone the whole hog. Their house, designed by 3sixty Technology of Henderson, Nevada (of which Mr Johnstone is a director) and built in the aptly named neighbourhood of Mountain Helix, revolves completely, once an hour.

Rather than using rubber hoses to connect the stationary and moving parts of the building, 3sixty's ingenious plumbing system employs horizontal ring-shaped pipes made of steel. Or, rather, it employs two ring-shaped half-pipes that rotate with respect to one another (the lower one remaining fixed while the upper one revolves along with the building). The joints between the half-pipes have rubber seals to stop the contents leaking, and each half-pipe has a vertical pipe connected to it, to introduce or dispose of the fluid concerned. Electricity, meanwhile, is delivered via a conductive brush that sweeps around a metal ring in the stationary base.

Electricity, of course, is needed to turn a revolving building. But if the building is well pivoted to reduce friction, that requires surprisingly little power. The motor that moves Mr Butler's house consumes about 370 watts; the Johnstones'—which is solar-powered—a bit over a kilowatt.

A couple of bespoke houses does not amount to a trend. But larger commercial developments are under construction, too. In April, for example, the world's first owners of revolving flats will begin moving into the Suite Vollard in Curitiba, Brazil, built by Moro Construções Civis. Each of the 11 apartments occupies an entire circular floor, costs about $550,000 and revolves at the occupant's command, in either direction, once an hour. (Moro has sidestepped the plumbing problem: the kitchens and bathrooms are located in the building's stationary central core.) Rogério Kffuri, Moro's head of sales, says the firm has signed contracts with developers in America, Canada, Japan, Portugal and the United Arab Emirates (UAE).

The UAE, in particular, seems keen on this sort of novelty. Dubai Property Ring, a local developer, plans to build a 30-storey block of flats called 55° Time Dubai. Instead of revolving platforms or individual floors, the entire structure will turn once a week, a pace that Tav Singh, the project's manager, calls "dignified". The owl problem, meanwhile, will be solved using a system similar to 3sixty's.

The most ambitious proposal yet comes from David Fisher, an architect based in Italy. He wants to build a skyscraper called the Dynamic Tower in Dubai. It would have 80 independently rotating, non-circular floors. This would give the tower a continuously changing shape. Solar panels and horizontal wind turbines between the floors would generate the power needed to turn it.

Mr Fisher has provided few details. But Antony Wood, head of the Council on Tall Buildings and Urban Habitat, an industry association based in Chicago, says technological limitations no longer rule out such towers. If the Dynamic Tower is not built, Mr Wood says, the explanation will not be an unavoidable lack of know-how, but an old-fashioned lack of money.

The Economist, New York, 5 mar. 2009, Technology Quarterly, online. Disponível em <www.economist.com>. Acesso em: 17 mar. 2009.