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## Earthship Westerdam

**The Westerdam isn't as self-contained as a spaceship, but it's as close as anything you'll find on the planet. Virginians have much to learn from the cruise liner about sustainable human settlement patterns.**

By James A. Bacon

Most of the people with whom I voyaged on a week-long cruise through the Western Caribbean last week seemed quite happy doing the things that one normally does on cruise ships: taking in the shows, shopping in the duty-free stores and consuming fabulous quantities of food and drink. I'll confess to a bit of over-eating myself, not to mention excessive consumption of fruity cocktails. But my mission wasn't to indulge myself: It was to observe a unique experiment in human settlement patterns.

The Westerdam is, as crew members of the 935-foot cruise ship are prone to liken it, a floating city. The 14-deck vessel houses a crew of 800 and up to 1,900 passengers. All of these people squeeze into a structure that takes up roughly one third of the surface area of a city block in my old neighborhood, the Fan, in Richmond -- a patch of real estate that normally would house maybe 40 inhabitants. In other words, the Westerdam packs in people at 70 times the density of a compact urban neighborhood.

The analogy with a land-based town or city is imprecise, of course. The Holland-America Line, operator of the Westerdam, does not pretend to run schools, operate hospitals or

support a government. Perhaps most important, there is nowhere on the ship for any of the 1,700 passengers to work. A 75-cent-per-minute charge for Internet access and the paucity of cell phone towers in the middle of the Caribbean Sea effectively cuts the passengers off



MS Westerdam (photo credit: Holland-America Line)

from their livelihoods. But most other elements of a fully functioning society are extant.

And somehow, it all works. The passengers, of course, are plied with gourmet meals, treated to lavish entertainment and waited upon hand and foot for a week, and then they depart. No one really expects *them* to grumble. But the Westerdam creates a community for the crew and staff as well, most of whom work long hours and live on the ship virtually non-stop through the length of contracts that typically run 10 months or more.

From my observations, I've concluded that the Westerdam of-

fers two important lessons for anyone wanting to build a prosperous and sustainable society. The first: Don't fear density. The second: It pays to be green.

From an urban planner's perspective, the most striking features of the cruise vessel are its density, its mix of uses and its pure pedestrian orientation. If the Westerdam were arrayed like modern American suburbs, all the staterooms would be segregated at one end of the ship, all the amenities would be clustered at the other end, and half the space would be dedicated to transportation corridors for the conveyance and parking of electric buggies to move people between the two. In other words, it would be hopelessly inefficient.

But the Westerdam makes density palatable if not downright delectable.

The first trick is creating a pedestrian-oriented community. In some American cities, nearly half the surface area is consumed by freeways, interchanges, roads, driveways and parking lots -- all for the purpose of moving and storing automobiles. On the Westerdam, there are no automobiles, and none of that space is needed.

Any location of the ship is readily accessible by foot from any other location via two ship-length corridors, various cross-corridors, two stairwells and a dozen elevators. The longest trip between two points would take no longer than five minutes for an active adult -- 10 minutes for

a little old, blue-haired lady on a walker.

The ship is equipped with additional passages accessible only to the crew. A dozen or more tons of food are required to feed everyone each week. From what I could tell, the crew transports boxes of food, water bottles, apparel, toiletries and incidentals on hand carts. Carts are not an efficient mode of conveyance when the distance to be covered is measured in miles, but they perform the job quite nicely when the distance is measured in meters.

The second trick to making density work is permitting mixed uses. Like a small town, the Westerdam combines a variety of (if you'll permit the expression) "land" uses: residential, retail, commercial and industrial. Within the space of less than a city block the ship blends staterooms, administrative offices, shops and entertainment amenities: a performance stage, a movie theater, a casino, swimming pools, an exercise facility and spa, restaurants and, of course, ubiquitous bars. The ship even contains an industrial zone -- the massive machinery that propels the ship, generates electricity and recycles the waste water dwells under the waterline on the bottom deck -- as well as a connecting infrastructure of passageways.

A passenger can find his every necessity accommodated within a brief walk from any point within the ship. Although some voyagers on the Westerdam choose to go on shore excursions, just as city dwellers choose to visit other cities, there is no compelling need to. Most people seem to enjoy the cruise experience at sea just as much as in port.

The third trick to making density

an asset is to plant pleasant public spaces throughout the vessel. The staterooms are tiny, useful mainly for sleeping, showering and changing clothes. But the cramped space of the living quarters is more than offset by abundant common areas. I was struck by how easy it was to find a quiet corner of the ship to spend time alone and read. My favorite space was the "promenade" deck, a wooden track that ran the 1/3-mile circumference of the ship. There were ample lounge chairs where one could sit quietly. For the more convivial passengers, there were a multitude of locations elsewhere on the ship suitable for chatting, eating, drinking and playing cards.

One could argue that conditions acceptable to passengers living aboard the Westerdam for a week of pampering would not be as enticing to crew and staff living aboard the ship for a full year. I posed that question to two members of the staff I got to know.

"For the first month, you feel a little crowded. But you get used to it," says Jun Marasigan, a guest relations staffer from the Philippines who has lived on board the ship for two months. "If I need privacy, my cabin mate will get out. But normally I don't need any privacy. My life is open for everyone."

Hilary Gavin, a native South African and fitness director, also found that life on board the cruise ship took some acclimation. "My first week I felt really claustrophobic," she admits. But after 10 months she's thoroughly adapted. "Now I feel complete freedom. ... This ship is now my world."

Living and working in such close quarters, the crew and staff become a community. Says Gavin:

"You get very close to people. You get to know people inside out, you can't hide anything. You can't be anonymous on board. The people you work with become your friends."

Even so, she says, she still requires some "me" time. Then she retreats to her cabin, or goes up to the top deck. "There are lots of places where there isn't anyone else around. ... You can lie on your back on Deck 11 drinking wine and watching the stars -- how many people get to do that?"

**J**an Van Aalst is one of the senior officers of the Westerdam. His job is reducing the ship's impact on the environment. "We take people to some of the most breath-taking places on earth," he says. "The ocean is our home. The ocean is where we work. Keeping the ocean safe and clean is good for the environment, our guests, the crew, for business."

A former Royal Netherlands Navy officer, bank manager and instructor at the Dutch maritime academy, Van Aalst pursues his job zealously. Nothing is too small or insignificant to escape his attention. Does the Westerdam, he asks, really need to light up its decks with so many lights? Does it really need to wash every towel every day? How can he encourage passengers to recycle their camera batteries?

One of Van Aalst's biggest challenges is disposing of solid waste. Each person on board generates between five and nine pounds day. That adds up to about 25,000 pounds -- more than 12 tons -- of garbage weekly. Every pound of waste must be recycled or properly disposed of, and Van Aalst has to account for it all. His records must withstand scrutiny in envi-

ronmental compliance audits.

As a Dutchman, Van Aalst is accustomed to recycling. "In Holland, we separate all the waste." The Dutch don't just sort paper from plastic and glass -- they separate the brown bottles from the green ones and white ones! Van Aalst is trying to impart that recycling ethic to the crew and passengers of the Westerdam. If it means sorting trash for three different recycling bins, including one for batteries, so be it. If it means dispensing with paper coffee cups, plastic lids and plastic stirrers, so be it.

Biodegradable food waste, says Van Aalst, is ground up, mixed with water and discharged at sea under strict guidelines. "Give the fishes back to the fishes." But dumping plastic into the water? That's a major no-no. "If you throw a plastic bottle into the sea, it will be there a half a million years from now."

Another huge challenge is recycling "blackwater," the name given to the effluent from toilets and the infirmary. The Westerdam treats the blackwater by running it through micro-pore filtration, bacterial digestion, chemical treatment and ultraviolet radiation. What comes out, says Van Aalst, "would meet the standards for drinking water in many countries."

The Westerdam also treats "gray water" from showers, sinks and pantries the same as it does blackwater.

Additionally, the ship runs another 2,200 gallons per day on average of bilge water, which results from the condensation on the machines. After running through oil-water separators, the bilge water must contain no more than 15 parts of oil per million. The result of all the effort: The massive Westerdam

has less environmental impact than a fishing boat with a leaky outboard motor. Even in Third World ports of call where the water is covered with an oily sheen, says Van Aalst, "I check every day to make sure not one drop is coming out of this vessel."

Van Aalst also measures the emissions from the Westerdam's smokestacks. He can tell you the levels of SOx and NOx to the parts per million. But there's one thing he can't tell you, and this surprised me. What is the Westerdam's carbon footprint? Obviously, the top brass at Holland-America has not been reading up on its Al Gore, for Van Aalst does not monitor the emissions of carbon dioxide, widely deemed to be a contributor to global warming. But CO2 is something the company should measure, if only to polish its environmental credentials. Given the ability to pack so many people into such a small space, the Westerdam undoubtedly is highly energy efficient, and I'm willing to wager that its per capita CO2 emissions are pretty low.

Van Aalst is a practical man. He is not what he calls "an environmental freak." He sees environmental protection going hand in hand with energy conservation, cutting costs and operating the cruise ship profitably. Still, he believes the Westerdam offers some valuable lessons to the rest of the world.

"We are doing better [with the environment] than the average town or village," he says. Holland-America sets goals, measures progress towards those goals, and then ratchets them higher. Land-bound communities, he suggests, could do the same.

"Every year, we have two or three big objectives, and two or three concern the environment," Van Aalst says. Currently, the ship is trying to cut its fuel usage by two percent. One way to do that is to be more selective about putting out the stabilizers that dampen the pitch during rough weather. Stabilizers make the trip more comfortable for the passengers and reduce the risk of stumbles and accidents, but they reduce fuel efficiency. It's a tough trade-off. Another conservation measure is to run the ship's five diesel propellers in more fuel-efficient configurations. The trade-off there is speed and travel time. Saving fuel may require shorter visits at ports of call.

The ship's engines also supply electricity, and Van Aalst is hyper-attentive to every light left on unnecessarily -- he has submitted a proposal to reconfigure the lighting circuits that would allow more flexibility in turning off unneeded lights -- and every door that blows open and lets air-conditioned air escape the ship. So far this year, Van Aalst says proudly, the ship is meeting its fuel conservation objectives.

**E**nergy conservation is a win-win: It saves the company money while reducing the environmental impact of the ship and its 2,700 inhabitants. Like the Westerdam, American communities should implement continuous improvement methodologies for finding economical, cost-effective ways to recycle and cut energy consumption. Conservation needs to become a personal habit and a community priority.

Conservation must go beyond recycling of solid waste and treatment of waste water. As the Westerdam demonstrates, it

is possible to live well by creating pedestrian communities, embracing density and trading some private space for public.

That's a lesson that Virginians desperately need to learn. We lavish ourselves with space -- space for cars, for yards, for houses. At tremendous expense, we have replicated the functions of public places inside our private houses in the form of dedicated rooms for dining, entertaining, watching television, even exercising. Not only do we construct this private space at great expense, we must continually supply it with lighting, heating, air conditioning and other energy-intensive applications.

Life on the Westerdam may seem an extreme example of human settlement patterns, and not one readily replicated in the "real" world. Not many people could afford the price tag of roughly \$1,000 per person per week that it takes to live the luxury liner lifestyle. But as energy costs rise and the imperative to conserve becomes more acute, we may find the Westerdam an example well worth emulating.

-- **March 21, 2007**

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