

# Crosstalk

## Extreme Designs

From the pyramids to the Hummer, more is often less

**T**here is a fundamental difference between what can be designed and built and what makes sense. History provides a lesson in the shape of record-setting behemoths that have never since been equaled.

The Egyptian pyramids started small, and in just a few generations, some 4,500 years ago, there came Khufu's enormous pyramid, which nobody has ever tried to surpass. Shipbuilders in ancient Greece kept on expanding the size of their oared vessels until they built, during the third century B.C.E, a *tessarakonteres*, with 4,000 oarsmen. That vessel was too heavy, too ponderous, and therefore a naval failure. And architect Filippo Brunelleschi's vast cupola for Florence's Cathedral of Santa Maria del Fiore, built without scaffolding and finished in 1436, was never replicated.

The modern era has no shortage of such obvious overshoots. The boom in oil consumption following the Second World War led to ever-larger oil tankers, with sizes rising from 50,000 to 100,000 and 250,000 deadweight tonnes (dwt). Seven tankers exceeded 500,000 dwt, but their lives were short, and nobody has built a million-dwt tanker. Technically, it would have been possible, but such a ship would not fit through the Suez or Panama canals, and its draft would limit its operation to just a few ports.

The economy-class-only configuration of the Airbus A380 airliner was certified to carry up to 853 passengers, but it has not been a success. In 2021, just 16 years after it entered service, the last plane was delivered, a very truncated lifespan. Compare it with the hardly puny Boeing 747, which will see its final delivery in 2022—53 years after the plane's first flight, an

**853**  
The most  
passengers  
on an  
airliner  
(Airbus  
A380)

almost human longevity. Clearly, the 747 was the right-sized record-breaker.

Of course, the most infamous overshoot of all airplane designs was Howard Hughes's H-4 Hercules, dubbed the "Spruce Goose," the largest plane ever made out of wood. It had a wingspan of nearly 100 meters, and it was propelled by eight reciprocating engines, but it became airborne only once, for less than a minute, on 2 November 1947, with Hughes himself at the controls.

Another right-size giant is Ford's heavy and powerful F-150, now in its 14th generation: In the United States, it has been the bestselling pickup since 1977 and the best-selling vehicle since 1981. In contrast, the Hummer, a civilian version of a military assault vehicle, had a brief career but is now being resurrected in an even heavier electric version: The largest version using an internal combustion engine, the H1, weighed nearly 3.5 tonnes, the electric Hummer, 4.1 tonnes. I doubt we will see 14 generations of this beast.

But these lessons of excess carry little weight with designers and promoters pursuing record sizes. Architects discuss buildings taller than a mile, cruise ship designers have already packed nearly 7,000 people into a single vessel (*Symphony of the Seas*, built 2018), and people are dreaming about much larger floating cities. There are engineers who think that we will soon have wind turbines whose more than 200-meter-diameter blades will fold, like palm fronds, in hurricanes.

Depending on where you stand, you might see all of this either as an admirable quest for new horizons (a quintessential human striving) or irrational and wasteful overreach (a quintessential human hubris). ■




### GIGANTISM IN THE AIR


Many flying behemoths have been tried, and most have failed. Of the three oversize planes shown in this illustration, the only one that has succeeded is the Antonov An-225, designed in the Soviet Union in the 1980s. This large cargo-lifter carries up to 250 tonnes of heavy machinery or construction parts on chartered flights to all continents.




**Antonov  
An-225 Mriya**  
Wingspan:  
88.4 meters  
Length:  
84 meters



**Airbus  
A380-800**  
Wingspan:  
64 meters  
Length:  
58.82 meters



**Hughes H-4 Hercules  
("Spruce Goose")**  
Wingspan: 97.82 meters  
Length: 66.65 meters



**Boeing  
737-MAX7**  
Wingspan:  
35.92 meters  
Length:  
35.56 meters