FROM A SPHERE, TILE BY TILE

How the shells were made

The roofs look like sails. They were designed as parts of a sphere, so they could be built in repeating pieces, and catch the harbour light.

Between 1958 and 1962, Jørn Utzon and his team tried parabolic and ellipsoid geometry, and then a sphere. That last idea meant the form could be prefabricated, and that a uniform pattern of tiles became possible. The official story calls it a milestone in twentieth-century architecture.

The roof	What official pages say
The tiles	After three years of work, Höganäs of Sweden produced what became known as the Sydney Tile: 120 mm square, made from clay with a small percentage of crushed stone. In total, there are 1,056,006 tiles on the roof, covering about 1.62 hectares.
The chevrons	"The 4228 tile chevrons required to cover the shells were produced in a factory set up under the Monumental Steps." Tiles were placed face down in one of 26 chevron-shaped beds, each curved to match the roof.
The light	In his 2002 Design Principles, Utzon wrote that the tiles were "a major item in the building. It is important that such a large, white sculpture in the harbour setting catches and mirrors the sky with all its varied lights dawn to dusk, day to day, throughout the year."

Under the steps, a different kind of invention

The Monumental Steps are carried by single-span concrete beams, some 49 metres long, without a colonnade underneath. Utzon called them "Ove's invention," after the engineer Ove Arup. A bronze plaque from the rainy first day of construction, 2 March 1959, can still be seen on the steps today.

Fourteen years, not four

Construction was expected to take four years. It took 14, and involved 10,000 construction workers. A state lottery paid for most of the finished house. In 1960, while the shells were still a worksite, Paul Robeson climbed the scaffolding and sang "Ol' Man River" to the builders as they ate lunch.

A short quiz

1. How many tiles does the official spherical-solution page count on the roof?
2. Where were the 4,228 tile chevrons produced?
3. What did Utzon call the long concrete beams under the Monumental Steps?

Answers. 1. 1,056,006. 2. In a factory set up under the Monumental Steps. 3. "Ove's invention."

Sources: sydneyoperahouse.com, "The spherical solution," "Interesting facts about Sydney Opera House," and "Construction begins," checked 17 November 2026.
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