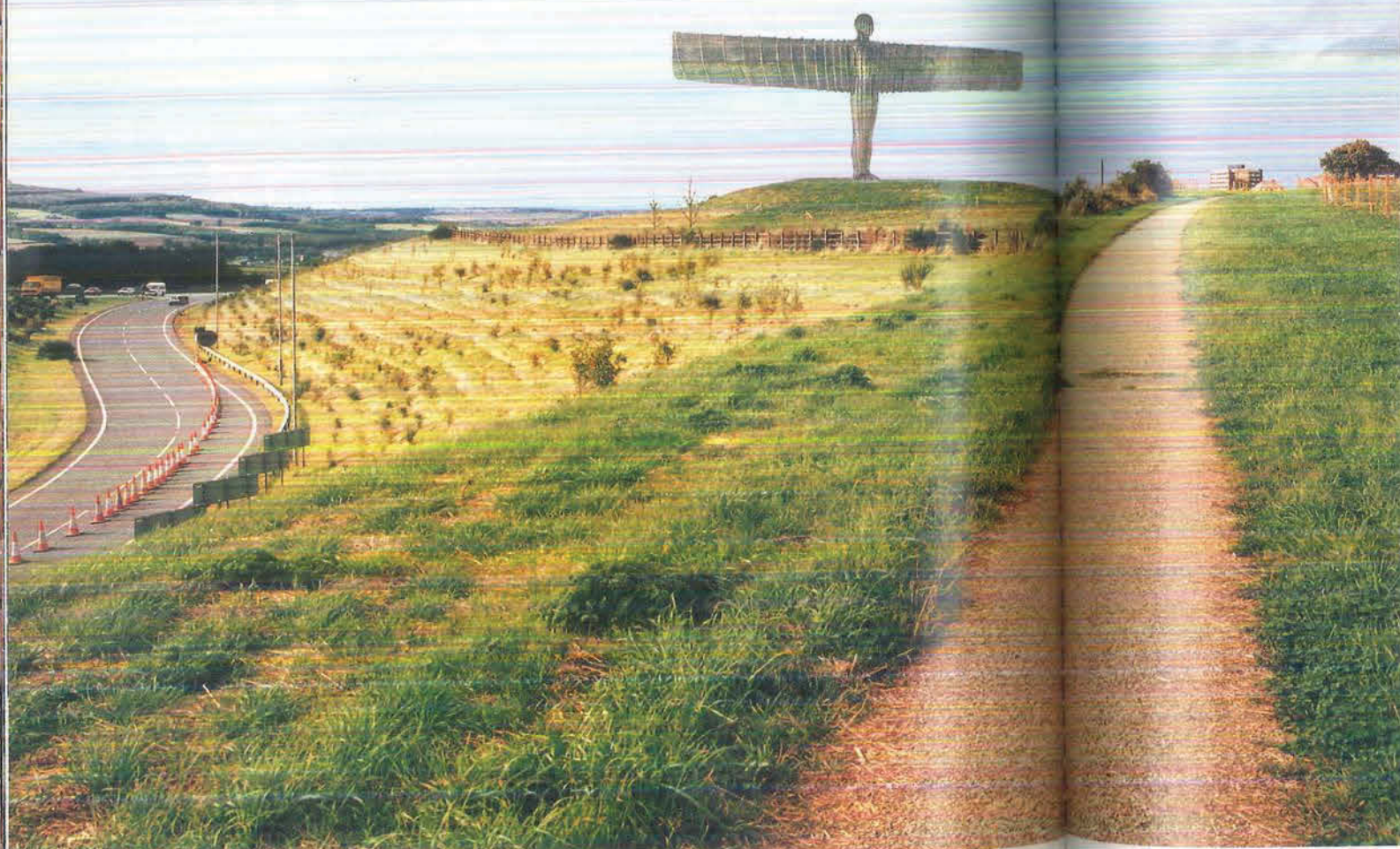


# Angel on my hard shoulder

The biggest sculpture in the UK – an angel with a wingspan almost as wide as a jumbo jet – will preside over the A1 outside Newcastle. Michael Glackin follows its progress in a Hartlepool factory ready for erection in the new year.



The 20 m high angel with a 52 m wingspan will dominate the south Tyneside skyline.

MIKE WOOD, CONTRACTS MANAGER OF HARTLEPOOL Steel Fabrications, says that diversification is the key to keeping a busy order book. "With so many peaks and troughs in the marketplace, it's important to be versatile in what you do. You have to be willing to turn your hand to anything."

Few would argue with his sentiments, although they may be surprised at just how far the steelwork fabricator has gone to prove its versatility. In addition to its routine column-and-beam jobs, the firm is working on a £800 000, 20 m high steel angel with a 52 m wingspan that will dominate the south Tyneside skyline next to the A1 near Newcastle when it is erected in the new year.

The Angel of the North is the latest project by Turner Prize-winning artist Antony Gormley. It was commissioned by Gateshead council as a monument to the craft and engineering tradition of the North-east. Although its cost, which includes almost £600 000 of National Lottery funding, has caused controversy among locals, Gateshead council believes it will generate a good deal of tourist revenue in the region.

The concept of the sculpture belongs to the artist, but the project in its entirety is a fusion of different skills and knowledge that, in addition to Hartlepool Steel Fabrications' welders, also involves structural engineer Ove Arup & Partners.

Last June, Gormley provided Ove Arup with a human-size, plaster-cast model of his concept. The model's shape and dimensions were then scanned into a computer to produce working data that enabled Hartlepool Steel Fabrications and Ove Arup to assess how the awkward giant could be built.

The 200-tonne structure is built around a cage cut from 50 mm thick steel. This forms the sculpture's skeleton, which has more than 2000 horizontal ribs. The ribs act as formers for the angel's overall shape and double as structural reinforcement throughout the length of the sculpture.

The ribs are welded to a series of vertical members which will remain visible on the finished figure and run from its feet to its head. The vertical members are in turn fixed to five horizontal steel circular sections, which serve a similar function in the structure as a ring-beam would in a building.

Once the skeleton is assembled, a 6 mm outer skin will be slotted through the vertical steel members and welded to the ribs. When the skin is fixed, the vertical steel frame and circular sections will protrude about 250 mm above the skin, creating the sculpture's striking raised-seam finish.

The geometry and curves required by the artist for the angel's body caused a few problems for the fabricators. Shaping plate steel to enable it to curve in two directions is unusual, and the welders solved the problem by forming the steel outer skin directly over the ribs of the body in situ.

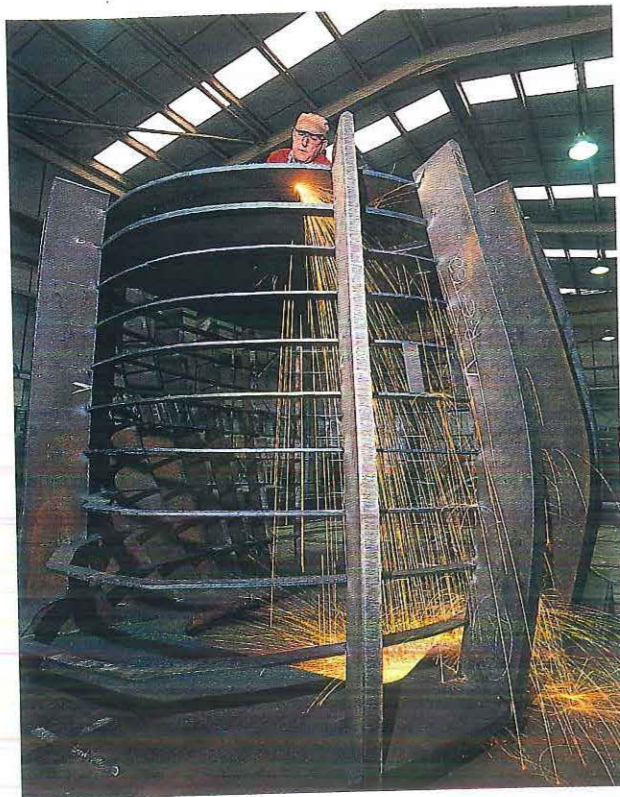
"In fact, shaping the skin in two directions was not unlike steel fabrication in shipbuilding," says Wood. "And because many of the welders here are from a shipbuilding background, it created only a minor difficulty."

The circular "ring-beams" in the chest of the angel will also ensure a secure anchor point for its giant wings once they are attached to the body. With a wingspan almost as large as that of a jumbo jet, the angel has strenuous requirements in terms of structural reinforcement.

"We've had to increase certain material thicknesses and add other structural members to accommodate both its size and the elements it will have to withstand," says Ove Arup associate Neil Carstairs. "But we've been able to give the artist the concept he wanted – the dimensions he specified have not been altered."

Making the giant angel stand up on a site that was once a ▶

**technical**  
steel sculpture



► works will be tricky. Once in place, the angel will rest on eight, 20 m deep concrete piles. However, because of the sculpture's weight, the site had to be stabilised, so old mine workings beneath the ground were filled with sulphite-resistant cement before the piles were drilled and filled with more than 150 tonnes of concrete.

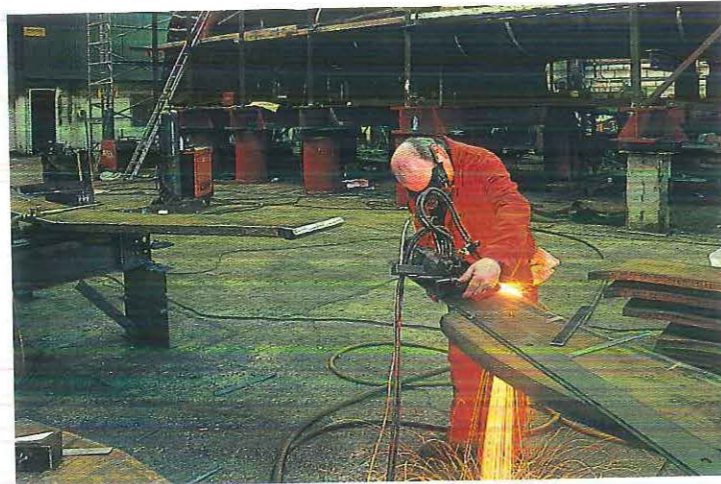
A concrete slab 1.5 m thick, covering an area of 104 m<sup>2</sup>, will be laid on top of the piles. The slab will serve as a platform for a 5.3 m thick plinth which the angel will ultimately stand on. Finally, it will be secured to the foundation with 52 bolts, each 3 m long, cast into the concrete.

Before being erected, the angel will be assembled in the workshop – "just to be on the safe side" – and brought to site in three sections: the two wings and the body. With the aid of two cranes – one to lift it off the ground, the other to tilt it to a vertical position – the body will be placed on the plinth and secured. A scaffold will then be erected alongside it, and the wings will be bolted and welded on.

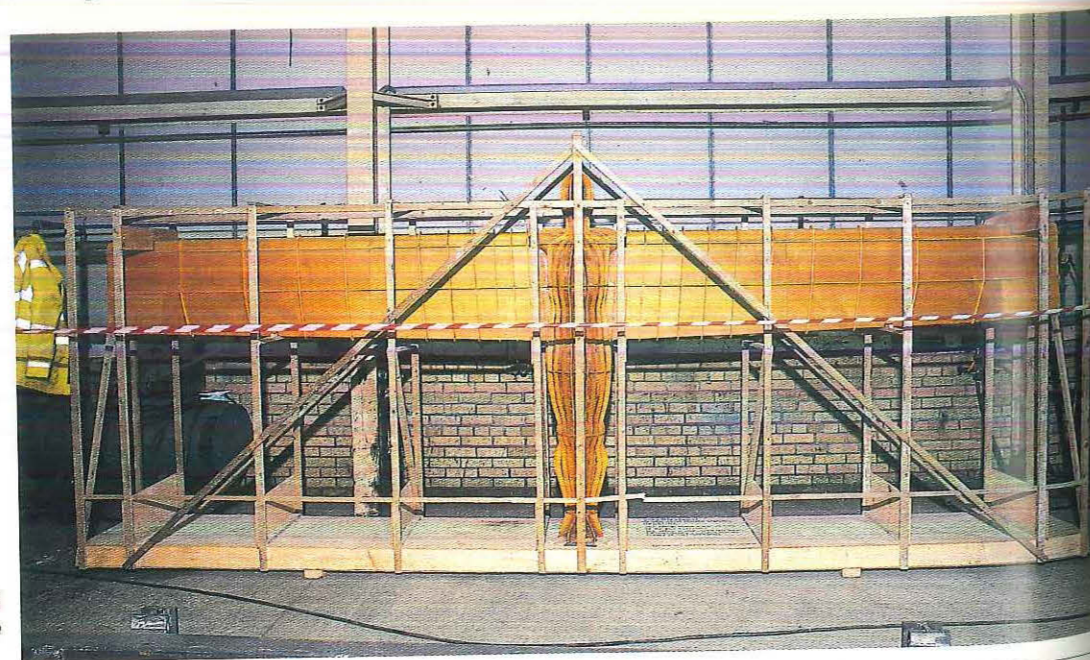
Once erected, the angel will be the tallest sculpture in the UK, as well as the largest angel figure in the world. In terms of accessible art, it is estimated that it will be viewed by about 33 million people a year. However, one thing the masses will not see is the quality of the welds – for a structure this size, they are particularly sharp and clean.

"So far, everything has met my highest expectations," says Gormley. "The precision the welders displayed in undertaking this work has been inspiring."

Above: The horizontal ribs – of which there are more than 2000 – form the skeleton of the angel, giving it shape and acting as structural reinforcement.



Right: A craftsman works on one of the "ring-beams" that will anchor the wings.



Right: A human-size plaster-cast model with timber surround acts as a guide for the giant structure.

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