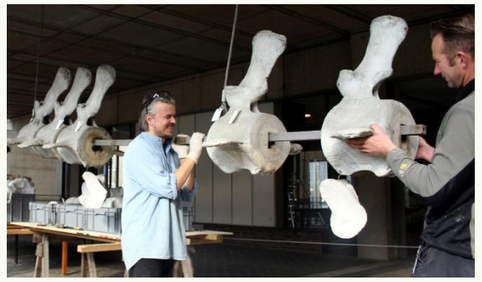
Recording, dismantling, cleaning and packing Cambridge University's 70ft-long Finback Whale skeleton

Nigel R. Larkin BA MSc FRGS

Affiliated Researcher, Cambridge University Museum of Zoology, Downing St, Cambridge, CB2 3EJ, UK, & freelance conservator and curator at natural-history-conservation.com



Introduction

At 70ft (21m) long, this particular Finback Whale (*Balaenoptera physalus*) skeleton is one of the biggest known examples of this species which is second in size only to the Blue Whale. This animal was washed ashore dead at Pevensey in Sussex in 1865 and 40,000 people are estimated to have travelled to see it on the beach within the first few days. The skeleton was prepared and subsequently bought for the museum by public subscription. It used to be mounted inside but in the 1990s it was hung from a ceiling outside the museum. After 16 years of being nested in and defecated on by pigeons the skeleton had to be recorded, cleaned, dismantled and packed away whilst a refurbishment program gutted the building and created a new glass foyer for the whale to be re-mounted in.

Cleaning, dismantling and packing

The task had to be approached carefully for several reasons: the pigeons had left behind a significant biohazard (not just their faeces but nesting materials and dead bodies); we would be working at height and the bones were considerably heavy; it was not clear how all the metal framework was joined together nor whether the rusty nuts and bolts would be easily undone; and we would be moving large amounts of materials, tools and equipment up a flight of stairs at the start and end of every day and well as carrying the large bones down. Because the specimen would need to be re-mounted in a new position in just a couple of years, meticulous records needed to be made of exactly how it was mounted and the order in which it would need to be reassembled. Therefore copious photos were taken and notes written, and all the bones and metalwork were labelled thoroughly before any dismantling commenced. A simple label on a bone saying what the bone was i.e. 'rib R15' was not enough – every hole where a bolt had been inserted was given its own tie-on label describing the piece of armature that it had been bolted to, and the matching bit of armature was labelled appropriately as well. WD40 was applied to all the nuts and bolts in advance, being careful not to contaminate the bones. Various parts of the project were videoed and the whole process was recorded with a time lapse camera (you can see the video on the Zoology Museum's Facebook page).

Despite the skeleton being cleaned about 10 years previously, the accumulated pigeon faeces were over an inch deep in places. Therefore before anything was dismantled the whole specimen was cleaned as thoroughly as possible with a stiff brush and a vacuum cleaner to get rid of the worst of the pigeon droppings and nesting material as well the general, dust, dirt and cobwebs etc. After being removed from the armature, each bone was thoroughly dry brushed again before being cleaned with the mild conservation detergent Synperonic A7 in water then the surface was cleaned of the detergent by further swabbing with water, whilst being patted dry frequently with paper towels so that the water did not soak in to the bone. The baleen was cleaned very gently with small soft brushes and a vacuum cleaner and was not 'wet cleaned'. All the rusty metalwork was cleaned with a spinning wire disk clamped to a bench, and then wiped clean with a damp rag, dried, painted and labelled. Where possible, the metal brackets were re-attached to specimens to keep them in context.

The 4.5m-long 3m wide skull and mandible were incredibly heavy, estimated at over a tonne in weight.

Left: cleaning ribs. Below left: galvanised steel Unistrut in use. Below: moving the skull in its protective cage

To move the skull into position in the 1990s it required 19 strong men, and injuries were sustained. Unfortunately the sutures of the skull are not fused and it had been sawn in half lengthways when initially prepared, so the whole structure was weaker than it might have been. Therefore, the skull itself could not support its own weight so a cage of galvanised steel Unistrut channel was built around it, bolted to a thick plywood base.

The protective cage was designed so that a crane would be able to lift it using straps placed underneath. Once the cage was built and Plastazote-lined wooden supports screwed securely underneath the bones, the weight had to be taken off the metal wires it was suspended from. Pneumatic 'Airjacks' were used (strong inflatable rubber 'pillows'). They were placed underneath the base of the cage to lift up the whole structure so that the wires could be undone and the weight transferred. Then a mobile crane moved the skull and mandible which together with the metalwork weighed 1.6 tons!

A large shed was constructed especially to house the skull for the duration of the refurbishment project. Bespoke wooden crates were made for the baleen and forelimbs and Plastazote foam-lined wooden shelving made for the ribs (some of which were 2.85m long). The main supporting metal beam onto which the vertebrae were threaded was in two main sections, bolted together. The larger of these weighed in the region of 170Kg and was lowered with a system of pulleys.

Conclusions

This project presented significant health and safety risks but with good planning well in advance the project was completed within the planned timeframe and within budget. A photographic, written and video record was made of the project specifically so that the skeleton could be put back together relatively easily a couple of years later. If Unistrut channelling had not been available to make the rigid protective and supportive cage around the skull and mandible, the project would have taken much longer and the bones would have been much more vulnerable. The team looks forward to repeating the project - in reverse and at greater height but thankfully without pigeon issues - in the Spring of 2016.

Acknowledgements Thanks are due to: Phil Rye, Matt Lowe and all the various volunteers for their help.