Blue Whale on the Move: Dismantling a 125 Year-Old Specimen

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Abstract (200 words or less)

The Natural History Museum (London, UK) intends to suspend a 25 metre-long, blue whale (*Balaenoptera musculus*) from its central Hintze Hall. Alongside other specimens which are to be put on open display in this space the environment was looked at in terms of sustainable improvements. Works are being undertaken to improve the conditions by utilizing natural ventilation and re-using existing duct work.

This specimen, acquired by the Museum in 1891, was suspended from the ceiling of the Mammal Hall, where it has been on display since 1934. Conservators worked with a specialist specimen handling company to carefully dismantle and remove each of the 220 bones from its original mount. The skull required a special frame and a precise calculation of movement to dismantle it and remove it. Many complex decisions were made during this process – as each bone removal did not dictate what the next would bring. During the dismantling phase, the conservation team have had to address the many requirements of curators, researchers, senior management and the media.

Main Text (1000 words or less)

Introduction

A 25-metre long blue whale (*Balaenoptera musculus)* skeleton has been suspended in the Natural History Museum's (London, UK) Mammals and Blue Whale gallery since 1934. (Figure 1) Following months of careful consideration this specimen was chosen to take centre stage in Hintze Hall, to give an introduction that illustrates the museum's research into the rich biodiversity of life on Earth and a sustainable future, as well as the origins and evolution of that life. This also meant that it had to be completely dismantled and removed for conservation treatment to then be re-suspended.

The whale beached at Wexford, Ireland in 1891 and was thought to be about 5yrs of age at time of death. The skeleton was purchased by the NHM in 1891 for £250. It was held in storage as part of the NHM's Cetacea research collection until 1934 when it was placed into the Mammals Hall on public display (R. Sabin, pers. Comm. 03 Sept 2015).

Planning and Preparation

A particularly crucial aspect of moving the blue whale skeleton was whether or not it could actually withstand the strains and stresses of dismantling, transportation and remounting. Due to the complicated and high-risk nature of this project, many specialists were involved, including conservators, curators, project managers, scaffolders, structural engineers, specimen handlers and mount makers.

Environmental Conditions. Alongside other specimens which are to be put on open display in this space the environment was looked at in terms of sustainable improvements. Works are being undertaken to improve the conditions by utilizing natural ventilation and re-using existing duct work. This will help to minimise fluctuations and high temperatures exhibited in the summer months.

Cleaning. Cleaning was necessary to inform the dismantling process about the condition of the blue whale skeleton, (as a thick layer of dust had accumulated). (Figure 2) A low-suction vacuum with a

soft brush was used to gently remove dust – a total of 1.3kgs of dust was collected from a surface area of approximately 110.4 m^2.

Documentation. Digital images, videos, analytical samples, drawings and reports were used to capture as much information regarding specimen condition as possible. Each skeletal element was inspected with a particular emphasis on signs of fragility and weakness which was then recorded in a condition report used to inform the dismantling process. Labels were attached to bone features with polytetrafluoroethylene (PTFE) tape to ensure that correct articulation would be maintained during re-mounting of the specimen. (Figure 3)

Dismantling the Specimen

Dismantling was carried out in several phases beginning with the smallest caudal vertebra. As more skeletal elements were removed the complexity, volume and weight increased.

Postcranial skeleton. As there was little documentation associated with how the specimen had been mounted, each bone presented an unknown challenge. The first discovery was two steel metal rods embedded through the first caudal vertebrae. Both had been fashioned into a loop at the posterior end to prevent it from being removed or sliding off easily. (Figure 4) This was remedied by using a small hacksaw and carefully cutting off the first loop. The internal armature of the remaining vertebrae was a rectangular iron bar bolted in sections, that ran throughout the length of the vertebral column.

Once the first 8 caudal vertebrae were successfully removed, the cable suspension metalwork that was bolted into the armature had to be removed as it effectively blocked the removal of more vertebrae. A support gantry was wheeled into place and a sling was placed under the exposed metal armature to support the structure as the first cable was uncoupled. (Figure 5)

Further along the vertebral column, other skeletal elements had to be removed to ensure progress towards the skull, including the chevrons, pelvic bones, scapula, radius, ulna, phalanges, ribs, stenebra and hyoids. Each was bolted onto the armature or had additional armature attached and had to be removed in a specific order so that other bones could then be safely removed. For example, the pectoral fins could not be removed until the ribs were completely dismantled.

During the dismantling process, it was discovered that the intervertebral discs were composed of plaster of Paris, wood blocks and crumpled pieces of newspaper from the early 1930s. (Figure 6)

Cranium and Mandibles. The final stages of dismantling involved removing the two mandible halves and the skull. The first challenge was to excavate around each bolt connection and uncouple the mandibles from the skull whilst providing full support to each element. Each mandible was then packed into a bespoke wooden frame so it could be carefully lowered down to the floor of the mammal gallery. (Figure 7)

The skull is almost 6 metres in length and three metres at its widest point. It is highly complex in shape with over individual 40 elements fused or partly fused together. The first challenge was to lift and move it without placing any strain on the bone. The second challenge was that, due to existing cable supporting the whale model underneath (which could not be moved or removed), the skull was going to need to be rotated as we moved it, so that it would fit through the gap between the cable and the side of the scaffolding to enable it to be lowered to the ground floor of the gallery without causing any damage. A bespoke steel cradle had been designed to be placed underneath the skull and existing holes and bolted areas of the skull were used to attach it to the cradle. (Figure 8) Crack monitor gauges had been placed at existing vulnerable parts of the skull to provide an additional recording mechanism for cracks opening up during the process. Extra removable sides were then added to the cradle, to provide extra protection for the rotation and subsequent move.

Conclusions

The skeletal elements are spread over three separate areas of the museum as there are about 220 bones in total. They will be undergoing conservation treatment over the next few months in the Darwin Centre gallery Pop up Conservation Studio (Figure 9).

Acknowledgements

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and Constantine Ltd.

Figure 1. The blue whale skeleton suspended in the Mammals Gallery prior to dismantling.

Figure 2. A thick layer of dust had settled on the surface of the blue whale skeleton. This was obscuring details regarding its condition to inform the dismantling process.

Figure 3. Each bone had to be carefully labelled to ensure that the correct articulation will be maintained in the new pose.

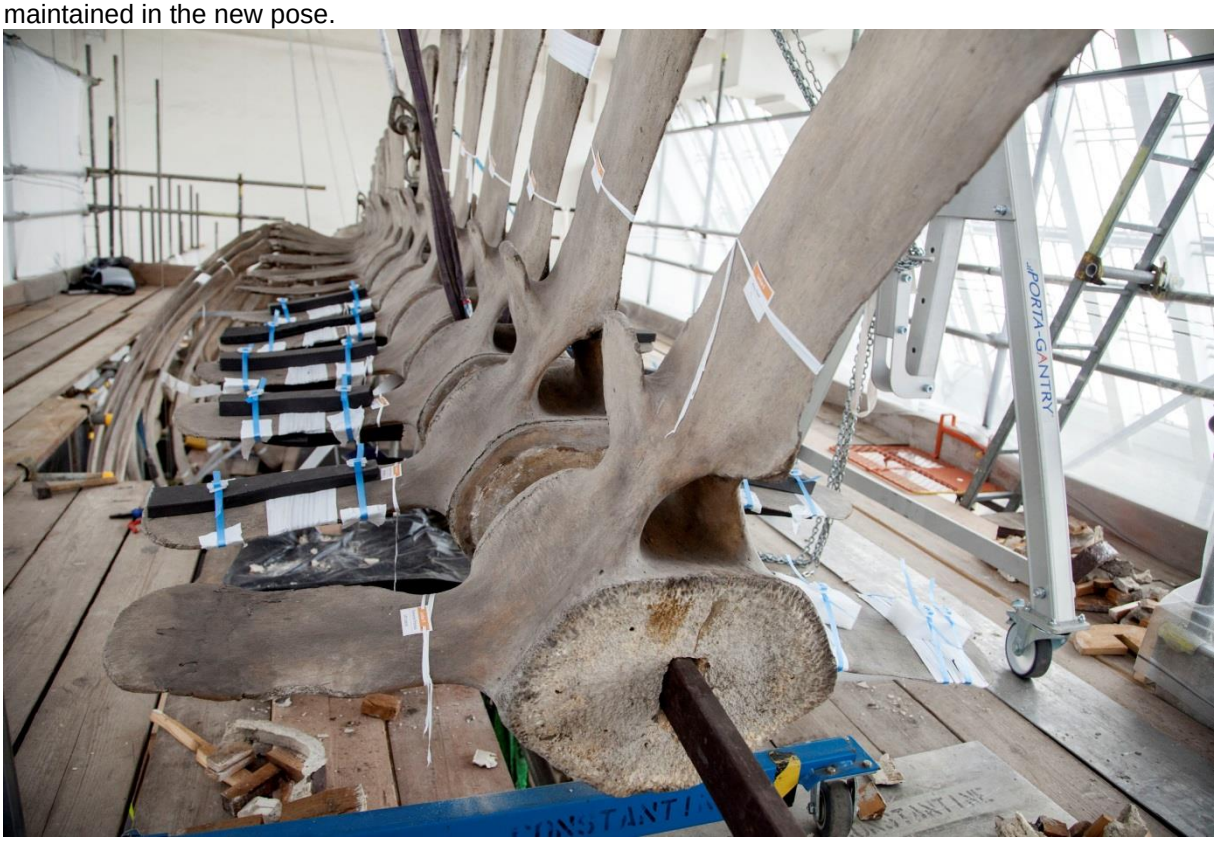

Figure 4. Removal of the first caudal vertebra revealed two metal rods terminating in a loop at the posterior end of the specimen.

Figure 5. A large gantry was used to support the main armature while vertebrae were removed and cables were uncoupled.

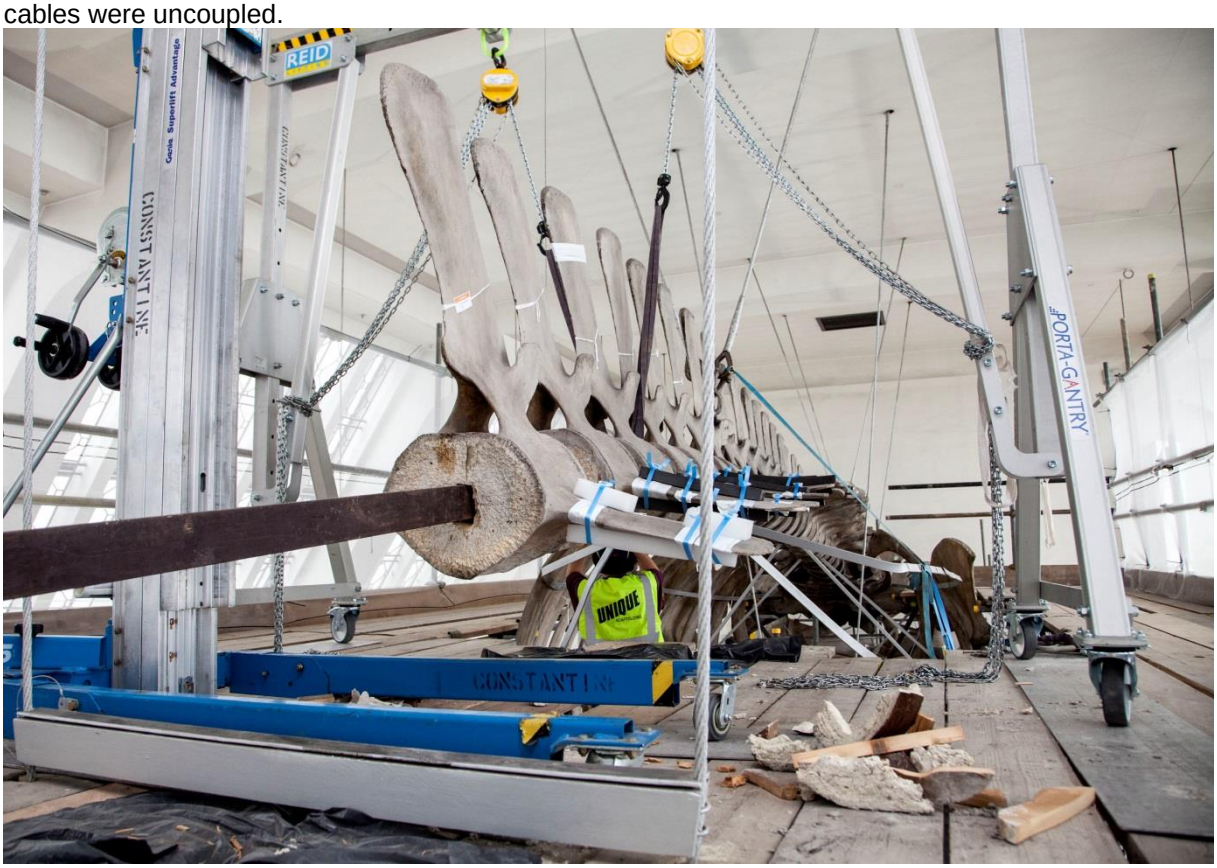

Figure 6. Each intervertebral disc was composed of plaster of Paris, newspaper and wood blocks.

Figure 7. Each mandible was carefully packed into a bespoke wooden cradle and then lowered to the ground.

Figure 8. Due to the complex and high-risk nature of removing the whale skull, it required a specialist frame for support.