

Crossing the Line – sustainability and large working object conservation in museums and heritage collections

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ABSTRACT

Large working objects pose significant challenges for the heritage sector. The primary issues are concerned with interpretation, conservation and authenticity but underpinning all of these is the issue of sustainability. Decision making in large object conservation has always revolved around the tension between using it and losing it, or storing it and seeing it decay through neglect. An additional challenge is authenticity. At what point does an object lose its authenticity? How many replacement parts, panels or new paint jobs does it take to reduce an object to a construct? This paper examines these challenges in order to explore a set of ideas that will allow a sustainable approach to large working object conservation in museums and heritage collections to be developed. It will use as a basis for analysis and discussion, ground breaking conservation projects at the Fleet Air Arm Museum (FAAM) in Yeovilton in the UK.

INTRODUCTION

Large working objects and vehicles feature in heritage collections globally and the number is increasing as technology advances and machines and vehicles fall out of daily use. The primary concern when such objects are accessioned into collections is getting them undercover (CCI 1993, Mikesh 1989). However the next major consideration for objects that have the potential or capability to be operated is whether to run them or not (see Chippington, Fitzgerald and Storer 1993, Mann 1990). Attitudes and approaches differ widely with regard to this question and there appears to be limited research or subject specific professional literature available to guide the museum, heritage site or collector. This is a discussion paper that will explore sustainability in large working object preservation. It will examine some contemporary questions and dilemmas facing the conservator/restorer of large working objects and present the results of an innovative approach that applies, to some degree, the principles of archaeological excavation to the investigation and preservation of an aircraft.

THE CHALLENGE

The management and conservation of large working objects presents significant challenges. Working objects are complex constructions comprising mixed materials and composites with all the problems associated with the management of lubricants, fuel, size, bulk and weight. Historically, the first major UK-based focus on conservation in the domain derived from a Science Museum initiative of 1987 which convened representatives of a number of industrial museums. One outcome was Storer's survey and report on *The Conservation of Industrial Collections* (1989) which was a joint venture between the Science Museum and The Conservation Unit of the Museums & Galleries Commission (MGC). The survey defined

large objects loosely as ‘anything too big to carry’, principally industrial and agricultural objects excluding buildings. It revealed that twenty of the forty museums visited had collections ‘stored’ in the open air and as a result two funding streams were initialised to tackle this. The first was a re-prioritisation of MGC’s Capital Grant scheme to help to address the need for buildings and the second was a change in the PRISM fund’s remit to include the restoration as well as the acquisition of scientific and industrial objects. A further outcome was the publication of the *MGC Standards in the Museum Care of Larger and Working Objects* (1994). In her foreword to the Standard, Dame Margaret Weston acknowledged the burgeoning independent industrial museum sector that had been establishing itself over the previous thirty years and noted that the standards were written to be useful to them as well as to relevant societies and private owners ‘...having large objects in their charge who, while they may have a strong interest in operation, also have a concern for long-term preservation’. Her comments highlight two key issues. Firstly the importance of the private and independent sector in the retention and preservation of larger working objects and secondly the operation versus preservation debate.

The independent museum sector relies heavily upon un-paid helpers and within the realm of large object conservation this has always been the province of retired engineers, mechanics, service personnel and other volunteers. Training is ‘on the job’ and there are only a handful of education institutions that offer relevant courses in the field. Over thirty five years ago Hallam (1984) noted the conservation community’s lack of interest in technological objects, ‘leaving them in the care of well meaning but often misguided craftspeople and curators’. How to establish best practice was clearly a need to be addressed. On 6 June 2006, a parliamentary question was raised by Baroness Platt of Writtle, about the role of the Science Museum (NMSI) with regard to scientific, industrial and technological artefacts and the development of best practice. She asked (Q541): ‘To what extent does the Science Museum provide a focus for the development of best practice in the conservation of scientific, industrial and technological artefacts around the United Kingdom? You have shown a picture of not much keenness on this and we are rather worried.’ The NMSI indicated their involvement in the Museums Association’s subject specialist network in Science and Technology, that they ran in-house training for their conservation staff and others in the care of large industrial objects and that they were planning to deliver seminars on conservation practice. The fact remains however that despite this there were and still are very few institutions today offering large working object conservation training or courses, they include Ironbridge (Birmingham University), Brighton and Hove College and West Dean College, Sussex. This presents a difficulty. Many people have expertise in the building, maintenance and repair of large working objects during their lifetime as everyday objects, few of them will have the knowledge that museum objects require a different set of ethical and practical principles to be applied to them if they are to achieve sustainability in museum and heritage collections. This is a training need and the primary knowledge deficit is in the realm of conservation ethics and practice.

THE ETHICS OF LARGE WORKING OBJECT CONSERVATION

The latter part of the 20th century saw significant development of ethical codes allied to the growth of improvements in conservation techniques and materials (Edson 1997). The first code of ethics was developed in 1963. This was the AIC ‘Standards of Practice and Professional Relationships for Conservators’ which was published in *Studies in Conservation* in 1964. Good conservation relies upon critical thinking and analysis and the application of conservation principles and ethics. This forms the bedrock of decision making with regard to intervention in the life of an object. Article 15 in the E.C.C.O. Professional Guidelines (II): Code of Ethics Promoted by the European Confederation of Conservator-Restorers’ Organisations and adopted by its General Assembly, Brussels 7 March 2003 states; *The Conservator-Restorer shall not remove material from cultural heritage unless this is indispensable for its preservation or it substantially interferes with the historic and aesthetic value of the cultural heritage. Materials which are removed should be conserved, if possible, and the procedure fully documented.* With reference to large working objects the question is what may be determined to be ‘original’ and necessary to

the understanding of the object and what is deemed to be an addition. Almost certainly during its working life time the object will have had many replacement parts, have been re-painted, perhaps customised and thus what is collected is an artefact that represents the culmination of that working lifetime. The presumption is that a museum or heritage site will have collected that object purposefully because it fulfils a need within the museum or heritage organisation's remit and collecting policy. This may be by association to place, personality, or perhaps a specific event. It has been collected to tell a story. Perhaps it is an excellent example in 'original 'condition with a full provenance, or one of the last surviving examples capable of being driven or flown? Maybe is it a 'time capsule', an extremely rare survival whose functioning ceased at a known point in time? Thus begins the dilemma for custodians of large working objects. What should be preserved? Is it more important to maintain the object in its 'original' condition as collected or to alter it to 'get it running'. This is where the critical thinking process must be activated and essential questions posed. What is to be gained and what will be lost forever? How will the decisions taken affect the interpretation potential of the object? How will the choices made affect the sustainability of the object as a viable component of a heritage collection to be enjoyed by current and, most importantly, future audiences? What about authenticity? When does an object cease to become an authentic item and is it ethical to present an object to the public as an historic object when really it is a re-painted, re-engineered, reconstruction? Could operating it actually risk the total destruction of the object?

From a sustainable viewpoint, if objects are to retain heritage value then they need to be capable of interpretation and reinterpretation. This relies upon the survival and quality of data inherent in their fabric and upon their cultural biography. If the object has been stripped of original features in a mission to reactivate it, then its sustainability as a heritage object has been compromised and minimised. It may also be argued that such actions may also be indefensible ethically in that the object will have been irrevocably altered through the removal of original materials. It is curious that such actions would not be tolerated with regard to other types of collections for example furniture, fine art or archaeology. So the question remains, why are large working objects treated differently?

THE KURTNA MATASJARV TANK

A recent 'time capsule' discovery illuminates this situation. On September 14 2000, a Soviet T-34 World War II tank was recovered from Lake Kurtna Matasjarv near Johvi, Estonia. This tank was originally used by Russian forces during the ferocious battles on the Narva front in north eastern Estonia in the summer of 1944. It was captured by German forces, and hastily re-marked with German army insignia to be used against the Russians as a piece of very effective captured equipment. As the battle lines changed again German forces withdrew from the area in September 1944 and deliberately abandoned the tank by driving it into a lake to prevent the Russian forces from regaining it. When it was re-discovered many wanted to see that tank cleaned, stripped, re-painted and made operational again thus elevating the desire to make the machine start and run above that of keeping it as an historical time capsule. And yet how many opportunities will there be to rediscover and keep intact such unique objects that say so much about how armies really operated in the field and how battles were waged? The chances of finding them are few and a poor decision can remove their historical value for ever.

Objects have a cultural heritage value that can be defined as personalia. How large working objects have been handled or modified by their users can be a great source of information about personal and social history. This might be in the form of, for example, graffiti or manufacturing methods. Most have fascinating and valuable witness marks relating to their use that if 'read' properly can reveal so much more about the individuality of that object enabling the creation of its unique cultural biography. It is precisely this seemingly rather ephemeral evidence that is in danger of being ignored and destroyed in the haste and desire to see the object repainted and returned to operational condition, often under the dubious heading of 'restoration'.



Figure 1. The photo shows the Kurtna Matasjarv tank being recovered. This was filmed and has been posted on YouTube where it has received nearly a million views.

The visitors to the Estonian tank will be able to hear the noise of the engine, to see it manoeuvre, perhaps have a ride but could the tank have been tackled in a different manner? What about the time-traveller effect, the buzz that the viewer feels when privileged to look at a discovery that has preserved in an exact moment in time, could this be equally worthy of preservation and interpretation? Is it achievable?

CORSAIR – THE TIME CAPSULE AIRCRAFT

A project that has challenged the way conservators think about the restoration of aircraft has recently been completed at the Fleet Air Arm Museum (FAAM) in Yeovilton, Somerset, England. This is the conservation of a World War II fighter plane that represents a pioneering ‘whole-aircraft’ approach to paintwork conservation (Morris 2006). It is a groundbreaking conservation project that is believed to be the first of its kind in the aviation world. The Corsair serial number KD431 is a single seat World War II fighter plane designed by the Chance- Vought Aircraft Company USA, but built under licence by the Goodyear Aircraft Company in Akron Ohio. The aircraft was added to the FAAM collection in the early 1960’s and was almost immediately repainted to make it look ‘more presentable’ to the public. As a result little or no in-depth research was carried out regarding its combat or service history, or what exactly had happened to it in the immediate post war years.



Figure 2. Corsair KD431 prior to conservation with brightly coloured paint finish applied in 1963.

Once in the hangar, the challenge was whether an aircraft that had been re-painted many years ago could be returned to its original paintwork and indeed whether the original paint had survived beneath the later layers. There was also the economic consideration as to whether this could be achieved within the financial limitations imposed by the museums and collections budget. The counter argument is that here is one of the few remaining opportunities to understand and examine a WWII fighter aircraft in accurate detail – therefore can you afford not to do it?

Initial paint scrapings revealed that there was good potential to recover the original paintwork and in 2000 it was decided to use the Corsair to pioneer the ‘whole aircraft’ method of paintwork conservation. This involved a stratigraphic analysis and removal of successive paint layers, using techniques familiar to archaeologists and forensic scientists. Inch by inch, layer by layer, the entire aircraft has been painstakingly examined, researched and carefully stripped of the paint finish applied in 1963. The result is remarkable. A Corsair in as near to totally authentic and original condition from 1944 as it is possible to achieve. Paintwork, markings, stencilling, even the scratches and wear marks from the period are all original. Of the forty or so remaining Corsairs around the world, some in flying condition, some on display in Museums there are no known examples in their truly original condition other than the FAAM’s Corsair KD 431. An additional public benefit is that the project has given museum volunteers the opportunity to engage with an authentic artefact and to contribute to its sustainability. KD431 has become an incredibly potent object. It is displayed in one of the FAAM’s large exhibition halls and is adjacent to other World War II aircraft which have been refinished in the past with new paint finishes. The contrast lends immense power to the Corsair as an exhibit. It hums with history. Here are the scuffs of the aviator’s boots, the maintenance engineers’ scratches and rough paint markings, the unique survival of gas reactive paint on the wing that was unknown until revealed by careful removal

of the 1963 paint layer.

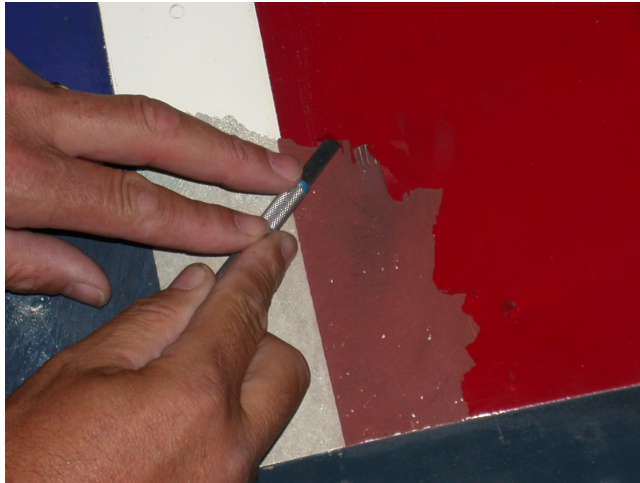


Figure 3. Paint removal in progress on the fin of Corsair KD 431 exposing the 1940's dull paint finish.

Following the success of the Corsair restoration project the FAAM's engineering team are aiming to restore and conserve Grumman Martlet AL246 using the same methodology, again tackling the removal of the inaccurate paint finish applied during the 1960's to reveal and leave intact, the original World War II paintwork. Partly because the Martlet provides another opportunity to examine in great detail another aspect of WWII aviation, and partly to demonstrate that the Corsair project can be repeated if critical thinking and good practices are applied.



Figure 4. Grumman Martlet AL246 in restoration hangar with conservation work in progress.

There are intriguing discoveries already. For example, the discovery that the original paint colour scheme is not one normally used by the Fleet Air Arm. What has been revealed is that the upper surfaces were

painted two-tone green and the lower surface of the aircraft duck egg blue. Research is now underway to establish exactly where this scheme originated from. Other details and witness marks being discovered include accident damage and parts identified as being from another Martlet aircraft. The museum's approach also includes contacting those who have worked on AL246 or other Grumman Martlets during WWII and is proving invaluable to the project adding much to the history and interpretation of the object by connecting it with people and their memories. What is key to this highly detailed approach is that the unique early history of the object is being captured, understood and preserved. Many other objects could enjoy a similar experience if the same methodology was adopted and altering them was resisted.

The FAAM also holds the world's oldest surviving purpose built aircraft carrier, a 1918 Thorneycroft Seaplane Lighter. This is Lighter H21, formerly recorded as T3, which is on the National Register of Historic Ships. Fifty-eight feet in length it was initially designed to be towed behind fast Royal Navy destroyers during WW I thus allowing an aircraft to be moved at speed to a new location. A later conversion enabled it to be used to launch an aircraft at sea from the Lighter platform. The same 'whole object' technique is being applied to reveal the cultural biography of this large working object.



Figure 5. Lighter T3 conservation in progress

USING OBJECTS

David Morris, Curator of Aircraft and Chief Engineer at the FAAM, who leads the Corsair, Martlet and Lighter conservation teams reflects upon his own thinking and approach to large working objects;

'My career with the Fleet Air Arm Museum has spanned some 28 years. I have witnessed many changes,

innovations and mistakes (some made by me) in my time from Junior Engineering Assistant to Curator of Aircraft. The thinking behind how key objects have been displayed and worked on has altered many times. We have now reached a stage in 2010 where I believe that objects are afforded much deeper and more critical thinking regarding their individual significance or state of originality. This is not to say the objects were previously mistreated but past trends and responses to a variety of needs often exhibition led, have seen some objects altered physically or cosmetically where, with hindsight, it would have been better not to have done so. Hindsight is wonderful for identifying errors but learning from it is the most important thing.'

His comments highlight a critical issue: the issue of sustainability of objects in museum and heritage collections. When is it best, for example, to do nothing? What about the needs of not just present but future audiences? Exhibition and display places immediate and definable demands upon museum objects sometimes perhaps at the expense of sustainability. Display within the context of large working objects can also mean operating or using them. Is this sustainable?

DRAWING A CLEAR LINE

In 1984 the FAAM entered into a new phase of object use and interpretation and chose to fly some of the aircraft from the collection. The plan was to purchase two small replica WWI biplanes with the intention of displaying them in the WWI exhibition hall for the majority of the year and then, on fine summer days, flying them locally to advertise the museum and as an additional attraction to draw in more museum visitors. According to Morris,

'This was very much in part of a trend that was sweeping through many large aircraft collections at the time. The net result was an expensive foray into territory that full time professional aircraft operators were finding difficult to cope with – let alone a museum.'

The key issues were the demands of maintenance and the exorbitant cost of fuel, insurance and certification. In addition the project was labour intensive and the objects were placed at high risk of damage or total loss. The project was reviewed and it was concluded that that it provided no real benefit to the FAAM or its collection as a whole. Other Museums had different experiences for example the Shuttleworth Collection in Bedfordshire and the Imperial War Museum at Duxford where public interest has been undeniably high due mostly to the large number of aircraft being flown and the close viewing proximity afforded to the observer. Whilst this has certainly resulted in popular support for their respective flying programmes and generated high visitor numbers it will inevitably have had an impact on the historical integrity of many of the objects, from significant alteration to, in some cases, total destruction. As far as the FAAM was concerned this approach was not sustainable. A line needed to be drawn: one to isolate the aircraft in the collection from any kind of operation or mechanical use. A new policy was agreed that no aircraft from the collection would be started, operated or flown. Instead all efforts and resources would be concentrated on keeping or returning aircraft into as original and complete condition as possible. This was deemed to be of most benefit to the FAAM and prompted a revised assessment of the entire collection and how it would be preserved and maintained into the future. The aim was to provide the very best accurate reference source for all interest levels from casual visitors to in-depth researchers and to move away from the trend of altering and operating to provide a temporary attraction. Morris notes that, *'Many private operators of historic flying aircraft have benefited greatly from this. They can now use the Fleet Air Arm Museum's collection as complete authentic study examples to aid their own operating and flying pursuits'*.

Temporary air shows attract enormous crowds demonstrating that there is obviously great interest in viewing working historic objects. However, how many of the viewing public stop to consider the authenticity of what they are watching? Is it an original object or a replica? Many of these show machines, whether car, steam engine or aircraft, have little, and in some cases no, original

manufacturer's material left as part of their construction or re-construction. How much does this matter to the casual observer and what lessons can museums requiring to demonstrate their objects draw from this?

AUTHENTICITY AND REPLICAS

If demonstrating or operating the object is the desired way to interpret an object and its history effectively could a good replica meet this need? Two key issues are financial viability and the heritage loss that will be incurred by continuing to use an object that is becoming rarer by the day or is perhaps already the last of its kind? The visitor dimension revolves around authenticity and public understanding. Is it possible to effectively communicate the need to run a replica in preference to the authentic object? Will visitors really appreciate seeing the original being worn out or would they understand and accept seeing a facsimile being demonstrated whilst still being able to see the last original example on display and safe? How many of them would find a replica disappointing? How many would actually know the difference? The exploration of these questions is a critical phase for the collections and executive team in deciding the future direction for a large working object. There are many options.

Replicas can be effective and convincing even if not particularly accurate. The Replica Sopwith Triplane N500 built and flown by the Great War Display Team is a good example (www.greatwardisplayteam.co.uk). At a short distance it is a convincing representation of a Triplane and is constructed well enough to perform flights. However, close examination reveals many detail differences from an original Triplane and not one single component used during its construction originates from a Sopwith Triplane. However it provides a very exciting spectacle to most onlookers and no doubt a large percentage of the air show audience viewing it have no idea how far from original condition or specification the aircraft actually is. It does however provide an indication and representation of what a Triplane looks like in flight and for many that is a sufficient and convincing enough experience. At the other end of the scale replicas can be magnificent and complex masterpieces which adhere very closely to original details and specification. An excellent example is the newly constructed railway locomotive 'Tornado' built by the A1 Steam Locomotive Trust in Darlington, England to the original design (www.a1steam.com). This engineering project clearly demonstrates that just about any highly detailed and accurate fully working replica can be achieved, if so desired. The dilemma is less about feasibility than cost of production.

To conclude, the sustainability of large working objects in heritage collections presents wonderful interpretation opportunities and challenges. As Hallam (1984) notes '*we cannot afford to leave the conservation of these objects to fate and well meaning restorers*'. By far the two key challenges to future preservation lie in firstly adopting a critical thinking approach to tackling large working object conservation and use, and secondly in the provision and access to appropriate training. Perhaps it is time to invest in developing a new career path and to create 'conservation engineers' who would be trained to adopt a sustainable approach to large working objects. One that ensures that no more evidence of an object's cultural biography ends up washed down the sink or on the shop floor.

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