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AVIATION – SPACE – ESPACE
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IATM Fellowship programme Skillbridge:
October 16th – 22nd, 2013

FINAL REPORT

Host Institution: National Railway Museum, York, UK
Participant Institution: Canada Science and Technology Museum.

Host: StathisTsolis, Conservation Manager
Participant: Sue Warren, Manager Conservation Division,

November 18th, 2013

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Structure of the Placement:
Using my IATM Skillbridge proposal as a guide, Mr. Tsolis arranged with representatives from a variety of departments within the NRM, to meet with me to discuss procedures and issues common to our institutions; and also our live steam programme. Throughout the week, I was able to meet with the Engineering, Fundraising, Knowledge & Collections, Archives, Learning and Volunteer departments. The following is a summary of learned material.

Introduction:
The rail program at the Canada Science and Technology Museum (CSTM) is at a critical juncture. There is currently only one operating steam locomotive (a 1923 Lima Locomotive Works 50 ton "Shay" class B locomotive), which is due for re-certification at the end of 2013. In addition to lack of financial resources, there is also a serious lack of knowledge and expertise available, not only at the Museum, but in Canada on the whole. In addition, the locomotives and rolling stock in our collection have not been properly assessed or prepared for long term storage. The aim of the Skillbridge fellowship, was to begin to fill these gaps in our knowledge and procedures.

Conservation:
The procedures for Conservation documentation and treatment are similar and transferable between NRM and CSTM. Mr. Tsolis provided examples of very detailed condition reports, which are both technical, and easily understood by non-engineers. This is particularly useful with respect to the coaches, and documentation of the non-mechanical aspects of the collection. Since none of our rolling stock have detailed reports, these examples will give us a good template from which to work. Mr. Tsolis has undertaken a number of these reports, and was able to highlight likely problem areas.

We were able to discuss hazards in the collection in some detail, focusing particularly on asbestos which is very common for us both. Our policies and practices are very similar, and our current Asbestos management plan is actually based on the NMSI policy document which I acquired through M. Leskard at NMSI in 2010. Mr. Tsolis demonstrated his asbestos management kit, which is an excellent idea and one I hope to replicate at CSTM.

Two procedures were discussed, that are regularly undertaken at NRM, and not currently required at CSTM: Health and Safety audit, and electrical appliance inspection. Both of these seem to be very practical and I would like to see them implemented at CSTM.

Throughout the week, we also discussed a variety of treatments and materials, and it was an excellent exchange of experience and skills; one which I think was mutually beneficial.

Engineering Department:
The Engineering team has 6 staff members. My contact with the engineering department was Matthew Ellis, Rail Operations Coordinator; who provided me with step-by-step instructions on winterising locomotives for long term storage. This discussion was specifically in reference to the City of Truro locomotive, currently being taken out of service. In addition to this procedure, Mr. Ellis provided valuable information on long term storage of rolling stock including moving them to rotate the wheels, removing gland packing from piston and valve rods to prevent corrosion, and lubrication of axle boxes and cylinders. He also identified areas that would hold moisture and could cause future corrosion, such as the cab floor. All of these procedures have since been applied to our Shay locomotive in preparation for storage.

Mr. Ellis also discussed operational maintenance: wash-out schedules and the operating log protocol in place at NRM. While this is done at CSTM, it is not as scrupulously documented as at NRM. This lapse in documentation has been as a result of losses of staff at the Museum, and transferral of responsibility to volunteers.

I had the opportunity to confer with another member of the Engineering team (David Leyson) to discuss options for re-certification of our Shay locomotive. The steam railway industry is still alive and well in the UK, but in Canada the skills are much harder to find. I did come away with recommendations for proceeding; and with contacts in the US and UK, who can advise us on moving forward with our project. It was very useful to have expert opinion on the scope of the project; something I have not been able to find locally. A full report of this will be generated as part of the internal planning process to re-certify our locomotive in 2014-15.

I also met with Charlie Bird of the engineering team, who is working with new lighting systems to light their coaches for display. Lighting is very important to the overall appearance and interpretation of the historic interiors; and it has been a challenge to address energy use, originality of appearance, and preservation of historic materials. The solutions are both elegant and practical.

I was also very interested in the way in which parts were repaired or replaced in operating rail. Mr. Ellis described their procedures for repairing vs. replicating; and he gave me a tour of the in-house machine shop where this work is undertaken. It is a truly fantastic shop, and the skills they maintain are an integral part of the history of the rail industry. Parts which are damaged beyond repair and use are labelled and kept as part of the history of the object, and also for reference should that part need to be replicated again.

One interesting aspect to their preservation work is the idea that re-painting IS conservation. Our rolling stock currently sits in a warehouse and the paint is actively peeling off. The idea that the paint layer is a protective conservation coating is a new one for me; and something to which I will give serious consideration. Unless the paint is historically significant, this is certainly a viable preservation strategy.

Mr. Ellis advised me that other systems in the coaches in particular, are not subjected to specific moth-balling procedures: electrical systems are tested and replaced as required if they are to be used; and heating/cooling/water systems are drained and purged.

Mr. Ellis is, himself, an example of succession planning in steam technology in the UK. He is young, and has years ahead of him. As part of the engineering team, he is exposed to a full range of skills, knowledge and experience; and will be instrumental in carrying that forward. In Canada this is much more of a challenge, since we do not have the same number of operating heritage rail groups, nor the interest in it. Heritage funding in Canada is limited, so qualified engineers will usually look to industry rather than heritage as a career path. At CSTM, we currently have no succession plan for rail or steam technology.

Sustainability: Knowledge & Collections.

My contact to discuss sustainability of live steam programs was Helen Ashby, Head of Knowledge & Collections. This was an extremely interesting discussion, and one which has changed my views on operating live steam. The NRM does not feel that live steam is sustainable within the context of a Museum, and is moving away from doing it in-house; to a programme whereby their locomotives are leased to recognized heritage railway groups to operate. In the UK there are over 100 heritage railways nationwide, and the NRM has partnerships with a few of these, subject to evaluation of their sites and operations. Detailed agreements are crafted to set out the parameters of the "loan"; acknowledging that the Museum is the owner or the "irreplaceable national asset", and the Railway Group borrows it and operates it according to NRM standards. Regular inspections by NRM engineering staff are a requirement of this agreement.

Each Locomotive has a separate Conservation management plan, a "living document" which is to say that it can be adapted and changed. This document provides the background to the decision-making process of whether it will be operated or not. The Engineering team and Conservation Department are consulted on treatment needs; and a Committee makes the final decision on the use of the locomotive. The custodian of the locomotive is then responsible for dismantling, inspection and a complete condition report. A treatment proposal and cost estimate must be provided at this point; and if the Committee approves the plan, the work can begin. If the decision is to NOT proceed, the custodians are responsible for reassembly. If the work is to commence, an agreement to operate is written, and the third party agrees to insure it for all risks.

The NRM currently favours this model, choosing to keep a small number of unique objects on site (i.e Rocket), and to add more interpretation. This focus on static

collections could also provide more time and resources to address other "at-need" objects in the collection; and this is certainly true for CSTM. Another contributing factor to this decision at NRM, is the loss of compatibility with mainline railways. Changing regulations and track specifications are reducing the number of historic locomotives than can actually run on the national system. We have experienced this to a much smaller degree at CSTM with respect to removal of branch lines cutting off our access to main lines.

NRM and CSTM operate under the same principle that there is an annual operating budget for the Museum, but no budget to operate large objects. At NRM, the live steam operating budget must come from fundraising or sponsors. To accomplish this, a business plan must be written and approved, and most of the money must have been raised before the project starts. This is an excellent model, and one which I would apply to any future major restoration project, including the re-certification of our Shay locomotive.

Fundraising:
My contact in the fundraising department was Fran Critchley, who described for me their project-based fundraising method and their "unrestricted" fundraising which goes into a common fund. She also described the various levels of support they seek at NRM, from individual to corporate supporters.

We discussed strategies for raising money for our re-certification project on the Shay locomotive, and Ms. Critchley had suggestions about initial requests, follow-through, and the need to pursue matching funding from other sources such as industry. She recommended working with the dedicated rail volunteers, to locate industry and corporate sponsors; which I am certainly going to do.

Education Department:
I was interested to meet a representative of this department to discuss how the NRM links its rail collection to the school curriculum. In Canada the railway had an immense impact on opening up the country to the west; but its social importance was much less than in England. Consequently this period of "development" is covered in only one year of the history curriculum in Canadian middle schools. There is currently no educational programming relating to engineering or steam technology at CSTM.

Nicola Russell met with me to discuss educational programming, and described the curriculum based programmes for a variety of age groups. Most of the educational content relates to history; however at higher age levels, there is a Science, Technology, Engineering and Math component which could be transferable to CSTM.

She also had some interesting insights on young visitors, and how they are included in the educational experience. NRM has specific activities for children under 6 years, and

has made a concerted effort to understand how young children interact with their displays, and how they can tailor the experience to better include them.

Interpretation:
I met with Amy Banks of the Interpretation Department, inside one of the historic rail carriages that is at the centre of a discussion about access. As at CSTM, visitors at NRM are asking for access to the interiors of historic carriages. This poses a huge risk of damage from wear-and-tear, and from pest infiltration; and is a threat to the long term preservation of the national collection. Mr. Tsolis was also present at the meeting, and we exchanged experiences with this at both our institutions. It is a common pressure not only for visitors; but for special events and VIPs. It is definitely an issue that needs careful consideration; and creative solutions.

The Interpretation Department would like visitors to be able to immerse themselves in the atmosphere of the carriages; which would involve sitting in the seats, looking at menus, and interacting with other furnishings. Mr. Tsolis pointed out that while many of the interior surfaces had been replaced with new ones; it was impossible to differentiate this to visitors; and therefore the risk to original surfaces is very high.

Suggestions for going forward include opening the carriages as a temporary exhibit (i.e. for a definite period of time to facilitate management of cleaning and wear), or having supervised tours, or by special request. It was agreed that opening them at all times, with no supervision, was not an option. I will be interested to see how this issue is resolved at NRM. At CSTM we do permit limited, supervised access to some of our carriages; but we do not have nearly the same visitor numbers as NRM, nor the same number of historic carriages.

The other representative I met with from the interpretation department was Ellen Tait, who had been instrumental in developing the Art Gallery space in the NRM. She took me on a tour of the Station Hall to look at how they have enriched the displays of coaches with auxiliary objects to set almost a theatre-like "scene" for visitors. I found this to be very effective; both for dramatic visual effect, and to humanize the experience. A combination of artefact and prop displays on the "platform" areas gives context to the larger pieces. Mr. Tsolis remarked that the artifacts consisted of things like the baggage cart that the prop luggage was stacked on; and so was not at high risk of visitor damage.

Additional materials that have proved to be very effective include material handling equipment such as baggage carts, period luggage (some open with period personal belonging secured behind a perspex screen), personal stories in letter form, vinyl information and graphics on carriage windows, and projected images on frosted glass surfaces. There is very little high tech interpretation and this fits very well with the ambiance in the Station Hall.

Archives:
I met with Tim Proctor, Curator of the Archives and Library. He gave me a tour of the "Search Engine" public reading room which sees approx. 130,000 visitors and 1,200 researchers annually. In addition, we looked at the reserve storage areas which are extremely impressive in scale and in the technological sophistication of the climate control. Much of the funding for this facility came from the National Lottery Foundation, thanks to Mr. Proctor's efforts, I believe.

Mr. Proctor has over 300 volunteers assisting him, and even so says there is a 15 year backlog of cataloguing the material. All conservation work is contracted out to external conservators, as there is no in-house paper treatment expertise.

The Archives works with two databases: Mimsy and Ad Lib. Mimsy is the main artefact database; but the Ad Lib is more specifically designed for archival material and has greater flexibility for entering and retrieving data. This is consistent with CSTM, where our library system is separate from the artefact database; and cross-over is limited and not easily searchable.

I was shown a variety of materials in storage; including posters, photographs, monographs, original drawings and documents, technical drawings and original artwork/paintings. Although Mr. Proctor admits there is much to do still, the NRM archives are very impressive in scope, and in organisation and preservation standards.

Ed Bartholomew, Curator of photographs, spoke with me about cellulose nitrate, and was very knowledgeable about the risk management program at NRM. He provided me with a document 'Standard Operating Procedures" for Cellulose Nitrate, and described their process for recording and storing their negatives. NRM also has an in-house service to reproduce images in their collection for researchers, publications, and a variety of uses. This does currently exist at CSTM, though is not well known as a resource and is not currently cost-effective.

Volunteers:
My final interview was with Matt Hick, Volunteer Officer. Mr. Hick provided me with the volunteer handbook and various documents related to recruiting, assigning and managing their corps of volunteers. The recruitment process is of particular interest, since we are actively seeking certain expertise in our preservation projects. I was also interested in the NRM experience with an ageing volunteer group, and we were able to exchange experiences and ideas about this. Our volunteers differ significantly from those of NRM in that ours are members of external societies who bring with them their "management" structure as well as their membership. The NRM has what they call a "bottom-up" recruiting method whereby they identify a project and then screen volunteers to find the best candidate. Their method allows for application of a disciplinary policy to address unsatisfactory behaviour.

All volunteers at NRM are provided with health & safety training from a central department budget. There is also an internal training program and a requirement for medical tests.

New rail technology: plastics, electronics.

The NRM has a bullet train on display which is a perfect example of new rail technology and new materials. This train coach is accessible to the public, which perhaps indicates the lack of importance the NRM places on the replaceable furnishings inside the vehicle. Mr. Tsolis said that plastics and modern materials are not currently a priority, largely because they do not have a lot in the collection and also because what they do have is considered replaceable.

Conclusions

The Skillbridge fellowship provided me with the opportunity to fully explore the daily operations of the NRM, for a full working week. I was able to learn about procedures and policies; as well as get a very personal and detailed accounting of daily routines. I very much appreciated the time that NRM staff gave to me; and am grateful that they were all so willing to share their knowledge and ideas. All were equally interested in finding out more about CSTM and our procedures. I have many more detailed notes which are not included in the above report; but which I would be happy to share with colleagues here and abroad. My first step in sharing is to present my experience at an all-staff meeting at CSTM in December. I have made excellent contacts, and hope to nurture those in the coming years.

Sue Warren
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Canada Science & Technology Museum

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