PLASTICS IN THE NATIONAL TRUST
A CASE STUDY AT MR STRAWS HOUSE

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Preservation Of Plastic ARTefacts in museum collections
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Introduction

The National Trust (NT) is a charity that cares for over 300 historic buildings and their contents open to the public across England, Wales and Northern Ireland. There have been few previous studies on preservation of plastics within NT collections, which form a significant part of the more modern collections of objects.

Aims

• Design an assessment system for condition reporting plastics consistent with NT condition reporting processes and future capture with the forthcoming electronic Collections Management System.
• Survey plastics within a NT property to test the assessment system, and to get an overview of the state of preservation of the collection.
• Provide recommendations for storage and care of plastics within NT.

To this end, the authors surveyed plastics at Mr Straws House, Worksop, UK, a small Edwardian family home containing almost 200 household plastics from the 1920s and 30s to 1990, ranging from spice jars to jewellery, as well as fixtures and fittings such as light switches.

Stability Code			
i	ii	iii	iv
Condition not expected to deteriorate within the next 10+ years	Condition not expected to deteriorate within next 5-10 years	Change in condition likely to be evident between 1-5 years	Change in condition likely to be evident within 1 year
Plastic specific guidelines: Modern stable plastic or bakelite in good condition, generally correctly stored with appropriate enviromental conditions.	May be stable but with small chips/ cracks, may be stored in appropriate environment but may have less than ideal packing conditions.	Cellulose Nitrate (and acetate) plastics showing no current sign of deterioration. Other types showing minor deterioration e.g embrittlement, hardening, cracking, or previous damage. Any plastics stored in inappropriate environment (>65% RH, >20C temperature).	Any plastics showing signs of deterioration, e.g stickiness, unpleasant or vinegar smell. Active mould growth. Cellulose Nitrate or Acetate showing signs of internal crazing or similar changes. Mixed material object with active deterioration of other parts e.g. metals.

Condition code			
A	B	C	D
Excellent	Minor amount of damage and/or loss of original and added material, or with light discolouration or accretions	Noticeable damage and loss and appears disfigured with visible accretions	Considerable and/or significant loss of original or added material or major damage/breakage or disfigurement. May be endangering other objects and surfaces.
Plastic specific guidelines: Good, sound condition with virtually no damage.	May have surface dirt or dust, minor chips/cracks/scratches or slight fading.	May include extensive scratches, large but stable cracks and chips, extensive dust/dirt, large areas of fading or yellowing, minor embrittlement, evidence of previous mould growth but no longer active.	May include active deterioration of CN and CA, PVC objects, smell, stickiness, hardening to the point where it is vulnerable to handling, active mould growth. Could have large losses or damage.

Treatment Priority Code			
1	2	3	4
Conservation treatment not required beyond routine maintenance	Conservation treatment desireable but not necessary to ensure the long term stability of the object. For instance, Conservation treatment may be required for curatorial reasons	Conservation treatment necessary to avoid further deterioration, loss or undesirable strain on an object &/or loss of significance (evidential or artistic value)	Conservation treatment required to prevent significant deterioration in condition of object &/or loss of significance (evidential or artistic value). This may include structural vulnerability, risk of total loss of entire object or part of object, or risk of accidents to visitors/users

Figure 1. Table showing generic object assessment guidelines used by NT, with plastic specific guidance for condition and stability evaluation.
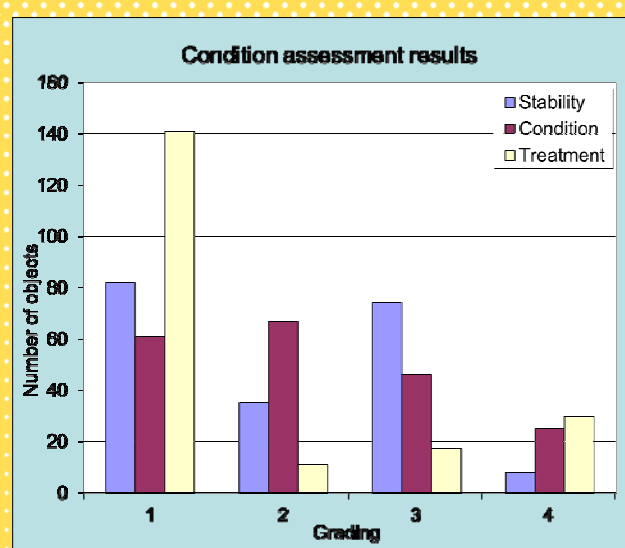

Figure 2. Graph to show the number of objects in each of the condition, stability and treatment categories.

Figure 3. Top, plimsoll showing area of sole adhered to acid free tissue. Bottom, deteriorating cellulose nitrate brush.

Condition scoring

NT uses a standardised condition scoring system, grading items into four categories based on their condition, stability and treatment priority, with 1 being the best or most stable, and 4 relating to objects in the poorest condition or the most unstable (deterioration expected within a year). These ratings have been used for all condition surveys within the Trust for some time, but there was no specific wording relating to scoring for plastics.

The authors created a set of definitions for condition, stability and treatment priority specific to plastic (fig. 1) which can be used for future surveys across NT, to ensure that condition assessment of different plastics is consistent.

Surveying plastics at Mr Straws House

The survey was carried out over two days and 181 plastic items were examined. There was a wide variety of plastics including natural, semi-synthetic and synthetics found during the survey, however only visual inspection was performed so not all were conclusively identified.

All items were photographed and a condition survey carried out using the agreed definitions. Buttons on clothing and synthetic fabrics were not surveyed, although PVC clothing items were included in the scope. Some collections of identical objects, such as bags of rubber rings, were surveyed as one item for speed and ease of recording.

Findings of the survey

The condition of the items surveyed was mainly good or fair, with 64% of objects falling into category 1 or 2. 71% of the items were not in need of treatment, or only a light clean, and so were graded as 1 for treatment priority (fig. 2). Only 6 (3%) were category 4Div, the lowest score possible. If this is representative of collections of plastics across NT overall, this distribution is generally encouraging.

38 objects were composed of cellulose nitrate or acetate, only one was actively deteriorating (fig. 3); the others appeared stable. The deteriorating cellulose nitrate brush was fully recorded and packed in charcoal cloth to reduce the rate of deterioration. Other actively deteriorating items were those made from natural rubber, e.g. plimsolls with sticky soles (fig.3), and PVC, such as a PVC coat, also sticky and yellowing.

The main recommendations from the survey were:
• Storage of 'sticky' plastics in silicon release paper.
• Storage of cellulose nitrate/acetate items with A-D strips to monitor for degradation.
• Separate out plastics from other items in store, to prevent degradation through off gassing.
• Stable plastics should be stored in conservation grade materials and monitored regularly for changes.

Summary

We have successfully defined a condition scoring system that works *in situ* for assessing plastics and plastic-containing objects. This can be used for future plastic surveys at other NT properties.
The majority of plastics surveyed were in good condition. The plastics that are deteriorating are those that are known to be vulnerable, namely cellulose nitrate/acetate, PVC and rubber. Verifying this knowledge of the most vulnerable plastics enables us to recommend to properties across NT that these should be seen as a priority for correct storage and in-depth recording.