

<b>Institution:</b> University of Edinburgh		
<b>Unit of Assessment:</b> 29 (Classics)		
<b>Title of case study:</b> Using Prehistoric Building Techniques to Inspire Sustainable Modern Construction and Protect Local Heritage in Scotland		
<b>Period when the underpinning research was undertaken:</b> September 2013 – 2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>  Tanja Romankiewicz	<b>Role(s) (e.g. job title):</b>  Research Fellow in Later Prehistoric and Roman Archaeology	<b>Period(s) employed by submitting HEI:</b>  September 2013 – ongoing
<b>Period when the claimed impact occurred:</b> June 2014 – December 2020		
<b>Is this case study continued from a case study submitted in 2014?</b> No.		
<p><b>1. Summary of the impact</b></p> <p>Romankiewicz's research on prehistoric architectures in northwest Europe has transformed the way that builders, visitors and heritage professionals understand sustainable building practices from the distant past. Eco-building projects in the Netherlands and Scotland have used Romankiewicz's findings on sustainability in prehistoric architecture as the basis for moving towards zero-carbon construction methods. In the Heritage sector, her research has formed the basis for new interpretation displays and reconstructions from Shetland to Galloway, helping to drive an increase in visitor numbers. Policy guidance produced by Romankiewicz in collaboration with Aberdeenshire and Highland Councils has made possible the curation of more effective regional and national heritage records for the future.</p>		
<p><b>2. Underpinning research</b></p> <p>Romankiewicz brings to her research an unusual blend of expertise in architecture and archaeology, thanks to undergraduate and postgraduate degrees in architecture and a combined architecture/archaeology PhD.</p> <p>Her research resulted in the first full-scale architectural study of 2,500-year old stone buildings in Scotland, known as brochs. Expanding on her PhD, she developed a new social model for understanding broch-building communities, based on detailed analyses of broch design, construction processes, and material resourcing [3.1, 3.2]. She placed these results within their international context, by analysing in detail more than 30 sites featuring timber and turf architecture across Britain, Ireland, Scandinavia, Northern Germany and the Netherlands – ranging from the Bronze Age to the Roman period [3.3,3.4,3.5]. Where brochs were previously understood in terms of the unsustainable consumption of material and labour, Romankiewicz showed how their tall, mortar-free stone walls were in fact well-adjusted to environmental conditions, making use of locally available materials and supporting economically self-sufficient households [3.1]. Her own reconstructions of broch designs have shown how it would have been possible to build them in treeless landscapes without recourse to the unsustainable import of timber, by using alternative construction methods and materials [3.2]. Romankiewicz's research confirms that brochs belong to long-standing traditions of drystone-building. It also demonstrates the extent of the sustainable management of resources by communities living in resource-poor or 'marginal' landscapes.</p> <p>Romankiewicz's research has transformed our understanding of brochs in social terms, too. Where traditional accounts emphasise their defensive character, linked to elite competition for resources, Romankiewicz has shown that in fact they were most likely homes for mutually co-operating households. On this non-elite reading, local groups joined a Scotland-</p>		

wide broch-building movement as a way of signifying their social and economic success, and managed to do so without exhausting local resources [3.1].

Romankiewicz has worked to situate brochs within wider British and Irish timber roundhouse traditions [3.3, 3.4]. She has shown that between 1800 BC and AD 200 similar architectural concepts were shared across large swathes of territory in northwest Europe. Made from either durable or perishable materials, these houses were malleable shells, capable of adapting in response to the changing needs of households [3.3, 3.5, 3.6]. Even when no longer used for human habitation, they continued to develop [3.3, 3.4]. First used for dwelling, some were later used for stalling animals, and then – once enriched with manure – they were transformed into nutrient-filled walled gardens. These structures thus sustained their communities in a variety of different ways, beyond traditional and rather fixed understandings of the ‘built environment’ [3.5]. Romankiewicz’s research showed in particular that low-carbon materials such as turf were well-suited for such shape-shifting architecture, and were more widely used than previously recognised [3.6].

Finally, Romankiewicz has pioneered new ways of improving the identification of these structures, difficult as they are to detect archaeologically because of their use of local soils which makes them difficult to distinguish from ordinary soil and topsoil [3.4, 3.6]. The use of low-carbon materials, together with the reuse of buildings for new purposes, render this ancient building practice very sustainable.

### 3. References to the research

3.1. T. Romankiewicz (2015). Land, stone, trees, identity, ambition: the building blocks of brochs, *The Archaeological Journal* 173, 1-29. DOI: [10.1080/00665983.2016.1110771](https://doi.org/10.1080/00665983.2016.1110771)

3.2. T. Romankiewicz (2018). Kühn im Konzept, phantasievoll mit Ressourcen – architekturarchäologische Analyse am Beispiel eisenzeitlicher Rundbauten in Schottland. In S. Wefers, I. Balzer et al. (ed.), *KunstHandWerk. Beiträge zur Vor- und Frühgeschichte Mitteleuropas*, 151-166. Langenweißbach: Beier & Beran. [ISBN 9783957410795] (Can be supplied by HEI on request)

3.3. T. Romankiewicz (2018). Pour une nouvelle conception de l'architecture domestique protohistorique métamorphosable dans le nord de la Grande Bretagne. In A. Villard-Le Tiec, Y. Menez (eds). *Les actes de 40e colloque international de l'AFEAF: Architectures de l'âge du Fer en Europe occidentale et centrale*. Presses Universitaires de Rennes, Collection Archéologie et Culture, 619-623. [ISBN 9782753574427] (Can be supplied by HEI on request)

3.4. T. Romankiewicz, R. Bradley and A. Clarke, (2020). Old Kinord, Aberdeenshire: Survey and excavation at an Iron Age settlement on Deeside. *Proceedings of the Society of Antiquaries of Scotland* 149, 221-247. <https://doi.org/10.9750/PSAS.149.1293>

3.5. T. Romankiewicz (2017). Turf. In R. Harkness (ed.). *Knowing From The Inside – An Unfinished Compendium of Materials*. University of Aberdeen, 196-201. [ISBN (print) 978-1-85752-060-6] <https://knowingfromtheinside.org/files/unfinished.pdf>

3.6. T. Romankiewicz (2019). Turf worlds: Towards understanding an understudied building material in rural Iron Age architecture – some thoughts in a Scottish context. In D. Cowley, M. Fernández-Götz, T. Romankiewicz, H. Wendling (eds). *Rural Settlement*. Sidestone Press, 135-142 (4,500 words). <https://www.sidestone.com/permlink/9789088908187>

### 4. Details of the impact

#### Building links between ancient and modern sustainable construction

Since 2014, Romankiewicz has applied her research into prehistoric building practices to the pioneering of new construction methods, exploring how efficiency in new buildings (including

carbon footprints) might be improved by learning from the past. Her cyclical model, in which prehistoric buildings changed from dwellings to byres and then into nutrient-rich walled gardens, inspired a resident of Almere eco-village, in the Netherlands to design a bio-dynamic family home (Fig 1). In 2017 Romankiewicz and the householder tested a method of prehistoric wall construction, in a 'hand-storming workshop' held with other locals alongside a landscape artist, Dutch eco-builders and Syrian refugees experienced in building with earth. The householder has since grown willows on the plot for future use in wattle wall frames, and has constructed additional test walls utilising plant-based materials readily available on site as wall-fillers. He now plans to construct a first full-scale structural test. [5.1].

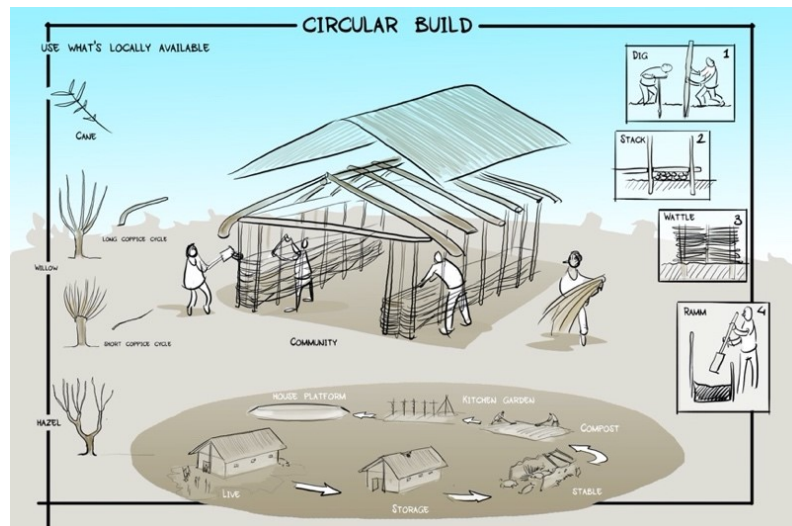


Fig. 1: Sketch of 'circular build' family home in Almere (2019).

This collaboration was facilitated by the archaeologist and eco-builder Daniel Postma, who is now based in Scotland where he runs the eco-building company, 'Archaeo Build'. Romankiewicz's experiments in the translation of archaeological research into useful modern building techniques has, he says, 'been instrumental in developing... archaeology's contribution to sustainable building. [It offers] different perspectives on how we expect our buildings to perform. Accepting the shorter lifespan of certain materials but then using that characteristic to your advantage by including the building in an agricultural cycle, as you [Romankiewicz] have argued for, is a great example of this contribution archaeology can make on a conceptual level' [5.2]. Romankiewicz's research helped Postma to find 'the confidence to promote these notions publicly...and to communicate the concept of this circular use [of] a biodegradable building in more detail to an interested audience' [5.2]. Archaeo Build has since roofed a cottage for Historic Environment Scotland at Canonbie, Dumfries & Galloway, in turf. Two further turf construction projects for eco-farms in Crieff, Perthshire, currently at the planning stage, represent forward-looking contributions to the Scottish government's goal for low carbon farming and building.

### Interpreting ancient architectures

Romankiewicz's research has also informed museum displays. The digital reconstruction of a local broch for the Taigh Chearsabhagh Museum on North Uist, Western Isles, changed perceptions of this monument, which is well-known locally but hard to imagine in its original form. 7000 visitors viewed the video reconstruction during the first year of the exhibition, followed by 4000 views the next year [5.3a and b]. This reconstruction helped viewers to understand an important environmental issue: the difficulty faced by residents of treeless islands in locating sufficient timber for their buildings. This difficulty existed even in the case of a reconstruction like Romankiewicz's, which sought to be as economical as possible in its use of resources [5.3a and b].

Across two Open Days in June 2016 for the Whithorn Trust (Dumfries & Galloway), Romankiewicz built two experimental double-wattle walls with earthen fills, based on excavated evidence nearby. These informed a 1:1 roundhouse reconstruction by a local architect and engineer, now used as the Trust's education centre. Two local craftsmen trained by Romankiewicz during the Open Days won the building contract and have since found further employment: as a trainer in ancient skills on-site (part of the Trust's education programme); and in Scandinavia, as a traditional builder. These two craftsmen together trained a third, enabling him to move from long-term unemployment to full-time employment in the agricultural services sector. The new visitor centre has increased the Trust's visitor figures by 75%, since its opening in spring 2017. It has helped to attract young families in particular, widening reach and participation. The project's success has strengthened the Trust's ambitions to develop similar reconstructions and training opportunities for local people [5.4].

In 2015 Romankiewicz also assisted in the creation of a new interpretation panel at Clickimin Broch (Lerwick, Shetland), managed by Historic Environment Scotland (HES) and now visited by nearly 10,000 people per year, including many local residents: an almost 100% increase since 2015 [5.5a]. HES's Senior Cultural Resource Adviser confirms that '[Romankiewicz's] advice was invaluable in enabling us to create a new and informed artist's impression of how Clickimin Broch may once have looked, particularly in terms of reconstructing the interior of the broch and the form of the roof' [5.5a]. Based on Romankiewicz's research and expertise, this was an innovative reconstruction, using turf as a roofing material and only a few small-diameter timbers to span the broch's interior. This makes for resource-efficient and sustainable construction, described as 'groundbreaking' by the conservation charity Caithness Broch Project, with whom Romankiewicz has been working on plans for a physical broch reconstruction in Caithness [5.5a]. An HES launch event for the Clickimin project was sold out, while more than 5,000 people watched online. Some were surprised to find just how little in the way of timber was, in all likelihood, required for broch roofs and floors. Romankiewicz's reconstruction helped Clickimin Broch to be shortlisted for DigIt's 'Scotland in Six Hidden Gems!' competition in 2017, and contributed to the updating of HES's Statements of Significance for protected broch sites (documents that outline a site's history, development and significance in order to justify protection as a Scheduled Monument) [5.5a and b].

### **Strengthening heritage management**

Romankiewicz's roundhouse research [3.4, 3.6] highlighted the need for refined archaeological detection methods and improved documentation of prehistoric architectural remains. To this end, Romankiewicz and the Aberdeenshire Council Archaeologist co-produced best-practice guidance on how to excavate prehistoric buildings to assist Local Government Archaeology Officers in day-to-day policy decisions on cultural heritage assets [5.6a]. This guidance became part of Aberdeenshire Council's Archaeology Service Strategy (2017-2020), addressing Aims 1, 2 and 5 alongside Objectives 1 (p.7 of the document), 7 (p.8) and 21 (p.10) [5.6b]. The Aberdeenshire Council Archaeologist confirms the value of this work, which has 'rewritten our understanding of roundhouses in the NE, improved how these sites are excavated and recorded, widened our consideration of how landscape and roundhouses are tied together, and brought about a guidance document that put into writing for the first time the standards that we expect everyone to meet' [5.6c].

Local Government Archaeology Officers at Highland Council, too, now routinely recommend this guidance document, effectively turning it into a legally binding document [5.7a and b] in relation to the granting of planning permission on archaeologically sensitive sites. Informed by Romankiewicz's Aberdeenshire Council document, a guidance document on Mesolithic flint scatters has now been produced, part-funded by Aberdeenshire Council and HES [5.6c and d]; and HES are in the process of developing a series of nationwide guidance documents as part of the national Archaeology Strategy, with a view to incorporating and expanding Romankiewicz's roundhouse guidance [5.8].



Archaeological contractors, required by the Council's planning conditions to produce detailed records for local and national heritage archives when mitigating development impact on heritage sites, have found the document 'most useful for planning the work ... and informing the Written Scheme of Investigation (WSI) [which] forms the basis of the archaeological planning conditions.' [5.7a]. Romankiewicz's document is also being used for budgeting and for communicating the importance of archaeological planning conditions to developers and planners [5.7a and b]. One project manager, having relocated from southern England, reports that as 'a new-boy to the archaeology of the Highland region it has proved an invaluable guide concerning the character and archaeology of these very common structures and, most importantly, how to approach their excavation. Your guide ensures that the level and types of information gathered during our fieldwork is not only consistent with that gathered by other archaeologists in the region but also maximised' [5.9].

Romankiewicz has also worked with Archaeology for Communities of the Highlands (ARCH) on the creation of a wider regional archaeological research framework to be used 'as a development tool by Highland Council, referred to by archaeological contractors in their work, a valuable source for students for learning and dissertation topics, and by local community groups when they come to research and contribute to their local heritage.' [5.10a and b]. The co-ordinator of this framework confirms how her 'perspectives have changed as a result of [Romankiewicz's] published works and follow up discussions', and anticipates that this framework 'will prove influential in research into Highland Archaeology in the coming decade, as well as providing a firm basis of knowledge for a wide range of stakeholders.' [5.10a].

## 5. Sources to corroborate the impact

- 5.1. Local resident of Almere eco-village (testimonial emails, 14 August 2019 and 28 October 2020).
- 5.2. Director. *Archaeo Build*. (testimonial email, 27 September 2019).
- 5.3.
  - a) Museum Exhibition organiser, *Taigh Chearsabhagh Museum and Arts Centre* (testimonial letter, 2 November 2020).
  - b) Website of virtual reconstruction (26 May 2016). *Iron Age Broch*. Open Virtual Worlds. <https://vimeo.com/168188567>.
- 5.4. Director. *Whithorn Trust* (testimonial letter, 2 November 2020).
- 5.5.
  - a) Senior Cultural Resources Advisor. *HES* (testimonial letter, 20 November 2020).
  - b) Statement of Significance for Dun Troddan, towards which unpublished material was provided and cited.
- 5.6.
  - a) T. Romankiewicz and B. Mann (January 2017). *Aberdeenshire Council - Excavating Prehistoric Roundhouses. Guidance on good practice and effective outcome for future research*.
  - b) Aberdeenshire Council Service Strategy document 2017-2020.
  - c) Aberdeenshire Council Archaeologist (testimonial letter, 29 March 2019).
  - d) C.R. Wickham-Jones (September 2020). *ALGAO Scotland Guidance for Investigating and Managing Lithic Scatter Sites in Scotland*.
- 5.7.
  - a) Minutes of meeting Highland Council, 5 October 2018.
  - b) Archaeologist. *Highland Council* (testimonial email, 28 January 2021).
- 5.8. Head of Archaeology & World Heritage. *HES* (testimonial email, 27 January 2021).
- 5.9. Projects Manager. *Highland Archaeological Services Ltd* (testimonial email, 30 September 2019).
- 5.10.
  - a) ARCH Learning and Engagement Manager and Co-ordinator. *Highland Regional ScARF* (testimonial letter, 30 December 2020).
  - b) Consultation documents: <http://www.archhighland.org.uk/scarf-consultation.asp>