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The historical turf farms of Iceland: Architecture, building technology and the indoor environment

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Abstract

Mineral-based turf has been used as a building material in Iceland for centuries. The vernacular Icelandic architecture is characterised by turf walls and sod roofs. This paper describes the historical development of the various archetypes of Icelandic turf farmhouses, researches the building techniques and materials applied, and qualifies the impact of the building properties on comfort and health of the former occupants. The study consisted of desk research, and a field study at the farmhouse of Glaumbær. In the wet and cold Icelandic climate, turf was an appropriate material that required its own building technology. The material was commonly available in settled areas of the island. Thick turf walls protected the residents against the harsh outdoor conditions, but had little effect on indoor air quality.

Keywords: Iceland; Farmhouse; Vernacular architecture; Turf; Indoor environment; Building technology

1. Introduction

In Iceland, mineral-based turf has been in use as a building material since the late 9th century, when Norse Vikings from Scandinavia and the British Isles settled on the island and started the history of the nation [1–4]. The Viking colonisation (*landnám*) is thought to have lasted for about 60 years, resulting in the movement of 40,000–60,000 settlers [2]. These first settlers occupied large pieces of land. During the first centuries after the *landnám*, most people in Iceland were independent farmers with similar living standards. The living conditions in Iceland must have been hard for the early settlers given the climatic conditions. The island is on the northern tree line, and in general barren and almost treeless, which to some extent is caused by human activity [1,2,4]. There are almost no natural resources in the ground [1]. Over half of the island is uninhabitable due to glaciers, highland and seismic activity. Only coastal areas and river valleys were considered as settlement locations, since they were covered with grasslands that were suitable for breeding livestock and small forests [1,2]. These forests consisted of birch trees that rarely grow higher than 4–8 m, rowan and species of willow, and provided some wood for fuel, but was unsuitable for construction [1,2].

In 1936, settlements were evenly distributed over the island. Of the 110,000 inhabitants, about half lived in plains and valleys in scattered lonely farms that were only accessible via small horse trails. The other half lived of fishery and trade in the few cities on the east, north and west coasts [1].

The traditional Icelandic farmhouses are characterised by turf walls and sod roofs, which serve as a thermally insulating envelope around a wooden frame. The building geometry and application of materials have been derived from experience, enabling optimal functionality and satisfactory thermal comfort, as well as the lack of convenient building materials on the island. The total farm complex consisted of residential buildings, numerous storage spaces, hay barns, smithies and other work spaces. Farmhouses are often strategically located on a natural or even man-made elevation, from where the owner could overlook his property. Since most farms were very remote,

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farmers had to be self-supporting. Multiple farms, sometimes located a days' ride from each other, were united in a parish [1].

Between 1910 and 1940, the number of turf dwellings declined from over 50 to 10% of the total Icelandic housing stock [5]. In general, people in rural areas opted to construct wooden or concrete houses due to greater prosperity that came with the introduction of modern farming techniques around 1900 [4], and the large amount of maintenance the turf dwellings required in comparison to modern houses [1]. After World War II, occupants of turf farmhouses were forced to leave their dwellings and move to modern houses [6]. Nowadays, traditional Icelandic turf buildings are of great historical and cultural importance to the country. For this reason, some well-preserved buildings are in use as museums and serve as well-visited tourist attractions.

The aim of this study is to investigate the historical development of the various archetypes of Icelandic turf farmhouses, to research the building techniques and materials applied, and to qualify the impact of the building properties on comfort and health of the former occupants.

2. Research methods

The study includes two research levels. First, desk research was carried out on the historical development of the Icelandic turf farmhouse, the accompanying building techniques and the building materials. Second, a case study was performed on one of the remaining turf structures to investigate building technology and various aspects of health and comfort.

Desk research focussed on historical Icelandic architecture, building techniques, the materials used and way of life on the old farms. A valuable source of information was a book on Icelandic turf farmhouses and churches by the German researcher Sacher [1]. Sacher visited the island and studied its architecture including Glaumbær farm in summer 1936, and described the Icelandic building technologies and way of life.

The case study was carried out on Glaumbær farm (Fig. 1), a former parsonage and a representative example of Icelandic turf architecture situated on the Skagafjörður in the north of the country. This compact building, constructed between 1750 and 1879, is one of the largest and oldest turf farms in existence, and is in use as a folk museum. The farm consists of 13 rooms along a central 23 m long corridor (Fig. 2). At the end of this corridor, the *baðstofa* (a room, which served as both a living and bedroom) is situated (Fig. 3). The room measures 52 m^2 and has four small dormer windows (together 1.3 m^2) facing west. The volume (34 m^3) was limited due to the small height. One could just sit straight up in bed, and stand upright in the middle of the room. In this room the occupants of the farm spent most of their time indoors. To the south was a small vegetable garden enclosed by an

Fig. 1. Glaumbær, an example of Icelandic turf architecture.

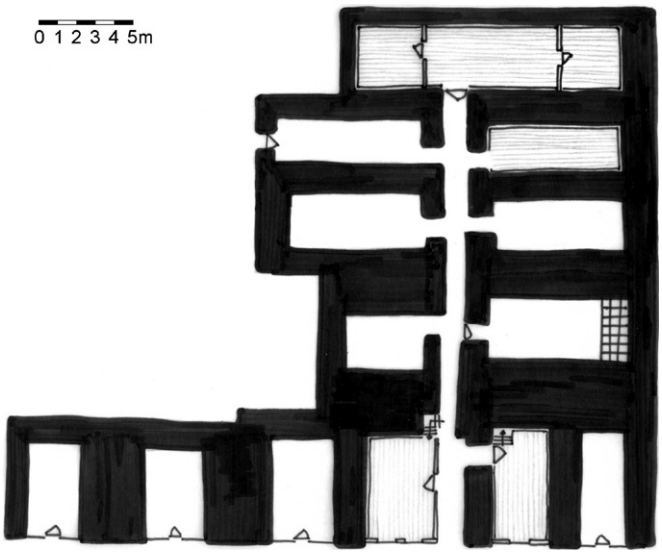

Fig. 2. Plan of Glaumbær farm, current situation.

Fig. 3. Impression of the *baðstofa* of Glaumbær.