

# CASE STUDY

## Cumbria Barn Conversion

Cumbria, England

**HUNTSMAN**  
BUILDING SOLUTIONS

The Home  
of Insulation



Fully breathable, HBS spray foam insulation applied to the internal walls



HBS is a water-blown insulation that expands 100-fold when applied, sealing all cracks holes and service holes. Its open cell structure lets the building breathe naturally.



## Huntsman Building Solutions insulation for windswept, Cumbrian barn conversion

The insulation of a 120-year old Cumbrian barn conversion proved a difficult challenge for this Father and Son farming partnership. Here, ECO Building News takes a look at a new technique in thermal insulation that's gaining popularity in these difficult to treat projects.

On the exposed Furness peninsular in Cumbria, close to the Lake District Fells, there is precious little shelter from the fierce, westerly gales that batter this part of the Irish Sea coastline.

Hardy residents of the area describe it as a "lazy wind" because it's more inclined to take the shortest route to its destination, scything straight through anyone that

stands in its way, rather than going around them!

Buildings suffer this battering in exactly the same way, so in the old days, builders tended to rely on physical mass to hold back the wind. Consequently, stone walls up to two feet thick were the accepted norm for houses and barns built in this neck of the woods.

Even with such substantial construction, keeping occupants warm was a considerable challenge in days before central heating and insulated walls.

No more so than for the current owner of a rambling Victorian farm and barn complex that sits almost on the shoreline at Kirby in Furness, a few miles up the coast from Barrow.

Originally built in 1899, and now owned by Father and Son, William and James Brakewell, the house and barn were in desperate need of refurbishment to bring them up to 21st century living standards.

William and James both live on site with their families and jointly farm the area as well as running an agricultural equipment sales and servicing business.

The main barn structure had stood virtually unused for years and qualified for improvement grants under the Government's Farm Diversification programme, introduced to support micro and small businesses and farm diversification.

In light of this, a scheme was devised to convert the barn into three dwellings - one three bed house for Father William to live in and two further 2 bed houses to be

used as temporary accommodation for workers at the nearby British Aerospace site at Barrow.

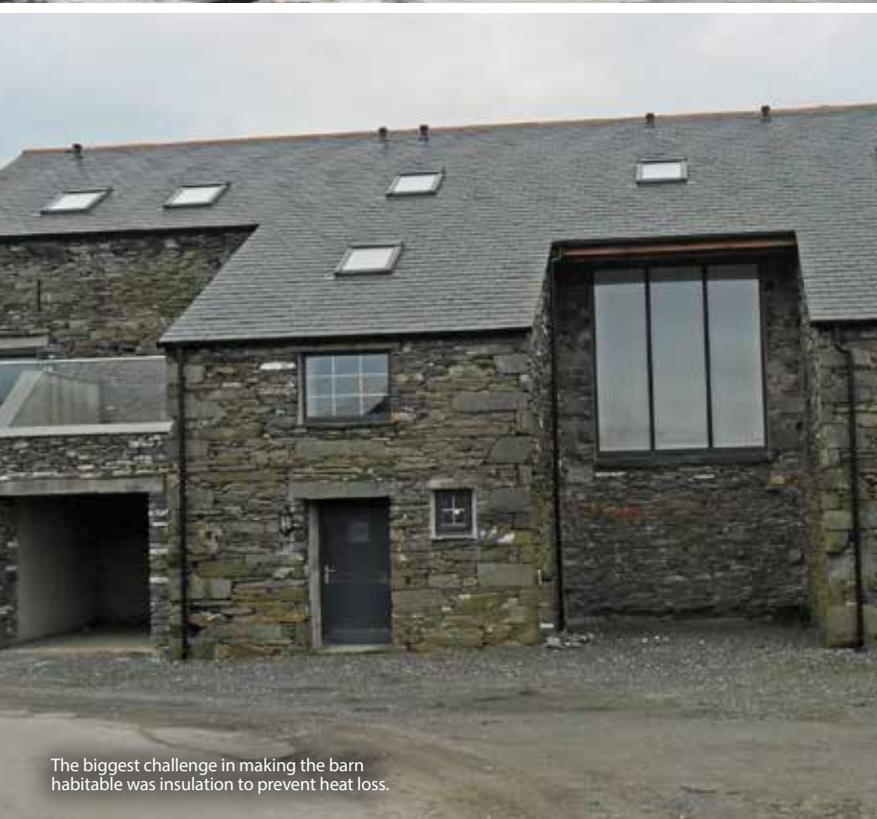
Doing most of the work themselves to keep costs under control they quickly recognized some of the challenges they faced in bringing the building up to habitable standards in this exposed location.

Son James Brakewell takes up the story. "The biggest problem we faced with the barn conversion was insulation. It's a huge building measuring 19.0m 10.0m with an eaves height of 10.0m. There are old cattle byres on the ground floor with a two story overshot barn on top, all built of local Burlington stone".

At the start of the conversion, an internal frame of timber studwork was installed,



Two 2-bed cottages and one 3-bed house were created from the 19.0mx10.0m, three storey barn.



The biggest challenge in making the barn habitable was insulation to prevent heat loss.

set 50mm off the external walls. Conventional rigid board insulation was considered but quickly rejected on the grounds of speed of installation and poor air tightness performance.

James continued “The main issue with insulation is air tightness. Most heat is lost from a building through air leakage and we knew we couldn’t seal the building adequately with rigid board material. The wind would always find a way through” he said. “What’s more, cutting and fitting boards to the studwork and beneath the roof would take weeks of work. We needed a system that would be both quicker to fit and give us better performance”.

James looked at alternatives and contacted local contractor, Greentherm Solutions who specialise in spray applied insulation, using Huntsman Building Solutions (HBS), a system originally developed by a Canadian company.

HBS is a water blown breathable foam that expands 100-fold when applied and seals every little crack, joint and service hole completely.

Greentherm sprayed HBS between the stud wall frame and directly on to the exposed stone walls creating a homogeneous and un-interrupted blanket of insulation, 125mm thick.

The roof structure was treated similarly, spraying directly on to the breathable underfelts. As HBS is “vapour open” there is no need to maintain an air gap above the insulation.

To prevent noise transmission between the dwellings, HBS was also used as cavity fill insulation in the blockwork party walls.

According to the manufacturers, because HBS has a soft, yielding texture and open, cellular composition, it provides outstanding insulation performance yet still allows the building to breathe naturally, preventing the build-up of potentially damaging condensation.

“The whole spraying process took less than a day and a half to complete rather than the three and a half weeks it would have taken to insulate with rigid boards” said James. Costs were broadly similar for both insulation methods but speed of installation and performance were in HBS favour “you simply cannot fit any other kind of insulation faster” he concluded.

Throughout the process, Local Authority Building Control were kept informed and were fully supportive of the process use.