

PITAIRLIE ROUNDHOUSE - SCOTLAND

Disguised as a traditional farm building with cutting-edge engineering

Project: Pitairlie Roundhouse

Company: JML Contracts

Sector: Residential

Technology: SIPs

Overview:

JML were approached to custom build a roundhouse and bothy overlooking the farmlands of Angus, Scotland, next to existing traditional farm steadings. The design of the new dwelling reflected the clients' appreciation of the buildings in the Scottish countryside and the roundhouse featured references to the adjoining steading building.

When the house was first engineered, the main feature of the project – a vaulted conical roundhouse roof – was not achievable. The initial engineered design had been for a large and complex steel structure, consisting of a curved steel ring beam with large steel beams connected and fixed to the floor via posts to take the weight of the proposed slated roof. Apart from ruining the aesthetics, the proposed steel structure was costly and over the client's budget. The client approached JML to establish whether a better approach could be sought using SIPs.

The whole house structure and bothy were re-engineered as a SIPs design. By doing so, the requirements for the steel were removed. The nature of the exposed site and the unpredictable Scottish climate meant the building method had to achieve a weatherproof shell quickly and efficiently. SIPs boasts a substantially reduced build time in comparison to other construction forms making it an ideal choice for the client. Through off-site manufacture, the SIPs kits can be designed and manufactured very quickly before being delivered and erected on site in days by JML's specialist team.

Project Type/Application:

The conical roofed roundhouse was the most obvious feature which made the SIPs design and solution most effective. A picture window opening was included late in the design process and the large patio doors were moved to accommodate the client's request which meant a lack of support over the window. This required a steel lintel and three steel fitch plates between the SIPs cantilevering over them.

This complication was resolved using a finite element analysis process on the whole structure. The use of SIPs facilitates features such as the 1.8m cantilevered canopy over the roof terrace whilst minimising structural thicknesses and providing an unrivalled level of thermal insulation and airtightness.

JML engineered, designed, produced and erected the full structure from its SIPs processing factory in Perthshire. The specialised installation team erected the house and installed triple glazed timber Aluclad windows and doors throughout. Their finishing joiners used local milled Scottish Larch to form the curved fascias and soffits for the roundhouse. The client chose reclaimed Scottish slates for both roofs.

The rest of the house has been finished to the highest standard and offers a great mix of a traditional looking exterior with an exceptionally efficient and airtight house including vaulted ceilings throughout. All of this was made possible by exceptional structural SIP engineering and design work. To be



able to engineer this complex building fully, a fully functioning 3d structural model of the house was created. This model was then used as the lead document on site for the installation team when erecting the faceted roundhouse and complex angles/interfaces between the bothy and curved roof areas.

Outcome/Results/Success Factor:

With such a complex design, accuracy and attention to detail are essential to ensure every joint was airtight and sealed. Having engineered and built many complex SIPs structures in the past five years, this particular project allowed JML to demonstrate just what can be achieved both structurally and aesthetically when building with the SIPs system and using specialist engineering knowledge. Although cleverly disguised as a traditional farm building the cutting-edge engineering is fully appreciated in the cathedralesque roundhouse with amazing panoramic view. It is finished with timber boards in a smooth, uninterrupted curve. It produces a truly unique and architecturally stunning room within a budget that could not otherwise have been possible without using SIPs.

The project was delivered exactly how the client and architect envisaged and demonstrated SIPs engineering at its most complex and creative. This project is a seamless blend of inspirational design and cutting-edge construction techniques, built with commitment and dedication to the client's dreams.

This project has recently won an award for 'Best SIPs Home' at the 2017 Build-It Awards in London and is shortlisted short listed in the 'Custom & Self Build' category at the 2017 Structural Timber Awards next month.