

# MOVING MODULAR HOUSING

Factory production of modular units is a finely tuned process, with handling techniques and transportation of modules from factory to final destination equally in need of careful planning.



cladding during the lifting, transport and construction stages. Ultrasonic, air leakage testing and thermal imaging can be used to benchmark panel or module performance in the factory and at the finished construction phase. Benchmarking the performance facilitates the assessment of any deterioration during the transportation and installation processes and also proves conformance with the requirements of building regulations.

Accelerometers fitted onto panels highlight problems caused by lorry journeys, e.g. hitting potholes or braking hard. The live real-time readings collected remotely from strain gauges fitted onto the modules enable an understanding of the consequences of these common transport hurdles. Deterioration of the modules may not always mean that they are no longer fit for purpose, as they could still be above the standard performance requirements. Results need to be assessed in line with building regulations and British Standards.

Transportability of modular buildings has an impact on costs. Handling techniques and storage can impact carbon footprint and affect safety requirements during installation. The offsite industry claim that a factory-built system creates a consistent and quality product that is not found in traditional-build. The success of a modular building is dependent on the factory-built modules arriving at site and being erected onsite in the same condition as they left the factory.

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**Images:**

01-02. If transportation, storage and installation are not considered at the design stage, this can have an impact on the condition of the building after installation, both structurally and environmentally

large impact on modules as higher forces are generated during the journey.

The method of transporting the modules must be considered at the design stage and may need to incorporate additional components like bracing or thicker gauge materials to assist during the lifting and transportation processes.

If transportation, storage and installation (TSI) are not considered at the design stage, this can have an impact on the condition of the building after installation, both structurally and environmentally. Panels and modules can be damaged during the initial lifting process, panel joints can open up, the framing elements can be permanently deformed or the cladding system can suffer cracks. Modules can be damaged by the transportation process or at the final lifting stages when delivered to site. The point at which the damage is sustained and the effects of any damage can be monitored and assessed, and the results used to redesign the transport routes, lifting plans or the module.

There are various techniques available for measuring the effects of TSI. One such technique is the live measurement of the stresses and strains generated in the frame or

Modular housing can be tested during the development stage for both structural and environmental performance. There are a variety of different testing methods that will prove the module or panels are fit for purpose and will meet the building regulation performance standards when constructed in the factory.

During the design stage, the sizes of the modules are considered in relation to the sizes of lorries available for standard transportation. The buoyant offsite industry in the UK has encouraged manufacturers from overseas to enter the UK market. Importing offsite housing into the UK can involve very long distances and shipping - sea crossings can have a