

modcell[®]

straw technology

ModCell[®] is a sustainable, prefabricated straw bale cladding panel, designed for use in residential, educational, retail and commercial buildings. This innovative system creates buildings with thermal performance up to three times higher than the current UK Building Regulations requirement.

technical guide



about



The entire process from sourcing to installation has been carefully refined to minimise embodied carbon in the ModCell[®] panels.

Panels are either made in our centralised manufacturing facility or at a Flying Factory[™], located within 20 miles radius of the construction site, utilising local skills and labour to assemble the panels.

Construction uses the second largest amount of resources after food production and buildings use 46% of all the UK energy.

Our product takes a material perceived as “deep green” and combines it with modern methods of construction. By combining the best from both worlds, we have developed a sustainable, carbon-neutral cladding and structural system that can help meet the challenges of climate change in the 21st century.

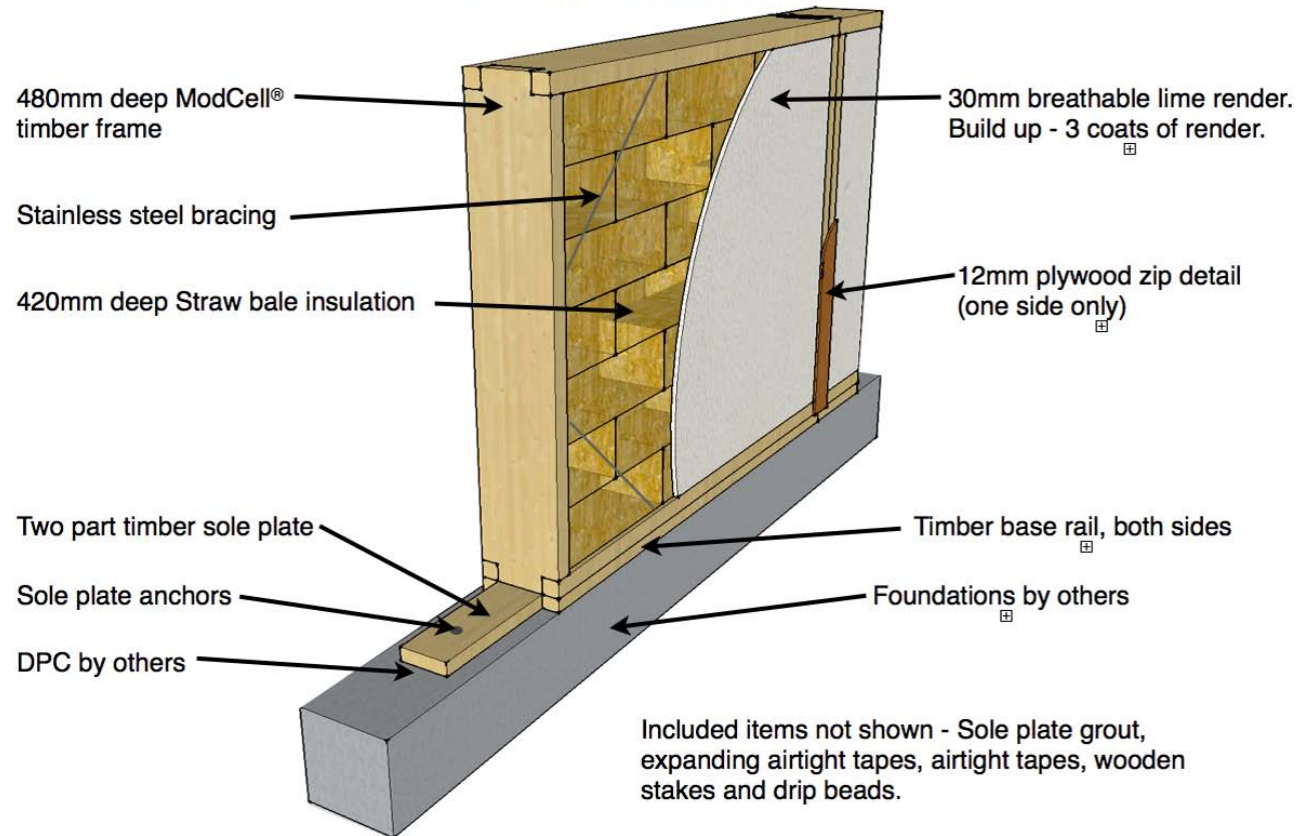
ModCell[®] is a sustainable, prefabricated straw bale cladding and structural panel, designed for use in residential, educational, retail and commercial buildings. The straw and timber work as a carbon bank, effectively reducing carbon content from the atmosphere and locking it up in these carbon sequestering materials. Prefabrication of the panels minimises material waste and results in a high quality product with excellent dimension tolerances.



components

A ModCell[®] panel comprises a FSC/PEFC timber frame, straw bales, a timber sole plate and where required an opening for a door or window. Panels can be structural so there is no need for lintels or base plates. Panels are available in a variety of lengths and heights.

ModCell[®] Traditional Internal & External view



ModCell[®] Traditional panels are located with a 10mm tolerance gap between them and sealed using compressible and other airtight tapes.

ModCell[®] Core and Core + panels are close coupled and use airtight tapes to ensure airtightness. Weathering details vary from project to project and are developed by ModCell[®] in conjunction with the project designer.

panel types



ModCell[®] is available as ModCell[®] Traditional lime rendered, ModCell[®] Core and ModCell[®] Core +. All are available as structural or non structural panels.

Non structural panels are pure cladding panels to steel, concrete or timber frames.

Structural panels can resist both vertical and horizontal loads.

ModCell[®] traditional

ModCell[®] traditional panels are 480mm deep and delivered to site with a two coat render finish applied inside and out. A finish skim coat is applied on site from a scaffold or cherry picker as the final surface finishes.

ModCell[®] Core

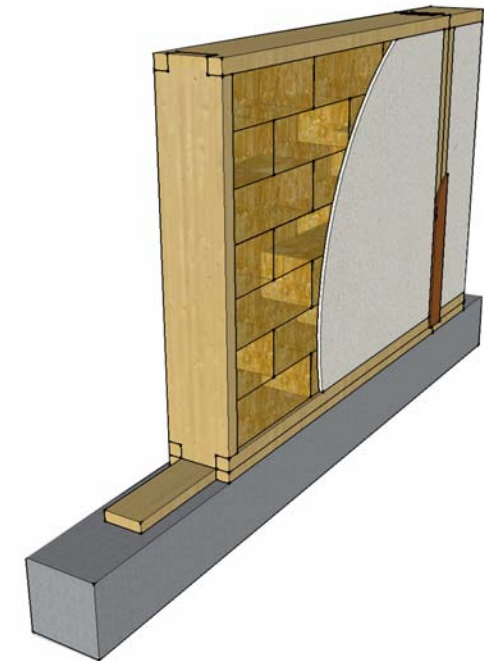
ModCell[®] Core panels are 427mm deep, factory finished fully closed, dry lined panel system using breathable sheathing boards in place of the render. The standard internal finish is a sheathing board, battened (not included in above dimension) ready to receive a variety of internal surface finishes, external finish is a breathable sheathing board, battened ready to receive a variety of rainscreen options.

ModCell[®] Core +

ModCell[®] Core + panels are 427mm deep, factory finished fully closed, dry lined panel system using breathable sheathing boards. The standard internal finish uses a sheathing board, battened (not included in above dimension) ready to receive a variety of internal surface finishes. In addition to the external breathable sheathing board there is 40mm of breathable wood fibre render board with 7mm breathable render applied as the final finishing surface.

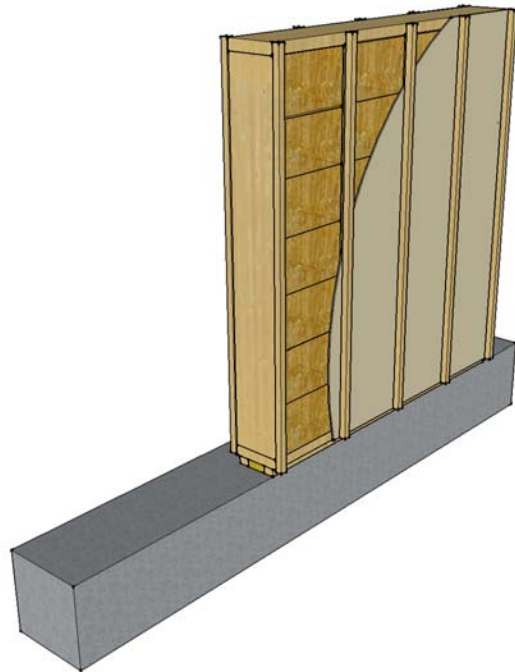
panel performance

	ModCell [®] Traditional
U Value	0.19 W/(m ² K)
Sequestered Carbon PAS 2050	1400kg of atmospheric CO ₂
Fire	2 hours+
Acoustics	50db



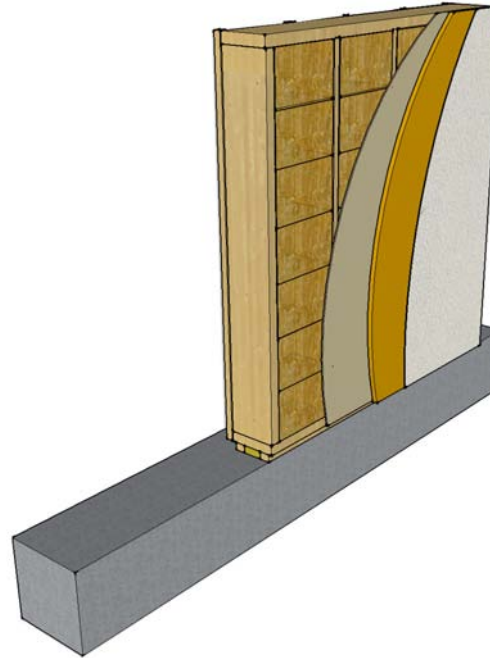
panel performance

	ModCell[®] Core
U Value	0.13 W/(m ² K)
Sequestered Carbon PAS 2050	1200kg of atmospheric CO ₂
Fire	0.5 - 1 hours. Varies according to finish
Acoustics	50db

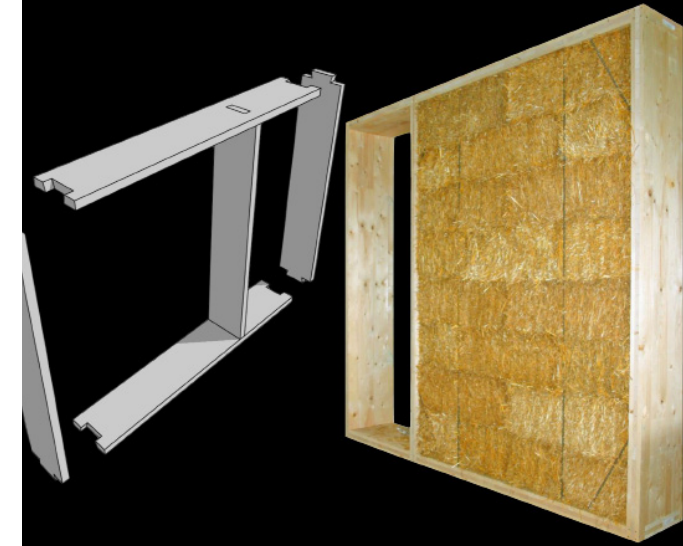


panel performance

	ModCell[®] Core +
U Value	0.11 W/(m ² K)
Sequestered Carbon PAS 2050	1300kg of atmospheric CO ₂
Fire	0.5 - 1 hours. Varies according to finish
Acoustics	52db



performance



ModCell[®] panels are carbon positive. A typical ModCell[®] Traditional panel has the equivalent of 1400kg of atmospheric CO₂ locked up in its fabric. A typical two storey BaleHaus[®] of 94 m² banks almost 43 tonnes of atmospheric equivalent CO₂

panel range



ModCell® panel range:

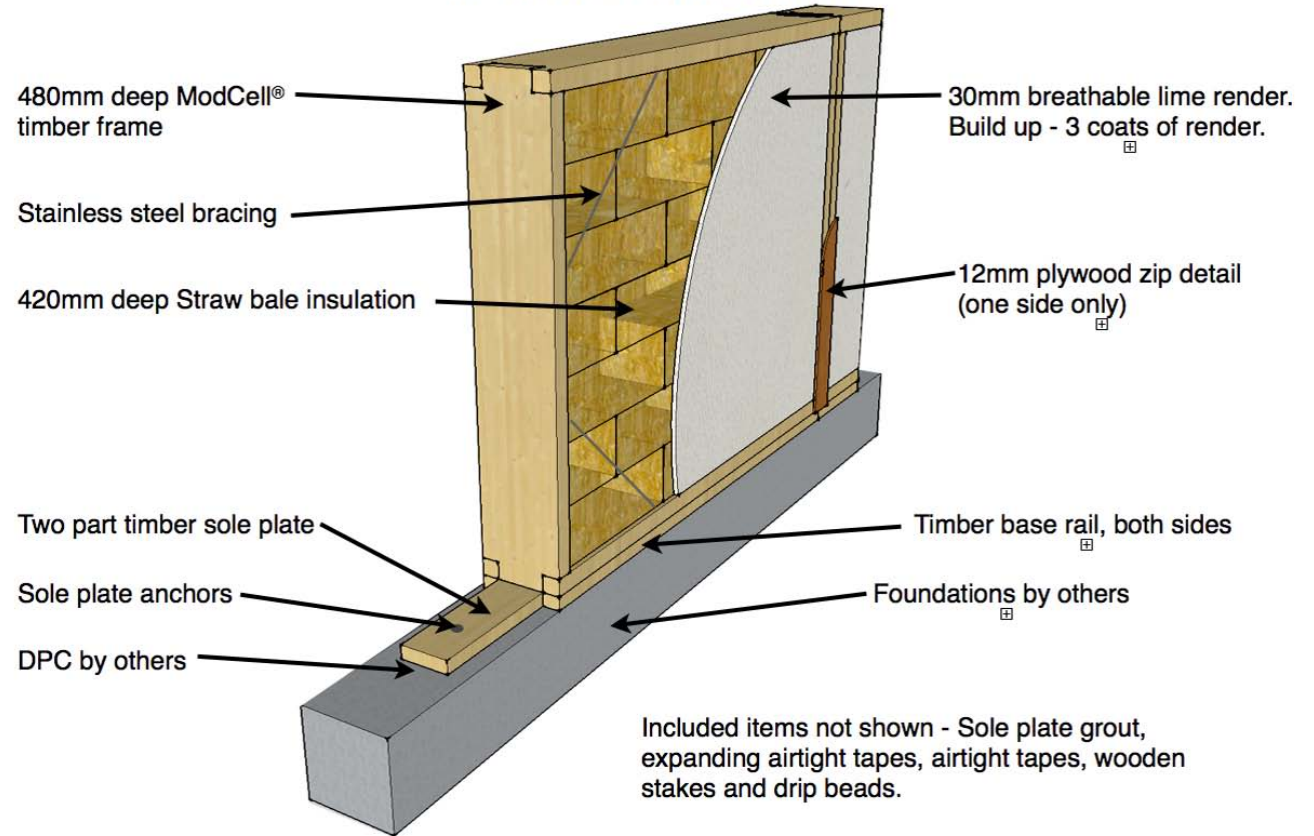
ModCell® Traditional

ModCell® Core

ModCell® Core +

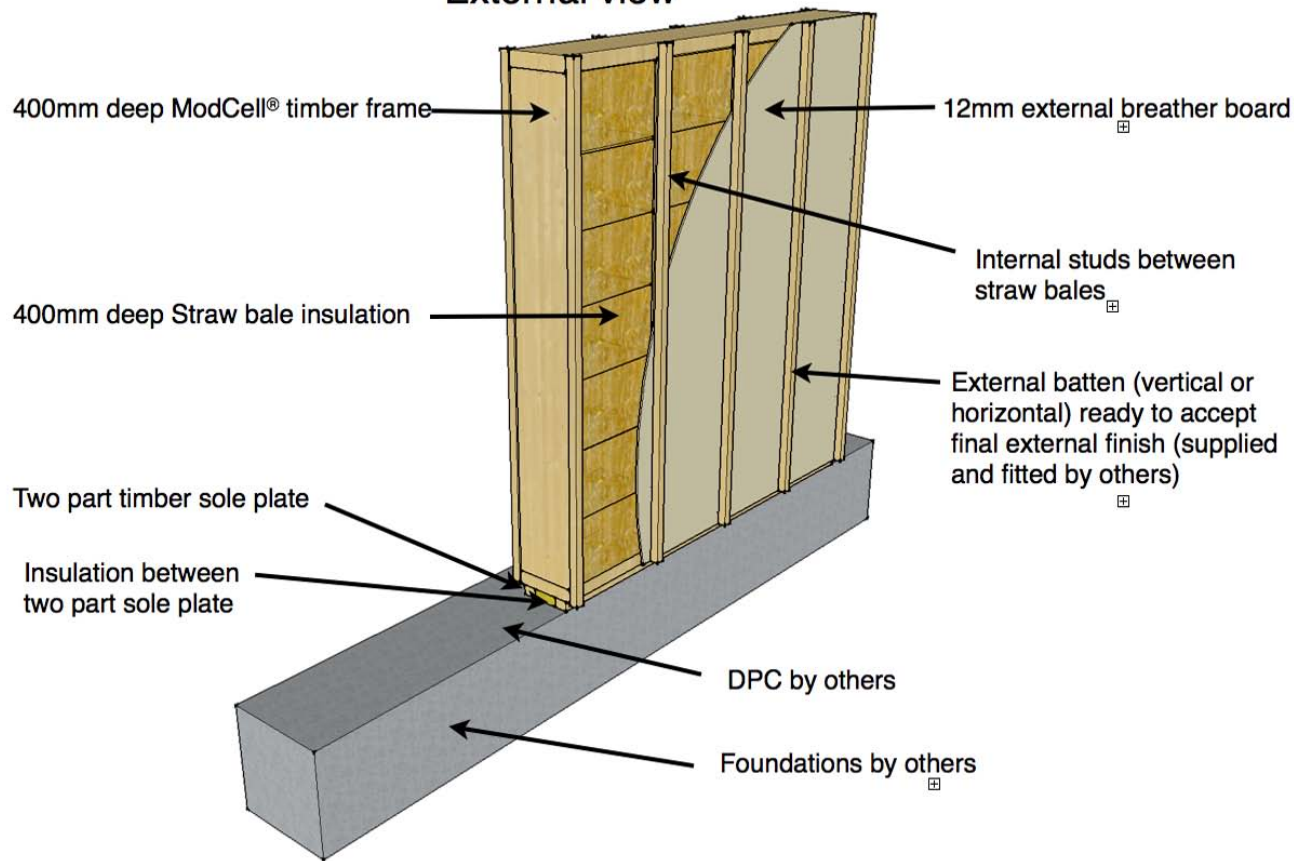
ModCell® Traditional

ModCell® Traditional
Internal & External view



ModCell® Core

ModCell® Core
External view



panel range



ModCell® offers a range of sizes and can provide a customized panel design service. Due to the nature of prefabricated construction, using standardized modules and rationalising the number of different panel types will increase efficiency of manufacture and decrease the overall cost.

panel range



ModCell® panel range:

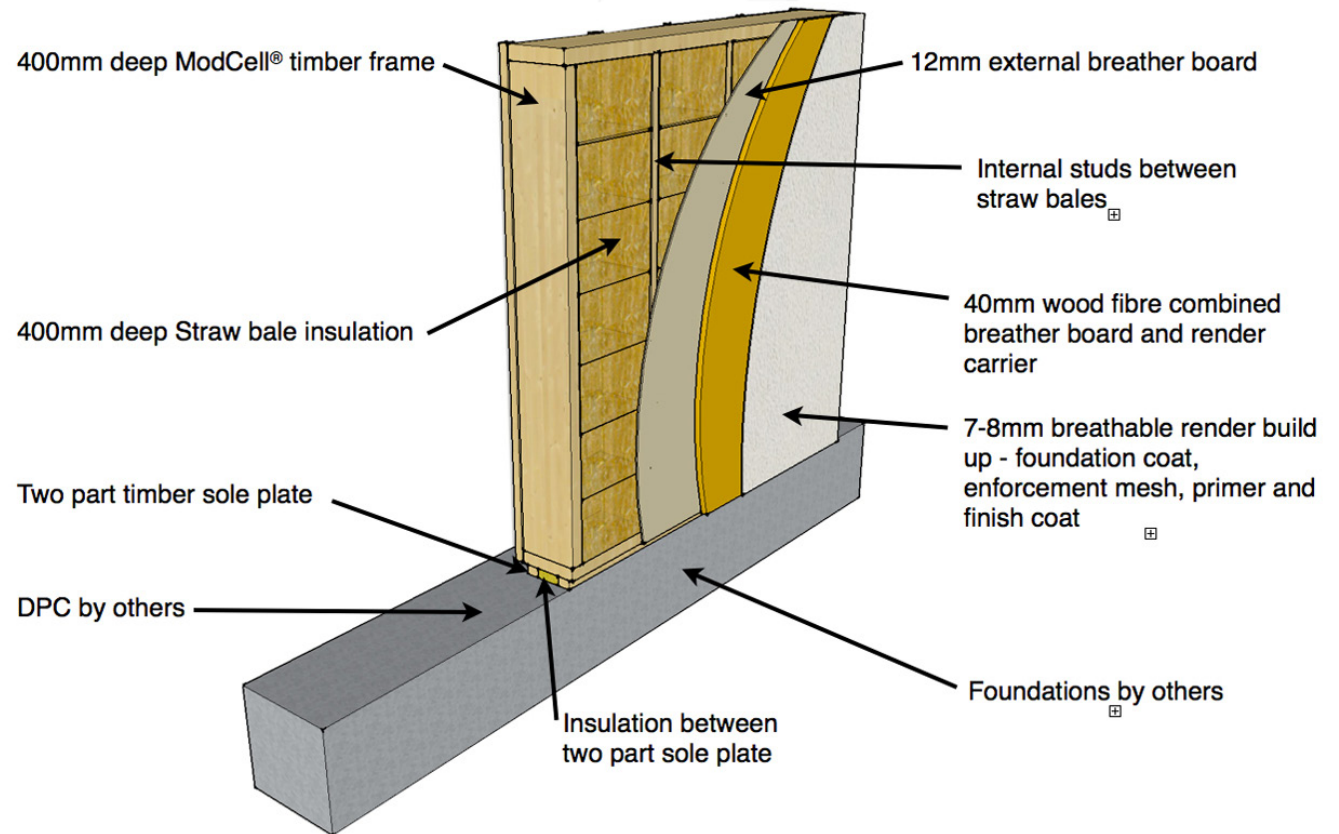
ModCell® Traditional

ModCell® Core

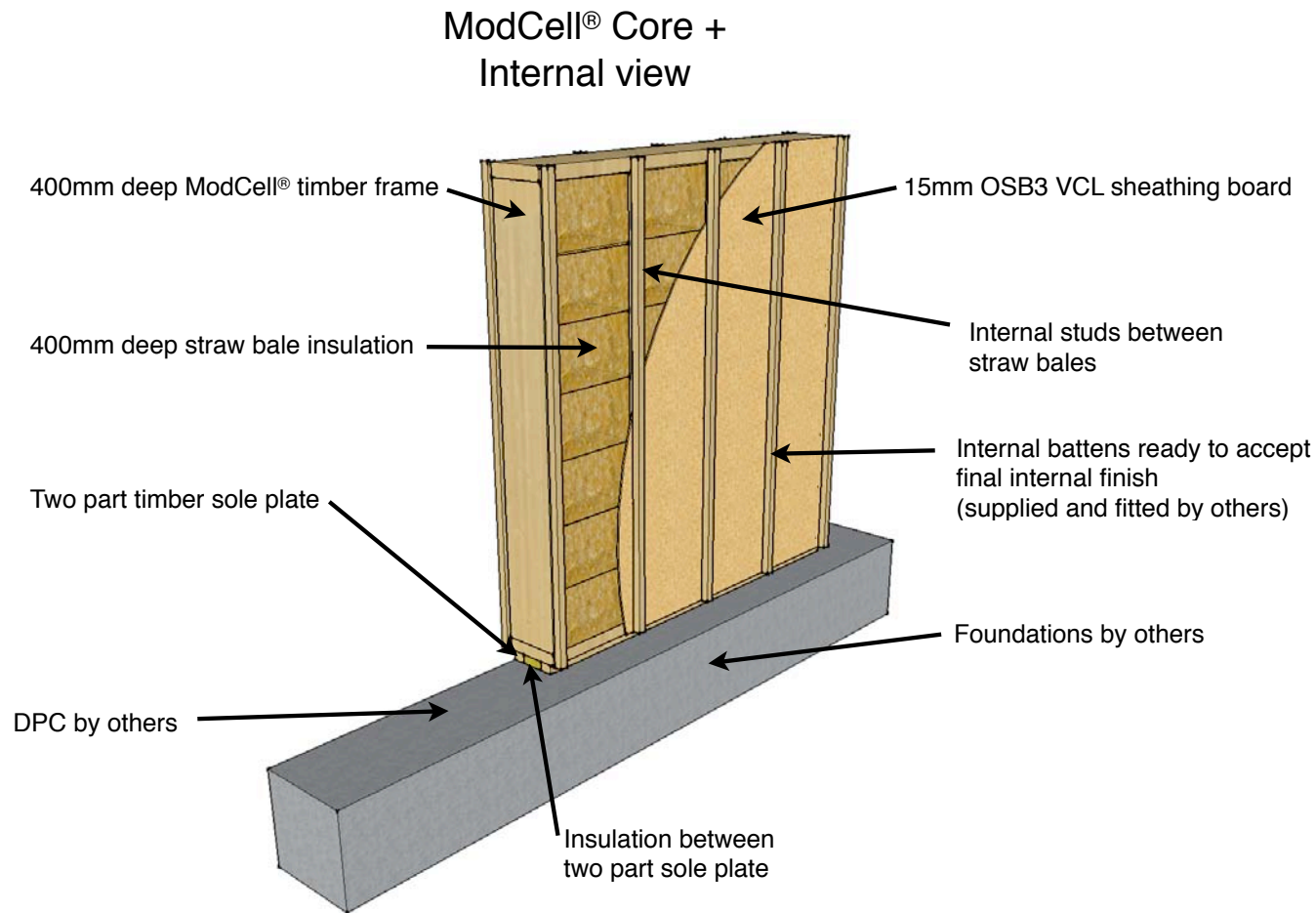
ModCell® Core +

ModCell® Core +

ModCell® Core +
External view



ModCell® Core and Core + Internal view



panel range



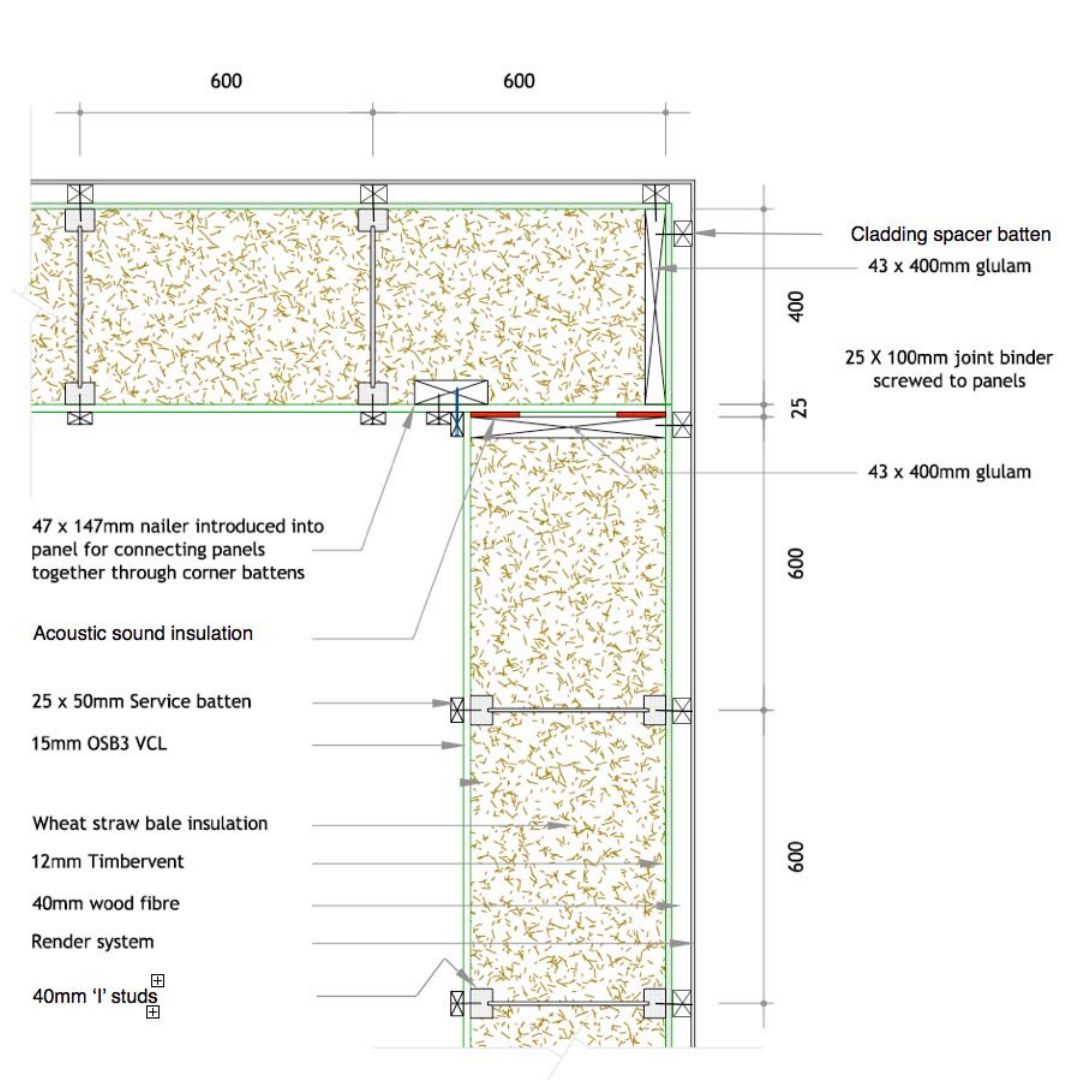
ModCell® offers a range of sizes and can provide a customized panel design service. Due to the nature of prefabricated construction, using standardized modules and rationalising the number of different panel types will increase efficiency of manufacture and decrease the overall cost.

details



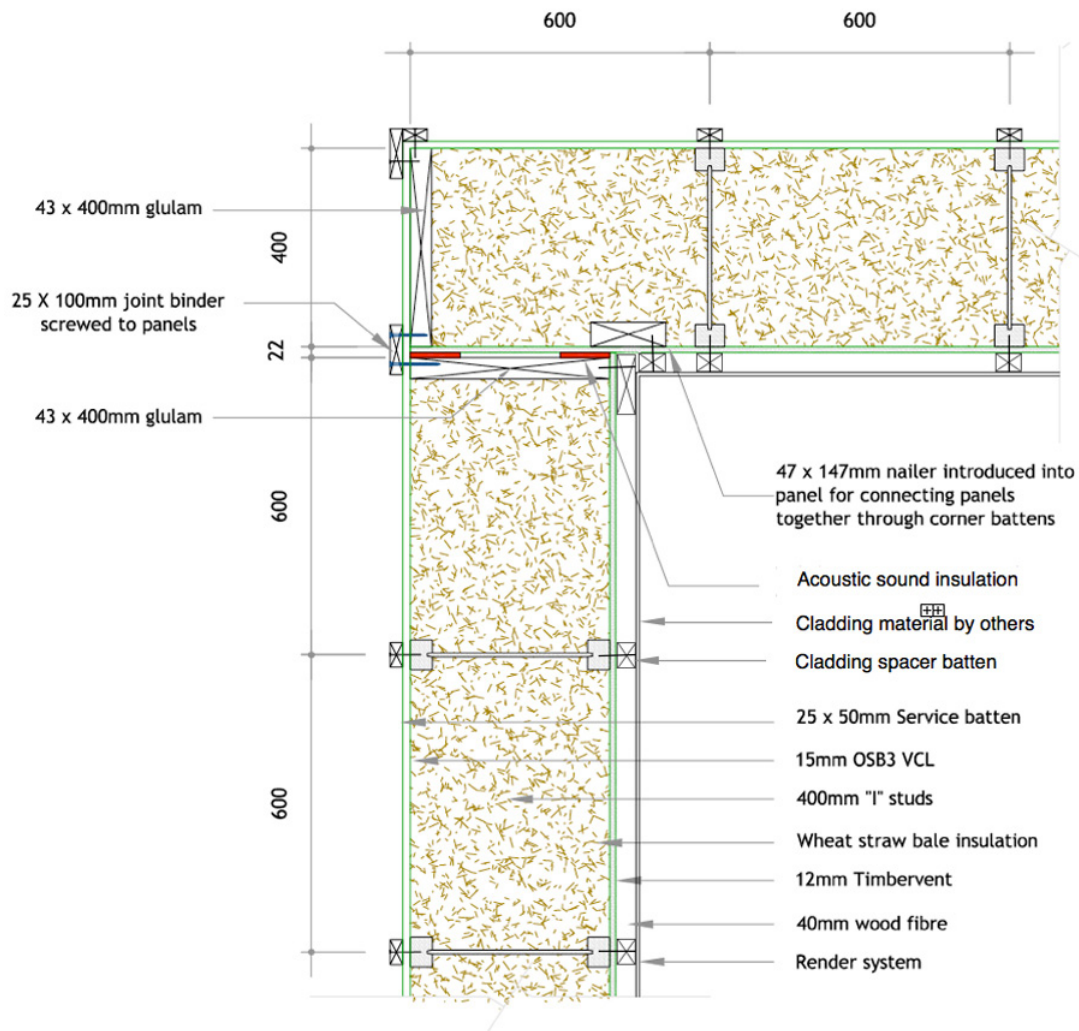
ModCell[®] typical connection details. The ModCell[®] panel system is a fully flexible offering and can be connected to steel frames, concrete frames and timber frames. Alternatively the ModCell[®] panels connect to each other and as such do not need a separate framing system to connect to.

ModCell[®] Core connection details



ModCell[®] Core external corner detail

ModCell® Core connection details



ModCell® Core Internal corner detail

details



A 3.0m x 3.2m Traditional panel weighs around 1800kg

A 3.0m x 3.2m Core panel weighs around 1100kg

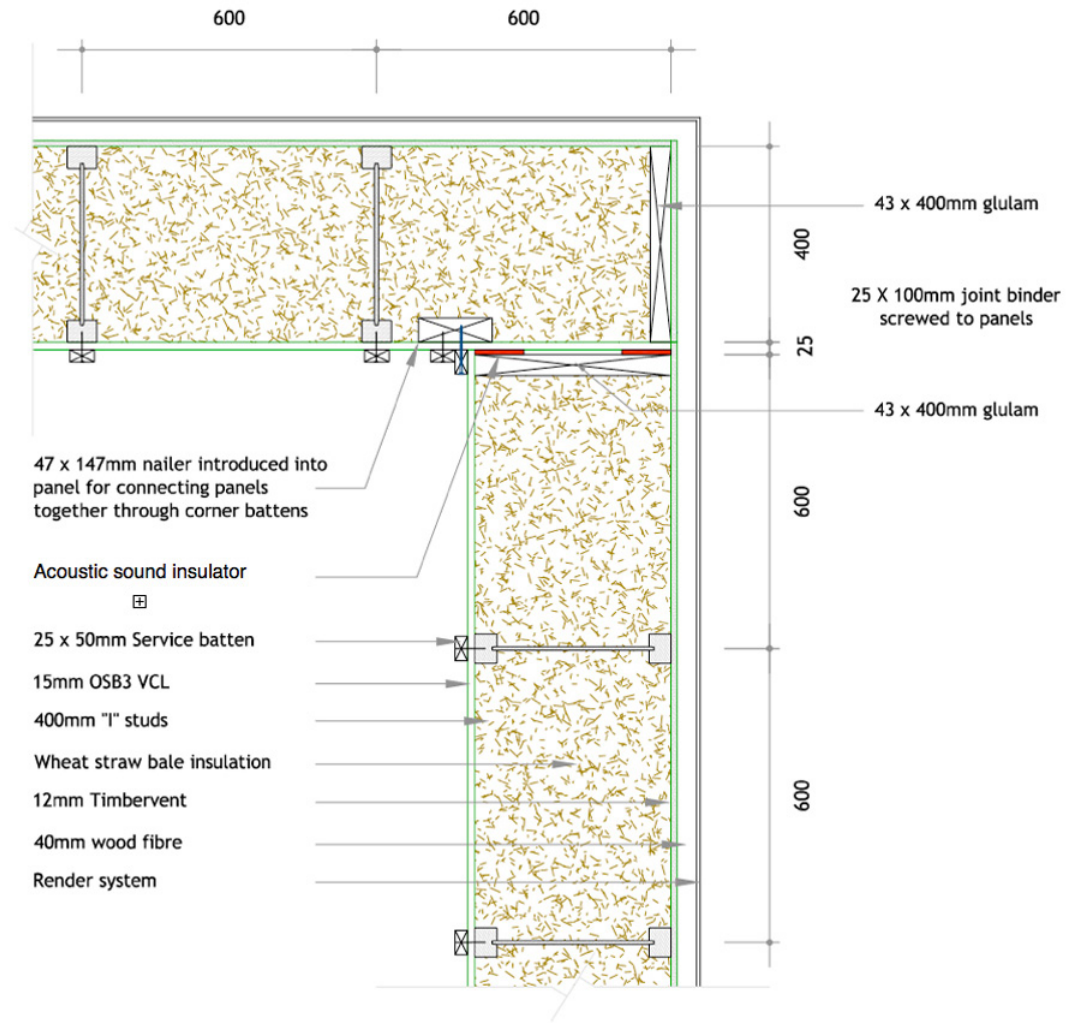
A 3.0m x 3.2m Core + panel weighs around 1300kg

details



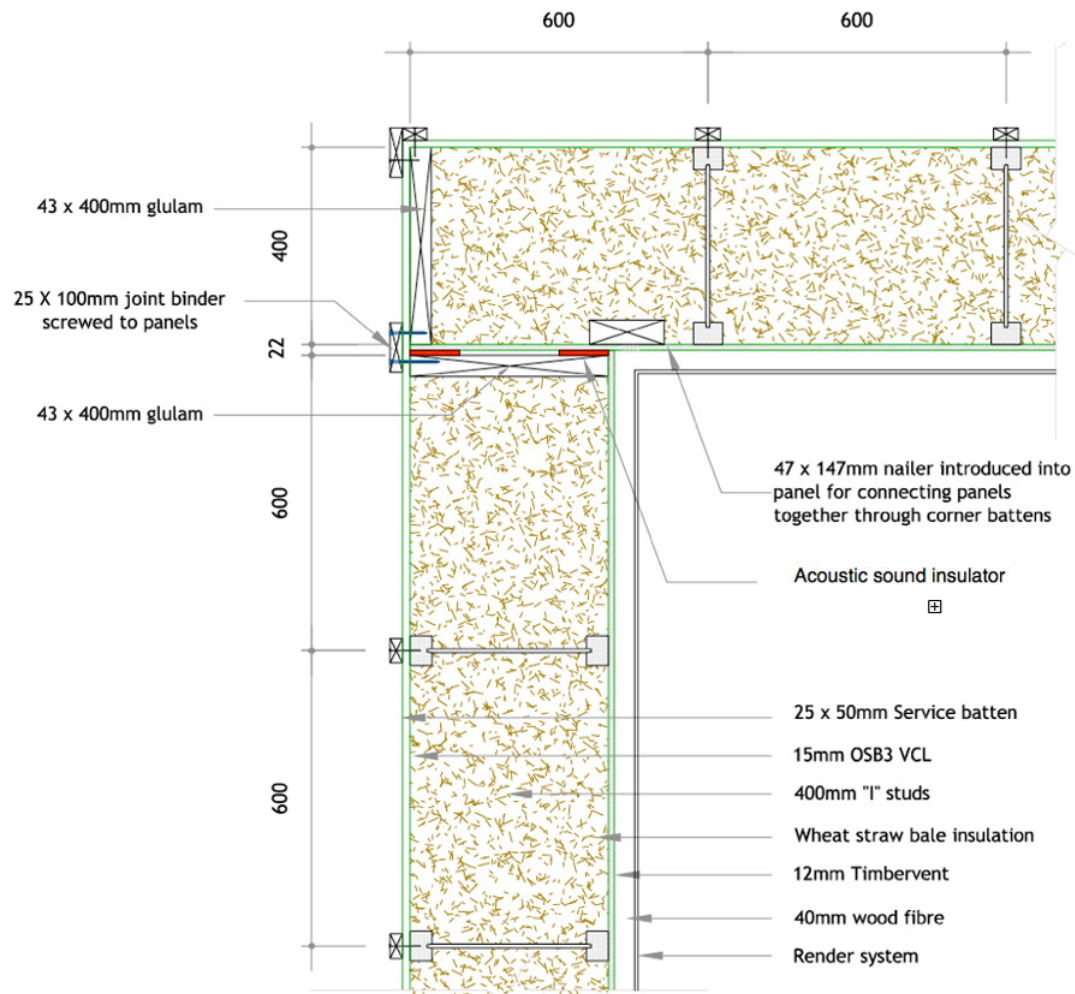
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ModCell[®] Core + connection details



ModCell[®] Core + External corner detail

ModCell® Core + connection details



ModCell® Core + Internal corner detail

details



A 3.0m x 3.2m Traditional panel weighs around 1800kg

A 3.0m x 3.2m Core panel weighs around 1100kg

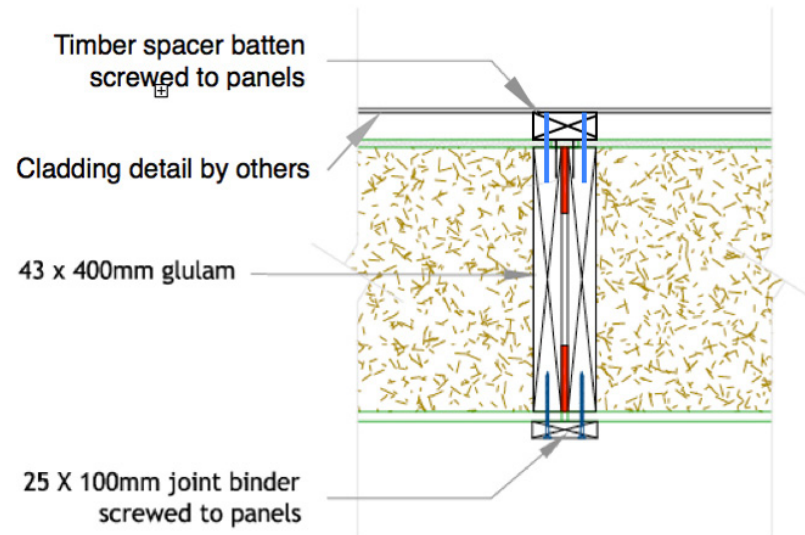
A 3.0m x 3.2m Core + panel weighs around 1300kg

details



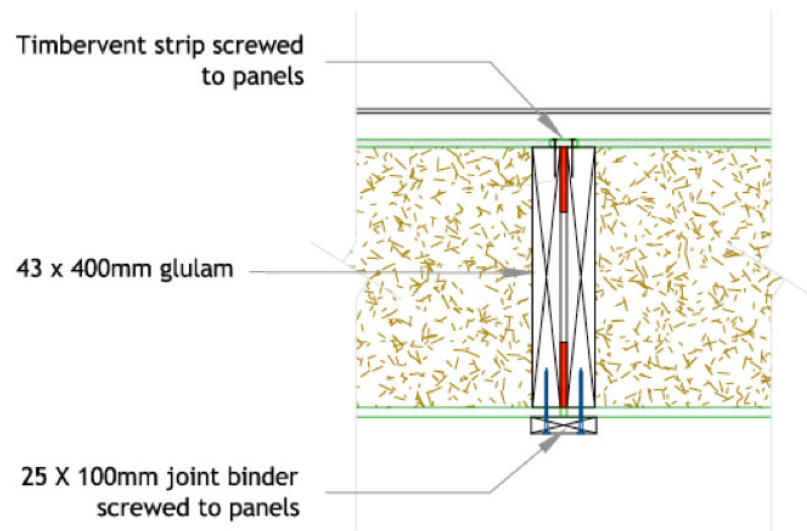
ModCell® is happy to discuss junction details to meet your design requirements.

ModCell® Core connection details



ModCell® Core joint binder detail for system

ModCell® Core + connection details



ModCell® Core + joint binder detail for render system

details



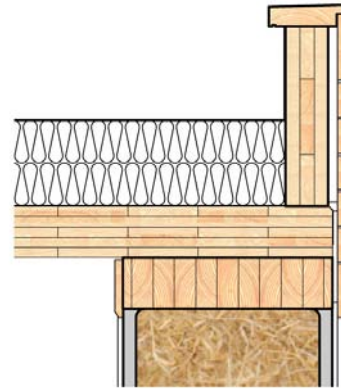
As well as choice of Traditional, Core or Core + panels Modcell® can meet your requirement for design of openings, type of finish and structural or non structural panel. Modcell® panels can support a range of window sizes and combinations.

details

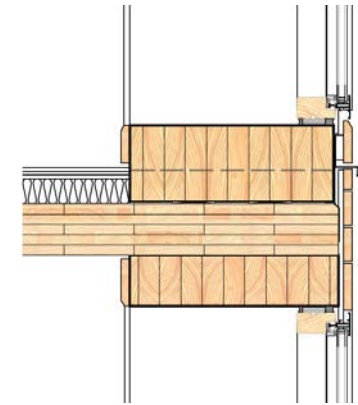


The following details demonstrate typical ModCell® Traditional panel junctions. Different architectural designs will have different requirements, particularly regarding roof and cladding details.

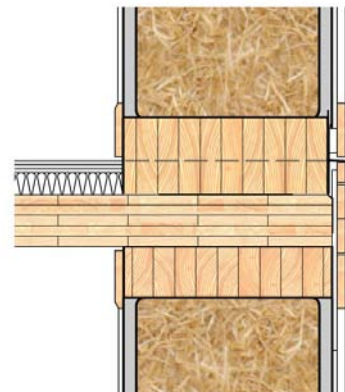
ModCell® Traditional typical details (lime rendered panels)



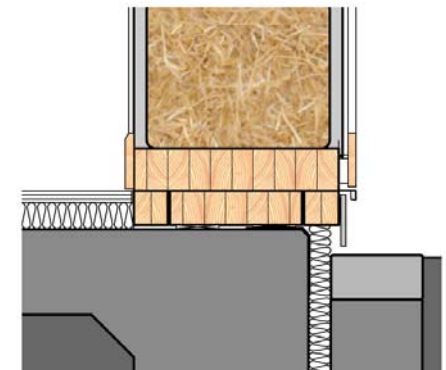
junction of exterior wall with roof (section)



junction of glazed panels (head and base)

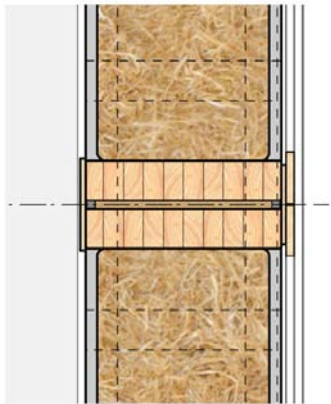


junction of exterior wall with floor (section)

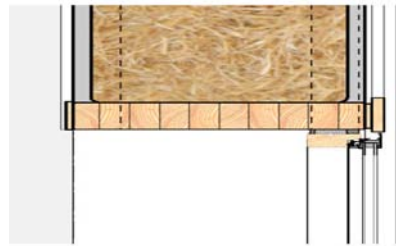


junction of wall panel to base slab (section)

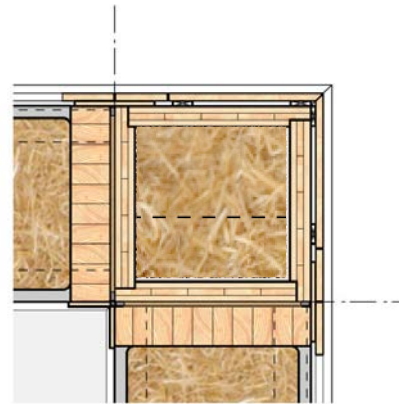
ModCell® Traditional typical horizontal details



junction of wall panels (plan)



junction of wall with window (plan)



corner junction (plan)

details



ModCell® panels are able to be made in a variety of panel dimensions. Please contact to find out more.

details



ModCell® typical connection details. The ModCell® panel system is a fully flexible offering and can be connected to steel frames, concrete frames and timber frames. Alternatively the ModCell® panels connect to each other and as such do not need a separate framing system to connect to.

ModCell® Traditional - finishes

ModCell® Traditional is available in a range of finishes suitable for both structural and non structural panel types. All panel finish types are available for both internal and external use.

Lime render finish is ModCell's standard internal and external finish. A variety of different types of lime render finishes are available.

Lime render flush finish provides a flush render finish between panels and is available both internally and externally.



ModCell® Traditional - frame to panel connection details

ModCell® Traditional loadbearing



ModCell® Traditional with Glulam frame.



ModCell® Traditional with steel frame
(same principles apply to concrete frame)
More expensive solution.



ModCell® Traditional with internal steel
frame (same principles apply to concrete
frame)



details



As well as choice of Traditional, Core or Core + panels Modcell® can meet your requirement for design of openings, type of finish and structural or non structural panel. Modcell® panels can support a range of window sizes and combinations.

structural



The structural timber frame is 'infilled' with straw bales, which are stacked to form a wall.

The straw is pre-compressed to reduce settlement and then pinned together for stability.

The wall is then either plastered using a protective lime render or clad with a range of products, including timber.

The bales act compositely with the render to provide a stiff panel that resists wind loads.

ModCell® - structural

ModCell® traditional, Core and Core + panels are available as non-structural or structural solutions.

structural performance

Vertical loads are supported by the head and side panels and panels are designed for the specific loads.

A ModCell® traditional panel can support horizontal safe working load of 22kN for a 3m panel.

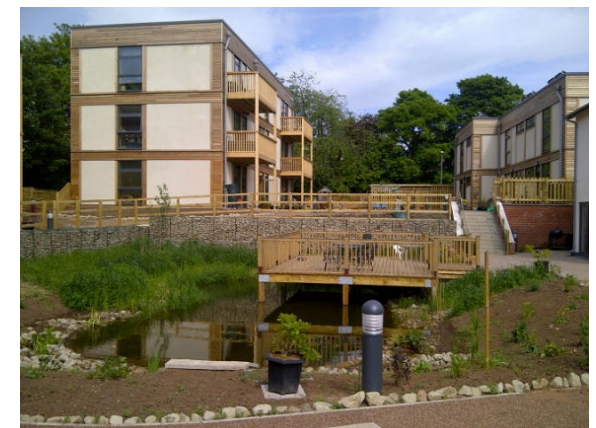
Call us for specific loading requirements.

On ModCell® Core and ModCell® Core + panel vertical loads are supported by the internal studs and panels are designed for the specific loads.

ModCell® Core and ModCell® Core + panels can be designed for horizontal loads in accordance with standard sheathing board design.

ModCell® is structural up to 3 floors high for both commercial and residential buildings.

Over 3 floors progressive collapse design requires an independent frame into which ModCell® infill panels can be secured.



ModCell® - services

On ModCell® traditional panels the electrical conduit can be installed behind the lime render face in the Flying Factory™, surface mounted on site once installation has taken place, or surface mounted but hidden behind surface mounted plasterboard.

ModCell® Core and ModCell® Core + any services can be installed by taking advantage of the space created between the sheathing board, the battens and the final internal surface material specified by the client.



ModCell® traditional showing light switch installed in lime render

ModCell® - what we offer

Our experienced team offers a range of services from supply to full design and build. If you are interested in our full design and build services please contact us to find out more. Our design services draw on our award winning design and consultation skills and apply passive design principles to maximise site potential and minimise energy demands.

ModCell® can also arrange educational visits to the Flying Factory™.

We are also happy to arrange a meeting to discuss your project in detail. Establishing how ModCell® can best be utilised to save costs, reduce CO2 and shorten construction times.

ModCell® also provide tailored CPD sessions. To arrange a CPD give us a call or send an email: 0117 955 6731 - 07793 943133

services



Services can be accommodated 'In', 'On' or 'Behind'

'In' - electrical sockets are on the face of the straw bale, secured in place and then the render is applied, allowing flush finishing of sockets

'On' - surface mounted

'Behind' - All services are installed in the void created between sheathing board and final surface finish.

manufacturing



The panels comprise straw bale timber, lime or breathable render and/or wood cladding with small quantities of steel fixings. They are precision-engineered using modern methods of construction (MMC).

The structural timber frame is 'infilled' with locally-sourced straw bales, which are stacked to form a wall, compressed for stability and to avoid settlement. The wall is then either rendered using a protective render or clad with timber.

manufacturing

1



Bales are trimmed to a standardised size.

2



Engineered pre-drilled timber arrives flat packed minimising CO₂ emissions from transportation.

3



Panel frames are assembled in a centralised manufacturing facility or a Flying Factory™ located within 20 miles of the construction site.

4



Simple, logical detailing minimises construction time and allows for quick training of local labour.

5



Panels are filled with locally grown straw. This is compressed to avoid any settlement.

6



Panels are transported on a low loader and are delivered to site as sealed units.

7



Panels are manoeuvred using lifting equipment.

8



Panels are located onto a sole plate helping to create an airtight seal between the panels and the floor slab.

9



Other elements of construction are quick to install and provide simple, reliable air tight detailing.

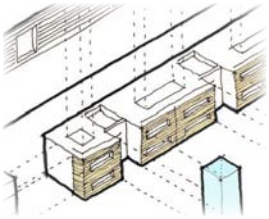
10



Panels can also be installed with other elements such as glazing pre-fitted.

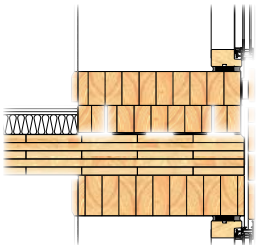
design and ordering process

1



ModCell® consulted at initial design stage. We can provide initial costing and advice to the client, architect and quantity surveyor.

2



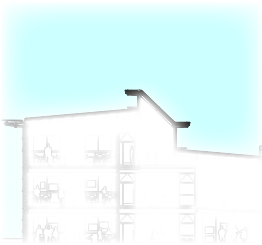
ModCell® provides standard connection details. We can also arrange a CPD event.

3



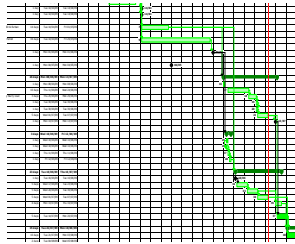
Continued design discussion with ModCell® ensures the system will work alongside other building elements.

4



ModCell® provided with detail design drawings, usually RIBA stage D-J and will provide a revised price quotation.

5



Meeting with main contractors established soon after appointment to agree appropriate lead times and installation dates.

6



Sourcing of straw and location of the Flying Factory™ established.

7



ModCell® manufactures the panels in a Flying Factory™ usually located within a 10 mile radius of the construction site.

8



ModCell® delivers and installs the panels on site. Install can be undertaken by Modcell® or the main contractor.

manufacturing



Our experienced team offers a range of services from supply to full design and build. ModCell® can also arrange educational visits to the Flying Factory™ and can provide tailored CPD sessions.

If you are interested in our full design and build services please contact us to find out more. Our design services draw on our award winning design and consultation skills and apply passive design principles to maximise site potential and minimise energy demands.

Modcell® Services:

Supply only

Supply & Fit

Design & Supply

Design, Supply & Fit

Consultancy

CPD Training

We look forward to hearing from you.....

Modcell® Technical Guide funded with
assistance from:

European Commission Executive Agency for
Competitiveness and Innovation (EACI)



ModCell®

The Proving House

21 Sevier Street

Bristol

BS2 9LB

United Kingdom

e enquiries@modcell.com

t +44 (0)117 955 6731

f +44 (0)117 3 04 1738

w modcell.com

Patent No: GB2457891B