Manufactured and distributed by:

CMS Modular Housing Sdn Bhd
A 1001, Ground floor, Section G, Cyberjaya
Selangor, Malaysia

Headquarters:
Lot 28 Block A, Taman Perindustrian Kajang,
P.O. Box 5200, 53000 Kuala Lumpur, Malaysia
Tel: (603) 439 336 Fax: (603) 439 340
Website: http://www.cmsb.com.my/modulr

MODERN AND INNOVATIVE,
HIGH QUALITY,
EFFICIENT & COST EFFECTIVE

CMS MODULAR HOUSING SDN BHD
**OUR MISSION**

CMS Modular Housing Sdn Bhd (CMSMH) is a customer-oriented organization providing innovative solutions and quality services to customers in the building industry. The productivity and profitability of developers and contractors can be maximized and the end-users can be assured of a high quality house.

CMSMH designs, manufactures, markets, and distributes a new concept of housing product which consists of the patented CMS Modular Housing System, CMS Insul Roof panel and CMS Quickwall panel system.

The company’s dedicated and committed workforce, special technical expertise, and after-sales service have enabled the customers to obtain the highest level of customer satisfaction.

Our corporate culture aims to provide an environment that will stimulate creativity, reinforce team spirit and reward individual enterprise.

CMSMH is totally committed to helping the building industry achieve new standards in the area of low and medium cost housing.

**PRODUCTION FACILITIES**

CMSMH’s production facilities are situated at Muara Tebas, Kuching. The built-up area of the factory is 15,678m².

CMSMH engages the most up-to-date technology (Programmable Logic Controller, [PLC]) in expanded polystyrene block moulding and cutting which maintains the quality of its core materials.

An automatic spray line using airless spray system together with 2 hydraulic press ensures reliable and permanent bonding of the modular panels.

The plant is capable of producing up to 500,000m² of modular panels annually.
CMS MODULAR HOUSING SYSTEM - BUNDLES OF VALUES

Better quality prefabricated components that withstand environmental deterioration

The CMS Modular Housing System produces top-quality prefabricated components manufactured in a factory environment with minimum on-site construction activities. It is engineered to be strong, durable and of high quality.

Speedy project completion time

Since the CMS Modular Housing System enables multiple components to be manufactured off-site, the factory-manufactured components are transported to site and assembled easily on location within days.

High structural stability

The system uses tried and proven technology and has full engineering certification, is Bamba approved satisfying SERI's 2-hour fire rating. In a CMS Modular home, lightweight and ductile materials are primarily used. The modular nature of the system and the inherent strength of the individual components results in superior structural stability. Furthermore, the prefabrication of walls and roof elements and heat-render coating of external walls create an inherently stable construction system.

Easy to renovate or extend

With a CMS Modular House, there is great flexibility with renovations or extensions. Not only are wall structures from prefabricated components available directly from the factory, but they are easily assembled on location.

The CMS Modular Housing System utilises composite prefabricated panels having a polystyrene core and faced with a variety of sheet materials that suit your operational requirements. Joining one panel to another is simplified using tongue and groove construction. The modular panels can be designed to perfectly adapt to your individual requirements.

Longer design life

The CMS Modular home has superior resistance and durability and the factory-fabricated modular components ensure consistent quality control and hence a guaranteed design life.

Smooth and clean surfaces

All internal surfaces in a CMS Modular home are smoother and cleaner, presenting a more pleasing appearance. As a result of its smoother surface, dust accumulation will be significantly reduced, therefore improving indoor air quality and making the dwelling safer for children.

Excellent thermal performance

In comparison with a conventional home, the CMS Modular home is approximately 5 times (or 95%) more effective in insulation rating. In particular, it is more effective in reducing substantial latent heat gain from the roof. This translates into substantial savings in electricity consumption as well as greater comfort for the occupants.

THERMAL PERFORMANCE

Conductivity [K] W/m²K

ROOFING
A - Metal roofing
B - Metal roofing with fibre glass insulation
C - Concrete roof tiles
D - Concrete roof tiles with fibre glass insulation

WALL PANEL
A - Double brick with plaster
B - plaster board with metal stud
C - Single brick
ROOF

CMS INSUL ROOF combines external roofing, structural strength, insulation, and internal lining into one, easy-to-handle building panel. It is available in a range of sizes, finishes, and colours. Insul Roof panels are easily joined using a simple overlapping jointing method which is strong, water-tight, and eliminates heat transfer.

Substantial savings

The unique ‘sandwich’ structure of roofing panels makes them exceptionally strong and rigid. These properties allow construction which requires less framing, less structural support, and less fixing time. The installed cost of CMS Insul Roof is substantially less than the cost of providing comparable forms of insulated roof construction.

Faster, easier installation

Because CMS Insul Roof combines external roofing, insulation, and internal lining into one, easy-to-handle, building panel, FOUR separate building operations are reduced to ONE. CMS Insul Roof roofing panels are relatively lightweight but rigid, and therefore easy to handle.

Greater energy efficiency

The expanded polystyrene, used in the core of CMS Insul Roof, is one of the most efficient thermal insulators. Substantial savings in conditioning costs can be achieved.

Virtually no maintenance

The ceramic based pre-painted metal finishes used in CMS Insul Roof panels have very high resistance to most forms of surface deterioration making them virtually maintenance free. CMS Insul Roof is ideally suited to applications requiring high standards of cleanliness and hygiene as the roofing and cladding panels are highly resistant to water, heat and humidity.

External Wall Panel

INTERNAL SKIN: Glass fibre panel
1.0mm thickness

EXTERNAL SKIN: Glass fibre panel
1.0mm thickness

CORE: 55mm thick polystyrene
Density: 16kg/m³

Internal Wall Panel

SKIN: Glass fibre panel
1.0mm thickness

CORE: 55mm thick polystyrene
Density: 16kg/m³

ADVANTAGES OF CMS QUICK WALL PANEL SYSTEM:

- Conventional cladding pack to suit most requirements.
- Other internal and external surface finishes available on request including weather resistant finishes.
- Other surface finishes available include steel, galvanized, aluminium etc.
- Easily transported for fast and simple installation.
- Provides a durable, dust-free environment.
- Abrasions made easy for selections and improvements.
- Suitable for wet area applications.
- Quick to erect - value on 20% of the time of conventional stud or brick wall.
- Light weight panel with a solid feel.
- Design and installation flexibility can satisfy any wall configuration.
- Frequent, service channels can be engineered and positioned to conceal mechanical and electrical services.
- Panels, once erected, produce a very solid wall which incorporates a fully integrated steel structural frame.
- Designed to make windows and doors easy to fit at any stage during construction and after completion.
- Provides thermal insulation higher than cavity brick wall.
- One qualified tradesman with one helper can usually erect and complete 160 square metres of wall in one working day.
- Panels can be disassembled and reused.

Other advantages:

1. Excellent thermal & acoustic insulation
2. Less labour, less material, more cost effective and reduced weight of roof
3. Safety - no eye irritation from reflective foil of fibreglass insulation
   - easy installation with panels strong enough to span
   - fits in excess of being used as a working platform

Pre-fab Beam

SIDE SKIN: Plywood (water resistant)
3.8mm thickness, Gum board 4.5mm or
Cement fibreboard 6mm thickness

CORE: 120mm thick polystyrene
Density: 16kg/m³

TOP/BOTTOM SECTION:
0.5mm thickness
Commercial grade galvanized steel

Accessories
RAPID PROJECT COMPLETION

Aerial photographs of Bandar Samariang Low Cost Housing Development, Kuching, Sarawak. This development comprises 5000 units of low cost and low cost plus housing. The developer is using the CMS Modular Housing System to implement this fast track project.

WEEK 1
Project site ready for commencement.

WEEK 9
Work progressing swiftly & efficiently.

WEEK 21
Completion of 1098 houses.
FREQUENTLY ASKED QUESTIONS

**General**

Q1. What is CMS Modular Housing System?
A: CMS Modular Housing System is a patented prefabricated steel framed composite panel building system. The steel frame panels utilize "tongue and groove" joint construction which is bolted to cast in situ concrete raft slabs.

Q2. What guarantees are given to the customer?
A: The structural integrity of the system is fully guaranteed and customers are furnished with a ten (10) year warranty.

**Features**

Q3. What is the advantage of CMS Modular Housing System as compared to conventional construction?
A: The system has the following advantages over conventional construction: better quality finishes, rapid construction time (hence saving in holding and financing costs), superior thermal performance, high structural stability, low cost and ease of maintenance.

Q4. Is the cost of the system lower than conventional construction?
A: The cost of system is comparable with conventional construction, but by taking into account the hidden costs involved in a project, substantial savings can be achieved by reducing financing charges and overhead costs resulting from more rapid construction time.

Q5. How does the thermal performance of the system compare with conventional construction?
A: The thermal performance of the system is superior since the core material exhibits exceptionally low heat conductivity compared with conventional materials like metal, concrete and brick etc.

Q6. Will the bonding between the core material and the skin of the panel give way under extreme heat?
A: No. The properties of the specially formulated flexible polyurethane adhesive remains stable within the temperature range of -150°C to +150°C. So, there will be no change in bonding strength under extreme temperature within that range.

Q7. How is the acoustic performance of the system?
A: The core material of the panels is a good sound absorber and insulator and is capable of dampening the structure-borne sound.

Q8. Is the system structurally stable when subjected to external loading like strong winds?
A: The structural strength of the system results from its patented steel frame construction which is specially engineered to withstand external wind loads in accordance with the relevant building codes.

Q9. Can the system withstand high impact loading?
A: Yes. The system is capable of absorbing and dissipating high impact and cyclical loading better than conventional construction.

Q10. Will the core material layer of the roof panels contract/melt/deform under long hours of heating?
A: No. There is no direct contact of heat source with the core material as it is protected by the external skin. Even if it was to come into contact with fire, the core is non-flammable and non-toxic.

Q11. What happens when rain water gets in contact with the core material?
A: Nothing happens. Polyurethane is stable in water and its structural integrity is unaffected.

Q12. How long does it take to build a modular home?
A: The time will obviously vary depending on design but generally twice as fast as conventional housing.

Q13. How good is the ventilation compared with conventional construction?
A: Due to the built-in "insulation-ventilation 3 in 1" design, no additional false ceiling is required, so the interior of the house is airy and better ventilated.

Q14. What is the design life of CMS Modular Housing System?
A: Conventional construction comprising masonry wall structure, timber roof trusses and metal sheet roof is susceptible to environmental deterioration. Moreover, the design life of a conventionally built house is difficult to quantify due to the inherent variability in materials and workmanship on each dwelling. However, the CMS Modular Housing system has superior components which ensures consistent quality control and hence a guaranteed design life.

Q15. Why is gypsum board used for internal panels?
A: Gypsum board is used because it is inherently stable, produces good quality finishes and requires minimum maintenance. The system can accommodate other material finishes requested by customers.

Q16. Is the system flexible in accommodating different designs?
A: Since the basis of the system is modular, there is maximum flexibility to accommodate different designs.

Q17. Can the panels be dismantled and reused easily?
A: The system can be designed to be dismantled and reused easily.

Q18. Is there any restriction on the system for renovation of houses?
A: No, almost any building contractor can renovate the house. CMS Modular Housing 5th Bhk will provide assistance should there be a need.

Q19. Are the materials readily available in the general market for renovation work?
A: Renovations can be made to the system using conventional construction or if required additions to the house can be made using the system with materials readily available from the manufacturer.

Q20. Can pictures or other objects be hung onto the wall and ceiling?
A: There are no problems for support for usual objects such as picture frames, light fittings etc. However, there may be some constraint on support of heavy objects such as air conditioning units that should be supported on one of the numerous metal studs in the house. Metal studs are at intervals of 900mm. The house owner will be provided with pamphlets which amongst other things, contains instructions and the support details for hanging heavy objects to the wall and roof.

Q21. How to repair damage/crack on the wall/ceiling?
A: Cracking is unlikely to occur if the finishing works are properly carried out. However, even if cracks occur they can be quickly remedied by plaster and paint.
**RECOMMENDED SPECIFICATION**

1) General

The system used shall be the CMS Modular Housing System. The system consists of prefabricated composite wall panels and roof panels rapidly erected to form a steel framed structurally stable building using revolutionary tongue and groove construction.

The wall panels are faced with a variety of sheet materials to suit various operational requirements.

2) Material Specification

a) Panel Core

   Flexible polyurethane core with density of 1.06g/cm³ is used as core material for the panels. The expanded polyurethane is produced in accordance with the requirements of AS 3866: part 3: 1992.

b) Panel Adhesive

   The adhesive used for bonding the polyurethane core to the skin materials shall be a moisture curing silicon based flexible polyurethane adhesive, developed specifically for bonding polyurethane foam to a variety of rigid and flexible facing materials.

c) Panel Surface Material

   (i) Gypsum board:

      Gypsum board shall be 10mm thick recessed edge for general use.

   (ii) Cement fibreboard - 4.5mm

   (iii) Chipboard - 6mm Home Chipboard

   (iv) Pre-finished steel sheeting

   The pre-finished steel sheeting used shall have a multi layer weather resistant paint film on one side and a non-weather resistance protective paint film on the other. The non-weather resistant rear surface shall be bonded to the polyurethane core material.

   The sheet shall be hot-dipped aluminum / zine coated high-mass, structural steel with thickness of at least 0.95mm (BMT).

   (v) Structural Steel Stud and Channel

   The steel stud / channel used shall be mill from 0.55mm BMT galvanized commercial grade steel sheet.

3) Roof Support Beams

   The roof beam shall be prefabricated using two (2) galvanized steel channel of 0.35mm thickness held together by flame retarded polystyrene core and laminated with two (2) water treated plywood sheets, cement fibreboard or chipboard.

   The beams are supported at ends on the external or party wall or dividing wall within rooms.

4) Installation

   a) Roof

   The roof panels shall be fixed using CLassic 3 stainless screws with neoprene washers to fascia to wall cladding, beams or other supports.

   Roof panels shall be laid as per specialist details.

   Suitable edge capping, barge capping and flashing shall be fixed with the recommended CLASSIC 3 fasteners / screws.

   b) Wall

   Wall panels shall be fixed using screws, construction fasteners, staples, adhesive or sealant approved and in accordance with CMS Modular Housing specificaiton.

   All gaps or joints between internal panels are to be filled with jointing compound, jointing tape and skim coating before application of paint finish.

   In areas subjected to moisture - W.C or shower, jointing compound and sealant shall be used.

   Fixing of tiles to wet areas shall be with recommended adhesive applied in accordance to CMS Modular Housing specificaiton.

   The plywood or Chipboard external skin of panels shall be protected with 2 layers of 10mm thick trowel applied cement render, with the first layer reinforced with zinc oxide based expanded metal mesh. The wire mesh shall comply with the following specification:

<table>
<thead>
<tr>
<th>Thickness</th>
<th>0.5mm (BMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strand width</td>
<td>1.2mm</td>
</tr>
<tr>
<td>Mesh opening</td>
<td>SWM: 16mm</td>
</tr>
<tr>
<td></td>
<td>LWMM: 38mm</td>
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</tbody>
</table>

   The mesh is to be stapled to the cement fibreboard or Chipboard using staples. Staples shall have dimensions of 12.5 x 14mm long and manufactured from 0.55mm galvanized wire, similar to Stanley Brand - 5019-14, Australia. The staples shall be applied at an angle of 60° to the surface of plywood or Chipboard using pneumatic staple gun.

   Spacing of staples shall be 225mm (MAX) and 150mm minimum. It is not recommended to staple at spacing of less than 150mm.