

# 3D POLYSTERENE WIRE PANEL CONSTRUCTION SYSTEM

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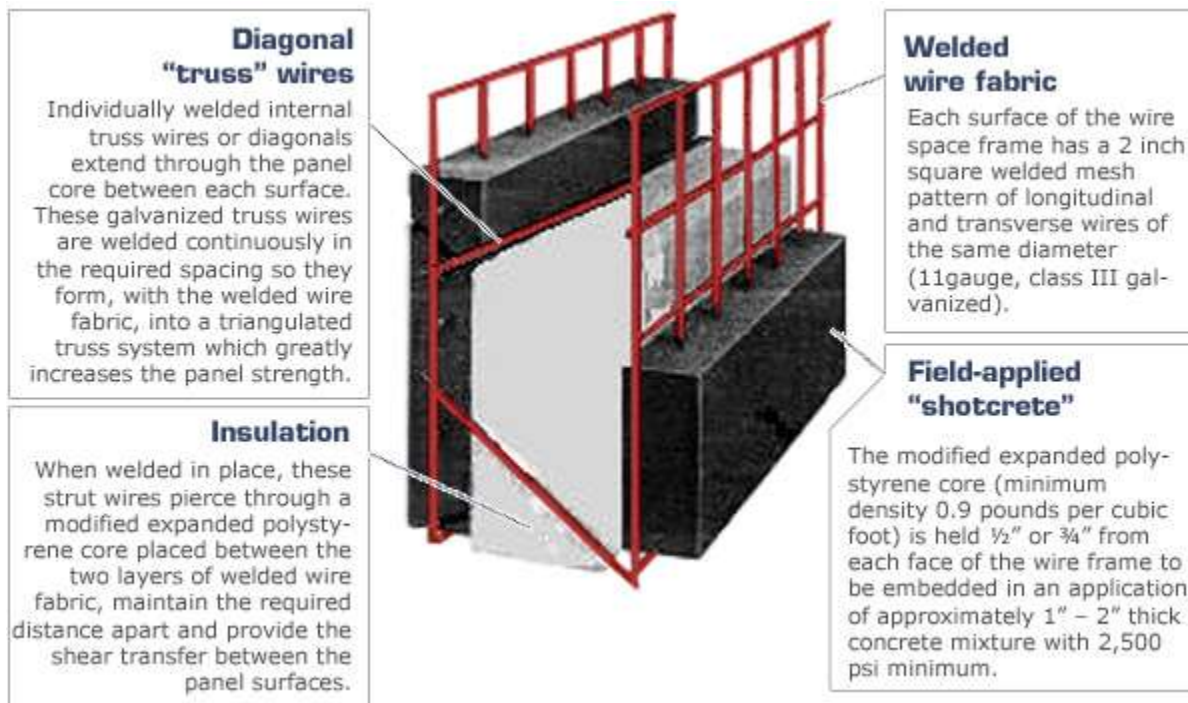
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**ABSTRACT** - The 3D panel Construction system is a complete wall & floor structure, combining the strength of steel, insulation of polystyrene and the durability of concrete. It provides a strong, low maintenance, highly insulated plaster building material. The 3D panel is a spatial structure consisting of an expanded polystyrene plate (usually called core) it is a versatile structural element designed for floor, wall, partitions, roofs ...In terms of energy consumption thermal protection, thermal insulation, comfort, simplicity, speed & cost of construction, strength and durability. Used polystyrene foam virtually inert & does not absorb moisture, is durable & resistant to decay. Stay-in-place forms today use polystyrene as molds for concrete and end up with soft exteriors and exteriors which have to be hardened. In the process, they lose the thermal mass effect necessary for energy efficiency. Unlike concrete block, the 3D panel provides the insulation and reinforcement strength to concrete which makes it acceptable for residential or commercial construction. The 3D Panel System has been described as Twenty First Century technology available today. Isn't it time for you to enjoy the pleasure of a construction system which provides long term durability and long term energy savings without compromising our natural resources.

## PRODUCT DESCRIPTION

It is the product inserted in the solid steel structure with the foamed polystyrene of heat shield. It as a lightweight panel is also apt for the whole construction structural body as well as partition wall, floor and roof stuff. Foamed polystyrene insulating layer with the thickness of 100mm in the center, steel wire truss coated with zinc of 3mm or 3.8mm between the insulating layer is pinned at 2 inch intervals, at both sides of which forms up at 5cm x 5cm or 5cm x 10cm intervals with the wire mesh coated with zinc of 3mm or 3.8mm that is at fine-spun 50mm or 100mm intervals. So the whole points of contact in all steel wires is joined in a spot welding, which is a panel of 2.4m or 4m full length, 1.2m width, 60-200mm thickness. At the first time, it will be sprayed or hand plastered on the both sides in a thickness of 7mm-10mm, and finished with first coat and double second coat of 35mm-30mm thickness, which produces the structure with the total thickness of 12cm-13cm, the self-load of 120kg/m<sup>2</sup>, and the strong earthquake proofing.



The 3D Panel is a unique and effective way to easily create a strong insulated concrete building or wall. 3D Panels are used in every type of concrete structure because of the flexibility of design and ease of use. Thousands of structure and walls have been built around the world with 3D panels. Many of them use the panel for all elements of the structure including walls, floors, stairs and trim. 3D Panel is used for affordable housing all the way to multi-million dollar housing. Residential, commercial, institutional multi-story all can be created easily with this remarkable code-approved method.

The strength of the 3D system is enormous and is partially attributed to the truss wires which are welded to connect each side of mesh to make the panel. The insulation in the center of the panel is suspended on the truss wires and becomes a continuous thermal break when panels are connected. The performance of the insulation thus is greater than the R-value rating because of the thermal-mass effect of the concrete on each side of the panel.

The monolithic structure with 3D panel enables it to withstand earthquakes, hurricanes and typhoons. Many 3D buildings have endured hurricanes with no water penetration or damage, earthquakes with no cracking, and at the same time provided a comfortable and energy-efficient environment for the residents. In the U. S. today there is a strong movement towards concrete housing. The 3D Panel System is perfect for this market. It provides hard walls and perfectly placed insulation for maximum efficiency. Stay-in-place forms today use polystyrene as molds for concrete and end up with soft exteriors and exteriors which have to be hardened. In the process, they lose the thermal mass effect necessary for energy efficiency. Unlike concrete block, the 3D panel provides the insulation and reinforcement strength to concrete which makes it acceptable for residential or commercial construction.

#### COMPOSITION:

- A three dimensional welded wire space frame
- With an expanded Polystyrene insulation core

#### CHARACTERISTICS:

- No buckling and bending of panels
- Simple bracing to hold panels in the required position
- Easy fixing of rough frames for doors and windows
- Simple and quick installation of utilities, etc

#### QUALITY OF MATERIALS:

1. Steel wire : steel wire with a diameter of  $\varnothing 3\text{mm}$ (3.8mm) licensed by KSM 0802 and coated with zinc in a tensile strength of 60~120kg/Cm<sup>2</sup>
2. Foamed polystyrene : licensed by KSM 3802 with a specific gravity of over 0.015kg/Cm<sup>2</sup>. (Over 0.015kg/Cm<sup>2</sup> is for the manufacturing order)
3. Strength of Mortar : Normally 1:3 (70kg/Cm<sup>2</sup>)

#### MERITS:

##### 1. Thermal Insulation

EPS squeezing foaming polystyrene that is famous for the internal thermal insulation is used and reduces the **loss of heat**. It also makes the comfortable indoor space regardless of temperature variation in the winter season.

##### 2. Fireproofing

It has passed the 120 minutes fireproofing test of national construction institute and has also been approved as the fireproofing materials for internal & external construction stuffs.

##### 3. Moisture proofing

As we have used the high performance foaming polystyrene 100m/m of low absorptiveness, it shows an excellent prevention against the condensation on the wall. (As for the usage of external wall, the exterior on the external wall needs the waterproofing mortar)

#### 4. Soundproofing

On the base of sound insulation performance test, it has shown a distinguished feature of soundproofing among others. Especially, it shows a heightened operation capability with both sides plasterboard.

#### 5. Lightweight

It only weighs a quarter of the masonry wall, which alleviates the fixed load of structure and also highly recommended in the enlargement of old buildings. (masonry 450Kg, panel 120Kg)

#### 6. Structure

It is used for every construction like residence and apartment approved by national construction institute and U. S. A agencies of **ICBO, BOCA, SBCC**. Especially, it is highly recommended the higher the building is and the longer its span is.

#### 7. Variety

It can be designed in a varied form without any professional knowledge, and fits for the round-typed materials as increasing **10%** indoor space compared with masonry structure.

#### 8. Economical Efficiency

As it is a standardized factory product, easy to construct, and allows us to execute the masonry, insulation, plastering at the same time, it surely reduces the construction time down to a third.

#### 9. Shortening of Construction Time

As we said above, it is easy to execute and able to curtail the construction expense with the high efficiency in thermal insulation. It also boils down the framing expense as a lightweight material, which is definitely economically effective.

### DESIGN

1. It is freely handled & framed up to any forms in the spot with the easiness of cutting and processing for the plane and solid design.
2. It has a versatile application to almost all construction architecture, especially for R-C structure, interior & exterior wall, single family & row house, apartment, condominium.
3. It can be diversely designed for the soundproofing wall in the additive building of weakened structure like school, gym, factory, farmstead, cooling & thermal insulating warehouse.
4. As it is standardized as a strengthened but lightweight, thin panel for construction structure, it has greatly increased the available floor space (10%).
5. As it weighs only a quarter of it compared with the self load of masonry wall, it sharply curtails the fixed load, which eases off the burden of ground-making and also renders service to the perfect construction with a thermal insulation.

#### 1-Design flexibility:

If you can dream it, you can build it with 3D Panel System. Rounded corners, archways, angles—it's the closest thing to modeling clay the building industry has today. Exterior walls built with 3D Panel System are structural entities themselves allowing designers to easily place cantilever windows, load-bearing floor systems and outer-wall openings with total flexibility. Interior walls built with 3D Panel System help bear loads throughout your structure, allowing greater distances to be spanned without interim supports.

#### 2 - Energy Efficiency

Building with 3D Panel System you can save 50 - 80% on the cost of heating and cooling. Due to the tremendous insulating characteristics of 3D Panel System reduce the initial building cost, as well as long term maintenance.

#### 3 - Thermal value and Heat loss

The 3D Panel System has been designed with maximum environmental comfort in mind. A wood, steel structure can not compare to the comfort available with the outstanding energy saving created by using 3D Panel System. The 3D Panel System

will keep you cooler in the summer and warmer in the winter. The expanded polystyrene core meets all the VA, FHA and HUD thermal requirements.

- No wood and steel studs to transfer heat or cold through the exterior walls.
- The use of minimum 3" thickness density cement and variable thickness of polystyrene ranging from 2" to 5" offer an excellent thermal barrier.
- Saves 50% - 80% of heating costs.
- Reduces size and cost of HVAC "heating and air conditioning" systems from 1 to 5). 1- Roof & Second Floor

#### APPLICATION OF CONCRETE:

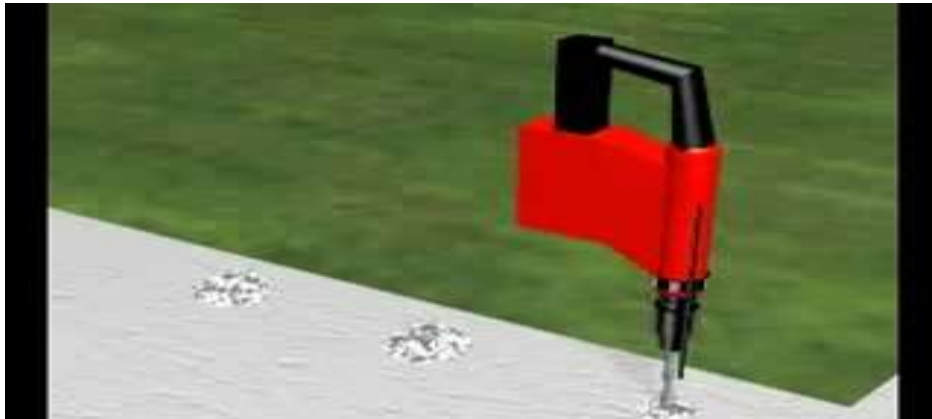
- Either manually
- shot Crete (guniting)

#### ADVANTAGES :

- Fast, simple erection
- Erection within only a matter of weeks [instead of months]
- High strength load bearing for walls and roofs
- Elimination of additional beams and columns
- Excellent thermal and sound insulation due to the locked-in-core body
- Economical use of materials
- Minimizing concrete consumption,
- Long life of buildings of high quality

#### INSTALLATION PROCEDURE:

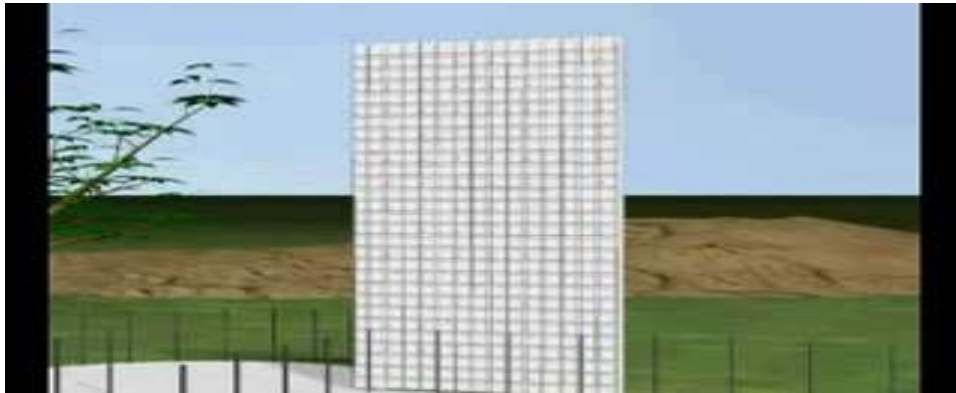
1. provide holes in plinth concrete.



2. Fix the reinforcement bars on the holes.



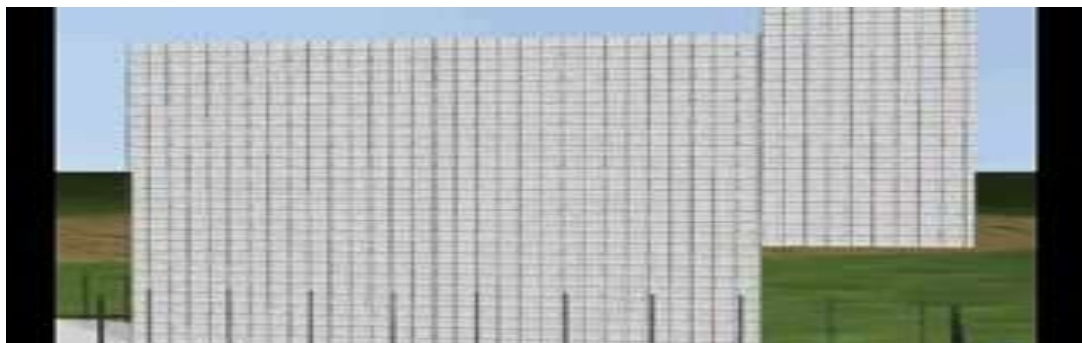
3. Fix the panel on the plinth level.



4. Tie the panel with the plinth level reinforcement.



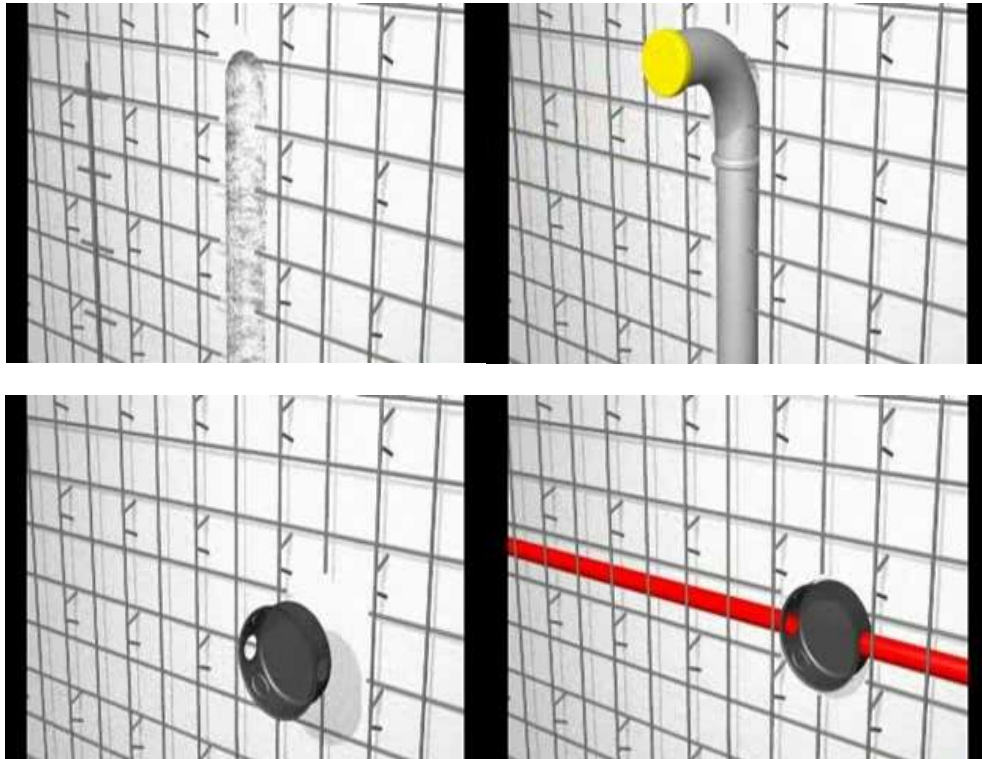
5. Fix the other panels



6. Joint the panels with tie.



7.Piping and electrical insulation



8. Concrete finish to the panel



9. Fix the panel through the required area.



10. Fix the roof panel and start the same procedure for first floor.



11. Complete the 3D panel construction.



12. Completed Building.



#### CONCLUSION:

Since the introduction of the 3D Panel for construction of walls, several new uses have emerged for the panel. These are explained in the following pages. The 3D Panel System has been described as Twenty First Century technology available today. Isn't it time for you to enjoy the pleasure of a construction system which provides long term durability and long term energy savings without compromising our natural resources? The revolution in construction technology has started and the 3D Panel is out in front

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