

“Seismic Resistant, Energy Efficient, Fast Construction Technology”

Structural Concrete Insulated Panel Construction (SCIP)

INTRODUCTION

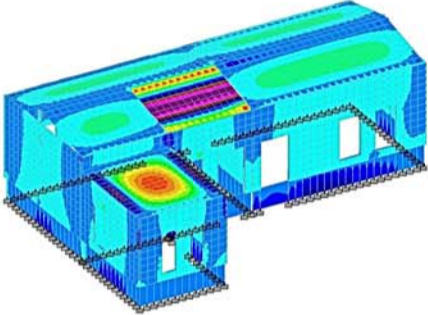
Structural Concrete Insulated Panels (SCIPs) have become a widely used alternative construction material for homes and other buildings. Since there are many types of Composite Panel building systems which have been developed, the acronym SCIPs refers to panels made from a thick layer of foam (polystyrene or polyurethane) and welded GI Wire mesh crossed between the foam sandwiched between two layers of shotcreting (1.5 inch thick on each side). Transporting cut to size to the jobsite, the panels can be rapidly assembled by workers without extensive training. Wall panels and Roof Panels are manufactured in 4 ft in width and 8 ft height, available in thicknesses range of 2” to 6”.



BACKGROUND

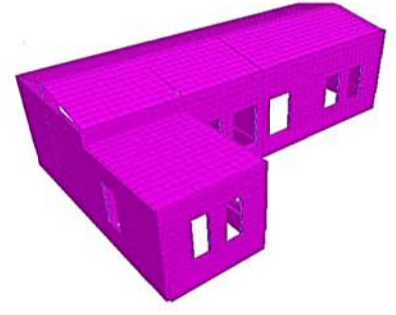
It became evident at the start of the reconstruction process that conventional means of construction cannot fetch the desired level of quality. The problems associated with the construction of conventional concrete structures were accessibility to the remote locations, severe weather conditions, unavailability of water and logistic arrangements at project sites. Keeping in view the light weight nature of the SCIPs, excellent structural compatibility to seismic prone areas, efficient thermal and sound insulation and much lesser time of construction compared to conventional RCC construction, it was decided to deploy the use of SCIPs in earthquake affected areas.

DESIGN



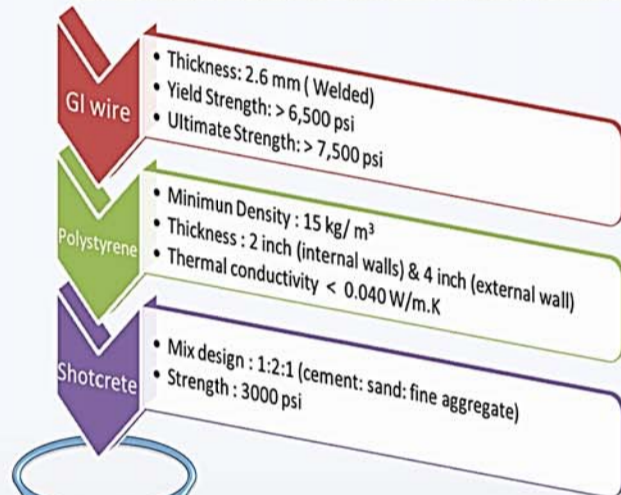
Stress analysis on 3-D Model

Bonding of the foam core to the stiff outer skins creates a web-and-flange structural strength (along the same principal as an I-beam) across the length and breadth of the panel. With the capacity to handle axial, bending, racking, and shear loads, properly designed and assembled SCIPs not only replace conventional framing, but will withstand high wind, and seismic forces. For low rise construction, SCIP panels are designed using standard charts for wind, snow and seismic load resistance capacity which have been developed by different manufacturers. SCIP panels are modeled as mesh elements in finite element based structural design softwares (SAP,ETAB, STAAD etc) and each element is checked for the permissible value of stress against the thermal, gravity, seismic and wind loads applied in accordance with the ACI, UBC and other relevant codes.

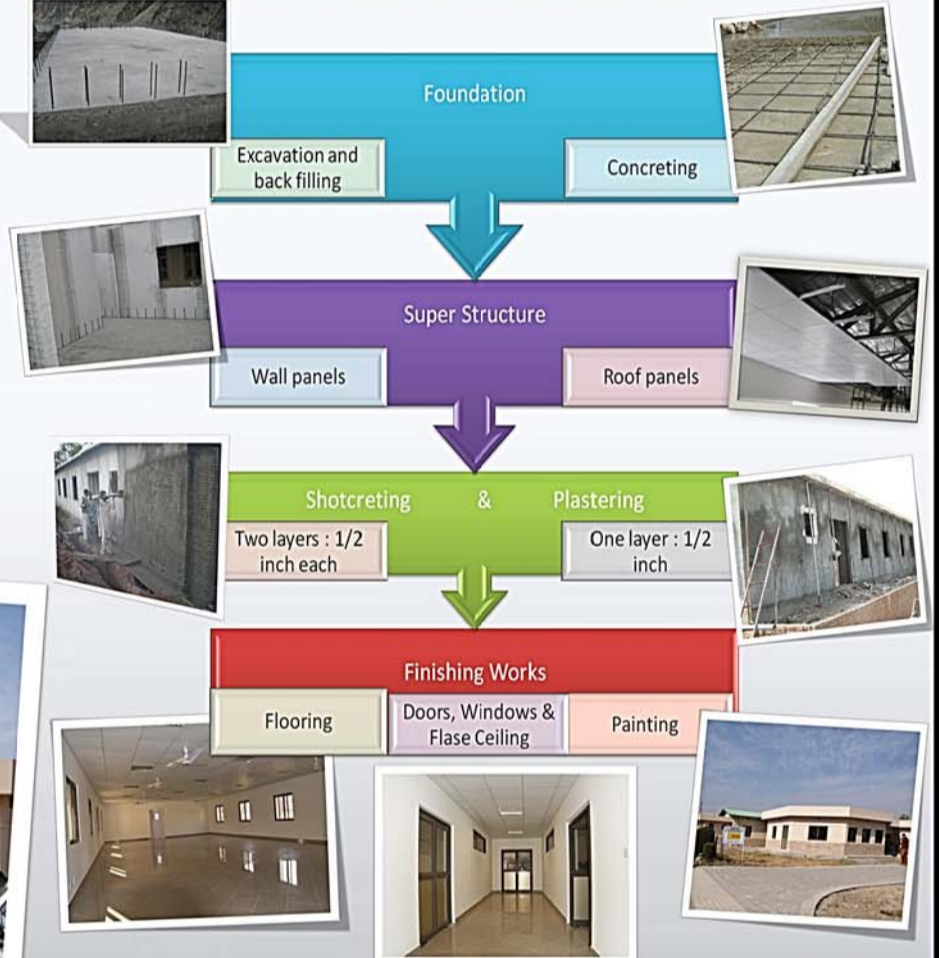


3-D Model Rendered view

MATERIALS SPECIFICATION

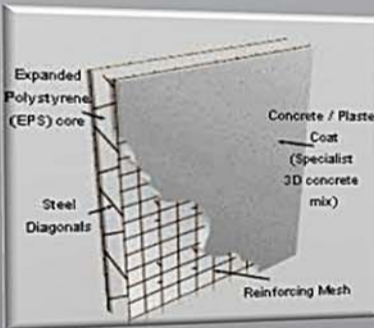


ERECTION SEQUENCE



ATTRIBUTES

TECHNOLOGY PROSPECTS



The conventional building system in Pakistan has always been divisive among the Engineers and Architects due to its poor energy conservation and longer construction period. According to a conservative estimate, buildings in Pakistan consume more than 40% of the total electricity produced. The demand of this sector is growing at the rate of almost 14% per annum, the highest among all other sectors. As per indices of Housing Ministry there is an increasing shortage rate of 4,000 housing units per year. To cope up with the challenges of the construction industry, energy efficient fast construction buildings solution is indispensable.

STRENGTH

Structural Concrete Insulated Panel (SCIP) walls can carry from 40,000 lbs to 120,000 lbs of load per linear foot of wall. Able to withstand 200mph+ hurricane winds and 7.5 scale earthquakes.

ENERGY EFFICIENCY

Super insulated PS foam cores provide R4.2 per inch of foam (for example-10 inches of foam core equals R42)-but the performance of the wall is greater due to superior sealing and thermal mass.

SPEED OF CONSTRUCTION

By eliminating multiple trades needed in a traditional wall, structures can be erected in less time than wood framing and brick structures and much less time than concrete block.

SOUND INSULATION

In urban areas or in multi-user applications, sound insulation is very important. PS walls are superior to almost every other wall system available.

LOW CONSTRUCTION COST

SCIP wall can save time during construction. Heating and cooling costs can be drastically reduced - up to 60% less than brick, block & wood framed wall systems.

