

Innovative Lightweight Scip Panels and Recycled Plastics: Reengineering Resilient Infrastructure for Rapid Construction

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As climate volatility and geopolitical crises escalate, the catastrophic loss of housing demands immediate, ecologically responsible structural solutions. To deploy affordable emergency housing in days rather than months, this presentation introduces a comprehensive dual strategy that fuses factory prefabrication with the circular economy.

The first cornerstone is lightweight Structural Concrete Insulated Panels (SCIPs). Built from a 3D wire mesh and an insulating core flanked by green concrete surfaces, these panels form a monolithic composite structure with exceptional load-bearing capacity, shear resistance, and resilience against severe earthquakes and extreme weather. Their minimal weight eliminates the need for heavy machinery, allowing for rapid, low-impact installation.

Complementing this structural shell is an innovative, separate building system: partially reinforced concrete interlocking recycled plastics. This technology repurposes ocean and landfill plastic waste into a seamless interlocking grid that dramatically accelerates assembly. By infusing a partially reinforced concrete matrix directly into the hollow channels of these high-energyabsorbing plastic blocks, the plastic acts as a permanent, protective stay-in-place formwork, while the internal concrete provides vital structural rigidity and load-bearing strength.

Because both the modular SCIP panels and the interlocking plastic components are lightweight and compact, they optimize shipping logistics for immediate deployment. Manufactured in qualitycontrolled factories, they are engineered for highly straightforward field assembly. Local volunteers can safely erect these structures with minimal technical supervision, drastically slashing building times, reducing construction waste, and bypassing skilled labor shortages. Ultimately, this framework demonstrates how pairing these two distinct material systems creates fast, equitable, and resilient housing for vulnerable populations globally.