

INTEGRATED STRUCTURES, INC.

Spar & Membrane Construction System

Fire Resistant

Exceeds Fire Rating of Residential Construction by 500%

Earthquake Safe

Far Exceeds Seismic Codes

Energy Efficient

R-50 Insulation, and Thermal Mass

Rapid Construction

Walls Erected and *Finished* in Two Weeks

Sustainable Technology

Recycles Agricultural Bi-product and Utilizes 90% Less Wood



Exterior of SMS residence

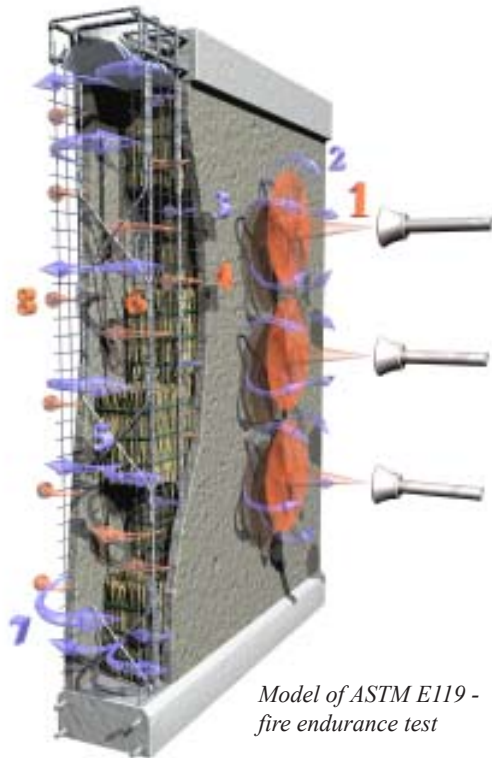
The architecture, engineering, construction firm ISI has created a construction technology called Spar & Membrane System (SMS) that improves fire and earthquake resistance, reduces energy cost, is environmentally friendly, and cost competitive with current construction. The core of this process utilizes straw bales and 3-1/2" concrete shields to build the outer walls. If the following information appeals to you please contact us for a more detailed presentation.



The SMS* and optional Cool Roof* Protects Lives and Safeguards Investments

*SMS and Cool Roof patent pending

Fire Resistance:



*Model of ASTM E119 -
fire endurance test*

1. Flame is applied to outer membrane
2. Half of the embodied water is driven out, initially protecting wall
3. Half of the embodied water driven into bales
4. Outer membrane temp rises
5. Water in bales driven out, further protecting wall
6. Bale temp. rises, applying heat to inner membrane
7. Embodied water of inner membrane driven out
8. Inner membrane temp. rises

Typical residential walls are type V non-rated construction. The SMS attains a minimum 4-1/2 hour rating, exceeding the highest fire rating recognized by the California Building Code. Incorporating two 3-1/2 inch thick concrete membranes, structurally connected with steel spars and separated by straw bale, the assembly exceeds the fire rating of standard residential construction by 500%.

Coupled with the 4-hour pre-cast concrete Cool Roof, the fire resistance is un-paralleled.

Earthquake Safety:

“We pulled the test panel to 4 times the allowable code drift and it continued to support a vertical load equivalent to a 5-story building.”

*R. Gary Black, P.E.
Professor Department of Architecture
University of California, Berkeley*



Seismic Testing - UC Berkeley

The SMS is resistant to *large magnitude* earthquakes. It is 18 times stronger and more ductile than standard residential construction. A plywood wall can handle 800 pounds of earthquake force per foot. The SMS can handle over 15,000 pounds per foot.

The SMS is 30 times stronger than a solid 6 inch concrete wall in the out-of-plane direction providing unprecedented seismic performance.

Energy Efficiency:

“Our SMS house is not air conditioned, yet it remains a comfortable 70° F inside even in 105° F heat.”

*SMS Home Owner
Sonoma, California*



Interior SMS residence

The SMS boasts R-50 insulation and thousands of pounds of thermal mass. California Title-24 requires R-19.

In most California climate zones the SMS will eliminate air conditioning all together and reduce heating costs by 50%. Combined with Cool Roof technology -- pre-cast, insulated concrete roof panels fitted with hydronic coils to collect solar radiation - the energy performance is unsurpassed.

Rapid Construction:

“The crew arrived to erect the walls – stacking bale, tying rebar, laying electrical and plumbing – they shot the concrete membranes, inside and out, completing the winery in about 2 weeks.”

*Larry long
SMS Winery Owner
Shenandoah Valley, California*

It takes about two weeks to construct and *complete* the walls for a 3,600 square foot two-story house. The walls do not require insulation, sheetrock, siding, stucco or trim, and they can stand in the weather unprotected while the roof and windows are installed. Speed of construction, and duplication of structure and finish result in considerable cost savings, which brings this far superior construction system within the cost range of more typical methods.



Day 1 - placing spars and bales



Day 10 - finished walls of winery

Sustainable Technology:

“A standard wood-framed home consumes over one acre of forest and the waste created during construction averages from 3 to 7 tons.”

U. S. Department of Energy



Interior of SMS residence

The SMS utilizes rice straw, an agricultural bi-product, keeping it out of landfills. Concrete used in the structure contains 20% fly ash, recycling an industrial waste. No wood is required to construct the walls. SMS buildings are virtually maintenance free and have a multi-generational life expectancy, reducing consumption of our natural resources.

The SMS is affordable and can make your next project an investment that:

- ◆ Protects your Family
- ◆ Safeguards your Possessions
- ◆ Reduces Energy costs and Impact on Natural Resources

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