

Alternative housebuilding with straw, wood and sod

Traditional materials

- “Stick” houses--2x4, 2x6 construction
- fiberglass insulation
- asphalt, steel or wood-shingle roofing

Cost—around \$100/sq. ft. in town; \$120/sq. ft. in the county

Availability

- good quality wood difficult to find

Alternative ideas

Strawbale houses

Straw vs. Hay

- straw is made from the leftover stems of harvested grain
 - it has a high C/N ratio and is therefore resistant to decomposition
- hay consists of finer-stemmed grasses or alfalfa often with the seed heads
 - hay has a higher nitrogen content and therefore is more easily decomposed

History

- traditional cultures throughout the world have long recognized the value of straw,
 - grasses and reeds as building materials
- they have used them effectively in combination with earth and timber to create shelter for thousands of years
- walls made from tied bundles of long lengths of straw, stacked in mud mortar are common in Asia and Europe
- these methods are still common, being replaced only where modern construction methods, materials and codes have become commonplace

In the United states, building with straw began in the late 1800's with the development of the stationary horse and steam-powered baler that compressed hay and straw into string- or wire-tied bales

- the first straw-bale houses, schools, barns and churches were built in the Sand Hills of Nebraska beginning in the 1860's
- many of these buildings are still standing today

Desirable characteristics of strawbale construction

- thick walls
- good insulation
- energy efficient
- low cost

House--1,375 sq. ft., 3 bdr., 2 bath, moderate climate with heating and cooling

	Conventional	Straw bale—totally owner built
Construction costs	\$ 82,500	\$ 20,625
Down payment (20%)	\$ 16,500	\$ 0
Finance	\$118,800	\$ 0
Energy (heat and cooling)	\$ 36,000	\$ 9,000
Total life-cycle costs	\$171,300	\$ 29,625
Savings	\$ 0	\$141,675

- ease of construction
- environmentally friendly
 - straw is a wasted product in many places that is burned annually
 - renewable and sustainable

Two styles of straw-bale houses

Nebraska style or load bearing

- bales bearing the weight of the roof directly
- requires pre-compression of the bales

Non-load bearing (modified post and beam)

- post and beam frame bears the weight of the roof
- requires no pre-compression of the bales

Cordwood Masonry (log-end, stackwood or stackwall construction)
fire-wood length logs stacked, infilled with mortar and insulation

A wall has four parts:

- one interior and one exterior mortar facing (roughly 4 inches thick)
- cordwood (16-24 inches thick)
- an insulating core between the two mortar walls

Benefits

- thick walls
- each piece is relatively light
- can be built slowly over time
- materials can be self-gathered

Sod

Actively growing grass and herbaceous plants

- usually used as a roofing material
- common in plains houses built low to the ground

Benefits

- durable
- environmentally friendly