Practical Passive Solar

Steve Kawell

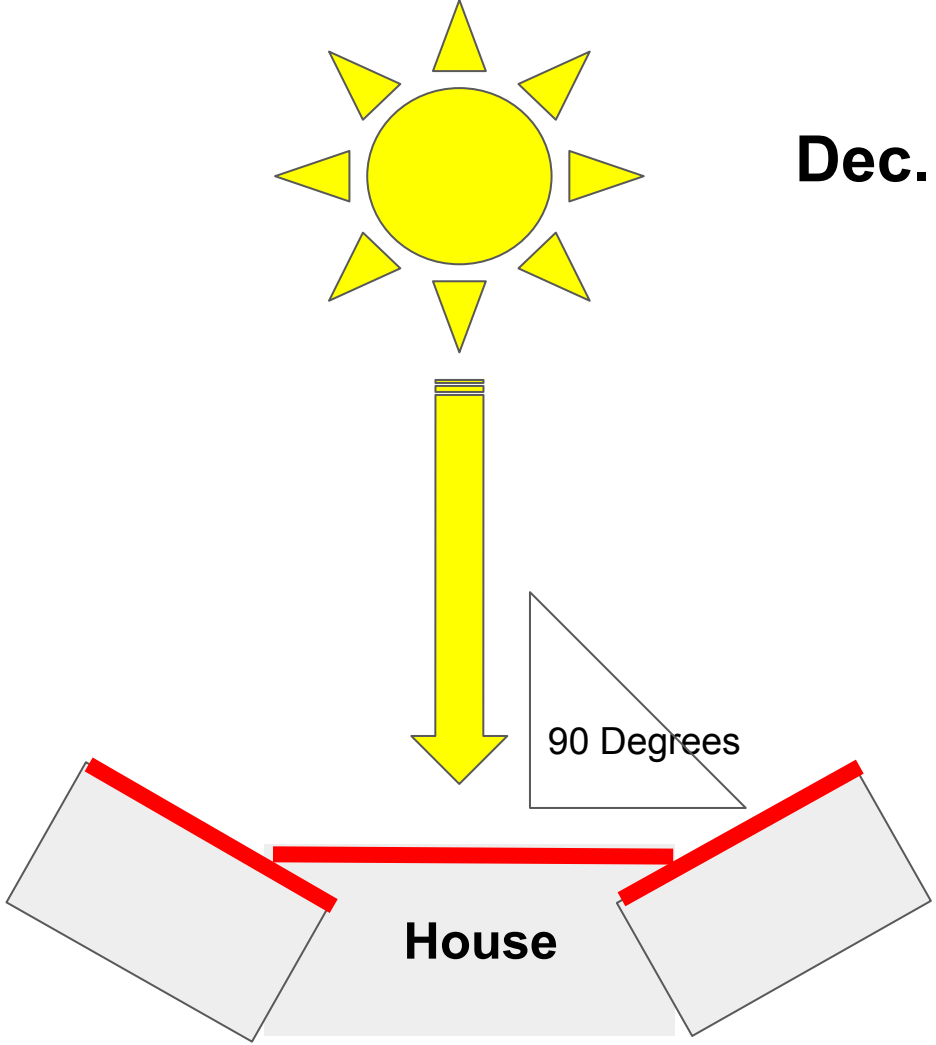
Higher Level of Design

Good Passive Solar Design Synchronizes a Building to the Daily and Seasonal Solar Cycles of Our Natural World for the Benefit of the Occupants.

1) **Free Energy Delivery …… Make it an Asset Not a Liability.**
2) **Reduce Heating and Cooling Loads…….. Saves Energy Dollars.**
3) **Greater Occupant Comfort.**
4) **Creates a Healthy, Vibrant Living Space……People, Pets, Plants.**
5) **Connects Occupants to Our World's Natural Cycles.**
6) **Survivability.**

Direct Gain Design.

Orientation, Orientation, Orientation



Dec. 21 Winter Solstice at Noon

True South

Self Regulating

30 Degrees off True South

Summer

Winter

South Facing Window area

Rule of Thumb:
10 - 15% of a rooms floor area.

1) Size of interior space.

2) Thermal mass.

3) Glass type. (Solar Heat Gain Coefficient)

4) Shading.

Don’t over glaze!

Thermal Mass

Passive Solar Battery.

1) Stores Solar Energy.

2) Stabilizes interior temperature swings.

3) Allows for greater window area.

4) Utilize common interior elements.

Concrete Slab w/ Stone Tile.

Stone Veneer Fireplace.

Kitchen Countertops.

⅝” Drywall Throughout.

South Window Shade Designs

SketchUp Solar Shading Modeling Tool.

Rule of Thumb:
2 ft. overhang, 1.5 ft. above top of window.

Larger overhang tempers oversize window area.

Observe the effects of the sun on your structures.

Winter Solstice
Equinox
Summer Solstice

Summer

Winter

Additional Passive Cooling Strategies

Appropriate Passive Solar Design Reduces Summer Overheating

Night Flush

1) Stack Effect Ventilation Strategy.
2) High ventable windows.
3) Ventable skylights.
4) Ceiling fans.
5) Whole house attic fan.

Minimize Western Elevation Sun Exposure

West Elevation Shading

Passive Solar Support Team

1) Very High Level of Building Envelope Insulation.

2) Heat Pump Heating/Cooling System.

3) Solar Photovoltaic Array.

4) Heat and Energy Recovery

5) Window Treatments.

Provide Privacy.
Increased Comfort Against Cold.
Reduces Energy Costs $$$.
Adjust Incoming Solar Radiation.
Dark Skies.

6) Solar Flywheel.

Programmable Thermostats

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A
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Design