

# Mei Yuan Ecological Building, Shan Dong University of Architecture

## Picture



Fig.1 Appearance of the building

## Basic Information

Location:	New campus of Shan Dong University of Architecture, Ji Nan, Shan Dong Province
Climate:	North China, Continental Monsoon
Project brief:	A new building for student's apartment
Client:	Shan Dong University of architecture
Architect:	Design & Research Institute of Shan Dong University of architecture
Timetable:	Start Project: October 2003 End date project: September 2004
Area:	2300 m <sup>2</sup>
Cost:	RMB 0.6 million

## Design features

Bioclimatic

features: Not specified

Materials/

Construction: Brick and reinforced concrete for walls and roof

Technical

features: Heating system: solar wall system offer heating and ventilation  
Hot water supply system: automatic solar water heating system, intelligent measure system

Lighting system: auto-tracking PV system for lighting

Renewable energy system: auto-tracking PV modules, solar collector, solar lighting system, solar chimney, etc.

Solar chimney ventilation system and natural ventilation system

U-values:  $k=0.41 \text{ w/m}^2\text{k}$  for walls

$k=2.0 \text{ w/m}^2\text{k}$  for glazing

## Project Details

Context and site: A new building for student's apartment; first solar wall project in China: collecting extra solar energy from south facade and transport to north rooms.

Function & form: Multi-storey (six floors); student apartment

Structural system: Steel frame and shearing force walls

## Energy efficiency control:

Thermal insulation

of building enve-

lope:

### Exterior façade:

The south façade adopts Solar Wall system (Fig.2) with overall fresh air heating and ventilating system, which is developed by "CONSERVAL" from Canada and "DOE" from U.S. The system collects solar energy in south façade to heat up the air and then transport the air to north rooms, which is the first project making use of Solar Walls.

The system can heat the air up to  $40^{\circ}\text{C}$ , bringing the fresh air into rooms parallel with heating function. The test shows that Solar Wall system saves 40% energy consumption in winter, the  $\text{CO}_2$  concentration is only 30% of the traditional system. Designers consider the integration of the solar wall with architecture; classical copper-colored solar walls are well

integrated with windows and façade, enriching the building façade and sculpt.

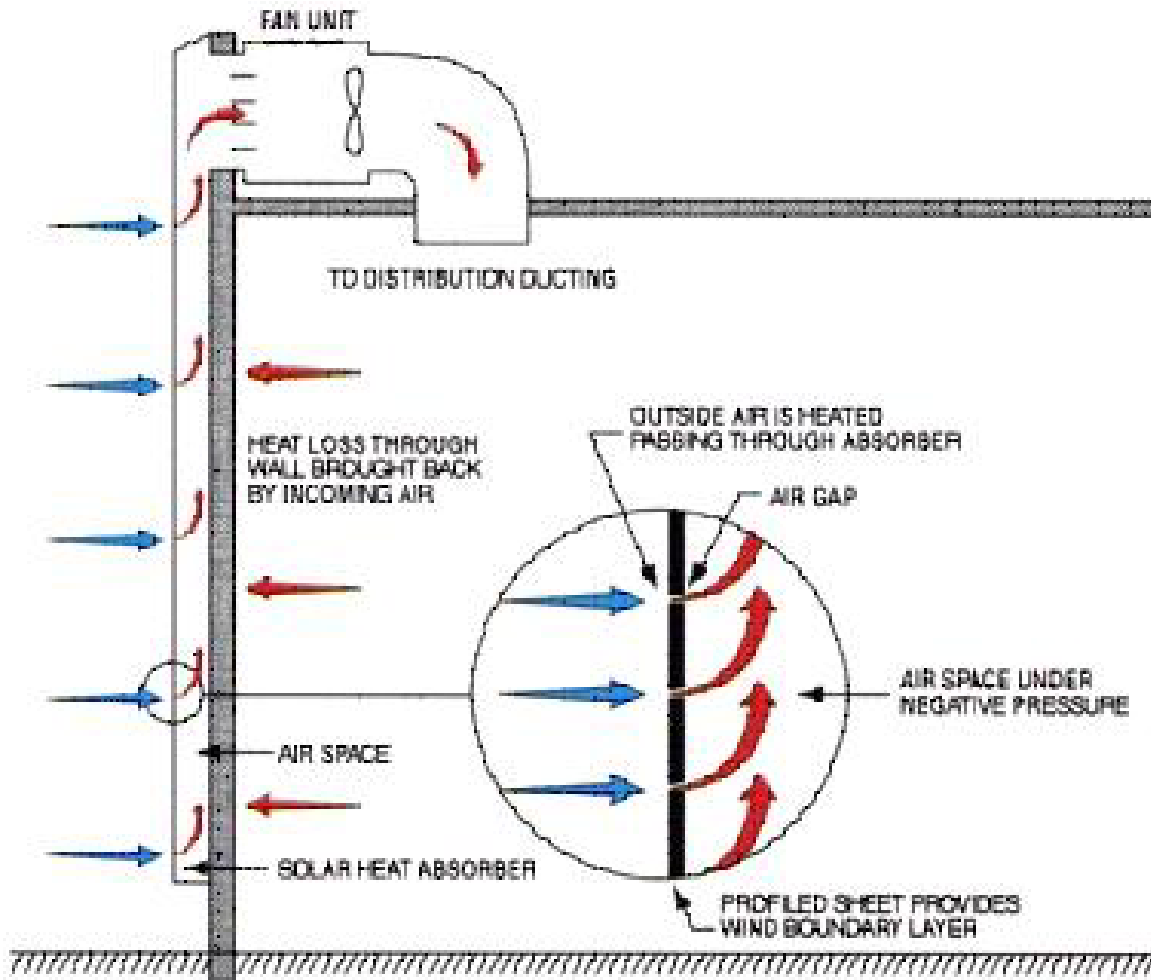


Fig.2 Principle of Solar Walls

Window: All the windows are interface hollow glazing, part of them are Low-E glazing.

Sun shading devices: Adjustable sun shading device is mounted at exterior façade.

Floor: Low temperature floor radiant heating system

Space heating  
cooling, venti-  
lation, air con-  
ditioning:

Heating system: solar wall system offer heating and ventilation

Natural ventilation: Solar chimney ventilation system: the chimney is located at end of corridor of the apartment to organize the natural

ventilation, improving the comfortable level in summer and transition seasons. The method could insure the corridor with 18°C, which is quite suitable for student apartment building.

Trickle stream ventilation devices at exterior window;

Power grill ventilation devices with double speed ventilating system

**Renewable Energy use:**

Solar walls

Solar chimney

Solar water heating: automatic distributing solar water heating system with intelligent measure system; reclaimed water system for toilet flush

Auto-tracking PV system for cartilage lighting