Sustainable Urban Design Symposium
MIT
6 May 2013
Competition Site Plan

Public Space
INDOOR CLIMATE CONCEPT

Natural Ventilation Mode

+ Operable windows can be used for ~4 months a year
+ Smoke Exhaust fans @ skylight maintain negative pressure in atrium
+ Occupants choose between mechanical and natural modes
+ Natural mode deactivates when window opens
INDOOR CLIMATE CONCEPT

Cooling Mode

- Provided by active slabs in occupied spaces
- AHU delivers minimum outside air – Air Quality & Dehumidification
- Classrooms are delivered air via displacement air
- Office fed air via windows or overhead systems monitored by VAV
- Transfer air sent to atrium

- Cooling tower
- Air handling unit (one east / one west) supply air to building
- Exhaust air from atrium
THERMAL COMFORT
Active Slabs
+ Heat Transfer by building occupancy
+ Use of thermal mass
+ Active Slab Operation allowed during natural ventilation
+ Windows Automatically close when conditions leave acceptable range
OFFICE/CLASSROOM FAÇADE

ALL WORKSPACES HAVE OPERABLE WINDOWS AND INDIVIDUALLY CONTROLLABLE, EXTERNALLY MOUNTED, SUN PROTECTION.

A GLASS RAINSCREEN PROTECTS THE PROGRAMMATIC INTERIOR WORKSPACES AND THE SUN SHADING DEVICES FROM STRONG WINDS.
ASSEMBLY
Double Skin Facade
+ Insulating Low-E Coated Low-Iron Glazing
+ ½" Tempered Laminated Low-Iron Glazing
+ Opaque Metal Composite Panels
+ Operable Windows
+ External Shading
THERMAL COMFORT
Window Automation

+ Manual Operation of Vents – Notified by Indicator Light
DAYLIGHTING
Spatial Organization & Local Control

+ Daylight Factor Level +3%
+ Outside retractable louvers reduce glare
+ Exterior blinds tilt angles vary to allow daylighting to be redirected in upper 1/3rd
+ Up & down when façade radiation passes certain limits
+ Local override for daylight
ASSEMBLY
Checkerboard Unitized System
+ Insulating Low-E Coated Low-Iron Glazing w/ gradient frit pattern
+ Insulating Low-Iron Full Ceramic Frit Spandrel Glazing
+ Insulated Operable Awning Vent
DAYLIGHT AND THERMAL CONTROL
Silkscreen Pattern

+ No external shading
+ Pattern minimizes coverage near ceiling
+ Deep spaces force strategic programmatic layouts – Stacks & circulation toward interior while reading reading rooms and group studies near façade.
+ Interior programs benefit from daylight from atrium
+ Glare protection achieved with interior screens

East façade
Glass without frit, t= 60%
glass with frit t=25%
glass with frit t=15%
glass with frit t=5%
THERMAL COMFORT
Window Automation
+ Automatic Vent Operation – Opens when conditions permit, not push button operation
Radiant Fin Tubes
+ Downdraft of cold air at atrium facades create cold spots which would cause local discomfort

DAYLIGHTING
Fixed Blade Louvers
+ Spacing to block intense allow plenty of views out
+ Minimal reliance on artificial light allows for more creative...
A VISION FOR PITTSBURGH
8TH STREET: THE ATTRACTIVE WAY TO THE RIVERFRONT!
THE PUBLIC SPACE NETWORK
8TH STREET

THREE SISTER’S GALLERY

RESTAURANT

CAFE

THEATER

OUTDOOR PERFORMING

HOTEL

RETAIL ATTRACTIONS
C
DIVERSIFY USER GROUPS
TYPOLOGIES

SEMI PUBLIC SPACES
THE LANES:
A FINER GRAIN
- CURRENT SITUATION
- COVERAGE OVER BYPASS
- DIRECT ACCESS TO THE WATER
- NEW OPPORTUNITIES FOR THE RIVERFRONT
View from sun position
21st March/September
CREATING A THREE-DIMENSIONAL GARDEN!

HIGH QUALITY ENVIRONMENT
früher
ODER / UND ?

Fussgängerverkehr  Fahrverkehr
Überlagerung
Unterbrechung der Fahrwege - Fußgängeraktivitäten
Verkehrberuhigung
Materialwechsel quer zur Fahrbahn

Belagsmuster überlagert gesamte Platzfläche einschließlich der Fahrbahn

Idee Gestaltungskonzept
Möblierung - Sitzbänke
Heimatfeste

Faschingsumzug

Wochenmarkt

Nutzungen am Marienplatz
15 W Energy-Saving

20 € Savings/Lantern (operation cost a year)

6,000 Lanterns

EXISTING LANTERN
SON-T 50W

$E_{\text{mean/street}} = 2.6 \text{ lx}$

Power: $\times 0.66$

Illuminance: $\times 3$

NEW RITTER LANTERN
CDM-T 35W

$E_{\text{mean/street}} = 7.5 \text{ lx}$