**PALZZINA I GUZZINI, RECANATI, ITALY**

<table>
<thead>
<tr>
<th>Building name:</th>
<th>Palazzina I Guzzini Recanati (Macerata)</th>
<th>Year of completion:</th>
<th>1997</th>
<th>Type of building:</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Team:</td>
<td>MCA studio, Paris- France</td>
<td></td>
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</tbody>
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**Site data**

<table>
<thead>
<tr>
<th>Design conditions winter</th>
<th>Design conditions summer</th>
<th>Average wind speed (m/s)</th>
<th>Prevailing wind direction</th>
<th>Terrain shielding</th>
<th>Dust pollution</th>
<th>Noise pollution</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Altitude (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>g/kg</td>
<td>T</td>
<td>g/kg</td>
<td>w</td>
<td>open</td>
<td>no</td>
<td>43.47 °N</td>
<td>13.31°E</td>
<td>100</td>
</tr>
<tr>
<td>-2</td>
<td>4</td>
<td>32</td>
<td>24</td>
<td>3.2</td>
<td>open</td>
<td>no</td>
<td></td>
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**Design philosophy for IAQ and Thermal Comfort and issues of concern for this building**

The building is located inside an industrial campus, surrounded by country, quite far from any possible source of air pollution and noise. This fact, coupled with an optimal possible orientation regarding both sun and direction of dominant winds, allowed a full exploitation of natural ventilation devices. The design philosophy is then of an ‘open’ building in which IAQ, thermal and visual comfort are achieved by mean of maximising natural ventilation and daylighting principles.

IAQ is achieved by exploiting the continuous air flow from outdoors, through openable (by mean of a mechanical system) windows, to the working environment. The air is finally exhausted through the atrium and 12 turrets on the roof.

Thermal comfort: during summer nights ventilation is exploited by opening the upper part of windows so that cool air flows under the heavy concrete structure of roofs. This strategy should ensure good thermal comfort in midsummer mornings. Modulated opening of upper, lower or both parts of the windows, according to external conditions, ensures sufficient air movement and internal...
load removal during mid seasons. Peak conditions can be covered by mean of fan-coil units. During winter outdoor air flows through the lower openings of windows (opened at their minimum step) and passes through fan-coil units. A moderate direct solar gain reduces energy requirements for the heating season.

**Principle of hybrid ventilation**

The building provides office accommodation on four floors, located around a central atrium with circulation and service facilities. The main elevation of the building is oriented approximately 12 degrees east of south. Natural cross-ventilation relies on free air flow across the space. Openable panels, located on the south and north glazed facades, and openings on the roof of the atrium provide natural ventilation across the plan. Openings above the atrium consist of twelve skylights with adjustable grilles: the control system opens and closes them depending on the air flow requirement. The total area of openings in the skylights is equivalent to half of the total openings on the facade. Cross-ventilation from the glazed facades to the skylights may be induced by the stack effect or by means of fans installed in turrets on the top of the building. A fan-coil unit in each room is available to provide supplementary cooling or heating when required.

**Components used to solve main issues or problems**

**IAQ**

Control is based on information coming from CO$_2$ sensors.

**Temperature control**

Thermostat located by each working area.

**Energy conservation**

Insulated and ventilated walls on east and west facade, low-transmittance selective glazed surfaces on south and north facade.

**Control air flow rate**

Two-step mechanically-opened windows; each window can be opened in different position. Opening of 12 grilles in turrets on the roof; each grille can be opened independently.

**Acoustic privacy**

Problem is still open: some meeting and heads’ rooms require a special acoustic privacy, designers are going to install ducts and mechanical ventilation in these rooms.

**Control Strategies**

The Central Control system responds to a variety of internal and external conditions. A time schedule should be provided to define when the building is occupied and, if it is occupied, openings may be set to the open or closed position by the central control system. According to IAQ and thermal comfort requirements, the natural ventilation mode operates if the ambient temperature is less than T$_i$-2°C. In the unoccupied mode the building should operate to allow ventilation to store cool within the mass.

**Particular control strategy issues**

The architecture of the control system is based on a central management system with local sensors at each working seat: a thermostat controls the local temperature as required by individual zone
occupants. Occupants may set local temperature in a range (± 2°C) around the temperature defined by Central control system.

The type of management is internal at present; a remote connection with external management service will be installed.

**Overall performance**

Guzzini Building is being evaluated during the winter 1998 - autumn 1999 period with respect to thermal comfort, energy consumption and ventilation performance. Moreover evaluations will be made by means of a specific questionnaire distributed to occupants. Some draught complaints have been registered, depending on occupants’ sensitivity; the problem is being solved by mean of a new (at minimum level) setting of lower windows opening.