

## 9 - Natural ventilation:

The natural ventilation, **provides the functioning of the passive solar systems of cooling** that are classified, as the ones of heating, in direct, indirect and separate:

- Direct profit, is gotten by intermediary of: Promotion of the **natural ventilation, contributing equally for the improvement of the quality of interior air (salubrious level)**. This ventilation can be obtained not alone through the study of the compartment and the localization of openings in surface of the side of is of the building; Creation of buildings with low factors of form - minimum exterior surface; Use of elements of the great thermal inertia and finishing of clear color; Rank of exterior elements of shade - about more efficient 70% of what interior solar protect. In this last case in particular, the use of the tree, the type of lapsed leaf, when correct projected, are sufficiently interesting for allow to shade in the Summer not hindering the entrance of solar radiation in the Winter (figure 6 - A and 6 - B); And implementation of systems of evaporative cooling.

In the practical one it is the formation of a solar chimney, that is obtained by saw of a chimney, with good solar exposition, that to the warm being goes to inferiorly provoke the ascension of less dense hot air and the cold air introduction. The static vacuum cleaner is based on a device located in the covering that provokes a suction consequently generating the air exit for the covering and the entrance for the inferior part of the compartment where if it locates (figure 6 - A and 6 - B), as well as in the building with one all (figure 6).

Another system of support to the natural ventilation, is the existence of a water deposit, in the superior extremity of the covering, stops beyond the structural effect, has the objective to originate a evaporative cooling, that is obtained through the water evaporation of this artificial deposit, is about an endothermic process where the water absorbs the heat of the way and humidification it. This system of cooling for radiation nocturne consists of the rank of elements of thermal storage (material weighed as the water) in the covering of the building, that during the day in the Summer is covered with isolation and absorbs the heat of the interior of the building and during the night it after radiates it for the exterior removal of the isolation. In the cooling indirect for ventilation nocturna the refrigeration of the elements of - for the circulation of the cool air of the night. During the day these catch the heat of the interior environment cooling it (figure 6).

- Profit indirect, with the resource refrigeration for radiation nocturne and cooling for ventilation nocturne.

## 10 - Thermal exchanges and improvements:

The constitution of a climatic biological building must be complemented with the resource to the use of thermal isolating materials of form to minimize the thermal exchanges. Of it more enters the materials used for salient thermal isolation the polyurethane and the expanded polystyrene that present low thermal conductivity. It will be able to have the resource to other thermal isolating materials, that present interesting characteristics as Structural Insulated Panels (SIPs) and the isolators inks. The SIPs they are panels isolator foam sandwich enters two layers of contraclad wooden or of Oriented Strand Board (OSB); the isolators inks, must its properties of isolation to the ceramics, that reflected the solar radiation and minimizes the transference of heat for the base where they are applied.

However the care will have to start in the optimization of the involving one, **preferential to the rank of thermal isolation for the exterior of the cloudy elements therefore in such a way improves thermal inertia**, to treat the thermal bridges carefully and still to use covering materials that increase the reflection of the solar rays, being this the alternative ace surfaces that are not coated by the vegetal layers.

## 11 - Structure of the building, its rigid nucleus and resistance to the fire:

The structural bases for the construction of a building, mainly in height, are the use of the Hardened one to make front to the compression and of the Steel to make front to the traction.

Although the city of New York, **being known for its buildings in height with Steel structures, the conquest of the airspace, due to its lack the level of the surface**. Related recent events with fires, **compel to this type of structure to be coated with products related with the hardened or cement one, in the direction to increase its resistance to the fire**.

--> Structural system to adopt for a building with high height (48 floors or approach height of 498 feet (EUA) or about 150m (EU)), the building, used has to give use to the structural system with a rigid nucleus to guarantee stability currently as cursor of the vertical circulates (box of elevators and stairs, well of ascent of utility, etc), functioning as resistant element to the wind, lapsing similarly to act in the action of the flagstone, functioning as a great horizontal beam. The rigid nucleus, with steel structure, allows the accomplishment of the structure of suspended system, therefore it uses lifter and the steel entirely is used to advantage in one of its better characteristics, that are the resistance the traction (figure 9).

To reduce the displacements in the Structures with Rigid Nuclei, a great superior beam must be created, generally in volumetric triangulation in bars of steel, making with that them extreme pillars function as elements traction and compression, contends partial has lain the rotation in the top of the rigid nucleus, that can be in steel (figure 9 - A).

The structural system of the considered building functions in similar way to the structural system "Outtrigger", that it will have to be placed in excellent way (figure 9 - B and 9 - B.1, 9 - C, 9 - C.1, 9 - C.2 and 9 - C.3):