COOLING CLIMATE DEVICES AT JADE METEO PARK

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Categories: Energy and sustainability, High Density, Philippe Rahm, Project, Senseable Technologies, Technology and fabrication, Thermodynamic Interactions

Tags: Climate, Climate regulation, Cooling climate device, Devices, Energetic Approach, Energy, Facilities, Heat transfer, Project, Public Space, Responsive Environment, Thermodynamic practices, Thermodynamics

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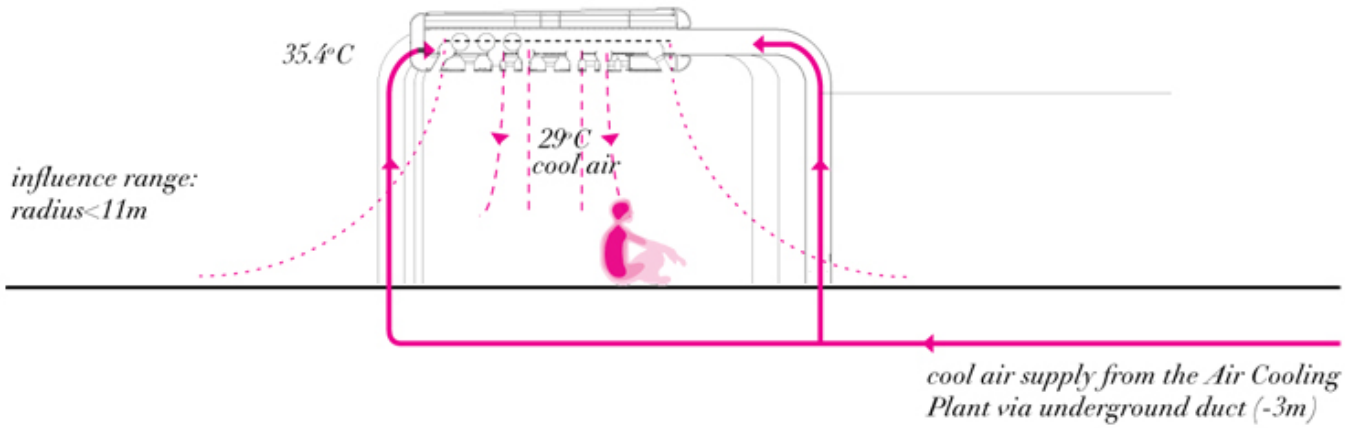
The natural cooling devices are trees with specific qualities for cooling the atmosphere because they have a lots of leaves or big leaves that create heavy shadows, or white flowers and waxy white leaves in order to reflect the warm sun rays, or trees that produce a strong evaporation with consequence to cool the air around because of the physical change of phase from liquid to gas. The artificial cooling devices are apparatus working on meteorological phenomena like convection, conduction, evaporation or reflection in order to cool the air or directly the human body. The convective cooling devices are named "Antycyclone" or "Underground breeze" and they blow cool air chilled by underground heat exchange. The conductive cooling devices are named "Night light" or "Vertical night" and expose black and cold surface chilled by cold water where the human skin can be cooled by touching them. The evaporating cooling devices are named for example "Stratus cloud" or "Blue sky drizzle" and by emitting mist or rain, they refresh the surrounding air temperature by their change of phase from liquid to gas. The reflective cooling devices named "Moon light" or "Long waves filters" are apparatus that filter or reflect the sunlight and the hat carried by it.



The **Anticyclone** device cools its surroundings during warm weather by blowing chilled air downward in order to help prevent Park patrons from overheating. To do so, the device utilizes two natural cooling phenomena: conduction and convection. Cool air brushing against the body causes human skin to transfer heat to the air, through conduction, thereby cooling itself. When the body is too hot, the brain signals blood vessels to vasodilate, causing them to expand in diameter. Because blood carries heat, more blood flowing to the skin's surface increases contact between the cool air and warm blood. This process speeds up the convective transfer of heat from the skin to the air,

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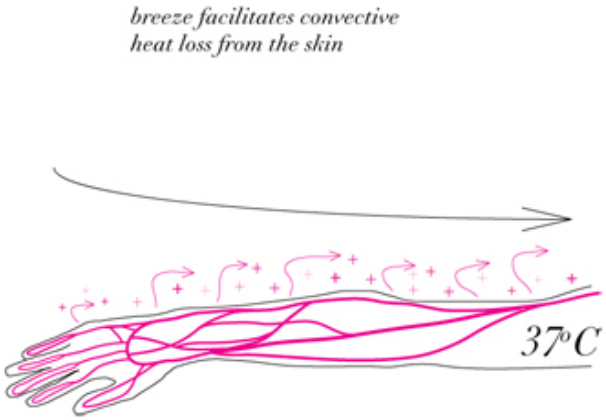
further cooling the body's internal temperature.

1. conduction

2. convection



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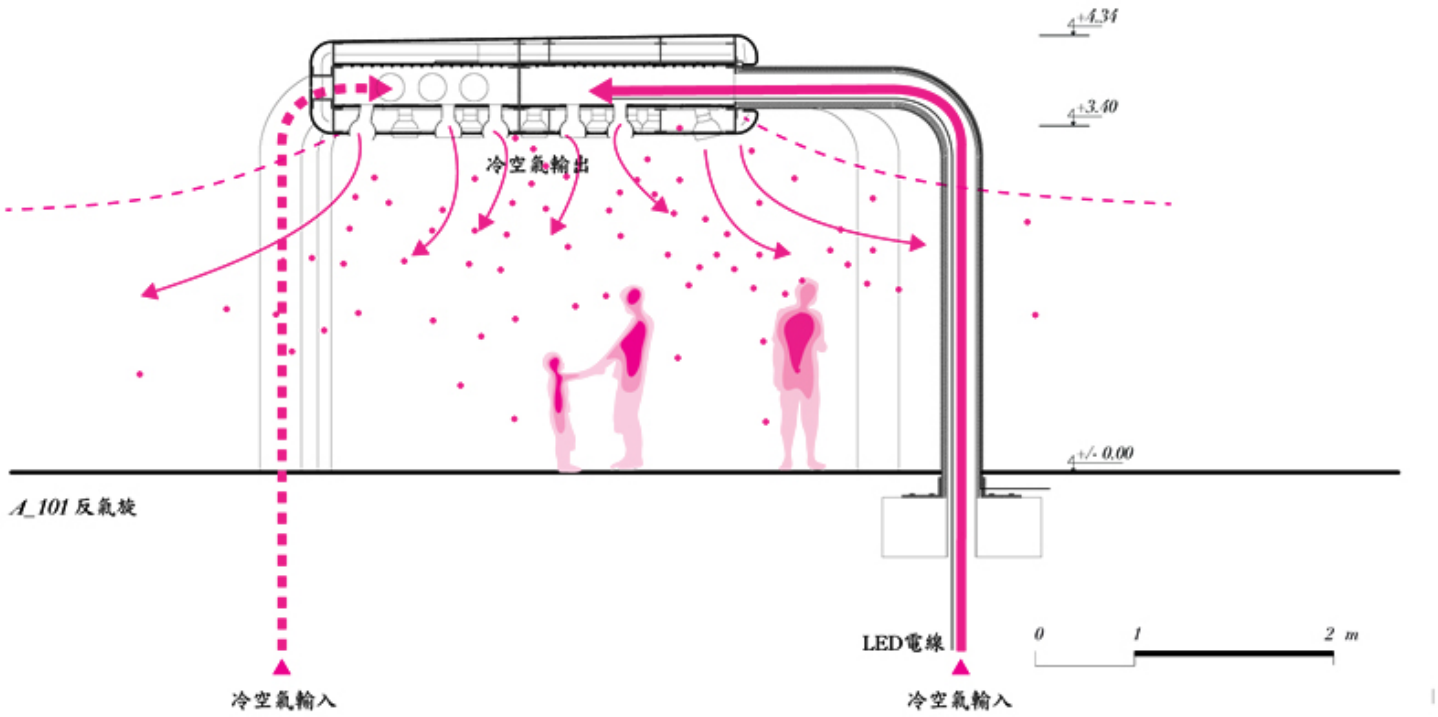

Principle Cool air blowing over skin also induces a convective heat exchange at the skin's surface. Convection is a process of losing heat through the movement of air or water molecules over the skin. This causes the cool air from the device to displace and replace the heat at the skin's surface.

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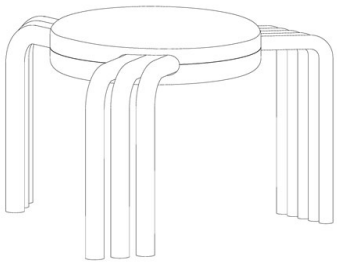
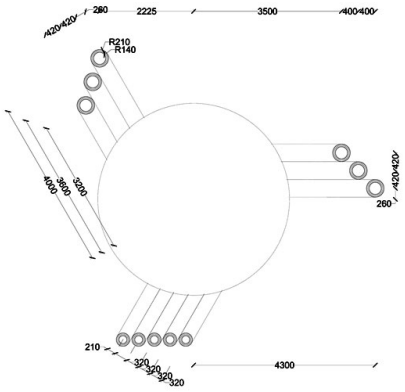
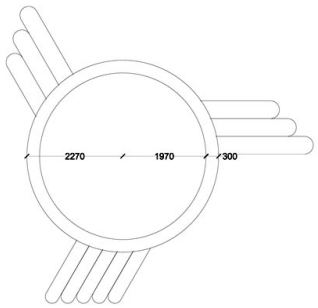


透視圖
axonometric view



平面圖 1:50
plan 1m 1:50



平面圖1:50
top view 1:50

Convective heat transfer is given by **q = hc.A.dT**, where: **q** = heat transferred per unit time (W), **A** = heat transfer area of the surface (m^2), **hc** = convective heat transfer coefficient of the process (W/ m^2. ˚C), **dT** = temperature difference be- tween the surface and the bulk fluid (˚C). On the 15th June 1pm, the average convective heat transfer from air that is 35. 4˚C to 29˚C chilled air blown from the device is approximately 27,91W.

Extract from coming soon

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