

competition essay, arch 349

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Operative Buoyancy.

Buo·yant l'boi-ənt; 'boōyəntl

adjective

able to stay afloat or rise on top of [the dependence on] gas or a liquid.
an optimistic confidence.

The ACSA transit hub competition begins with a very open direction: to build an environmental transit hub that uses architectural innovations to best preserve and promote the surrounding environment. Operative Buoyancy began as a project that seeks to archive the highest level of sustainability possible through the optimization and manipulation of building systems across all scales. Based upon a pre-fabricated structural concrete system, the design of the station uses self-cleaning concrete both as a structural and a finish material. This system is then tweaked and adjusted in frequency based on the program and the thickness of each individual element is optimized based on load and span. The result is a dynamic and inviting space crafted purely out of concrete's inherent characteristics.

Siting the project carefully resulted in a rich set of precedents to kick start the project. Immediately, Detroit, MI was considered as a site where a large scale public infrastructure was needed. Detroit's population today is less than half of what it was during its peak in the 1950s. The once prosperous Motor City now faces an undeniable crisis and is in need of a new breath of life. In the face of steep population declines and an unfathomable amount of vacant land, the city is desperate to attract new generations of city dwellers and must first establish the infrastructure to necessitate this new mode of living - one independent from vehicular transport. To do this, a hybrid node of transportation systems could allow people to travel and connect from their suburban homes to the downtown core to work, shop or enjoy a ball game.

The transportation hub is situated in an empty lot in Detroit's sports and cultural district. The proximity to various large sports arenas and various theaters and music halls encourages city dwellers to visit these entertainment facilities via public transport. Located at the intersection of various major highways the station is able to facilitate a large amount of coach lines traveling from multiple directions.

Furthermore, Detroit is already planning several improvements to their transportation infrastructure that our project can take advantage of. Obama's plans for stimulus money to boost infrastructure throughout the United States has inspired a flurry of projects in the Detroit area; a streetcar project to connect the northern suburbs to downtown and heightened bus fleets will be two large contributors to our downtown transit hub.

The challenge is to match the appropriateness of the siting with the physical resolution of the transit hub. It is crucial to design a project that would promote concrete, sustainability and the Detroit core, when the last thing one would think Detroit needs is more concrete. Thus, it is necessary that we would be able to present concrete in a way that would not remind people of the concrete behemoths that could not sustain the downtown neighborhood. "Sustainability" as a buzzword is great to

promote a specific material or isolated project, but perhaps a more appropriate way to think of *sustainability* is in terms of durability. The ability to sustain an architectural life in the Detroit wasteland would be the challenge.

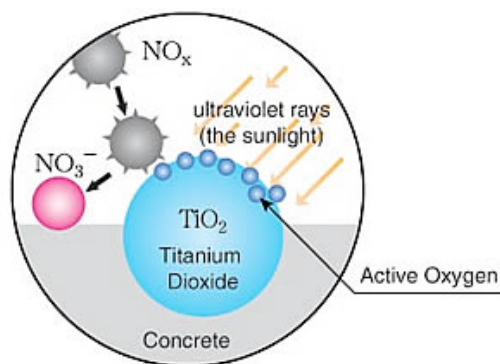
Primarily, the massing form will be broken up into fins that wrap around the width of the long platforms. Similar to the moves of Calatrava, we hope to take a large amount of needed program, and create a light, translucent space that is not only a successful building, but a successful first step to revitalizing Detroit by bringing a new reputation to Detroit's architecture.

By manipulating the flexibility of a pre-fabricated concrete structural system the station is able to perform with incredible material efficiency without compromising the spatial qualities of the programs within.

The articulation of structural density and size allows the transit station to perform flexibly and responsively to its environment and program. The dense array of concrete frames is passively heated in the winter to provide the south-facing lobby and administrative spaces the maximum amount heat and light. Alternately, the traffic intensive lobbies are shaded to minimize energy spent in cooling.

Furthermore, an atrium vertically connects the bus terminal on ground floor with the light rail platform above. This connection not only provide easy way-finding for travelers unfamiliar to the station but more importantly naturally ventilates the building through the air transfer from the ground to the platform through the atrium space.

Not only is the pre-fabricated system sustainable within the design model but the very assembly of this system is designed to minimize environmental impacts caused by the construction of projects at this scale. Each frame within the system can be fabricated in a local manufacturer, transported via trucks and assembled on site. This flexible pre-cast system eliminates the need of formwork usually required in the conventional concrete construction and consequently reduces the time and energy consumed in the construction process.



Strategies for a better environment is no less considered when choosing the materials for Detroit's transit hub. The entire concrete system of the station will be built with self-cleaning concrete. Apart from its high waterproofing qualities and lower cost of construction, self-cleaning concrete actively cleans itself and the environment around it. The photocatalytic cements within the concrete uses ultraviolet light in sunlight to accelerate chemical reactions and is able to quickly decompose a high range of pollutants from tobacco smoke to the fog-

generating nitrous oxides (NO_x) and sulfuric oxides (SO_x). Not only will the station remain bright and clean in years to come but it will also improve the air quality of the surrounding area. The choice to build the transit hub with this system will also act as a



catalyst to promote and share the use of sustainable materials in the Detroit downtown core. One could imagine the use of self-cleaning concrete and bright, public spaces having a presence in the heart of the Detroit once the transit hub is well-established. Similar to the affect of the UWSA in the Galt downtown, other designers would want to take a stab at building a better Detroit as well.

The idea of self-cleaning concrete is not a new approach to dealing with concrete discoloring. In fact, not only has it

been used to shield from highly damaging pollutants in the air, but Air France's headquarters at the Charles de Gaulle International Airport in Roissy has armed their headquarters with the photocatalysis-charged material to keep soot and fume stains free. Or, the Church of the Year 2000 in Rome [pictured] incorporates a very formal way of promoting self-cleaning concrete.

Our hopes are that the transit hub catches the attention of the American people in Detroit, and that they can start to re-think the way that people interact with architecture. The transit hub's long-term plan will prove that a new way of interacting with architecture is not only desired, but needed if change is going to be made to a deteriorating situation.

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