Jonathan Hernandez

(#3, 5, 6)

**Flexibility of the system diversity of forms available**

**What kind of structures can be built with the system? Describe the type of shapes can the system be created. What are the massing implications of these shapes?**

* CONCRETE CONSTRUCTION IS VERSATILE, THERE’S NO LIMIT IN THE DIVERSITY OF FORMS YOU CAN CREATE. SINCE CONCRETE WHEN FIRST POURED INTO THE WOODEN FORMWORK IS SLURRY, IT GIVES YOU FLEXIBILTY WORK WITH IT SO IT CAN TAKE ANY SHAPE OR FORM
* THE KIND OF STRUCTURES THAT CAN BE FORMED FROM THIN SHELL CONSTRUCTION ARE ROOF STRUCTURES. IT DOESN’T MEAN YOU’RE LIMITED TO DESIGN, ANY SHAPE CAN BE FORMED. THE MASSING IMPLICATIONS THESE CAN GIVE TO THE VIEWER IS THAT THEY’RE HEAVY WHEN IN REALITY IT’S LIGHT WEIGHT. THIN SHELL STRUCTURES CAN BE LESS THAN 2” THICK
* THE STRUCTURES THAT CAN BE BUILT WITH THE SYSTEM IS ROOF STRUCTURES

**Connection Details**

**Document and show typical connection details between the supporting floors and their vertical structure. You should have sketches, diagrams and pictures describing these details.**

* THE STRUCTURES USE AN UMBRELLA FOOTING TO SUPPORT THE LOADS BEING TRANSFERRED THROUGH THE HYPER BOLIC STRUCTURE

**Systems strengths and weaknesses**

**Create a list of outlying system’s strengths and its typical applications. You should describe which types of structures the system is typically used for and why. We should also describe which types of structures the system will not be the most effective system and why.**

* TYPICAL APPLICATION IS ROOF STRUCTURE BECAUSE OF ITS COMPLEX SHAPE

**STRENGTHS:**

* THE STRUCTURE STRENGTH COMES FROM THE HYPER BOLIC SHAPE WHICH DISTRIBUTES THE LOAD TO THE UMBRELLA FOOTING, NO NEED FOR COLUMNS
* RESISTANT TO EARTHQUAKE
* RESISTS LOADS THROUGH CURVATURE (ARCH)
* CONCRETE IS STRONG IN COMPRESSION AND STEEL HAS TENSILE STRENGTH
* FIRE RESISTANT
* CONCRETE HAS GOOD WORK ABILITY TO FILL THE FORM/MOLD PROPERLY WITHOUT REDUCING THE CONCRETES QUALITY
* THIN SHELL STRUCTURES ALLOWS ROOF TO BE BUILT WITHOUT INTERIOR COLUMNS OR EXTERIOR BUTTRESSES
* THOUGH THE CONCRETE MAY BE LESS THAN 2” THICK, THE CURVATURE AND WEIGHT OF THE SHEET STIFFENS THE STRUCTURE, ALLOWING IT TO SUPPORT ITSELF AND ADDITONAL LOADS
* ALLOWS WIDE AREAS TO BE SPANNED WITHOUT THE USE OF INTERNAL SUPPORTS
* MAXIMIZES SPACE WITHIN THE STRUCTURE WHILE MINIMIZING THE MATERIALS REQUIRED TO BUILD IT
* IT IS ALSO RELATIVELY RESISTANT TO STRUCTURAL DAMAGE IN THE EVENT OF AN EARTHQUAKE, FLOOD OR OTHER NATURAL DISASTERS

**WEAKNESSES:**

* CONCRETE HAS NO TENSILE STRENGTH
* STEEL HAS NO COMPRESSION STRENGTH
* IF NOT SEALED RIGHT WATER CAN GET THROUGH THE ROOF INTO THE INTERIOR

**CASE STUDY: FELIX CANDELA “LOS MANANTIALES”**

Los Manantiales was built in Mexico City, the concrete system used was the thin shell system. This particular system was used because los Manantiales was supposed to be a restaurant and the program required for seating for 1,000 people. Thin shell structures allow wide areas to be spanned without the use of internal support such as columns. Which help maximize the floor space. In the area where los Manantiales was being built was prone to earthquakes. Thin shell construction is relatively resistant earthquakes, floods and other natural disasters that may occur.

