Week 8: Asynchronous Design Studio

3D Printed Housing Project

PERSEID Method: Environmental Layer

Overview

Recall in Week 3, you began brainstorming the various considerations and parameters for the project relative to the PERSEID screening layers. This week, you will focus specifically on ENVIRONMENTAL elements. The suggested considerations in Week 3 were,

Performance

1. Weather performance
2. Print throughput

Regulatory

1. Building code
2. Municipal regulations

Socio-cultural

1. Appeal of the house
2. Consumer price

Environmental

1. Carbon footprint
2. Hazardous substance use

Step 1 – reflect on the importance of EVIRONMENTAL issues

Read the following brief article:

Is 3D Printing Really As Ecofriendly As We Think It Is?

What are some key ENVIRONMENTAL challenges that come to your mind after having read the article?

Pollution of water bodies and reliance on mineral resources are some major disadvantages of 3D printing houses. These negatives will challenge our material selection and push towards something more renewable, as well as emphasis on the treatment of wasteful byproducts due to printing.

Optional

If you have time and the interest, here is a fairly long 20 minute video on a new material for 3D printing houses: Eco Friendly 3D Printed Concrete Alternative and the following link downloads a scientific paper on the potential full environmental impact of 3D printing, Environmental Footprint and Economics of a Full-Scale 3DPH . These optional resources are provided to you in case this project has captured your interest in this topic and you want to learn more for the future. Of course, if you do choose to spend the time to review the material in 2PX3, you are more than welcome to reference its content in your design deliberations.

Step 2 – Sources of ENVIRONMENTAL challenges

In addition to the usual consideration of EVIRONMENTAL factors such as carbon footprint of the material and printing process, what are some other areas of concern? For example, transportation vehicles, necessary support buildings or other temporary structures, and even noise are all sources of disturbances or damage to the environment. Can you think of any other aspects of the total construction project that you should consider?

Source of ENVIRONMENTAL concern	How might you quantify or measure the environmental impact?	What are ways that you could mitigate the potential harm?
Material choice – Concrete	Contribution to pollution and environmental effects of the mining industry.	Use a different material – something naturally occurring and that causes less pollution to be produced.
Transportation method	Pollution caused by convoy in volume of greenhouse gases produced.	Using a more efficient method, such as train. Or, using electric vehicles, but this may be out of budget.
Water pollution caused by construction	Pollution levels in nearby bodies of water	Taking the proper precautions, repeatedly testing the water.

Step 3 – revisit PERFORMANCE, SOCIO-CULTURAL, and REGULATORY considerations

In previous weeks, you were asked to recommend key parameters for the PERFORMANCE then SOCIO-CULTURAL and then REGULATORY, and recommend the key parameters and factors that you think you should consider for this stage in the design. When you do this, reflect on some of your thoughts on Step 1.

If your group has already dealt with some of the issues but your thoughts are changing as you learn more, feel free to adjust your recommendations. The whole point of this process is to constantly iterate and if needed, make adjustments. So you can even add a consideration if your group has identified additional considerations above and beyond the two that were suggested. Feel free to add rows to the table.

Parameter choice	How will you measure, calculate, or assess the impact of the parameter?	Which consideration?
1.Material choice	Pollution level per volume of material used	Carbon Footprint
2.Material choice	Abundance and curing time while considering environmental effect	Performance
3.Transportation method	Greenhouse gas output (volume), cost	Carbon footprint, consumer appeal (price)
4.		
5.		

From the above, which parameters or factors do you think are the most important or influential in the decisions? Which should be discussed more thoroughly when you get together with the team?

I think the determining factor will be the material choice, as this has a large effect on cost, environmental impact, but also the appeal of the house. If we made houses out of mud, nobody would buy them even though they are eco-friendly and cheap. So, I think striking a balance in this category is important.

Submission Instructions

1. Upload a *.**PDF** copy of the Wk-8 - Asynchronous Design Studio 8 Worksheet to the Avenue Dropbox titled **Asynchronous Design Studio Week 8** by Friday, March 11th, end of day (5:30pm)
    - Use the following naming convention: **macID_AsynchDS8.pdf**