Actual Applications of 3D Printing: Chapter 7 of the Emerging Technology Report

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What is the Emerging Technology Report?

- Report to summarize the state of the art with respect to 3D Printing of Concrete.
  - Report from ACI Committee 564
    - Led by ACI Committee 564-0A
- 8 different chapters
  - Introduction
  - Terminology
  - 3D Printing Platforms
  - Materials Considerations
  - Quality Control
  - Structural Considerations
  - Case Studies
  - Future Needs

Objectives

- Chapter 7 Objective
  - Generate an in-depth, multi-faceted understanding of a complex issue in its real-life context.
    - Field and lab actual applications
- Presentation objective
  - Discuss process that is being used to develop chapter

Process for chapter development

- Decide what information to collect
- Decide how to collect information
- Solicit case studies
- Synthesize
- Ballot

Email *

Valid email

This form is collecting emails. Change settings

What is your first name? *

Short answer text

What is your last name? *

Short answer text

What is the name of the project that the 3D printing concrete was used for? *

Long answer text

How would you classify this project?

- ○ Lab project
- ○ Field project

What is your print area?

Long answer text

What is your current position/title and what organization are you currently with?

Short answer text

Project Information Section

In this section, you will be asked more questions about the 3D concrete printing case. These questions are used as guides. You do not have to answer every question and for each question, you can decide how much detail to provide.

Project Overview: Please provide an overview of the project (e.g., location of project, type of construction, project objective, use of material printed, key stakeholders involved (owner, builder, engineer, contractor, architect, etc). *

Long answer text

Why was 3D printing selected for this project? *

Long answer text

Approximately, what percentage of the 3D printed concrete was printed off-site?

- 100% of the 3D printed concrete was printed off site and then installed on site
- Majority (>50%) of the 3D printed concrete was printed off site and then installed on site
- Moderate amount (~25 - 45%) of the 3D printed concrete was printed off site and then installed on site
- Minor amount (< 20%) of the 3D printed concrete was printed off site and then installed on site
- 0% of the 3D printed concrete was printed off site and then installed on site

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Use this section to provide information about the mix design and mix proportion. (Note, at the end of this form you will have the option to upload files. Thus, if you would prefer to upload a table, just state "see file upload").

Short answer text

Please describe the construction process and printing process.

Long answer text

Use this section to comment on the fresh state properties (targets and/or results) of the 3D-printed mixture.

Long answer text

Use this section to comment on the hardened state properties (targets and/or results) of the 3D-printed mixture.

Long answer text

What quality control procedures were used?

Long answer text

Use this space to provide information on any of the following? (feel free to comment on all).

a. How much concrete was printed?

b. Type of printer?

c. How long did it take?

d. What parts of the project used 3D printed concrete?

e. Structural system (reinforcement type and installation method)

f. Challenges

g. What was the end result?

Long answer text

What key insights did you learn from doing this project?

Long answer text

Based on this project, what, if anything, would you adjust for a future project?

Long answer text

What advice/recommendations do you have for others in this space?

Long answer text

What if any, codes, specifications, and/or publicly available resources, did you find to be useful for being able to design and print 3D printed concrete?

Long answer text

File upload

It would be great to have at least one image (photo, table, figure) or video to associate with your case study.
Please upload supporting files here:
https://utexas.app.box.com/f/690c7e26e47440f696999ee6b4a9fe01

You can upload at most 4 files.

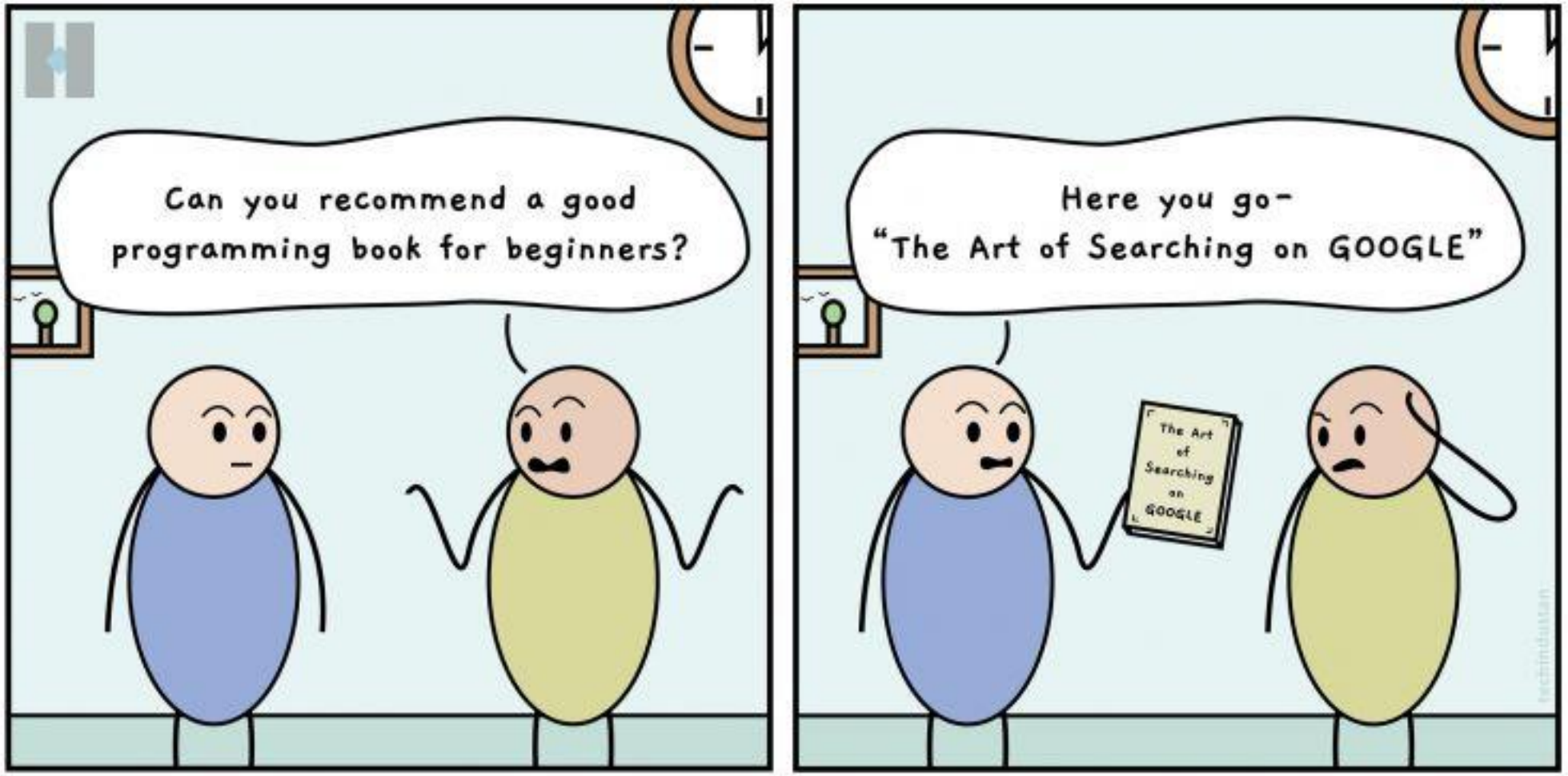
If you have any references or links that you would like to provide about this project, please put it here

Short answer text

Is there anything else you would like to add?

Long answer text

Literature Mining



4.3 NOVEL STRATEGIES FOR MATERIALISATION

Industrialising Concrete 3D Printing: Three Case Studies

Nadja Gaudillière
XtreeE, Rungis and Laboratoire GSA, École Nationale Supérieure d'Architecture Paris
Justin Dirrenberger
XtreeE, Rungis and Laboratoire PIMM, Arts et Métiers-ParisTech
Romain Duballet
XtreeE, Rungis and Laboratoire Navier, Champs-sur-Marne
Charles Bouyssou, Alban Mallet, Philippe Roux and Mahriz Zakeri
XtreeE, Rungis

Project	Production Time (%)	Material Consumption (%)
Artificial Reef	33	33
Collectors	66	33
Pillar	21.6	-29
Urban Furniture	62.5	59.2
Average	45.8	24.05

Sheil, B., Thomsen, M. R., Tamke, M., & Hanna, S. (Eds.). (2020). *Design transactions: rethinking information modelling for a new material age*. UCL Press.

Comparative Review of the Technology and Case Studies of 3D Concrete Printing of Buildings by Several Companies

by Nicholas D. Bello [1,*] and Ali M. Memari [2]

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Estimated wall thermal bridging and structural resistance.

What will we do with the information?

- Present them “as-is”
- Synthesis
  - Compares and contrasts commonalities
  - Summarize key findings

Call to action…

https://shorturl.at/drQR9