

ICF

International Concrete

Competition



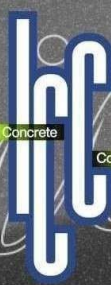
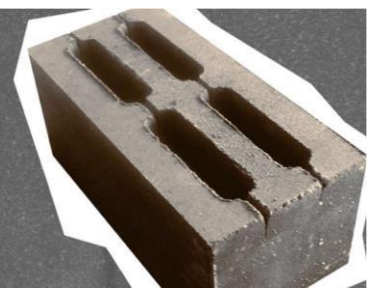
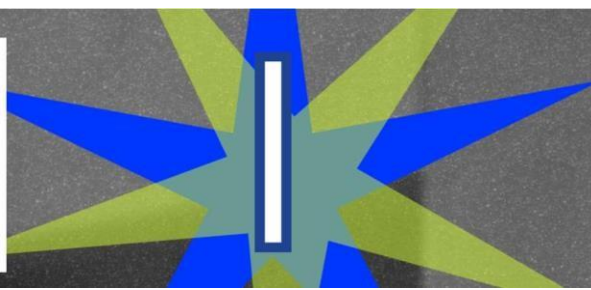
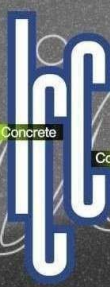


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A. BACKGROUND

Concrete is a widely favored construction material due to its high structural strength and flexibility in quality adjustment to suit various applications. With the rapid growth of infrastructure development in Indonesia, the demand for concrete has seen a significant escalation. Concrete plays a central role in major projects such as toll roads, ports, airports, and even energy and telecommunications sectors, thanks to the abundant availability of its raw materials.

However, cement as the primary binding component in concrete has a substantial environmental impact due to the high carbon emissions generated during its production, which contributes significantly to global warming. In addition, the massive exploitation of natural aggregates such as sand and gravel poses a serious threat to environmental balance.

As a mitigation effort, utilizing waste materials with properties similar to cement presents a sustainable alternative for material substitution. There is a growing need for innovation in developing **low cement concrete** by incorporating waste materials as replacements for fine and coarse aggregates. One of the major challenges in this approach is the potential reduction in compressive strength due to the decreased cement content. To address this, **microfillers** is introduced as a micropore-filling material in concrete mixtures, which enhances the density and early strength of the concrete, ensuring that it still meets high-performance standards required for modern infrastructure.



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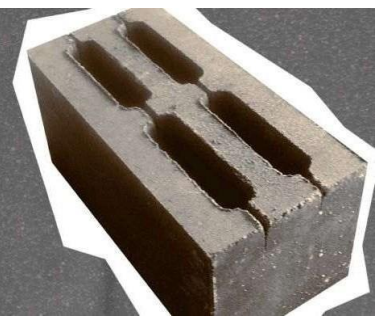


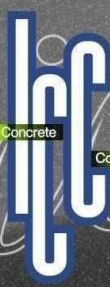
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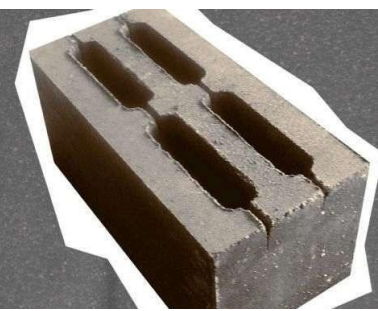


In response to the growing need for strong, efficient, and environmentally friendly construction solutions, CIVILWEEK 2025: "Strength in Unity, Build with Integrity" presents a concrete competition themed "**Next-Gen Eco Concrete: Stronger with Waste-Based High Early Strength Concrete.**" This competition serves as a platform for student innovation in developing high-performance concrete in accordance with SNI standards, featuring low cement content, the use of microfillers, and the substitution of fine aggregates, coarse aggregates, and binders with waste-based materials. It is expected that this competition will generate innovative ideas capable of addressing future challenges in the construction industry through sustainable practices.

B. TERMS OF THE PARTICIPANTS

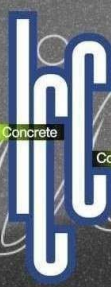
The participating team is obligated to have the responsibility to understand and abide by any given rules, including the following rules. Failure by either intentionally or by accident can affect points reduction or disqualification.

1. The participants are active students of civil engineering studies programs from various universities around the world.
2. Each college can send out 1 or more teams of 3 students who come from the same university.
3. Each participant is only allowed to be a leader or member in one team. Each team is only allowed to submit one proposal.
4. Participants should be equipped with a letter of approval to enter the competition with the decisions from advisors/head programs/others. (letter of approval format attached)





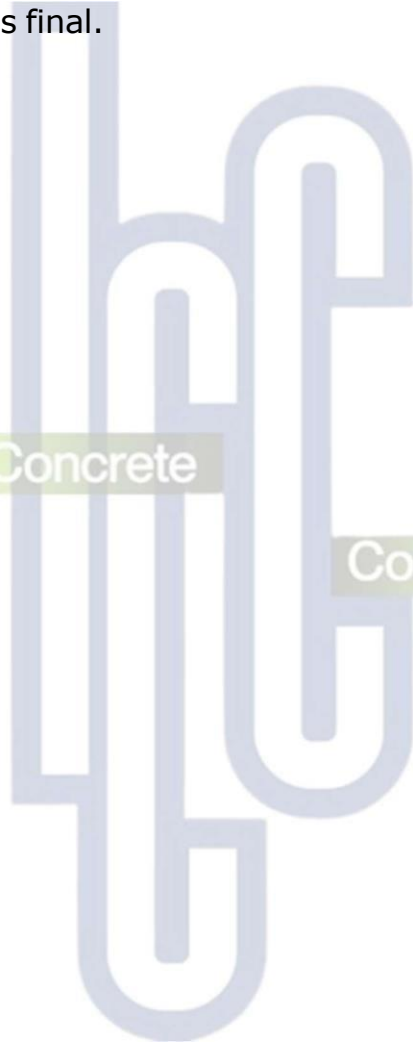
International Concrete
Competition



5. Participants were required to follow the program in the concrete competition according to the committee's terms and directions.
6. Participants must comply with the regulations given by the committee.
7. The jury's decision is final.

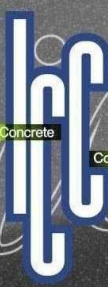
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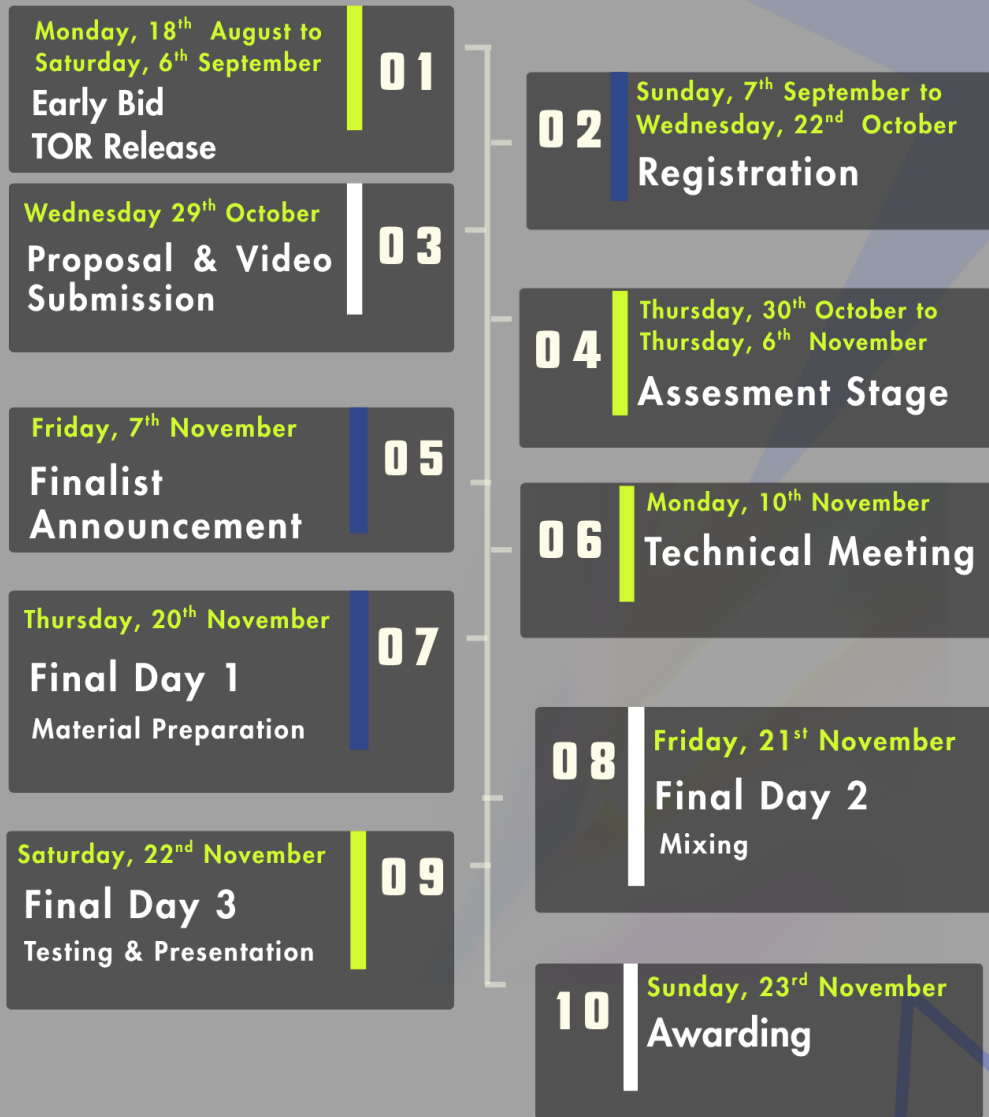
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C. COMPETITON TIMELINE

Roadmap





D. REGISTRATION PROCEDURES

1. Required participants register at www.civilweek.hms-uns.com and must confirm their registration no later than 22rd October 2025 with the following format:

ICC2025_UNIVERSITY NAME_TEAM NAME

Send to:

civilweek@ft.uns.ac.id

2. Participants must pay a registration fee of Rp 375,000 for national team and \$55 for international team. Payment can be made via bank transfer to Bank Central Asia (BCA) bank account:
Bank account number: 7851059524

Bank account name: **FLORENTINA ARSHA PRAJASDISA**

3. At the time of registration, participants enter:
 - a. copy or scan of payment evidence (via bank transfer)
 - b. file proof of registration, could be downloaded at
<https://civilweek.hms-uns.com/>
 - c. photocopy or scan of student id card

E. SYSTEMATIC OF THE COMPETITION

Civilweek 2025 International Concrete Competition Will be done in two stages:

First stage (Elimination round)

In the elimination round, 6 teams with the best score in proposal and video based on jury assessments will be selected, with jury assessment criteria will be explained in chapter /point F. All content in the proposal and video must be in English.



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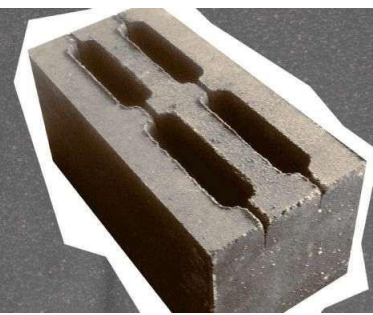
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[@civilweekuns](https://www.instagram.com/civilweekuns)



[@yqf388w](https://line.me/tv/@yqf388w)





- a. Teams only required to submit a proposal file in PDF (file. PDF), with the format of the name "ICC 2025_UNIVERSITY_TEAM NAME_PROPOSAL.
- b. Teams upload the video files to each team's Google drive. Afterwards, links along with proposals were sent to email :
civilweek@ft.uns.ac.id
- c. Proposals and videos must be submitted no later than 29th October 2025 at 23:59 (GMT+ 7). Late submissions will be subject to point deductions based on the committee's provisions.
- d. The announcement of the teams that qualify for the final round will be informed through Instagram @civilweekuns and participant's WhatsApp group
- e. Six of the selected teams will advance to the finals, which will be held offline at Sebelas Maret University, Surakarta, Indonesia based on the dates and requirements outlined.

Second Stage (Final Round)

1. Teams which become finalists are required to present and make test objects offline at Sebelas Maret University Surakarta.
2. The final round provisions will be further informed with the release of the finalist TOR.

Concrete specification

1. The production of 3 (three) **Self Consolidated Concrete** samples for the elimination round will be carried out by each team with a 1 day age of concrete.



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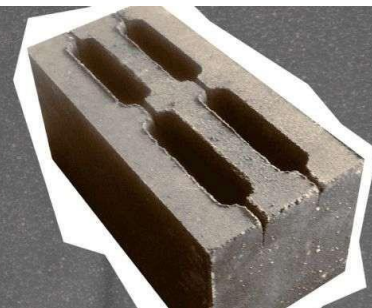
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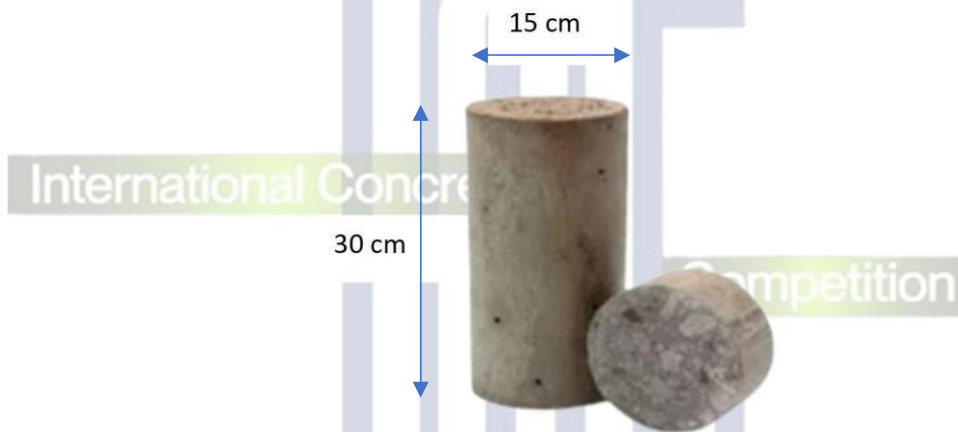
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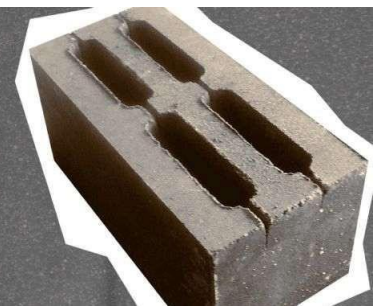
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- Concrete production is designed for the highest possible compressive strength (f_c) and the planned compressive strength written in the proposal for 28 days of age.
- After creating the concrete samples, the concrete was tested at 1 day of age at the respective universities. The test results were converted using a dividing factor of 0.231 for 1-day age.
- Concrete test specimens in the form of cylinders with a diameter of 15 cm and a height of 30 cm.



- Participants are forbidden to use silica fume, hazardous waste as innovation materials and iron/steel materials, and other materials as resolvable in concrete.
- The type of cement provided by the committee is the (OPC) Ordinary Portland cement.
- The maximum allowed use of cement is **300 kg/m³** of concrete mix
- The maximum allowed use of binder is **450 kg/m³** of concrete mix





8. Innovation must be in the form of substitution/replacement of cement and fine/coarse aggregates with percentages not determined by the committee.
9. Participants must explain the background of the selection of other ingredients besides the concrete raw materials used in proposals, how to gain, benefits and effects of substitute materials used on strength of concrete, as well as the economic, social and environmental impact.
10. Participants are required to provide information on other materials used in place of coarse aggregate, fine aggregate, and binder.
11. Participants are allowed to use admixtures, in the final stage the committee will provide superplasticizer.
12. The materials used are stated quantitatively (stated in weight, volume, and percentage of the overall material)
13. The use of superplasticizer shall not exceed **1.5%** of the total binder content per cubic meter.

Proposal Writing Criteria

1. The proposal is written of 15-20 pages (not including cover, approval sheet, summary, list of images, table of contents, list of tables and appendices).
2. The proposal is written in English.
3. The covers designed by including the logo of respective university, the title of the proposal, team members, year, and the name of the event (International Concrete Competition CIVILWEEK 2025).



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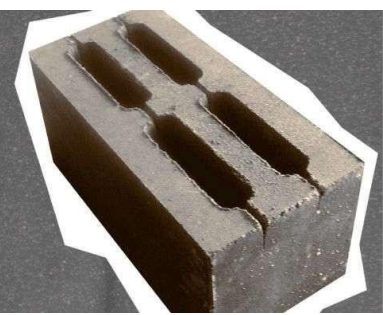
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4. The proposal is written on A4 paper size with the following formats:

- a. The title of the chapter is written using Times New Roman 14.
- b. The contents of the proposal are written using Times New Roman 12 and the line spacing of 1,5.
- c. Writing Margin:
 - From the left side 4 cm.
 - From the right side, top, and bottom each 3 cm.

5. The structure of the proposals is as follows :

- a. Cover
- b. Approval Letter (uns.id/ICC_Civilweek2025)
- c. Preface
- d. Abstract
- e. Table of Contents
- f. List of Images (if any)
- g. List of Tables (if any)
- h. Chapter 1: Introduction

Background, including:

- Considerations in the selection of additional materials used in concrete.
- The process to obtain the additional materials.



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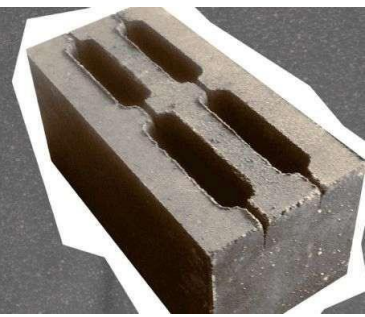
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- Advantages and disadvantages of additional materials.
- The effect of the use of additional materials to concrete's strength.
- The resulting impact from economic, social, and environment point of view.
- Theoretical justification that supports the above explanation.

i. Chapter 2: Methods

- Material data and materials used
- Mix Design calculation
- Concrete making methods

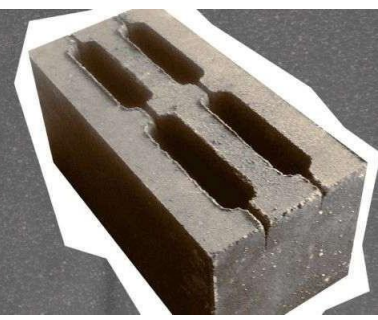
j. Chapter 3: Discussion

- The Compressive strength plan of High Early-Strength Self Compacting Concrete aged 1 day.
- Designed slump value refers to **EFNARC "Spesification and Guidelines for Self-Compacting Concrete"**
- LCA and LCC analysis stated quantitatively from the impact caused in Production and Construction of concrete refers to **ISO 14040 / ISO 14004**

k. Chapter 4 : Closing

- Conclusion
- Suggestions

l. Bibliography





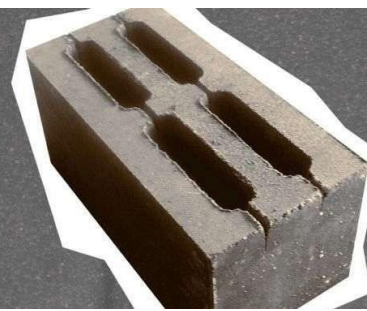
m. Appendix

- Documentation: Materials and concrete making process
- Additive materials data
- Concrete Samples before and after the compressive strength test
- Slump test result by Abrams Cone and compressive strength test result.

Video Criteria

The video for making 3 samples of one day old specimens was carried out at each participating university. Participants must make a video with rules:

1. All content must be in English.
2. The competition video has 10 minutes as maximum duration, with contents:
 - Introduction from members of the team and explanation of the innovative materials used
 - Weighing Materials and how to make concrete.
 - Steps of making until testing concrete (include Slump Flow and one day Compressive Strength Test).
 - Enclosed the logo of HMS UNS and CIVILWEEK 2025 (on the top-right corner), and logo of each participant's University (on the top-left corner).
 - Logo required in the video can be downloaded from uns.id/ICC_Civilweek2025





3. The process of mixing ingredients into the mixer until poured into the mold and slump flow test must not be cut or edited and must be clearly visible (may be accelerated as long as it is clear).
4. Minimum video quality is 720 pixels.
5. The video is sent to civilweek@ft.uns.ac.id (cc ICC) and will be uploaded by the committee on CIVILWEEK Youtube Channel.
6. The committee will provide a concrete marker template through the following link uns.id/ICC_Civilweek2025.
7. Concrete markers are placed on fresh concrete. Laminated markers are recommended
8. Examples of concrete marker applications can be seen on the link: uns.id/ICC_Civilweek2025

F. TEST STANDARDS AND ASSESSMENT CRITERIA

Compressive strength is the ability of concrete to withstand a compressive force per unit area. The compressive strength of concrete indicates the quality of a structure. The value of the compressive strength of concrete is obtained through standard testing procedures, using a testing machine by giving a gradual compressive load to a concrete cylindrical specimen (diameter 150 mm, height 300 mm) until it is crushed. **ASTM C 39/C 39M-04a is used for the standard compressive strength test.** For testing the compressive strength of concrete, the test specimen in the form of a concrete cylinder with a diameter of 15 cm and a height of 30 cm is pressed with a load P until it fails.



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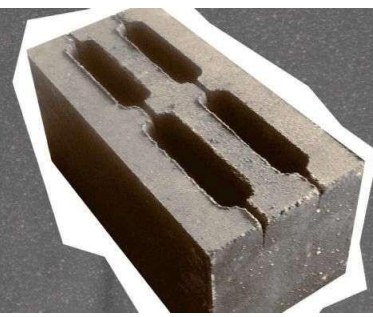
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Because there is a compressive load P , the compressive stress in concrete (σ_c) is equal to the load (P) divided by the cross-sectional area of the concrete (A), so it is formulated:

$$P = F/A$$

with:

P = Compressive strength (Mpa)

F = Compressive Force (N)

A = Area (mm²)

1 kg = 9.81 N

*Participants **must provide** information whether the results of the slump flow test by Abrams Cone and 1-day concrete compressive strength test meet the standards.

LCA and LCC standard for this competition refers to **ISO 14040 / ISO 14004**. LCA addresses environmental aspects and potential environmental impacts (e.g., resource use and environmental consequences of emissions) throughout a product's life cycle—from raw material acquisition, production, and use, to end-of-life treatment, recycling, and final disposal (i.e., cradle-to-grave).



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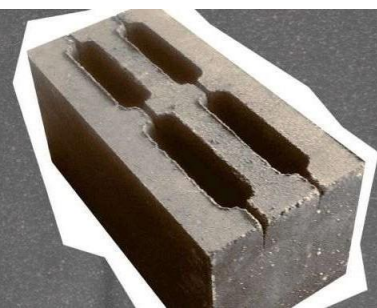
There are four stages in LCA analysis:

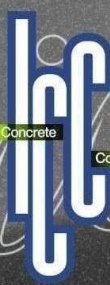
- a. Goal and scope definition
- b. Inventory analysis
- c. Impact assessment
- d. Interpretation

In the inventory analysis stage (Stage 2), quantitative assessments can be conducted, such as the amount of carbon gas reduction achieved through cement innovation, the annual reduction in natural aggregate extraction, the total reduction or annual use of waste, and other relevant calculations.

LCC (Life Cycle Costing) in contrast to only focusing on the purchase price, is especially useful if a relevant share of costs are incurred during the use or end-of-life phase of the analysed product or service. The nature of life cycle costs depends on the specific product in question. Different cost elements are taken into account, depending on the product type.

The boundary of this analysis is limited to the impact caused in Production and Construction of concrete innovation.





Assessment for selection in the preliminary round includes:

Proposal Assessment

No	Assessment Criteria	Percentage
1.	Systematic Proposal	15%
2.	<i>Mix Design Calculation</i>	25%
3.	LCA	30%
4.	LCC	30%

Video Assessment

No.	Assessment Criteria
1.	Compressive Test Result
2.	Accuracy between Strength Test Result and Strength Plan
3.	Slump
4.	Introduction innovation concrete
5.	Mixing
6.	Material weighing





G. WINNER PRIZE

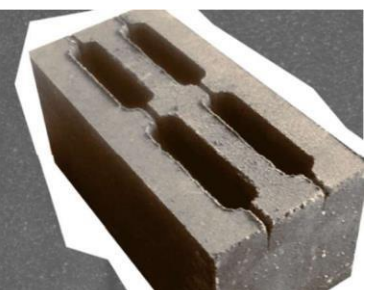
International Concrete Competition CIVILWEEK 2025 prizes are:

- 1st Place : USD 762 + Certificate + Vandel
- 2nd Place : USD 488 + Certificate + Vandel
- 3rd Place : USD 305 + Certificate + Vandel
- 1st runner up : Development grant (USD 35) + Certificate
- 2nd runner up : Development grant (USD 35) + Certificate
- 3rd runner up : Development grant (USD 35) + Certificate

*All Finalist will be provided with accommodation and local transportation during the International Concrete Competition

H. OTHER TERMS

- Teams are responsible for understanding and complying with these TORs.
- The proposal design will be judged by a jury as previously described.
- Finalists will be announced later.
- Six (6) teams that have passed the finalists must immediately confirm to the committee their willingness to participate in the offline final of ICC Civilweek 2025 at UNS, Surakarta, Indonesia. International participants are advised to prepare their visa and passport before attending the offline final competition in Indonesia.
- All submitted works must be original. Cheating or plagiarism in any form is prohibited in the competition.
- Collaboration between teams is not allowed.
- The decision of the jury is final and fixed.





- The organizers reserve the right to keep all competition proposals and other related documents regarding ICC.
- Any action that may damage or endanger the competition is not allowed.
- All decisions made by the judges and organizing committee are final, and we reserve the right to change the competition rules at our discretion.
- If participants have difficulty in obtaining additional information or materials specified from the committee, they can contact the committee through email civilweek@ft.uns.ac.id or the contact person listed below:
 - a. +62 895-6059-86253 (Darrell)
 - b. +62 877-2996-9091 (Bagas)

Competition



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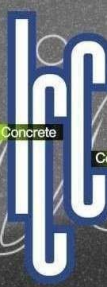
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ATTACHMENT

CONCRETE MATERIAL PRICE LIST

No	Material	Price
1.	Sand	0.0625 USD/kg
2.	Gravel	0.03125 USD/kg
3.	Cement	0.09375 USD/kg
4.	Admixture	0.625 USD/liter
5.	Waste Materials	(Adjusted by way of obtaining)

Information :

The conversion value of 1 USD is IDR. 16.000





International Concrete
Competition



INTERNATIONAL CONCRETE COMPETITION

CIVILWEEK 2025

organized by:

HIMPUNAN MAHASISWA SIPIL

CIVIL ENGINEERING DEPARTMENT FACULTY OF ENGINEERING

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