



Miguel Ángel Garavito Pérez
Miguel Ángel Caro Sichacá

Friends and colleagues



The student chapter of the ACI

(Universidad Nacional de Colombia)

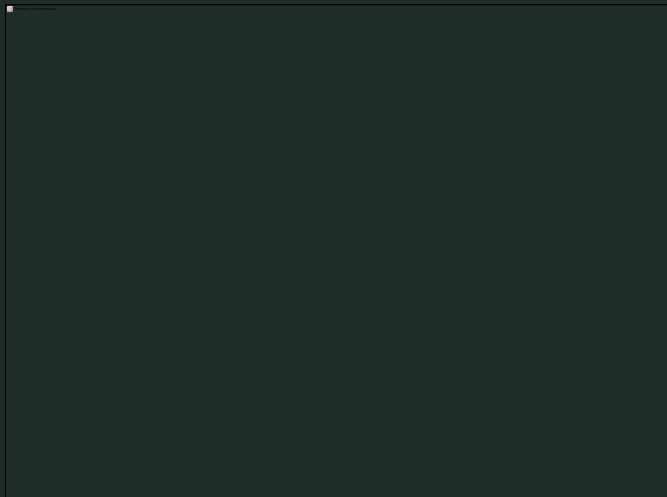
Is formed as a student initiative, on March 4th, 2016, with the support of Engineer Juan Manuel Lizarazo, the Engineer Jorge Segura Franco and the Engineer Ismael Santana Santana.



UNIVERSIDAD **NACIONAL** DE COLOMBIA
CAPÍTULO ESTUDIANTIL

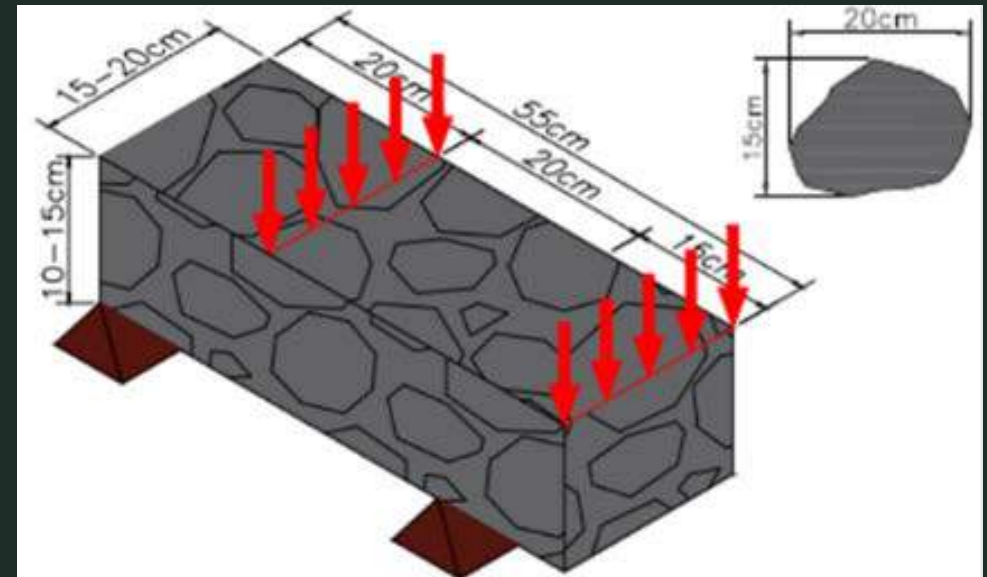
Activities Performed

- Technical visit to a prefabricated concrete plant
- Conference: Concrete Pathologies
- Technical visit to a military residences building construction
- Technical visit to Bacatá's building construction
- Participation in the contest organized by the chapter of the ACI of the ECI
- Participation in the Bowling Ball Competition and ACI Concrete Convention and Exposition in Salt Lake City



Participation in the local concrete competition

- The High Resistance Concrete contest was organized by the ICA Student Chapter of the Colombian School of Engineering Julio Garavito.
- In the category we participated, the objective was to design and build a reinforced concrete beam, whose load conditions and dimensions were those shown in the image (allowing irregular shapes), maximum weigh 40kgf.



Mix design In charge of Miguel Garavito

- We use the ACI 211 method of concrete mix design
- Cemex branded cement was used.
- As an additive we used a plasticizer called Plastol 7000 produced by the brand Toxemen



Reinforcement design (In charge of Miguel Caro)

- As indicated by the Colombian standard of earthquake-resistance NSR-10, the ultimate resistance method was used, starting with the bending and then shearing design, ensuring that both meet the limits of amount and separation.
- In order to adjust the beam to the maximum permissible weight, we decided that the cross section was trapezoidal



Final test

- The destructive test of the beam was carried out in the concrete laboratory of the Colombian School of Engineering Julio Garavito
- The load that resisted the beam was 35,23Tonf, being the one of greater resistance



➤ Difficulties

- One of the biggest difficulties we had was that we did not have full knowledge of how to design the concrete mix
- We also did not know very well the effects of plasticizer in the manual mixing of the concrete, which made the work too difficult, since the concrete mixture was not manipulable with the elements we had available

Learning

- To work as a team
- Understand the need for safety factors in engineering, since the uncertainty regarding the properties of the material with which it works is high (and is evidenced in the fact that the load supported by the beam was higher than the design load)
- Thanks to this contest, we were able to strengthen ties of friendship, not only among ourselves, but also with the laboratory workers, teachers, colleagues and friends, who offered their help unselfishly to make possible what in principle we did not consider a probable reality

Bowling Ball Competition





Thanks

