About IIT Madras

- Indian Institute of Technology Madras is a public engineering institute located in Chennai, India
- Best technical institute in India (MHRD, 2017)
- The institute has nearly 550 faculty, 8,000 students and 1,250 administrative and supporting staff.
- The Institute has sixteen academic departments and a few advanced research centres in various disciplines of engineering and pure sciences,
- There are nearly 100 laboratories organised in a unique pattern of functioning.




Civil Engineering at IIT Madras

- Started in 1959 since the beginning of the institute.
- We have the following divisions
  - Building Technology and Construction Management (BTCM)
  - Environmental and Water Resources Engineering (EWRE)
  - Geotechnical Engineering (GT)
  - Structural Engineering (ST)
  - Transportation Engineering (TR)

Student Associations:

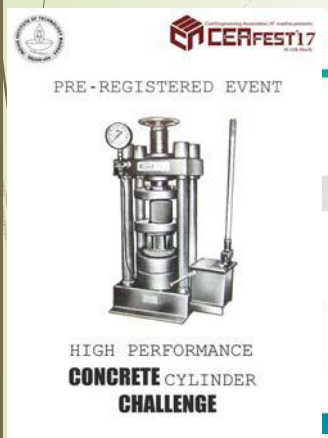
Civil Engineering Association (CEA)

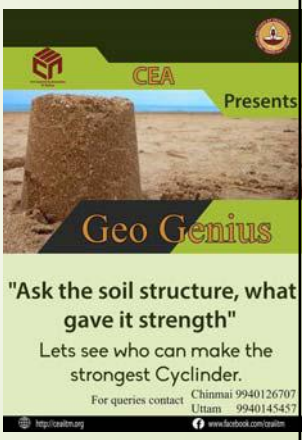
- The Civil Engineering Association (CEA) was formed with the primary aim of exposing potential civil engineers to the challenges of the profession

Civil Engineering Association
IIT Madras

KC1

Some highlights of CEA:

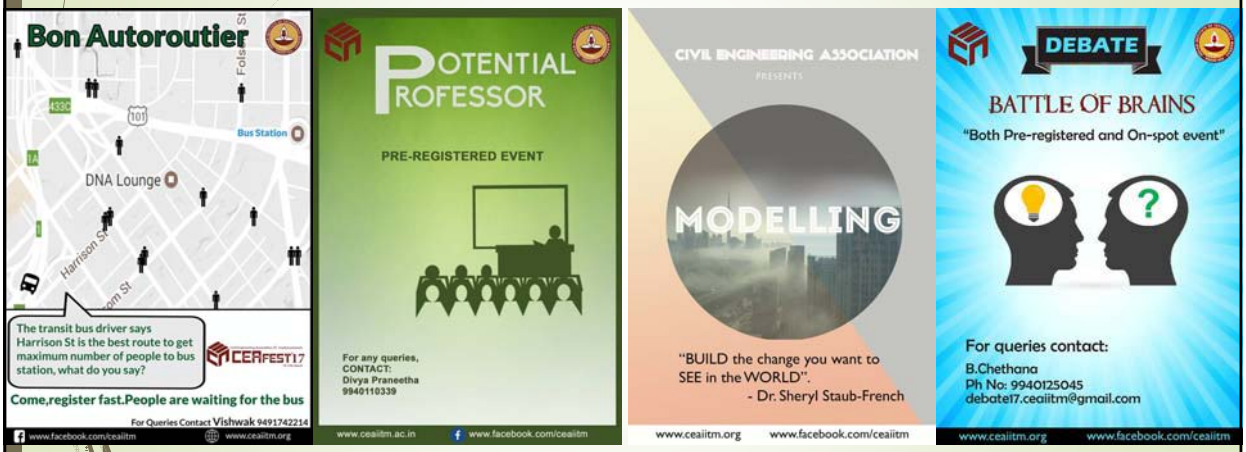




Slide 6

KC1 Krishna Chaitanya, 10/6/2017

Some highlights of CEA:



Indian Concrete Institute (ICI)- IITM Chapter

- To promote growth of concrete construction and its sub-specializations.
- To collaborate with national and international agencies in creating better understanding of concrete construction technology.
- To identify R & D problems of practical relevance to concrete construction technology.
- To disseminate information and to arrange to train personnel for the needs of changing concepts in the technology.

EPD Competition, Anaheim 2017

IIT Madras ACI Team

- First team to participate in ACI competitions (Started in Fall 2017).
- 2 Senior (4th year) Civil Engineering students
- Faculty Advisor (Dr. Ravindra Gettu)

The EPD

Concrete

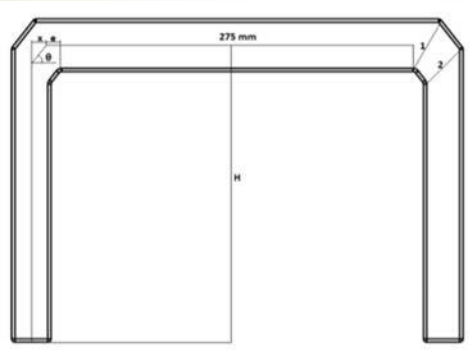
Mix design: A wastage of 25% was assumed and the following mix proportion was achieved using volume batching.

- Cement confirming to ASTM C 989 standards: 400 kg /m3
- Superplasticizer (Master Glenium B233): 2% by weight of cement
- Water- Cement ratio: 0.3
- Silica fume: 10% by weight of cement
- Fine aggregate (passing through 1.18 mm sieve) = 1170 kg/m3
- Coarse aggregate (passing through 10mm sieve) = 808 kg/m3

The EPD

Decision of shape:

- The arch should keep standing without collapsing on the egg itself. Arch it should fail at Joint 1 than Joint 2 .
- Allocation of a weighing factor=M2/M1 = 3/2
- In the allowable space envelope for the arch, a five sided arch was the best option compared to a curved joint.



x	12 mm
θ	52°
L	313 mm
H	225 mm
e	7mm

Fig 1 Size and shape parameters

The Frame

Fig 2 Finished arch after curing

Fig 3 Nylon Mould

Reinforcements

Fig 4 Finished Reinforcement Cage

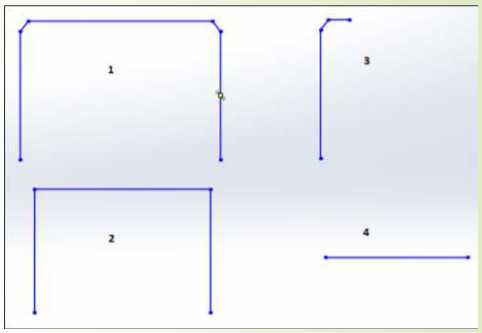


Fig 5 Details of each distinct units

Reinforcements

- Untempered Spring Steel (1.6 mm diameter)
- Tension Reinforcement- 3 nos. of 1.6 dia wire
- Compression Reinforcement- 2 nos. of 1.6 dia wire
- Tension developed near the ends (partial rigidity due to columns)
- Four different components repeated to complete the shape (Fig 4)
- Stirrups:
  - ✓ Minimum Design Horizontal spacing : 40 mm
  - ✓ Minimum Design Vertical spacing: 60 mm

Real Life Application

Portal frames on metro train bridge curves can be simulated from by the EPD.

Thank you!


MAKING CONNECTIONS
FALL 2017
aci
SOUTHERN CALIFORNIA CHAPTER


aci
American Concrete Institute
Always advancing


Civil Engineering Association
IIT Madras


INDIAN INSTITUTE OF TECHNOLOGY MADRAS