ACI Fall Convention 2021
Atlanta, GA. Oct. 17th – 22nd

aci CONCRETE CONVENTION

Leopoldo 1201

A SUSTAINABLE ICONIC ARCHITECTURAL AND HIGH-PERFORMANCE CONCRETE BUILDING IN THE NEW SAO PAULO SKYLINE

Douglas Couto
PhD Engenharia
São Paulo, Brazil

The ACI Excellence in Concrete Construction Awards

The ACI Excellence in Concrete Construction Awards celebrate innovation and inspire excellence throughout the global concrete design and construction community.

Join us for the 2023 ACI Excellence in Concrete Construction Awards on Monday, October 30, 2023.

Now more than ever, concrete design and construction projects must

2023 EXCELLENCE AWARDS

The next annual ACI Excellence in Concrete Construction Awards will be held October 30, 2023, during the ACI Concrete Convention in Boston, MA, USA.

SUPPORT THE EXCELLENCE GALA

Place your company at the forefront of the gala, gaining exposure to industry professionals when you sponsor the ACI Excellence in Concrete Construction Gala.

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2022 WINNERS

View the most recent Excellence Award winners.

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2021 ACI Excellence High Rise Category Judges

Siddhartha Bhattacharya
Bechtel India Pvt. Ltd.
Haryana, India

Andres Matos-Ortiz
Jr. Engineer
Flood Testing Laboratories
Chicago, IL, United States

Thomas Farrell
Partner
Cove Property Group
New York, NY, United States

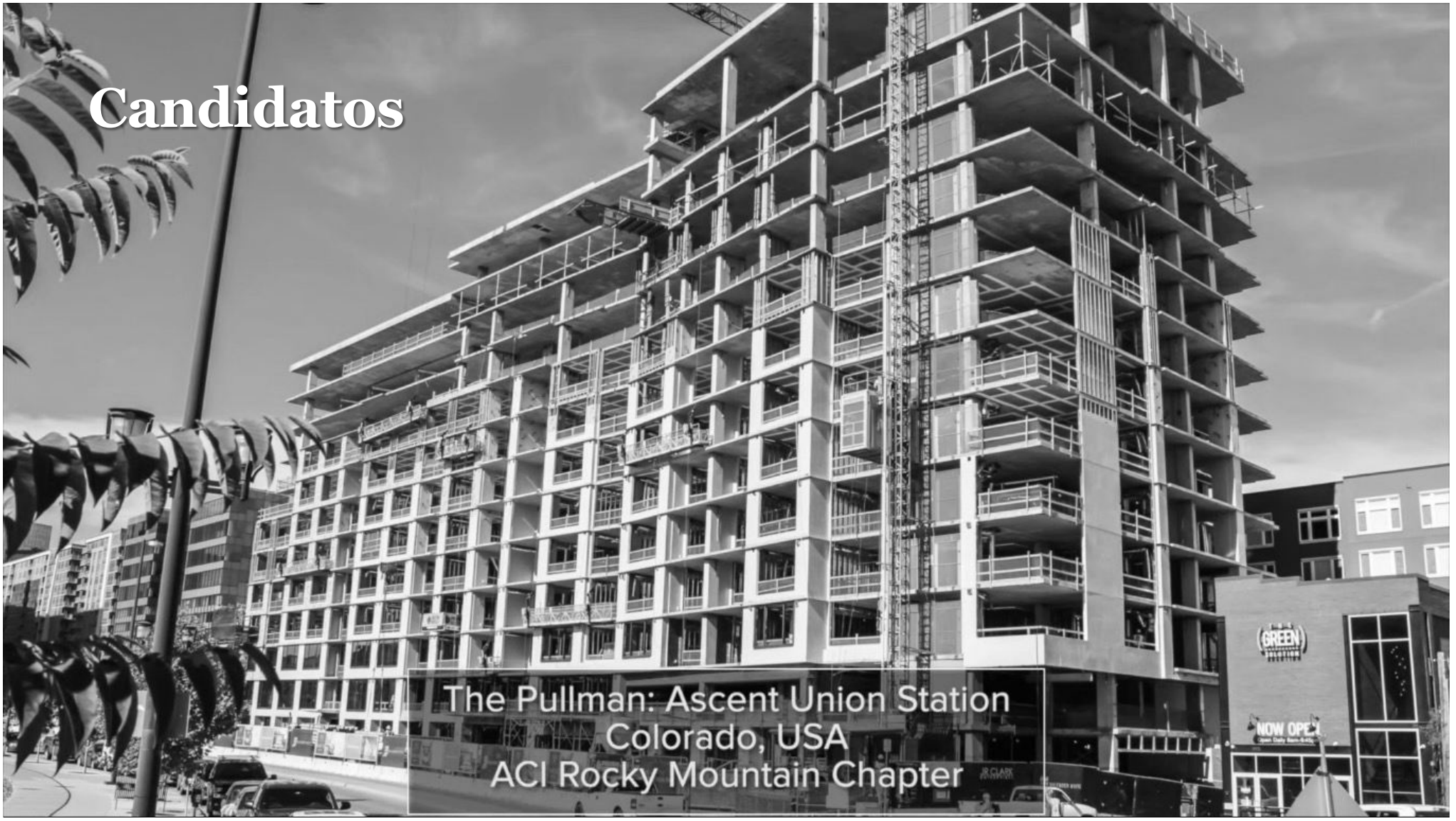
Candidatos


Ayala Triangle Garden Diamond
(ATG Tower 2)
Metro Manila, Philippines
ACI Philippines Chapter

Candidatos


Humaniti Complex
Québec, Canada
ACI Québec and Eastern Ontario Chapter

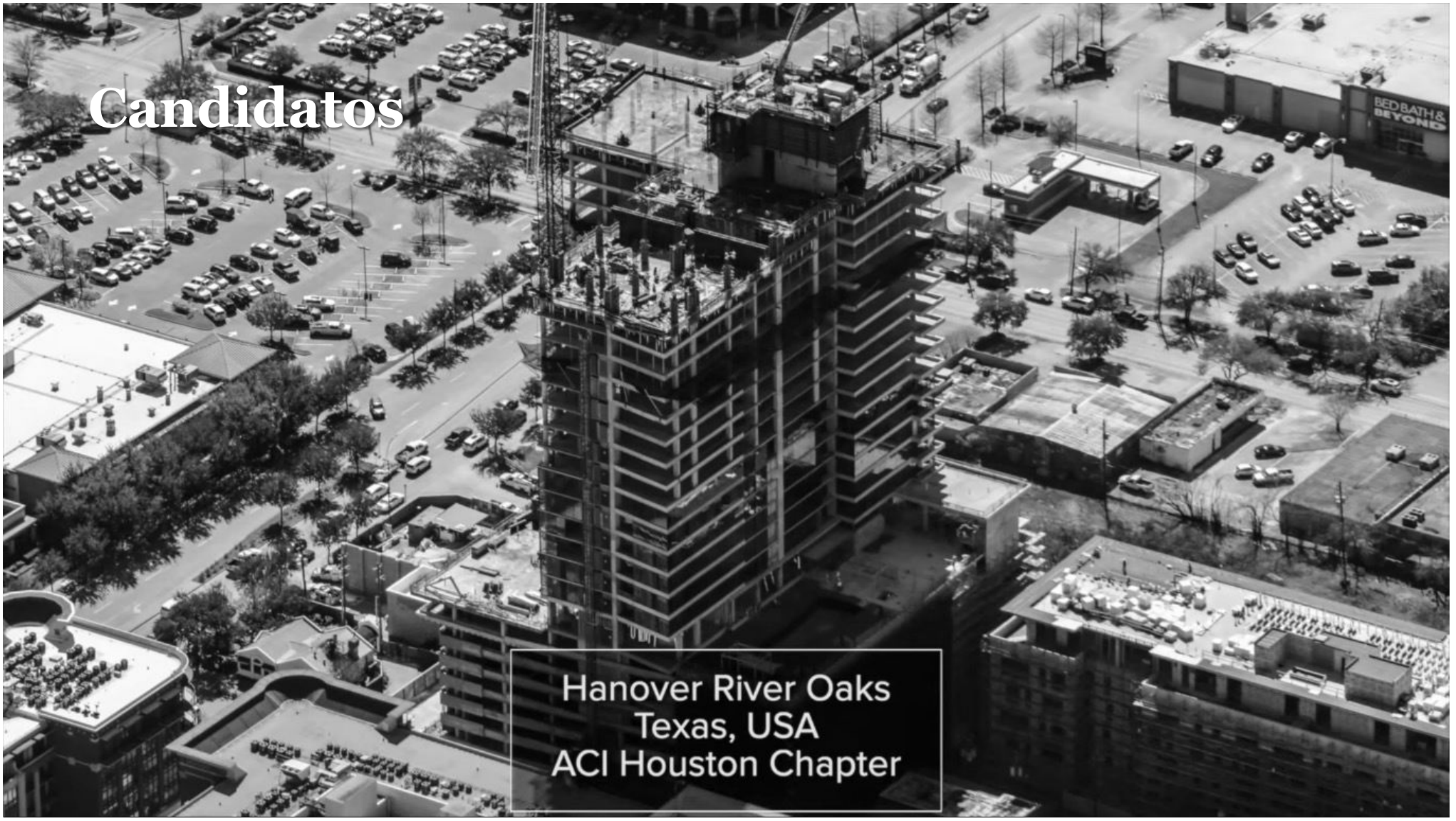
Candidatos


The Pullman: Ascent Union Station
Colorado, USA
ACI Rocky Mountain Chapter

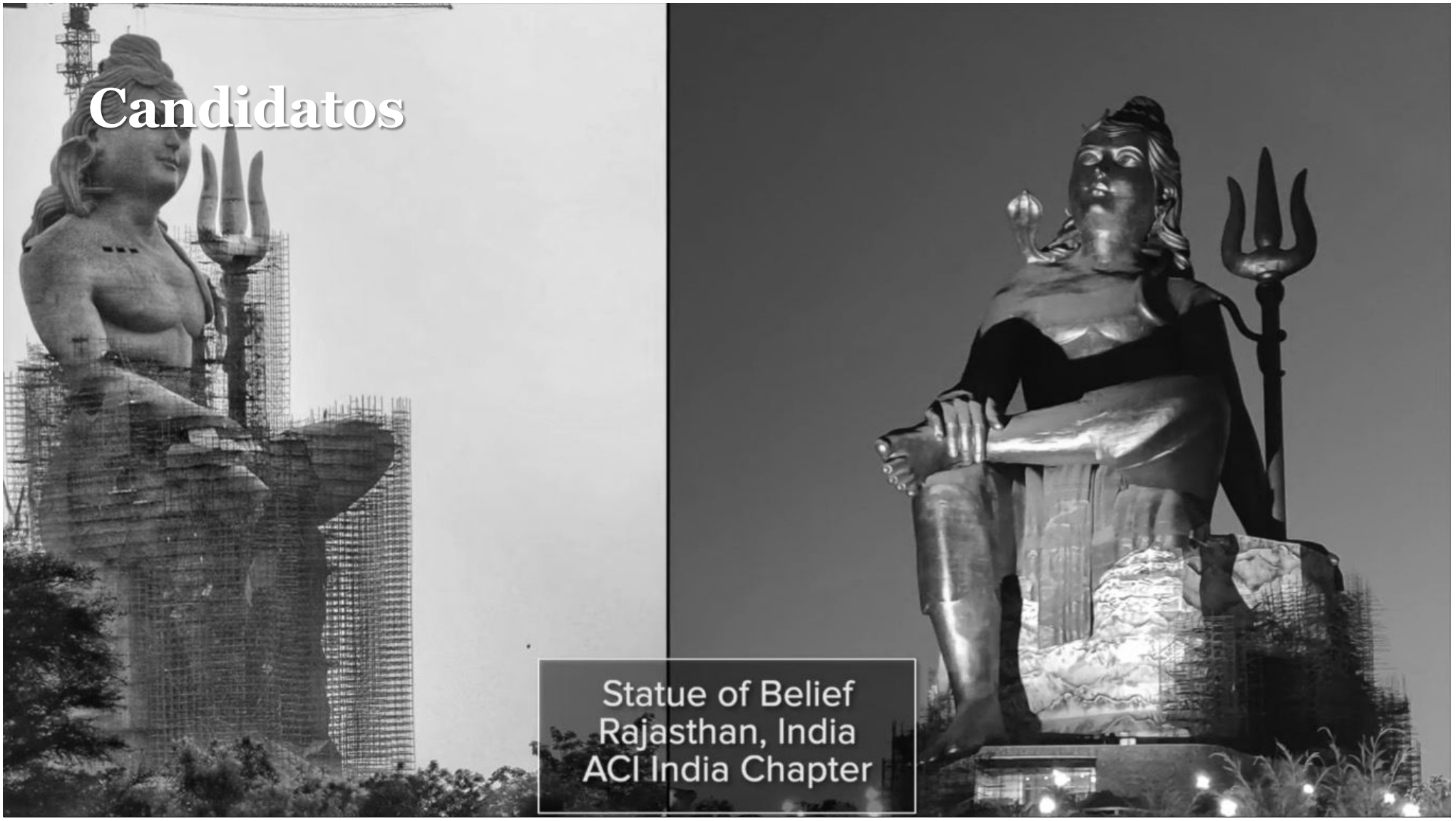
Candidatos


Metropolis R3
California, USA
ACI Southern California Chapter

Candidatos


BED BATH & BEYOND
Hanover River Oaks
Texas, USA
ACI Houston Chapter

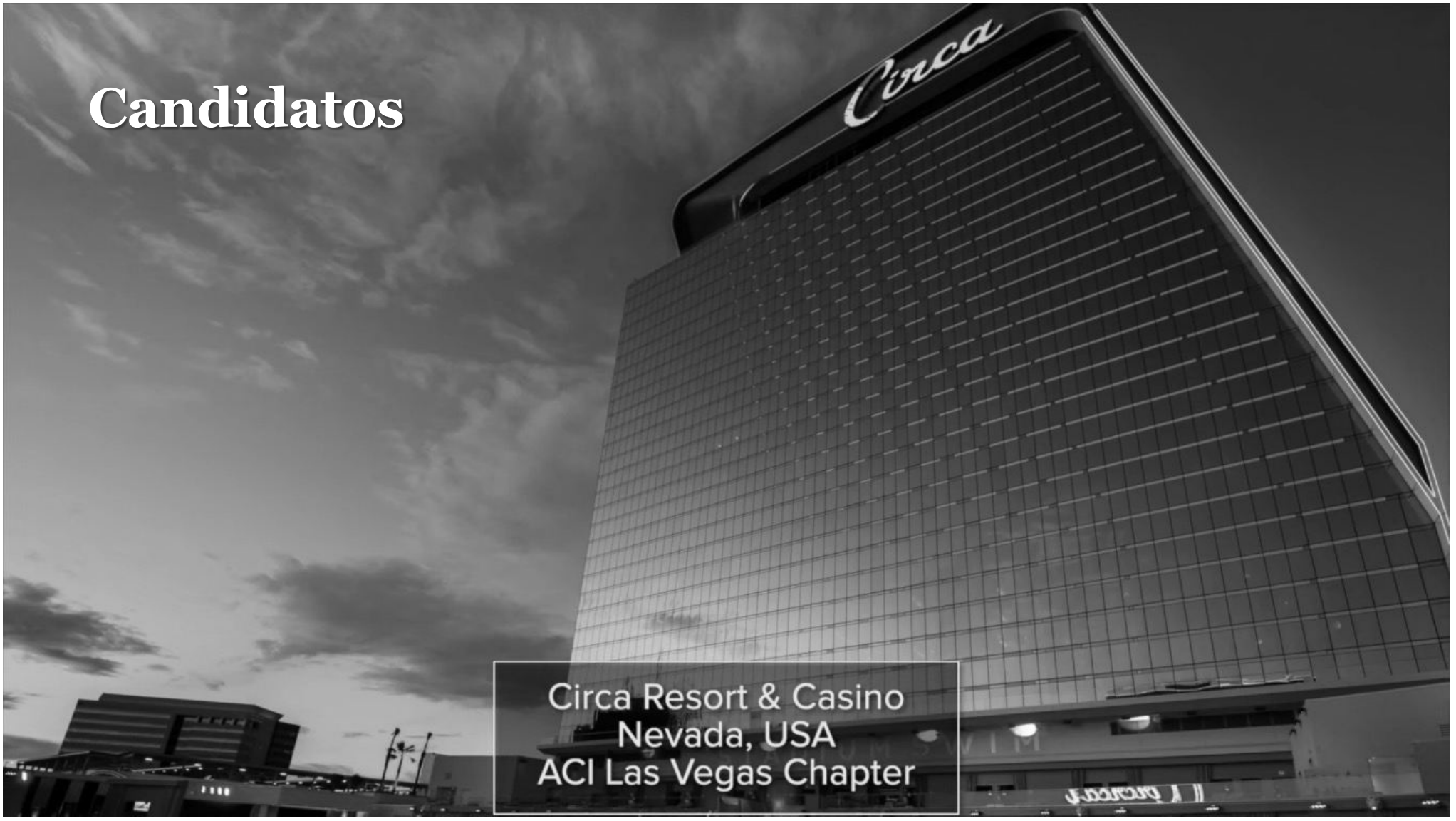
Candidatos



Candidatos

PWC Tower in Citylife District
Milano, Italy
ACI Italy Chapter

Candidatos



Candidatos


AVALON
Avalon Harbor East
Maryland, USA
ACI Maryland Chapter

First Place – High-Rise Structures

Leopoldo 1201, São Paulo, Brazil. The Leopoldo 1201 residential building has a total built area of 10,974 m² (118,120 ft²) within 1125 m² (12,100 ft²) of land, with four underground floors, a ground floor, and 23 stories. This building has one house/apartment per floor and a penthouse at the top. The architectural concrete façades emphasize the biophilic design of the terraces that have varied designs that vary in thickness and span. The building columns have reduced cross sections to increase the internal free space and to provide more parking spaces; and the architectural concrete of the terraces was formed with a slatted wood texture. These characteristics posed great challenges for the structural design and development of the concrete mixtures.

Project Team Members: *Owner:* Nortis Incorporadora e Construtora Ltda.; *Architectural Firm*: aflalo/gasperini arquitetos; *Engineering Firm:* Ávila Engenharia de Estruturas Ltda.; *General Contractor:* Nortis Incorporadora e Construtora S.A. *Concrete Contractor:* PhD Engenharia Ltda.; *Concrete Supplier:* Votorantim Cimentos S.A. – Engemix.

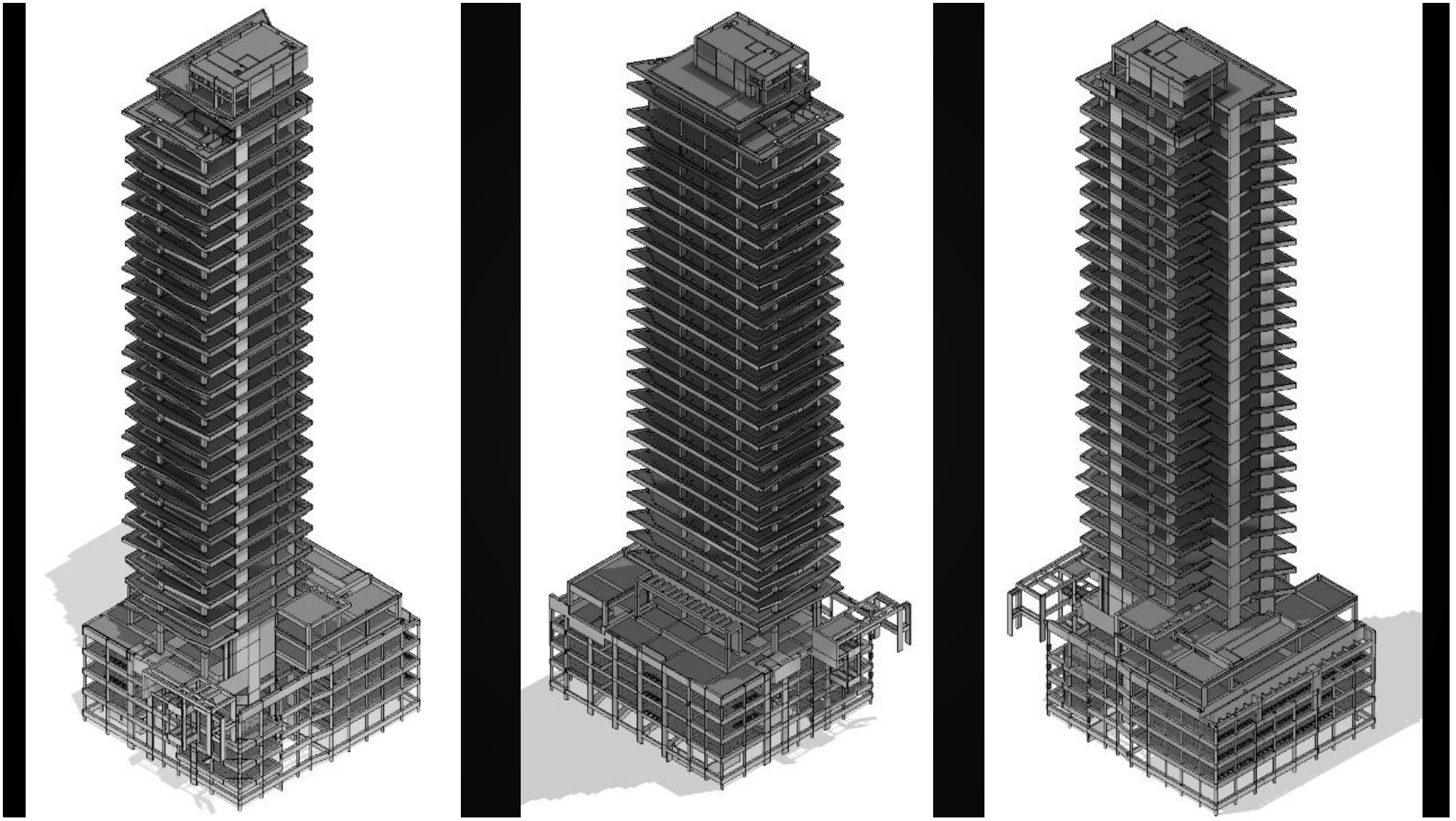
Nominator: Instituto Brasileiro do Concreto (IBRACON), ACI International Partner


Intervenientes
NORTIS
catuai
Grupo
aflalo/gasperini arquitetos
AVILA
engenharia de estruturas
PhD
Engenharia
VOTORANTIM
cimentos

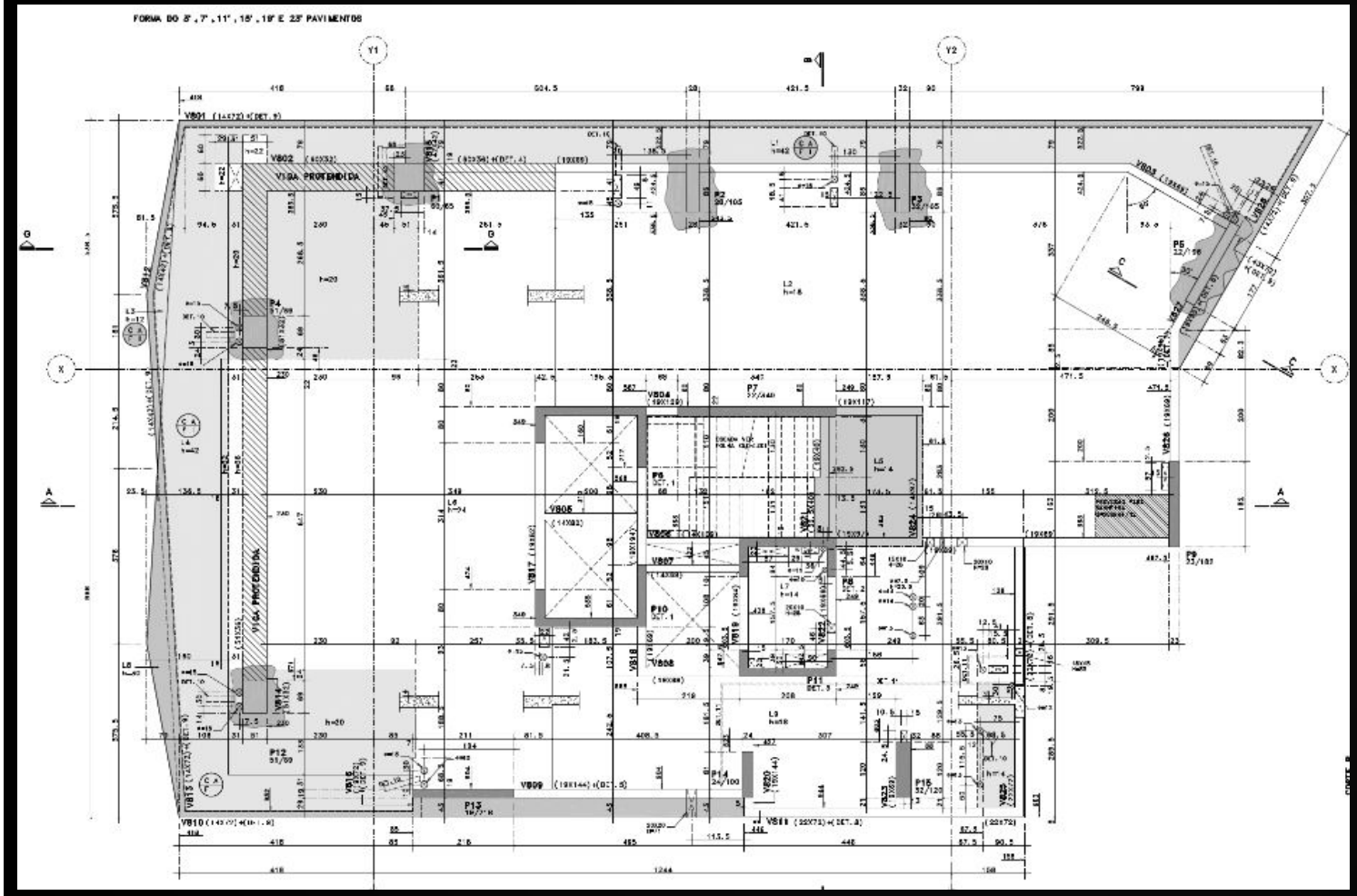

Fachada Arquitetura
4 variações concreto aparente 28 pavimentos

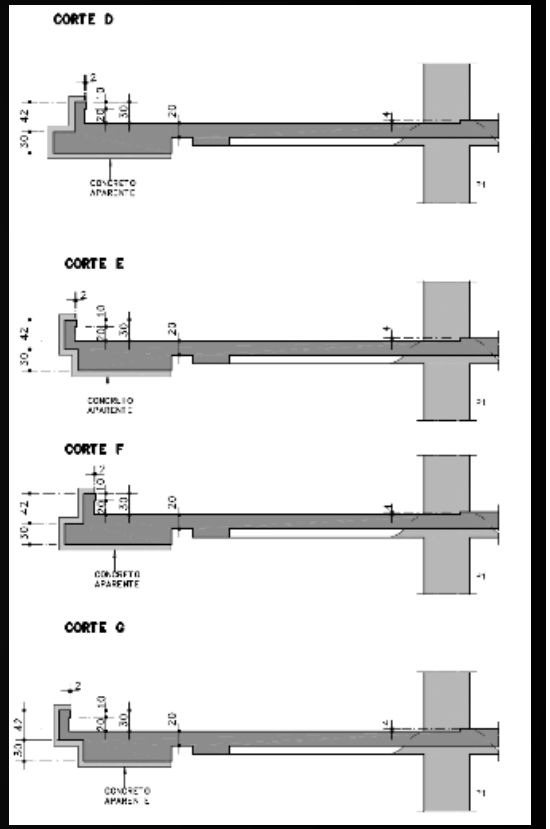

4 variações
aci

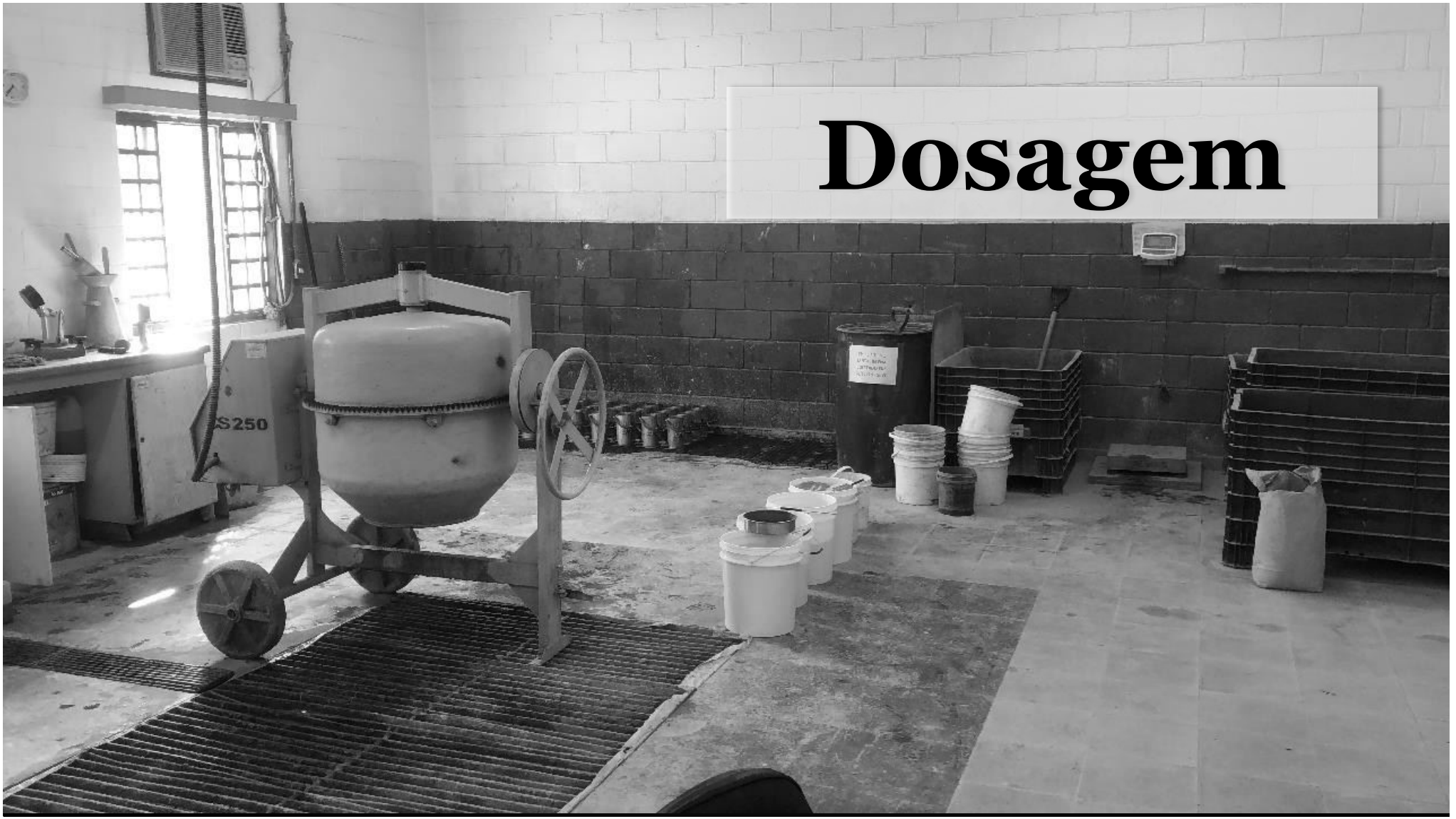
ESTRUTURA



Andar tipo


FORMA DO 5º, 7º, 11º, 15º, 19º E 23º PAVIMENTOS
VIGA PROTENDIDA
VIGA PROTENDIDA

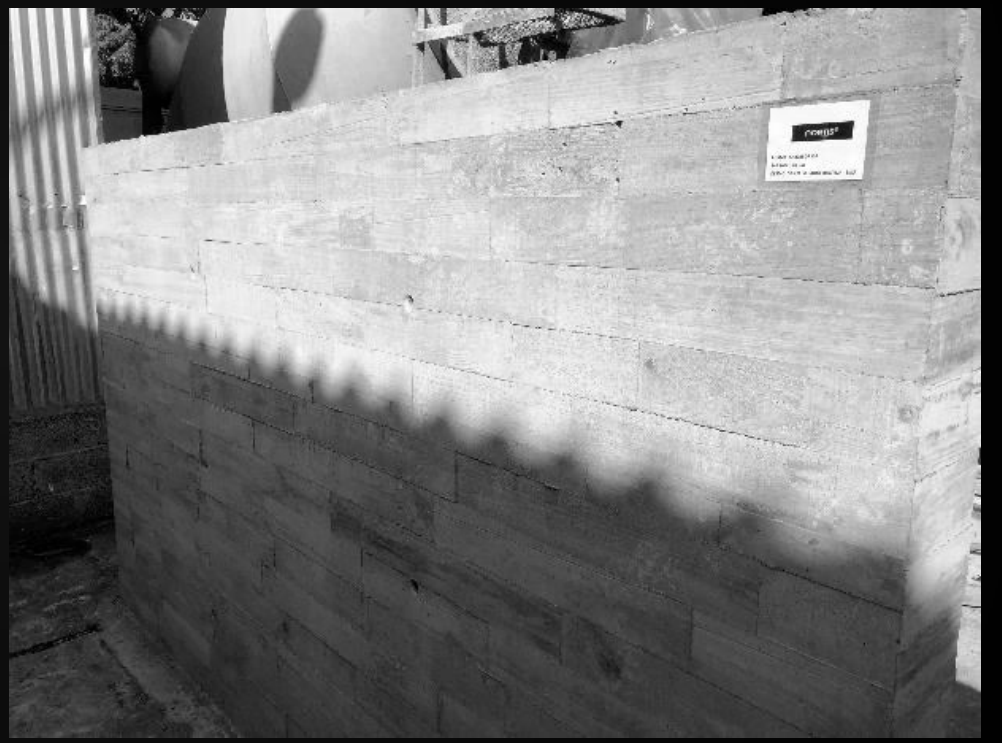

CORTE D
CONCRETO APARENTE
CORTE E
CONCRETO APARENTE
CORTE F
CONCRETO APARENTE
CORTE G
CONCRETO APARENTE


Dosagem

Traço do concreto C90

Clinker Portland:	**438 kg/m³**
Escória de alto forno:	**91 kg/m³**
Filler calcário :	**49 kg/m³**
Silica ativa:	**84 kg/m³**
a/cm:	**0.25**
Aditivo 1:	**1.7%**
Aditivo 2:	**0.9%**
Aditivo 3:	**0.1%**
Aditivo 4:	**0.1%**
Pigmento vermelho:	**1%**
Agregado graúdo:	**calcário**
Agregado miúdo:	**quartzo**

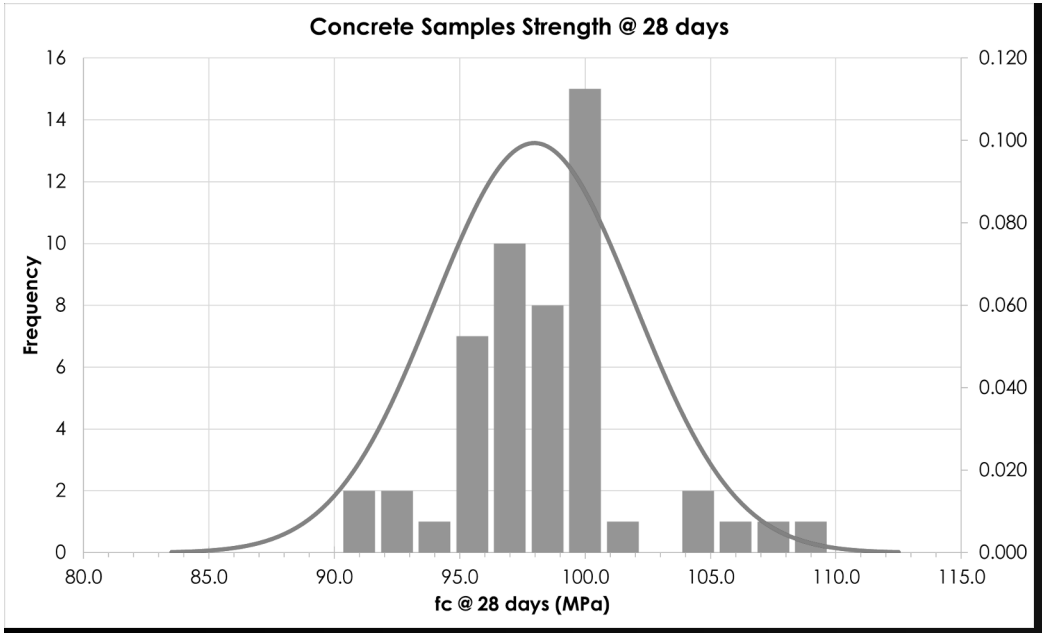
Protótipos

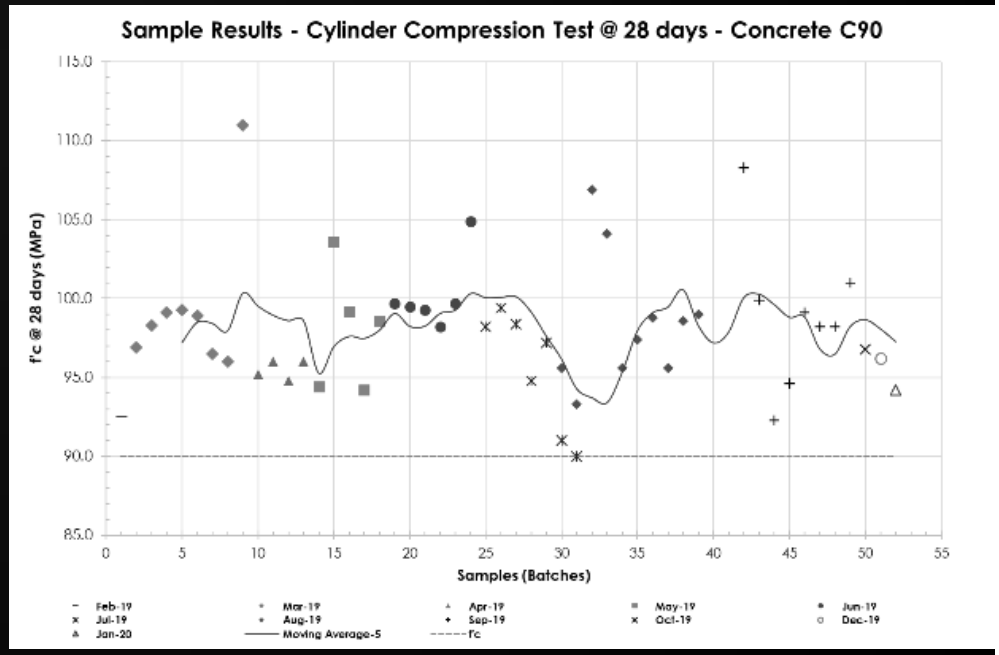


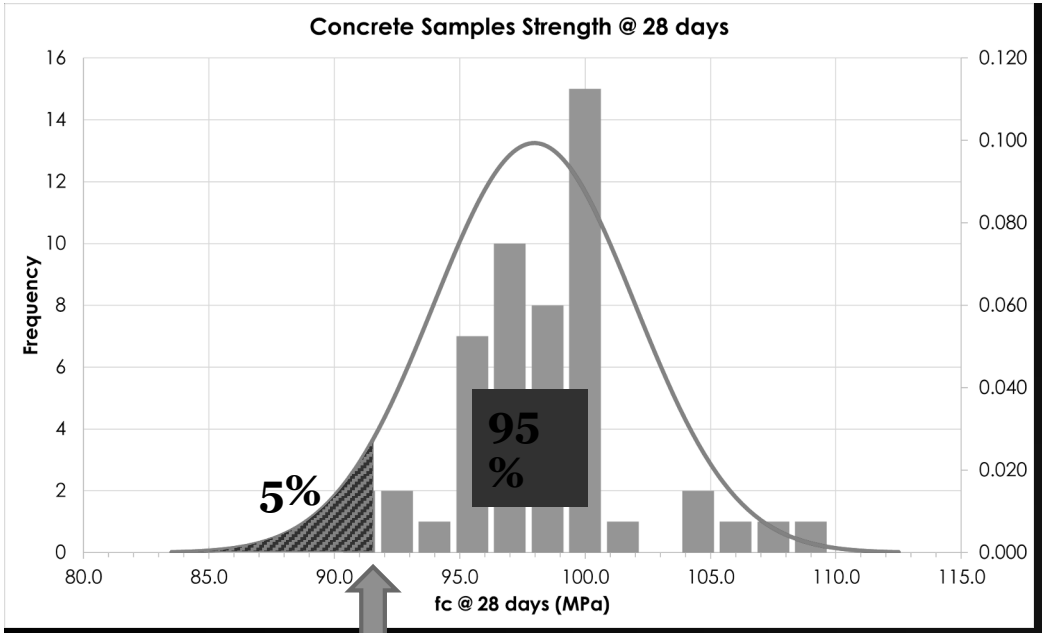
Protótipos

Protótipos


Controle
00799 F kN
101.7 F MPa
FRACTURE DETECTED
7 8 9
4 5 6
aci

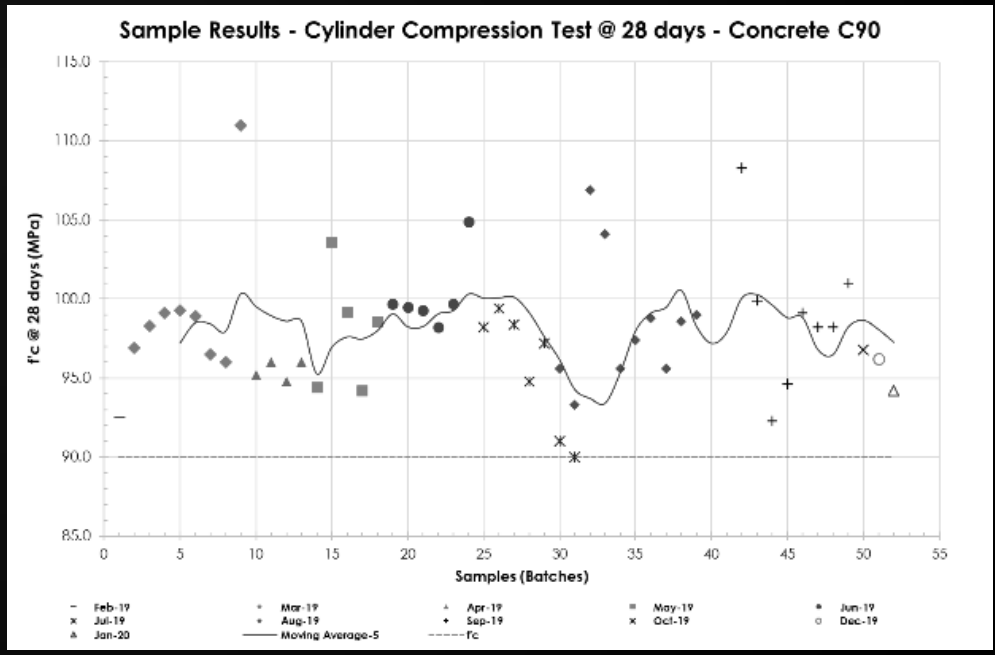

Concrete Samples Strength @ 28 days
Frequency
fc @ 28 days (MPa)
0
2
4
6
8
10
12
14
16
0.000
0.020
0.040
0.060
0.080
0.100
0.120
80.0
85.0
90.0
95.0
100.0
105.0
110.0
115.0


Sample Results - Cylinder Compression Test @ 28 days - Concrete C90
f'c @ 28 days (MPa)
Samples (Batches)
85.0
90.0
95.0
100.0
105.0
110.0
115.0
0
5
10
15
20
25
30
35
40
45
50
55
Feb-19
Mar-19
Apr-19
May-19
Jun-19
Jul-19
Aug-19
Sep-19
Oct-19
Dec-19
Jan-20
Moving Average-5
f'c



f_{ck} = 91.5 MPa @ 28 days

51 BTs em 11 meses →
~410 m³



Controle:

28 dias f_{cm}:	**98 MPa**
63 dias f_{cm}:	**105 MPa**
Desvio padrão:	**4.01 MPa**
Variabilidade:	4.1%
$f_{ck,est}$:	**91.5 MPa**
Módulo @ 28 days:	**48.5 GPa**
Módulo @ 91 days:	**50.0 GPa**

Traço do concreto

C90

Clinker Portland:	**438 kg/m³**
Slag:	**91 kg/m³**
Filler (limestone) :	**49 kg/m³**
Silica Fume:	**84 kg/m³**
Water/Cement ratio:	**0.25**
Admixture 1:	**1.7%**
Admixture 2:	**0.9%**
Admixture 3:	**0.1%**
Admixture 4:	**0.1%**
Pigment:	**1%**
Aggregate:	**Limestone**
Sand:	**Quartz**

C90: 4.87 kg clínquer/MPa

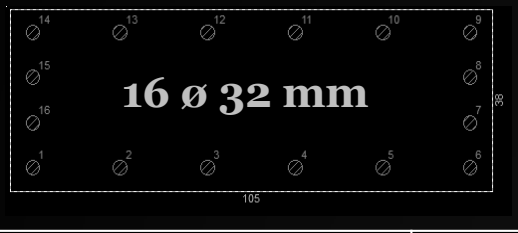
C50

Clinker Portland:	**303 kg/m³**
Slag:	**63 kg/m³**
Filler (limestone) :	**34 kg/m³**
Silica Fume:	**22 kg/m³**
Water/Cement ratio:	**0.45**
Admixture 1:	**0.35%**
Admixture 2:	**0.93%**
Aggregate:	**Limestone**
Sand:	**Quartz**

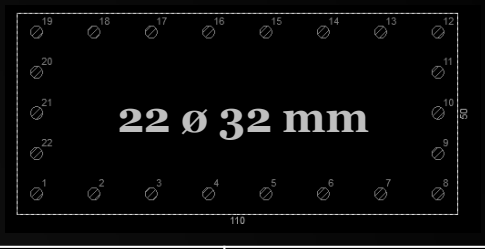
C50: 6.06 kg clínquer/MPa

Comparação (pilar altura 3,35m)

C90 (105 x 38)



C50 (110 x 50)



Item	C90	C50	benefício ao planeta
concreto	1.34 m^3	1.85 m^3	- 28%
forma	9.61 m^2	10.75 m^2	-11%
aço	340 kg	447 kg	- 27%
cimento	774 kg	740 kg	+ 5%
areia	713 kg	1689 kg	-58%
brita	1351 kg	1672 kg	-20%
água	221 L	351 L	- 37%
CO_2 emissão	1.42 ton	1.72 ton	-17%
vida útil de projeto	1000	200	- 80,0%