

Brazil



Name: Brazilian Tunnelling Committee (CBT)

Type of Structure: CBT is a committee of the Brazilian Society for Soil Mechanics and Geotechnical Engineering (ABMS). It is an open society based on membership

Number of Members: 217 Individual Affiliate Members and 103 Corporate Affiliate Members.

ASSOCIATION ACTIVITIES DURING 2020 AND TO DATE

Events

16/07 - Aplicações do Tirantes em Contenção e Tratamentos de Emboques. Case: Cortina em Auto injetável, com Tirantes e Micro estacas. Retaining structures on tunnel portals. Case: self drilling use on tie back and micropiles.

07/05 - "Recalques nas Obras do Porto Maravilha" – Werner Bilfinger – Case: Maravilha Harbor settlement due to tunnelling.

14/05 - Tendências nas escavações subterrâneas influenciadas pela indústria 4.0 – Alex Nowak – Underground excavation tendencies due 4.0 Industrie.

19/05 - "Benefícios ambientais, sociais e econômicos de obras subterrâneas" – Tarcisio B. Celestino – Environmental, social and economics benefits due to underground excavation.

26/05 - "Jet Grouting em Obras Civis" – Akira Koshima – Jet Grouting in civil works.

04/06 - "Especificando cimentos sustentáveis para concretos duráveis" – Sílvia Vieira – Votorantim – Sustainable cement specifications for durable concrete

16/06 - "Concreto projetado reforçado com macro e micro fibras sintéticas" – Manfredo Belohuby – Sika S/A – Reinforced shotcrete with micro and macro synthetic fibers

25/06 - "Projetos de Túneis – Diferentes soluções adotadas para problemas similares" – Luiz Guilherme Isfer Maciel – Pedra Branca escavações – Tunnel design – different solutions for similar problems.

02/07 - "Etapas essenciais para um projeto de túneis por NATM: Técnicas Europeias" – Jose Adelmar Mello Franco – NATM essential steps in design: European techniques.

09/07 - "Previsão sísmica em túneis: casos da Amberg Technologies" – Enrique Vegas Leon, Jozsef Hecht Mendez – Tauri Engenharia – Seismic forecast for tunnels: Amberg Technologies.

16/07 - "Automação da instrumentação

de um túnel com vistas a avaliação da estabilidade da frente e da seção- interpretação dos deslocamentos" – Jose Adelmar Mello Franco – Case: automatic tunnel instrumentation for front stability evaluation and section support – displacement interpretation.

23/07 - Membranas projetadas para impermeabilização de túneis" – Maurício Garcia – Master Builders Solutions (Basf) – Membranes designed for waterproofing tunnels

30/07 - "Painel de Práticas Contratuais – Lei 8.666, Lei do RDC, Lei das Estatais" – advogado Arthur Luis Pinho de Lima, da Empresa de Planejamento e Logística (EPL); o engenheiro Flávio Henrique Cunha Lobato, da Galvão Engenharia; o engenheiro Tiago Ern, da AIG Seguros Brasil, e o advogado Júlio César Bueno, da Pinheiro Neto Advogados, moderador Eloi Angelo Palma Filho. – Contractual practice panel.

05/08 - "Túneis da Ferrovia do Aço" – Carlos Serman – Case: Ferrovia do Aço railway tunnels.

13/08 - "Aprendendo com Casos de Obras de Túneis – Teoria e Prática". Roberto Kochen – Learning from tunnel construction cases.

20/08 - "Túneis para saneamento do Consórcio ITI-7 – Despoluindo o Rio Tietê" – Bruno Rodrigues Leite – Case: tunnels for sanitation – cleaning Tietê River.

27/08 - "Concreto Projetado para túneis: aspectos práticos de um processo para o século 21". – Cassio Moura – Shotcrete for tunnels: process practical aspects for 21st century.

03/09 - "Enfilagens Metálicas Tubulares como Pré Suporte de Túneis: Conceitos técnicos e casos de obra". Alaor Coelho – incotep – Steel pipe umbrella as tunnel preliminary support

13/09 - "Estruturas subterrâneas em rocha para mineração". – Lineu Azuaga Ayres da Silva, CBMR – Underground estruturas on rock for mining.

24/09 - "Prática recomendada – Concreto projetado reforçado com fibras" – Antonio

Figueiredo, Fernando Stucchi, Tarciso B. Celestino, Cassio Moura, Werner Bilfinger – Fiber reinforced shotcrete – recommended practice..

01/10 - "Aspectos construtivos, desafios e soluções encontradas na construção de túneis de pequeno diâmetro" – George Teles – Solotrat – Construction, challenges and solutions on small diameter tunnelling. **08/10** - "TBM em Túneis em rocha no Brasil – Caso do Túnel Gastau" – Roberto Kochen – Rock tunnels excavated

Publication

Journal: Soils & Rocks (www.soilsandrocks.com.br), in English, published by the Brazilian Society for Soil Mechanics and Geotechnical Engineering (ABMS), the Brazilian Association for Engineering Geology and the Environment (ABGE) and the Portuguese Geotechnical Society (SPG). Three issues are released each year. The following volumes were published in 2020:

Volume 43, N. 1, January - March 2020

http://www.abms.com.br/links/soilsandrocks/Soils-43-1-2020v2_red.pdf

Volume 43, N. 2, April - June 2020

<http://www.soilsandrocks.com.br/wp-content/uploads/2020/07/Soils-43-2-web.pdf>

Volume 43, N. 3, July - September 2020

http://www.abms.com.br/links/soilsandrocks/SR-43-3_web.pdf

Volume 44, N. 4, October - December 2020

http://www.abms.com.br/links/soilsandrocks/Soils_43-4-web.pdf

Press and social media:

101 published articles on CBT website; 33 mailing on CBT@News; 02 podcasts and 216 posts on Facebook, Instagram and LinkedIn.

LinkedIn 150 posts

Site 140 reports

Instagram 133 posts

Facebook 155 posts

Sending 54 issues of CBT@news.

Launch of Technical Publication

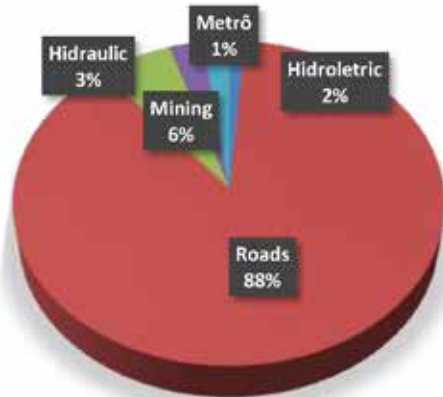
On September 24, 2020, CBT launched its first technical publication. The publication "Recommended practice - Fiber reinforced shotcrete" has been downloaded 82 times by the CBT website since its launch.

CURRENT TUNNELLING ACTIVITIES

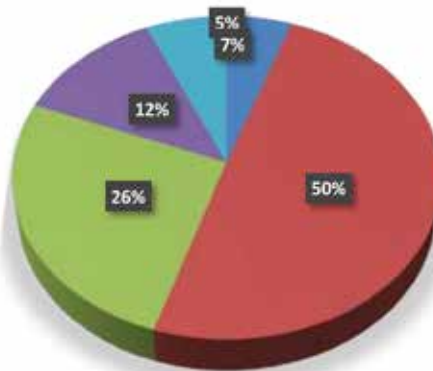
The estimated total volume of tunnels excavated in Brazil is 3.9 million m³ in 46km of tunnels. It includes roads, railways, hydroelectric facilities, mining and hydraulic.

The distribution, in percentage is:

Volume 2020



Length 2020



■ Metrô ■ Roads ■ Mining ■ Hidraulic ■ Hidroletric

STATISTICS

1. Length

Total 46,2km (5.4% mechanized and 94.6% conventional)

2. Volume

Total 3,991,000m³ (1.2% mechanized and 98.8% conventional)

3. Amount (USD or EUR) of tunnelling / underground space facilities awarded in 2020:

Estimated US\$1.1bn

4. Finalized tunnels

PCH Salto do Guassupi, PCH Sede II, CGH Igrejinha and PCH Morro Grande.

5. Tunnels under construction

PCH Dois Saltos, PCH Alto Farias, Ipojuca I and II, Tigre, Cacareco, Fortaleza metro, Tamoios road.

FUTURE TUNNELLING ACTIVITIES

- Metro de Fortaleza is one of the projects expected for 2021.
- São Paulo Metrô, Lines 2 and 6.
- Ring road around Florianópolis (was expected in 2019, postponed to 2021);
- New concessions around the country bring some provisions for new tunnels in SP, RJ, RS, but probably later than 2020.

EDUCATION ON TUNNELLING IN THE COUNTRY

There are no courses in Brazil yet that focus on tunnelling. Some universities have one or two disciplines related to underground construction, like Makenzie (São Paulo-SP), USP (São Paulo-SP), UnB (Brasília-DF), Iesplan (Brasília-DF). On post-graduate courses our references in Brazil are Brasilia Federal University (UnB) and São Paulo University (USP), São Carlos school.