



**Comitê Brasileiro de Túneis –
CBT Brazilian Tunnelling
Committee (ITA Member)**
Secretaria Executiva (Metrô/SP)
E-mail: cbtabs@metrosp.br

COLLAPSE AT SÃO PAULO METRO PINHEIROS STATION SITE

NOTE ISSUED BY THE BRAZILIAN TUNNELLING COMMITTEE OF THE BRAZILIAN SOIL MECHANICS AND GEOTECHNICAL ENGINEERING ASSOCIATION (CBT - ABMS)

1. The Brazilian Tunnelling Committee (CBT), a branch of the Brazilian Soil Mechanics and Geotechnical Engineering Association (ABMS), wishes to express its profound regret in relation to the accident at São Paulo Metro Line 4 Pinheiros Station site on January 12, 2007. First and foremost, the Committee wishes to express its sympathy to all those directly affected by the consequences of this accident.
2. Over the last week, CBT directors have spared no effort to inform the community and technical circles through numerous media interviews seeking to clarify issues related to the collapse and tunnel engineering in general.
3. In the course of these interviews, our members have avoided speculation and simply presented the facts about the collapse while pointing to the characteristics of underground excavation in urban settings, providing lessons learned from examples of collapses in other countries, and comparing the construction methods used. In relation to determining the causes of the collapse, the Committee believes that this is a complex task involving great responsibility, and requires data and facts that will not be available until a detailed examination of the technical documents has been made. We note that an inquiry of this type is to be made by an expert commission especially

designated by the Institute of Technological Research (IPT) of the State of São Paulo. The Committee firmly supports the latter's technical and ethical qualifications and holds its members and the institution in high esteem.

4. In relation to suggestions aired in the media that a wrong decision was taken to excavate underground in the section where the collapse took place, the Committee reaffirms that the technology available to Brazilian tunnel engineers is capable of executing underground works in any geological context or urban environment, and even in a section of complex geology such as the one involved here. As proof of this, several other tunnels have been built in similar geological conditions, and under the Pinheiros River itself in São Paulo. Therefore there was nothing wrong in deciding for an underground excavation solution adapted to the site.
5. Another important point is that the tunnelling method used for the Pinheiros Station – NATM, or sequential excavation method — is in normal use for structures executed in similar geological conditions. As further clarification, we would emphasize that the mechanised excavation technique using tunnel-boring machines can be used up to diameters of around 12 meters in solid rock, which is not the case of the site of the collapse, so this technology could not be used to excavate tunnels of the dimensions of the Pinheiros Station.
6. CBT once again reasserts its confidence in the ability of Brazilian engineers to execute structures of this size in these geological conditions in urban environments. As proof of the competence of the country's engineering one has only to see the examples of successful underground structures in the Committee's recently published book *Brazilian Tunnelling* describing the 120 most important tunnels built in the country since the mid-19th century. At this difficult time, the Committee shares the sadness felt by all the different segments of the civil engineering industry in Brazil (design engineers, construction companies, equipment suppliers, service providers, planners and researchers). This does not mean that we ignore, minimize or diminish the importance of collapses in underground structures in Brazil and worldwide, especially when loss of human lives is involved. Lessons drawn from these rare

accidents will lead to better and more secure techniques for modern tunnel engineering.

7. In relation to analysis of the type of contractual arrangement (turn-key) used, the Committee believes that an unhurried discuss is required to review the several alternatives for the technical relations between the parties involved, on the lines practised in several countries around the world. However, the Committee believes that at this time it would be premature to open this debate for the case of Line 4 before the IPT concludes and submits its inquiry into the causes of the collapse.
8. Finally the Tunnelling Committee believes that the reasons for this collapse, on being examined in a responsible manner, will provide valuable lessons for tunnel engineering and lead to technical and safety enhancements that will strengthen the role and importance of underground excavation for Brazil and its people.