

6ª CONFERENCIA INTERNACIONAL GEOTECNIA DE DUCTOS

IPG2023-0006

USE OF FLEXIBLE CONCRETE AS EMERGENCY MITIGATION MEASURE

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RESUMEN

In February, in the middle of Carnaval, record rains fell over a big portion of Brazil and, in particular, on the coastline of São Paulo State. Between the evening of February 18th, a Saturday, and the following morning, 683 mm fell over Bertioga and 627 mm over São Sebastião. These precipitations were exceptional and records for the cities, resulting in 52 casualties. Besides the human losses, a very dramatic aspect is that São Sebastião is crossed by the Sea Ridge, a mountainous region along the coastline whose hillsides are crossed by the Petrobras pipeline OSBAT. OSBAT is a 120 km long pipeline stretching from São Sebastião northbound to Cubatão southbound. Approximately 50 km of this length cross the Sea Ridge and are, therefore, subject to geohazards such as landslides or debris flows. In fact, 52 geohazard occurrences were detected, from low risk to high risk, according to our classification, 5 of which were considered dangerous enough as to force the interruption of the pipeline operation. Among those high risk five, emergency measures had to be taken to reestablish safety, especially debris removal and drainage. Especially useful for the rapid execution of drainage systems was the adoption, for the first time in Transpetro, of the Concrete Canvas® technology. Concrete Canvas can be defined as a thin (5-10 mm), flexible mat that, in contact with water, turns into a hard cementitious surface suitable to the execution of water channels. The mat contains a dry concrete mix, inside a tridimensional fiber matrix, with a fibrous film at one (upper) side and a PVC film at the other (under) side. Once water added, it stays workable (flexible) for two hours and then it hardens in the desired format. Concrete Canvas was then used in the following sites in the OSBAT pipeline: km 37+000, km 37+500 and in km 24+800. More heavy rains happened in June, serving as a test for the Concrete Canvas channels, and they proved to be very effective. Nevertheless, the in-situ installation of the Concrete Canvas demands several accessories for transporting and lifting, without which the installation is impossible. It took some misfits until the field personnel got practical with its use. It can be concluded that it's a high-quality product and highly practical in emergency situations, although it demands some acquaintance with it.