Slab and Cradle System in EPS (expanded polystyrene) to support sanitary sewage networks.

Osti, Rogério José* **Graduated in Civil Engineering and Law, Technologist in Hydraulic Works, MBA in Environmental Sanitation with International Module at the London School of Economics and Political Science (LSE – London/UK) and Master's Degree in Environmental Auditing. Employee of Sabesp for 31 years in multifunctionalities, Commercial Management, Operation and Divisional Management, with a focus on obtaining results, through People Management and Valuing. Construction Management in Metropolitan Enterprises and Transformation Agent.**

*** Address: Ana Costa Ave. 296 – Campo Grande - Santos – São Paulo - CEP:11060-000 - Brasil - Tel.: +55 (13) 98111-3247 - e-mail: rjosti@sabesp.com.br – Superintendence of Management of Metropolitan Enterprises and Baixada Santista – EM.**

Keywords: EPS; sanitation; sewers; universalization; technology.

INTRODUCTION

The system for laying sewage collection networks, usually, and I would say traditionally, has remained the same over time for the implementation of the sanitary sewage system.

The construction method for implementing a sanitary sewage network, after excavating the trench, shoring and lowering the water table, when necessary, the bottom of the trench must be regularized to measure and align the elevations that will define, according to the project, the depth and slope, with a pre-cast reinforced concrete structure being laid, which constitutes the slab and cradle for laying the pipe on the upper portion, providing support and alignment of the network.

This laying method aims to meet its intended purpose, however it presents some disadvantages and limitations, resulting in the opportunity to replace the pre-cast reinforced concrete slab and cradle with the EPS slab and cradle system.

The high weight of the concrete parts, the workability of the installation, makes it time-consuming and increases the risk of work accidents on site. There are difficulties in subsequent interventions for the maintenance and implementation of the sewage connections, as there is a need to break the cradle with jackhammers and heavy tools for installing specific parts.

In the final implementation price, concrete slabs have higher final costs due to storage, transportation, movement and installation, with the option of the EPS slab and cradle

system, safeguarding the stability of the sewage collection network in relation to the level and the alignment.

GOAL

The objective of this work was to analyze the application of expanded polystyrene (EPS), replacing the reinforced concrete slab and cradle as support in the laying of sanitary sewage pipes.

METHODOLOGY

Expanded polystyrene (EPS) is a rigid cellular plastic, resulting from the polymerization of styrene in water. The product is pearls measuring up to 3 millimeters, which are intended for expansion. In the transformation process, these pearls increase by up to 50 times their natural size, through steam, fusing and molding themselves into different shapes.

Expanded, the pearls have up to 98% air in their volume and only 2% polystyrene. In 1m³ of expanded EPS, for example, there are 3 to 6 billion closed, air-filled cells and as a result, EPS products are inert and do not contaminate soil, water and air.

The production of EPS products strictly follows the specifications of NBR 11752 and the EPS slab and cradle system has the potential for use in practically all construction infrastructures of any sanitary sewage system.

RESULTS AND CONCLUSIONS

The applicability test was structured with two manholes (PV's) placed at a distance of 6 meters from one point to the other with a depth of 2.50m. After leveling and piling the bottom of the trench, a crushed stone ballast was placed, which was also manually piled using sockets, after which the slab and cradle system in EPS was laid, leveled and aligned, and a pipe was placed. ocher pvc dn150mm which was also leveled.

After checking the leveling, the backfilling of the trench began, with the backfill between the walls of the trench and the EPS slab and cradle system, on both sides, until reaching the height of the cradles and then manual piling of the soil alternately on both sides, taking care not to misalign the pipe, and the process is repeated until the trench is completely filled with a mechanical process in the final layer of one meter.

The test was carried out on a passable street in the municipality of Bertioga, and the integrity of the pieces was unearthed after 30 days.

ACKNOWLEDGMENTS

I would like to thank my wife Solange for her support, understanding and dedication. We appreciate the commitment of Sabesp professionals who are always in the process of developing new technologies for the environmental development of São Paulo and the country.

REFERENCES

ABIQUIM (São Paulo). What is EPS? 2020.

Available at: http://www.https://www.epsbrasil.eco.br/eps/index.html accessed on: October 20, 2022.

THAIS,H.L.N.EPS:poliestirenoexpandido.POLIESTIRENOEXPANDIDO.2014.Available at:https://comonuvens.wordpress.com/2014/05/22/eps-poliestireno-expandido/. Accessed on: May 26, 2021.

https://repositorio.animaeducacao.com.br/bitstream/ANIMA/17298/1/ESTUDO%20DA%20VIABILIDADE%20DO%20POLIESTIRENO%20EXPANDIDO.pdf. Accessed October 23, 2022

https://www.scielo.br/j/ce/a/Z47gnFxxyQym5M8FgY7wZ6q/abstract/?lang=pt. Accessed October 23, 2022

https://www.isorecort.com.br/o-que-e-eps/. Accessed on October 21, 2022.