

Metro de Santo Domingo

A GAME CHANGER
CELEBRATES 10 YEARS





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RESEARCH BY *Fernando Ruiz*

2 019 marks 10 years of Metro de Santo Domingo, the most extensive metro system in the Central America region. During this time, the metro transported in excess of 500 million passengers around the city, with each year showing significant passenger growth. Remarkably, ten years after its opening, a metro ticket still costs the same as it did the day it opened: RD\$20 (around forty cents in US dollars).

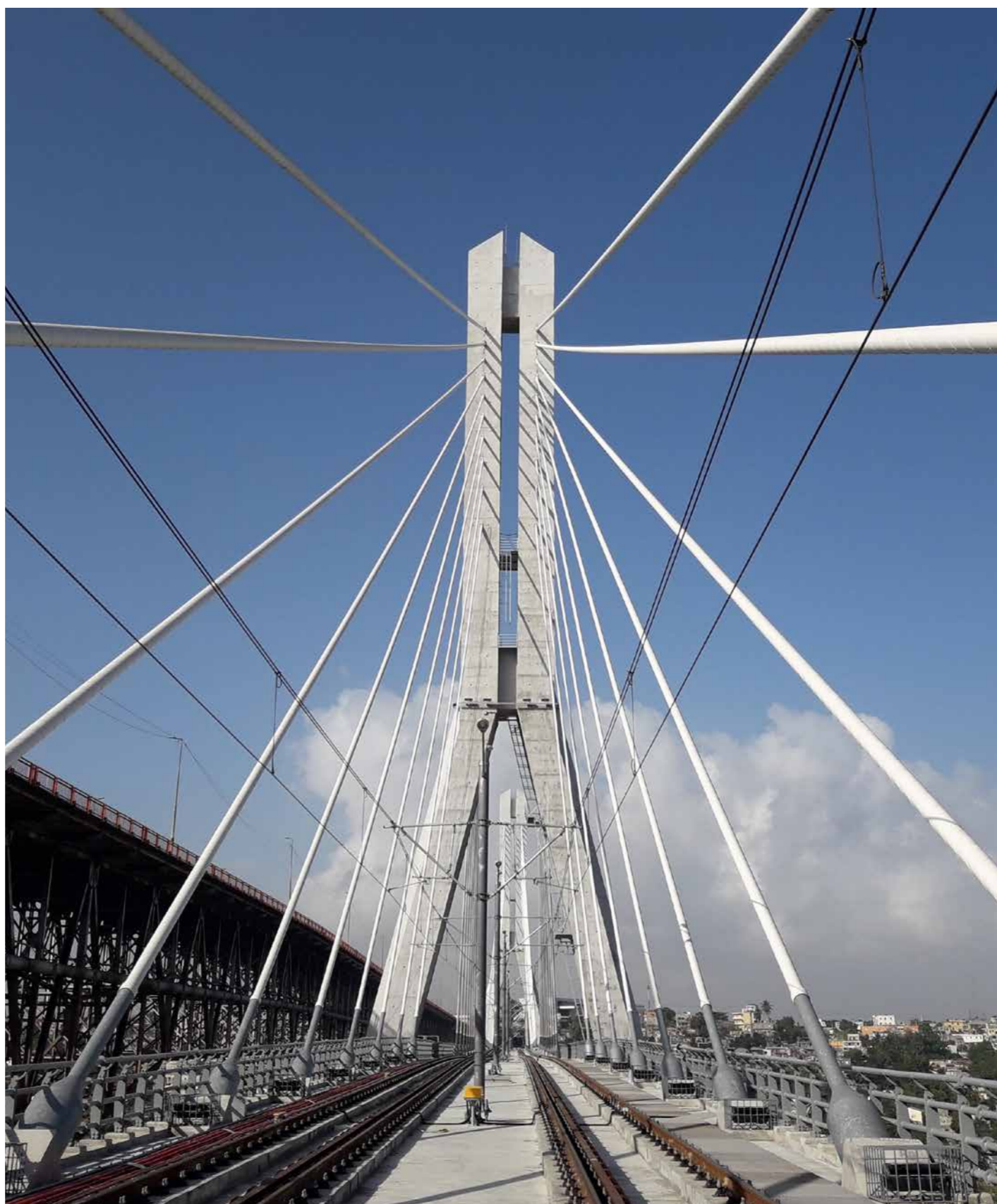
Very often, small countries like the Dominican Republic don't always have the scale to achieve world class infrastructure, which makes the arrival of Metro de Santo Domingo all the more impressive. Furthermore, in 2018, a new set of wagons was added to cater for the increasing demand. Manuel Saleta, director OPRET, the parent company of Metro de Santo Domingo, recently sat down with Business Excellence to tell us more.

Background

The Metro Santo Domingo story starts with OPRET (Oficina Para El Reordenamiento del Transporte), its parent company. OPRET was established by government decree in 2005. Its mandate was to plan, design, construct, implement, operate and maintain the lines of the future Mass Rapid Transit System (SITRAM) in conjunction with existing means of transport in the greater Santo Domingo area.

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planning of a metro line running from north to south of the capital, serving as the backbone of the transport system to be implemented in Santo Domingo. The studies, designs and plans by OPRET, resulted in Line 1 of the metro, with its 16 stations, being delivered in February 2009, with a total of 16 stations and about 14 and a half kilometres of track.”

OPRET and the Dominican government didn't stop there. Buoyed by the success of the first line, and seeing the difference it made to the city in just a couple of short years, both parties began looking into the construction of a second metro line in the capital. As Mr. Saleta says: “the planned route of the line ran from west to east of the urban and interurban environment of the city, linking the satellite populations of Los Alcarrizos and San Luis.”

The first section of the line, with a total length of 12.85km and 14 stations, has been in operation since April 2013. A cable car of 5km in track length was inaugurated in May 2018, and was soon followed by Line 2B in August that year. Line 2B has 3.4km of track and introduces four new stations to the network. Mr. Saleta notes: “the incorporation of eighteen new wagons to the network shows that we continue to expand in quantity and quality, substantially increasing the daily number of users using the mass transit network.”

Key Statistics

When asked about the figures behind the metro system, Mr. Saleta is quick to rattle off an

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SERVINCA has participated in the development and construction of numerous projects in the power generation, Infrastructure and Transport (Coal / Gas / Diesel Plants, Transmission Lines, Distribution and Substations) sectors, in Renewable projects (Mini Hydroelectric, Hydroelectric, Parks Wind farms, Photovoltaic Parks and Biomass) and in civil works projects in different sectors of the Dominican industry and Haiti.

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8. Proyecto Metro De Santo Domingo Línea 1
9. Epc Mini Central Hidroeléctrica En Planta Aes Itabo 481Kw



SUBSTATION PARADISE 40MVA

- Supply and Assembly of Power Transformer 138kV-69 Delta 12.5kV, 40 / 56MVA, 3Ø, 3 poles. Class OA / FA, 60HZ, 350-110kV. BIL, ABB.
- Supply and Assembly of 138kV Power Transformer, Two (2) Cores, 150-300: 3.0A
- Supply and Assembly of Hot Galvanized Metallic Structures for 138kV and 15kV gantries.
- Supply and assembly of 120kV lightning arresters, 700kV BIL.
- Supply and Assembly of 139kV disconnecter blade, parallel type, Three (3) poles, 1200A, Vertical Mounting, Operated in group.
- Supply and Assembly of Switch 138kV, 1200^a, 3Ø, 60HZ, SF6, Tank type Dead.
- Supply and Assembly of Medium Voltage (MT) Cells, Metalclad Type. 12.5kV located in Control room.
- Supply and assembly of control panel, protection and signaling of transformer with TPU 2000R relay
- Supply and assembly of control panel, protection and signaling equipment 138kV.
- Supply and Assembly of battery recharger-rectifier 400A-H, 125vdc Output 120 / 208V.
- Supply and Assembly of lead-acid battery bank, 20 cells of 6vcd 200A-H, including terminals and mounting structures.
- Supply and Assembly of auxiliary service boards of alternating and direct current, 120 / 208vac 500^a.
- Supply and assembly of auxiliary services dry transformer, 150KVA, 12.5 / 7.2Kv, 120 / 208kV.



INTERCONNECTION PACKAGE:

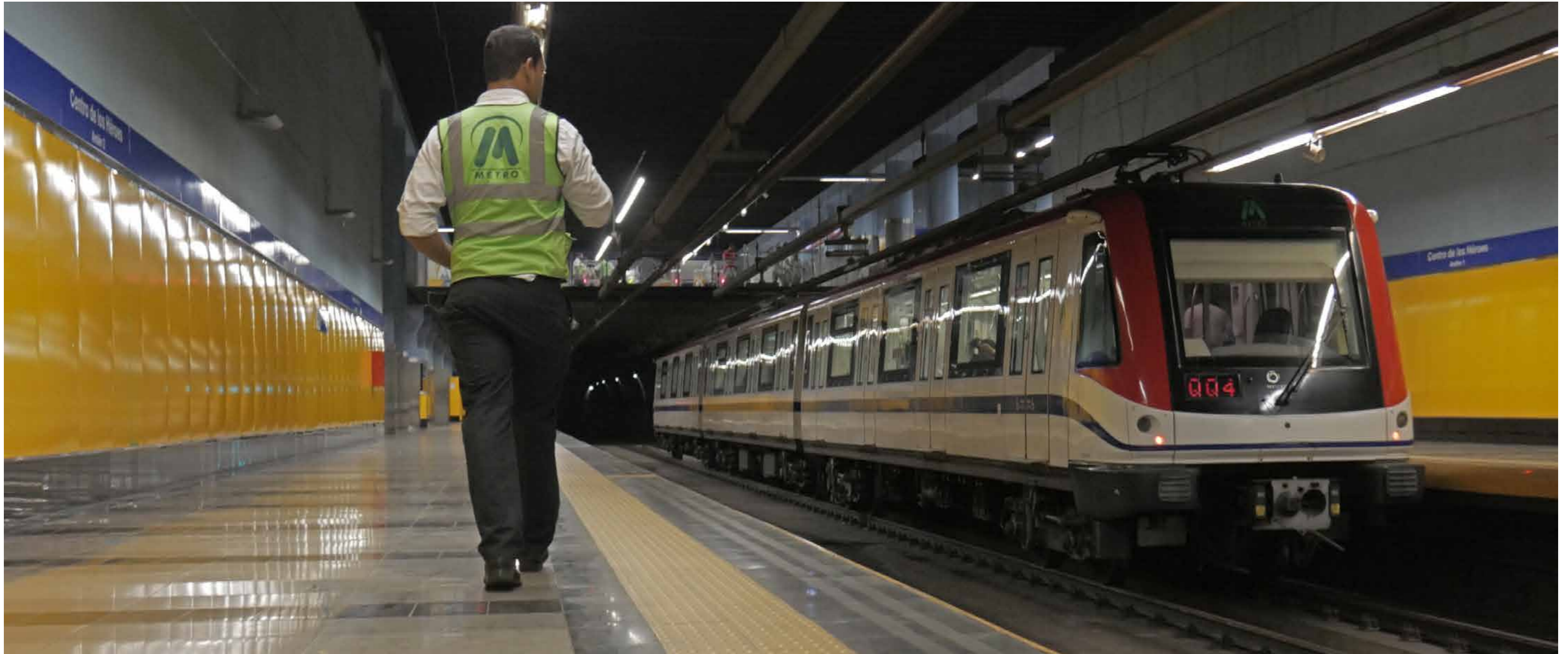
- MT and BT wiring, connections and terminations.
- Measurement, communications between equipment.
- Laying of Santa Isabela airline (Supply and Assembly of 800mts in 138kV, including metal towers, insulators, conductors et
- Laying, connection and installation of trays and supports for 20 KV buried conductor for direct use of section 400 MM2 (1) of AL, in a configuration of two conductors per phase.
- Supply and Assembly of Power Transformer 32/40 MVA-138kV in primary winding and 21kV in the secondary winding ONAN / ONAF, OLTC in AT, Copper immersed in oil. Temperature elevation tests, measurement of audible noise, atmospheric impulse and factory supervision for assembly and commissioning.
- Supply and Assembly of three (3) fields of SF6 138kV in the existing part and two (2) in the new S / E encapsulated in gas type EXK-0
- Supply and assembly of four (4) 21kV fields. Medium voltage (MT) equipment including protections.
- Supply and Assembly of auxiliary service transformer.
- Supply and assembly of control and protection for the fields and automation system.
- Supply and assembly of 120kV lightning arresters, 700kV BIL.
- Supply , laying and connection of power cables from the existing S/ E to the new S/ E approximately 200mts of high voltage cables with their cups and accessories. Structures with conventional equipment for assembly.
- Supply and Assembly of auxiliary service boards
- Supply and assembly of 21kV cables.
- Civil work.



PROJECT:
METRO SANTO DOMINGO LÍNEA I
EXPANSION OF ISABELA SUBSTATION 32MVA

- Supply and assembly of three-pole disconnecter blade. Central opening, Horizontal mounting, nominal voltage 138kV, 60Hz, NBA 1650kV, Rated current 1,299 A, Short-time current 31.5kA. Motorized operation 220Vac.
- Supply and assembly of 3 lightning arresters-auto metal-oxide station-class valves for a 138kV system.
- Unipolar Power Switch 1250A (Line). TC Current Transformer.
- Power transformer TP.
- Control panel and line protection for 138kV.
- Accessories and Equipment Materials





impressive array of numbers and statistics: “Line 1 was built with an investment of \$800 million. and executed within 3 years and counted with the collaboration of national and international companies for the construction of the 16 stations, tunnels and viaducts. Likewise, advanced railway systems were installed and 19 trains of 3 wagons were acquired, with a capacity of 547 passengers each. The current line capacity is 13,128 passengers per hour in each direction.”

“Line 2A was built with an investment of 650 million dollars and executed within 3 years.

As with line 1, it counted on the collaboration of national and international companies for the construction of the civil work of the 14 stations and tunnels. Finally, in August 2018, Line 2B was inaugurated, with 3.4 km in length, connecting this time to the National District with the same heart of Santo Domingo Este and a total investment of 350 million dollars.”

What a Difference a Train Makes

By their nature, metro systems are transformative in practical and environmental terms, and Metro

de Santo Domingo is no different. In fact, being a relatively small city in international terms may make its metro all the more transformative. To begin with, there has been the economic impact; Mr. Saleta says that, “at present, the operation of the system has about 3,500 jobs. About 1800 direct, occupied by OPRET staff and the rest indirectly in security personnel, maintenance companies and other suppliers of goods and services.”

Next, there is the indisputable positive environmental impact. He tells us: “In 2009,

the year of opening to the public of Line 1, the Santo Domingo Metro transported nearly 11 million passengers. After 10 years of operation and the growth of the network, in 2018, 89 million passengers were transported” He conservatively notes that this would have incurred 3 million extra bus journeys, but by our calculations, this assumes that everyone on the metro would have otherwise used the bus. Instead, it has unquestionably removed many single driver vehicles from Santo Domingo’s streets.



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Descripción de la compañía

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- Diseño, construcción y mantenimiento de sistemas eléctricos que incluyen alimentación de potencia, generadores de emergencia, paneles eléctricos, distribución de energía,

iluminación interna y externa, sistemas de aterrizaje, pararrayos, paneles de aislamiento, UPS, TVSS y controles digitales para integración de sistemas.

- Sistemas de climatización con agua helada o expansión directa que pueden ser de volumen variable o constante tanto en agua como en aire, o bien contar con control de humedad. Podemos incluir además control de presión de zona climatizada, ventilación y extracción de aire.
- Sistemas de ahorro de energía mediante: recuperación de energía, monitoreo y control remoto de equipos de climatización, aplicación de productos químicos para mejorar la transferencia de calor, Ahorro de energía de iluminación tanto interior como exterior y uso de paneles solares.
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“So far there have been eighty-five visits, which have involved nearly nine thousand students, from schools and colleges, from all over the country”

The impact has even extended to the city's culture. Metro de Santo Domingo has established the “Metro Culture” program, which looks to educate future generations about values, heritage protection and the transmission of knowledge of the integrated transport system. Mr. Saleta says: “We are building a “Metro Culture” understood as a model of social, educational and cultural management that produces transformations

towards a new citizen coexistence in harmony, good behavior, sense of belonging, solidarity and respect.

He adds: “So far there have been eighty-five visits, which have involved nearly nine thousand students, from schools and colleges, from all over the country. We have also received the visit of numerous international guests. More than twenty-five cultural activities have been carried out, which directly impacted



Did you know?

In 2019, Metro de Santo Domingo is expected to pass the

19 million passenger mark.

By definition, that's 19 million journeys which will have been made cheaper, easier, more sustainably and faster than was ever possible before.



“We’re defining which phases should be developed next. We need to reevaluate the changes that occurred in the transport habits of the citizens of Gran Santo Domingo”

approximately one million people, among users of the Santo Domingo Metro and visitors attracted by the activities.”

Partners and Suppliers

With no previous experience of what was required to deliver a world-class metro system, OPRET had to turn to experts in the field. They turned to an old friend of Business Excellence, Metro de Madrid for assistance. Of them, Mr. Saleta says: “during the beginning of the project and during the development of engineering construction and

start-up of lines 1 and 2A, Metro de Madrid contributed its knowledge, experience and work methodology to ensure the success of our project.”

He continues: “Of the strategic partners that have helped and continue to help the Santo Domingo Metro project is the French Development Agency (AFD). It has participated with the issuance of financing through the Ministry of Economy, Planning and Development for a part of the construction costs of Line 2B. The AFD continues to collaborate to achieve the objectives of OPRET.”

Other partners and suppliers which merit mention include those such as Servinca, Vegazo Ingenieros Electromecanicos and Siemens, all for engineering; ICAT is a local construction firm which excelled when called upon to build its first underground metro system; Alsom, the ever-reliable provider of metro carriages; and finally, Schaltbau Sepsa and Sofratesa for both the control systems and other complex technology required for a metro system to operate without any hitches.

Just the Beginning

More development plans are afoot. Mr. Saleta tells us that when the master plan for the metro was first drawn up, it included 6 metro lines in total, only two of which have been developed so far, along with the cable transport project. “We’re defining which phases should be developed next. We need to reevaluate the changes that occurred in the

transport habits of the citizens of Gran Santo Domingo,” he says.

What a massive change in transport habits that has been: In 2019, Metro de Santo Domingo is expected to pass the 19 million passenger mark. By definition, that's 19 million journeys which will have been made cheaper, easier, more sustainably and faster than was ever possible before. Miss Solete says: “The subway of Santo Domingo is the backbone of the mobility of Greater Santo Domingo.” There is perhaps no more succinct way to describe what the metro means to this capital city. **BE**

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