ACCESSIBILITY ASSESSMENT OF
BUS RAPID TRANSIT SYSTEMS IN MEXICO

EL PODER DEL CONSUMIDOR

ABSTRACT

Bus Rapid Transit (BRT) systems by nature and when well-implemented are a prime option for providing public transport services with greater levels of accessibility to the general public and especially to persons with disabilities or limited mobility. This assessment demonstrates the current conditions of accessibility features on 16 existing corridors of nine BRT systems operating in eight states of Mexico.The corridors were studied and ranked based on quantitative and qualitative information compiled at 747 access points of 573 BRT stations on five domains of accessibility: interior features of the station; connectivity of the station to public space; operational features relative to service; interior features of vehicles; and connections for intermodal transfer facilities. Study findings indicate that no BRT system in Mexico is fully accessible. Study authors call upon competent authorities to: address omissions and risks quickly and appropriately; create a regulatory framework to procure future accessible design for future BRT systems; activate public participation through focus groups and expert advisory committees; and condition access to federal funding on the inclusion of accessibility standards and establish accessibility standards for BRT systems.

INTRODUCTION

Approximately 81.2 million inhabitants of Mexico are concentrated in urban zones, representing more than 72% of the country's total population.[1] These people depend on public transport for 60 to 80% of their urban transit needs, yet the majority of public transit systems in the country provide low capacity services through the use of buses, minibuses and vans. These services are additionally characterized by a lack of professionalization, poor connectivity with public spaces and an absence of inclusive design features to provide accessibility to all users through appropriate infrastructure inside the vehicles and at stations or bus stops.

These conditions affect public transport users on a daily basis, especially more than five million people who live with some type of disability or impairment, according to national census figures.[2] In this context, these and other passengers require preferential spaces and features to ensure their safety and comfort on public transportation. Such passengers include those with limited mobility due to illness, age, accidents or some other condition, and include those who temporarily or permanently move slowly, those with balance problems, pregnant women, seniors, adults traveling with children, or people carrying luggage or packages. The National Institute of Statistics and Geography of Mexico reports the existence of 10,530,888 people over the age of 60 and 21,631,207 children under the age of 10, who gain particular benefit from making these systems accessible.

Given this situation, it is essential to provide the best possible conditions of infrastructure, signalization and information for public transport systems. However, current elements for accessibility on Mexican public transport systems, and specifically on the nation's BRT (Bus Rapid Transit) corridors, are not fully implemented nor functional. Current national and international technical, design, and operational guidelines, as well as best practice specifications, to provide accessible services free of barriers and to ensure social inclusion have not been followed.

BRT systems by nature and when well-implemented continue to be the best option for providing public transport services with greater levels of accessibility since they offer a combination of structural and operational elements for any user, regardless of the person's physical condition or cognitive faculties, to make use of services and infrastructure through more inclusive designs and operations. Among BRT system attributes, most of these services operate at street level with ramped access to stations built at vehicle level. This design and construction permit connectivity with the public space and with other modes of public transport.

Since the launch of the first pioneer BRT corridor in the city of León, Guanajuato in 2004, BRT systems have gained relevance on local government

agendas in Mexico as a solution to transport issues in major metropolitan areas, setting a precedent for phasing out the traditional concession contract model and for modernizing urban transport and reclaiming urban space. To date, local governments have implemented ten BRT systems in nine different states of the country, with four more under construction according to available information.

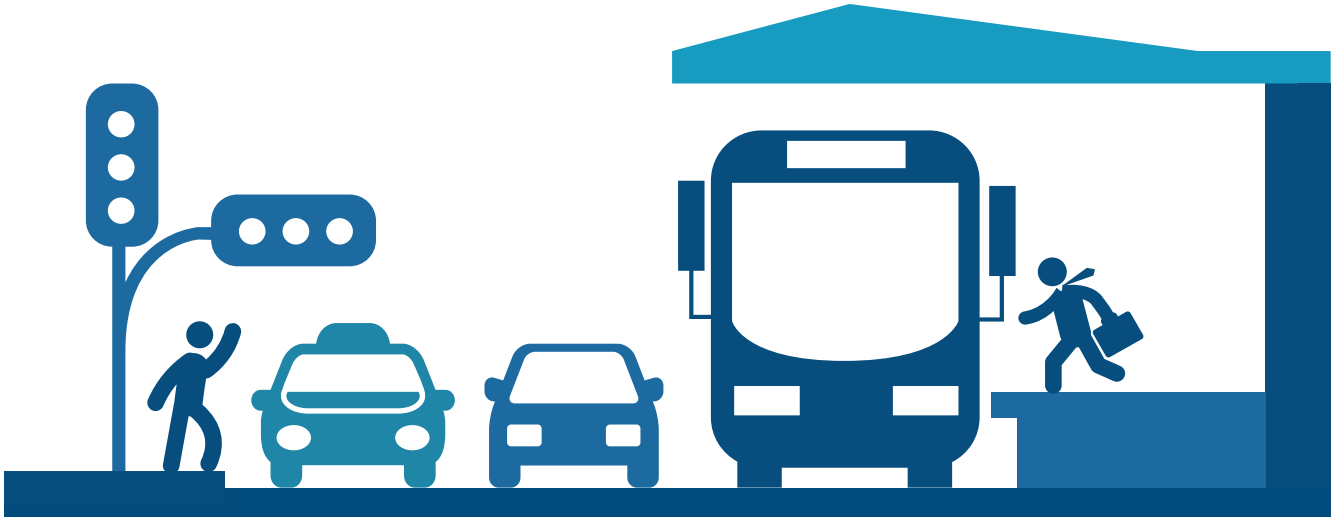
BRT systems have increased the capacity of Mexican cities to respond to user needs for daily transit: speed, comfort, safety and affordability. Diverse academic, government and civil society actors have carried out analysis of the accessibility of certain urban transport systems in Mexico and on the effectiveness of BRT systems. But beyond user perception surveys, the conditions of accessibility of BRT systems have been little studied or reviewed to date, making this endeavour a pioneer effort to contribute to policy analysis and accesibility to public transport in Mexico.

[1] Ángel Molinero, Situación actual del transporte urbano en México. Mexico City. 2014.

[2] Censo de Población y Vivienda 2010, Instituto Nacional de Estadística y Geografía.

STUDY OBJECTIVE

Identify the current conditions of the elements and adaptations that make BRT corridors accessible to the public in general but particularly for persons with disabilities or limited mobility, through the review and evaluation of elements for platform-level boarding, safe and aesthetic pedestrian access, good passenger information in both visual and audible formats, stations and vehicles with adaptations for accessibility, capacity for providing service to users at peak times of demand, and easy connectivity with public spaces and other forms of transport.



METHODOLOGY

This diagnostic assessment[3] evaluated 747 access points of the 573 stations open to the public at the end of 2015 and beginning of 2016, distributed across nine BRT systems[4] located in the cities of Chihuahua, Ciudad Juárez, Guadalajara, León, Mexico City, Monterrey, Pachuca, Puebla and the State of Mexico. The assessment methodology was developed by transportation engineer Víctor Hugo Alvarado Ángeles, of El Poder del Consumidor's Efficient Transportation and Air Quality campaign, taking into consideration criteria from national standards, manuals and guidelines, as well as international recommendations and best practices in regards to accessibility of public transport systems in general. The fieldwork for this assessment was carried out on weekdays at both peak and low-demand hours. The features assessed are as follows:

1 ELEMENTS NEEDED AT THE STATION PLATFORM

- Ramp or surface at platform level for station accesss
- Tactile floor guideways (routes)
- Tactile signs in raised letters (pictograms, text and/or Braille)
- Courtesy doors
- Support staff
- Call button
- Visual information
- Audible announcements
- Interior station lighting

2 COMPLEMENTARY ELEMENTS NEEDED FOR PUBLIC ACCESS

- Marked pedestrian crossings
- Ramp and/or sidewalk/curb surface at street level
- Audible pedestrian traffic light
- Pedestrian bridget or tunnel for station access (only in the absence of street-level accessibility)
- Elevator
- Physical barriers (obstacles to the accesible route)
- Public lighting

3 OPERATIONAL SERVICE FEATURES

- Level of service at stations in peak hours
- Level of service by BRT vehicles in peak hours
- Distance between the BRT vehicles and the platform

4 INTERIOR DESIGN AND ADAPTATION OF BRT VEHICLES

Horizontal or vertical support bars for passengers traveling while standing; visual and audible information; adequate width of doors and aisles; and preferential seating for persons with disabilities or limited mobility such as seniors, pregnant women, people with visual disabilities who use guide dogs, and persons using wheelchairs or strollers.

5 ACCESSIBILITY CONDITIONS FOR INTERMODAL TRANSPORT

A set of elements that includes: existence of infrastructure for direct connections with other forms of public transportation and/or BRT lines (accessible routes), horizontal or vertical signage and illumination during night hours, access to both visual and audible information, and lack of physical barriers.

[3] The full study in Spanish, with the general aspects of the evaluation, details of the methodology and results, is available at: http://elpoderdelconsumidor.org/wp-content/uploads/2016/07/DIAGN%C3%93STICO-DE-ACCESIBILIDAD-DE-LOS-SISTEMAS-BRT-EN-M%C3%89XICO.pdf. The evaluation criteria and technical appendix is available at: http://elpoderdelconsumidor.org/accesibilidad/

[4] The nine systems include 16 BRT corridors. For the purposes of this evaluation, the five corridors that make up the Optibús system in the city of León, Guanajuato, were considered as a single corridor, given that 71% of the 62 stations are shared, with a single station simultaneoulsly forming part of two or three different corridors.

RESULTS

The overall results are found below for each one of the five main indicators of accessibility on the 16 BRT corridors evaluated:

Elements needed at the station platform. Tactile floor guideways exist in 48% of BRT stations (that is to say, along full routes both inside and outside the station) and tactile signs are only fully present at 20% of the 16 BRT corridors. Call buttons are only in existence on two BRT systems, Mexico City's Metrobús and Monterrey's Ecovía. Finally, only the Metrobús system provides information using audible devices.

Complementary elements needed for public access. 42% of sidewalk ramps or waiting areas that connect to the pedestrian crossing between the station and public spaces are functional and are alligned with the signage/marked pedestrian crossings. This signage is only fully visible at 49% of the total access points evaluated. Only 28% of the access at crossings had audible pedestrian stop lights in order to assist pedestrians with visual disabilities. 37% of the bridges installed to provide access to stations due to environmental and traffic conditions were inacessible to users with some type of disability or limited mobility since they use stairs at their endpoints.

Operational Service Features. 11 out of the 16 corridors evaluated offer more than 50% of the travel time at F Service Level (maximum user saturation). During peak demand hours, boarding BRT vehicles is impossible, leading users with disabilities or limited mobility to wait up to 25 minutes to be able to board a vehicle. An overall fault on all 16 BRT corridors is that none of the vehicles aligns at a distance of less than 10 cm from the platform, as indicated by best practice recommendations for operating accessible public transportation.[5] This exposes users to the risk of accidents when boarding and alighting from the vehicles.

Interior Design and Adaptation of BRT Vehicles. It is worth noting that on corridor 1 of the RUTA system in the city of Puebla, the majority of the vehicles currently circulating lack spaces for users in wheelchairs or with strollers. And, compared to all of the BRT systems evaluated, only Metrobús provided audible information to users inside the vehicles along its five corridors.

Accessibility Conditions for Intermodal Transport. The greater part of the corridors do not have the necessary conditions to guarantee an accessible travel path between modes of transport at transfer points. Only two corridors provide more than 90% of accessibility adaptations: Vivebús in Chihuahua and Ecovía in Monterrey.

Certain systems were found to have worsened rather than improved, as in the case of Mexibús, in which Line 1 began operations with tactile floor guideways at all stations but failed to include them on routes 2 and 3. Vivebús in Ciudad Juárez fell behind its counterpart in the city of Chihuahua, upon failing to include elements such as audible pedestrian stop lights, tactile floor guideways, and safe pedestrian crossing at street level, as well as street-level intermodal transfer centers to facilitate access between the BRT platform and other public transport modes.

In contrast, systems such as Mexico City's Metrobús have learned from earlier efforts and have been implementing improvements to increase accessibility for users. Starting with the first BRT corridor, Mexico City installed call buttons to support people with limited mobility; audible pedestrian traffic lights were implemented on the second corridor, together with tactile floor guideways and Braille signage to benefit users with visual disabilities; the third corridor installed informational screens with audio for the public that cannot perceive visual information; the fourth corridor sought greater connectivity with the urban environment; and finally, we see all of these services on the fifth corridor. Thus substantial improvements have been incorporated.

This study reflects the reality of how accessibility is relegated during BRT system design and execution, failing to give it due importance, and also highlights areas of opportunity to further improve BRT services in Mexico. It is important to mention that not all users have the same characteristics of mobility, making it critical that all corridors offer inclusive services. Moreover, accessible systems should allow users to enter and leave the station, as well as transit in an integral, comfortable and safe manner to reach their destination.

[5] The distance for aligning buses/vehicles with the platform is suggested to be less than 10cam, acccording to sources consulted: 1) Pautas de accesibilidad para Sistemas Integrados de Transporte Masivo, Tom Rickert, pp. 20, 21. 2) Guía de Planificación de Sistemas BRT. ITDP, 2010.

Ranking of BRT corridors in Mexico according to study findings

RANKING	LINE	CITY	STATIONS	ACCESS POINTS EVALUATED	PERCENTAGE OF ACCESSIBILITY
1	L5 Metrobús	Mexico City	18	32	83.3%
2	Ecovía	Monterrey	40	40	78.9%
3	L3 Metrobús	Mexico City	33	35	73.9%
4	L2 Metrobús	Mexico City	36	37	73.7%
5	L1 Metrobús	Mexico City	46	56	61%
6	Vivebús	Chihuahua	43	52	58.4%
7	RUTA 2	Puebla	34	38	57.1%
8	L4 Metrobús	Mexico City	36	66	54.8%
9	Optibús	León	62	79	54.5%
10	RUTA 1	Puebla	38	41	54.4%
11	Tuzobús	Pachuca	30	34	53.5%
12	Macrobús	Guadalajara	27	50	49.1%
13	L1 Mexibús	State of Mexico	24	35	48.7%
14	L3 Mexibús	State of Mexico	29	64	47.6%
15	L2 Mexibús	State of Mexico	43	44	46.7%
16	Vivebús	Ciudad Juárez	34	44	41.3%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CONCLUSIONS

The issue of accessibility needs to be understood in a comprehensive manner and not as isolated components that are not integrated into the system as a whole. It is important to monitor and demand corrections of the faults found during this study in order to improve the quality of services provided. Failure to correct these errors poses the risk of these public transport systems being considered a poor option of transportation due to deficiencies in planning, design, construction, supervision and maintenance. Providing the necessary conditions to serve all users results in quality service.

Hence, starting at the planning stages of BRT systems, it is important to consider carrying out focus groups with persons who live with different types of disabilities or limited mobility in order to come to know the real needs of all categories of BRT users. One example of this is the use of ramps at stations and to access sidewalks since they can benefit different groups of people, such as people using strollers or seniors, as well as users in wheelchairs.

It is essential that the Mexican government and authorities develop a national standard and technical guidelines that establish requirements for making new or adapting existing public transport systems, through at least three interventions:

1) intermodality and accessible infrastructure for all public transport systems
2) connectivity with public space and
3) manufacturing of accessible buses.

OUR RECOMMENDATIONS:

Based on the findings of this study, we believe it is fundamental to influence and improve BRT systems across five dimensions:

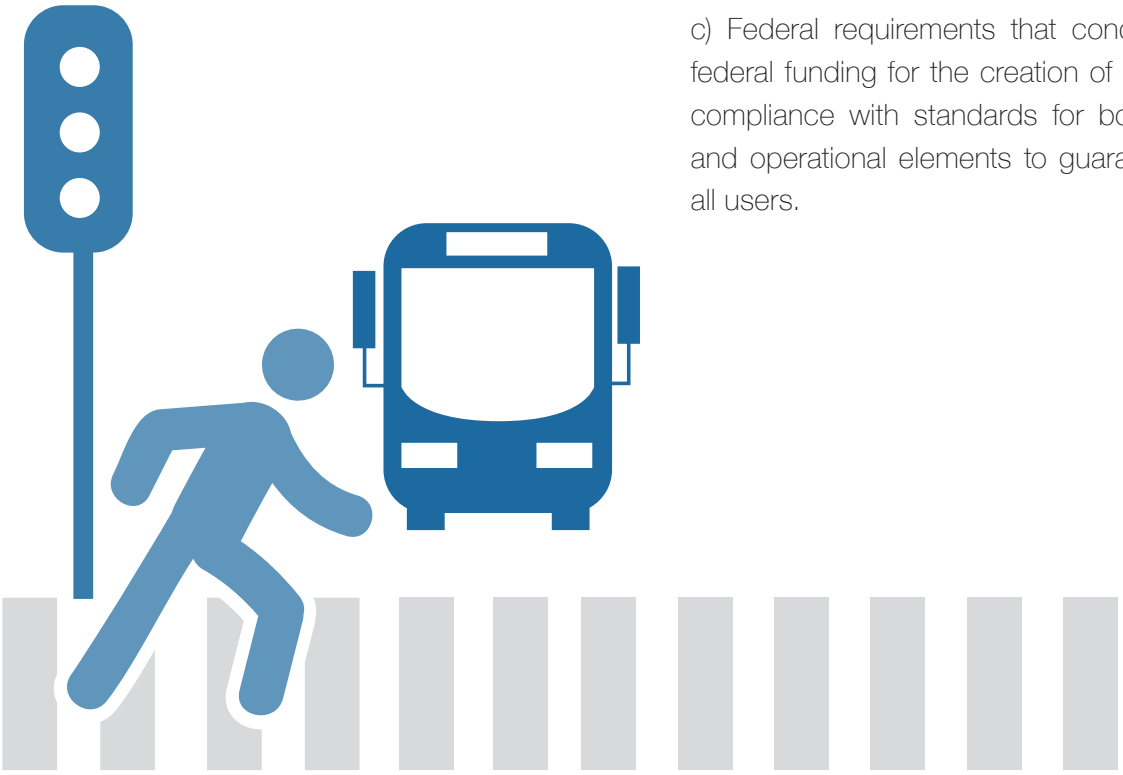
1) within the station
2) within their urban environment
3) in regards to service operations
4) within BRT vehicles and
5) at bus stops or modal transfer centers.

Furthermore, and to correct faults and omissions detected during this study, we demand the generation of a comprehensive public transport policy plan, which fully articulates all modes of public transport and is inclusive in nature, that should contemplate:

a) Creation of a regulatory framework for the execution of upcoming BRT corridors using accessible designs, grounded in standards or specialized technical guidelines developed specifically for BRT systems.

b) Public participation, through the existence of focus groups composed of users and of an advisory committee for the evaluation and review of the planning stage of these transport systems as an integral part of the planning and execution process.

c) Federal requirements that condition access to federal funding for the creation of BRT projects on compliance with standards for both infrastructure and operational elements to guarantee access for all users.



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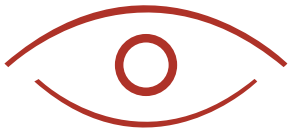

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