ACCESS TO SMALL VEHICLES IN DEVELOPING COUNTRIES

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SUMMARY

Considerable numbers of small public transport vehicles providing fixed-route services in urban and rural areas in developing and transition countries are designed and operated in an inaccessible manner. The result is that millions of persons with disabilities in parts of Africa, Asia, and Latin America are denied access to work, education, health care and other activities. Due to the lower cost of ownership, small capacity vehicles tend to drive out more regulated larger buses in cities throughout the developing world, thus further decreasing the potential for safe and accessible public transport. Yet many access features serving disabled passengers using vans, mini-buses, and other small vehicles are low cost and could easily be implemented. Vans, as well as some small buses which have lower floors than larger conventional sized buses, could lend themselves to lower-cost access by passengers using wheelchairs. This paper reports on the results of a study of "micros" in the Mexico City metropolitan area, focusing on positive steps which have already been taken as well as areas where additional work is recommended to address concerns raised by disability advocates concerning the design and operation of public transport vehicles in one of the world's largest cities.

INTRODUCTION

Nearly three-quarters of Mexico's one hundred million people live in urban areas and nearly one out of five live in the greater Mexico City metropolitan area. Nine million persons live in the Federal District at the core of Mexico City and at least another 9 million live in the remainder of the city. Other large cities are nearby with the largest being Puebla, with 1.3 million people. This study focuses on Mexico City's fleet of 60,000+ micros, which are 20-25 seat mini-buses. The research included two site visits to Mexico City, in December 2001 and March 2002, with assistance especially provided by Mexico City's Ministry of Transport and Highways (in Spanish the Secretaría de Transporte y Vialidad, known as SETRAVI). The study was supplemented by research on Puebla's

fixed-route "combi" fleet carried out in March 2002 and assisted by DIF-Estatal of Puebla, a major government social service agency. Combis are vans seating 11-12 passengers. The work was performed by Access Exchange International (AEI) as part of a larger international project to enhance accessible transportation in the developing world, sponsored by the UK's Department for International Development (DFID).

The research activities included a focus group with members of Libre Acceso, a cross-disability NGO which has actively promoted access to pedestrian infrastructure and public transport in Mexico City. Participants with different disabilities reported transportation barriers in Mexico City as being much the same as found elsewhere in less-wealthy regions, as reported more fully in the inception report of the DFID study noted above (Venter, 2002).

A National Council on Disability (Colegio, 2001) in Mexico has especially identified issues of insensitivity toward persons with disabilities as well as discourteous or unsafe operation by bus and taxi drivers. Advocates of accessible transportation are highly conscious of United Nations and regional declarations concerning the civil rights of disabled people. At a national level, President Fox's cabinet level Office for the Promotion and Social Integration of Persons with Disabilities provides an opportunity for its staff of disabled persons to impact Mexican society. In Mexico City, an Accessible Transport Working Group provides an impressive degree of coordination between disability advocates and city departments. The city's Federal District has published a number of technical manuals relating to access to infrastructure and, to a lesser degree, to transportation.

Accessible pedestrian infrastructure includes some 2,500 bus shelters, ten thousand curb ramps, and a program of curb ramp construction at Federal District and sub-district levels. Accessible pedestrian ways in Mexico City especially assist travel to five Metro stations with access features, as well as 50 full-size accessible buses serving major routes. While this integrated approach is clearly good practice, it should be noted that these are the very systems which are losing modal share to the smaller micros and combis. However, the growing curb ramp program also increases the potential for accessible trip chains to be available to frail elders and other passengers with mobility concerns living in areas served by the ubiquitous micro fleet.

ACCESS TO MEXICO CITY'S MICROS AND REPLACEMENT VEHICLES

Public transport in Mexico City includes municipally managed Metro, large bus, and electric (LRV, trolley) modes, in addition to micros such as the vehicle shown in the photo at left. The Federal District's Transportation Law requires SETRAVI to promote accessible public transport services (Ley de Transporte, 1999).

The breakdown in terms of modal shares is shown in the chart below (Anuario, 2001):

Mode	Trips/day (millions)	Percentage of total trips
All public transport	24.58	80.0
Metro	4.4	14.3
RTP (large buses)	.58	1.9
Electric Transport modes	.24	0.8
Taxis	1.35	4.4
MICROS & COMBIS	**18.01**	**58.6**
Private cars, etc.	6.11	19.9
Total public + private	30.69	100.00

Micros and combis are reported to account for 59% of all trips made and 73% of all trips on public transport modes. 102,000 registered taxis account for 5-6% of public transport trips, per reports by SETRAVI. If accessible design and operation does not occur in the micro and combi fleets, most disabled persons in Mexico City will never be able to use public transport systems.

The modal share of micros has increased from a mere 6% in 1986, devastating the fleet of large buses. Around half of all micros have a single owner, while others belong to lightly regulated companies of 2-5 micros and more tightly regulated companies with more than 5 micros. SETRAVI is charged with providing driver training to 50,000 micro drivers (and 130,000 taxi drivers) in the Federal District and plans to increase training to promote courteous and accessible practices to assist disabled passengers. However, the earnings of micro drivers emanate from the difference between passenger fares and operating costs, creating a major disincentive for safe operation which is only partially balanced by SETRAVI's regulatory powers.

Air quality drives much of transport planning in Mexico City and replacement of the aging micro fleet with somewhat larger and less polluting vehicles is high on the agenda. The replacement program also provides an opportunity to consider universal design features for the micro fleet, which in turn could benefit passengers with disabilities. Currently, Federal District authorities are buying and destroying old micros built prior to 1991 for 100,000 pesos or about US$11,000, which goes toward the purchase of somewhat larger buses by the previous owners. (See photo of recycling of old micros, at left.) Many of these new vehicles have improved design features for disabled passengers.

VEHICLE DESIGN FEATURES

The table below compares the features of old micros with new model replacement vehicles, such as pictured at left. The table notes improved access features while also recommending additional features based on concerns raised by disability advocates in Mexico City. Advocates especially focused on the need for lower first steps, wider doors, additional hand grasps, and improved audio and

visual signage to assist those with sensory disabilities. As one disabled advocate noted, the old micros "do not have adequate hand grasps for passengers to stabilize themselves, in addition to the problem presented by the high first step."

Cited specifications for new model vehicles are from the *Official Records of the Federal District (Technical Manual for Public Transport Vehicles)*, February 25, 2000. Both old micros and the newer small buses to replace them are manufactured in different models.

Selected design features	
Old micros	**New model replacement vehicles (small buses)**
External destination signs	
Signs usually on front only, sometimes on sides. While print size is sometimes large with good color contrast, this practice is not consistent.	No changes noted. Recommended: More consistent use of large print high-contrast signs on front and side of vehicle, and preferably on rear.
Distance to first step	
40 cm. (The owners of 2 of 50 surveyed micros had added a permanent step under the vehicle front entrance behind the front tire, to reduce the distance to approx. 20 cm. Photos of these micros are included in this paper.)	40 cm. maximum is specified Recommended: See discussion below on ways to decrease this critical dimension (one of the most important design elements for many disabled passengers) to 25 cm.
Front and rear steps & related hand grasps	
Ground to floor: app. 85 cm Steps: • Narrow: app. 35-40 cm. usable width • 2 additional steps to floor level, with an approx. 20 cm. rise. The 1st of these steps is highly irregular in shape due to the folding door, with the leading edge at an angle which poses a trip hazard. Hand grasp: • Single exterior vertical hand grasp by right side of front entrance. Hand grasps lacking or inadequate once inside stair well. Passengers with limited upper body strength on one side would be at risk when boarding or alighting. All boarding and alighting passengers are at risk if vehicle moves, due to lack of any easily reached hand grasp in the stair well in most vehicles.	Ground to floor: 96 cm maximum specification Steps: • Wider: 65 cm. minimum specification in front, rear narrower in some models • 3 additional steps to floor level, with approx. 22 cm. rises (Min. specification is 2 more steps with 28 cm. rise) The 2nd and 3rd steps beveled in some models due to folding door, but leading edge is not irregular. Hand grasp: • Diagonal railing parallel to stairs is mounted on the right side of boarding passengers only and significantly improves access over old micros, but only for passengers with upper body strength on the side adjacent to the railing. Recommended: Added hand grasp mounted on folding door on left side of boarding passenger. Door frame may need to be redesigned and/or strengthened to

	accomplish this.
Anti-skid stair treads and flooring	
Yes	Yes
Seats	
Number: 21 seats, up to 24 or more in some models Forward facing double seats on one side and aisle facing bench seat on other side. Passengers seated on bench seat have no way to stabilize themselves during ride. All seats are small with little leg room.	Number: 24 seats, with up to 30-40+ seats as other models approach standard bus size All seats are forward or rearward facing. Improves stability while vehicle is in motion, with hand grasps affixed across tops of all seats. Seats somewhat larger with more leg room. Additional leg room at prioritized seat behind driver in some models, marked with disability logo and easily reached via continuous hand rail from right side of front entrance past driver to seat.
Hand grasps for standing passengers	
Standees must rely on (1) grasps affixed to forward facing seats on one side only or (2) a single horizontal ceiling-mounted rail running the length of the vehicle. A total of 2-3 vertical stanchions in front and rear of vehicle near top of stair wells is inadequate. Short or mobility-impaired passengers may not be able to reach any hand hold when the vehicle is crowded.	Standees must rely on (1) grasps affixed to all forward facing seats on <u>both</u> sides, or (2) <u>two</u> horizontal ceiling-mounted rails running the length of the vehicle. A total of 6 vertical stanchions in front and rear of vehicle near top of stair wells are an improvement, but a lack of vertical stanchions along the length of the aisle means some short or mobility-impaired passengers may not be able to reach a hand grasp when the vehicle is crowded. <u>Recommended</u>: Although significantly improved, additional vertical stanchions should be considered along the length of the aisle.
Use of color contrast	
Color contrast is lacking. Stair tread edges and other key surfaces are inadequately marked and interior features are difficult to distinguish by all passengers and especially passengers with limited vision.	Excellent color contrast on stair tread edges on some models, but not on others. Other key surfaces (hand grasps) are not marked. Interiors are brighter and access features somewhat more contrasting in some models, but less in others. <u>Recommended</u>: Contrasting colors (typically "safety yellow") on all key edges and surfaces.
On-board written and audio passenger information	
Lacking.	Lacking in models observed
Passenger complaint number	
Yes, in large print on exterior of vehicle but not in interior	Yes, in large print on exterior of vehicle but not in interior <u>Recommended</u>: Consider placing complaint and commendation number in interior of vehicle

CONCLUSIONS

Disability leaders and other stakeholders in Mexico have noted a number of areas where low-cost access features and aids could become standard equipment or practice for small vehicles. Their observations include the need for the improvements now in place or recommended for the new vehicles replacing the aging micro fleet.

Demonstration projects could be considered to assist in determining the costs and benefits, constraints, and general feasibility of the following approaches for access to small vehicles.

• Demonstration projects need to explore improvements in vehicle operation through the preparation and testing of training modules and packages of incentives and disincentives to promote more courteous operation of micros and combis. Training modules could rely on illustrations and videos to enhance understanding by drivers with poor reading skills.

• Reduction of the distance up to the first step is another critical area for exploration. Work is needed on the use of different approaches to reduce the ground-to-first-step distance from 40 cm. to no more than 25 cm. under infrastructure conditions found in Latin American cities. While it was the opinion of SETRAVI officials that speed bumps would damage an added lower step beneath the front entrance, the driver-owners of two old micros (out of fifty) at a recycling facility had soldered on an extra step in order "to help older people get on." (See photo at left, noting each mark on the ruler equals 5 cm.) They had not experienced damage to the inexpensive additional step, located immediately behind the front tire. This extra step halves the distance to the first step inside the vehicle, so that a passenger need only climb four 20 cm. steps. Alternatives to this approach include a retractable lower step mechanically operated by the driver, provision of a kneeler device (depending on vehicle design), and modification of curb heights at stops where vehicles can be effectively channeled adjacent to the stop either by physical barriers or through driver training.

• The use of hand grasps mounted on *both* sides of doors on micros and other small buses in order to improve the stability of all boarding or alighting passengers and especially those with less mobility on one side of their bodies. This addresses the other major issue (in addition to the distance to the first step) confronting all passengers at the critical bus stop-vehicle interface.

• Improved wayside access could also be explored by demonstration projects. (1) Access for wheelchair users could be provided using double-doored vehicles with a modified entrance in conjunction with wayside structures at key sites. Some of Mexico City's replacement vehicles have a wide double door centered between the axles. (See photo at left.) This door is blocked for a wheelchair user by a vertical stanchion centered in the stair well. This stanchion could presumably be removed

if it were replaced by hand grips on both sides, affixed to the two opened doors. This would probably open the way to test the use of wayside platforms with bridges, located at key sites. A demonstration project on a selected route could clarify the technical issues regarding wayside access. (2) Access for blind passengers, passengers with reduced vision, and semi-ambulatory passengers could be explored using high-contrast curb sections to demarcate unpaved bus stops, provide tactile and visual definition, and reduce the distance to the first step of the bus.

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