

# **PORTO ALEGRE, BRAZIL**

**BRIEF: ASSIS BRAZIL AND  
FARRAPOS BUSWAYS**

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# **PORTO ALEGRE, BRAZIL**

## **Brief: Assis Brazil and Farrapos Busways**

### **CITY CONTEXT**

Porto Alegre, the capital of Rio Grand Posul state, is located about 760 km [470 mi] southwest of Curitiba and 1,100 km [680 mi] southwest of São Paulo. The city, founded in 1772 on the banks of Rio Guraibo – a 50-km- [31-mi-] long, 1.6-km- [1-mi-] wide inlet – has a population of 1.3 million.

### **BUSWAY OVERVIEW**

In response to serious congestion, 27.5 km [17 mi] of busways in five corridors were introduced between 1978 and 1982 with funding from the World Bank. The busways are not fully segregated but are located centrally in the roadways to avoid problems of servicing frontage development and to minimize violations by parked and turning vehicles. Unlike Curitiba, the roads on which these busways are located are heavily used. Bus stops are located in the center of the roadway, and passenger access is facilitated by traffic signals. The median busways are shown in [Table 1](#).

Daily ridership was reported at 775,000 passengers in 1984. The peak-hour flows on the Assis Brazil and Farrapos busways have been reported at 17,500 to 18,300 people per hour. Practical capacities have been estimated at 8,200 to 14,700 passengers per hour. These high flows result from a “bus ordering” operation during peak periods.<sup>(1)</sup> Buses are organized at the downtown terminal to follow an ordered convoy. Bus routes are assigned into three different families of routes, each designated by a separate letter (A, B, or C). Buses then organize into queues at the downtown terminal according to the assigned designation. A signal at the downtown terminal directs buses in each of the three queues into ordered convoys of six buses (2 from route family A, 2 from route family B, and 2 from route family C). Buses follow each other in this order in platoons of up to six buses much like the multiple cars of a train. Because buses in each route family fall in the same order in the bus convoys, passengers organize themselves at designated locations on station platforms along the route in order to meet their specific buses.

### **ASSIS BRAZIL BUSWAY**

The Assis Brazil busway is located on a radial corridor that connects the city center with outer suburbs. At bus stops, staggered on-line passenger platforms minimize road width requirements. Between stops, busway running sections are separated from general traffic lanes by heavy studs.

Bus services are operated by private companies that function under a municipally regulated regime. Operators use single-deck buses of various sizes, and in peak periods, some companies use passenger trailers towed by conventional buses to increase capacity (known locally as “Romeo and Juliet”). Urban bus services use the busway, and minibus and inter-urban buses use the general traffic lanes.

In the evening peak period, buses enter the busway in the same sequence as the bus bays within the stops (known as “bus ordering”). (See [Figures 1 and 2.](#)) This technique evolved from the Comonor Convoy System.

The median busway was neglected because of political factors and shortages of funds. The physical condition of the busway road surface, platforms, and shelters has deteriorated over the years. Operationally, the busway carries high bus and passenger volumes, but throughput is constrained by a bus stop at a busy suburban center (Obirici) where large volumes of passengers board buses in the evening peak period.

Bus flows of 325 and 260 buses per hour have been reported during the morning and evening peak hours. These flows correspond to 16,300 and 13,100 seated passengers, respectively. Actual passenger flows were 26,100 in the A.M. peak hour and 18,300 in the P.M. peak hour.<sup>(2)</sup>

Peak-hour bus speeds were 22 km/hr [14 mph] in the A.M. peak period and 17 km/hr [11 mph] in the P.M. peak period.

#### **FARRAPOS BUSWAY**

The Farrapos median busway links the city center with important suburbs and with the Assis Brazil busway; it runs parallel to the Porto Alegre metro. One end of the busway is located at the edge of the city center where extensive traffic management measures have been implemented, including a bus street to disperse buses to local terminals. Although the busway carries high bus volumes, passenger transfer demands are relatively light along its length. Design and operational characteristics are similar to those for the Assis Brazil busway.

Bus flows during the morning peak hour of 378 buses resulted in 19,100 seated passengers. During the P.M. peak hour, 304 buses resulted in 15,200 seated passengers. Actual passenger flows were 15,300 in the A.M. peak hour and 17,500 in the P.M. peak hour.<sup>(2)</sup>

Bus speeds are 22 km per hour [14 mph] in the A.M. peak period and 19 km per hour [12 mph] in the P.M. peak period.

A before-and-after survey of the Avenida Farrapos busway was conducted one week after implementation. The results, shown in [Table 2](#), indicate a 29% decrease in journey time, a 41% increase in speeds, and a 4% increase in peak-direction, peak-hour traffic flow.<sup>(3)</sup>

## REFERENCES

- (1) Gardner, G., Cornwell, P., and Cracknell J., The Performance of Busway Transit in Developing Cities (Interim Report), Transport and Road Research Laboratory, Crowthorne, Berkshire, U.K.
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- (3) Diaz, R.B., and Shenck, D.C., Innovative Service Design Among Bus Rapid Transit Systems in the Americas, (undated).

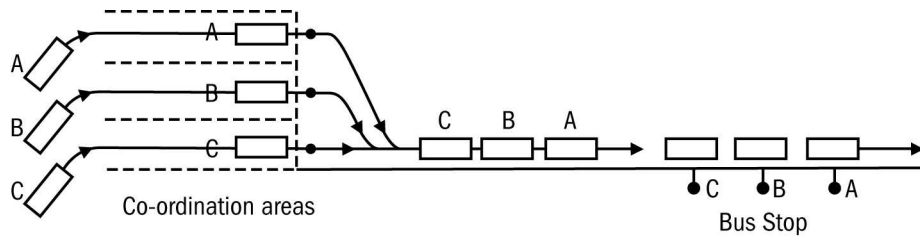
**Table 1: Busway Overview**

<b><u>Busway</u></b>	<b><u>Year Installed</u></b>	<b><u>Length</u></b>
Avenida Farrapos	1980	5.4 km [3.3 mi]
Assis Brazil	1981	4.8 km [3.0 mi]
Brotasio Alves	1981	5.0 km [3.1 mi]
Bento Gunceives	1982	5.3 km [3.3 mi]

**Table 2: Before and After Survey of Avenida Farrapos Busway  
Porto Alegre, 1980**

<b>INDICATOR</b>	<b>BEFORE</b>	<b>AFTER</b>	<b>CHANGE</b>
Journey time (mins)	24	17	-29%
Average bus speed (km/h)	12.3	17.3	+41%
Average occupancy (pass/trip)	52.0	45.8	-12%
Passenger flow (pass/h)	14,067	14,656	+4%
Corridor bus fleet	301	353	+17%
Bus accidents	2	1	-50%

Note: Survey conducted in September 1980; speeds and flows refer to direction center-Suburbs in peak hour (18-1900 hours)



**Figure 1: Bus Ordering Assembly Area**



**Figure 2: Bus Ordering Technique**