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FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

Bikeways and intermodality between bicycles and public transport

Introduction

This issue of the FAL Bulletin looks at how the bicycle has evolved as a form of transport. The first section describes a bicycle traffic scheme to make the bicycle a safe, effective and competitive method of transport and one that complements other means of travel.

The second section presents case studies showing that bicycles are a valid alternative to cars and can be integrated into the transport chain, linking with other means of travel and making each of them more attractive.

With this issue, the ECLAC Infrastructure Services Unit draws on Certu (Centre for Studies on Urban Planning, Transport and Public Facilities) studies on international transport and mobility projects, as sources that could assist in the design and implementation of public policies in Latin America and the Caribbean.

I. Bikeway schemes

A city that is overcrowded and polluted becomes dangerous and uncomfortable for the people who live and move around in it. The only way to improve how a city works is to rebalance the various forms of transport, in favour of pedestrians, public transport and bicycles.

A general traffic scheme can be implemented only within the framework of a comprehensive policy that includes pro-bicycle measures. Such a traffic scheme is a scheduling and planning tool that enables road management authorities to design improvement policies and lay out multi-year investment plans. It also facilitates the coordination of services within

This issue of the *FAL Bulletin* analyses how the bicycle has evolved as a form of transport and outlines a bicycle traffic scheme. It provides examples showing that bicycles are a valid alternative to cars and can be integrated into a transport chain.
The author of this bulletin is Certu. The original document, prepared in Spanish, refers to two Certu publications: NOTE No. 1 and NOTE No. 100. It is part of the activities being undertaken by the Infrastructure Services Unit within the framework of cooperation between ECLAC and the Government of France.

The Centre for Studies on Urban Planning, Transport and Public Facilities (Certu) is a member of the Scientific and Technical Network of the Ministry of Territorial Equality and Housing and the Ministry of Ecology, Sustainable Development and Energy. It designs and disseminates urban planning and development methods and techniques. It is committed to ensuring sustainable cities at the service of urban areas. Certu is not responsible for any changes to the original publication made by ECLAC.

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the area. All government agencies managing a road network (including municipalities of all sizes, communes, population centres, departments and regions) can then be provided with a master plan for bikeways.

A. Network of bicycle and commuter routes

The desire to promote greater use of bicycles in cities fits neatly into the framework of implementing a comprehensive commuter policy in urban areas —one of whose objectives must be to reduce the use and the speed of cars and reduce parking in city centres, via other measures implemented at the same time.

Overall commuting patterns

A pro-bicycle policy is both complementary and integral to a comprehensive study on commuting and parking for all forms of transport (public transport, walking, biking and cars). Studies on commuting patterns (whether completed, under way or as a useful reference for bike schemes) take a range of forms and names, according to the size and structure of the government agency involved: PDU (Plan de Déplacements Urbains), PGD (Plan Global de Déplacements), PLD (Plan Local de Déplacement), PDD (Plan de Déplacements Durables).

For smaller localities and rural communities or where there are no other arrangements for getting around, a bicycle traffic scheme should encompass all forms of transport as well as parking. In other words, it can provide comprehensive guidelines for modes of travel.

The Law on Air and the Rational Use of Energy (LAURE) passed in 1996 (that amended article 28 of the Law on Inland Transport Development, making urban commuter plans compulsory for cities with more than 100,000 inhabitants), states, in Article 20, that: "the creation of bike routes should take urban commuter plan guidelines, if any, into consideration."

Classifying road networks

A street hierarchy makes it possible to tailor routes to the functions they perform (or should perform) by defining the various categories of roads. Street hierarchies usually have three main levels (collectors, arterials and local roads). This classification allows for mapping proposed bikeways along these routes in keeping with two general approaches: shared with or segregated from other forms of transport.

The road safety provisions of decree 2008-754 of 30 July 2008 introduce the idea of an **encounter zone** (pedestrian priority zone), thus completing systems (with their pedestrian zones and 30-km-per-hour zones) for reduced- speed traffic areas. Including such zones in urban areas is a key part of a bikeway network.

In encounter zones, using consistent infrastructure to reduce the speed differential between vehicles and bicycles makes it possible to apply the principle of coexistence between various forms of transport. Except in specific cases, building special bicycle facilities in these areas is not advised. The decree also expands the use of two-way lanes in encounter zones and 30-km-per-hour zones.

Objective: A complete network (the concept of bikeway continuity)

Targeted infrastructure improvements are not enough to make bicycles a safe, effective and competitive method of transport when compared with other forms of getting around. To really promote the use of bicycles as a means of transport, one of the fundamental objectives of any such policy must be to provide a continuous network throughout the territory.

B. Network features

A bikeway network is made up of all the routes inside a city and its districts, routes connecting districts and localities, and various types of recreational routes.

This means that such networks are not made up exclusively of traditional paths and lanes. Instead, they are part of a full set of recommended technical solutions and accompanying measures, offering the most appropriate solution for each situation.

The network grid should be so fine that it is useful for the entire population and provides the shortest routes for cyclists.

All of our cities have "networks" like this in "virtual" form because road networks can, barring provisions to the contrary made by the competent authorities, be used by cyclists but do not always ensure their safety, comfort and enjoyment, especially when motor vehicle traffic speed and density are high.

Solutions geared towards taking bikers more into account differ according to the features and functions of roads (see street hierarchy). However, they should provide for biker safety, speed, comfort and ease of use. The typical cyclist profile (young bikers, for example) is also an important factor in selecting a technical solution.

Safety

Reducing the speed differential between bicycles and motor vehicles is one of the main factors in improving the level of safety. For this reason, measures are being sought to limit speed. Determining the street hierarchy up front makes it possible to define the perimeters of reduced- speed traffic zones.

In the rest of the network, route segregation is the preferred option (bikeways are located some distance away from 70-km-per-hour roads, and bike paths and lanes run adjacent to 50- km-per-hour roads). Typology (children, for example) and expected bicycle traffic density are also elements that, in some reduced-speed traffic zones, suggest that some other kind of lane segregation should be chosen.

The measures proposed allow for the correct management of automobile parking (considerations include space constraints, manoeuvring and opening doors) and for due attention to be paid to property entrances and exits.

At intersections, paying attention to reciprocal visibility of users (the second factor in improving the level of safety) and specific practices for bike trips will yield targeted solutions (such as islands at roundabout entrances/exits, areas for bicycles at traffic lights, preselection lanes and turning paths into lanes as they near intersections).

Speed and shortening distances

Time and distance covered are far more important for cyclists than for motor vehicles. That is why the network grid must be as fine as possible. Special attention should be paid to pointless stretches of routes, which can be avoided by specific measures (at times, very simple ones).

Implementing two-way bike paths and bike lanes is helpful, as are studies of corridors and beltways (such as routes that pass through residential complexes and developments, and rehabilitating or building footbridges).

Comfort

The pleasure of travelling by bicycle should not be spoiled by:

- poorly maintained roads;
- lack of attention to specific details (ridges, gaps and uneven width, debris, tree roots, protruding manhole covers and the like);
- lack of signage;
- the absence of or faded road markings;
- encroachment on facilities built for cyclists (parked cars);
- lack of consideration for cyclists (speeding, failure to respect safe overtaking distance); and
- standardized facilities, signage and regulations (which must also be enforced) all contribute to biking enjoyment.

Ease of use

Ease of use requires route continuity and easy access. A true bikeway network cannot be made up of small, unconnected sections. Routes should be continuous, well-marked and interconnected, regardless of the type of infrastructure or roads they run along. Any break or missing link in the network, however small it may be, makes bikeways unsafe and longer and detracts from route quality.

Everything is connected

A bike traffic scheme is one of several tools for implementing pro-bike policies in a community. Beyond the limited scope of a study on bikeway networks, issues such as parking, signage, intermodality, services and communication should be considered.

Viewing bicycles as a form of transport in their own right is important, especially in an urban environment. This means that public space design (for new projects or when redoing roads) and mode management should give bicycles equal treatment with motorized transport modes and, in some cases, even give them priority (in design or management).

Parking bicycles safely is one of the keys to pro-bike policy success. Bicycle parking should be provided in all trip-generating hubs, business and shopping areas and schools. Special attention should be paid to public spaces in which secure bicycle parking lots can be built (areas to be renovated or new projects).

The draw of a public transport station can increase fivefold or tenfold with an appropriate bicycle policy. Intermodality (bicycle/tram, bus, train, intercity bus) requires easy access to stations and vehicles, stops and stations (road and rail) and, above all, secure parking areas.

Bike-sharing systems play an important role in promoting bicycles and have boosted the use of this mode in cities where they have been implemented on a large scale. They are also crucial for successful intermodality with public transport. Other services must also be developed (such as bicycle rentals and repair, and bike riding lessons).

C. Bikeways: a project-based approach

Bikeway planning is often approached in the framework of a comprehensive transport plan. Useful general guidelines for studying such networks can be found in the Bicycle Charter (see box 1), which clearly affirms the political and technical will required to achieve this result.

Completion of a bikeway project requires dividing the work among competent, motivated teams.

Motivated teams

All projects of this nature call for the establishment, firstly, of a steering committee, chaired by the mayor or a deputy and comprising elected representatives and, ultimately, representatives of other social stakeholders (resident and cyclist associations, business owners, parents and other supporters). Secondly, there must be a project team built around a strong core of technicians from different areas, plus experts as required.

The role of the steering committee is to:

- propose specifications to the project team, clearly defining project objectives, content and requirements, in keeping with the Bicycle Charter (see box 1);
- approve proposals made by the project team (a route network, solutions and accompanying measures) and manage their implementation by city authorities;
- ensure project coordination with other city projects;
- establish a timeline;
- specify accompanying measures, especially with regard to communication and parking; and
- implement the monitoring and evaluation process.

The project team is responsible for the technical coordination of the project and for execution in keeping with agreed phases and deadlines.

Box 1
THE BICYCLE CHARTER

Establishing a pro-bicycle policy directive underscores the will to promote the use of bicycles and is a true and sustainable technical and political commitment to the people.

This policy directive presents major government agency guidelines governing the use of bicycles. It recommends, for example:

- including bicycles in transport policy;
- organizing the ongoing promotion of the use of bicycles;
- designing and implementing a multi-year plan to improve bicycle facilities;
- ensuring that bicycles can coexist with other means of transport;
- integrating the cycle dimension into all projects for modifying or redesigning infrastructure and in urban planning;
- increasing the number of safe parking areas in homes and close to shops and services, as well as in workplaces and schools;
- guaranteeing connections with hubs inside and outside of cities;
- allocating a specific, substantial annual budget for bicycle transport;
- enhancing safety for younger children who bike to school;
- factoring bicycles into workplaces (parking, security, promoting bicycle plans in businesses/offices, road accident risk prevention plans, etc.);
- training technicians to keep cyclists in mind;
- implementing an effective tool to promote greater respect of public spaces and the infrastructure provided for bicycles and cyclists.

The bicycle charter should remain a reference for all urban planning projects.

A multi-stage project

Bikeway proposals go through various stages. Implementation can be more or less complex, depending on the duration and scope of each stage, population size, topography, road network structure, inhabitants' practices and other variables.

The approach proposed involves the following stages: bikeway siting; data collection; analysis and assessment; objectives; proposals; and monitoring and evaluation.

Bike reconnaissance

Before undertaking a very technical project, all individuals involved in the study should familiarize themselves with the challenges it poses, by going on a bike ride through the city.

This experience will enable each of them to discover the benefits of this mode of transport, as well as possible route layout challenges and drawbacks.

Data collection: practices and requirements

An observation of behaviour (displayed by cyclists and other users), plus cyclist surveys and interviews with local stakeholders (communities, transport department, associations) allows information to be gathered about cyclist practices and the challenges they face in terms of how the infrastructure (such as crossings, paths, lanes and parking areas) works and is used.

User patterns (enhanced by surveys) can thus be analysed at a later date, especially with feedback from resident and cyclist associations, schoolchildren and parents.

Data collection: technical data

This information, available from the town hall or community records, includes data on accidents, traffic, parking, road use and operation (the street hierarchy, if available, should be obtained; otherwise, one should be proposed and adopted after the final assessment), the main trip-generation hubs, city planning and project documents, topography, geometric features of the road system, breaks (train tracks, rivers, fast lanes), forecasts (infrastructure or urban development projects), public transport networks, traffic plans and existing facilities for bicycles.

The project team should also approach other communities (such as departments, neighbouring communities, communes and regions) to glean information about other existing or proposed bikeway facilities, as well as projects under way, with the aim of creating continuous bikeways and ensuring consistent intermodality.

However, some elements and details can be seen only with on-site observation. Therefore, as the project progresses, there should be no hesitation in returning to the field, by bike, to gather more data (in particular, to verify existing facilities for cyclists).

Analysis and assessment

Data compiled are sorted and transferred to maps of:

- road networks and street hierarchy;
- bike facilities and all other elements useful for travelling by bicycle (fact sheet on existing facilities);
- trip-generation hubs;
- locations of accidents involving bicycles and other road users;
- problem areas (for example, list of bicycle traffic obstacles, complex intersections, breaks and poorly located parking areas); and
- corridors and beltways.

Maps of districts, similar areas or entire cities can reveal the true nature of the challenges, their scope and causes, as well as the options for addressing them.

All of the data and maps, once analysed, make it possible to prepare an assessment and subsequently submit it to the local authorities.

Drafting a bike traffic scheme makes it possible to take a very specific inventory of existing facilities for cyclists. This could be the opportunity to draw up a fact sheet on the facilities available (status, photographs, comments).

Receiving a report on items such as safety, intersection management, maintenance, road markings, signage, reflective markers, layout, visibility, surface material, how the ends of bikeways are to be handled and noncompliance by other users allows those in charge to make improvements where needed.

Objectives, scenarios and proposals

In keeping with the final assessment (approved by the steering committee) and expected specifications, the project team presents a proposal outlining objectives to be confirmed by the committee. On the basis of these objectives, the proposed scheme can be outlined.

Next, the project team presents the proposed bikeway network and alternatives (scenarios). Like the road network, the bicycle traffic scheme is built around a structuring network and has its own hierarchy.

Accompanying measures (like layout, parking and services) should be built into the financial projections. A map of locations can be provided for possible parking areas.

Once the steering committee has ruled on the alternatives offered, the team turns to developing and proposing technical solutions and appropriate regulations for each section or sector. These solutions are subject to financial estimates and specific timelines.

At this stage of the project, project monitoring and evaluation are defined.

This approach is not a linear one. Project implementation will involve much back-and-forth: between field work and desk reviews, between assessment and objectives, and between objectives and the final site proposal.

Monitoring and evaluation

The steering committee is advised to entrust the monitoring of operations to the project team. The project team may also be asked for its opinion on a project that is in execution, as well as on successive annual programmes.

The steering committee may also request an evaluation of the facilities and of the entire network.

During the study phase, the project team proposes evaluation criteria (number of users, cost, safety and degree of satisfaction, among others).

Communication

In order for it to be understood and implemented, the bicycle traffic master plan is accompanied by a communication action plan to inform, persuade of and demonstrate its effectiveness with regard to safety, accessibility and improving the quality of life.

The project team presents a real communication plan to the steering committee. The plan is part of the bikeway scheme; its objective is to provide information on implementation of a bikeway network (public meeting) and to promote the use of bicycles. The communication plan relies on dissemination tools such as city newsletters, the Internet, pamphlets and meetings.

One of the first activities that users tend to be eager to see is an operating plan accompanied by letter of commitment to cyclists, pedestrians and motor vehicle drivers.

The communication plan may also propose specific measures with concrete objectives, such as:

- explaining the advantages of riding bicycles in cities (among them: health benefits, less pollution, more economical);
- recommending good biker practices;
- recommending good vehicle driver practices;
- defining regulations (concerning, for example, biker rights and duties, mandatory signals);
- preparing fact sheets for those in charge of trip-generating hubs to raise awareness among workers on the benefits of riding bicycles to commute from home to work or for making work-related trips; and
- disseminating information on the establishment of a bicycle convoy or pedibus system at city schools.

II. Intermodality: bicycles and public transport

The term intermodality refers to the combined use of various means of transport. Bicycles are combined with other forms of transport and become part of a transport chain. This complementarity makes each form of transport more attractive and provides a valid alternative to cars. It involves various aspects that are detailed below. The following information is based on fact as opposed to theory as it outlines several case studies and is constantly being updated.

A. Linking bicycles and stations

It is important to have a safe and well-marked bikeway network (with standard directional DV-type signs specifically for bikers and H-type signs for bike tourists) that converges with bus and train stations. Network continuity is achieved by using as many different types of facilities as possible (among them: paths, trails, 30-km-per-hour zones, pedestrian areas, parks, two-way streets with one lane reserved for cyclists, shared bus/bike lanes, surfaced shoulders, bicycle routes and greenways, footbridges and tunnels).

Regions can subsidize the construction of connecting bikeways radiating out a certain distance from stations. Île-de-France and Rhône-Alpes in France, for example, already have them.

1. Shared bus/bicycle lanes

Having buses and bicycles share designated bus-only lanes is a special element of the intermodality between bicycles and public transport. This specific solution is becoming increasingly popular and is generally welcomed by users.

In the city of Annecy, for example, bus lanes have been opened up for use by cyclists as well. There are also closed two-way lanes (designated by a solid line or a raised barrier that keeps vehicles from exiting, such as for passing) and open one-way lanes (designated by a broken line) approximately three metres wide. Results have been encouraging: the use of bicycles in the city centre has even doubled. In Paris, two-way bus-only lanes open to bicycles are 7.5 metres wide; they have decreased the number of accidents involving cyclists.

Cyclists welcome these designated lanes, as well as closed one-way 4.5-metre wide lanes and open 3.5-metre wide bus-only lanes, half of which are authorized for use by cyclists. There is even talk of installing more. Other cities, like Strasbourg, Grenoble, Nantes, Rennes, Lorient and Lyon have bimodal lane sharing. Toulouse is also developing designated lanes.

2. The importance of good signage

On a more global level, cities where bus lanes are open to cyclists have seen few accidents. Those that that have happened highlight a cyclist visibility and perception problem, plus the element of surprise at the presence of a bicycle on a lane reserved for buses. Good signage on these special lanes (both on clear stretches and at intersections) contributes a good deal to biker safety. In addition, there has been no discernible reduction in the speed of buses, since buses rarely have the opportunity to overtake cyclists, especially when there are frequent stops and intersections. Nevertheless, prior training for bus drivers is recommended.

Just as cyclists are now allowed to ride on bus-only lanes, many countries such as Sweden, the Netherlands and Italy allow bicycles to be ridden on tram platforms (the street between the two rails) in some areas. Some French cities, like Grenoble, do too, especially on pedestrian streets.

Bicycle lanes can also run alongside platforms, preferably not between the platform and general traffic, but rather to the right of traffic. Changing some streets into 30-km-per-hour zones, along with other measures, calms traffic speed and makes it possible for bikers and motor vehicles alike to use them without specific bicycle facilities.

Box 2
SHARED BUS/BIKE LANES IN PARIS

A study to assess bus lanes shared with bikers and other users in Paris is being conducted by the Île-de-France Regional Council, in association with the Centre for Studies on Urban Planning, Transport and Public Facilities (Certu), the central technical service in the French Ministry of Environment and Sustainable Development and Planning. The study, which spans 2000 to 2004, found that 75.5% of bicycle accidents take place on clear stretches. Only 11% of bicycle accidents involved a public transport vehicle. Many of the vehicles being driven on special lanes are actually not authorized to do so.

The majority of accidents resulting in injuries to cyclists on bus lanes are side collisions (approximately 60%). Because most accidents occur during passing or U-turns, lanes must have a minimum width, especially if they are closed. Current recommendations are between 3 metres and 3.5 metres wide for open lanes, 4.5 metres wide for closed one-way lanes and 7 metres wide for closed two-way lanes. The second most frequent kind of accident is caused by the opening of doors of parked vehicles. Parallel parking and delivery vehicle parking are, therefore, other considerations to bear in mind. The third most frequent kind of accident happens when making a right or left turn at an intersection, resulting in a collision with another vehicle (often a bicycle) driving in a specially marked lane. This underscores the importance of good signage and turning radiuses for low speeds.

B. Carrying bicycles onto public transport

Where bicycles are allowed on vehicles, an effort should be made to expedite the speed of loading the bike onto the vehicle, have separate areas for bicycles and passengers and make it easy to identify train cars where bikes are allowed.

1. Platforms accessible to wheeled devices

The requirement that persons with limited mobility should be able to access the transport chain in keeping with recent legislation is leading to technological changes in infrastructure and equipment such as low-floor vehicles, adapting facilities at public transport transfer points, elevators, ramps, wider doors and power lifts. There is no question that greater access to transport lines will benefit

bicycles and passenger seats as required, such as on the TGV Est high-speed trains.

The regional trains (TERs) allow bicycles on board. The French National Railway Corporation (SCNF) systematically proposes new equipment with space for bicycles to the organizing authorities. The Transilien trains (SNCF commuter trains) and the RER trains (regional express lines) also allow bicycles on board during off-peak periods. SNCF is considering soft transit/tourist trains that could carry a large number of cyclists to green bike trail networks. Most of the trains en route to Belgium, Luxembourg, Germany, Switzerland and Italy offer a train-plus-bike service. On the Eurostar, bicycles may be carried on board as checked luggage on the London-Paris and Paris-London routes.