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Basic parameters for the design of intermodal public transport infrastructures

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Abstract

The greatest megacities around the world are facing overcrowding public transit systems, added to environmental and traffic complications. Numerous efforts have been done aimed at tackling those issues. Intermodalism consists of combining and coordinating the operation of the diverse transport modes in order to offer as continuous and door-to-door services as possible. Intermodalism concept has become more and more important over the last years. Projects such as integrated public transport systems have been implemented at several cities of the world. All of these projects have required the enlarging of some existing infrastructures as well as the design and construction of new intermodal facilities. Intermodal facilities are infrastructures where people who use public transit can shift between different modes of transport. These infrastructures are especially planned to allow the operation of at least two transport modes at the same time. This paper considers the analysis and study of eight (8) existing successful international experiences in order to identify common factors, minimal standards, and new concepts that have been already included into the design of their intermodal facilities. Cases located all over world have been included. The results of these analyses can help future planners and designers to take into account basic aspects that are needed to achieve functionality and sustainability over the implementation of intermodal infrastructures. This document provides a brief description of the case studies, the chief findings established, and the key design elements found.

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1. Introduction

Intermodal infrastructures are assets that have been designed to allow the operation of two or more transport modes (Riley, Bührmann, Hoenninger, & Christiaens, 2010). Countless aspects have influence in the development of transport systems and their infrastructures. Some of them are related to land use, environment, and economy, among many others (Alcântara, 2010).

Achieving innovation, efficiency and sustainability requires more than technical and operational criteria. Analysing the applicability of design features for intermodal facilities implies grasping the context in which infrastructures have been built and how this context can have an impact on the designs. Based on journals and organisational documents, the case studies including in this paper were assessed in terms of their standards of operation, levels of integration and the technical parameters applied for designing and implementing their intermodal facilities.

Nomenclature

BCC	Brisbane City Council
CBD	Central business district
CCTV	Closed-circuit television
CRTM	Consorcio Regional de Transportes de Madrid
ILTP	Integrated Local Transport Plan for Brisbane
IRTP	Integrated Regional Transport Plan for South East Queensland
MTR	Mass Transit Railway (Hong Kong)
NHS	Canada's National Household Survey
PPP	Public-Private Partnerships
PTV	Public Transport Victoria
RTD	Research and Technological Development
STM	Secretaría de Transportes Metropolitana
US	United States

2. Definition of research population and sample

Initially, intermodal facilities in cities such as Hanover and Seattle were considered by completing a first source evaluation. However, a preliminary assessment of criteria, such as population and area, of those cities indicated the lack of some important data as well as the existence of relevant differences with other cities included into the sample. At this point, it was essential to determine whether other studies like this had been tackled. Six (6) existing studies were found and rapidly reviewed, allowing the inclusion of London and New Jersey as part of the study cases. Finally, by considering the quality of the found information, a total of only eight (8) cities were included into the final sample: Toronto; Madrid; Melbourne; Brisbane; Sao Paulo; London; New Jersey; and Hong Kong.

3. Analysis of cases

3.1. How to measure the level of integration?

Luk & Olsewski (2003) argue that intermodal integration involves five (5) general categories: physical, transport network, fare, information and institutional or administrative. Nevertheless, for the purposes of this paper the level of integration for each of the case studies has been measured by following the integration model of the community of Madrid (Cristóbal, 2011). A total integration includes administrative, fare, and modal (physical and operational) integration. That integration model is shown next: