Fare Collection Toolkit
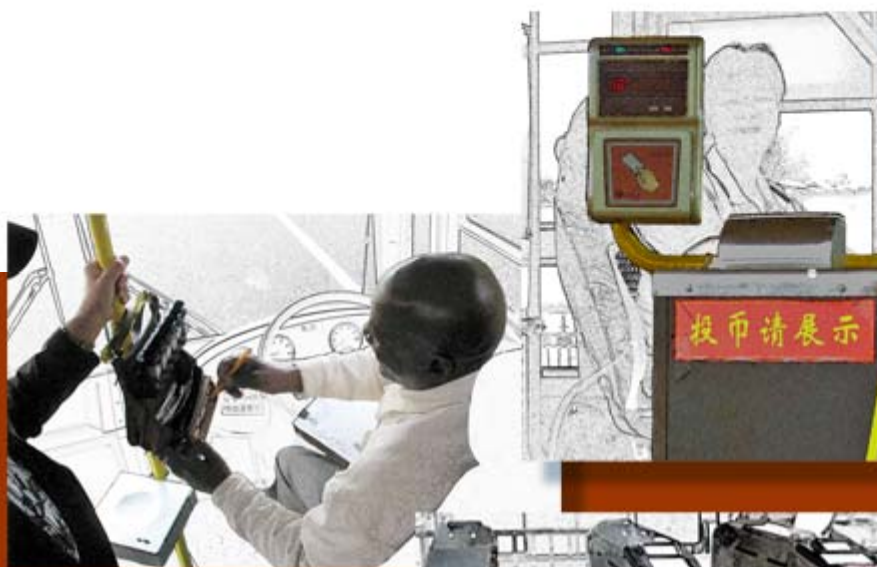
Tools and options for reforming public transport fare collection systems

COMPANION GUIDE

Sub-Saharan Africa Transport Policy Program

THE WORLD BANK

To start using the Toolkit

Please visit: www.ssatp.org

Sub-Saharan Africa Transport Policy Program (SSATP)

This Toolkit was funded by the SSATP, which is an international partnership to facilitate policy development and related capacity building in the transport sector.

The World Bank

The Toolkit was developed by the World Bank under the guidance of Ajay Kumar, O.P. Agarwal, and Sam Zimmerman. The World Bank is a vital source of financial and technical assistance to developing countries around the world. To learn more about the World Bank visit: www.worldbank.org

General enquiries

For more information, or to receive additional copies of this guide or a CD version of the Toolkit, please contact:

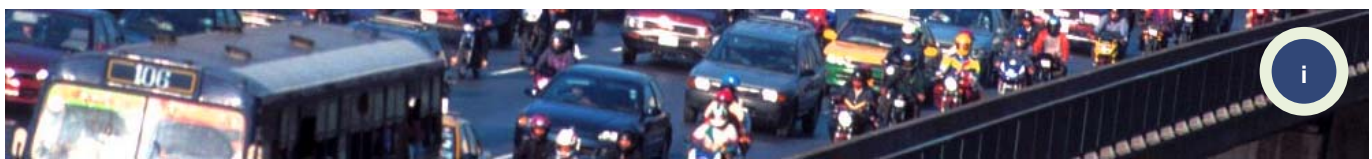**Ajay Kumar**

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TABLE OF CONTENTS

TOOLKIT CREDITS
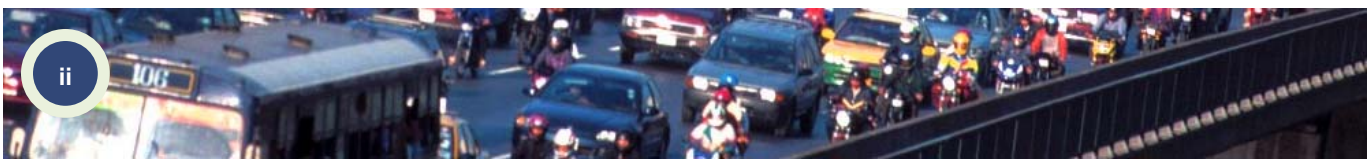
FOREWORD

You are here: Home

- ▸ Overview
- ▸ Framework
- ▸ Objectives
- ▸ Practices
- ▸ Procedures
- ▸ Technologies
- ▸ Case Studies
- ▸ Tools

Welcome to the **Public Transport Fare Collection** Toolkit!

This **Companion Guide** provides the reader an outline description of its contents and the basic directions for using the Toolkit.

The **Public Transport Fare Collection** Toolkit is part of a comprehensive library of reference and capacity building resources that have been prepared by the World Bank for policymakers and senior technical managers in urban transport. The **Public Transport Fare Collection** Toolkit is part of a public transport Toolkit suite that includes the **Urban Bus Toolkit** and the **Passenger Transport ITS Toolkit**.

The objective of the Toolkit is to provide a basic understanding of all aspects of fare collection systems for urban passenger transport. The Toolkit is a step-by-step guide that helps urban transport leaders and managers plan, design, and implement enhanced fare collection systems that can improve the sustainability and effectiveness of the passenger transport systems in their cities.

The Toolkit provides key information that will help leaders and managers understand:

- The strategic issues and institutional frameworks governing the selection of objectives for the fare collection system
- The potential policy and operational objectives for the system from the perspectives of its various stakeholders
- The fares practices and concessions that can be planned in order to attain these objectives

- The operational procedures that can be followed in order to fulfil those practices; and
- The technologies that can support the effectiveness of these procedures.

The focus of the Toolkit is on urban passenger transport. It does not seek to address the full domain of extra-urban or inter-city passenger transport, nor the unique needs of demand-responsive transport.

The policies and practices covered in the Toolkit are based on an initial assessment of the strategic issues and institutional frameworks that govern the selection of objectives for the fare collection system. The Toolkit is based on field research in the first half of 2011, and thus represents general international practice at that time.

However, fare collection is a constantly developing sector, both in its applications and its technologies. The interested reader should examine the latest developments through links to live sites that are provided in the website part of this Toolkit. There is also a wide range of suppliers of the technologies, and each has their own websites where more information can be found.

The **Public Transport Fare Collection** Toolkit consists of two parts:

1. This short **Companion Guide** which provides a brief introduction to the Toolkit, the materials it contains (Main Content), and instructions for the use of the website (Using the Toolkit); and
2. A **website** which provides detailed information for the policy maker and the system operator. There are two versions of the website: 1) On-line that is accessible from anywhere with an Internet connection; and 2) CD ROM that comes with the Toolkit and can be used when no Internet connection is available.

MAIN CONTENT

You are here: Overview »

‣ Toolkit structure

‣ Decision process for reforming a fare collection system

‣ Lessons learned from the Case Studies

‣ Technical specifications

‣ How to use the Toolkit

‣ Credits and acknowledgements

‣ Site map

Toolkit Structure

The Toolkit is structured in five progressive layers, and comprises the following sections:

1. **Fare Collection Framework** covers the strategic issues and institutional frameworks in the urban passenger transport system that govern the selection of objectives for the fare collection system.
2. **Fare Collection Objectives** addresses the policy, pricing, and usability objectives of the fare collection system from the perspectives of its various stakeholders.
3. **Fare Collection Practices** considers fare structures, fare products and concessions, and fare integration modalities.
4. **Fare Collection Procedures** covering the various processes used in the collection and protection of passenger revenues.
5. **Fare Collection Technologies** covering the various technologies employed to enable these fare collection processes.

Each of these subject layers can be accessed by clicking on one of the tabs at the top of each page in the Toolkit. This provides an easy way to navigate among the fare collection topics.

OVERVIEW   FRAMEWORK   OBJECTIVES   PRACTICES   PROCEDURES   TECHNOLOGIES   CASE STUDIES   TOOLS

This summary provides a basic understanding of each of the five subject layers. It provides an overview of the activities that need to be considered, and the principal options that have been identified in international practice.

The organization of public transport and terms used to describe the organization varies throughout the world. For the purposes of this Toolkit, the following definitions are used:

- An **authority** is defined as the public entity involved in the strategic planning, investment decision making and regulatory oversight of public transport in the respective metropolitan area or city
- The **operator** is defined as the entity, public or privately held, that actually delivers the public transport services.

Toolkit Suggestions for Different Users

The Toolkit can be entered in a number of ways, depending on user needs and the purpose of the visit. The following suggestions are made for decision makers, transport managers, and technical task managers.

Policy and decision makers

Policy and decision makers in local governments or transport authorities, transport executives, transport regulators, and transport operators should enter the Toolkit at the **Framework** level. This helps them consider the strategic issues and institutional frameworks in the urban passenger transport system that govern the selection of objectives for the fare collection system. They can then examine the options for **Objectives** and **Practices**.

Transport managers

Managers of the transport executives, transport regulators, and transport operators charged with designing and developing the fare collection system based on the selected practices should enter the Toolkit at the **Procedures** level. This helps them consider the options for the various processes involved in the collection and protection of passenger revenues, and the **Technologies** required to support those procedures. The **Case Studies** provide examples of where such procedures and technologies have been implemented.

Technical task managers

Technical managers who are charged with the procurement, installation, and operation of a specific application should enter the Toolkit at the **Technologies** level. They also should examine the relevant **Case Studies** and the **Passenger Transport ITS Toolkit**, if an electronic fare collection system be chosen.

Fare Collection Framework

You are here: Framework »

- ▸ Sector funding and cost recovery
- ▸ Economic regulation
- ▸ Role of public and private sectors
- ▸ Institutional framework

The strategic and institutional framework established for the urban passenger transport system in any given city will govern the setting of objectives for its fare collection system. The policies set for **sector funding and cost recovery** affect the level of fares that need to be charged. The form of **economic regulation** and the **institutional framework** influence the allocation of responsibilities for the operation and administration of the fare collection system. The respective **roles of the public and private sectors** also have some bearing on these decisions.

These four key issues are the main considerations discussed in the **Framework** section of the Toolkit.

Sector funding and cost recovery

Political decisions have a major influence on the quality and the price of urban passenger transport services. The important political decisions are the level of government funding support and the degree to which passengers and other stakeholders contribute to the costs of service provision.

The political decisions help shape key decisions made regarding fare collection. These key decisions are: 1) the extent that service costs are borne directly by their users, 2) the setting of standards for those services, and 3) the actions that are required when direct cost recovery is impractical and the source of supporting funds to meet the resultant deficit.

The following relevant factors are discussed in the Toolkit:

- Cost recovery from route operations
- Service standards
- Public service obligations (PSO)
- PSO reimbursement
- Capital expenditure
- Maintenance expenditure
- External funding sources
- Addressing funding deficits
- Application of subsidies

Economic regulation

The economic regulation of urban passenger transport is covered in depth in the **Urban Bus Toolkit**. The regulation of competition and the form of service contracting are important considerations. However, the control of tariffs is particularly important to the fare collection system.

The following key issues are discussed in the Toolkit:

- Regulation of competition
- Form of service contracting
- Setting of service standards
- Market entry requirements
- Control of tariffs
- Frequency of tariff adjustment
- Level of tariff adjustment
- Predatory pricing

Role of public and private sectors

The respective roles of the public and private sectors in the urban passenger transport system will influence how the fare collection system is operated and administered.

The following key issues are discussed in the Toolkit:

- Enabling frameworks
- Service delivery
- Revenue risk allocation
- Investment and risk allocation
- Regulatory and operational control

Institutional framework

The institutional framework for urban passenger transport also affects the fare collection system. It defines the authority for fare collection and the organizations that will operate and administer the fare collections system.

The following key issues are discussed in the Toolkit:

- Area of jurisdiction
- Enabling legal framework
- Passenger transport authority
- Operating and infrastructure entities
- Transport operators or collectives
- External control agencies

Fare Collection Objectives

You are here: Objectives »

‣ Fare policy objectives

‣ Fare pricing objectives

‣ Fare system objectives

The objectives set for the fare collection system depend on the strategic and institutional framework that has been established for the urban passenger transport system as a whole. These objectives can be grouped into three categories; **policy objectives**, **pricing objectives**, and **system objectives**.

Fare policy objectives

The fare collection system should be designed to meet key public policy objectives. This is true regardless of whether fares are set by an authority or by an operator.

The following common policy objectives are examined in the Toolkit:

- Standard pricing for all journeys
- Standard pricing for similar services
- Minimizing cost of interchange
- Protection of disadvantaged groups
- Direct poverty alleviation
- Modal equality
- Modal diversion
- Utilization of spare capacity

Fare pricing objectives

The objectives set for the pricing of fares depend on the perspective of the organization setting fares. Clearly operators put their own financial interest first, whereas a public transport authority generally is expected to protect the public interest within the constraints of its own resources.

The objectives set for fare pricing differ among cities throughout the world. These differences reflect the variety of strategic policy and institutional frameworks that govern the provision of urban passenger transport in these cities.

The following common, but often conflicting pricing objectives are examined in the Toolkit:

- Revenue maximization
- Profit maximization
- Related to value of service
- Related to cost of production
- Balancing value and cost priorities

Fare system objectives

A fare collection system should not only meet its policy and pricing objectives, but it also should be effective and efficient in its application and operation. The following common system objectives are discussed in the Toolkit:

- Understandable by passengers
- Simple to administer by agents
- Doesn't unduly slow boarding
- Amenable to security controls
- Controls acceptable to passengers
- Clarity in the allocation of revenues
- Generate travel planning data
- Minimize cost of operation
- Maximize investment return

Fare Collection Practices

You are here: Practices »

- ▸ Fare structures
- ▸ Fare products
- ▸ Fare integration modalities
- ▸ Fare pricing differentiation
- ▸ Concessionary fares
- ▸ System payments management

Fare collection practices involve the different design elements of setting fares for travellers. These elements include the **fare structure**, the **fare products**, **integration modalities**, **pricing differentiation**, and **concessionary fares**. Fare collection practices also involve **system payments management** to insure that the proper revenues are collected and, as necessary, shared among operators.

Fare structures

The pricing of different trips taken on different services — the fare structure —should be based on the objectives set for the fare collection system, in particular **fare policy objectives** and **fare system objectives**. Often, fare structures vary among in cities across the world because of differences in these local objectives.

The following common fare structure practices are defined and assessed in the Toolkit:

- Flat fare over urban network
- Route-specific flat fares
- Flat fare from point of boarding
- Distance-graduated fares
- Graduated fares with taper
- Zonal and honeycomb fare patterns
- Travel-time related fares
- Fares related to number of boardings

Fare products

A fares system will normally include a range of fare products tailored to specific travel purposes and passenger characteristics. The Toolkit describes the following common fare products:

- Single-trip, adult fare
- Return-trip, adult fare
- Off-peak travel fares
- Daily fares cap
- Period fares
- Group fares

Fare integration modalities

Integration modality practices are concerned with how travellers are charged for trips that involve travel on more than one transport vehicle. The fare issue is whether travellers transferring to and boarding a second vehicle on their journey should receive discounts or pay no additional fares on the second vehicle.

In some transport systems, no fare discounts are offered, even when the second vehicle belongs to the same operator as the first. In other systems, however, fare discounts are provided. These discounts appeal to passengers who travel on large or complex network. They also appeal to passengers travelling on transport system with flat fare structures.

Fare integration often is a policy objective, but there some implications. The Toolkit discusses the following common implications:

- Interchange routing validities
- Interchange with same operator
- Interchange between operators
- Discounts from standard fares

Fare pricing differentiation

The fare charged for a specific journey may vary in relation to a number of parameters. Often this pricing differentiation is done in response to local **fare pricing objectives**.

The following pricing differentiation practices are explored in the Toolkit:

- Variation by travel time or day
- Variation by speed of travel
- Variation by standard of service
- Variation by method of payment
- Variation by nature of passenger

Concessionary fares

Many urban passenger transport systems offer reduced fares or even free travel to selected groups of travellers for societal reasons. For example, most urban passenger

transport systems offer cheaper travel for children and free travel for babies.

The Toolkit provides an overview of the following relevant issues that should be considered when contemplating concessionary fares:

- Purpose of concession
- Extent of concession
- Categories of coverage
- Method of identification
- Informal concessions

System payments management

Robust practices and procedures are needed to insure that the proper revenues are collected and, as necessary, shared among or paid to operators. Data are recorded to provide an internal audit trail of the transactions and to provide a basis for service planning.

The following key payment management practices are discussed in the Toolkit:

- Collection of monies from fares sales
- Data collection from fare validation
- Collection of subsidy from its sources
- Management of revenue sharing
- Payment of production contracts

Fare Collection Procedures

> **You are here:** Procedures »
>
> ▸ Identification of correct fare to be paid
> ▸ Off-board travel payment systems
> ▸ On board travel payment systems
> ▸ On-board travel payment location
> ▸ Point of fare validation
> ▸ Verification of correct fare at alighting
> ▸ Revenue protection processes
> ▸ System security management
> ▸ Revenue reconciliation

The collection and protection of passenger revenues involve a number of operating procedures that are carried out daily. These procedures vary in detail from city to city, but the common elements and their variations are explored in the Toolkit. The selection of the appropriate options depends on the **fare collection objectives** and **fare collection practices** that have been set for the specific city.

Identification of correct fare to be paid

Establishing the price is a basic component of any purchase or transaction. The identification of the correct fare to be paid before the ticket purchase has many benefits:

- Gives confidence to the passenger that he can afford to pay for his journey
- Provides reassurance to the passenger that the price being charged is correct
- Helps the passenger make decisions about travel choice between services where there is competition in the market
- Acts to speed boarding where there is payment on entry to the vehicle
- Removes any excuse for over-riding on the fare paid
- Avoids potential disputes between the passenger and operator

To achieve these benefits, the information given to identify the correct fare should be:

- Intelligible to passengers
- Comprehensive in coverage of products
- Accurate and up-to-date
- Easy to read and understand

The manner and location in which the correct fare can be identified varies widely in international application. The Toolkit discusses the key features of the following procedures:

- Information at terminal or stop
- Information on the vehicle
- Information remote from the service
- Demand-responsive transport

Off-board travel payment systems

Fare payment made prior to getting on the transport vehicle can be beneficial to passengers and to operators. One benefit to passengers and to operators is that off-board payment speeds up boarding time by avoiding delays in transacting payment on-board.

Off-board payment also removes the security risk of cash on the vehicle. If payment is made through a separate agency, the operator can be separated from all external and internal cash security issues. However, this means that operator will have to pay a commission in return.

Off-board travel payment systems also provide passengers options that cannot be supported in the vehicle. Typically, these options are not offered in the vehicles because of the requirement for access to an external database or because of the complexity and duration of the transaction. Examples of these options are:

- Issue or personalization of smart-cards
- Issue of periodic passes, including concessions
- Adding applications or authorizations to an existing smart-card
- Adding new fare products when they are introduced
- Accepting payment by credit or debit card

Experience has shown that easy access to the pre-payment locations is necessary for off-board pre-payment to be successful and widely accepted. Information on the fares and pre-payment processes must be clear, prominently displayed, and easy to understand.

The following common off-board payment procedures are explored in the Toolkit:

- Sales agency and reward
- Point and method of ticket sale
- Ticketing medium
- Stored-value products
- Other payment validation media
- Value charging to media
- Periodic passes

On-board travel payment systems

On-board travel payment systems can vary. Therefore, it is important that passengers quickly understand the ways payment are made on the vehicle. This helps passengers prepare for payment. On-board information concerning the

fare payment process should be clear, prominently displayed, and easy to understand.

Passenger familiarity with the processes helps the operator to speed boarding and incrementally improve trip times, and, thus, vehicle productivity. Any driver involvement in the payment system, other than for cursory checks, inevitably increases the vehicle dwell-time at the stop.

If tickets are issued, or fare validations are recorded, then verification of payment can be established. This reduces disputes between passengers and the operator staff.

The following common on-board payment procedures are described in the Toolkit:

- Ticketless, crew cash collection
- Ticketless, fare-box cash collection
- Pre-printed tickets
- Tickets printed at point of issue
- Stored-value products

The location of on-board travel payment varies widely in international application. The following options for the payment location are discussed in the Toolkit:

- At entry, to driver
- At entry, to static conductor
- During travel, to roving conductor
- At exit, to driver or conductor
- At entry or exit, with direction of travel

Point of fare validation

The location of validation equipment on the vehicles is important. Faster boarding occurs when passengers can process their tickets or cards quickly and easily without impeding the flow of others within the vehicle or near the entry and exit points.

Operators validate the travel documents of individual passengers to ensure the collection of all legitimate revenues and to discourage and minimize fraud. Validation
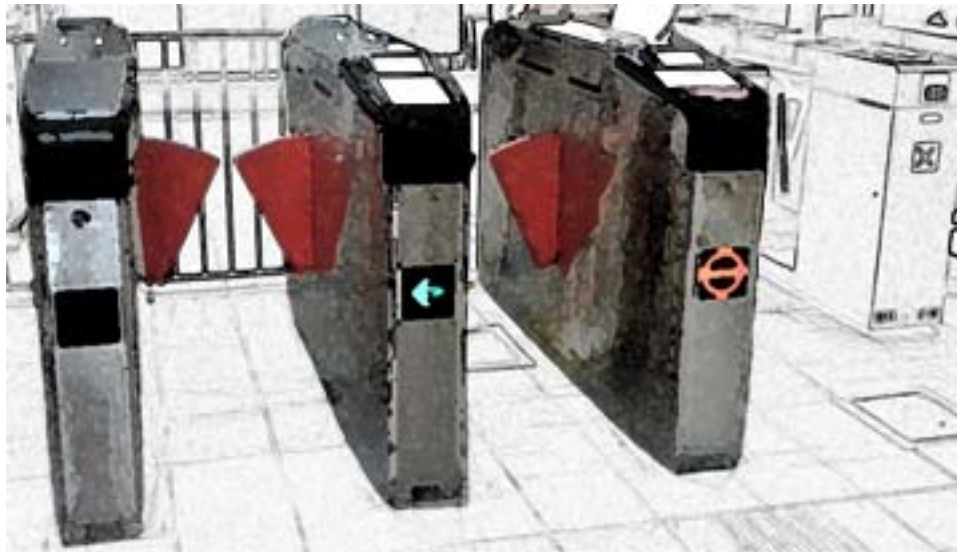
On-board travel payment location

The location of on-board travel payment on the vehicle can affect the proper collection of fare revenues and the speed of the fare collection. It is important that a consistent location be used to make passengers feel comfortable using transport vehicles in different travel situations. On-board information concerning where the fare payment processes are transacted should be clear, prominently displayed, and easy to understand.

It should be noted that the driver or conductor of informal transport modes typically collects cash. However, the timing of collection [either upon boarding, during the trip or upon alighting] and the location of the conductor for payment varies with local convention.

also gives passengers confidence that their fare payment is valid and that any subsequent inspections of their travel documents will confirm the legitimacy of their travel.

The point of travel validation varies widely in international application. The following point of fare procedures are reviewed in the Toolkit:

- At terminal or stop barrier
- On-board vehicle, off-board sale
- On-board vehicle, at point of sale

Verification of correct fare at alighting

Validation at alighting (getting off the vehicle) is used to verify that passengers have paid the correct fare for the trip undertaken in a graduated fare system, and that over-riding beyond the last valid stop for the ticket has not occurred.

Operators validate the passenger fares to ensure the collection of all legitimate revenues and to discourage and minimize fraud.

The fare validation also demonstrates publicly that the operator takes seriously that every passenger pays the correct fare on the system. It is important that information on the requirement and processes for fare validation at alighting is clear, prominently displayed, and easy to understand.

The following alighting validation procedures are discussed in the Toolkit:

- On-board vehicle, manned
- On-board vehicle, machine
- At terminal or stop barrier

Revenue protection processes

Fare evasion is a concern to all operators. Ticketing fraud is usually involves the active intervention of the ticket issuer or machine holder, the ticket inspection staff or the passenger, or some collusion among the parties.

Often operators have difficulty in quantifying the revenue losses from fare evasion. Most operators obtain fare evasion estimates through internal sources, although some external studies have been conducted.

The intensity of evasion and the cost to operators varies widely, depending on the cultural attitude to evasion, the degree of sophistication of the ticketing and fare collection environment, and the perseverance of operators in managing and identifying fraud and in successfully prosecuting offenders. In less sophisticated operating environments with weak ticketing systems, very high levels of legitimate revenue loss can be expected.

Modern electronic ticketing systems are designed with more fraud protections. Often, the introduction of modern systems significantly reduces fare evasion. In many cases the cost of investment in the system is returned in a very short period through the revenue losses avoided.

In informal transport systems, the driver is motivated to monitor passenger fraud. The driver usually contracts with the vehicle owner, pays a fixed daily 'hire' charge, and retains all excess revenues. In some cases, the driver is the owner of the vehicle.

In either case, he is well motivated to ensure the collection of all revenues. Often, he will employ a trusted assistant and supervise him closely. This crew generally deals effectively with any passengers who attempt to avoid payment.

A variety of revenue procedures should be considered to minimize fare evasion. The following common practices and concerns are discussed in the Toolkit:

- Managing evasion
- Passenger evasion
- Crew peculation
- Passenger / inspection collusion
- Passenger / crew collusion
- Crew / inspection collusion
- Crew / machine repairer collusion
- Penalty fares and application
- Criminalization of offences

System security management

Urban public transport operations are unusual in that relatively unskilled vehicle crews or sales agency staffs often are responsible for monies and properties. However, they work in a generally unsupervised public environment that is remote from other staff and from senior management. This situation requires robust systems to control operations, properties, and monies so that activities are well documented and assets well protected.

Good security management involves the consideration of several key issues. Common procedures that are used to address the following issues are discussed in the Toolkit:

- Securing cash arising from sales
- Management of ticketing media
- Management of fares sales equipment
- Management of electronic security

Revenue reconciliation

An urban passenger transport system may have multiple sources of revenue, ranging from on-vehicle sales through to quantified subsidy payments. It also may have multiple beneficiaries of these revenues, ranging from the operators to the public authority. Clearly, robust procedures are needed so that all revenues are accounted and reconciled before payments are made to the beneficiaries.

The reconciliation process may be manual or computerized in traditional fare collection systems, but can be automated through a clearing house in electronic systems. The latter clearly has advantages in terms of accuracy, security and speed.

The development of an effective revenue reconciliation process involves the consideration of several issues. Common procedures that are used to address the following issues are reviewed in the Toolkit:

- Ticket sales consolidation
- Ticket validation consolidation
- Communications
- Revenue reconciliation

Fare Collection Technologies

You are here: Technologies »

- Farebox
- Tickets
- Ticket issuing machine
- Ticket validators
- Ticket readers, single use
- Ticket reader and decrementer
- Smart-cards
- Smart-card transactions
- Entry and exit barriers

A wide range of technologies, covering both hardware and software, are in application or development for fare collection systems around the world. For convenience, these technologies are grouped into nine clusters that serve distinct fare collection functions at varying levels of sophistication.

Fareboxes

Fareboxes are used for the deposit of fares paid on the vehicle. Normally, the driver supervises the correct payment of fares. The following three types of fareboxes are described in the Toolkit:

- Coin or token accepting
- Currency-note accepting
- Linked to ticket-issuing machine

Tickets

Tickets are the visible evidence of fare payment. They vary from simple card or paper, through to magnetic-stripe technology. Smart-cards are a form of ticketing, but are covered in a separate section. The following eight types of tickets are presented in the Toolkit.

- Pre-printed, paper or card
- Pre-printed, multi-journey
- Printed at point of issue
- Smart paper tickets
- Magnetic-stripe tickets
- SMS text on phone or PDA
- Scanable image on phone or PDA
- Machine-readable applet

Ticket-issuing machines

These machines are used to issue physical tickets after the fare payments are made. They are designed to print an accurate ticket, record the fare payment transaction, and prohibit tampering by the public and the operator staff. The following four types of machines are reviewed in the Toolkit:

- Mechanical
- Electronic, hand-held
- Electronic, on-board vehicle
- Electronic, off-board vehicle

Ticket validators

After a ticket has been issued, the passenger presents the ticket to the operator for travel on a specific service. The operator must check the ticket to insure that it is valid for specific service. In most cases, this validation check must also protect against the re-use or re-sale of the ticket for another journey not authorized by the original purchase.

Validation devices range from simple mechanical punches to sophisticated time-recording printers. The following five ticket validators are examined in the Toolkit.

- Hand-held hole-punch
- Security hole-pattern punch
- Decrementing punch, multi-journey
- Printed validation stamp
- Printed stamp with time recording

Ticket readers, single-use

These machines are used for the verification of single-use tickets. They check the validity of the ticket and record its usage. In some applications, they may activate entry into the transport system through gates or turnstiles. Details about the following three readers are presented in the Toolkit:

- Magnetic-stripe, read-only
- Bar-code reader
- Applet reader for phone or PDA

Ticket reader and decrementer

These machines are used for the verification of multi-use tickets. They provide the same functions as the single-use ticket readers, but make adjustments to the stored value of the ticket. Details about the following five readers are presented in the Toolkit

- Magnetic-stripe, read and decrement
- Magnetic-stripe, read and write
- Bar-code reader
- Applet reader for phone or PDA
- Readers for inspection control

Smart-cards

Smart-cards are the basis of modern electronic ticketing. These cards have an embedded chip that can hold data securely and participate in fare transactions. They are also known as "chip cards" or "integrated circuit cards". Smart-cards are normally credit-card sized, and are made from flexible or rigid plastic.

The following five types of smart-cards are described in the Toolkit:

- Contact card
- Contactless card
- Proximity card (BIBO)
- Personalized smart-card
- Electronic purse (e-Purse)

Smart-card transactions

Smart-card systems require external devices to add and adjust the configurable information on the card. They are hardware elements of the fare-collection system that communicate with smart-card and make the fare transaction. The following five hardware elements are discussed in detail in the Toolkit:

- Smart-card encoder and recharger
- Smart-card readers
- Smart-card validators
- Smart-card proximity sensor
- Secure application modules

Entry and exit barriers

Gates and turnstiles are physical barriers to control the flow of people into an area, or between areas. In broad terms, gates are barriers that can open and close. They may be set to allow one person through at a time, or to be opened and closed to suit the circumstance. Turnstiles are rotating devices that allow one person through at a time.

Barriers control access to closed areas within a transport system. Normally they are equipped with some form of automatic fare validation or control.

There is a great variety of gates and turnstile concepts. The following six barrier concepts are reviewed in the Toolkit:

- Passive gate or turnstile
- Gate with coin or token operation
- Gate with magnetic-stripe reader
- Gate with bar-code reader
- Gate with smart-card reader
- Multi-reader gate

FARE COLLECTION DECISION PROCESS

The objective of the Toolkit is to help urban transport leaders and managers plan, design, and implement enhanced fare collection systems. A ten-step decision process is provided in the **Overview** section of the Toolkit to help leaders and managers in this improvement effort.

The decision process takes the leaders and managers through the five progressive layers of fare collection beginning with **Framework**, proceeding through **Objectives**, **Practices**, and **Procedures**, and ending with **Technologies**. The process provides an action plan for addressing all of the elements of a good fare collection system.

1	If the strategic policy and institutional frameworks need reform ...	first use the Urban Bus Toolkit www.ppiaf.org/UrbanBusToolkit
2	If the strategic policy and institutional frameworks are appropriate ...	define the objectives of the system from all stakeholder perspectives: authority; operators; and passengers.
3	If any of these strategic policy objectives are in conflict ...	prioritize interests of one stakeholder set **or** find compromise objectives that can still meet the main interests of all parties.
4	Once the objectives for the fare collection system have been selected ...	define the fare collection practices: fare structures, products, and concessions; price differentiation, and integration modalities.
5	Once the fare collection practices have been defined ...	select the most appropriate procedures for: payment and validation of fares; securing and allocating revenues arising.
6	Once the fare collection procedures have been selected ...	identify the most appropriate technologies to support those procedures in the local operating environment.
7	If identified technologies involve electronic fare collection systems ...	follow the implementation guidance from the Passenger Transport ITS Toolkit
8	If investment in electronic fare collection is projected to be viable ...	investigate whether the embedded ITS technologies could have additional applications in the transport system.
9	If investment in electronic fare collection is projected to yield a high return ...	use this to pre-fund the investment, maybe by granting the financier a priority lien on the revenues arising for his security.
10	Should this investment provide ongoing high rates of return ...	revert to the fare collection system objectives so as to prioritize the allocation of the financial surpluses arising.

CASE STUDIES

You are here: Case Studies »

- Dar es Salaam, Tanzania
- Dublin, Ireland
- Izmir, Turkey
- Johannesburg, South Africa
- Karnataka, India
- Lagos, Nigeria
- Sofia, Bulgaria
- Sri Lanka

A set of case studies has been prepared to illustrate how fare collection systems work in practice. The sites were selected to provide diversity in geographic location, institutional framework, operator type and scale, and technology employed.

The case studies are presented in three clusters:

1. Sites where electronic fare collection systems have been implemented:

    - Dublin, Ireland
    - Izmir, Turkey

2. Sites where electronic fare collection systems are in first deployment:

    - Johannesburg, South Africa
    - Mysore, India
    - Sofia, Bulgaria

3. Sites where electronic fare collection systems are being considered and/or some initial testing is being carried out:

    - Dar es Salaam, Tanzania
    - Lagos, Nigeria
    - Sri Lanka

Each case study is presented in detail in the **Case Studies** section. The information includes:

- **Contextual information**: Regulatory environment; operator information; basis of service organization and procurement; basis of financial support.
- **Fare collection systems**: Overall fare collection approach; individual fare collection procedures; technical details; means of operations management.

- **Implementation experience**: Preparation; procurement; installation and implementation; post-implementation experience; lessons learned; benefits achieved.

The Toolkit also summarizes six key lessons learned from the case studies. These lessons are presented in the **Overview** section. They address the variety of fare collection systems that are being used, the interaction between institutional framework and the design of the fare collection system and impacts of introducing an electronic fare collection system.

USING THE TOOLKIT

The Toolkit was designed to be straightforward and user-friendly. To make the best use of the Toolkit, it is important to understand:

1. Technical specification required to use the Toolkit; and
2. Toolkit features

Technical Specifications

The Toolkit was conceived as a website so that it could be universally compatible and accessible to all users. There are two versions of the Toolkit:

1. **On-line** that is accessible from anywhere with an Internet connection; and
2. **CD ROM** that comes with the Toolkit and can be used when no Internet connection is available.

The only difference between the two versions concerns the links to external sites and external content. On the CD ROM version, these links only work when used on a computer that is connected to the Internet.

The Toolkit can be used with slow Internet connections. However, it will perform better and faster when a stable high-speed connection is available.

Browser compatibility

Both versions only require a standard browser to be used. No additional software or installation is needed.

The following standard browsers can be used to view the Toolkit:

- **Mozilla Firefox** version 6, and later - Microsoft Windows; Linux; Mac OS X; FreeBSD

- **Google Chrome** version 15, and later – Linux; Mac OS X (10.5 and later, Intel only); Microsoft Windows (XP SP2, and later)

- **Microsoft Internet Explorer** version 7, and later - Microsoft Windows XP, Vista, and 7

- **Apple Safari** version 5 - Mac OS X Snow Leopard and Lion; Windows XP, Vista, and 7; and iOS

To ensure optimum performance of any web application, it is always advisable to upgrade your browser to the latest available version. These are free and most allow automatic installation. Check periodically for updates and keep your software current to ensure smooth operation.

The Toolkit employs JavaScript. This is a standard feature in all the above browsers, and it is usually active by default. Should the option be switched off in your browser, you can simply switch it on in the setting or preferences of your browser.

Recommended operating system and hardware

Recommendations are made for following operating systems regarding the system versions, computer processors, hard disk capacity, and computer memory.

- **Windows**: XP Service Pack 2+ / Vista / 7 - Intel Pentium 4 or later; 100MB hard disk; 128MB memory

- **Mac OS X**: 10.5.6 or later - Intel Mac; 100MB hard disk; 128MB memory

- **Linux**: Ubuntu 8.04 or later / Debian 5 / OpenSuse 11.1 - Intel Pentium 3 / Athlon 64 or later; 100MB hard disk; 128MB memory

Usability on mobile devices

The Toolkit is usable on mobile devices such as Apple iPhone and iPad and Android handsets. These devices should have an Internet connection using the mobile versions of current browsers.

Toolkit Features

A consistent interface is used throughout the Toolkit. Once you familiarize yourself with its components you will find the Toolkit easy to use.

Main navigation bar

At the top of the page a series of tabs correspond to the seven areas of the Toolkit. Placing the mouse or touchpad pointer over each of these reveals a pull-down menu listing the sections within that area. Clicking on any of these titles / headers displays the content of the relevant area / document in the main display area below.

The **Overview** area is your entry point. It provides you with the essential information to find your way around the Toolkit.

Framework, **Objectives**, **Practices**, **Procedures**, **Technologies**, and **Case Studies** are the content areas.
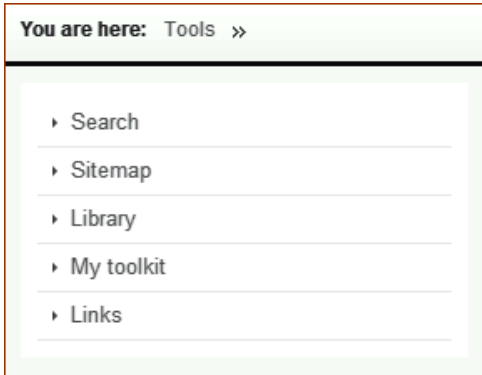
Tools is where you find additional aids and features to complement the content.

Wherever you are in the Toolkit these same options are available at the top of the page. You will be able to jump directly from any page in the Toolkit to any other area and will never find yourself in a dead-end.

Left hand column

You are here: Tools »

▸ Search
▸ Sitemap
▸ Library
▸ My toolkit
▸ Links

On the left hand side of the screen you see a list of the pages with detailed information in the area that you are visiting. Clicking on each of the titles/headers will display the content of the selected page.

Breadcrumb trail

You are here: Tools » Library » Glossary

Breadcrumbs are a secondary navigation scheme that reveals the user's location within a website. Wherever you are in your journey through the Toolkit you will see, just below the tabs at the top, breadcrumbs that follow the title **You are here**.

The breadcrumbs tell you where you are and the path you have followed to get there. Clicking on any title / header in the list of breadcrumbs is the quickest way to retrace your steps.

You are here > Tools > Library > Glossary

A second breadcrumbs navigation bar is provided at the bottom of each page in the blue task bar. You can use this in the same way as the top breadcrumbs navigation bar.

Expanding the page view

In the top left hand corner of the display area there is an **Expand content** button. This allows you to expand the main display area to full width, which can be useful if you are viewing the Toolkit on a small screen. If you choose to print the page when expanded, it will print what you see on the screen.

When the page is expanded you can shrink it again and reveal the left column by clicking on **Collapse content**. This will be at the top left of your page at that point.

Searching, printing, and bookmarking

Q SEARCH + ☰ ADD TO MY TOOLKIT 🖶 PRINT
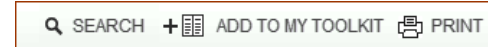
On the right hand side just above the main display area you find three options: **Search**, **Add to My Toolkit** and **Print**.

Clicking on **Search** lets you search key words in content titles through the Toolkit. The search function provides you with a listing of the content titles with the key words. The search function can also be found under **Tools**.

Clicking on **Add to My Toolkit** lets you save to your computer a copy of the page that you are currently viewing. This allows you to set aside documents you want to refer to later, or to create sequences of selected documents you intend to use separately from the Toolkit.

Selecting the option opens a small window where you can give a name to the document. The path to it will be saved automatically, and you can add your own notes to it. The document will be saved to the **My Toolkit** area, which is to be found under the **Tools**.

By selecting **My Toolkit**, you will go to a page where all the documents you selected are listed with the title you gave them. Using the My Toolkit features, you can reorder the sequence, edit the notes and go directly to the page.

When your computer is connected to a printer, clicking on **Print** will print the currently displayed page. If it fails to print, please check your printer connection.

Text size

You can enlarge or reduce the size of the text by pressing keyboard shortcut in the following browsers:

- **Windows**: In Internet Explorer, Firefox, Chrome, Opera and Safari browsers:

  To make the text bigger, press the **Ctrl** and **+** keys together.

  To make the text smaller, press the **Ctrl** and **-** keys together.

  To return to normal size text, press the **Ctrl** and **0** keys together.

- **Mac**: In Firefox, Chrome or Safari browsers:

  To make the text bigger, press the **Command** and **+** keys together.

  To make the text smaller, press the **Command** and **-** keys together.

  To return to normal size text, press the **Command** and **0** keys together.

Sitemap

Under the **Overview** and **Tools** menus, you will find a text-based map of the whole site —**Sitemap**. It is organized by area — the one you get to clicking on the main title/header on the tabs at the top of the page. Each element in the map is an active link taking you directly to the relevant page. The map will help you understand the hierarchy of the content and the relationship between each component.

Tools

This area provides the following aids and features:

- **Search** lets you search key words in content titles through the Toolkit. The search function provides you with a listing of the content titles with the key words.
- **Sitemap** is a text-based map of the whole site. Each element in the map is an active link taking you directly to the relevant page. The map will help you understand the hierarchy of the content and the relationship between each component.
- **Library** stores the **Glossary** and **Documents**. The **Glossary** provides definitions for the abbreviations and acronyms used throughout the Toolkit. **Documents** provides a listing of relevant publications on fare collection systems.

You are here: Tools » Library

- Search
- Sitemap
- **Library**
    - Glossary
    - Documents
- My toolkit
- Links

It is not necessary to go to the glossary page each time you want to find the meaning of an abbreviation. Whenever these abbreviations and acronyms appear just place the pointer over it. A label will then appear with the definition.

Q SEARCH + ADD TO MY TOOLKIT PRINT

- **My Toolkit** contains the copies of the pages that saved by clicking on **Add to My Toolkit**. This feature lets you save to your computer a copy of a page that you viewing in the Toolkit. This allows you to set aside documents you want to refer to later, or to create sequences of selected documents you intend to use separately from the Toolkit.

- **Links** provides relevant Internet links to references, World Bank documents, research centres, databases, International bodies, and standards bodies.

Tabbed browsing and multiple pages open at the same time

At times you may want to keep multiple pages open at the same time and be able to toggle between them. You can either have pages open in different browser windows or, more practically, use tabbed browsing. This will give you one titled tab for each open page at the top of your browser window. Just click on the tab to get to that page.

To open a link in a new tab in Internet Explorer 8, Mozilla Firefox, Apple Safari and Google Chrome on a PC, press the **Ctrl** key while clicking on the link, or right click on the link if you have a two-button mouse. You can then choose **open link in new tab** or **open link in new window** from the menu that displays. On a Mac use the **Command** key instead of **Ctrl**.

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