

ROAD ASSET VALUATION AND MANAGEMENT – CASE STUDY FINLAND

Saarinen Jani, Executive Director
RAKLI - The Finnish Association of Building Owners and Clients

Introduction for Road Asset Management

Roads have been managed by engineering for a long time. Pavement Management Systems (PMS) are the first systems, which were taken into practical use by road administrations in 1980's. These systems have usually been applied for paved road networks only, and the analyses have been based mostly on technical principles. Pavement Management Systems have been utilised for programming, prioritisation and optimisation of road works.

Development of Infrastructure Management Systems (IMS) has lead to more comprehensive road management. These systems have usually been generalisations of pavement management systems including other engineering structures such as bridges, road furniture, etc. into the analysis. Recently Infrastructure Management Systems have been integrated to Geographical Information Systems (GIS).

Introduction of Asset Management Systems (AMS) has lead to more business oriented approach. However, Asset Management System is quite often a synonym for integrated management systems without adequate economical approach. And most of the systems in use cover only a specific share of all assets. The key difference between traditional management systems and asset management system is the wider context of the asset management. Managing assets requires implementing of an accounting and valuation of assets in monetary terms.

State-of-the-art road asset management consists of integrated use of varied management systems including accounting. However, asset management is rather a strategic and systematic approach to managing business, e.g. road transport, road infrastructure, and road administration.

Managing Road Administration's Resources like a Business

OECD has defined Asset Management as follows: *“A systematic process of maintaining, upgrading and operating assets, combining engineering principles with sound business practice and economic rationale, and providing tools to facilitate a more organized, and flexible approach to making the decisions necessary to achieve the public's expectations.”* (OECD 2001)

Road administrations are moving from purely government-controlled organisations with their own executive departments to agency status and, in the most far-reaching model, to a private enterprise. Such a change has several distinguishing characteristics. Government input decreases, private risks increase and the infrastructure user is increasingly regarded as the customer. (PIARC 2005)

In the context of these developments, the term ‘asset management’ is increasingly being used to characterise a ‘business-like approach’ to road network management. This approach means that the results of the road network management activities are regarded as a service or product to be supplied to a client. (PIARC 2005)

Asset management should be developed as a systematic procedure, which has to include at least the following elements:

- Definition and inventory of assets: road network, other infrastructure, other fixed assets and resources;
- Road management systems for use, maintenance and development of assets;
- Valuation of the assets and reporting the value in monetary terms: capitalisation and depreciation;
- Implementing accounting: Integration of road management and accounting; and
- Systems and procedures for utilisation of asset management information.

Valuation of Assets in Monetary Terms

Managing road assets requires valuation of assets in monetary terms. Each asset has an economic value to the transport network. Each asset has also a capital value, calculated either from the original investment cost or the price of replacement. The expression of asset value in such accounting terms is a key element in developing the common language between financial managers and overseeing bodies.

The asset value and the change of the value are used when defining the need for investments and maintenance of the assets. The asset value states also the amount of capital investments that have been made. It also shows the amount of yearly expenses and yearly investments compared with the total value of assets. The road asset value can therefore be used when reasoning the annual need for road management financing for decision-makers and road users. For them the annual need for money is more understandable when it is compared with the total road asset value and the change in that value. (PIARC 2005)

Valuation of road assets is usually based on the following stages:

- Definition and inventory of assets: road network, other infrastructure, other fixed assets and resources;
- Valuation of the assets and reporting the value in monetary terms;
- Implementing of accounting methods and procedures: capitalisation and depreciation;
- Implementing financial reporting, financial statements, statements of revenues and expenditure and balance sheet; and
- Integration of road management and accounting.

The main purposes of valuation of the assets is to enable reporting in monetary terms to reflect the physical conditions of the road network, and to assist asset managers inform asset owners of the effects of financing strategies. Asset value is also a significant factor in determining priorities for the future investment.

Definition and Inventory of Assets

The basis for asset valuation is the definition of the road assets and the asset items. The road assets usually contain roads, bridges and other engineering structures such as tunnels. Roads are usually divided into road substructures, running surfaces, equipment and accessories. These assets might contain also land areas (e.g. road areas, rest areas etc.), unfinished road projects and road structures under construction. Real estate, buildings, machines, equipment etc. should be included in other fixed assets.

Assets should be divided into several asset items (groups). The assets belonging in one item should have similar purpose of use and the same estimated length of service life. It is also necessary to define yearly expenses and capital investments. The normal maintenance is considered as yearly expense, but upkeep or improvement with long term effects is considered as investment expenditure. (PIARC 2005)

For better management it is necessary to make an inventory of the assets. In the case of roads, it is also essential to measure the condition of roads. Inventories can either be done at certain fixed time intervals or on the basis of change in condition. The roads and other assets should be listed or registered, and updated after each inventory

Valuation Methods

Asset value is usually calculated in the owner's book-keeping and stated in the balance sheet of the year-end financial statements.

The monetary value of assets can be defined in many different ways, for example as follows:

- The book value or written down value is the value of an asset as used in most accounting systems. It is usually based on the original acquisition cost, which has been adjusted for depreciation, or by any other increase or decrease in value. The acquisition cost includes the expenses of the purchase or manufacture of the asset;
- The market value is the current market price of an asset, i.e. the sum of money that could be obtained for an asset if it was sold in the market at a certain time;
- The replacement value is the present market price of a similar asset to replace an old asset;
- The present value is considered to be the present value of payments made at a later date. Thus the future payments are discounted into the present;
- The nominal value is the purchase value of an asset on the purchase date;
- The real value can be converted from the nominal value by taking into account the inflation since the purchase date;
- The taxable value is the monetary value of an asset determined for taxation purposes; and
- The utility value represents the quantitative or qualitative benefit of an asset for the user. It can vary depending on the user. (PIARC 2005)

The value of the road assets is usually determined as book value, which is based on the original acquisition cost, adjusted by the depreciation or by an increase or decrease in value. Although the road asset value is usually determined for accountancy purposes, this value can also be used for road management and budgeting purposes.

The acquisition cost contains the costs of both planning and construction. If the investment expenditure of the existing road network cannot be determined, the road asset value can be calculated as the replacement value or as the present value.

Depreciation of the Assets

Valuation is based on depreciation parameters which have to be defined using planned depreciation or measured condition of the assets. The depreciation of assets represents the annual loss of the value and the annual wearing of the assets. The depreciation to be written off yearly should be planned beforehand and confirm according to local accounting standards and requirements.

The depreciation method can be linear, digressive or progressive or it can be based on physical condition of roads. Most commonly, linear depreciation is used for financial accounting purposes and non-linear depreciation for road engineering purposes. When using the straight-line method (linear method), the depreciation is calculated as a fixed percentage either of the acquisition value or of the acquisition value reduced by the residual value. The percentage of the acquisition value is determined by the economical or expected lifetime. (PIARC 2005)

Many Road Administrations use a combination of above methods. The choice of depreciation method generally depends on the type of asset. For some type of assets such as land areas and unfinished structures depreciation is not necessary applied in any form. Depreciating parameters can also be regulated by the laws, acts or other standardisation.

Ideally, the amount of depreciation should correspond with the actual wearing and consumption of an asset, i.e. depreciation = deterioration. And for road assets, the annual depreciation should also correspond with the annual need for maintenance and upkeep of road network. The yearly depreciation can simply be a percentage of the original acquisition cost according to the asset's economical lifetime. (PIARC 2005)

The economical lifetime can be, for example:

- 20-50 years for road substructures;
- 10-20 years for running surfaces;
- 50-100 years for bridges;
- 5-20 years for equipment and accessories.

In addition, an asset can be considered to have a residual value. The residual value is the value of an asset at the end of its expected lifetime, i.e. at the moment when all the planned depreciation has been written off from the value of the asset. The residual value is usually a positive number or zero, but in some cases it can be negative. (PIARC 2005)

Financial reporting

An inventory and valuation of road assets needs to be done at the latest when the first balance sheet of the year-end financial statements is to be done by the road administration or the party responsible for road maintenance. The investments increasing the road value and the depreciation reducing the value usually need to be stated in both the balance sheet and profit and loss account. By using the book value of the road assets, the road management financing and the level of investments can more easily be justified. (PIARC 2005)

The asset value indicator is most commonly used in annual reporting and financial statements, monitoring the performance, measuring the level of investments, and also for strategic planning, resource allocation and road management. Most countries provide balance sheets where the value of assets is included.

However, while many road administrations use asset values in their work, the valuation does not seem to have a real connection to road management.

Framework for Asset Management

According to the PIARC C6 Technical Committee 2000-2003; “*Asset management should be developed as a systematic procedure or as a set of guidelines.*” The framework for asset management consists of the following:

- technical tools,
- administrative arrangements,
- owner’s policy and customer orientation, and
- business reform.

The strategic asset management framework comprises the existing business strategies which may be selected for improving approach to road management. Others may wish to concentrate on implementation of specific tools, when others might seek for administrative or business reforms.

Technical tools, such as pavement management system, are used in most of the organisations. Management systems are integrated with GIS-applications. There is often an accounting system in use, but they are not yet integrated with other software. In most advanced organisations there might be comprehensive range of enterprise software applications and business solutions implemented.

The most significant benefits from road asset can be reached by administrative arrangements, customer orientation and business reform. Administrative arrangements might include promoting competition and privatisation of the state owned services and production. The value of road assets can be added by paying attention to the needs and feedback of customers, road users and other stakeholders. Definition of owner’s policy is also needed. Biggest benefits from asset can be achieved by business reforms, such as adding the participation of private sector, implementing PPP's, risk sharing, life time costing, new type of innovative off-budget funding etc.

Conclusion

Comprehensive asset management consists of integrated use of different management systems including accounting. Modern asset management requires valuation of assets in monetary terms. The expression of asset value is a key element in developing the common language between financial managers and overseeing bodies.

There are several methods to estimate asset value, but no single one is absolutely correct. According to the Finnish Road Administration’s experiences, the accounting methods used should be simple rather than comprehensive. And for road assets, the annual depreciation should correspond with the annual need for maintenance and upkeep of road network.

Road asset management is about managing road administration’s resources more like a business. It is rather a strategic and systematic approach or a process. Managing roads like a business should be based on several stages of development such as introducing technical tools, administrative arrangements, customer orientation, and business reforms. Valuation of road assets is a good start.

Case Finland

Introduction

There are about 80 000 kilometres of public roads in Finland. These roads are managed by a state agency - Finnish Road Administration (Finnra). Finnra's budget is about EUR 700 million and number of employees 950. The value of road assets is currently about EUR 14,9 billion, which is about 30% of the total assets of the State of Finland.

Finnra is responsible for planning, maintaining and developing of the road transport system. Since 2004, road maintenance, investments and design have been 100% submitted to open competition. Finnra has not any machinery or labour forces. Former production of Finnra is currently a state-owned enterprise – Destia.

Introduction

Road asset management in Finland is based on the road maintenance management systems developed in the 1980's. By means of these management systems the necessary financing for road maintenance and for new investments has been estimated.

The usage of the management systems is premised on:

- a road data bank of all public roads;
- measurements of the road condition and the prediction models for predicting the road condition in future;
- traffic volume and estimation of traffic costs;
- costs and effects of all types of investments and maintenance; and
- geographical information system.

Historically, the value of the road assets could not be estimated by means of these management systems. Thus the road asset value was not included in the accounts either. Therefore, road asset management has been developed. Now road assets are valued annually and road asset valuation is an important element of the accounts.

State wide financial accounting

In Finland, a new financial accounting system for the whole state and all state organisations was introduced at the beginning of 1998. By this means, the accounting systems of these organisations were unified. The new system corresponded to the commercial book-keeping used in private companies. At that time, all public offices implemented an inventory of their assets and so the first balance sheet in 1998 could be defined.

The new accounting system was based on both business accounting and traditional budget accounting (budget revenues). In business accounting, the financial statement made at the end of the financial year contains a statement of revenues and expenditure and a balance sheet. The balance sheet (i.e. the statement of assets and liabilities) shows all the assets: road assets, other fixed assets and current and liquid assets. The statement of revenues and expenditure shows the revenues from activities, annual maintenance and operating costs, investments and depreciation.

Principals of road asset valuation

The inventory of the road assets is based on the information from the road data bank and on reports of road maintenance costs. Although the monetary valuation of road assets had been studied already in the 1980s, the present methods were introduced only in the 1990s.

A new method of road value accounting was introduced in 1998 as part of the new financial accounting system for all state organisations. The road asset value in the first balance sheet 1.1.1998 was about EUR 14 500 million. (EUR 14 900 million in 2006)

The road asset value for the first balance sheet was based on the total sum of original road investment expenditures taken from the financial accounting of Road Administrations since 1950. The depreciation corresponding to the annual need of upkeep and general overhaul was then written off from the total sum. The annual need of upkeep and general overhaul was estimated by a pavement management system and a bridge management system. The value of road areas was determined as the procurement cost of those areas. Depreciation was not considered for road areas. The value of buildings was defined as taxation value.

After the value of all the road assets was determined in 1998, this sum has been updated yearly when closing the accounts. The investments made during that year are activated and the depreciation of the structures, the value of the assigned land areas, the value of the road sections removed from service or surrendered (e.g. to local authorities) are written off from the road asset value.

Definition of the road assets

In the accounts, the road assets are divided to three parts:

- roads (substructures, pavements, bridges and other engineering structures);
- roads under construction, including road designs;
- land and water areas for construction.

Roads are divided into four parts because of different economic lifetimes of constituent parts:

- road substructures (economical lifetime 50 years);
- running surface (economical lifetime 10 years);
- bridges (economical lifetime 50 years);
- other structures (economical lifetime 10 years).

The major part consists of substructures, i.e. the lower part of the road pavement and the filling or embankment, etc between the running surface and the subsoil. It also includes drainage systems. Bridges consist of all the bridge structures. Other structures consist of all the remaining structures, such as lighting, railing and telematics.

Roads under construction consist of unfinished road projects, investment plans and road designs. Land areas consist of road areas, rest areas, parking areas and loading areas.

Capitalisation

The value of road structures is increased yearly by the costs of:

- investments (like renovation or general overhaul) to remedy the actual road network to its former level of service or to a better service level corresponding to the demands of increased traffic volume (replacement and expansion investments);
- investments to construct new road connections (new investments and major road projects to develop the road network); and

- road and structural design plans being an essential part of the road construction.

Depreciation

The value of road structures is decreased yearly by:

- depreciation matching the annual need of maintenance and renovation;
- the value of the road sections removed from service or surrendered e.g. to local authorities.

The depreciation is considered only for finished road structures, not for road structures under construction. Depreciation is calculated monthly, but activated in the balance sheet only annually.

The value of land areas is updated yearly. The value of surrendered land areas is deducted and the acquisition costs of the acquired land areas are added to the asset value. No depreciation is considered for land areas.

Changes of parameters

In 1998-2000 depreciation was calculated using the reducing balance method. Then the depreciation percentage was constant for each type of road structure and the depreciation was calculated from the residual value of the totalled value of that particular road structure (e.g. from the asset value of all the bridges). When using this method, the depreciation for a single structure diminishes every year. The depreciation percentages used were 2% for substructures, 10% for running surfaces, 1.2% (1/85th) for bridges and 10% for other structures. The depreciation was calculated once a year.

Since the beginning of 2001 the depreciation has been calculated monthly as straight line depreciation. The amount of depreciation is constant because the depreciation is a constant percentage of the acquisition value. The residual value of the structure is always zero.

Since 2001 the economic lifetime for substructures has been assumed to be 50 years, for running surfaces 10 years, for bridges 50 years, and for other structures 10 years. Thus the yearly depreciation percentage for substructures and bridges is 2%, and for running surfaces and other structures 10%.

Conclusions from Finland

Road asset management in Finland is not based on any single technical application; it is a collection of systems and procedures for management of road assets. In practice, there is a comprehensive accounting system in use, and road asset valuation is now part of this system.

Although the separate management systems have not yet integrated, it has been possible to integrate the information from the traditional management systems and from the accounts. The information from the accounts has been used for financial planning and for estimating the amount of maintenance and investments needed.

According to the Finnra's experiences, the annual depreciation should reflect the need for maintenance and upkeep of the road network, and the accounting methodology used should be simple rather than comprehensive.

Valuation of the road asset has made road management more transparent. Value of road assets has been discussed in public and the stakeholders are now familiar with the road asset value. This enables also active monitoring of road infrastructure assets.

However, the most significant benefits from road asset management have been based on administrative arrangements, customer orientation and business reform such as promoting competition and privatization of the state owned services and production.

References

Finnish National Road Administration, Report of Activities and Financial Statements 2006. Finnish Road Administration, Internal publications 8/2007, ISSN 1457-991X

Liimatta P., 2000. Accounting of Road Assets in Finnra, utilisation of calculations and asset management (abstract in English). Finnish National Road Administration, Report 33/2000.

Organisation for Economic Co-operation and Development, OECD, 2001. Asset Management for the Roads Sector. ISBN 9789264186972

Organisation for Economic Co-operation and Development, OECD, 2000. Performance Indicators for the Road Sector.

Saarinen J. and al., 1998. Pavement Management in Finland: Decision making from national policies to project-level programming. Presented at the 4th International Conference on Managing Pavements, Durban, South Africa.

Saarinen J., Tapio R. and Männistö V. Managing Assets in Road Sector. Paper presented at PIARC Programme of International Seminars, Estonia, 2001

Transportation Association of Canada, 1999. Highway Asset Management Systems - A Primer.

US Department of Transportation Federal Highway Administration Office of Asset Management, 1999. Asset Management Primer.

US Government Accounting Standards Board, 1999. Basic Financial Statements – and Management’s Discussion and Analysis – for the State and Local Governments: Statement 34 of GASB.

World Road Association, PIARC Technical Committee on Road Management (C6), 2005. Asset Management for Roads – An overview. ISBN 2-84060-176-1