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The development of HDM-4

The Highway Design and Maintenance Standards Model (HDM-III), developed by the World Bank, was used for over two decades between 1980 and 2000, to combine technical and economic appraisals of road projects, to prepare road investment programmes and to analyse road network strategies.

Conception

The University of Birmingham led the International Study of Highway Development and Management (ISOHDM) that extended the scope of the HDM-III model, to provide a harmonised systems approach to road management, with adaptable and user-friendly software tools. The US $ 3.5 million research project developed the Highway Development and Management Tool (HDM-4), a universal standard system for road management and investment appraisal. HDM-4 is a powerful system for the analysis of road management and investment alternatives that is applicable in both developing and industrialised countries.

Improvements

Improvements to the technical models in HDM-4 encompassed the introduction of new relationships as well as extensions to relationships used in HDM-III. The objective was to address such issues as the traffic congestion already affecting many developing countries, the incorporation of recent research on vehicle operation costs, a wider range of pavement types, maintenance effects, safety implications and the adaptability of models to a wide range of environments. HDM-4 can be used for assessing technical, economic, social and environmental impacts of road investment.

Since the release of HDM-4 Version 1 in 2000, the software has been used in many countries for a diverse range of projects. The experience gained from the project applications together with the feedback received from the broad user base, identified the need for improvements to the technical models and to the applications implemented within HDM-4. The improvements included in Version 2 of HDM-4 are categorized as follows: new applications, improved technical models, improved usability and configuration, improved data handling and organization, and improved connectivity.

Improvements in applications that have been incorporated in HDM-4 Version 2 include sensitivity analysis, budget scenario analysis, road asset valuation, multi-criteria analysis (MCA), and estimation of social benefits.

Dr Odoki was a Research Fellow on HDM-4 Phase 1 Project (1993 – 2000) and became the Technical Director of HDM-4 Phase 2 project (2003 – 2004).

The ISOHDM project is coordinated by the World Road Association (PIARC) on behalf of the leading international financing institutions (the sponsors) listed below.

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