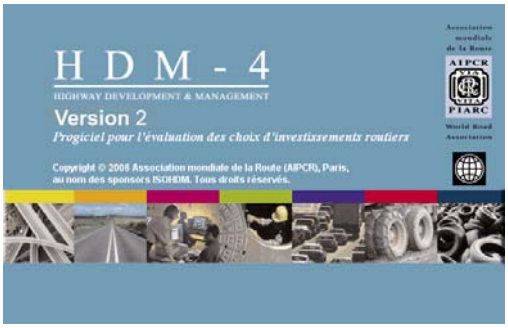
HDM-4 Applications

The Highway Development and Management System (HDM-4) is a software program originally initiated by the World Bank and extensively used for the appraisal of investments in road transport infrastructure. This application is generally acknowledged by main donor organizations and governments of many countries and, in fact, it has become one of the main tools of decision making in road infrastructure financing. The HDM-4 Version 2.0, the latest version of the program, was developed by PIARC in 2005 and has been maintained by HDMGlobal since.

HDM-4 carries out an analysis of road management investment alternatives such as developing new roads, improving existing roads, maintaining existing roads or applying innovative techniques of funding. The current version of the application has benefited greatly from the feedback provided by users in terms of its features improvement in Sensitivity Analysis, Budget Scenario Analysis, MCA, Estimation of Social Benefits and Asset Valuation.

HDM-4 allows you to conduct analysis on three levels commonly used in road management decision-making:

- Strategic Level: predicts pavement deterioration for various funding levels and management strategies at road network, sub-network, or individual segment level over 5 to 40 years. Cost-benefit analysis and cost-effectiveness analysis are utilized for an analysis at strategic level.



- Programme Analysis: prepares multi-year program of projects within budget constraints. Total cost-benefit analysis is used for programme level analysis.
- Project analysis: conducts cost-benefit analysis of one or more projects. Multi-criteria analysis is used in project analysis based on economic, functional, energy, political, safety, environment and social criteria evaluation.

At all levels the underlying investigation by HDM-4 is based on the concept of life cycle analysis under a user-specified scenario of circumstances. This involves the analysis of pavement performance and cost-benefit analysis of different project alternatives based on the above-mentioned criteria.

Key Documents:

- Kerali, H. G. R., The Highway Development and Management Series: Volume one: Overview of HDM-4, 2000
  This is a short executive summary describing the HDM-4 system. It is intended to be used by readers new to HDM-4, particularly high-level management within a road organization.
- Turner, J., Fouracre, P., Bryceson, D., Odoki, J. B., Taylor, G.,

Farhad, A., and Davis, A., Overseas Road Note 22: A guide to pro-poor transport appraisal: The inclusion of social benefits in road investment appraisal, Transport Research Laboratory Ltd, Wokingham, United Kingdom, 2004.
This Note addresses the issues associated with the inclusion of social benefits in rural transport appraisal. A software 'add-on' to include social benefits with HDM-4 is also described. This document is primarily targeted at those engaged in the appraisal of roads, but it will also be of value to other stakeholders who should be involved in the process of road-fund allocation.

- Archondo-Callao, R., World Bank Transport Paper TP-20: Applying the HDM-4 Model to Strategic Planning of Road Works, World Bank, 2008.
  This technical note presents the author's experience applying HDM-4 and its predecessor, the Highway Design and Maintenance Standards Model (HDM-III), to road network strategic planning evaluations in developing countries, with the objective of providing recommendations and tools to the readers who are involved in strategic planning activities.
- McPherson, K., and Bennett C. R., Success Factors for Road Management Systems, World Bank, 2005.
  The purpose of a computerized road management system (RMS) is to assist the road agency in the planning and prioritization of road investments. The goal of this project was to identify factors that have contributed to the successful implementation of an RMS. The objective is to use these key components of success to help ensure better future implementations.

Case Studies:

- Rohde, G., Wolmarans, I., Sadzik, E., The Calibration and Validation of HDM Performance Models in the Gauteng Pavement Mangement System (PMS), AFRICON, Pretoria, South Africa, 2002.
  It is well recognized that the HDM models require regional calibration in order to be effective. This paper examines the validity of the models and calibration factors on the surfaced network of Gauteng.

Recommended Links:

- HDMGlobal
- PIARC
- The World Bank developed a series of tools to facilitate the dissemination and use of the HDM-4. The tools can be downloaded from the HDM-4 Dissemination Tools site
- www.lpcb.org. This website contains resources on HDM together with case studies of its implementation

For further information
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