HDMGLOBAL

HDM - 4

HIGHWAY DEVELOPMENT & MANAGEMENT

WORLD ROAD ASSOCIATION MONDIALE DE LA ROUTE

Illustration of HDM4 through the world

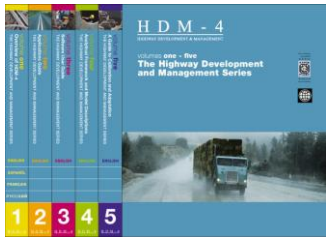
Robert MESNARD (EGIS)

Tyrone TOOLE (ARRB)

Board members

arrb GROUP ATKINS egis ECOLE NATIONALE DES PONTS ET CHAUSSEES ICH Instituto del Cemento y del Hormigón de Chile TRL UNIVERSITY OF BIRMINGHAM URS Scott Wilson

North - Western Africa: Technology

	Knowledge	Models	Software
		HDM-4 HIGHWAY DEVELOPMENT & MANAGEMENT	RUE SERDWE
MOROCCO	**Published Technology, conventional model, applied with high level of model calibration :** ▪ **Vehicle fleet** ▪ **VOC** ▪ **RDME**		
BURKINA FASSO	**Published Technology, conventional model, applied with good level of model calibration :**		

Recent applications & developments

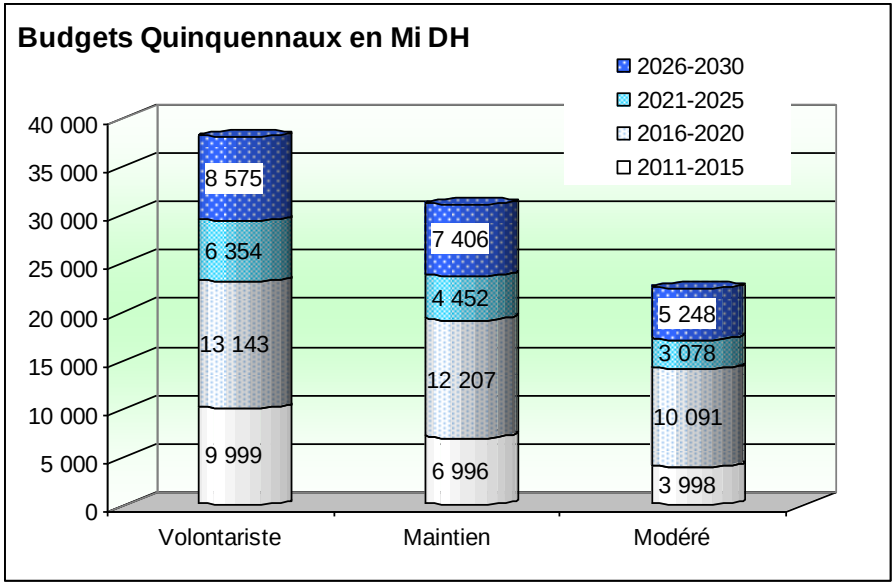
Recent applications	Features
MORROCO	
• Cost Benefit Evaluation (CBE) of maintenance and improvement • Maintenance Program (5 years) •Improvement program	• Long term pavement monitoring used for RDME calibration • Special inquiries on vehicle fleet and VOC (CNER) •
BURKINA FASSO	
• Cost Benefit Evaluation (CBE) of maintenance on unpaved roads	• Extensive calibration based on long term experience

Morocco : Project

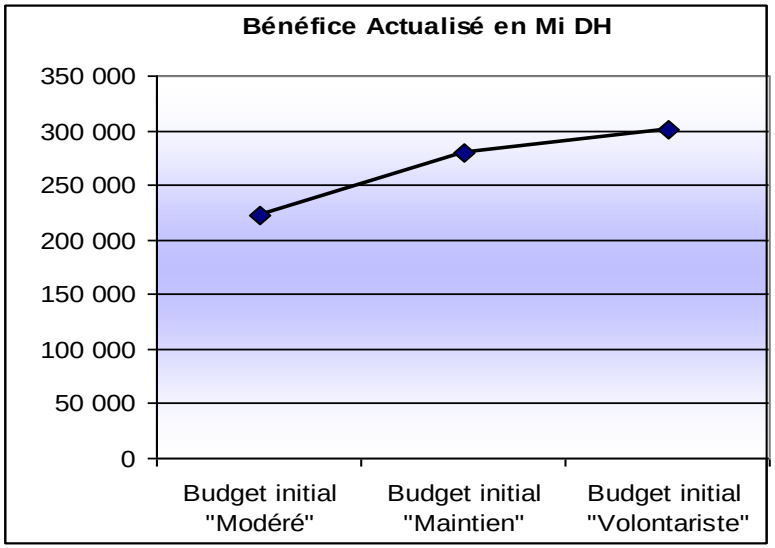
- **Network concerned:**
  - 38 000 Km paved
  - 2 climatic zones
- **Objectives of the project:**
  - Definition of a new road policy : investment, maintenance and operation
  - Improvement : based on analysis of road functions
  - Maintenance budget adapted to latest extension of network
  - Maintenance based on optimised asset management and satisfaction of road user
  - Long term monitoring of the network

Morocco – Maintenance

- **Maintenance:**
  - **Optimisation of strategy**



  - **Comparison between NPV optimisation and target IRI**



HDMGLOBAL

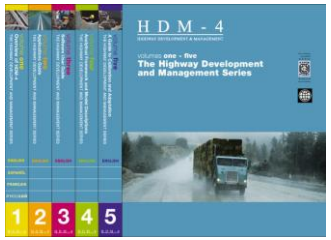
HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Morocco – Improvement

- **Improvement:**
  - Total budgets for each profile type (2 lans 3.5m; 2x2 lanes..)
  - NPV / profile type
  - Optimisation of year for transformation in new profile

Current prof. to 2X2	NPV MiDH / Km			
	Rough1	Rough2	Rough3	Rough4
Width2/traffic4/NonArid	35	75	48	54
Width3/traffic3/NonArid	13	11	13	
Width3/traffic4/NonArid	26	47	33	50
Width3/traffic5/NonArid	116		121	104
Width4/traffic4/NonArid	9		28	

South America : Technology

	Knowledge	Models	Software
		HDM-4 HIGHWAY DEVELOPMENT & MANAGEMENT	RUE SERDWE
Brazil	**Majority of users :** **Published Technology, conventional model, applied with basic level of model calibration**		

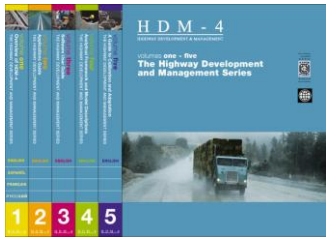
HDMGLOBAL

HDM-4 HIGHWAY DEVELOPMENT & MANAGEMENT

Recent applications & developments

Recent applications	Features
• ROAD MASTER PLAN (Espirito Santo State, Santa Catarina State)	• Economic evaluation of interest of construction of New roads • Economic evaluation of paving program
• Federal Administration : Instruction for study new road project	• Report for technico-economic feasibility study : ◦ Using : Construction, maintenance, operation costs, VOC and time cost ◦ Calculating : NPV, IRR, NPV/C

ASIA – PACIFIC : Technology

	Knowledge	Models	Software
		HDM-4 HIGHWAY DEVELOPMENT & MANAGEMENT	
ASIA – PACIFIC	**Majority of users :** **Published Technology applied with moderate level of adaptation and model calibration**		
AUSTRALIA **NZ**	**Support general approach:** ▪ **knowledge : extensive studies** ▪ **models : calibrated HDM-4**		

HDMGLOBAL

HDM-4 HIGHWAY DEVELOPMENT & MANAGEMENT

Recent applications & developments

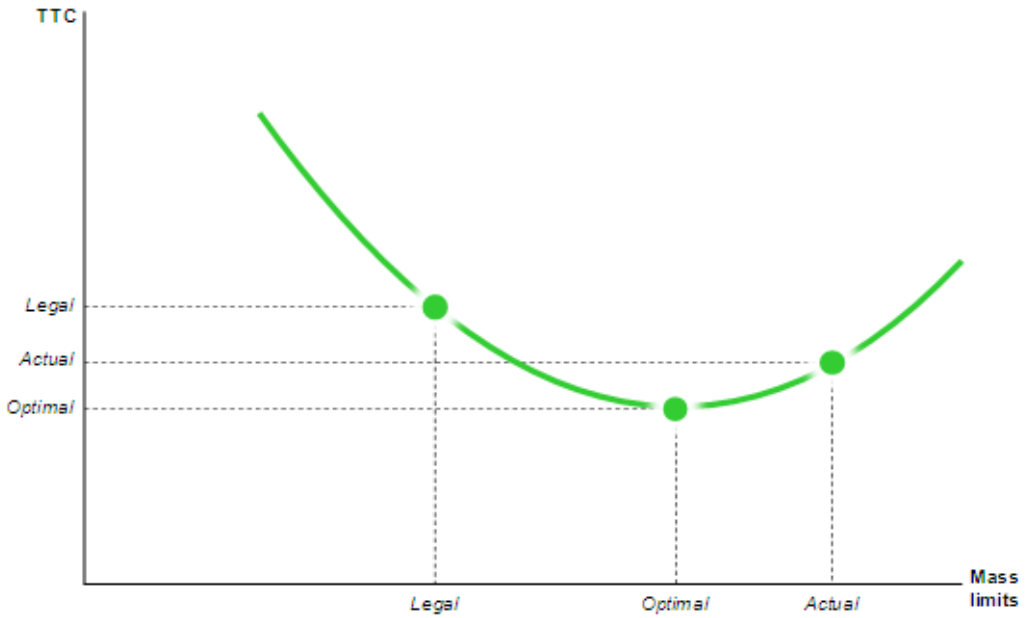
Recent applications	Features
PAPUA NEW GUINEA	
• Cost Benefit Evaluation (CBE) of maintenance	• Section specific calibration • Pothole and roughness modeling • Total Transport Costs (TTC) and Incremental BCRs
INDONESIA	
• CBE of pavement design and maintenance standards • Impact of actual & compliant loading on TTC • National & Regional works programes & investment strategies	• Extensive calibration & data studies • National system employs HDM technology • Aggregate style roughness & VOC models

Recent applications & developments

Recent applications	Features
AUSTRALIA	
• Marginal cost of road wear • Regional network & axle loading strategies	• Extensive adaptation & model development • Support to policy

Indonesia: Axle loading compliance

- **Compliance delivers lower Road Administration Costs, but Road Users Costs rise**
  - **too many extra trips : (39%)**
  - **legal limits too low**
  - **a balance is needed**



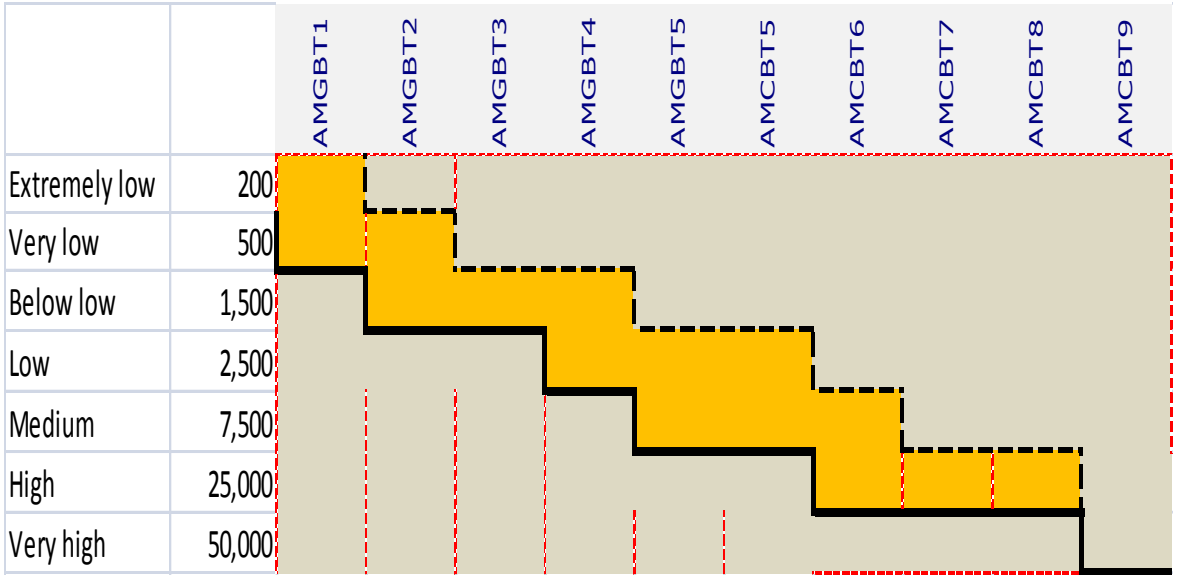
- **Target worst offenders : 80% damage by 10% fleet**

HDMGLOBAL

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Indonesia: Pavement design

- **"Actual" and "compliant" scenarios > 15 year initial structural life**
  - Actual loading imposes an additional cost (up to 25% RAC)
  - Address risks through better planning, design and implementation
  - Increase awareness and inform policies on enforcement and legislative change



HDMGLOBAL

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Australia : model development

- **Local road deterioration models**
  - **Calibration of HDM model**
  - **Driven by country wide studies involving >100 Councils**
- **Commonwealth-led studies of the marginal cost of road wear and heavy vehicle charging egime**
- **Regional network & freight strategies**

- **It was small part of HDM partners projects using HDM4 V2**

Thank you for your attention

robert.mesnard.fr@gmail.com

tyrone.toole@arrb.com.au

HDMGLOBAL

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT