

MANAGEMENT OF RESURFACING AND ROUTINE SURFACING MAINTENANCE IN SMALL COMMUNITIES

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INTRODUCTION

The management of resurfacing and routine maintenance in small communities in southern Africa is becoming increasingly neglected. Changing priorities and integration of local areas have given rise to other challenges. The ensuing constraints in terms of skills and funding mean that surfacing maintenance is often not applied, with the result that the road deteriorates significantly.

A simple computer based management system is described in the paper, which uses visual assessments, basic traffic and geometric data to recommend appropriate resurfacing and routine surfacing maintenance. It was developed to overcome the constraints in small communities, using PMS and Expert System technology. Its operation can be devolved to a low level with very limited demand on computer resources.

This paper though is not about pavement management systems; it is more about innovation in the management system for bitumen surfacing maintenance. It describes the system, and then discusses the experience in the use of the system in Namibia and South Africa. The system is also used for teaching the basics of Pavement Management Systems at universities and in short courses.

The body of the presentation follows as slides.

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES

BACKGROUND

- Maintenance of bituminous surfacings in small communities in South Africa has deteriorated since CAPSA 1994.
 - *major loss of skills in road maintenance at the local and provincial government level,*
 - *severe budget constraints mean that road maintenance funding often takes a back seat.*
- The use of **bituminous road maintenance products** in the small communities has dropped significantly, and the road network has deteriorated accordingly.

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ORGANISATION AND SOCIAL ASPECTS OF SMALL COMMUNITIES

- Many small communities in southern Africa which are characterised by:
 - *few or no technical staff,*
 - *projects and budget too small to justify the use of consulting engineers,*
 - *new politicians who require renewed justification of budget proposals,*
 - *no historical roads resurfacing programme.*
- A southern Africa bitumen supplier developed a resurfacing management system for these communities: the **ColasPMS**.

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES

CONCEPT OF RESURFACING MANAGEMENT SYSTEM

- Simple system:
 - *based on simplified visual assessment,*
 - *TMH 9 compatible,*
 - *expert system algorithm included to recommend treatments/resurfacing.*
- Limited scope:
 - *maximum 100 streets,*
 - *not to compete with high-end systems.*
- Simple outputs:
 - *resurfacing budget,*
 - *routine maintenance programme.*

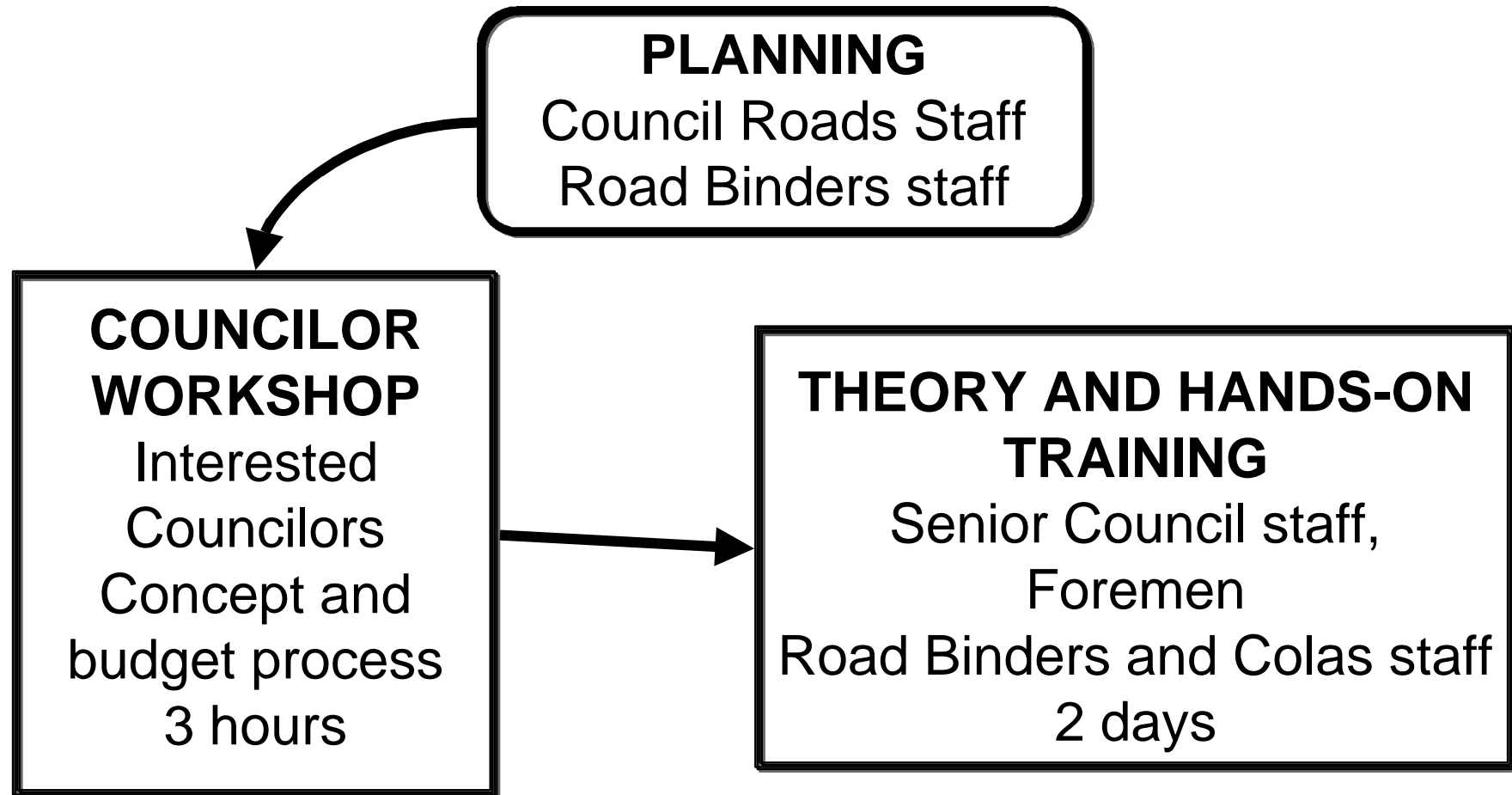
MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES **INSIDE THE MANAGEMENT SYSTEM**

- Computer based. Processes visual assessments and produces list of works.
- Expert system used to recommend resurfacing needs,
 - *based on the degree and extent of each distress type,*
 - *and on the combination of defects.*
- Produces a programme of routine maintenance.
- Produces a prioritized resurfacing budget.
- Produces a list of roads for possible rehabilitation.

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES
**IMPLEMENTATION OF THE SYSTEM
IN NAMIBIA**

- Introduced concept to each Council or Town
- 2 day course of theory and hands-on training
 - *1 or 2 staff from each town/community*
 - *Road Binders Namibia staff (RBN)*
- Pilot study at 4 towns
 - *inspections done by the trained staff,*
 - *plus a trained assessor from RBN,*
 - *RBN processed the data,*
 - *Output to the town/community's staff for inclusion in a budget presentation.*

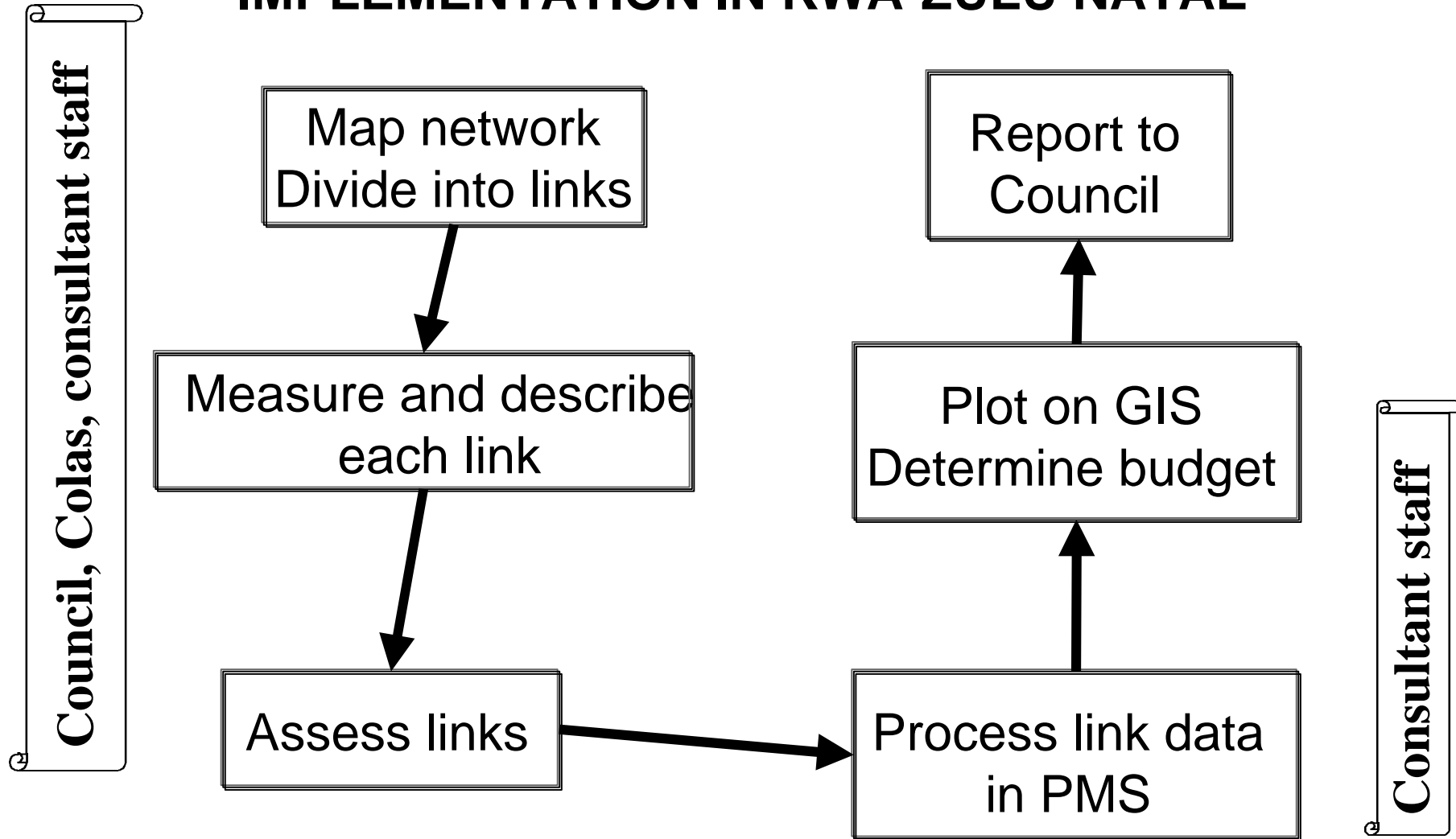
MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES
IMPLEMENTATION FLOWCHART
LOCAL COUNCIL LEVEL - NAMIBIA



MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES **IMPLEMENTATION IN KWA-ZULU NATAL**

- In Kwa-Zulu Natal, implementation adapted to handle severe skill shortages.
- An initial ½ day course introduced community leaders to the concept.
- Road network mapped and captured onto computer.
- Visual inspections were done by trained assessors.
- Inspection results processed the data, and using a GIS, presented graphically.
- Given to TLC staff for Council budget presentation.

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES IMPLEMENTATION IN KWA-ZULU NATAL



MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES

LESSONS FROM IMPLEMENTATION

- **Political leaders** of the community must be trained in, and give support to, the overall resurfacing management concept
- One of the assessors should come from outside the community to maintain quality control
- The output of the system must integrate with the reporting/budgeting system of the community
- Pilot sites are effective in demonstrating the concept
- Implementation takes a **number of months**, and caution is needed not to arise expectations too quickly

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES
**EDUCATIONAL USE OF THE RESURFACING
MANAGEMENT SYSTEM**

- The system can be used in education with only a short introduction:
 - *undergraduate level at University of Witwatersrand,*
 - *short courses such as the Pavement Management School at Universities of Stellenbosch and Pretoria,*
 - *other PMS systems used successfully in education include Ninham Shand's and the VISMUN system of the former CPA.*

MANAGEMENT OF RESURFACING IN SMALL COMMUNITIES **UNDERGRADUATE COURSE USE AT UNIVERSITY OF WITWATERSRAND**

- Undergraduate semester course on construction and development.
 - *2 lectures given on PMS,*
 - *2 lectures given on TMH 9 and distress types,*
 - *a full afternoon is spent working in groups doing visual inspections of 10 roads on Wits campus,*
 - *assignment to process data and report results.*
- Superb tool to integrate the content of lectures into a real world application.
- Adds a 'hi-tech' image to civil engineering.
- Is very well received by students.

CONCLUSIONS

The management of bituminous surfacing maintenance in small communities in southern Africa is often dysfunctional, with few or no technical resources, and with projects and budgets too small to justify the use of consulting engineers. It can be revitalized using a simple computer based system, as shown by pilot studies in Namibia and Kwa-Zulu Natal.

The will and enthusiasm to use the system is easily found at the local level. The politicians, council staff and the community have been found responsive to the concept of timely maintenance, but they have been lacking the resources or skills to determine appropriate maintenance measures and budgets.

A model has been developed for the implementation of the computer system, and its subsequent operation, which is integrated with the political realities and the resource constraints. This brings the high level power of the TMH 9 visual assessment technology, coupled with an expert system algorithm, to recommend maintenance treatments for a small bitumen surfaced road network.

The computer system has also found an application in teaching Pavement Management Systems, at universities and in short courses.

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