



## Innovation to Mitigate the Impact of Road Work on the Road User and Surrounding Environment

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# Study Methodology

## **National and international surveys**

- Agencies from 17 countries

## **Identify the impact of road work on:**

- Noise
- Safety (user, construction workers)
- Environmental pollution (air, water, soil)
- Availability
- Vibration and nuisance

## Case Studies

**Agencies asked to describe actions that would be required or take place to minimize impact of the road work**

- Urban construction near hospital, elementary school and shopping area
- Rural pavement rehabilitation in the summer on roadway passing through a national park

## Report Highlights

**Innovations are primarily driven by the need to maintain traffic flow**

**Reduced impact of road work for safety, pollution and vibration is secondary**

**Developing and emerging countries are significantly less concerned the impact of road construction than developed countries**

**Cooperation between all stakeholders is necessary to foster innovation**

# Methods to Reduce Noise

**Establish maximum allowable noise levels**

**Shorten construction duration**

- Prefabricated concrete slabs
- Use warm asphalt technology
- Bonus/penalty tied to construction schedule

# Methods to Improve Safety

**Advance notice to warn of construction**

**Escort vehicles**

**Speed/radar displays**

**Clear distinction between travel lanes and construction zone**

**Barriers to restrict access to construction**

**Proper lighting for night work**

**Sidewalks and temporary bridges for pedestrian traffic**

## Methods to Reduce Pollution

**Use dust suppressors or emission control measures**

**Monitor contamination risks**

**Proper storage and handling of construction materials**

**Recycling at or near the construction site**

## Methods to Reduce Vibration

**Other methods of transporting construction materials  
(rail, water, etc.)**

**Control of construction vehicle speed**

**Compensation for sound proofing adjacent buildings**

**Adapted construction techniques**

**Restricted use of vibratory compaction for sensitive areas**



## Methods to Improve Mobility

**Promote public transit use during construction**

**Off-peak construction (weekends, nights)**

**Detours or temporary traffic lanes**

**Alternative means of transportation construction materials (water, rail, etc.)**

**Rapid construction techniques (two lift asphalt concrete, prefabricated concrete panels)**

# Technical Paper Summary

## **Serghini – Dry Embankment Construction**

## **Ferber – Water Resources Preservation**

- Compaction innovation to minimize risk of embankment instability and maximize bearing capacity for roads in sub-Saharan Africa
- Protect limited water resources
- Specifications for future dry embankment construction

# Technical Paper Summary

## **Mueller – Compact Asphalt**

- Places two lifts of asphalt in one operation
- Reduced traffic impact due to placement of binder and surface course lifts in one pass
- Promotes better bonding between layers and possible additional pavement life and reduced life-cycle impact on traffic

# Technical Paper Summary

## **Brillet – Impact of Pavement Maintenance on Fuel Consumption and GHG Emissions**

- Provides a technical method of determining increased fuel consumption and green house gas emissions during pavement maintenance and rehabilitation activities
- Assists in determining the true cost of road work and its impact on the environment

# Technical Paper Summary

**Olard – Low Energy Asphalt**

**Brosseaud – Warm Mix Asphalt**

**Raynaud – Cold Mix Asphalt**

**Caillot – Warm Mix Asphalt**

**Carbonneau – Reduced Energy Asphalt**

- Reduced asphalt plant and paver fume emissions
- Reduced green house gas emissions
- Reduced energy use

# Technical Paper Summary

## **VanGils – Rehabilitation of Antwerp Ring Road**

- Incorporated bonus payments to minimize construction duration
- Included significant on-site recycling to minimize construction traffic to the site
- Additional buses, trams and trains to provide alternative transportation during construction
- Advanced public communication of road work

# Technical Paper Summary

## Hein – Canadian Experience

- Contract requirements to minimize user delay costs
- Innovative construction techniques to minimize construction duration

# Technical Paper Summary

## **Mukabi – Mechanical Stabilization for Rural Roads**

- Reduction in noise, vibration and airborne dust
- Improved social/economic aspects for marketing of agricultural products and access to basic welfare services
- Reduced construction cost



# Technical Paper Summary

## **Lonneux – Fast-Track Concrete Paving**

- Use of fast-track techniques to reduce construction duration and minimize the impact of construction on road users
- Provides schedule and material details for a successful project

# Technical Paper Summary

## **Vallat – Reducing the Environmental Impact of Road Work**

- PROPICE project to optimize preservation and rehabilitation of infrastructure and minimize impact on road users and residents
- Includes selection of optimal techniques, innovation and design and execution

# Technical Paper Summary

## **Friberg – Traffic Calming for Short-Term Road Work**

- Describes the results of numerous methods to reduce traffic speed through construction zones to improve both road user and construction personnel safety

# Technical Paper Summary

## **Friberg – Radar to Evaluate Effect of Variable Message Signs**

- Improving safety of line marking crews
- Outlines impact of radar and LED speed signs

# Technical Paper Summary

## **Von Devivere – Sustainable Strategies to Protect the Environment**

- Describes strategies to minimize environmental impact of construction
- Use of rail and water transportation for aggregates
- Warm mix asphalt to reduce fuel and emissions
- Reduction of emissions and dust

# Technical Paper Summary

## **Borgna – Improved Safety During Road Repair**

- Innovative use of temporary barrier walls to facilitate roadway rehabilitation

# Technical Paper Summary

## **Bellini – Traffic Information Systems During Roadway Rehabilitation**

- Evaluation of the effectiveness of mobile dynamic message signs to improve road user and construction worker safety

## Technical Paper Summary

### **Boussuge – Real Time Driver Information System for Road Maintenance**

- Describes the collection and transmission of speed limit recommendations to vehicle GPS navigation systems
- Improves driver and road construction worker safety



# Technical Paper Summary

## **Ballié – Innovation Asphalt Binders**

- Describes an alternative binder through the processing of raw materials of vegetable origins
- Reduced energy consumption and green house gas emissions
- Promotes sustainable development

# Conclusions

**Give designers and contractors freedom to make choices**

**Agencies need to challenge designers and contractors to be creative**

**Use of end-performance specifications**

**Clear and transparent validation of performance**

**Promote stable contract award criteria**

**Select best value - not low bid contracting**



## Conclusions and Recommendations

**Provide legislative framework and contractual conditions to promote and provide incentives to recycling. Provide an economic level playing field**

**Decision makers demand minimum levels of recycling**

**Pro-active dissemination of information to the construction industry**

**Area wide co-ordination of recycling activities**

**Development of performance based designs to encourage innovation**