IRF and Environment: Highlights on the Policy Statement

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IRF Working Group

- Platform to share knowledge
- A forum for case-studies
- Identify and test best practices
- Clearing house for R&E
- Provide expert advice


INTERNATIONAL ROAD FEDERATION
FEDERATION ROUTIERE INTERNATIONALE
International Road Federation
Innovative Practices for Greener Roads

Greener Roads Through New Mixing and Compaction Technologies

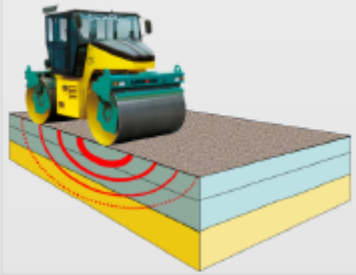
Roads are the backbone of a flourishing economy. Thanks to new technologies, they can be built even more environment-friendly. A major step in this direction is reducing the asphalt temperatures, which has been achieved by new mixing technologies. As a consequence, asphalt laying asks for faster compaction technologies. Ammann provides proven solutions to the construction industry for both of these new challenges.

Asphalt is an ideal material for the construction of high-quality roads, which consist of several layers of asphalt and gravel. The preparation of the asphalt is usually done in a central mixing plant, where minerals are dried, heated up and mixed with bitumen. The hot asphalt is delivered to the road construction side in lorries and a paving machine is laying the material on the prepared ground. Finally compactors effect consolidated layers and durability.

Environmental Benefits

Lowering the maximum temperature of the asphalt during production and mixing allows a reduction of fuel consumption at the mixing plants, since less energy is needed to heat the minerals and the bitumen. The second advantage of lower temperatures is the significant decrease of asphalt smoke that construction workers are exposed to.

The Ammann Compaction Expert (ACE) enables the operator of a roller to choose the optimal vibration mode on the road construction site. Very fast compaction is achieved and the current level of compaction is measured



Intelligent compaction with vibration modification

AMMANN

Ammann is a leading supplier of machines, systems and services to the construction industry, with core expertise in asphalt and road building worldwide. Driven by an entrepreneurial spirit, the family-owned business founded in 1869 is now in the fifth generation. Ammann develops asphalt plants integrally, from analysis to construction, to maintenance. In addition, it develops and produces compaction machines. The decentralised service points enable fast reaction times.

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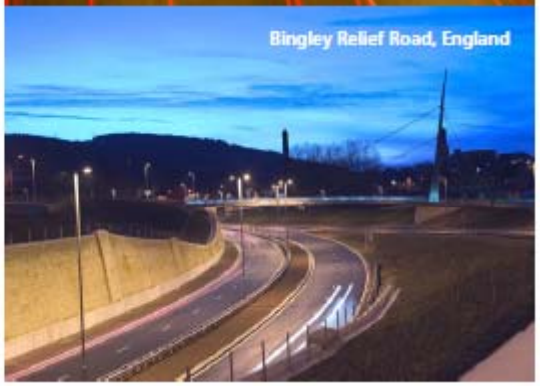
Environmental Benefits

Running through Snowdonia National Park, Arup's design of the **A470** trunk road in Wales (previous page) provided a safe and reliable route for road users and preserved a landscape of lush pastures and diverse flora and fauna. The **Shenzhen Western Corridor** (previous page) demonstrates how the planning, design and construction of a major road can be completed in record time without compromising the water quality or cultural heritage of a region's ecologically sensitive area.

The **Bingley Relief Road** shows how effective community engagement and sustainable innovative design can reduce traffic in urban areas and improve a community's quality of life. Complex challenges included crossing a protected peat bog - where direct access for construction plant was denied - and ensuring minimal disturbance to its delicate hydrological and ecological balance. Sustainability was at the heart of the design for the **M6 Toll Road.** Three million tonnes of sand and gravel excavated from the site was re-used as special fills and aggregates for concrete and drainage, saving 400,000 lorry journeys to and from the site. Measures were taken to mitigate the effects of the route on the local environment including the translocation of heath land; the relocation of rare plants and wildlife and planting over one million new trees and shrubs.

At Arup we demonstrate how well considered infrastructure can be truly sustainable, improve people's lives, enhance the environment and leave a legacy for the benefit of future generations.



- **Challenges**
- **Case studies**
- **Lessons Learned**
- **Recommandations**

3. CONSTRUCTION

3.1 INTRODUCTION

The construction phase of a road is considered critical in the process of sustainable road provision and a case study or two, can hardly do justice to such a diverse topic. Further discourse and documented cases are no doubt required to further this aim.

The SEA and EIA form crucial inputs to the development of a construction programme in that it should serve as a guide to both process and substance in execution of the contract.

3.2 PROCESS – ROAD CONSTRUCTION

1. Management and execution framework / programme

An important step is the integration of environmental and quality management into the construction programme. This could mean the employment of dedicated resources to oversee the respective action plans developed for these key activities. The plans should ideally also identify the various stakeholders and the specific roles each are to play throughout the project period.

2. Codes of practice and Guidelines

While engineering codes should not easily be waivered, there would be instances where innovation, without relaxation of standards would be appropriate. An example would be the use of local material for minor retentions or barriers which would blend in with the natural environment.

3. Stakeholder engagement

The EIA process should ideally have identified areas considered sensitive to various stakeholders. This initial consultative process should be taken further by keeping interested parties informed through regular communication or liaison sessions. A stance of inclusion invariably results in a better end product and could mitigate against potential delays resulting from opposition to the development as it progresses.

4. Partnering

The areas of environmental, quality, and safety management have developed into highly specialised fields and due consideration should be given to partner with such experts where appropriate. Such partnering should ideally achieve outcomes that improve on existing practices without an increase in costs.

3.3 PRACTICE – ROAD CONSTRUCTION

To construct a road pavement that meets all performance standards with minimum impact on the environment the following elements are important considerations:

1. Energy consumption and green house gas emissions

- Paving products produced at lower temperature and energy consumption. Numerous studies conclude that the production of paving material is the most energy intensive activity in producing a pavement. In the quest to minimise GHG emission, it's therefore imperative to reduce energy consumption.

3.5 CASE STUDIES

3.5.4 Case study 4

[Table 6] Case Study 4 – North Kiama Bypass - provided by Roads Australia

Aspect	Elements
Project Title	North Kiama Bypass Re-use of quarried materials slag materials
Project description /summary	• The Princes Highway is the major north-south transport spine connecting the south coast of NSW with Victoria and the major connector road for the local suburbs of Kiama, Kiama Downs, Gainsborough and Minnamurra in the Kiama area. The growing traffic volume associated with population growth in both the south coast and the urban area in North Kiama has resulted in increasing conflicts of through traffic with local traffic. • Population growth trends for the area indicated that the local region is expected to experience high population growth in the next 25 years. This requires a high standard road corridor to properly serve the growing demands of commuter, tourist and freight traffic. • The RTA commenced construction of a 7.6 kilometre high standard four lane carriageway to bypass the northern Kiama area in 2001. The bypass was completed and open to traffic in November 2005.
Project development	  • The design of the bypass included a major cutting through some high quality basalt within a quarry precinct, which had not been previously extracted due to the proximity of local residences. • Whilst the material could have been crushed and used in the works, the quantity available was far in excess of that needed for the project, and the efficiency of mobile crushers is such that it would not have been economically viable to do so. • A decision was made during the design phase to make this valuable surplus material available for higher value re-use. The basalt material was used for reconstruction of an entrance road located at Lake Illawarra and was stockpiled for the construction of a marina at nearby Shell Cove. A significant quantity was also taken by the RailCorp for the manufacture of ballast for maintenance of State Rail Infrastructure. High quality basalt was also exported to nearby quarries. • In total, approximately 1,000,000 tonnes of high quality basalt was exported from the project. • There were three basalt quarries adjacent to the bypass – and two of these quarries had large stockpiles of minus 5 mm material. This material is the very fine dust that is produced by the crushing process and it has a very limited market and thus is effectively a waste product from the quarry industry. • The construction of the bypass was able to utilise this material for the construction of embankments, and as select fill for the construction of reinforced soil walls. Testing also revealed that it was suitable for use in the select material zone, the bottom layer of the pavement.

IRF Policy Statement
Environment

- **A commitment to a stronger pro-active role**
- **Advocates for a much wider strategic approach**
- **Provides straightforward and action-oriented recommendations**

- *Comprehensive and coherent **transport policies**, including promotion of effective public transport are a key starting point for addressing the environmental challenges associated with the road sector.*

- ***Life-cycle-analysis** methodologies should be adopted as a guiding principle for the assessment and selection of materials and technologies.*

- *The development and use of **tools to determine the carbon footprint** of road infrastructure and traffic should be encouraged. These tools can be used to assess and reduce the environmental impact considering alternative solutions.*

- ***Materials and energy*** *are key finite resources, and must be used in a manner that recognizes, and is compatible with, supply limitations and life-cycle costs. Particular emphasis should be given to re-using and recycling resources to the maximum extent.*

- ***Noise pollution*** *must be addressed as part of an integrated approach, taking into account the interactions of pavements, tyres and vehicles.*

- ***Monitoring of all environmental impacts*** *of the infrastructure during the period of operation is crucial in measuring the success of all design and construction considerations and improving any problems that may arise.*

How are we going to implement these recommendations?

Viable green road infrastructure is today a reality!