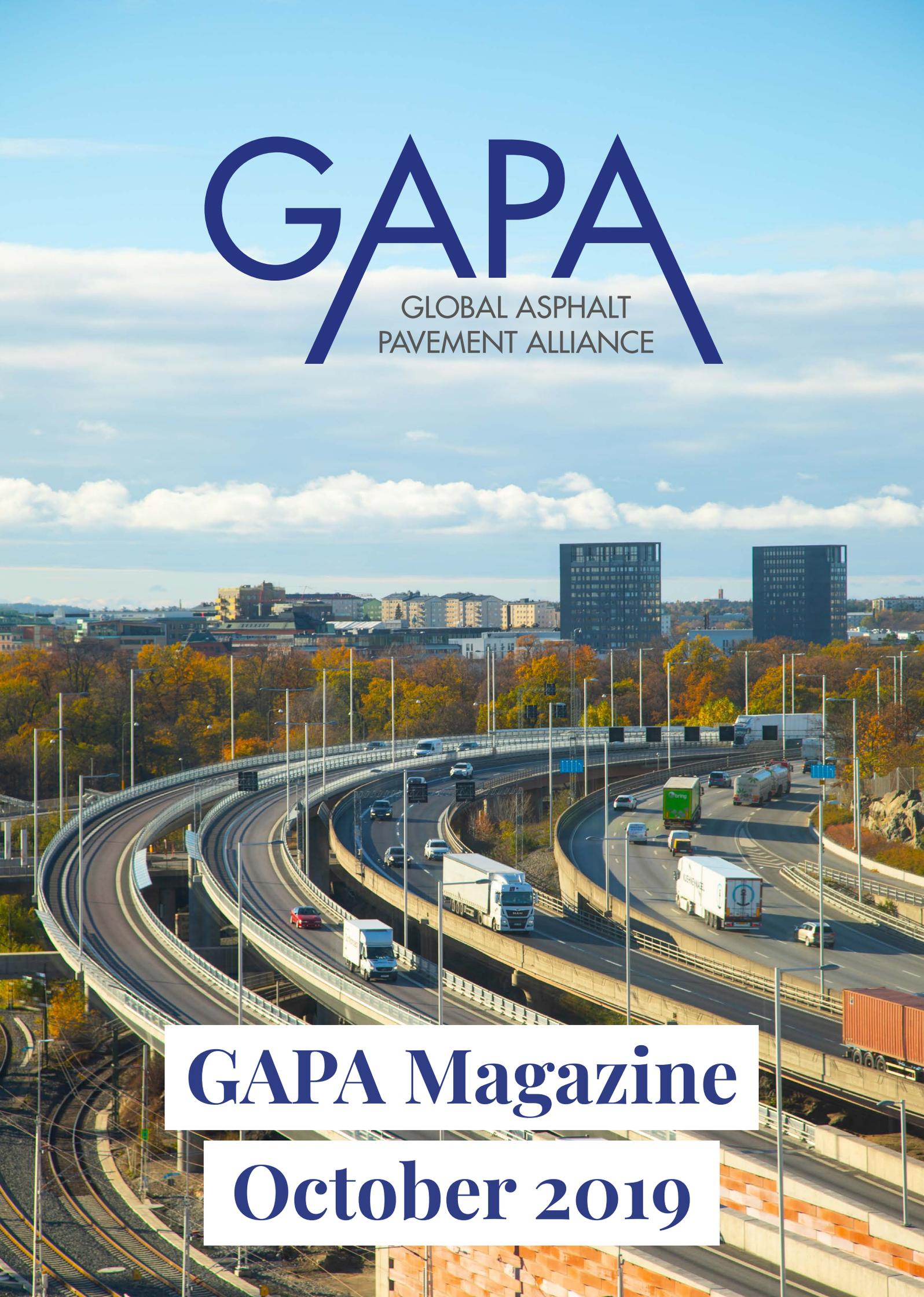


# GAPA

GLOBAL ASPHALT  
PAVEMENT ALLIANCE



**GAPA Magazine**

**October 2019**

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# Introduction

The Global Asphalt Pavement Alliance (GAPA) was founded in 2008 during the 4<sup>th</sup> Eurasphalt & Eurobitume Congress in Copenhagen in Denmark.

The Global Asphalt Pavement Alliance (GAPA) is a global network of regional and national trade associations whose activities are related to the production and laying of asphalt for pavements.

The GAPA members are meeting once a year to exchange information about relevant topics to identify existing and future developments in the asphalt sector and to build common strategies to deal with such developments.

The focus is on fostering international cooperation to help respond to the global challenges and opportunities impacting the asphalt pavement industry.

This first GAPA Magazine consisting of articles provided by GAPA members was created to expand communication between the meetings and to inform the global asphalt industry about important GAPA issues.

## Information about GAPA

The Global Asphalt Pavement Alliance (GAPA) was founded in 2008.

The Founding Members of GAPA are

- Australian Asphalt Pavement Association - AAPA
- European Asphalt Pavement Association - EAPA
- Japan Road Contractors Association - JRCA
- National Asphalt Pavement Association in the United States - NAPA
- South African Bitumen Association - SABITA

Founding GAPA was a formalisation of the already existing good co-operation between global trade associations involved in the production and laying of asphalt.

The asphalt associations around the world are all facing similar challenges and they require a strategic and fundamental co-operation of its industry associations and representatives.

The GAPA members are convinced that global developments and challenges that are likely to impact the sustainability of the asphalt industry can best be dealt with in a framework of international cooperation which will provide systems for exchange of information and experiences in order to find common solutions.

The GAPA members acknowledge their good co-operation in the past and will base their future collaboration on the same mutual trust.



# Focus and goals of GAPA

## Focus of GAPA

Emphasis shall be directed to Association activities in respect of the asphalt product (a mixture of stone, bitumen, filler, etc.) and its application in roads, highways, and airport pavements.

## Goals of GAPA

To provide direct benefits to our respective Associations and our membership through:

- a) Optimising activities and increasing individual and combined effectiveness through cooperative arrangements.
- b) Promoting international awareness on agreed major issues.
- c) Creating a structure and forum principally for the exchange of information, for joint activities and the sharing of knowledge.
- d) Identifying existing and future developments that may have an economic, technological, legal or other impact on the asphalt industry globally, and forging common strategies to deal with such developments.

## GAPA Membership

The GAPA membership is open for national associations and regional associations (a region is covering several countries). Membership is for those national or international associations that represent the asphalt mix producers (hot mix, warm mix) and/or the contractors constructing asphalt pavements.

Where there is a multi-national association representing a region, continent or subcontinent (e.g., the European Asphalt Pavement Association), the multi-national association is the member, not the individual national association (e.g., Germany, England,

France, etc.). Membership is approved by the founding members of GAPA.

## Key strategic areas of GAPA

The following key areas indicate those deemed to be strategic in respect of the competitiveness and the sustainability of asphalt and thus the future wellbeing of GAPA constituents, and shall provide the terms of reference for future discussions, meetings and activities.

A targeted approach to be adopted to deal with specific issues and agreed actions in respect of:

- a) Environmental affairs
- b) Occupational health and safety
- c) Marketing and promotion of asphalt to counter the threat of alternative products;
- d) Awareness and implications of changes and trends of global markets in relation to component materials, i.e. bitumen and aggregates;
- e) Engineering and technology developments and implementation thereof;
- f) Training and education of producers, applicators, designers and the users of asphalt;
- g) Research and development goals and projects.

## More Information

More information about the GAPA activities, its meetings and details regarding the operation of GAPA can be found on the GAPA website: [www.globalasphalt.org](http://www.globalasphalt.org)

# News of GAPA members

## AAPA News



### Safe sampling of hot bitumen from road tankers

*Australian asphalt pavement association in conjunction with its industry partners is giving the pavements sector an overview of the recommended safety procedures that need to occur when sampling hot bitumen from road tankers.*

Bitumen and binders in Australia are tested and certified to national specifications at the point of manufacture or supply. In recent years there has been an increasing focus on assessing the properties of bitumen at the point of delivery, for example, at the point of transfer into tanks at asphalt plants or sprayer trucks at road sealing sites. In order for this to happen, samples need to be taken during the transfer process of bitumen from road tanker into a static tank or sprayer. The practice of sampling bitumen on site is an activity that involves hazards as it requires personnel to be in close proximity to free flowing hot bitumen. It is therefore very important to follow a rec-

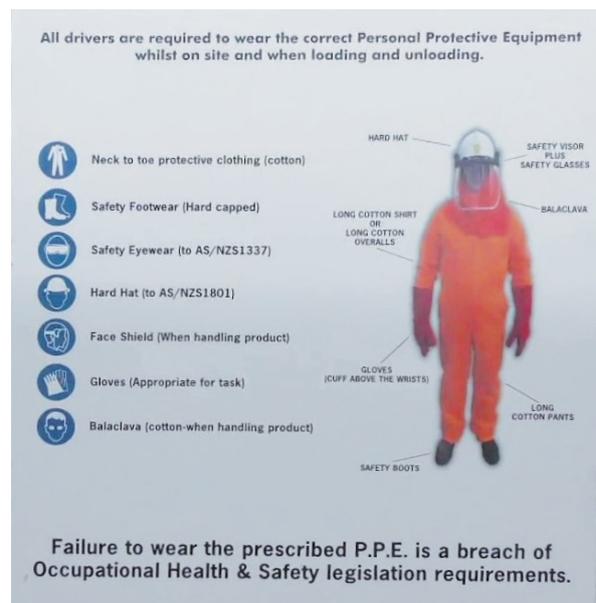
ommended sampling procedure that minimises any risks to the operator and helps to ensure that a representative uncontaminated bitumen sample can be obtained. In conjunction with industry personnel, Nigel Preston from Viva Energy together with Australian Asphalt Pavement Association (AAPA) has put together a video illustrating a recommended procedure for the safe sampling of bitumen from road tankers. The procedure highlights the key steps that should be followed, focusing on safety on the operative responsible for obtaining the sample. Nigel Preston won both the NSW and National industry roadworker safety award for this initiative.



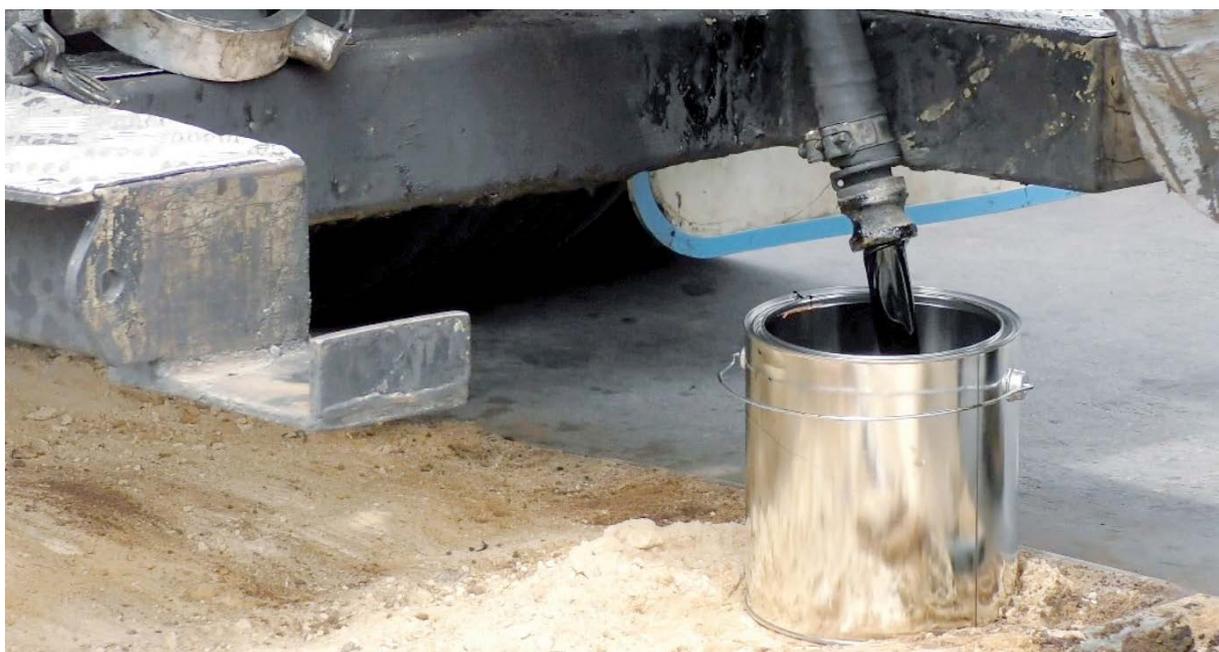
Sampling bitumen from a road tanker needs to take place during discharge. For any bitumen discharge the road tanker should be on flat clean ground with no ignition sources within a ten-metre radius of the tanker. Prior to discharge, all pipework should be securely connected and checked, then discharge commenced under suction. In order to obtain a sample, the discharge must be interrupted so that bitumen is allowed to flow under gravity from the sample valve. Correct PPE (Personal Protective Equipment) is essential. The operator must wear neck to toe protective clothing, safety footwear, safety glasses and face shield, hard hat and balaclava and elbow gauntlets in order that they are fully protected in case of any spills.

Once the discharge has been stopped, a large slops bucket should be placed on the ground underneath the sample valve to collect any drips or minor spillages. Around two litres of bitumen should then be drained into the slops bucket to clear any residual bitumen from the previous load and also clear any flushings that may have settled in the sump or the pipework.

The sample containers should be metal



'paint-style' tins of around four litres capacity with open top lids. Prior to taking a sample the slops bucket should be moved to one side and a sample tin placed directly under the valve. The sample point should be less than two feet above flat ground. Under no circumstances should the operator taking the sample hold the tin during filling. Approximately 750 millilitres to one litre of bitumen should then be allowed to flow into the tin. The sample should then be carefully





placed to one side on level ground and allowed to cool with the lid partially covering the opening.

Ideally duplicate or triplicate samples should be taken in the event that subsequent re-testing of bitumen is required.

It is very important that clear, legible labels are attached to the samples providing the following information: The grade of bitumen, the supplier, the date of sampling and the batch or shipment number from which the sample was taken.

The above details will need to be completed by the operator taking the sample. Labels should then be placed on the sides of the tins (not on the lids) and the tins placed to one side and allowed to cool.

Adherence to the above procedure should ensure that samples are obtained safely and are representative of the grade of bitumen being supplied. Sampling should not take place in windy conditions or if the tanker is parked on uneven ground.

Overall sampling of as-delivered bitumen is a problematic exercise as it is carried out in a relatively uncontrolled environment usually with untrained personnel. Handling hot bitumen carries associated hazards and on-site sampling introduced unnecessary risks

to the bitumen delivery operation.

Whilst AAPA has provided a recommended safe procedure for sampling bitumen from road tankers, the official position of the association is that this activity should only occur when extenuating circumstances dictate. There are risks involved with road tanker sampling and the best way to manage these risks is for them to be eliminated altogether.

*To view the safety video, please visit: [www.aapa.asn.au/safe-sampling-of-bitumen/](http://www.aapa.asn.au/safe-sampling-of-bitumen/)*

## Broadening Horizons of AAPA



*Australian Asphalt Pavement Association's report of its 2018 International Knowledge Transfer (IKT) to Asia, detailing the latest innovations and advancements in flexible pavements across South Korea, Japan and China.*

Australian Asphalt Pavement Association (AAPA) led Australian and New Zealand flexible pavements professionals from member road construction companies, consultancies, state road authorities and bitumen suppliers to exchange expertise and experience with like-minded professional bodies overseas.

AAPA has led similar delegations at regular intervals over the past 30 years through Europe, the United States of America and South Africa. However, this marks the first time in AAPA history it has undertaken its International Knowledge Transfer (IKT) across Asia, visiting South Korea, Japan and China.

IKT benchmarks Australian / New Zealand flexible pavements engineering and construction practice against those around the globe. The transferred learnings drive opportunities for continual improvement in engineering, construction, sustainability and safety. Many learnings were ascertained from the tour, which are shared below.

### Move away from concrete

The Asian countries visited all have a mature highway network. In each of the countries, the delegation was advised that due to the challenges with performance characteristics,



*The IKT to Asia in 2018 saw delegates attend a range of different sites across South Korea, Japan and China.*

opportunity costs and long-term maintenance of concrete pavements, there has been a general move away from concrete in favour of asphalt. This shift towards heavy-duty flexible pavements for improved affordability, ride, noise and maintainability wasn't a surprise to the group.

### Recycled asphalt pavement (RAP)

Asphalt is one of the most renewable materials on the planet, being 100 per cent reusable. RAP usage in Asia (in particular in Japan and South Korea) is greater than Australia. In Japan RAP makes up 80 per cent of all new asphalt material placed. Since no RAP is allowed in the open graded surface layers, the RAP content of base layers regularly exceeds 90 per cent. In China there is government incentives for Contractors to use in excess of 50 per cent RAP. Road construction firms, through performance-based specifications have greater autonomy and road authorities do not cap the amount of RAP allowed in pavements. The higher RAP percentages drive changes in the production plant design. A separate drying drum for RAP is typically installed to allow the production of high RAP content mixes. There is greater company research and process around the binder impact in RAP mixes - compared to Australia - and rejuvenator is used at RAP contents greater than 20-30 per cent.

### Use of cold and warm mix technology to reduce energy costs

The use of cold and warm mix asphalt in Asia is prevalent. This leads to greater safety and sustainability benefits in the production and delivery of flexible pavements. The motiva-

tion is predominantly a reduction in energy cost, not workability and the contractor is able to nominate the temperature range with the modulus assumptions built into the design.

IMO 2020 will see a new global limit for ships to use fuel oil on board with a sulphur content of no more than 0.50 per cent (the current limit is 3.50 per cent). The sulphur restriction on fuel oil means that many oil refineries will have to make substantial investments in upgrading their facilities to meet the IMO 2020 requirements. Since bitumen production is linked to fuel oil production, this has potential implications for bitumen availability. The SK refinery was visited in South Korea and this refinery produces over 2 million tonnes of bitumen per annum. The Australian annual consumption (as a benchmark) is in the order of half this volume from this one refinery.

SK advised that it is currently investing US\$1 billion in its refinery to meet the new IMO requirement.

### Sustainable asphalt plants

In dense urban areas there are greater environmental requirements for emission controls. This requires some asphalt plants to invest in technology such as vacuums and plasma to reduce emissions. The tour was hosted by Ammann in China, where many of the new plant environmental controls being explored by this group were presented.

### Construction

Across the countries visited the opportunity of intelligent compaction technology is being explored for greater quality control in the delivery of bituminous pavements. There are several well documented benefits of intelligent compaction for asphalt, including: uniformity and density and efficiency and documentation of the compaction process. This technology is available in Australia and being trialled by AAPA members. As part of the AAPA continual improvement program,



## “IMO 2020 has potential implications for bitumen availability”

work is underway to assess and implement the technology uniformly across the country. In high dense urban areas, the effects of noise and heat sink are managed through the painting of existing rigid pavements to reduce the glare and heating of surrounding buildings. However, more widespread is the use of open grade asphalt, which shows significant benefits on both these attributes.

### Safety

Australia / New Zealand benchmark well with Asia in roadworker safety management, however, some differences were noted on major freeways, in particular:

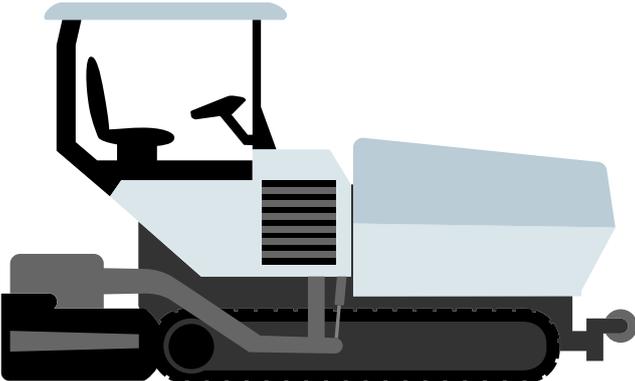
- The use of colour to delineate work zones and gain attention of the travelling public.
- Led flashing as opposed to reflectors alone to delineate traffic zones.
- Less traffic controllers on-site, with greater autonomous controls used.
- As in Australia, autonomous braking and tracking systems are being trialled on heavy equipment to reduce the risk of incidents related to interaction with workers / pedestrians.
- The beginning of increased use of smart technology such as drones for on-site compliance. This technology is currently in trial showing great promise for: availability of real-time data, automatic data input into a BIM, reduced workers 'on site' and preparation of as constructed drawings.

The tour undertook a number of guided

tours seeing amazing historic sites such as temples, gardens, marketplaces, local cultural shows and traditional eateries The AAPA IKT 2020 will be announced following the 18<sup>th</sup> AAPA International Flexible Pavements Conference and Exhibition in August.

AAPA would like to thank its hosts and supporters in Asia, without whom the tour

wouldn't have been possible: Korean Institute of Civil Engineering, Korea Expressway Corporation, Hyundai Engineering and Construction, Sakai Heavy Industries, ShiraokanPlant, i-Construction Expo, Nichireki Corporation, Public Works Research Institute, Zhejiang Highway Association, Geochina conference, ZCCC, SouthEast University, APT, Ammann, Tongji University



# EAPA News

## The Ideal Project



The durability of asphalt pavements is very important because the availability of the road network is getting more and more important and that means that roads should be built to last for a very long period and the amount of maintenance needed has to be reduced.

Durability of is not only important for the availability of the network, it is also related to the effective use of material. Effective and efficient use of materials or a better durability of products also leads to a lower Carbon footprint, less need of resources and that is better for the environment.

There are many ways to use materials in a more efficient way and there are also many ways to obtain a better durability of roads and road surfaces. Durability also leads to cost savings in the end because of the more efficient use of material.

To show the possibilities and techniques of building more durable roads EAPA created and published the EAPA paper "The Ideal Project".

This paper provides tools for increasing the durability of asphalt pavements by providing good examples in all stages of a road building project; so from the design preparation until maintenance stage.

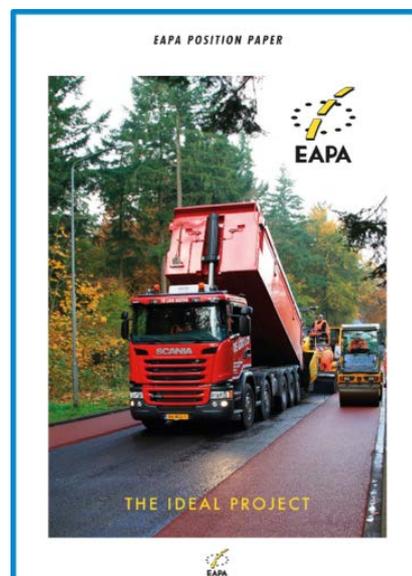
Maximising the durability of road pavements will:

- Reduce the delays to road users caused by maintenance
- Reduce the maintenance costs of the road authority
- Lower the Carbon Footprint (so better for the environment)

- Improve the sustainability of asphalt pavement construction and in the end providing more value for the money spend.

The aim of the paper is to encourage all working in the asphalt industry and at the road authority side to contribute to making more durable asphalt pavements. It provides techniques and procedures as well as the latest technologies.

The paper presents information everybody should know for creating durable asphalt pavements. It is not providing all the knowledge that is needed in the different steps of road design, road building and road maintenance, because it is totally impossible to have all that information in one paper. This document can be seen as a starting point of a whole library and as appetiser. For more information and details good reference are provided. This paper goes further than the standard books; it is meant to bring new ideas that go on top of that.





## The aim of the paper is to encourage all stakeholders to contribute to making more durable asphalt pavements

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The paper providing examples and tools for increasing the durability of asphalt pavements starts with ‘Project reparation’ where the road authority has to prepare the information that is needed for the contract / contractor.

The right choice of the ‘Tendering procedure’ gives the road authority the opportunity to obtain the quality it would like to have. In the present tendering systems mostly the costs is the only criteria used and the lowest bid is awarded. This only results in lowest possible / allowable quality and does not result in a real high quality and it neither stimulates the use of the latest technology and innovation.

In the construction sector the knowledge and technology is available to deliver high quality products. The road authority should ask for it and a construction company should be rewarded for improved performance, robustness and efficiency of road infrastructure.

A good ‘Project planning’ is the beginning of a good / ideal project and it can reduce the risk of failures / under-achievements.

A uniform asphalt mixture, uniform in temperature and gradation is important to obtain a uniform pavement structure. Uniform temperatures of the asphalt mixture are essential to get a good evenness of the layer

and to obtain a uniform compaction.

Good procedures for loading and unloading should be followed to avoid mixture segregation (during loading) and to avoid temperature differentials in mixture (cooling) during transport. Material Transfer Vehicles (MTV) can be used when needed to avoid stops and to remix the asphalt to get a homogeneous and uniform mixture (again).

A constant paver speed should be maintained for getting a uniform pavement layer and stops should be avoided because they can lead to unevenness and cooling down of mixture. An MTV can be used to create buffer to avoid stops/starts. For the asphalt transport track and trace systems can be used to inform the paving crew about the expected arrival time of the next trucks with asphalt, the amount (and type) of asphalt delivered and the amount to be delivered.

Information technology can assist the paving crew to obtain a homogeneous and uniform pavement layer; uniform in grading and also uniform in temperature.

The asphalt temperature behind the screed can be measured with an infrared line scanner and this asphalt temperature can be displayed on the paver or on a 4G mobile phone / iPad. A uniform asphalt temperature behind the screed is important to be able to compact the asphalt uniformly. In Norway and Sweden the contractor gets a bonus when the temperature is uniform and he gets a penalty when the temperature is not uniform.





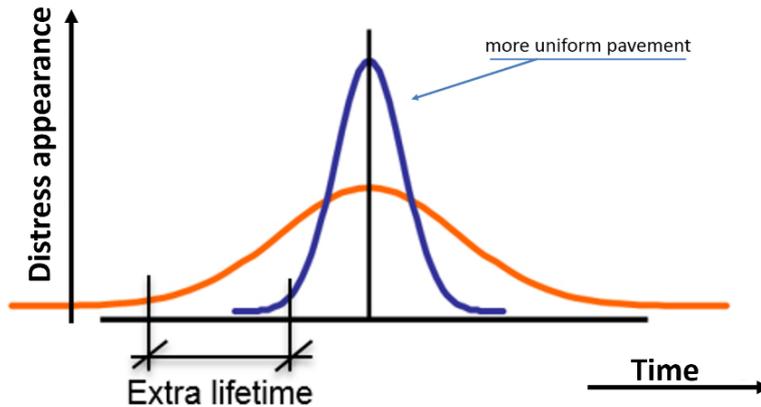
*Asphalt temperature shown on the paver*



*Asphalt temperature shown on a mobile device*

Good compaction is essential for all pavement layers because it increases stiffness of the layers, without hardly any additional material cost. For asphalt it also increases the resistance to permanent deformation, it improves the fatigue behaviour, it reduces water permeability of the asphalt layer and it minimises or prevents moisture damage.

As shown in the figure below a reduction of spreading, so a better uniformity of pavement will lead to a longer service life of that pavement.



A Continuous Compaction Control system can be used to assist the roller driver in obtaining a uniform compacted pavement structure, which is important for obtaining a durable pavement.

Next to the above-mentioned examples the paper presents many other tools and knowledge the asphalt industry has available to deliver a (very) high quality road infrastructure to reduce maintenance activities. To be able to use these new technologies contract forms are needed that allow the asphalt industry to show what it can do.

## Huge CO<sub>2</sub> savings by maintaining roads



Road transport contributes to about a fifth of the EU's total emissions of CO<sub>2</sub>. Unlike other sectors, transport emissions have been generally increasing since 1990. As a result, the EU sets binding targets on cars, commercial vehicles and heavy-duty vehicles, aiming to steadily reduce vehicle emissions.

One route to greater reductions in CO<sub>2</sub> emissions from road transport is currently not being exploited: the influence the road infrastructure itself has on vehicle emissions. Specifically, smooth, well-maintained road pavements will lead to the best performance of vehicles regarding CO<sub>2</sub> emissions. Conversely, a road network which can deteriorate will not only work against all efforts to reduce vehicle emissions but will also lead to higher road maintenance or reconstruction costs over the long term.

There are many reasons why a modern, well-maintained road network is desirable; the opportunity to reduce CO<sub>2</sub> emissions is just one of these. Policymakers and Road Authorities should be aware of how such CO<sub>2</sub> savings can contribute to their overall emissions targets, and how this can be achieved in combination with the regular road maintenance.

The fact is that with Europe's current road network, if all other factors remain the same, CO<sub>2</sub> emissions from road transport would steadily creep up each year.

Unlike other CO<sub>2</sub>-saving strategies, proper maintaining the road network can start now. It does not rely on new technologies to be developed. Tailor made solutions from the asphalt industry are already available. With

regular road maintenance, which is often delayed due to budgetary constraints, the road gets e.g. a new surface layer which will automatically have lower rolling losses because it is smoother and more even than the replaced one.

In this way even normal maintenance leads to CO<sub>2</sub> reduction. Additionally, upgrading roads would have a positive effect in terms of growth and jobs. Construction activity has a strong multiplier effect on growth thanks to its local nature. Further benefits include better air quality (since emissions other than CO<sub>2</sub> will also be reduced proportionally), noise reduction, reduced vehicle maintenance costs and safer roads.

### How do road pavements influence emissions?

The road pavement directly influences vehicle fuel consumption through the rolling losses experienced by a vehicle riding over it. Rolling losses include both energy losses in the suspension system due to an uneven road, and losses at the level of contact between the tyre and the pavement. Various aspects of the quality of the road surface influence rolling losses: evenness, rutting, potholes and deteriorated joints. Other factors, such as pavement characteristics, can also influence rolling losses. So poor quality

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**“Tailor made asphalt surfaces with low rolling resistance characteristics will provide even greater CO<sub>2</sub> reductions”**

or deteriorated pavements contribute to higher rolling losses.

Road maintenance can contribute to CO<sub>2</sub> reduction in two ways.

- Road maintenance or upgrading improves the smoothness of the road. This will lead to a reduction in vehicle CO<sub>2</sub> emissions.
- By applying new surface layers with low rolling resistance characteristics, an even greater CO<sub>2</sub> reduction will be achieved.

### **What is the magnitude of the potential savings?**

Independent studies demonstrate that vehicle fuel consumption and CO<sub>2</sub> emissions increase with an increasing pavement roughness and inadequate surface texture for all types and classes of vehicles. Thus, a higher pavement smoothness reduces CO<sub>2</sub> emissions. A Transportation Research Board report [1] shows that an increase of surface roughness (measured by using International Roughness Index - IRI) IRI of 1 m/km leads to an increased fuel consumption for heavy trucks of 1% at normal highway speed (96 km/h) and 2% at low speed (56 km/h). Surface texture (measured by Mean Profile Depth - MPD) has an influence for heavy trucks too: an increase in MPD of 1 mm will increase fuel consumption by about 1.5% at 88 km/h and by about 2% at 56 km/h. In a Danish report [2], it is shown how the development of the national evenness index of the Danish State Road network depends on the budget for maintenance and repair from 1998 to 2008. It gives a good overview what happens if the budget for maintenance is not enough: fuel consumption could increase by some 3% [1,2]. Therefore, a proper and well-budgeted maintenance of the road surfaces is crucial for keeping the IRI and the related CO<sub>2</sub> emissions low. A study at a test track in Nevada [3] showed that trucks driving on smooth pavements after the rehabilitation of the pavement consume 4.5%

less fuel.

Proper maintenance to replace pavement surfaces that show "bad" or under-performing surface conditions by smooth road surfaces with "good" properties would result in CO<sub>2</sub> emission reduction for the existing European road network. The presented data prove that this would lead to fuel reductions and lower CO<sub>2</sub> emissions of up to 5%.

### **Almost 28 million tonnes of CO<sub>2</sub> from road transport in Europe could be saved yearly!**

Therefore, an upgrade of one third of the entire road network of Europe by 2030 could lead to yearly savings of 14 million tonnes of CO<sub>2</sub>. If two thirds of the network were upgraded, this could be 28 million tonnes of CO<sub>2</sub> saved yearly [4]. This is the equivalent of replacing 6 million cars with zero-emission cars! [5]

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**“Almost 28 million tonnes of CO<sub>2</sub> could be saved yearly. This is the equivalent of replacing 6 million cars with zero-emission cars.”**

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Only pavements with smooth surface conditions (low IRI and low MPD) prevent higher CO<sub>2</sub> emissions. Road surfaces made with low roughness and special tailor-made texture to reduce CO<sub>2</sub> emissions provide even more CO<sub>2</sub> emission reduction. A proper and well-funded maintenance strategy for CO<sub>2</sub> emission reduction would require investment but would additionally have a huge payback in terms of stimulating the economy, growth and jobs, fuel savings, reduced vehicle maintenance costs as well as contributing to climate change mitigation.

ROAD PAVEMENT INDUSTRIES  
HIGHLIGHT HUGE CO<sub>2</sub> SAVINGS  
OFFERED BY MAINTAINING  
AND UPGRADING ROADS



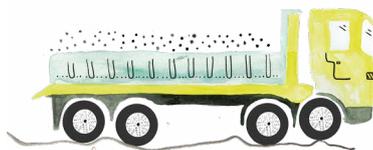
Almost 28 million tonnes of CO<sub>2</sub> from road transport could be saved yearly – let's not waste this opportunity!



More information can be found in a brochure on the EAPA website <https://eapa.org/wp-content/uploads/2018/07/EAPA-EU-PAVE-FEHL-PAPER> EAPA Website.pdf.

THE DIFFERENCE..

..BETWEEN WELL MAINTAINED AND NON-MAINTAINED ROADS



[1] National Cooperative Highway Research Programme – Report 720 Estimating the Effects of Pavement Condition on Vehicle Operating Costs, Transport Research Board, 2012, Pages 55-56  
[2] Evolution and harmonization of evenness evaluation techniques Bjarne Schmidt, Danish Road Institute, Report 94, 1999  
[3] Sime, M., et al., WesTrack Track Roughness, Fuel consumption, and Maintenance Costs, Tech Brief published by Federal Highway Administration, Washington, DC. January 2000

[4] Based on [http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Total\\_greenhouse\\_gas\\_emissions\\_by\\_countries\\_\(including\\_international\\_aviation\\_and\\_indirect\\_CO2\\_excluding\\_LULUCF\),\\_1990\\_-\\_2014\\_\(million\\_tonnes\\_of\\_CO2\\_equivalents\)\\_updated.png](http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Total_greenhouse_gas_emissions_by_countries_(including_international_aviation_and_indirect_CO2_excluding_LULUCF),_1990_-_2014_(million_tonnes_of_CO2_equivalents)_updated.png) and [http://ec.europa.eu/clima/policies/transport/index\\_en.htm](http://ec.europa.eu/clima/policies/transport/index_en.htm)  
[5] <http://www.forbes.com/sites/peterdetwiler/2014/02/25/what-does-the-equivalent-of-taking-cars-off-the-road-really-mean/#699a085964b6>

## Promotion of the Road Construction Industry

### 1. Background

In Japan it seems that the pavement industry is unattractive for a young student. In fact, we usually work even on Saturdays at the construction site, and in the urban area we must do the night work. So one of the biggest problems of our industry is securing of human resource such as engineer, operator and worker. There are few Universities or

Colleges which have a Pavement Course, so most civil engineering students do not know pavement technology. Falling birthrate and high aging are problems too. Figure1 shows that a large number of elderly workers will retire within 10 years and younger generation does not work in construction industry.

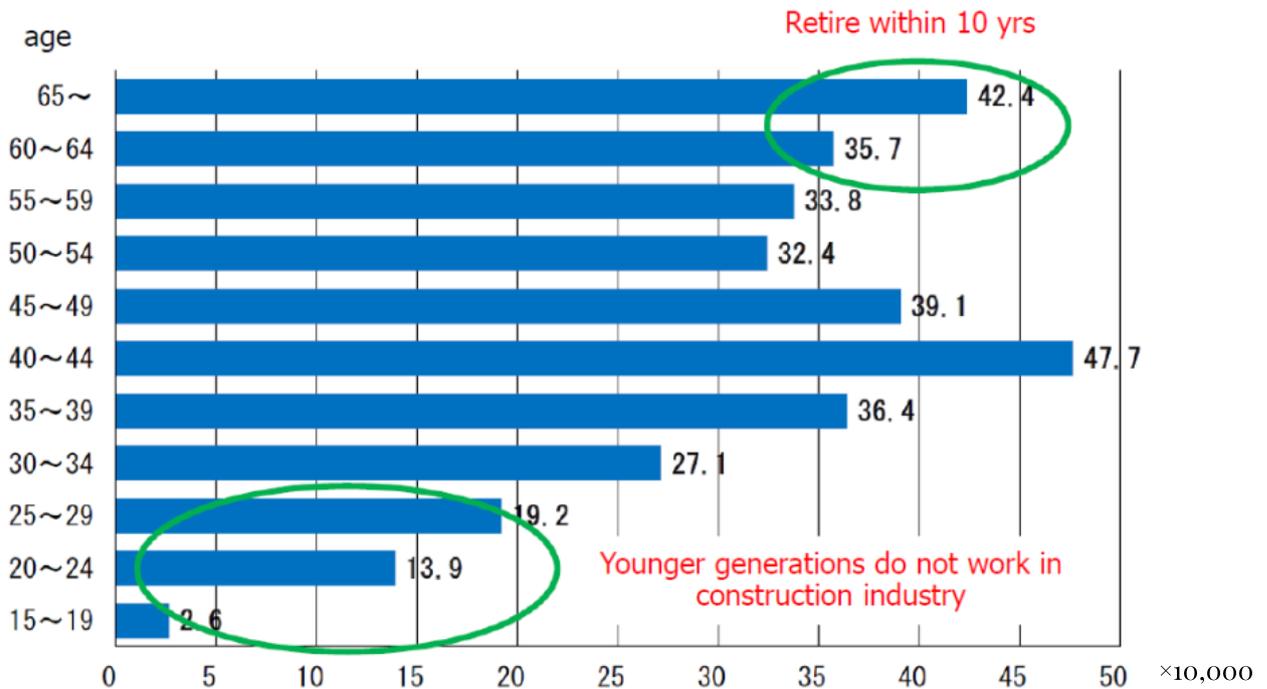


Figure 1 Number of worker in construction industry



“the biggest problems of our industry is securing of human resource such as engineer, operator and worker”

## 2. Impression of People

In Japan the construction industry was called the 3K industry. 3K means Kitanaï (Dirty), Kiken (Dangerous), Kitsui (Hard Duty). So most of the parents, especially the mothers did not want to work her children in construction industry (See Figure2).

In Japan little boys are fond of construction equipment toys like wheel loaders, road rollers or dump trucks in their childhood. But when he has grown up, he does not show any interest to construction equipment anymore.

To improve this impression, JRCA members are trying to promote our jobs for the kids near the construction site. The photos below show activities of our promotion.

We have received messages from children like,

“Completed road is so beautiful”

“I appreciate contractor building new road”

“Making smooth road using paver is interesting”

JRCA members have continued these activity for years, and will continue from now on.

Our Industry (Construction Industry) are called 3K Industry  
 Kitanaï (Dirty)  
 Kiken (Dangerous)  
 Kitsui (Hard Work: Heavy Duty)

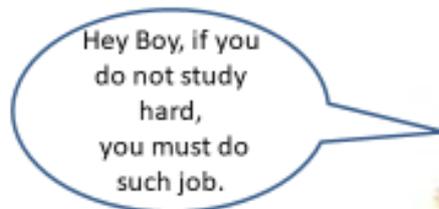


Figure 2 Impression of Japanese People for our Industry



Promotion for elementary school



Promotion

### 3. Change of "3K" to "New 3K"

The Japanese Ministry of Land, Infrastructure and Transportation started the full use of ICT (which is called i-Construction in Japan) in pavement works in 2017.

JRCA expects to change "3K" to "New 3K using i-Construction (Figure3)."

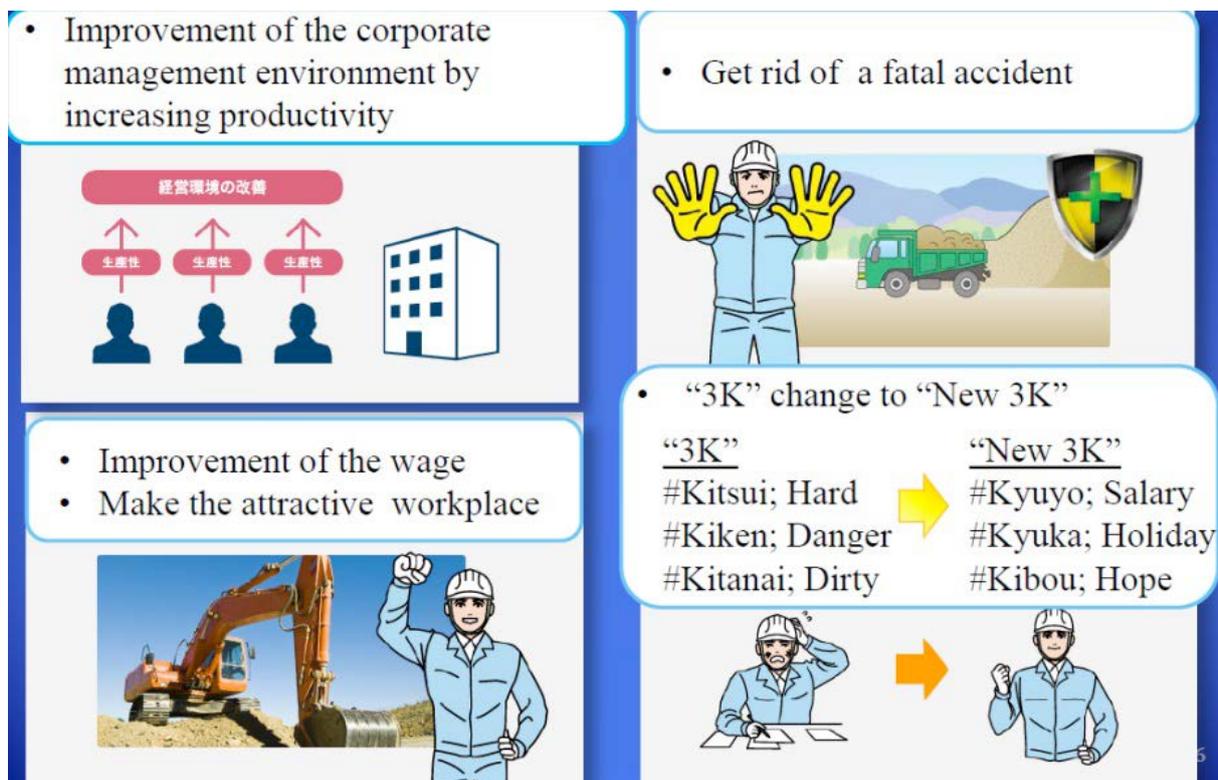


Figure3 Change using i-Construction

### 4. Activity in time of disaster

In Japan, we have many kinds of disaster every year. In 2018 we had heavy earthquakes and big typhoon. Furthermore, in the winter there was a record of snowfall hit in the snowy area (photo on the right side) and in the summer deadly heat did hit in Tokyo. JRCA members contract the cooperation agreement with local government and they are working to reopen the damaged road and make emergency repair (photo on the right side). We believe that these activities, which contribute to the society, will improve the image of our industry.



Earthquake



Heavy Snow



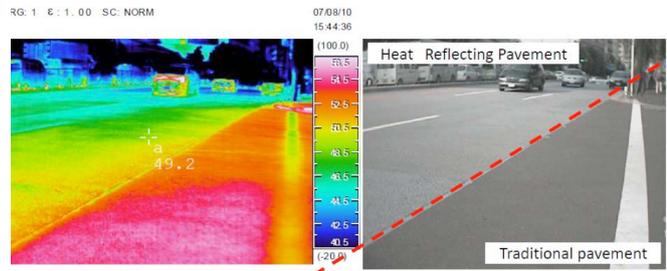
Emergency Repair

## 5. Technical development of countermeasure for the disaster

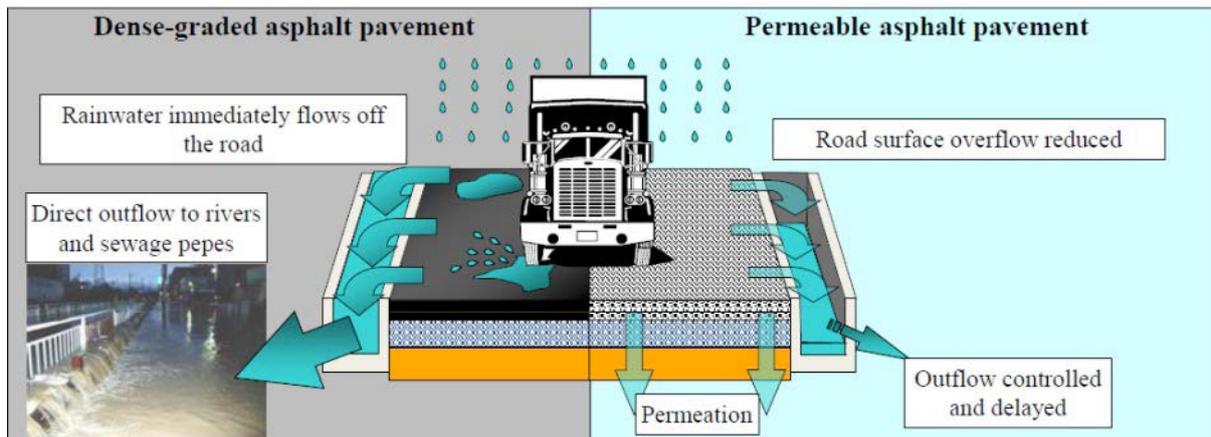
New technologies of countermeasure for disaster have been developed in Japan. Some of these technologies are show in the pictures below.



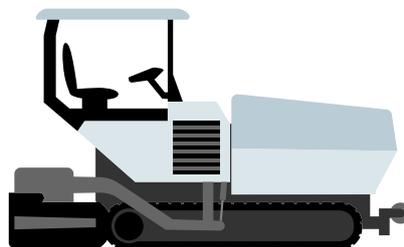
*Countermeasure for earthquake*



*Countermeasure for Heat Island*



*Figure4 Countermeasure for flood (Permeable asphalt pavement)*



**“We believe that JRCA activities, which contribute to the society, will improve the image of our industry”**

## NAPA Raises Public Awareness About Work Zone Dangers

Work zone fatalities shatter lives. In the United States in 2017, 799 people were killed in roadway work zones, including 143 construction workers. Members of the National Asphalt Pavement Association are dedicated to creating a safe environment for workers, and NAPA supports this with online training, peer guidance, and safety resources, but in 2017 a worker at a NAPA member company challenged his employer to do more: The worker noted that his company did a lot to ensure safety within the work zone, but it was distracted drivers that worried him the most. It was this inspiration that sparked NAPA's #WatchForUs public awareness campaign.

#WatchForUs is a multifaceted public relations effort to remind drivers of the need to slow down and to pay attention in roadway work zones. It launched during National Work Zone Awareness Week (NWZAW) 2018 and has continued year-round since with videos, social media outreach, and other activities.

The centerpiece of the 2018 #WatchForUs campaign was a short film produced with the help of NAPA member company Ranger Construction Industries in Florida. The film focuses on a young woman on her wedding day, and shows the pain caused by the loss of her father in a work zone accident. The film, "A Moment Can Save a Life," is highly emotional and engaging, garnering about 13,000 views on YouTube since its debut. Short "trailer" versions of the story have been used successfully on social media and were also made available for cable and broadcast television, as well as gas station video screens.

The film was supported by additional video



**“The centerpiece of the 2018 #WatchForUs campaign was a short, impactful film, A moment can save a life”**

testimonials recorded during the World of Asphalt Show from paving crews and others in the industry about their experiences with accidents and near-accidents in the work zone. For 2019, these testimonials were edited into a new video for NWZAW 2019. In addition to the videos, infographics and social media shareables were distributed along with a toolkit to aid in their use to NAPA members, the State Asphalt Pavement Associations, and other partners. In all, NAPA partnered with 16 other associations, including state departments of transportation and labor unions, on the campaign. NAPA was honored with two Public Relations Society of America awards – a Thoth Award and an Award of Excellence – as well as with a silver Go All In Award in a worldwide internal competition at the marketing firm Golin, NAPA's strategic communications partner. All the campaign materials and the toolkit can be found online at [www.WatchFor.Us/toolkit](http://www.WatchFor.Us/toolkit).

# WATCH FOR .US



*"A Moment Can Save a Life" tells the emotional story of a family's life was changed completely by a distracted driver."*



*One of the social media pieces developed for the WatchForUs campaign.*

## Working to Fill the Need for Asphalt Industry Workers



Roadbuilders in the United States, much like their counterparts in other parts of the world, are facing a workforce shortage. To make more young people aware of the career opportunities the asphalt pavement industry provides, NAPA has embarked on a long-term workforce development effort to both recruit all levels of new workers, as well as retain those in the industry by showing viable future career growth pathways. NAPA's new Workforce Development Committee is leading a national market research effort to better understand people's opinions of the asphalt pavement industry and their understanding of the career options available. In particular, NAPA is looking to build connections with teachers and guidance counselors, as well as parents, in an effort to influence those who are best positioned to influence and inform the construction industry's next generation of workers. At the same time, the committee is looking to build workforce-focused partnerships with other construction associations, educators, government, and other industries. The committee is also looking within NAPA member companies for ways to build a rich and rewarding workplace for workers. Industry partnership efforts have already borne fruit, as NAPA learned from and worked with state asphalt pavement associations on more local workforce development initiatives. For example, in 2017, members of the Asphalt Pavement Association of Indiana (APAI) Workforce Development Committee began collaborating with the Indiana Chapter of Future Farmers of America (FFA), a school-based organization focused on building leadership, personal growth, and career success through agricultural education.

In Indiana, about 12,500 middle and high

school students participate in 206 local FFA chapters statewide. The programs are typically connected with school agriculture programs and tend to include teens who come from rural farming backgrounds and are already familiar with working long hours around heavy equipment. To expose these students to the opportunities in asphalt, APAI and FFA Indiana organized the first ever Ag2Asphalt Day in May 2018.

Ag2Asphalt gave more than 150 students and their teachers from a dozen schools the opportunity to learn about the asphalt industry. It included a career fair where students could learn about every aspect of the industry from material extraction to mix production and placement, from labs to maintenance shops, and even office jobs in HR and IT. Producers, paving companies, and equipment and materials suppliers, as well as several colleges, participated in the career fair, giving attendees a chance to ask questions and get hands-on experience with construction simulators.

Outside, a crew from Milestone Contractors spent the day alternating between repaving the FFA Leadership Center parking lot and answering questions and giving students a tour of their paving and compaction equipment. Volunteers from other contractors from across Indiana were on hand to explain to students what they were watching.

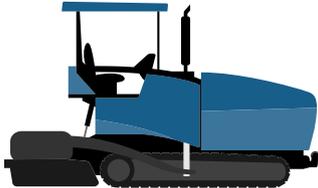
The APAI-FFA Ag2Asphalt partnership is something NAPA believes can be duplicated

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**“The programs are typically connected with school agriculture programs”**

nationwide. FFA has 8,630 local chapters in all 50 states, plus Puerto Rico and the U.S. Virgin Islands, and nearly 700,000 middle and high school students are FFA members. Working with APAI, NAPA followed up on the Ag2Asphalt Day with a booth at the FFA National Convention. Over three days, more than 2,200 students stopped by the NAPA/APAI booth to learn about careers in the asphalt pavement industry. The partnership between the asphalt industry and FFA then brought its next event to the 2019 World of Asphalt Show and Conference, where the

NAPA Associate Member Council and APAI organized a student day for students in the Indianapolis region to see construction equipment and test simulators. "There are many similarities in values and focus," said C.J. Potts, President of Milestone Contractors and a past President of APAI, talking about FFA students and the asphalt industry, "shared values of hard work, family, and community. I am so excited for us to develop this partnership and to build opportunities for the future."



**“The APAI–FFA Ag2 Asphalt partnership is something NAPA believes can be duplicated nationwide”**



*Indiana Future Farmers of America students test drive a construction simulator at the first Ag2Asphalt event.*



*A Milestone Contractors paving crew pauses while paving the FFA Leadership Center parking lot to talk with students about careers in the asphalt industry.*

## Alternative bitumen rubber technology with warm mix asphalt benefits

Bitumen rubber (BR) has been used successfully in southern Africa since the early 1980s. Many municipalities, provincial authorities and clients at national level are now embracing alternative bitumen rubber technologies based on New Crumbed Rubber Technology (NCRT).

Bitumen rubber is used extensively in South African asphalt products, not only due to its increased fatigue resistance and reduction in ageing of the binder but also the environmental advantages of reducing and reusing waste material. The success of bitumen rubber in both chip seals and asphalt applications in the past 30 years has led to increased use on most of the freeways around South Africa. It is particularly favoured by toll road concessionaires due to reduced life cycle cost using bitumen rubber, even with a higher initial input cost.

Bitumen rubber in South Africa typically consists of bitumen (78%), rubber crumbs (20%), and extender oil (2%). The ratio and percentage of various components may be adjusted depending on the source and grade of bitumen, the area and the season.

Selection of quality raw rubber materials adds desirable properties to the product and improves performance. The grading, morphology, type and source of rubber crumbs are controlled and specified since they influence the reactivity and elastic properties of the end product. The crumbed rubber contains approximately 40% carbon black, a natural anti-oxidant that is proven to delay

ageing of the bitumen rubber binder on the road.

Bitumen rubber, due to its higher viscosity, is handled at between 195 and 215°C.

Bitumen rubber asphalt (BRA) is predominantly used as a gap graded or continuously graded asphalt mix. The continuously graded envelope is slightly coarser in the fine sand fraction to accommodate the crumbs in the combined grading.

### New Crumbed Rubber Technology

In-depth and continuous research on testing for all modified binders has led to the development of several specifications and guidelines over the years, most recently the New Crumbed Rubber Technology (NCRT). Compression recovery and resilience properties are equivalent to conventional bitumen rubber, but viscosity, softening point and flow tests are unique to alternative bitumen rubber due to its specific composition.

After several years of R&D in Germany and then South Africa, followed by the production of trial blends, laboratory asphalt designs and a plant trial at Much Asphalt Roodepoort, a successful section of New Crumbed Rubber Technology (NCRT) was placed on the Misgund rehabilitation project on the N1 freeway south of Johannesburg in November 2012.

Flexibility of supply and demand due to elimination of high cost of on-site plant establishment made smaller contracts for bitumen rubber demand more feasible. In

projects supplied by Much Asphalt including a road on a steep incline in Plettenberg Bay and Baden Powell Drive among others in Cape Town, warm mix asphalt has been very successfully substituted in both the use of NCRT in Ultra-Thin Friction Course (UTFC) and dense graded asphalt applications. The increase in compaction window, the reduction in manufacturing and paving temperatures in excess of 30°C were found to vary on the mix and aggregate type.

In addition to improved rheological behaviour of the NCRT binder (relative to conventional bitumen rubber), the most beneficial advantages are the improvement of shelf-life and remarkable storage stability.

Bitumen rubber typically had a storage life of six to eight hours in chip seal applications and beyond 14 hours in asphalt applications under more gentle controlled conditions.

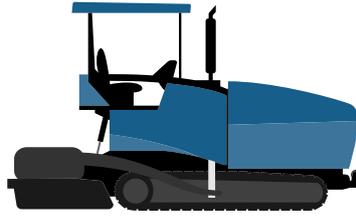
If longer shelf-life is desired and improved rheological properties are required, the recently developed New Crumbed Rubber Technology (NCRT) can be considered to provide practitioners with a well-balanced binder with enhanced properties.

“The new NCRT product proves that there are exciting opportunities to be considered” says Marais of Much Asphalt. “This hybrid technology provides the best of both worlds, combining warm mix asphalt with bitumen rubber properties and behaviour.”

More information can be found in the paper “Latest developments in crumb rubber modified bitumen for use in asphalt and seals - the South African experience” by HIJ Marais, C Botha, W Hofsink, J Muller and J van Heerden; Proceedings of the 17<sup>th</sup> AAPA International Flexible Pavements Conference held on 13 to 16 August 2017 in Melbourne, Australia.



Picture 1: UTFC paving trial on Upington airport runway



**“This hybrid technology provides the best of both worlds, combining warm mix asphalt with bitumen rubber properties and behaviour”**

Picture 3:  
Bitumen rubber UTFC with NCRT applied as warm mix asphalt in a recent project in Plettenburg Bay



Picture 4:  
Warm mix Asphalt with NCRT in Plettenburg Bay

## Road funding – is the fuel levy still the answer?



*The funding of roads in South Africa continues to attract debates from all quarters, in particular when the question of tolls arises. Most of these debates lack any factual foundation and thus are given to given to emotional outburst which polarises more than it clarifies.*

Many believe that the fuel levy should continue to be the answer. With the rapid urbanization the world over and South Africa being no exception, the provision of adequate capacity and management of trunk roads in urban areas face the biggest challenge. If one considers the N1 between Pretoria and Johannesburg as an example, providing additional lanes will only assist to a certain extent. Hence the answer lies not only in engineering solutions but in managing the provided road capacity through other means as has been done in certain parts of the world.

When the fuel levy was introduced in the early parts of the last century, the urbanization phenomena was hardly on the horizon, and the issue then was connecting the various parts of South Africa. Here the fuel levy played its role but such a road pricing mechanism is woefully inadequate to deal with the issues of urbanization, the imminent introduction of electric vehicles, air quality, safety etc. To adequately deal with this new paradigm a totally different approach would be required. Here we need a tariff setting

mechanism that influences behaviour for which the fuel levy is not suitable.

The fuel levy raised as a means to finance roads is considered not ideal as it:

- Is not fair (if considered a tax, it is a regressive tax) - the poor pay as same as the rich eg. a person earning R5 000 a month pays the same rate of tax as one earning R50 000 a month or more.
- Is not equitable - the latest (more fuel efficient) vehicles owned by those who can afford the latest, pay less than the older models owned by those who can't afford the latest in order to travel the same distance.
- Is not transparent - whilst one can easily establish the rate per litre which the fuel levy attracts, it is difficult to calculate trip costs.
- Cannot be utilized as a tool to manage congestion during peak periods, a dilemma which all major cities face.
- Does not consider road damage caused by the mass of the vehicle. As a result of this, movement of freight by truck could possibly be subsidized by light motor vehicles and thus skew the comparison with the cost of freight on rail. The illustration below, ex research in New Zealand, which consider various components that could be considered in formulating a road user charge, explains the issue at hand.

	Old car	New car	Hybrid	Electric
l/100km	11	6	2	0
R/100km*	37,07	20,22	6,74	0

\* Fuel Levy at R3.37 per litre

## Road user charge: a fair share by vehicle class

(Ex a report by The independent Road User Charges Review Group in New Zealand).

**Heavy Vehicle**   **Space**   **Weight**   **Road wear**   **Common**   **VAT**

Light vehicle < 3.5 tonnes



2-axle truck 6-9 tonnes



3-axle truck < 18 tonnes



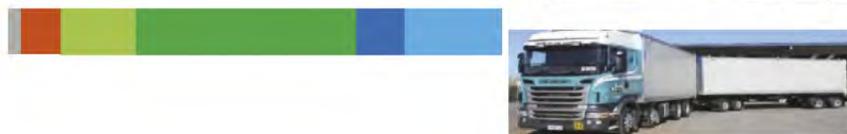
3-axle prime mover with 3-axle semi trailer



4-axle truck with 4-axle trailer



9-axle truck and trailer '50-Max' combo



With electric vehicles on the horizon, which attracts no fuel levy for use of the road, the situations described above will be exacerbated.

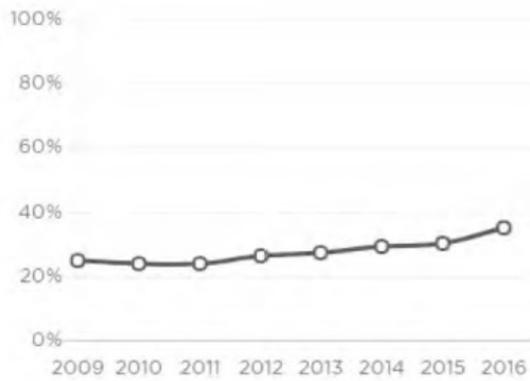
The fuel levy is considered appropriate in two instances:

1. It's easy to collect; and
2. It is ideally suited to raise an emission charge, should this be considered.

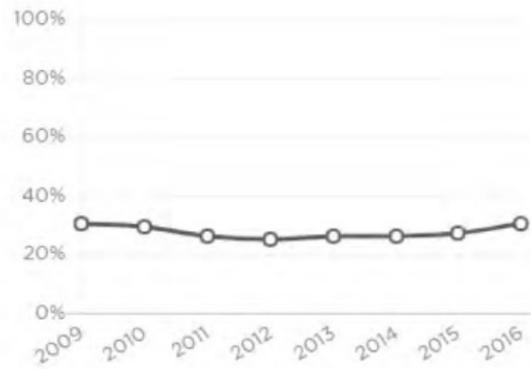
In some form or another, road users pay for the use of a road. If it is not in money, it might be in time in the case of congestion or in vehicle operating cost where the road is not in ideal condition.

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**“With electric vehicles on the horizon, which attracts no fuel levy for use of the road, the situations described above will be exacerbated”**



*Cape Town stats*



*Johannesburg stats*

The Tomtom Indexes above shows Cape Town's congestion levels on a steady increase from 2009 resulting in an additional 42 minutes per day (163 hours per year) in 2016. The route between Johannesburg and Pretoria shows an initial improvement as a result of the Gauteng Freeway Improvements pre 2010, but now again shows a similar upward trend.

With vehicle growth alone (other than densification policies etc.) this will only deteriorate over the coming years unless planned interventions are made. These could be in the form of congestion charges or dynamic road user charges where a charge is raised based on the time of day, location, average speed, etc. Much misconception can be dealt with if a new Road Use Charge systems is cost effective, efficient, sustainable, equitable, transparent and well administered.



# Future Meetings

The next GAPA meeting will be held on Thursday 17 October 2019 in Sun City, South Africa, so the day after CAPSA 2019.

The meeting in 2020 will be held in Madrid on Friday 15 May 2020, so the day after the E&E Congress.

In 2021 the GAPA meeting will be held on Monday 22 March 2021, so the day before the NCAT Seminar that will be held on 23 – 25 March 2021.

In 2022 the GAPA meeting will be most probably held in Tokyo, Japan in connection with the JRCA Symposium.

# Colophon

## Text

AAPA, EAPA, JRCA, NAPA and Sabita

## Editing

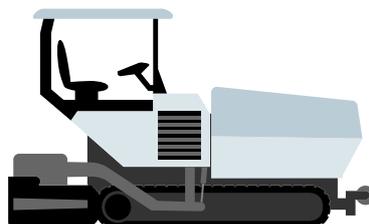
EAPA

## Layout

Window Stories

## Pictures

AAPA, EAPA, JRCA, NAPA And Sabita



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# Global Asphalt Pavement Alliance Membership Application Form

Name of Asphalt Pavement Association:  
\_\_\_\_\_  
\_\_\_\_\_

Fax:  
\_\_\_\_\_

Association Staff Leader (e.g., Executive Director):  
\_\_\_\_\_

The above association represents the hot-mix/warm-mix producers and/ or the contractors constructing asphalt pavements.

Association Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Check box:  Yes  No

Please provide additional background information on your association, e.g., the size, scope, representation, and key focus areas.

E-Mail:  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Telephone:  
\_\_\_\_\_

\_\_\_\_\_  
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Fax:  
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\_\_\_\_\_  
\_\_\_\_\_

Association Member Leader (e.g., Chairman):  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Leader/Chairman's Company:  
\_\_\_\_\_

### Application Approval:

Membership of Alliance is approved by the founding members of GAPA.

Leader/Chairman's Company Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Submit Application To:

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Belgium  
E-mail: karcher@eapa.org

E-Mail:  
\_\_\_\_\_

Telephone:  
\_\_\_\_\_



The Global Asphalt Pavement Alliance (GAPA) is a global network of regional and national trade associations whose activities are related to the production and laying of asphalt for pavements

[www.globalasphalt.org](http://www.globalasphalt.org)



## INTRODUCTION

The Global Asphalt Pavement Alliance (GAPA) was founded in 2008 by the Founding Associations.

It was a formalisation of the already existing good co-operation between global trade associations involved in the production and laying of asphalt.

The asphalt associations around the world are all facing similar challenges and they require a strategic and fundamental cooperation of its industry associations and representatives.

The GAPA members are convinced that global developments and challenges that are likely to impact the sustainability of the asphalt industry can best be dealt with in a framework of international cooperation which will provide systems for exchange of information and experiences in order to find common solutions.

The GAPA members acknowledge their good co-operation in the past and will base their future collaboration on the same mutual trust.

### THE FOUNDING MEMBERS OF GAPA ARE

- Australian Asphalt Pavement Association - AAPA
- European Asphalt Pavement Association - EAPA
- Japanese Road Contractors Association - JRCA
- National Asphalt Pavement Association - NAPA
- South African Bitumen Association – SABITA

Membership shall be open to regional and national trade associations whose activities are related to the production and laying of asphalt for pavements.

### KEY STRATEGIC AREAS OF GAPA

The following key areas indicate those deemed to be strategic in respect of the competitiveness and the sustainability of asphalt and thus the future wellbeing of GAPA constituents, and shall provide the terms of reference for future discussions, meetings and activities.



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# GAPPA

GLOBAL ASPHALT  
PAVEMENT ALLIANCE

[www.globalasphalt.org](http://www.globalasphalt.org)