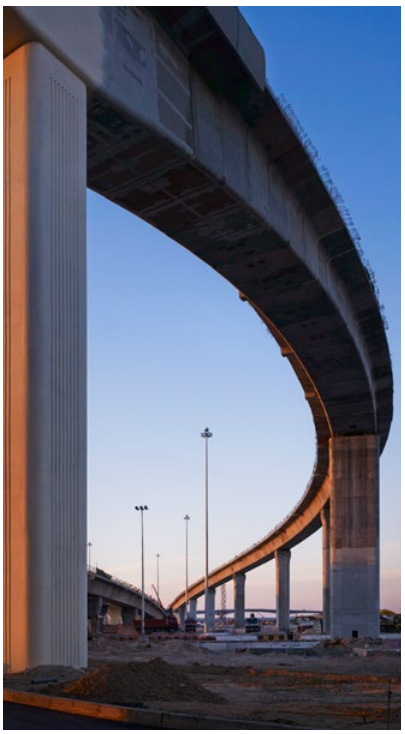
IRF GLOBAL

2018 GLOBAL ROAD ACHIEVEMENT AWARDS



IRF

70 YEARS

1948 - 2018

IRF GLOBAL

TABLE OF CONTENTS

Chairman's Message 1

Asset Preservation and Maintenance Management
PEHKO Project 2015-2025, Improving Productivity of Paved Road Asset Management
Roadscanners Oy, Finland 2

Construction Methodology
SR 520 Floating Bridge and Landings Project
Kiewit/General/Manson, A Joint Venture 3

Design
Waterview Connection
Well-Connected Alliance 4

Environmental Mitigation
Inje-YangYang Tunnel
Daewoo E&C 5

Program Management
The Jahra Road and Jamal Abdul Nasser Street Developments
Pace/Louis Berger & Public Authority for Roads & Transportation (PART), Kuwait 6

Quality Management
Implementation of RFID Technology in Traffic Signs Database Inventory
Faculty of Transport and Traffic Sciences, University of Zagreb 7

Research
RUCONBAR
University of Zagreb Faculty of Civil Engineering 8

Safety
Weather Responsive Intelligent Variable Speed Enforcement System
New Airport HIWAY CO., LTD (NAH) 9

Technology, Equipment and Manufacturing
Autonomous TMA
Royal Truck & Equipment 10

Traffic Management and Intelligent Transport Systems
iCITE® Data Aggregator
Eberle Design, Inc. 11

Urban Planning & Mobility
The Geofencing Oslo Demo
Norwegian Public Roads Administration 12

2019 GRAA Application Information 13

FOSTERING A GLOBAL MARKETPLACE FOR INDUSTRY SOLUTIONS

Eng. Abdullah A. Al-Mogbel
IRF Chairman

On behalf of the International Road Federation (IRF) and our panel of judges, I would like to congratulate the winners of the 2018 IRF Global Road Achievement Awards. They are an asset to an industry that is constantly investing in new solutions to deliver efficiency gains and sustainability advances that benefit everyone.

Instituted in 2000, the Awards have distinguished more than 135 programs, projects and products from around the world. Today, the Awards are recognized as a prestigious industry accolade in their own right, but they also serve to remind a much wider audience that the mobility everyone takes for granted would not be possible without the talent and commitment of our industry. For our sector, they also serve as an accelerator of progress and new ideas. By showcasing new technologies and creative solutions, we are able to learn from each other, and build on our successes.

IRF's flagship industry award program is characterized first and foremost by its universal appeal, and this year is no different with 11 winners from seven countries. The diversity and quality of these projects are also a great testament to IRF's status as the global marketplace for best practices and industry solutions. I invite you to examine them in detail and to submit your own exemplary projects to the 2019 GRAA Competition.

PEHKO PROJECT 2015-2025, Improving Productivity of Paved Road Asset Management

ROADSCANNERS OY, FINLAND

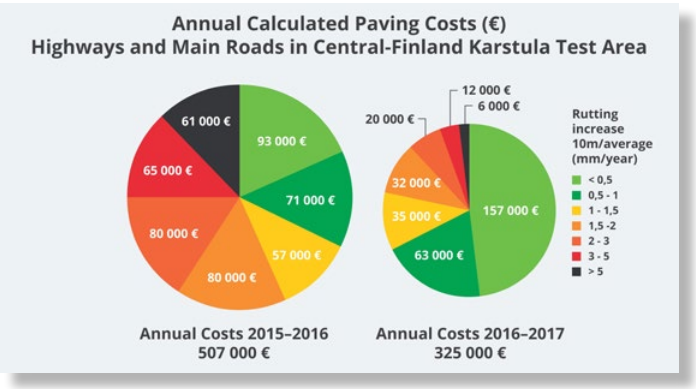
The decline in national budgets for paved roads has caused increasing pavement deterioration rates in many countries that will soon lead to major problems on national networks. The trends towards heavier truck total weights and maximum allowed axle loads have exacerbated this, as have the newer generations of tire types with smaller footprints. Climate change is also likely to have an effect. All of these cause extra stresses on pavements and unbound structures. To counter this Roadscanners and the Finnish Transport Agency are investigating new methods and policies to address the problem. Two 10 year R&D pilot projects were commenced in 2015 in Lapland and Central Finland, and good experiences from these has led to a further pilot, which will start this year in Southern Finland. Their ambitious goal utilizes new technologies in road asset management to be more effective, and reductions of up to 50 % are predicted in annual paving costs in the future compared to current needs.

The PEHKO project is largely based on long term work, carried out by ROADEX projects and ROADEX Network within the Northern European Road Agencies and on Roadscanners' own product development. The goal for the PEHKO project is to improve practices and policies in paved road maintenance and management and thereby improve the condition of the paved road network, or at least keep it at the current level using less resources. This is being done by focusing on three targets:

1) Improving daily maintenance, especially drainage.

2) Applying new NDT methods in the diagnostics of paved roads.

3) Changing maintenance policies from reactive to more proactive maintenance.



The PEHKO project has now been underway for three years and preliminary results have exceeded expectations. Right from the start the weakest links reducing pavement life and increasing cycle costs were identified. These sections, spread all over the network, covered only 10-20% of the length, but incurred up to 50% of the annual paving costs due to deficiencies in both pavement structures and daily maintenance. Typical structural problems were thin pavements and heavy trucks on road sections with soft subgrade soils. Maintenance deficiencies were mainly associated with poor drainage and inadequate winter maintenance.

The first calculations of the impact of the new, improved and focused methods on annual paving costs were made in 2017. In Central Finland, where there was slightly more funding, the calculated annual costs fell by as much as 30%. The same figure in Lapland was 12%. The results also showed that the impact of daily maintenance on the pavement backlog could be up to 50%. With these encouraging results it is expected that the target of 50% reduction in calculated annual paving costs can be reached by 2025. If this can be replicated over the whole national road network in Finland, the FTA will be able to additionally address the low volume road network, which is currently highly underfunded.

Timo Saarenketo
Chief Operations Officer, Roadscanners

" Winning the Global Road Achievement Award 2018 is a great honor not only for Roadscanners Oy and its staff, but also for the project partners of the Finnish Transport Agency and Centres for Economic Development, Transport and the Environment of Lapland, Central Finland and Uusimaa. The results from the PEHKO project show that digitalization and new technologies can provide new cost effective solutions to meet the challenges in the asset management of paved roads worldwide. "

CONSTRUCTION METHODOLOGY

SR 520 FLOATING BRIDGE AND LANDINGS PROJECT

KIEWIT/GENERAL/MANSON, A JOINT VENTURE

The SR 520 Floating Bridge & Landings project across Lake Washington enhances public safety, improves travel reliability, relieves congestion, and expands the public's transportation options by:

- replacing an old, structurally vulnerable four-lane floating bridge with a stronger, six-lane bridge
- adding shoulders on the roadway to minimize traffic disruptions from disabled vehicles
- adding dedicated HOV and transit lanes in each direction
- adding a separate bicycle and pedestrian path to give the public a new commuting option
- designing-in accommodations for future light rail
- raising the bridge roadway so wind-whipped waves no longer crash over live traffic, and so bridge maintenance crews have safe driving access across the pontoons below the roadway deck without disrupting traffic
- eliminating the need for a draw span due to higher, 70-ft. clearance for boat passage under the new bridge, which means no more traffic delays on SR 520 due to draw span openings.

Using the design-build delivery methods, Kiewit/General/Manson, a Joint Venture's (KGM) was contracted by Washington State Department of Transportation (WSDOT) to build the 7,708.5-ft. floating bridge structure. It is the longest in the world, with a fixed east approach and transition structures on the east and west ends between the future fixed structures and the new floating bridge. Project scope included:

- precasting 44 supplemental stability pontoons and the bridge anchors under the contract, and taking delivery of 21 main line longitudinal concrete pontoons, 10 supplemental stability pontoons, and 2 cross pontoons built under a separate contract by Kiewit-General, a Joint Venture
- towing and moorage of all 77 pontoons to Lake Washington from off-site precast facilities via in-land waterway and open-ocean routes
- on-site assembly of 21 longitudinal pontoons, 54 supplemental stability pontoons, and 2 cross pontoons to form the floating bridge substructure
- constructing the superstructure that carries the roadway deck on top of the pontoons using a variety of precast components
- constructing a maintenance facility with dock and crew access beneath the east approach structure
- dismantling and removing the old floating bridge and approach structures from the lake

Replacing the world's longest floating bridge was understood to be a technically challenging assignment, but also challenging was gaining public consensus on what, if anything, was to be built. In 1997, WSDOT began the long and difficult task of planning the replacement of this key part of Seattle's transportation system. Public discussion, debate, and planning continued for 14 years, looking at many alternative alignments and crossing types, concluding with a Final Environmental Impact Statement in 2011.

When awarded the design-build contract in 2012, KGM focused on ways to accelerate bridge construction. This was accomplished by converting a marine job into a land job through pre-casting a large portion of the permanent structure and sequencing the work from the shore to allow drive-on access.

Cody Bishop
Project Director, Kiewit/General/Manson, A Joint Venture

" Kiewit/General/Manson, A Joint Venture is proud and honored to receive this award. We would also like to express sincere gratitude to everyone on our team – Kiewit, General, Manson, the design team led by KPFF, and our client the Washington State Department of Transportation – for their invaluable contributions as well as their commitment to successfully delivering this project. "

WATERVIEW CONNECTION

WELL-CONNECTED ALLIANCE

NZ Transport Agency's NZ$1.4bn Waterview Connection is New Zealand's largest, most ambitious roading project to date, having one of the biggest impacts on how people travel in Auckland since the opening of Auckland Harbour Bridge in 1959.

The 47km motorway includes twin 3-lane tunnels at 13.1m diameter x 2.4km long and a motorway-to-motorway interchange. Bypassing the city to the west, it links Manukau, Waitakere and North Shore regional centres and improves regional connections, completing the Western Ring Route (WRR) a second motorway route through the city identified politically at a national and local level as supporting the growth of New Zealand's largest city and contributing to the wider economic prosperity of New Zealand.

Waterview Connection was delivered by the Well-Connected Alliance for the NZ Transport Agency, who together were responsible for design, construction, initial maintenance and operation of the project.

The project has been recognised for its innovative approach to tunnelling in complex geotechnical ground conditions, its focus on value engineering and innovation, as well as its technical contribution to the road industry by upskilling the local Auckland workforce. These elements together supported delivery of a project that maximised cost efficiency and benefits to the local community.

Tunnelling at the heart of Waterview

Alice, the 10th largest earth pressure balance tunnel boring machine (TBM) in the world, was used to build the project's tunnels. It measured 87m in total and weighed 2400 tonnes (3100 tonnes when combined with backup gantries), featuring a 14.4 m diameter rotating cutting head attached to the front of a 12m-long shield. Alice was followed by three gantries housing all the equipment required to place precast concrete segments to line the tunnels and remove all spoil.

Most of the tunnel route passes through sandstone featuring unique ground sediment, challenging seismic conditions and high water inflows. The size of the TBM was chosen because it could provide the best capability to handle the varying soil and rock conditions in its path, managing the project's geotechnical risks while minimising cost and programme risks.

The Alliance worked collaboratively with KiwiRail and Auckland Transport to manage risks involved with the shallow tunnel crossing under the live North Auckland rail line, New Zealand's busiest arterial road and critical utilities. They developed real-time continuous survey monitoring and communications protocols to minimise risks to workers and the public and ensure that the precise location and performance of the TBM were safely managed.

Opened in mid-2017, Waterview Connection has supported a massive increase in capacity for the Auckland road network. A month after opening Former Transport Minister Simon Bridges said "road users are benefiting from quicker, more reliable travel times and traffic flows across both local roads and Auckland's motorway system."

Around 60,000 vehicles are using the Waterview Connection each day, with more than 2 million vehicles now having travelled through the twin tunnels – the longest road tunnels in New Zealand - between the suburbs of Owairaka and Waterview.

Charlie Jewkes

Project Alliance Board Member, (Director of Transport, WSP in Australia and New Zealand)

" Waterview Connection was a unique opportunity for a group of internationally agile organisations to come together as one team to shape how the city of Auckland travels. Only by working cohesively could we share our strengths and challenge what had been done before in our respective disciplines. In doing so we left a legacy not only for global best practice for road projects, but also for the city of Auckland for future mega-projects. "

ENVIRONMENTAL MITIGATION

INJE-YANGYANG TUNNEL

DAEWOO E&C

Inje-Yangyang Tunnel is located in mountainous area called Baekdudaegan Mountain Range. It is a part of Korean Expressway No. 60 (total length: 150.2km, 4 lanes) which connects Seoul and Yangyang City.

The Baekdudaegan runs through most of the Korean Peninsula that it is often called “spine of the Korean Peninsula”. The development of the place is strictly regulated by Korean national government to preserve the nature in the region that minimal environmental impact from the development was the key issue at the design and construction stages.

In order to minimize environmental damage in the area, the length of the Inje-Yangyang Tunnel was planned to be 11km length, which is the 18th longest road tunnel in the world and the longest in Korea. It is expected to reduce 13,947 tons amount of CO2 emission per annum by shortening the travel distance.

To satisfy the specified law and undertake social responsibility in environmental issue, all related parties endeavored to make the project eco-friendly by implementing the results of the Environmental Impact Assessment and seeking ways for mitigation as follows.

All damaged areas by the construction have been restored. Tunnel entrances are restored by planting trees to keep original scenery and soil disposal area is utilized as a park for the residents. Moreover, air-purifying trees are planted near ventilation towers to decrease the carbon emission and to maintain the original landscape.

Due to long distance of shotcrete waste disposal, temporary storage for shotcrete waste was installed inside the tunnel for effective treatment of the waste. Steel pipe was used for water supply and wastewater disposal to prohibit water and soil pollution to substitute conventional PVC pipe, which causes water leakage. Liquid type of cement accelerator which causes water and soil pollutions was replaced by mineral type of cement accelerator to minimize pollution and to reduce concrete waste. Also, all wastewater during construction stage was recycled by filtering system.

Ventilation fan for construction makes loud noise and such noise impacts on residents and wildlife near tunnel, as well as workers. To mitigate the noise, soundproof wall with steel plate was installed at tunnel entrances to reduce the noise under restriction level designated by government law.

During operation period, renewable energy, such as geothermal and solar energy, was used for the maintenance building. Also, eco-friendly liquid snow melter are used to prevent acidification of the soil. Tunnel water is treated by segregating road surface water and ground water.

Inje-Yangyang Tunnel has been successfully merged into natural environment despite of its long distance. It becomes honored infrastructure in terms of environment preservation as well as its scale in Korea. In addition, Inje-Yangyang Tunnel has a lot of fire protection facilities like cross passages (maximum spacing 200m for passenger and 600m for vehicle), optical sensor fire detection system, intelligent ventilation system, etc. to operate safely under extreme circumstances.

Hee-Chul Kim
Senior Vice President, Daewoo E&C

“ This award is a great honor for us. Daewoo E&C has been enriching people’s lives ever since its establishment in 1973. We believe in the power of construction to change the world, and are committed to continuing in our role as a market-leading global construction convergence innovator. ”

THE JAHRA ROAD AND JAMAL ABDUL NASSER STREET DEVELOPMENTS

PACE/LOUIS BERGER & PUBLIC AUTHORITY FOR ROADS & TRANSPORTATION (PART), KUWAIT

The Jahra Road (RA/166) and Jamal Abdul Nasser Street (RA/167) Development Projects are two strategic ventures put forward by the government of Kuwait as part of ongoing plans to further enhance its existing infrastructure and transportation network. Kuwait's Public Authority for Roads & Transportation (PART) appointed a joint venture of Pace and Louis Berger (LB) to undertake the design and construction supervision of the projects to transform the existing roads into internationally standardised multi-levelled expressways, extending 10 to 11 km across western Kuwait.

The total construction cost reaches over US $1.5 billion for both projects. Major components include:

RA/167
1. 18 km of elevated segmental viaduct bridges: -8 km for elevated Nasser Road mainline along -10 km exit/entry ramps
2. 716 m of depressed road (underpass)
3. 3 multileveled interchanges with major highways
4. 20 km of ground level and service roads
5. 9 ground level roundabouts replacing traffic signal intersections
6. 130000 m2 precast yard
7. 8600 bridge segments
8. 8 pedestrian overpasses

RA/166
1. 17.7 km of elevated segmental viaduct bridges: -7.3 km for elevated Nasser Road mainline along -10.4 km exit/entry ramps
2. 620 m of depressed road (underpass)
3. 5 multileveled interchanges with major highways
4. 18.5 km of ground level and service roads
5. 7 ground level roundabouts replacing traffic signal intersections
6. 150000 m2 precast yard
7. 8390 bridge segments
8. 10 pedestrian overpasses

Objectives:

- Segregate between bypass traffic and local traffic flow via elevated highways
- Increase the highway capacities thereby minimising traffic congestions
- Reducing traffic accidents
- Meet future traffic demands in the over-crowded roads of Kuwait
- Improve road safety standards and facilities.

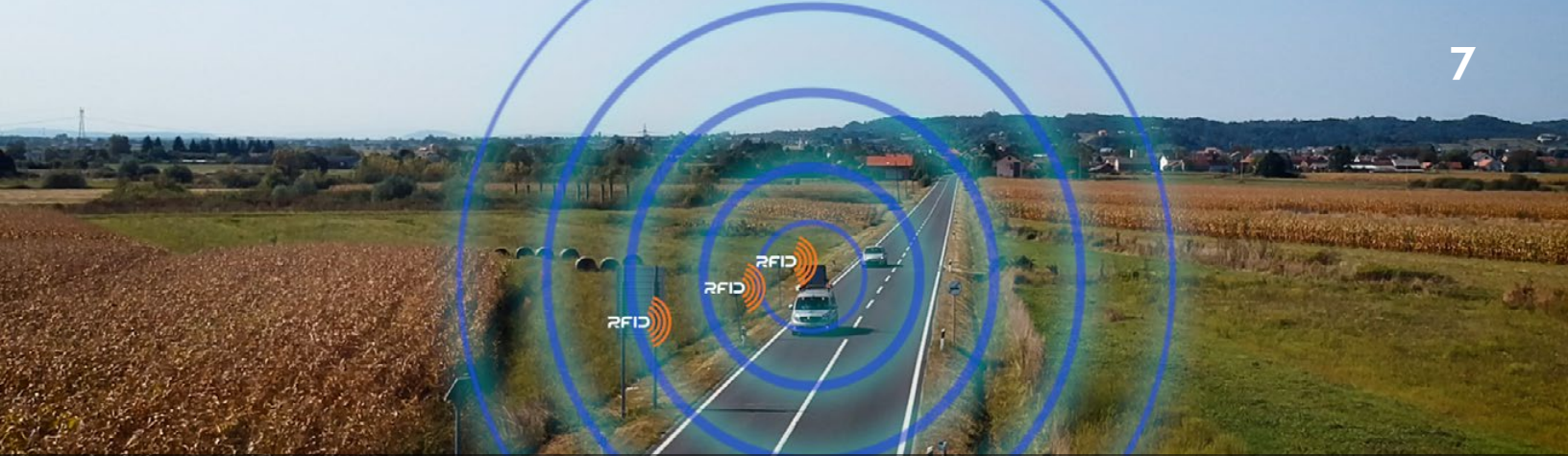
The projects are interconnected within a network of newly developed highways including the Jaber Causeway and Doha link.

Key challenges:

- Construction in constricted work areas with minimal rights of way
- Maintaining effective communication in the coordination processes with stakeholders
- Obtaining the necessary approvals from authorities
- Detour facilitation procedures
- Undocumented changes to the underground network of utilities and services that appear during excavations
- Extreme weather conditions and other factors affecting concrete casting operations and on-site productivity
- The existing heavy traffic density on the road due to the presence of services like hospitals and universities
- Procuring equipment, machinery and materials imported from abroad in order to meet construction schedules.

Tarek Shuaib
Chief Executive Officer, Pace | Architecture, Engineering + Planning

" Winning the IRF Global Road Achievement Award is one of the ultimate accolades within our industry and recognition of the outstanding work that has been completed to achieve this landmark project. The results of the project are testament to the vision of the client and expertise of the partner organisations who have delivered a development to world-leading standards "



IMPLEMENTATION OF RFID TECHNOLOGY IN TRAFFIC SIGNS DATABASE INVENTORY

FACULTY OF TRANSPORT AND TRAFFIC SCIENCES, UNIVERSITY OF ZAGREB

Traffic signs as part of a traffic control plan warn, guide and inform road users as well as regulate and manage road traffic. In order to fulfil their function, they must be properly and timely maintained. The basis for planning and conducting the maintenance activities of traffic signs represents their extend database.

For these purposes Croatian Roads ltd., as a national Road Authority of state road network in Republic of Croatia, with the Department of Traffic Signaling at the Faculty of Transport and Traffic Science University of Zagreb and company SmartView from Croatia, carried out a two-phase project with the aim of creating a full-scale traffic signs database.

The first phase was the database creation, i.e. data collection. During two-year period, from 2015 to 2017, the Department has collected the data of 149 435 traffic signs on the 6 957,23 km of state roads in Croatia. In order to create a functional database, all relevant data about the signs were collected: code of the signs according to the Croatian regulation, GPS coordinates, signs chainage, position, dimensions and shape, name of manufacturer and year of manufacturing, height and distance from the edge of the pavement, mounting characteristics, plate thickness, class of retroreflection material and values of retroreflection (measured using handheld retroreflectometer) as well as digital photo of the sign.

The second phase of the project, which started in 2017 with Finnish partners, JAMK University of Applied Sciences and company Aksulit, consists of installation of passive RFID tags on each sign from the database. The main goal of RFID tags is to enable the efficient and fast database check and update. For this purpose, a vehicle used for standard road control is equipped with RFID reader, antennas and a portable PC. During the normal drive, RFID tags are read and the database is automatically updated.

In order to determine the maximal reading range, optimal RFID tag position on the sign, antenna angle and polarization type, vehicle speed and type of RFID tag, two pilot experiments were conducted. Overall 700 traffic signs were marked in 2018 with the passive RFID tags and successfully tested.

The database is a part of web-based GIS tool which enables the road authorities, in this case Croatian Roads ltd., their accession and optimization of maintenance activities all with the goal of improving the traffic signs quality and thus increasing the overall road safety. With developed database, road authority has the possibility to analyze which factors in diverse geographic and traffic conditions influence the quality of different materials for traffic signs and based on that plan financial resources needed for the maintenance, i.e. replacement of technically incorrect signs. Besides better planning, road authorities can evaluate the quality of the producers and contractors. With that the most cost-effective solutions and materials can be chosen for each road in order to assure adequate quality needed from the road participants and thus increase the road safety, especially during low visibility conditions, while on other hand giving the possibility to road authority to prioritize maintenance activities and optimize their costs.

Darko Babic
Faculty of Transport and Traffic Sciences, University of Zagreb

" It`s a great honor and a privilege to be recognized by IRF and their Global Road Achievement Awards. Winning this special award is a proof of the hard work and effort of all partners in our project and surely it is a great motivation for all of us to continue in that direction. Our common goal is to bring asset management to the next level "

RUCONBAR

UNIVERSITY OF ZAGREB, FACULTY OF CIVIL ENGINEERING

RUCONBAR is a highly absorptive environmentally friendly concrete noise barrier.

In its nutshell, RUCONBAR (RUbberized COncrete Noise BARrier) is a concrete based solution composed of an absorbing and a bearing layer. Its absorbing layer is made of recycled waste tires and concrete. By incorporating in its absorptive layer 40 % of rubber granules recycled from old automobile tires, an innovative product has been created, which is a novel solution in the sphere of noise protection, unique on the market.

RUCONBAR concept is an economical, easy to implement, and environmentally sound noise protection solution. For orientation, 50 t of recycled rubber granules, obtained by recycling 8000 waste car tires, can be used for manufacturing 1 kilometer of noise barriers 3 m in height (3,000 square meters of barriers).

Sound absorption category A3 (8 to 11 dB) according to EN 1793-1:2013 can be achieved by varying the thickness and shape of absorbing layer. Category A4 (12 to 15 dB) can be achieved for special purpose applications. Aside from noise mitigation properties, product certification and compliance has been established through rigorous testing resulting in CE label (Conformite Europenne) issued by Notified Body in 2014.

The product RUCONBAR is designed to be replicable on any market in need of end-of-life tire recycling and quality noise protection on road and railway infrastructure. Technology transfer has been ensured through prepared procedures for production plant assembly and staff training documentation.

The product was conceived at University of Zagreb Faculty of Civil Engineering in Croatia, where the first idea, involving concrete mixtures with rubber granules, was tested. It was further developed and funded through Eco-Innovation framework of European Commission together with the industry and business partners from Croatia.

The first application of this novel innovative noise protection barrier was made on a road section near toll booths for Krk Bridge in Croatia. Following this example, RUCONBAR walls are being constructed on different road and railway sections.

Major environmental benefits of using RUCONBAR are:

- **31% reduction in GHG emissions** compared to similar solutions available on the market,
- **reduced consumption of non-renewable resources** (gravel or crushed stones, natural clay and tree felling),
- **protection of natural environment** against uncontrolled clay excavation and tree felling practices,
- **recycling end-of-life car tires**.

Project RUCONBAR and its final product – the noise barrier – have been widely recognized as an excellent example of academic-professional cooperation to tackle major environmental challenges. This has been acknowledged by:

- Grand prix at “ARCA 2012” innovation fair, Zagreb, Croatia
- GREENOVATION Award in 2012
- CEMEX Building award in 2015 (Sustainable building)
- Golden medal at “Inventions Geneva 2016” innovation fair in Geneva, Switzerland
- Golden medal at “Innova 2016” innovation fair in Brussels, Belgium
- Silver medal at “Silicon Valley International Invention Festival 2018” in Santa Clara, CA, USA

Prof. Stjepan Lakusic, PhD CE
University of Zagreb, Faculty of Civil Engineering

“ This prestigious global award will expand worldwide recognition of our organization and especially of the product RUCONBAR which tries to establish its position on the global market of noise protection solutions. ”

SAFETY

WEATHER RESPONSIVE INTELLIGENT VARIABLE SPEED ENFORCEMENT SYSTEM

NEW AIRPORT HIWAY CO., LTD (NAH)

The Incheon International Airport Expressway, which is managed and operated by NAH, has the world's first three-dimensional self-anchored suspension bridge, Yeongjong Grand Bridge, as its main facility. Yeongjong Grand Bridge is 4,420m, and it is double-decked bridge that accommodates roads (upper deck and lower deck) and railways (lower deck).

Dense fog and strong winds occur frequently on Yeongjong Grand Bridge located on the sea. On February 11, 2015, fog had lowered visibility to 50 meters at the time of the accident which caused a 106-car rear-end collision on the bridge. After the accident, NAH conducted joint research with the Ministry of Land, Infrastructure and Transport (MOLIT), Korean National Police Agency(KNPA) and the Korea Road Traffic Authority (KoROAD) to find the traffic management countermeasures to ensure the driver's safety at the weather-vulnerable marine bridge.

As a result of these efforts, We have developed the Intelligent Variable Speed Enforcement System (iVSES). In this system, WIS (Weather Information System) monitors various weather information (fog, wind, rainfall, snowfall) in real time and transmits it to the ITS center. The VSLS (Variable Speed Limit Sign), VMS (Variable Message Sign) and LCS (Lane Control System) display the speed limit information (100 km/h ~ 30 km/h or closed) according to the weather information.

EBS (Emergency Broadcasting System) and fog lights provide the driver with safe driving information corresponding to the weather information. At the same time, the section speed VES (Video Enforcement System) detects the speed limit violation in conjunction with the operation state of WIS and VSLS. The APEB (Apparatus for Preventing Entrance of Bridge) blocks the entry of vehicles when the road need to be closed, and the AIDS (Automatic Incident Detection System) detects an accident (stopped vehicle, pedestrian, fallen object) in 15 seconds so that road managers can respond promptly and appropriately in emergency situations.

The existing VES shows a fixed speed limit regardless of the weather conditions. We have developed the iVSES, the first variable speed enforcement system in Korea, and can legally limit the speed of traffic according to weather conditions such as fog, strong wind, snowfall and rainfall.

According to the statistics of the KNPA, traffic accidents have decreased by 34% and speeding vehicles over 110 km/h by 74% since 2017 with the iVSES at Yeongjong Grand Bridge.

VSLS	100	80	50	30	Road Closed
	Attention	Caution	Alert	Critical	
Rainfall (Storm)	Normally	Wet	Heavy rain warning	Issue a flood(storm) warning	
Snowfall	Normally	Less than 2cm	2cm or more	-	10cm or more
Wind	Normally	14~20m/s	20~25m/s	-	25m/s or more
Fog (Visibility)	Normally	250m or less	100m or less	50m or less	10m or less

Ji-Young Koh
President, New Airport HIWAY

" Winning this award is a great opportunity to highlight the efforts of our company (New Airport HIWAY), which provides the safest road environment for motorists using expressways. In the future, we hope that the NAH project will become a reference case in many countries around the world and will actively promote the introduction of various safety facilities to prevent car traffic accidents and ensure the safety of road users."

AUTONOMOUS TMA

ROYAL TRUCK & EQUIPMENT

By the nature of the operations, highway construction and maintenance work zones are incredibly dangerous work environments. While stationary operations are dangerous in their own right, mobile operations are especially dangerous as the work trucks are moving at such a slow speed compared to traffic. In these cases, frequently-distracted passing motorists present a hazard to the work crew in the zone, as any deviation from their lane could lead to potentially fatal consequences for the workers.

To prevent undesired outcomes due to an increased level of danger, truck mounted attenuator (TMA) trucks are positioned in front of the work crews in order to shield them from errant vehicles entering the zone. The attenuator serves to absorb the impact of a crash, thus protecting not only the work crew but also the driver of the errant vehicle. In this situation though, the driver of the TMA truck is left directly in harm's way, protecting everyone but themselves. Because of the sheer amount of force from the impact, TMA truck drivers have sustained lifelong injuries or even been killed in these crashes.

In 2015, Royal Truck & Equipment partnered with Kratos Defense, a global leader in developing advanced unmanned system solutions, to create the world's first autonomous TMA (ATMA) truck. In utilizing military technology to automate a standard TMA truck, the ATMA performs its duty to protect crews in the work zone with a higher level of precision than a human driver could possibly achieve. Not only does this increase safety by removing the truck's driver, it also removes the human error from the equation. In the event of a collision, the ATMA automatically sets the air brakes and straightens the wheels of the truck, a best practice technique that may be difficult for a human driver to do in such a short moment. Perhaps more importantly, by removing the driver of the truck, a human's self-preservation instinct is removed. Whereas human drivers of TMA trucks have moved the truck to avoid an impending collision, and thus leaving the work crew fully exposed to an errant vehicle, the ATMA truck stays in place and does its job to protect workers in the zone.

Currently, the ATMA is deployed with Colas in the United Kingdom, where it is known as the Autonomous Impact Protection Vehicle (AIPV), as well as in Colorado with the Colorado Department of Transportation. As a whole, 2018 can be characterized as a year of massive growth for the ATMA. In May 2018, the truck was approved for autonomous usage on all roads in the state of Colorado. In the following month, Royal's Government Accounts Manager testified at the Pennsylvania Senate Transportation Committee's hearing on "Automated Work Zone Vehicles and Platooning." Since then, the vote to allow the usage of autonomous vehicles has been passed by the Pennsylvania Senate and is now set to be voted on by the state's House of Representatives.

As far as its future, the ATMA has generated significant interest amongst state DOTs and full deployment is expected within a few years.

Fred Bergstresser
Government Accounts Manager, Royal Truck & Equipment

" Winning a project is always an honor. A real project win for us means that we see the worker go home at night alive and well. Our "Project" goal has always been looking for ways to improve highway work zone safety. We build on that every day with the most recent iteration being the Autonomous Impact Protection Vehicle (AIPV) which gets the driver completely out of the danger zone and home safely. "

TRAFFIC MANAGEMENT AND ITS

iCITE® DATA AGGREGATOR

EBERLE DESIGN, INC.

There is a global need for more intelligent traffic management and enhanced road safety, fueled by data collection and the useful interpretation of that data into real-time information that provides for effective action by traffic engineers. The prevailing transportation paradigm, one-person-one-vehicle, is forcing the multi-modal traffic infrastructure to its limits. With continuous congestion, longer commute times, and increased accidents, agencies are tasked with finding solutions without escalating their already saturated system architecture. That dilemma is pushing transportation professionals to seek innovative technology tools, to manage to a higher level of service, using their limited and constrained resources. Methods for enhanced level of service, or LOS, is through automated traffic signal performance metrics.

One technology for collecting and analyzing those traffic metrics is the Eberle Design Data Aggregator. The iCITE® Data Aggregator features a data and communications rich hardware platform, that transforms any legacy traffic cabinet into a continuous traffic count intersection monitoring station, which easily interfaces to traffic controllers, communications enabled detectors and intersection safety monitors. By adding remote intersection data to your traffic data set, coupled with providing turning movement counts and split timing data, the Data Aggregator brings immediate access to non-interconnected or remote intersections via 3G/4G/LTE/GSM/GPRS cellular communications. It provides travel time calculations via Wi-Fi or Bluetooth sensor networks, and provides the fourteen performance metrics mandated by the U.S. Federal Highway Administration.

By installing the **iCITE**® Data Aggregator, every intersection is turned into a permanent traffic count station with Arrivals on Red, the Purdue Coordination Diagram, Split Failure, Queue Length, Split Monitoring, and Signal Phase and Timing Data. Any traffic management agency has the ability to measure, analyze, manage and take action to make their intersections and traffic flows more efficient. Adding in Traffic Travel Time, Speed Data, and Average Daily and Annual Traffic Counts, traffic planners gain insight into how best to adjust and time infrastructure assets, allowing improved levels of traffic throughput.

Utilizing the same EDI hardware, vehicle OEMs can have access to a wide range of real-time traffic cabinet data to optimize traffic flow, reduce congestion and save lives.

Eberle Design's iCITE® Data Aggregator makes the most of existing infrastructure to collect traffic data, to connect remote (unconnected) traffic intersections while continuously preparing for future infrastructure and data collection needs. Accuracy in collecting traffic data is critical to the optimization of traffic flow in any traffic management network. You cannot manage what you do not measure.

Dr. Bill Sowell
Vice President, Eberle Design, Inc.

" Eberle Design is grateful for selection as the 2018 Traffic Management and ITS IRF GRAA award winner with our iCITE/Data Aggregator product. Since its inception, the iCITE/Data Aggregator has provided cities, counties and State traffic management agencies with the ability to affordably connect and retrieve real-time traffic data from isolated or non-interconnected intersections. Optimization of traffic signal timing relies upon models built upon accurate and reliable data, and our product helps provide a reliable real-time traffic data set that is useful and actionable. We are thrilled to be part of IRF Global, and fully support its mission and message of Better Roads. Better World. "

THE GEOFENCING OSLO DEMO

NORWEGIAN PUBLIC ROADS ADMINISTRATION

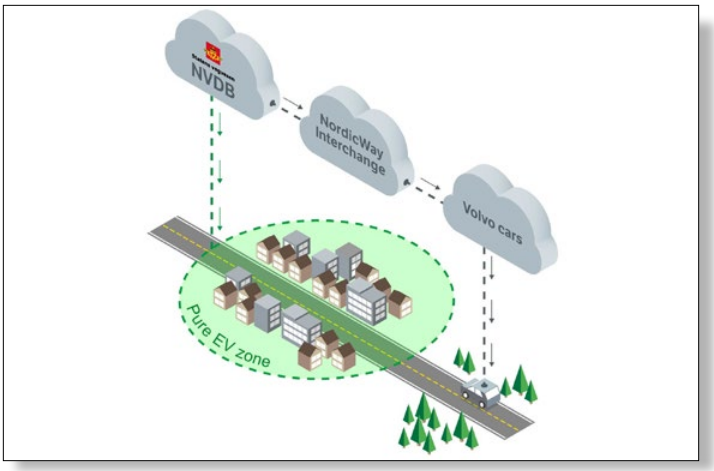
In the fall of 2017 a demonstration was executed in the city of Oslo to demonstrate geofencing for lower emissions by direct interaction with plug-in hybrids to override drive mode. The project was lead by the Norwegian Public Roads Administration (NPRA), who with a small team of engineers collaborated with engineers at Volvo Car Corporation to develop the demonstration within approximately two months development time.

A geofence is a virtual perimeter for a real-world geographic area. Traffic management deals with optimizing the flow of people and goods in geographical areas. Traditionally these areas have been defined by physical infrastructure, such as tolling stations, traffic lights, signage, designated lanes and physical obstructions. Physical infrastructure tends to be expensive, production costs are just part of that equation, often construction near roads can be equally costly both in pure monetary, as well as in societal costs such as delays. There is also a safety risk associated with road works. Today, alternative solutions are at our doorstep as the capabilities of vehicles increase and our society is becoming increasingly connected.

If the car is connected via cellular coverage, why shouldn't the road authorities communicated directly with it? Connectivity is the missing link to be able to make more dynamic and intelligent solutions for society. Instead of paying to pass a point, you can pay because you choose to pollute, or choose to drive during rush hour.

Continuing the vital collaboration with the car industry, and building upon existing digital infrastructure within the NPRA, it was shown that a geofence for zero emissions could be produced within a few weeks, at very low cost. The geofence was created in the NPRA production system for infrastructure management, The national Road Database (NRDB), and sent to the NordicWay Interchange, an AMQP-based service for sharing traffic related messages between private and public parties in the Nordic countries. The geofence was then collected from the Interchange by Volvo Cars. Volvo Cars could then send information about geofences and required behavior associated with them to the vehicle, when the vehicle was approaching a geofence. In the demo two plug-in hybrid vehicles were used for this purpose, and five consecutive demos performed. Each demo showed the creation of a new zero emission geofence in the NRDB and the successful delivery to the vehicle. The vehicle, in turn, was automatically made to change from its current drive mode, to an all-electric drive mode. This would include calculations on needed battery capacity before entering the geofence, and even charging the batteries before entering the zone, if necessary.

This demo showcased the use of geofences, a full development of such a system would require a municipality or other relevant authority in the loop. Geofencing can be an enabler for more intelligent and adaptive traffic control for example for reduced fees for environmentally friendly driving, such as lower emission of pollutants or noise, or speed adaption around vulnerable areas.



Ane Dalsnes Storsæter, Elin Leikvang
Project leader for The Geofencing Oslo Demo | Tech lead for The Geofencing Oslo Demo

" Winning the IRF GRAA award for Urban Mobility is a great honor, and recognizes the results of public-private cooperation to achieve fast development of new technologies and services to create transport systems that benefit society."

2019 GRAA Application Information
APPLICATION DEADLINE: MARCH 31, 2019

The application package must include:

1. A completed application form
2. A project summary (<500 words)
3. An explanation of how the project meets the criteria of the category in which it has been submitted (~100 words)
4. Microsoft PowerPoint® presentation (.ppt or .pptx) including but not limited to slides, photographs, drawings, diagrams, videos, or additional explanatory materials. (Presentations should be limited to 30 slides or less).
   - If completing a paper application, please compress all your files into a single ZIP archive and send the files via email (if <5MB) or a file-sharing service (if ≥5MB) such as Dropbox, WeTransfer, ShareFile or other like service.
     OR
   - Complete our online application, which includes built in file uploading (https://irf.wufoo.com/forms/2019-graa-application/)

Incomplete applications will not be considered. All materials must clearly identify the name of the project, the award category, and contact information of the submitting applicant.

Please note:
The submission of copyrighted material to IRF for the Global Road Achievement Awards shall constitute a general grant of permission to IRF to use the materials for promotional purposes.

Each application package must be accompanied by a non-refundable entry fee of $400 for IRF Member, $875 for non-members. A separate application package (accompanied by payment of the entry fee) must be submitted for each project entered in each category.

Entry packages must be received by the IRF, at the address listed below, by 5:00pm EST on March 31, 2019.
Entries must be addressed to:

Global Road Achievement Awards
c/o International Road Federation
500 Montgomery Street.
5th Floor
Alexandria, VA 22314 USA

For further information, please contact:
graa@IRF.global
Tel: +1 703 535 1001

GLOBAL

KNOWLEDGE • ADVOCACY • EDUCATION
BEST PRACTICES • BUSINESS OPPORTUNITIES

Better Roads. Better World.

IRF GLOBAL

International Road Federation

GLOBAL HEADQUARTERS & SECRETARIAT
Madison Place
500 Montgomery Street, Fifth Floor
Alexandria, VA 22314 USA
Telephone: +1 703 535 1001 Facsimile: +1 703 535 1007

REGIONAL OPERATIONS
Brussels, Belgium | Santiago, Chile | Accra, Ghana
Nairobi, Kenya | Kuala Lumpur, Malaysia | Chicago, IL USA

www.IRF.global