Surface Transport

For this fourth and last edition of our *Technology Watch Journal*, we concentrate on the following themes with respect to their contribution to U-STIR research:

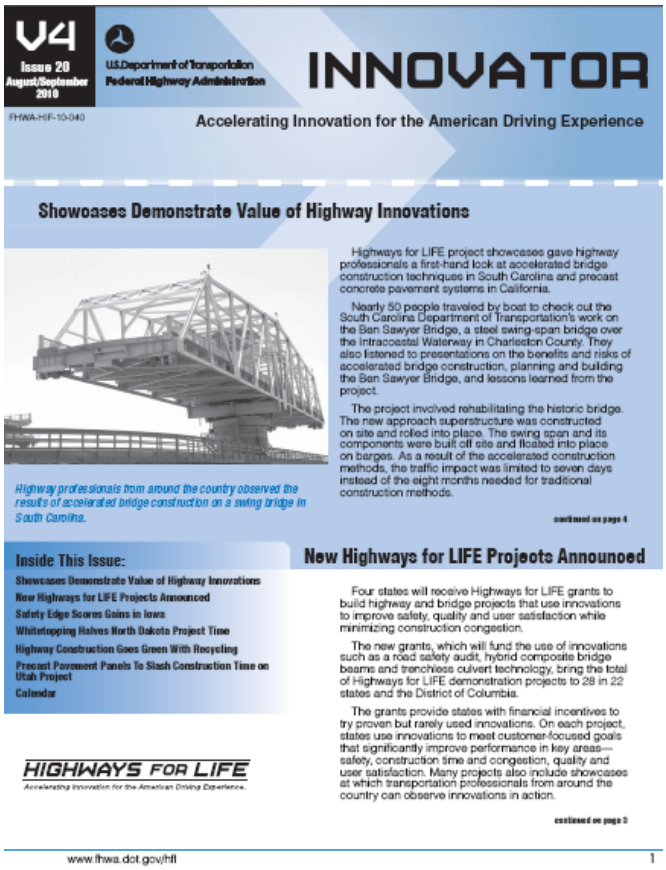
- Transport Research Dissemination (USA)
- Infrastructure and Services (Germany, China)
- Energy and Environment (UK, International, USA, Germany)
- Transport Policies (China, Portugal)
- About Innovation (International)

The articles presented (origin, abstract & source) clearly highlight trends in surface transport.

Transport Research Dissemination

United States

Innovator: Accelerating Innovation for the American Driving Experience


V4
Issue 20 August/September 2010
U.S.Department of Transportation Federal Highway Administration
FHWA-HIF-10-040
INNOVATOR
Accelerating Innovation for the American Driving Experience
Showcases Demonstrate Value of Highway Innovations
Highways for LIFE project showcases gave highway professionals a first-hand look at accelerated bridge construction techniques in South Carolina and precast concrete pavement systems in California.
Nearly 50 people traveled by boat to check out the South Carolina Department of Transportation's work on the Ben Sawyer Bridge, a steel swing-span bridge over the Intracoastal Waterway in Charleston County. They also listened to presentations on the benefits and risks of accelerated bridge construction, planning and building the Ben Sawyer Bridge, and lessons learned from the project.
The project involved rehabilitating the historic bridge. The new approach superstructure was constructed on site and rolled into place. The swing span and its components were built off site and floated into place on barges. As a result of the accelerated construction methods, the traffic impact was limited to seven days instead of the eight months needed for traditional construction methods.
Highway professionals from around the country observed the results of accelerated bridge construction on a swing bridge in South Carolina.
continued on page 4
Inside This Issue:
Showcases Demonstrate Value of Highway Innovations
New Highways for LIFE Projects Announced
Safety Edge Scores Gains in Iowa
Whitetopping Halves North Dakota Project Time
Highway Construction Goes Green With Recycling
Precast Pavement Panels To Slash Construction Time on Utah Project
Calendar
New Highways for LIFE Projects Announced
Four states will receive Highways for LIFE grants to build highway and bridge projects that use innovations to improve safety, quality and user satisfaction while minimizing construction congestion.
The new grants, which will fund the use of innovations such as a road safety audit, hybrid composite bridge beams and trenchless culvert technology, bring the total of Highways for LIFE demonstration projects to 28 in 22 states and the District of Columbia.
The grants provide states with financial incentives to try proven but rarely used innovations. On each project, states use innovations to meet customer-focused goals that significantly improve performance in key areas—safety, construction time and congestion, quality and user satisfaction. Many projects also include showcases at which transportation professionals from around the country can observe innovations in action.
continued on page 3
HIGHWAYS FOR LIFE
Accelerating Innovation for the American Driving Experience
www.fhwa.dot.gov/hfl
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The U.S. Federal Highway Administration has released the latest issue of its Innovator newsletter, which is designed to help advance widespread implementation of innovations and technologies in the highway community and help chronicle a nationwide movement to improve the way highways are built.

Its audience is transportation professionals in highway agencies, trade and research groups, academia and the private sector, and the driving public.

Source:
http://www.trb.org/Main/Blurbs/Innovator_AugustSeptember_2010_163947.aspx?utm_medium=etmail&utm_source=Transportation%20Research%20Board&utm_campaign=TRB+E-Newsletter+-+10-26-2010&utm_content=Web&utm_term, October 2010

Infrastructure and Services

Germany

Self-organizing traffic lights

A new patent may revolutionize traffic control, saving fuel, reducing travel times and emissions, and doing it all without limiting drivers' mobility. This truly "green" idea will have drivers waiting less and help us preserve our environment.
Currently, traffic jams and road congestion do a lot more than annoy millions of people every day. In the United States alone, delays linked to backed-up traffic cost nearly $100 billion each year, and waste more than 10 billion litres of fuel, not to mention countless human hours. And then there's all the extra CO2 and other pollutants spewed into the atmosphere. As developing nations become more industrialized, these problems will only grow worse unless there is some radical new solution. We can build more roads, of course, encourage more people to ride bikes or share their cars with others, and improve buses and other forms of public transport. But there may be another way.
As Stefan Lämmer at the Institute of Transport & Economics of TU Dresden and Dirk Helbing of ETH Zurich have recently shown, we could reduce traffic congestion markedly by re-thinking the way we try to control how traffic flows. We're fixed on the idea that lights should cycle on and off in a regular and predictable way, but this idea, they say, is unnecessarily restrictive. And less orderly patterns could be far more efficient, reducing travel times for all, and making traffic jams far less frequent.

Engineering without engineers...

At the moment, traffic engineers normally tailor the cyclic operation of lights to match known traffic patterns from the recent past. Lights on main roads stay green longer during peak hours, for example. But so far it requires supercomputers or engineers, who do the tuning.
Lämmer and Helbing wondered if traffic lights might devise better solutions on their own, if given some simple traffic-responsive operating rules and left to organise their own on-off schedules. To find out, they modelled the flow of traffic as if it were a fluid, and explored what happens at road intersections, where traffic leaving one road has to enter another, much like fluid moving through a network of pipes. [...]

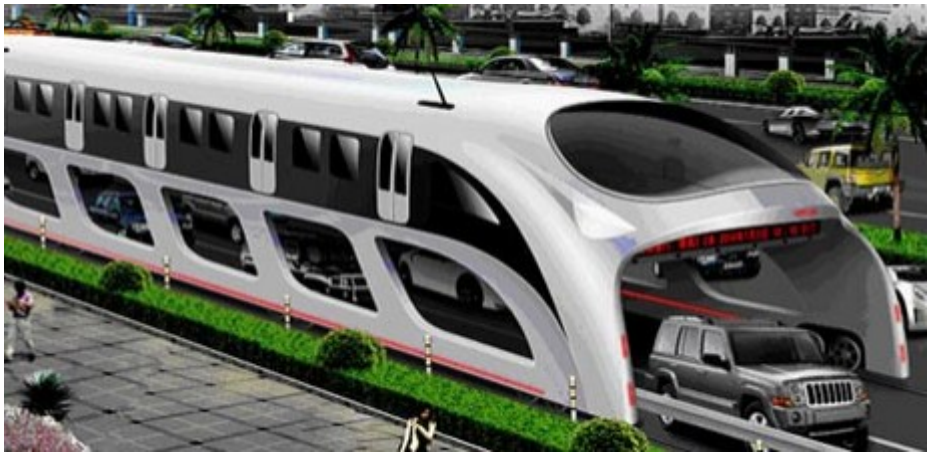
Reducing delay time by 10%-30%

The key is that this kind of control does not fight the natural fluctuations in the traffic flow by trying to impose a certain flow rhythm. Rather, it uses randomly appearing gaps in the flow to serve other traffic streams. According to their simulations, this strategy can reduce average delay times by 10%–30%. Remarkably, the variation in travel times goes down as well, although the signal operation tends to be non-periodic and, therefore, less predictable. You can't say precisely how the lights will go on and off, but you can be sure your drive will be shorter. [...]
Town planners are beginning to look at self-organising lights as a practical solution to looming traffic congestion. Lämmer and Helbing are working with a German traffic agency to implement the idea, soon. In previous tests based on Dresden's road layout, they've had encouraging results.

Further information: www.santafe.edu/media/workingpapers/10-09-019.pdf
www.tu-dresden.de
Source: http://www.innovations-report.com/html/reports/logistics/organizing_traffic_lights_161703.html, September 2010

China

Go go gadget straddling bus! Chinese super-buses glide over traffic



China is home to more people than any other country on Earth, and they're moving into megacities at a rate that's simply unprecedented. In fact, just about everything about today's China is unprecedented – this is a country facing some absolutely staggering challenges in the next 30 years. It's a peek into the future for Western nations – a glimpse at what is becoming the world's first megacolony. Managing a transport plan for such a colossal number of people – many of whom now own, or aspire to own, cars – presents a traffic congestion and pollution quandary the likes of which we've simply never seen before. Take a look at Mike Hanlon's jaw-dropping Yez video to get a snapshot of the problems China faces and see how its government and industries are scrambling to become the global leaders in local emissions-free vehicles. And take a look at this amazing public transport solution – it's a bus network that drives over the top of the cars on a slightly modified road, able to stop without interrupting the traffic flow and to glide over the top of congestion. This go-go-gadget bus is far quicker and 90 percent cheaper to build than a new subway route, it's solar/grid electric powered and it's no pipe dream – construction starts at the end of this year. [...]

The buses are 6 meters wide and 4.5 meters high, so they can straddle two lanes of traffic, and yet still fit under most existing overpasses. Each bus will have a capacity of 1,200 people, which sounds like a ridiculously large number, but then it's worth remembering that China already has 120 cities with more than a million inhabitants – and by 2030 it will have double that. You simply can't think in normal numbers when it comes to China. [...]

This is not a pipe dream – the pilot program goes into construction by the end of this year in the Mentougou district of Beijing, where 186km of tracks will be laid. If it works, you can expect to see it rolled out across China's large cities – and FAST. The next 20 years are going to see some thrilling technological advances as China plays catchup to its rampant population growth and booming economy. This is just the beginning. Exciting times for emerging tech heads!

Source:
Loz Blain, http://www.gizmag.com/chinese-straddling-bus-china/15931/, August 2010

Energy and Environment

United Kingdom

Greener drivers before greener cars

With companies beginning to renew their fleets as the economy picks up, IAM Drive & Survive calls for fleet managers and business drivers to invest in eco-driver training to improve their efficiency. "Companies no doubt consider green credentials when buying new company cars, but they may not realize how much more efficiently their employees could be driving them," said Simon Elstow, IAM Drive & Survive head of Training.

"Simple techniques such as advanced anticipation, intelligent route planning, and speed control can increase your fuel economy by 50%, as well as getting you from A to B a lot quicker," Elstow continued. "Ecolution, our fuelsaving driver training course, has increased the mpg of one company's fleet by nearly 30% - a huge saving in terms of fuel bills. Efficient driving also means reduced wear and tear on the car and a better resale value, and less frequent car replacement which is an ecoburden in itself."

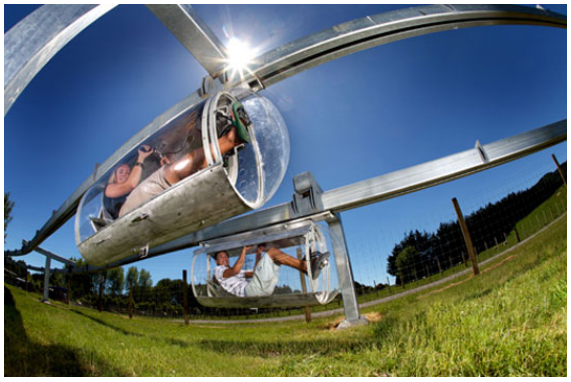
Employers and individuals – mindful of their CSR and environmental responsibilities – are increasingly seeing their car as a catalyst for green change. A forthcoming IAM report Motoring Facts 2010 has found that companies are opting for more fuel-efficient vehicles, with twice as many new diesel company cars as private cars being registered every year.

"Although companies are looking into providing greener vehicles for their fleet, we advise them to do the job properly and look at how improving their business drivers' skills could also save them money and reduce their CO2 emissions," Elstow concluded.

Sources: VIGIE Transports Terrestres, N° 32, quatrième trimestre 2010
Traffic Technology Today, August 2010

International

Google invests in Shweeb's pedal-powered bike monorail



Google's interest came about thanks to their Project 10^{100}, an initiative that seeks to find solutions that make the world a better place. The competition attracts a lot of entries — this year they received over 150,000 applicants from 170 countries. Shweeb was named one of the top five as voted on by the public, claiming top honors in the "Drive innovation in public transport" category.

The idea was conceived by Melbourne cyclist Geoff Barnett while he was living in Tokyo. After six years researching his dream, he set up a test bed in Rotura and launched the system in 2007. Since then, more than 30,000 people have ridden the Shweeb system, and the current speed record is 55 seconds for a 600m ride.

Shweeb managing director Peter Cossey said the company would spend the $1.05 million on research and development to build a showcase transit system in the northern hemisphere: "The northern hemisphere became the natural choicefor us due to the sheer number of people that require transport and also the opportunity to achieve a higher global profile for the future growth of the company," Mr Cossey said.

With that in mind, is it possible that we'll see the likes of the Shweeb in San Francisco, London or Tokyo soon?

Source:
Timon Singh,
http://inhabitat.com/2010/09/27/google-invests-in-shweebs-peddle-powered-bike-monorail/2/,
September 2010

United States

Ford Developing Biofuel From Algae for Use in Vehicles

When one of the biggest car manufacturers in the world invests their capital into algae biofuel research, you know that renewable energy will soon play a major role in the global economy. Ford Motor Company has recently hired scientists to look into algae as the major ingredient in their efforts towards bio-fuel production. The company has quickly realized that if their cars are to be relevant in the future, then they will need to find alternatives to gasoline and oil. The company has also been looking at ethanol and butanol biofuels, but at the moment, believe that algae may hold the greatest potential.

Working with scientists at Wayne State University's National Biofuels Energy Laboratory, Ford has been researching the potential of algae as a major biomass ingredient in the production of fuel. To aid in their research, the team of scientists have been conducting assorted experiments on algae oil and its potential to power vehicles.

And this may come as a shock to many, but this isn't Ford's first attempt at using alternative fuels to run their products. According to Tim Wallington, technical leader with the Ford Systems Analytics and Environmental Sciences Department, "Ford has a long history of developing vehicles that run on renewable fuels; and the increased use of biofuels is an important element of our sustainability strategy now and moving forward."

Sherry Mueller, Research Scientist, Ford Motor Company added, "Algae have some very desirable characteristics as a potential biofuel feedstock and Ford wants to show its support for any efforts that could lead to a viable, commercial-scale application of this technology." Furthermore stating, "At this point, algae researchers are still challenged to find economical and sustainable ways for commercial-scale controlled production and culturing of high oil-producing algae."

Source:
Timon Singh, http://inhabitat.com/2010/10/15/ford-developing-biofuel-from-algae-for-use-in-vehicles/
October 2010

Germany

Wheel in a corset

Are lightweight construction materials suitable for extremely stressed and safety-relevant components such as car wheel? Tests and calculations show that fiber-reinforced plastics are highly damage-

tolerant and distinctly superior to aluminum in car wheels. Researchers have already produced a prototype lightweight wheel.

Just imagine your car suddenly comes to a halt on a quiet country road, and it's only four years old. This is not a pleasant thought. A breakdown is expensive. Not to mention the safety risk to the occupants – because the breakdown was caused by the extremely light plastic wheels so highly praised by the car salesman. One of them has broken. "Such a scenario must, of course, never happen in reality," states Prof. Dr.-Ing. Andreas Büter from the Fraunhofer Institute for Structural Durability and System Reliability LBF in Darmstadt. The experts there specialize in operational strength testing of plastics in general and plastic wheels in particular.

To create the fundamentals for the production of lightweight and yet safe and reliable components they launched the High-Strength Plastic Structures project in cooperation with five other Fraunhofer institutes. "The aim was to provide the conditions and the tools for the operationally reliable design of extremely light safety parts made of SMC (sheet molding compound) material which could be produced on an ongoing basis in medium to large volumes. SMC is a fiber-reinforced composite material which mainly consists of inorganic constituents," explains project manager Professor Büter. "Up to now SMC has only been used for secondary parts of the bodywork such as the bonnet or doors," states Büter. "The purpose of our project was to clarify whether SMC is also suitable for safety-relevant primary parts." SMC is superior to metal in several ways. It is not only lighter but also exhibits an excellent mass-to-strength ratio. What's more, it is cheap to produce in medium to large quantities.

But what are the material properties of SMC? How are the fibers oriented? What production methods are suitable for processing this material? Are there any air conclusions? What stresses and loadings can SMC car wheels withstand? The research scientists have looked into these and other questions. "On our test stands we have simulated for example how the wheels and suspension of a car behave on a rough road, in forward motion and reversing, and how long the components can endure these conditions," states Andreas Büter, describing the tests conducted at the LBF. After three years of research work the scientists can now present the results. On conclusion of the project Büter highlighted an important finding: "If correctly processed, fiber-reinforced plastics are highly damage-tolerant and distinctly superior to aluminum wheels."

And what happens now? In cooperation with the industry the researchers would like to create a wheel based on the developed prototype which can withstand high stresses and loadings. It would feature a local reinforcement of continuous fibers. "That would act like a supporting corset for the wheel," the project manager adds, outlining his team's vision.

Source:
http://www.fraunhofer.de/en/press/research-news/2010/09/wheel-in-a-corset.jsp
September 2010

Transport Policies

China

China plans standards for electric cars

China plans to issue new standards to regulate the charging infrastructure needed for electric cars, the official Shanghai Securities News reported.

The government plans to introduce three standards in October that would cover

technical requirements, among others, for the charging facilities for electrical vehicles, the Securities News said, citing an unnamed source from the State Electricity Regulatory Commission.

The regulator is currently talking with power grid operators and crude oil producers for five other standards that it aims to establish this year, the newspaper added.

The Chinese government will invest more than 100 billion yuan ($14.8 billion) to subsidize its fledgling environmentally friendly car industry over the next 10 years, local media reported.

Sources: VIGIE Transports Terrestres, N° 32, quatrième trimestre 2010
Ibtimes, August 2010

Portugal

Portugal cuts road projects after economists say they don't help the economy

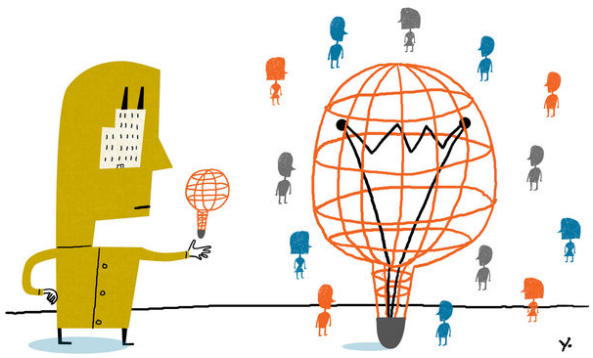
Portugal has announced it is postponing construction of five major roads totaling nearly 1 000 kilometers. The reason given is to cut expenditure from the national budget, but the relevant minister says there is a need to rethink the country's transport network on a multi-modal basis.
The decision was announced by the minister of public works António Mendonça, and signifcantly the announcement was made to a leading association of economists. Last autumn, a group of 28 leading Portuguese economists called for a shift in thinking away from transport infrastructure investments, after noting that the decade that followed massive transport investment in the 1990s was the worst for nearly a century.
Mendonça, an economist who has been in charge of transport since September's elections, said the tenders for building the five new roads would be 'suspended for an indeterminate amount of time', adding: 'Obviously we are facing financial restrictions, but it's not just about that – we need to rationalize and make more effective our transport system, as well as integrating our road system with investments planned in other modes of transport.'
As part of the shake-up of transport spending, Mendonça announced that a number of shadow-tolled roads (where the government pays the bill for road users to the private operator) will have real tolls, and he confirmed the government's intention to continue with major investment in high-speed rail and the continuation of discussions on a possible new airport for Lisbon.

Sources: VIGIE Transports Terrestres, N° 31, troisième trimestre 2010
TransportEnvironment.org , March 2010

About Innovation

International

Innovation: It isn't a matter of left or right



About Innovation

In my research, I analyzed 300 of the most influential innovations in science, commerce and technology — from the discovery of vacuums to the vacuum tube to the vacuum cleaner — and put the innovators of each breakthrough into one of four quadrants. First, there is the classic solo entrepreneur, protecting innovations in order to benefit from them financially; then the amateur individual, exploring and inventing for the love of it. Then there are the private corporations collaborating on ideas while simultaneously competing with one another. And then there is what I call the "fourth quadrant": the space of collaborative, nonproprietary innovation, exemplified in recent years by the Internet and the Web, two groundbreaking innovations not owned by anyone. […].
Why has the fourth quadrant been so innovative, despite the lack of traditional economic rewards? The answer, I believe, has to do with the increased connectivity that comes from these open environments. Ideas are free to flow from mind to mind, and to be refined and modified without complex business development deals or patent lawyers. The incentives for innovation are lower, but so are the barriers. […]
Consider a recent start-up called Kickstarter, which embodies many of these complex values. Kickstarter is a site that allows individuals to fund creative projects, like movies, art installations, albums and so on. Donors may get special gifts in return for their contributions — signed copies of the final CD or an invitation to the opening — but they don't own the creations they help support. In just two years of existence, Kickstarter has raised more than $20 million for thousands of projects, taking a small cut of each transaction. […]

BUT the problem is that we don't have a word that does justice to those of us who believe in the generative power of the fourth quadrant. My hope is that the blurriness is only temporary, the strange disorientation one finds when new social and economic values are being formed.

The choice shouldn't be between decentralized markets and command-and-control states. Over these last centuries, much of the history of innovation has lived in a less formal space between those two regimes: in the grad seminar and the coffeehouse and the hobbyist's home lab and the digital bulletin board. The wonders of modern life did not emerge exclusively from the proprietary clash between private firms. They also emerged from open networks.

Source:
Steven Johnson is an author and entrepreneur. His new book, "Where good ideas come from: The Natural History of Innovation", http://www.nytimes.com/2010/10/31/business/31every.html?pagewanted=2&_r=1&ref=technology
October 2010

Technology Watch Journal is a bi yearly journal.
Comments on current edition or contributions to the next Journal issue may be sent to:
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