

# InfraStructures

**CONSTRUCTION • PUBLIC WORKS • NATURAL RESOURCES**

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THIS ELECTRONIC VERSION OF INFRASTRUCTURES IS MADE AVAILABLE FOR THE SOLE PURPOSE OF GIVING OUR ENGLISH SPEAKING READERS A TASTE OF THE ORIGINAL PRINTED VERSION OF THE MAGAZINE.

WE WILL TRY TO PUBLISH AS MUCH OF THE EDITORIAL CONTENT OF THE PRINTED VERSION AS POSSIBLE GIVEN THE TECHNICAL LIMITATIONS.

## Welcome

Throughout its eight years of serving the French speaking users of heavy machinery and specialized equipment in Canada, InfraStructures has established itself as the most acknowledged reference in its field. All other magazines have a different scope or focus. None offer a better mix of local content, important industry news, good circulation and reasonable rates for both readers and advertisers.

As you may know, our next major step for 2005 is in the making: an English print version of InfraStructures – distributed by mail across Ontario and the Maritimes. If you are interested in receiving the English print version of InfraStructures next year, please send us your coordinates by mail or e-mail.

For the year 2004, issues of the English online version will feature more content than last year. We encourage you to send in your news releases and articles which we will gladly publish free of charge.

Finally, we offer a great advertising package: Buy space in our French print version and get published in the English online version free of charge. Please call us to discuss your advertising plans in detail.



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On the front cover : A new AML-Bucher vacuum sweeper used by Entretien J.R. Villeneuve Inc., of Sainte-Thérèse, Québec, for Spring cleaning.



## In the News...

### MAJOR PLANT ENGINEERING SERVICES CONTRACT IN SAGUENAY, QUÉBEC

Bechtel announced a contract with Alcan to provide engineering, procurement and construction-management services for a new facility to treat and recycle aluminum smelter pot residue (potliner) in Jonquière, a suburb of Ville de Saguenay, Québec.

Featuring technology developed by Alcan's Arvida Research and Development Centre, the new facility will not only render the spent potlining environmentally harmless, it will also enable Alcan to recycle and generate value from the potlining byproducts.

Bechtel, in collaboration with BPR-Bechtel, will spearhead the major \$150-million, three-year project. The work will create 80 person-years of employment, mainly for engineers and technicians in the Saguenay.

Jean Simon, Vice President, Operations, Saguenay-Lac St-Jean, Alcan Primary Metal, stated that Bechtel and its subsidiary BPR-Bechtel were selected for their superior business proposal, which also promises to generate the most benefits for the region.

"We will add and train new, highly skilled personnel in order to export our unique expertise in aluminum throughout the world," explained Andy Greig, President, Bechtel Mining & Metals. Regional businesses involved in the project, including suppliers and sub-contractors, will also benefit from access to these new international markets.

Brian F. Kenny, President, Bechtel Canada, said he is pleased to have been awarded this important contract, which will support the expansion strategy of the new company, BPR-Bechtel.

Denis Harvie, President and General Manager, BPR-Bechtel, said that the Saguenay contract reinforces the company's success and growth strategy. "Alcan's confidence in BPR-Bechtel enables us to increase our resources in the region, and to strengthen our core competency in the aluminum industry," he stated.

The project is currently being evaluated by the Bureau des audiences publiques sur l'environnement. If for any reason the project fails to secure the necessary environmental permits and authorizations, the contract's cancellation clause will take effect.

Created in 2002, BPR-Bechtel is a trusted provider of best-in-class plant engineering and capital project management services. BPR-Bechtel is co-owned by Bechtel, one of the world's premier engineering-construction companies, and BPR, a Québec-based engineering firm with exceptional industrial expertise.

Source: Bechtel, BPR-Bechtel

### SYNTROLEUM AND SOVEREIGN OIL & GAS SIGN UPSTREAM JOINT DEVELOPMENT AGREEMENT TO ACCESS STRANDED NATURAL GAS FIELDS

Syntroleum Corporation and Sovereign Oil & Gas Company have signed a joint development agreement whereby Sovereign will work exclusively with Syntroleum to acquire and develop stranded natural gas fields worldwide using Syntroleum's proprietary gas-to-liquids synthetic fuels technology. The joint development agreement brings together the Tulsa and Houston-based companies to identify and license proven gas fields in remote locations for use as feedstock to

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supply Syntroleum's previously announced GTL Barge. The GTL Barge will produce environmentally friendly synthetic fuels from natural gas at a competitive price to replace high-sulfur diesel and other conventional fuel.

Earlier this month, Syntroleum announced a Memorandum of Understanding with Dragados Industrial S.A., the Spanish engineering contractor, and TI Capital, the finance arm of a middle east based crude oil transportation and marketing company, to finance, build, own and operate GTL barge plants. "This agreement with Sovereign completes our GTL Barge project development team," said Syntroleum President and Chief Operating Officer Jack Holmes. "With Syntroleum's GTL technology, Dragados' and TI Capital's engineering, construction, and finance capabilities, and Sovereign's upstream expertise, we have linked the three necessary components for developing the first GTL Barge project."

Syntroleum's GTL Barge consists of a nominal 19,000 barrels per day total liquids production plant mounted on an inland barge. Ideal for calm water conditions, the barge plant uses Syntroleum's proprietary air-based GTL technology, the Syntroleum Process, to convert natural gas into synthetic diesel and other clean fuels. The GTL Barge is designed to develop already discovered offshore and near-shore natural gas assets where there is currently no infrastructure to economically produce and transport the gas.

Under their plan, a number of Syntroleum's GTL Barges will produce and convert gas to liquids in offshore and near-shore regions of the world, making formerly stranded gas fields economic. The GTL Barge is capable of producing about 130 million barrels of synthetic fuel from a 1.2 trillion cubic feet field. The primary product is a high-quality, environmentally friendly synthetic diesel fuel that is biodegradable, non-toxic and as clear as water.

"We are pleased to solidify a relationship with Sovereign to provide a clear path to locate and acquire stranded gas reserves for our recently announced GTL Barge projects" stated Jack Holmes. "Their experience in the oil and gas industry adds proven upstream expertise in identifying oil and gas reserves and acquiring access to those reserves at just the right time in the GTL Barge project development effort. Sovereign has a track record of success, particularly in West Africa, in identifying and pulling together the many elements of a successful oil and gas deal."

Sovereign Oil & Gas, led by President Joseph M. Bruso, is currently active in West Africa and the Middle East, with extensive worldwide experience in international upstream new business development and E&P operations management. The Sovereign team has managed more than twenty international projects over the past twelve years, including the development of the offshore gas assets for the first natural gas-to-power project in West Africa in 1995,

and the discovery and initial development of Equatorial Guinea's Zafiro field, which now produces approximately 300,000 bpd of oil. Combined reserves discovered by Sovereign's technical team exceed three billion barrels of oil equivalent. In 2000, Sovereign led Vanco Energy Company (joined this year by Canada's Nexen, Inc. and Spain's Repsol YPF) into Equatorial Guinea's offshore Block 'K'. Last December, Sovereign concluded a major Nigerian project with a farmin to

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offshore block OML 115 by Nexen. In its joint development arrangement with Syntroleum, Sovereign will identify and obtain access for Syntroleum to stranded natural gas assets.

"We are delighted to join with Syntroleum in this exciting venture," said Bruso. "In 2003, GTL came of age, as there are now at least four large commercial GTL plants under construction or in the planning stages, with 450,000 bpd of synthetic fuels capacity. Syntroleum has already identified forty

stranded gas fields that would be a good fit for their unique GTL Barge plants, with potential reserves equivalent to eight billion barrels of synthetic diesel and clean fuels."

Adds Holmes, "The combination of Syntroleum's GTL Barge and Sovereign's upstream capabilities gives us unique leverage in capturing and developing these gas fields that are too small for conventional GTL or LNG but perfect for our Barge, and moves us another step closer to our goal of commencing

commercial GTL production".

Source: Syntroleum Corporation  
Sovereign Oil & Gas Company

#### **\$122.5 MILLION INVESTMENT IN ROLLS-ROYCE CANADA**

Rolls-Royce Canada Limited of the Rolls Royce plc group has announced an investment of \$122.5 million at its Montreal facility to carry out a major research and development project to be spread over a four year period. This project is being implemented with the assistance of a federal investment, with risk and reward sharing, of \$30 million. These funds have been allocated by Technology Partnerships Canada, an agency of Industry Canada.

The project will see the development of innovative technologies to support the next generation of 25 to 35MW gas turbine products and to further enhance the capabilities of the current engines. The technology is focussed on improving performance and reducing still further the environmental impact of what are already amongst the cleanest fossil fuelled energy sources available today.

In addition, this investment of Rolls-Royce Canada will consolidate and strengthen its position as a producer of market leading gas turbines. It will also secure the long-term employment of 100 highly qualified Research and Development Engineers in the Energy Business Unit.

"Rolls-Royce Canada constantly strives to raise its standards of excellence and this Research and Development Project builds on that philosophy. This investment will enable us to strengthen our competitive position in the worldwide energy market by increasing the efficiency of our industrial engines while at the same time substantially reducing their emission levels, this will result in tangible benefits to the environment" explained Mr. Pierre Racine, President of Rolls-Royce Canada.

The industrial turbines manufactured by Rolls-Royce Canada are products derived from the Trent and RB211 aircraft engines manufactured by Rolls-Royce. These turbines can be used, for producing electricity or for extracting natural gas from the earth and pumping it through pipeline distribution networks to consumers. During recent years, Rolls-Royce Canada has developed the industrial version of the Trent turbine, which can generate close to 60 megawatts of power. This is sufficient electricity to meet the energy needs of a city of over 30,000

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Source: Rolls-Royce Canada Limited

### **VOLVO MOTOR GRADERS SAIL THE HIGH SEAS – DESTINATION: MEXICO**

Most fleets of motor graders are put to work building or servicing roads as soon as they leave the factory, but on October 29, 2003, a new fleet from Volvo Motor Graders had to first take to the high seas.

The motor grader division of Volvo Construction Equipment, Goderich, Canada, launched a fleet of 42 graders from the Port of Baltimore, Maryland, aboard the merchant ship Yohjin (a roll-on roll-off vessel) destined for Chiapas, Mexico. After eleven days at sea, with a stopover in Miami, Florida, the Volvo motor graders were delivered to the port of Veracruz, Mexico. Since the graders had been secured below decks on the Yohjin where they were not exposed to ocean salt en route, they were driven off the ship at Veracruz ready to go to work.

A team of operators took charge of driving the machines from Veracruz to the Chiapas state capital of Tuxtla Gutierrez where they began work constructing and maintaining roads in the area's coffee fields.

"This fleet represents the largest motor grader order Volvo Construction Equipment has received from Mexico," said Nibaldo Urzua, regional vice president for Volvo CE in Mexico.

All units in the order are Volvo G710B graders, designed for road construction but will be principally used for road maintenance operations in Chiapas. The order was placed in August of 2003 with a request for 120-day delivery. The Volvo motor graders were delivered ahead of schedule, advised Brian Lowe, Product and Communications Manager, Volvo Motor Graders.

The Volvo G710B-series grader is part

of a new generation of machines that offers enhanced productivity, fuel efficiency, servicing access, operating control, and operator comfort. The Volvo CE B-Series line of motor graders is comprised of five tandem drive and two all-wheel drive models, all of which are suited to all public and private sector tasks. The tandem drive machines range in operating weight from 33,400lb (15,150kg) to 43,250lb (19,618kg) and engine output from 179hp (133kW) to 243hp (181kW). The

all-wheel drive machines' operating weights range from 35,400lb (16,046kg) to 38,250lb (16,639kg) with engine output ranging from 221hp (175kW) to 243hp (181kW).

Powered by Volvo D7 (436 cu.in.) and Volvo D10 (587 cu.in.) EU Stage II and US EPA Tier II-compliant engines, the Volvo B-Series was developed not only for optimum fuel efficiency and low emissions, but also to provide high torque at low rpm for precise power control at all speeds in all grading

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applications. The flat torque curve delivered by Volvo engines reduces the need for downshifting, making the job easier for the operation. Cooling of the Volvo motor grader engines is accomplished with a hydraulically driven thermostatically controlled variable-speed fan that regulates fan speed depending on cooling demand to optimize power and to further improve fuel economy.

In response to customer input for improved hydraulic response and reliability, Volvo CE

introduced a new hydraulic system with the B-Series motor graders. The heart of the new system is a 284 lpm axial piston hydraulic pump providing increased efficiency and optimum pump life.

Volvo G700B-Series motor graders can also meet the most demanding requirements of fine grade contractors. Combining the advantages of the high torque capability of the Volvo engines with the large variable displacement hydraulic pump allows the

operator to reduce 1st-gear ground speed by operating at a lower rpm and retain full hydraulic control. This permits precise moldboard positioning to match the grade requirement.

Superior fuel efficiency and productivity were important reasons for the deal being awarded to Volvo CE. However, it was not the only reason. "The State of Chiapas purchased its current grader fleet in 1994, and over the years the state has received excellent service and parts support from the Volvo CE dealer in Mexico, Convento Dixel and its local sub-dealer in Tuxtla Gutierrez. When it came time to modernize the fleet, the contract was given to Volvo CE," explained Urzua.

The current grader fleet (now ten years old) is now undergoing a needs survey prior to refurbishing by Tuxtla Gutierrez, the local dealer. After servicing, the older graders will be distributed throughout the state of Chiapas for municipal use.

"This order represents a significant share of the year's expected Volvo CE equipment sales in Mexico," said Lowe. "Volvo Construction Equipment and Convento Dixel have been working with authorities in other areas to identify additional service needs. The continuing improvement in the political and business environment of the Chiapas region is also encouraging for future development and market opportunities."

Source: Volvo Construction Equipment

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### CONSTRUCTION INDUSTRY SEARCHING FOR SOLUTIONS TO STEEL PRICE HIKES

Sharp increases in steel prices are affecting architects, contractors, and builders in North America who are looking for solutions that involve using less steel. Global steel and scrap prices have skyrocketed in recent weeks and market analysts point to extraordinary demand and consumption of steel by China as reasons for the increased prices.

A leading supplier of steel market information, MEPS International reports hikes in price between February 2003 and February 2004 as high as 65.5%. Rebar, which averaged \$249 per ton a year ago is up to \$412 per ton. Medium sections and steel beams which sold last year for \$336 per ton now sell for \$491 per ton. Wire mesh, which averaged \$257 per ton last year is now at \$403 per ton.

On the scrap metal side of the industry, Tom Danjczek, president of the Steel Manufacturers Association in Washington D.C. said, "An emergency steel scrap coalition has





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been formed to study what has caused scrap prices to go up and what the impact will be on our customers." The coalition points to purchases made by China and South Korea that account for half of all US exports. The coalition warns that construction, a mainstay of the U.S. economy faces direct harm from sharply increased steel scrap prices and that construction companies of all sizes will be impacted by the crisis.

Bob Klee, Director of Technical Services and Architectural Consulting for Clayton Block Co., Inc. in New Jersey commented, "We've been talking to architects about using load-bearing concrete masonry because of the shortages expected and the increasing cost of steel. In our discussions with the

architects, we've found this steel price hike is wreaking havoc with their business... they are getting requests for changes in all sorts of projects due to the increased costs. Contractors are caught in the middle on this issue. We're advising the architects we talk with to put up high strength masonry walls and spread the columns out. That is a solution that would considerably reduce the quantity of steel required and lower the costs."

A report issued last month by architectural firm Davis Langdon Adams addresses the high demand and prices for steel products and warns of the impact on project schedules. The report says, "As demand increases and supplies shrink, some projects have

faced delays in receiving needed materials. This can have a significant impact not only on budget, but also on the ability for the projects to be completed in a timely and efficient fashion."

From a contractor's point of view, Chris Payne, an estimator for a major east coast contracting company said, "The huge increases in steel prices are affecting everything and the situation is in such flux that steel suppliers won't guarantee prices for more than a week. We're also having a problem getting architects to agree to loosen some of their specifications. Some of the jobs we're bidding are scheduled in 2005, which makes projecting real costs impossible."

Brian Buehner from Buehner Block Company, Inc. in Salt Lake City reports talking with designers in his market who are looking for cost-cutting solutions. Buehner says, "Architects are worried about getting projects moving and constructed before being hit by another round of hikes in steel prices. Architects are in a panic mode."

The price increases and expectations of even greater prices have contractors scrambling. Robert Baxter, who handles construction administration for the Mosley Group in Richmond, an architectural firm with a heavy focus on building schools said, "Contractors are scrambling to get any submittals that require steel in so they can lock down their prices before the increases. Everybody is in a state of panic about it. The word from suppliers is that a price increase is imminent."

Dave Jollay, head of Jollay Masonry Contractors in Atlanta reports the steel price hikes are beginning to impact the masonry industry but said, "I do not think any of us are aware yet of how much the impact will be. Certainly with the price hikes on our wire-tie and reinforcing components, stainless steel counter flashings, and reinforcing bar for structural design we will see an increase to our in-place wall costs. The assumption is that our competitors will be more negatively impacted, and while that may be true you have to keep things in their proper perspective. For example, a steel stud wall system will certainly be impacted, but the raw material cost of the steel is probably 25-30 percent of the total building cost. So, the overall price per square foot is not going to double. In fact their industry will do all that they can to minimize the price spike and the resulting loss of market share."



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Mark B. Hogan, President of the National Concrete Masonry Association, said "Although there may be some increases in the cost of reinforcing steel used in reinforced concrete masonry wall systems, relative to competitive systems, concrete masonry wall systems are more cost competitive as a result of steel price increases and remain an excellent product of choice for designers and builders, even when the economic situation is more stable for steel."

Source: National Concrete Masonry Association

### CAT LIFT TRUCKS INTRODUCES NR3000 SERIES REACH TRUCKS

Cat Lift Trucks proudly presents a new series of reach trucks designed to meet high expectations. The productivity-boosting design includes a rugged mast and carriage and a spacious operator compartment. Capacities range from 2,500 to 4,500 lb (1200

- 2000 kg), and lift heights reach as high as 425 in. (10750 mm). To match an array of applications, single reach, deep reach and straddle configurations are available. Each high-performance truck can be configured to specific operating requirements and performance needs.

Product features such as rapid lift and travel speeds, low effort operator controls and a flexible side stance compartment make the Cat® reach truck a highly productive material handling solution. Performance profiling will allow customers to customize drive and hydraulic settings based on the application, individual operator experience level and personal preferences. These settings, including travel speed, acceleration rate, regenerative braking response and steering sensitivity, can be easily customized through the display to fit diverse requirements. From warehouse environments to retail store operations, these innovative new models are a first-rate fit for a variety of applications.

NR3000 Series reach trucks are designed to help keep cost of ownership low. Brushless Alternating Current (AC) motors and the elimination of hydraulic and traction system contactors allow service intervals to be extended. Display-based diagnostics allow service technicians to quickly troubleshoot the truck. Quality is built in by using industry-proven components to keep downtime to a minimum. Assembled at the Cat Lift Trucks plant in Houston, TX, the new NR3000 models have the support of a nationwide parts distribution network.

"Cat Lift Trucks customers expect quality; they demand productivity; and they insist on a lower cost of ownership," Warehouse Products Sales Manager Chris Kuny said. "In everything we do, we work to deliver on that commitment."

From the manufacturing and distribution headquarters in Houston, Texas, Cat Lift Trucks offers a full line of durable lift trucks with models ranging from 2,200 - 33,000 lbs. capacity. By putting customer needs first and having the most comprehensive customer support programs in the industry, Cat Lift Trucks is Everything You've Come To Expect - productivity, quality and low cost of ownership.

Source: Cat lift truck

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of Canada (CRAC) Conference and General Meeting will be hosted June 2nd to 6th at the Fairmont Jasper Park Lodge in Jasper, Alberta. The focus of this year's line up of seminars is Financial Management for business both big and small and discussing where the Association has been and where it is going.

The CRAC's membership is comprised of crane rental and related companies from across Canada and the United States. Membership includes small, family owned and operated businesses, with one or two cranes, to large multi-nationals.

Source: Crane Rental Association of Canada

#### ALL BUSINESS OPERATIONS OF GLOBALSTAR ACQUIRED BY THERMO CAPITAL PARTNERS

Globalstar, the world's most widely-used handheld satellite phone service, today announced the completion of its financial restructuring following the formal acquisition of its main business operations and assets by Thermo Capital Partners LLC. In concluding this process, the new owners of Globalstar

also announced a number of additional corporate initiatives and commitments, intended not only to ensure Globalstar's long-term financial stability but also to foster far greater growth and expansion for the company than ever before.

As expected following its preliminary acquisition agreement in December 2003, Thermo now owns 81.25% of a newly-formed Globalstar company in exchange for an investment of \$43 million, with the remainder of the equity to be distributed to the creditors of the original Globalstar company - Globalstar, L.P. (GLP). With this acquisition, Globalstar's main business has now effectively exited from the bankruptcy process.

"Today is unquestionably a major turning point for Globalstar," said Jim Lynch, managing director of Thermo. "Despite its slow start, Globalstar - now in its fifth year of uninterrupted service - is by far the best positioned, with the best technology, to take advantage of the opportunities in the mobile satellite market, by increasing our attention on Globalstar's customers and their communication needs."

Thermo today also announced several new

business initiatives and strategies, aimed at ramping up the company's growth in the months and years ahead.

Underlying these initiatives is a new business plan that Globalstar and Thermo have been developing over the past several months, centering on re-aligning the company's resources to bring greater emphasis on addressing customer needs, particularly in the company's key markets such as oil and gas, maritime, defense, and transportation. Furthermore, Globalstar has already recruited new professional staff who will bring new expertise and skills to the company's sales and marketing departments and will be hiring additional professionals to further augment its sales efforts.

Globalstar service will continue to be marketed and sold under the Globalstar name, and the company's service provider partners around the world will continue to support customers as usual, with newer products and services expected to be introduced in the future.

Source: Globalstar



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## Front Delivery Stone Spreaders



Indiana Phoenix, Inc. and Bay-Lynx Manufacturing of Ancaster, Ontario, have sold the first Multi-Cat front discharge stone spreader units into the Southeast under the two companies' joint marketing effort for the product.

According to Bob Enright, CEO of Indiana Phoenix, the latest trucks are going into service for Action Concrete Contractors of Greenville, SC. Dana Pelletier, president of Action Concrete, will take delivery of the trucks at the end of May.

"These trucks allow us to eliminate the double handling of stone products at the construction site," Mr. Pelletier explains. "Now our operators can remain in the cab and precisely deliver stone or sand directly where it's needed, eliminating the need for a skid steer loader to distribute material after delivery."

Mr. Pelletier explains that his company also operates concrete pumper trucks, which offer similar advantages in handling ready-mix concrete. "The Multi-Cat front discharge spreaders are a natural fit with our pumpers, allowing us to deliver a variety of materials exactly where they're needed, even in difficult access situations. This means we can deliver materials to a broader range of construction sites--a real competitive edge for us"

"Indiana Phoenix is a leader in front discharge construction materials delivery technology," Mr. Enright explained in making the announcement. "An alliance with Bay-Lynx was a logical move because of Bay-Lynx's innovative new Multi-Cat front discharge stone spreader design."

According to Greg Koppelaar, general manager of Bay-Lynx, the Multi-Cat is the first front discharge delivery system for stone, gravel, sand, topsoil and other site preparation materials.

"Front delivery equipment offers a host of advantages in visibility, maneuverability and, precision placement," Mr. Koppelaar said. "It's also designed with a wider chute opening, a load suspension beam and has a 17-yard load capacity. And with our new throw-conveyor feature, we can spread materials up to 80 feet from the front of the truck."

In addition, the equipment is available with a remote control that allows the operator to monitor material delivery from outside the truck cab near the point where material is being discharged.

The Indiana Phoenix truck platform features Caterpillar C-13 410-hp diesel engines, Meritor 23,000-lb. front axles, Meritor 46-160 46,000-lb. drive axles and Hendrickson HN 52" rear suspensions.

Source: Indiana Phoenix



# Scania XPI – the fuel injection system of the future

Scania XPI – for extra high-pressure injection – paves the way for emission levels beyond what is possible with today's diesel technology. The new high-pressure injection system is being developed jointly with US engine manufacturer Cummins. Scania XPI enables Scania to focus on offering the best possible operating economy, while leading the market in environmental concern, performance and driveability.

"Scania's objective is to further reduce emissions while offering the best possible fuel economy and driveability in order to provide the lowest overall cost of operation," says Urban Johansson, Senior Vice President Powertrain Development at Scania. "Our successful co-operation with Cummins to develop and produce Scania HPI, our current high-pressure injection system, has led into the new long-term development project on common-rail technology.

"Efficiency and environmental performance will be the main criteria for any transport system in the future. Efficiency also speaks

for the diesel engine, which despite century-long development, still has great untapped potential. With common-rail technology, Scania can continue to refine the diesel engine and its combustion process well into the 2010s."

## FUTURE DEVELOPMENTS



High-pressure fuel injection systems like Scania HPI are the key to meeting current emission levels. But even higher injection pressures will be needed to reduce emissions beyond Euro 5. This will be achieved using Scania XPI and combinations of EGR and

SCR.

By that time, the emission levels from diesel engines will be so low, at least of the exhaust components we know of today, that other issues will take over. Concerns about carbon dioxide emissions and the greenhouse effect will increase and concerns about the availability of crude oil will increase the need to use the most fuel-efficient engine technology.

Source: Scania

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# Roadtec Selects BLS Poly Bolt-On TUFPADS® Track Pads for New RX-900 Milling Machine

Roadtec, Inc., manufacturer of world-class equipment for the road building industry, has announced that it will offer, as an option, the new BLS Poly Bolt-On TUFPADS® track pads on its new RX-900. This new highway-class, full lane/half lane milling machine was just introduced at the World of Asphalt, held last March in Nashville, Tennessee. BLS Enterprises, Inc., of Itasca, Illinois, U.S.A., has supplied Roadtec with TUFPADS® bonded-to-triple grouser track pads for many years. The newly introduced Poly Bolt-On version, which bolts to the steel triple grouser, drew the attention of Roadtec engineers when they talked to BLS President, Barry Stoughton, at a recent trade show, and he demonstrated for them the benefits of utilizing the new type track pad.

The Poly Bolt-On TUFPADS® track pad is the first of its kind to be manufactured for track vehicles and is seen to be especially useful on milling machines. Owners of milling

machines can now have the labor savings of easy installation and dismantling of a bolt-on pad and the cost savings that can be realized by reusing the steel grouser, combined with the durability and long life of a polyurethane track pad. Customers also save money by only needing to buy the poly pad and reusing their steel grouser after the first purchase. Savings also result from lower shipping costs, because much of the weight is in the steel grouser. Costs to assemble old cores for shipping become a thing of the past. Because of simplified installation and removal, companies can now replace track pads in the field with a just small crew and avoid having to transport the machine back to the company's garage.

BLS Enterprises, Inc. is the first company to sell bonded track pads made from polyurethane and has done so for seventeen years. Now BLS is the first company to manufacture bolt-on to triple grouser track pads made



from polyurethane. In fact, the new Poly Bolt-On TUFPADS track pads, like the bonded pads, are made from a special improved polyurethane compound known as Poly II, for up to 24% longer wear.

Roadtec, a legendary manufacturer in the road building industry, is the first machine maker to realize the benefits of using BLS Poly Bolt-On TUFPADS® track pads, but it will certainly not be the last.

Source: BLS Enterprises, Inc.

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# City of Toronto Wins 2003 Perpetual Pavement Award

The Asphalt Pavement Alliance announced that the City of Toronto has won a 2003 Perpetual Pavement Award for the Don Valley Parkway. The award was presented at a special ceremony at the APA's Asphalt Pavement Conference during the World of Asphalt® Show and Conference, in Nashville.

To qualify for this prestigious award, a pavement must meet strict criteria and demonstrate Hot Mix Asphalt's long life characteristics, excellence in design, quality in construction, and value to the traveling public. It also must have been constructed at least 35 years ago. Engineers at the National Center for Asphalt Technology evaluated the nominations and a panel of industry experts validated the winners.

This is the first time that the Perpetual Pavement Award has been given to a road outside the United States.

"It is an honor and a privilege to accept this award," said David Kaufman, general manager of the Toronto's Transportation Services division. "As a result of combining

adequate sustainable funding, sound asset management and a committed, dedicated staff, we've been able to keep the roads in a state of good repair and avoid costly maintenance in the future."

The award-winning Don Valley Parkway is one of three major expressways running through the City of Toronto. Its first 7 km were constructed in 1950 (and reconstructed in 1962). The road was extended by 22.9 km in 1957.

The expressway was designed as a deep strength asphalt pavement that would accommodate high traffic volumes. The Parkway's pavement structure includes a base layer of 80 mm, a binder layer of 170 mm, and a surface course of 50 mm.

Since its construction, the road has received routine maintenance and resurfacing in the 1970's and the 1990's. Today, the road experiences an average annual daily traffic count (AADT) of between 80,000 and 100,000 vehicles and a total of 1.2 to 1.3 million equivalent single axle loads (ESALs).



"Even though this pavement has been punished by more than 45 years of heavy use, motorists are still using the original pavement structure," said Pete Alex, APA Co-Chairman. "The extraordinary performance of this pavement is worthy of attention."

"Perpetual Pavement is an industry standard which is extremely well represented by this highway," added Luke Stango, APA Co-Chairman. "Long life, durability, and exceptional performance are hallmarks of Hot Mix Asphalt. This pavement is testimony to high-performance asphalt as a marriage of excellent design and quality construction."

Source: The Asphalt Pavement Alliance

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Here are a few pictures of visitors and exhibitors at World of Asphalt, held in Nashville, Tennessee last March. Next year, World of Asphalt will give way to Conexpo-Con/Agg 2005, in Las Vegas, Nevada.

World of Asphalt will be back in 2006, this time in Orlando, Florida.

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# How Conditions and Coagulant Type Can Effect Cryptosporidium Removal by Filtration



*This article is based on a conference paper presented at the 10th Gothenburg Symposium. It describes the effect of different coagulant types on the removal of Cryptosporidium by filtration. The authors of the original paper are M. Emelko and T. Brown, of the University of Waterloo, Canada. Monica Emelko PhD. is assistant professor of Environmental and Civil Engineering at the University of Waterloo, Ontario, Canada, and can be contacted at mbemelko@uwaterloo.ca.*

Multiple water treatment strategies are critical in the effort to effectively remove pathogens including *Cryptosporidium parvum* (*C. parvum*) from drinking water. While traditional disinfection technologies incur considerable costs and have practical limitations, filtration by granular media can provide an excellent barrier when operated properly. But for filtration performance to be effective, appropriate chemical pre-treatment is vital, and efficacy suffers if that pre-treatment is sub-optimal.

It is recognised that the interaction of *C. parvum* oocysts with chemical coagulants contributes to the effectiveness of the pathogen's removal by filtration, but only

limited information is available regarding the charging mechanisms. Recent studies have suggested oocyst surfaces contain glycoproteins and trace amounts of fatty acids that can have ionisable groups such as carboxylates or phosphates. This means that the interactions between the surfaces of oocysts and the chemical properties of coagulants used in drinking water treatment are likely to be mechanically different and may affect subsequent treatment processes differently.

Recent work has suggested that enmeshment in precipitate may be the primary mechanism of oocyst removal when ferric chloride is used. In contrast, the same work suggested that the chemisorption of hydrolyzed aluminium species was an important mechanism when alum was used as a coagulant. These investigations suggest that the specific interactions between alum and the oocyst surfaces might provide benefits in oocyst removal. While some studies have demonstrated that improvements in *C. parvum* removal by filtration could be associated with specific coagulants, others have underscored the general optimisation of chemical pretreatment rather than specific coagulant selection.

Previous studies have demonstrated comparable levels of *C. parvum* removal by filters treating alum-coagulated water at both warm (~20-26 °C) and cold (~2-3 °C) water temperatures. Similar studies conducted at the same pilot plant demonstrated that oocyst-sized polystyrene microspheres were reasonable surrogates for *C. parvum* removal by filtration.

In the study described here, pilot-scale filtration studies were performed to investigate the relative impact of coagulant type on the removal of *Cryptosporidium* and oocyst-sized polystyrene microsphere surrogates by granular media filtration. The impacts of in-line alum, ferric chloride, and chitosan coagulation on subsequent filtration were investigated.

## PILOT-SCALE TREATMENT PLANT

Two glass filter columns 50 mm in diameter

were operated at a loading rate of ~10.4 m/h (~4.3 US gpm/ft<sup>2</sup>) in a constant rate, rising head mode during the filter evaluations. Each of the filters contained 508 mm of anthracite over 203 mm of sand. The filters treated dechlorinated tap water with 3.5 NTU of kaolin-induced turbidity. The raw water was coagulated in lime and then filtered. One filter treated alum-coagulated water at a dose of 5 mg/L alum at pH 6.9. A second filter treated ferric chloride-coagulated water at a dose of 3 mg/L at pH 6.9. Investigations were also conducted with Chitosan-coagulated water at a dose of 1 mg/L.

During the experiments, formalin-inactivated oocysts and oocyst-sized polystyrene microspheres were added to the filter influent to yield concentrations of ~105 oocysts/L and microspheres/L respectively. The oocysts were added to the raw water and were subsequently coagulated. The addition of oocysts to the raw water did not substantially increase particle loading to the treatment system.

## OPERATIONAL CONDITIONS

The effects of alum, ferric chloride, and chitosan coagulation on *Cryptosporidium* and oocyst-size microsphere removal by filtration were investigated during three experimental conditions: stable operation, sub-optimal coagulation, and no coagulation. Stable operating conditions were periods of optimised treatment during which filter effluent turbidities did not exceed 0.1 NTU. Sub-optimal coagulation conditions represented a coagulant misfeed resulting in a 50 per cent reduction in applied coagulant dose. The no coagulation experiments represented a complete coagulation failure.

All of the experiments were conducted after two to four hours of stable operation after filter ripening. *Cryptosporidium* oocysts and oocyst-sized polystyrene microspheres were seeded into the raw water for one hour during each of the experiments. Filter effluent and effluent samples were collected at four time points, each approximately ten minutes apart, throughout the seeding period. Removal



calculations were based on these influent and effluent concentration pairs.

## ANALYTICAL METHODS

### (a) *Cryptosporidium parvum*

Stock suspensions of formalin-inactivated *C. parvum* were vortexed for 30 seconds, and then a small portion of the suspension was removed to enumerate the oocyst concentration. The stock concentration was determined by averaging triplicate counts using a hemocytometer and light microscopy. The entire grid (1mm<sup>2</sup>) was used for oocyst enumeration at 400x magnification.

During the filtration investigations, *C. parvum* oocysts were measured in filter influent and effluent samples. Filter influents were analysed in 2.5 mL volumes. Filter effluents were analysed in volumes ranging from 5 mL to 1 L, depending on the operating condition studied. Sample volumes were chosen to yield between ten and 2,000 oocysts per membrane.

All of the samples were directly filtered through 25 mm, 0.40 µm polycarbonate membranes utilising a previously described method and standard immunofluorescence assay. Presumptive microscopic analysis for *C. parvum* was performed at 400x magnification. Recovery data from the water matrix indicated approximately 75 per cent recovery of oocysts, comparable to results reported elsewhere.

### (b) *Polystyrene microspheres*

Fluoresbrite™ carboxylated YG fluorescent-dyed, oocyst-sized polystyrene microspheres were used as non-biological surrogate indicators for *C. parvum* removal. The YG dye matches the fluorescence filter settings of fluorescein, similar to FITC for *C. parvum*. The microspheres were concentrated and enumerated concurrently with *C. parvum*, by the method generally described above. Recovery data from the water matrix indicated approximately 75 per cent recovery of microspheres, comparable to results previously reported elsewhere.

### (c) *On-line parameters: turbidity and particle counts*

Turbidity was monitored at the filter influent and effluent locations using on-line turbidimeters calibrated using dilute formazin solutions as specified by the manufacturer. An IBR particle counter measured total particles from 1-150µm at the filter effluent location.

## RESULTS AND DISCUSSION

*C. parvum* removals by filtration preceded

by in-line alum, ferric chloride, and chitosan coagulation during stable operation, sub-optimal coagulation, and coagulation failure were recorded and analysed. During stable (optimised) operating conditions, similar levels of *C. parvum* removal were observed in the pilot-scale filters, regardless of coagulant type (alum, ferric chloride, or chitosan). The importance of maintaining proper coagulation was clearly demonstrated. Compared to alum and chitosan, ferric chloride may result in slightly lower *C. parvum* removals by filtration during sub-optimal coagulation conditions, and further analysis is necessary to determine whether the differences are statistically significant. A possible explanation for such differences may be the different mechanisms of interaction between the coagulants and the oocysts. In agreement with other reports, this study demonstrated almost no oocyst removal by filtration during complete coagulation failure, regardless of coagulant type.

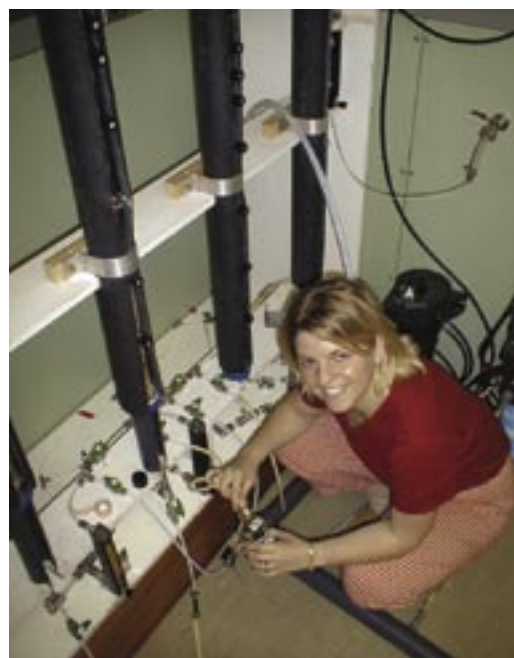
Oocyst-sized polystyrene microsphere removals by filtration preceded by in-line alum, ferric chloride, and chitosan coagulation during stable operation, sub-optimal coagulation, and coagulation failure were also recorded and analysed, providing similar data to the oocyst data above, however there was considerably more variability. The overall trends regarding the impact of coagulant type and coagulant conditions were similar between both the oocyst and microsphere sets of data. Microsphere removals by filtration preceded by alum, ferric chloride, and chitosan were similar. Again it appeared that, compared to alum and chitosan coagulation, ferric chloride coagulation may result in slightly lower removals of microspheres by filtration during sub-optimal coagulation conditions, and when no coagulant was present, there was little removal of microspheres by filtration.

Oocyst and microsphere surface charge and compressibility may contribute to the observed differences in oocyst and microsphere removals by filtration. In the present study, the overall relationship between *C. parvum* oocyst and polystyrene microsphere removals during the range of operational conditions investigated was fairly linear. Microsphere removals were similar to oocyst removals, though often slightly lower, regardless of the coagulant type utilised.

## CONCLUSIONS

The pilot-scale results from this work indicated that:

- Alum, ferric chloride, and chitosan coagulation generally resulted in similar removals of *Cryptosporidium* oocysts and oocyst-sized microspheres during optimised operating conditions when filter effluent turbidities were consistently below 0.1 NTU
- Sub-optimal coagulation conditions with alum, ferric chloride, and chitosan coagulation resulted in deteriorated *Cryptosporidium* and microsphere removal by filtration, relative to stable operation. *Cryptosporidium* removal by filtration during sub-optimal coagula-



*Monica Emelko PhD. Is assistant professor of Environmental and Civil Engineering at the University of Waterloo, Ontario, Canada*

tion with either alum or chitosan appeared marginally better (relative to stable operation) than that observed during ferric chloride coagulation.

- The observed differences in *Cryptosporidium* and microsphere removal during sub-optimal coagulation conditions (and possibly during stable operation) may be associated with the different mechanisms of alum, ferric chloride, and chitosan interaction with oocysts during filtration. Further analysis is necessary to determine if these differences are statistically significant.

- Oocyst-sized polystyrene microspheres appeared to be reasonable indicators of *Cryptosporidium* removal by filtration, regardless of coagulant type.

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unloading of any object onto or from the bed. The versatile functionality of this innovative system creates a new philosophy of transportation: the Multi Utility Vehicle.

In order to present, communicate and market this revolutionary invention in an effective and thrilling way, Rinspeed has created the



“X-Trem” and “Tatoo.com” concept trucks showed in 1999 and 2000 at the Geneva International Motor Show, Detroit and Las Vegas Auto Shows.

## THE APPLICATIONS

The “X-Tra-Lift” can be installed in any new

or used Pick-Up truck . Its simple structure and small numbers of components allow a cost effective production and attractive retail pricing.

Since the biggest market for this kind of equipment is in the United States, Stellar Industries of Garner, Iowa, manufactures and



distributes the “X-Tra-Lift” in North America. Stellar products are sold in Quebec by Les Équipements Twin Inc.

Source: Rinspeed,  
Les Équipements Twin Inc.  
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# Hitachi's 800-ton Ultra-large Excavator, the EX8000

Hitachi Construction Machinery Co., Ltd. developed the ultra-large hydraulic excavator EX8000 as the largest class in the world, with an operating weight of 780 tons and a loading shovel bucket capacity of 40 m<sup>3</sup>. The EX8000 exceeds the operating weight and loading shovel bucket capacity of the EX5500-5 by 270 tons and 11 m<sup>3</sup>, respectively.

After the completion of detailed performance tests, the EX8000 will be scheduled for user tests in a Canadian mine from this October.

The EX8000 was developed as a response to the growing size of dump trucks designed to reduce costs at mines. It can load a 300-ton dump truck with four passes in two minutes.

## SPECIFICATIONS EX8000 - LOADING TYPE

|                   |                     |                         |              |
|-------------------|---------------------|-------------------------|--------------|
| Bucket            | 40.0 m <sup>3</sup> | Ground pressure         | 235 kPa      |
| Operating weight  | 780.0 t             | Swing speed             | 3.2 rpm      |
| (2) Engines       | S16R-Y1TAA1         | Travel speeds           | 2.0/1.4 km/h |
| Engine power (2x) | 1,400 kW@1,600 rpm  | Max. arm crowding force | 2,870 kN     |
|                   | 1,900 HP@1,600 rpm  | Max. digging reach      | 18,500 mm    |
| Crawler length    | 10,500 mm           | Max. digging depth      | 4,100 mm     |
| Crawler width     | 8,650 mm            | Max. cutting height     | 20,500 mm    |



EX8000

Source: Hitachi Construction Machinery Co.,Ltd.

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# CERIU Fact Sheets :

## “Cathodic Protection Using a Sacrificial Anode”



*Fact Sheet SP-01  
Trenchless Techniques  
Stabilization and Protection of Structures  
Cathodic Protection  
Using a Sacrificial Anode*

### DESCRIPTION OF THE TECHNOLOGY

This technique is used to protect metal pipes from the effects of external corrosion.

### PROCEDURE

A pit near the pipe to be protected is excavated and a sacrificial anode installed. The anode must be connected to the pipe via a conductor wire.

Protection is based on the principle that corrosion will attack the sacrificial anode, as it is made of a less noble metal, rather than the pipe itself.

An assessment of the system's performance is carried out by measuring the electric potential of the pipe using permanent

reference electrodes buried near the pipe or a portable reference electrode placed on the ground above the pipe. The anode's current can be measured at test points set up at strategic locations along the length of the pipe.

### MATERIALS

The materials used in the sacrificial anode are magnesium, aluminium or zinc.

### APPLICATION

Types of Pipes and Structures

Cathodic protection can be used to protect buried metal pipes, reinforcing steel in concrete as well as underground reservoirs, regardless of the shape or size of the section.

### PRELIMINARY AND COMPLEMENTARY WORK

To determine the dimensions and alloy needed for the sacrificial anode, the corrosivity of the soil and the integrity of the pipe need to be assessed.

Proper care should be taken to locate the pipe and adjacent structures prior to excavation. All excavation must be done in accordance with the spacing requirement established in the design specifications.

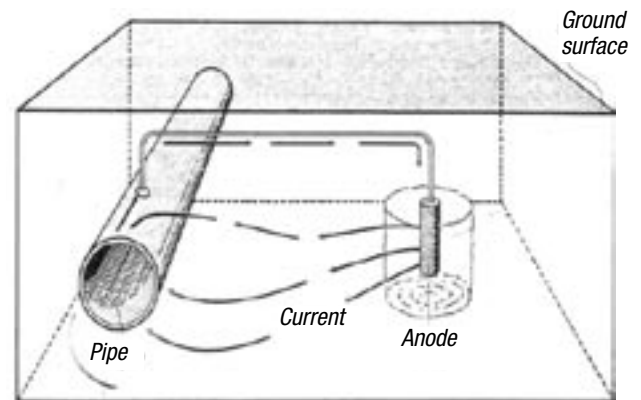
### CONDITIONS AND LIMITATIONS

The parameters that need to be taken into consideration in the design of the sacrificial anode are:

- the dimensions of the pipe;
- the electrical continuity between the

various pipe sections;

- the soil resistivity;
- the soil aggressivity;
- the life expectancy of the anode;
- the presence of stray currents.



### DEADLINES AND TIMEFRAMES

Except where considerable quantities are required, most materials are available within a fairly reasonable timeframe. For larger-scale projects, at least one month of lead-time should be planned.

The planning stage is vital. Sufficient time must be set aside to collect and analyze soil samples and perform the necessary calculations related to the anode.

As a general rule of thumb, twenty or so anodes can be installed in a day. The final potential readings are taken three to four weeks after installation.

### TESTING AND MONITORING

During installation, 1% of the anodes are sampled to ensure that the alloy meets specifications (ASTM G97 and ASTM B843).

Assuming the electric continuity of the pipe, static potential readings must be



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obtained before installation of the anodes begins. Using a portable Cu / CuSO<sub>4</sub> electrode, a reading of the pipe-to-soil potential is taken every 10 m above the path of the pipeline.

At least three weeks later, another pipe-to-soil potential reading must be obtained at every 10 m to ensure that the pipe is properly polarized and meets the guidelines established by the National Association of Corrosion Engineers (NACE).

During this survey, all anode currents are measured and recorded at the test points.

Results of these tests are then submitted to an engineer in graph form, along with a written report on system performance.

#### STATUS OF THE TECHNOLOGY

Cathodic protection has been in existence for several decades. Its first commercial applications were in the 1920s to protect pipelines in the U.S. Southwest. Since then, the technique has been in regular use in the petrochemical industry, mainly to protect pipelines.

The first Canadian application, in the 1970s, was designed to protect water mains in southeastern Ontario. The technique has

been in use in Quebec since the 1980s.

*CERIU assumes no responsibility whatsoever concerning the application of the techniques and procedures described in the present fact sheet.*

*To obtain the complete collection «CERIU Fact Sheets» you are invited to contact Mrs. Céline Forest by phone at (514) 848-9885 poste 272 at the Centre d'expertise et de recherche en infrastructures urbaines (CERIU).  
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# NAPA Names 2004 National Officers

Charles F. Potts, CEO, Heritage Construction & Materials, Indianapolis, Ind., has been elected Chairman of the National Asphalt Pavement Association for 2004. Mr. Potts was installed in office during NAPA's 49th Annual Convention in Phoenix, Arizona.

Other national officers serving with Mr. Potts for 2004 include Richard C. Moore, Jr., Lehman-Roberts Co., Memphis, Tennessee, First Vice Chairman; James H. Roberts, Granite Construction Inc., Watsonville, California, Second Vice Chairman; Ronald M. White, Superior Paving Corp., Gainesville, Virginia; Third Vice Chairman; Thomas W. Hill, Oldcastle Materials Group, Washington, DC, Treasurer, and G.M. "Mac" Badgett, III, Vulcan Materials Co., Birmingham, Alabama, Secretary.

Mr. Potts' NAPA activities have included serving on the Executive Committee since 1995. He was Chairman of the National Center for Asphalt Technology (NCAT) in 1996 and has served on NCAT's Board of Trustees since 1986. He served as Vice Chairman

of the Committee for Asphalt Research and Technology from 1998 to 2002. He has served on numerous other NAPA committees and task forces.

Mr. Potts received a Bachelor's Degree in Civil Engineering from The Citadel in 1966, and a Master's Degree in Civil Engineering from West Virginia University in 1967. He is also a graduate of Harvard's Advanced Management Program.

Mr. Potts is a member of the Board of Directors of the American Road and Transportation Builders Association (ARTBA). He is on the Board of Directors for the National Stone, Sand and Gravel Association (NSSGA) and the National Center for Asphalt Technology (NCAT). He is a member of the Civil Engineering

Advisory Council at The Citadel. He is a member of several Transportation Research Board committees and Federal Highway Administration technical working groups. He is also past president of the Association of Asphalt Paving Technologists.



The National Asphalt Pavement Association is the only trade association that exclusively represents the interests of the Hot Mix Asphalt producer/contractor on the national level with Congress, government agencies, and other national trade and business organizations. The Association provides technical, educational, and marketing materials and information to its Members; supplies product information to users and specifiers of paving materials; and conducts training courses. The Association, which counts more than 1,000 companies as its Members, was founded in 1955.

Source: National Asphalt Pavement Association



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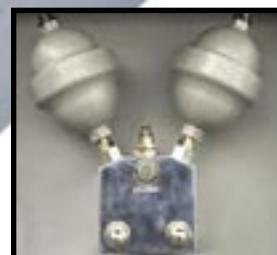
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*(This device is patent pending)*



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