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DECEMBER 2014
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2 A Land Or Sea Lifesaver

3 A Real Crapshoot

4 Cleaning Quackers Quickly

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TOP DEAD CENTER

Diesel Progress Predicts ...

One of my favorite things to read is predictions of the distant future. They are easily the least accountable things you can write. "The Construction Industry in 2065." "What Farm Machinery Looks Like 50 Years From Now." "Power 2075."

It is the rare (and slightly sick) individual that will tear a page out of a magazine or take a PDF and file it to look at 50 years hence. That's why it's easy journalism. You can't prove or disprove the assertions and nobody, other than the aforementioned weirdo, will challenge your forecasting. "You said in 2015 that we would be harvesting corn on Mars! You were wrong! Everyone knew it would be on Jupiter! Duh."

This issue of *Diesel Progress* looks at the year that was 2014 — that's mostly what the *Newsmaker Of The Year* is about. And looking at the 2014 *Newsmaker Of The Year*, I doubt that few outside of the strategy teams at Generac and Briggs & Stratton saw the aggressive paths those two companies would take over the last 12 months.

I also doubt that anyone predicted ZF buying TRW, Siemens buying Dresser-Rand or many of the other deals, big and small, which populated industry news this year.

So what's ahead for 2015, he said, recognizing that with that short of timeline, somebody out there may well say 12 months from now, "Boy, did you miss predicting the biggest story of the year!" I can almost guarantee you we will. That's what makes this fun.

But looking at 2015, there is little doubt that natural gas from fracking, energy independence and increasing use in industrial engines will continue to be a major theme. The whole subject was a runner-up for the 2014 *Newsmaker Of The Year*, so that's not exactly an under-the-radar type of prediction.

Stage 5 emissions regulations and the possibility of a Tier 5 in the U.S. will also be much discussed. Again, not new news, but a story that will likely increase in intensity, volume and hyperbole.

Tier 4 used engine and equipment migration into lesser-regulated countries will continue its steady climb into greater industry consciousness. First discussions of the subject for us date back to ConExpo-Con/Agg 2011, but only more recently have companies been heard to say, "Wow, what *are* we doing about that?"

It is no great feat of crystal ball gazing to say the downturn in agricultural machinery sales will be much discussed. I also think at this point next year people will be saying, "Well, it looks like mining sales bottomed out late in 2014."

I have no clue which way China is headed.

The rumor mill is not currently buzzing about any major acquisitions. Which, of course, means something big is right around the corner.

The subject of telematics will continue to grow. Who has access to what data? Who owns the data? How secure is it?

But I can almost guarantee that the 2015 *Newsmaker Of The Year* article will start with the phrase, "In a deal no one in the industry saw coming ..."

So it goes. Happy Holidays. dp

Mike Osenga
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INNOVATIVE USES OF HORSEPOWER

28 A Real Crapshoot
34 Cleaning Quackers Quickly
36 A Land Or Sea Lifesaver
40 Float Like A Boat, Drive Like An ATV
44 Rocket Man-euvers
46 Standby Power For Science

TECHNOLOGY OF CLEAN AIR

50 More Compact Crankcase Cleaning
52 Emissions: The Mother Of Invention

TECHNOLOGY

14 A Cool Concept For Locomotives
62 Focusing On Fuel Efficiency

INDUSTRY NEWS

6 Rental Revenues Continue Comeback
12 Exec Changes At Navistar
18 2014 Newsmaker(s) Of The Year
24 The Ground Power Behind The Air Power
60 Gearing Up For Growth

COLUMNS

2 *Top Dead Center — Diesel Progress* Predicts ...
4 *Street Smarts* — Fuel Economy Effort Goes Worldwide
10 *Trendlines* — A Big Wish For 2015
22 NFPA Monthly Scoreboard
48 *Emissions & Alternatives* — CNG Stations Added ... Hydrogen Fueling Competition ... New Cellulosic Ethanol Plant ... Merchant LNG Facility Opens ...
54 *Power Systems Outlook* — Gen-Set Sales Marginal In Third Quarter, But Could Get Late Push
64 *Global Business Notes* — Volvo CE Moving Production To China ... Terex Selling Group To Manitex ... AGCO In Precision Ag Venture ... Engine Supply Deals For Deere & Deutz ...

dp BULLETINS

8 Diesel HR
9 Dateline
38 Product Pipeline
47 DotCom
56 Advertisers' Index
58 Jobs
59 Marketplace
61 Powerlines

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 3 of 65

STEVE STURGESS

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Fuel Economy Effort Goes Worldwide

STREET SMARTS IS A MONTHLY COLUMN DEVOTED TO THE ON-HIGHWAY TRUCK MARKETS. STEVE STURGESS IS AN INDEPENDENT TRUCKING WRITER AND CONSULTANT BASED IN LAGUNA NIGUEL, CALIF. HIS BLOG IS AT WWW.STEVESTURGESS.COM

A visit to the new Shell lubricants research and development center in Shanghai earlier this year included many presentations with some worrisome figures. For instance, Dr. Richard Tucker from Shell Technology opened his presentation with the fact that 2050 will see the world population rising to 9 billion people — 2 billion more than today — and by then 75% of the population will be living in cities. And I can tell you here that our visit to Shanghai gave more than a little insight into what that will mean. It's a vertical city, thronged with people. And lots of rather poorly controlled traffic.

That'll likely get worse. Tucker said that the vehicle population will rise from 800 million worldwide to 2 billion by 2050.

The presentation noted that many more of the world's population will rise from "energy poverty," leading to a doubling of the world's energy needs. And that's against a dire need to address greenhouse gases, most importantly CO_2. To achieve those goals, every energy consuming device, be it a mine hauler or an electric toaster, is going to have to be at least twice as efficient as today's to consume half the energy. And his opening presentation slide concluded that we shall have to generate three times more energy from renewable sources by the middle of this century if we are to succeed.

Against this background, Turner said that in Shell's prediction, two-thirds of vehicles are still likely to be using current engine technologies and conventional liquid fuels. So getting the higher efficiencies from spark-ignited and compression-ignited engines driving those vehicles is going to take a suite of technologies that will have to include low-friction lubricants.

Hence the visit to the Shell Shanghai Technology Center, a new facility that, along with research centers in Houston, Texas, and Hamburg, Germany, are working together to develop lubricants that offer low friction without the tradeoff of higher wear and less durability for the engines they are to protect.

But to make these next steps, lubricants are going to have to be developed in partnership with the engine and vehicle OEMs, said the Shell team assembled at the Tech Center's open house. The Shanghai facility, which opened just last year, is there to forge these partnerships with Chinese auto and truck makers. In her presentation, Dr. Selda Gunsel, vice president of downstream global commercial technology at Shell, pointed to the relationship between the Hamburg Research Center and Daimler, which is helping Daimler set a new standard in truck fuel efficiency in its Record Run economy event of a few years ago, using exclusively Shell FuelSave Diesel and Shell Rimula R6 LME. Another high-profile relationship, she said, is in the development of special race lubricants for Ferrari.

The Rimula brand will be familiar to readers of *Diesel Progress* acquainted with markets outside of North America — it is the most recognized heavy-duty diesel lubricant in much of the world and the strongest brand in China.

Shell goes to great lengths to keep the brand in front of Chinese customers. An example is the traveling Trucker Roadshow. This is a China-nationwide event that was introduced by Shell 11 years ago to interact with Chinese truck drivers. In fact, Shell said that since 2003, it has staged 2455 road shows in almost 1000 locations across China. In all, the event, which includes trucker games, entertainment and education, has covered a distance of nearly 200,000 miles and attracted 260,000 participating truckers.

Shell Rimula Trucker road shows usually take place in parking lots or logistics parks — places where trucks park and truck drivers collect. Shell shares its lubricant knowledge with these truckers at the special events, such as tips for choosing the right lubricants, extended oil drain intervals and extra maintenance that bring cost savings through extended engine life, said the Shell people at a truckstop we visited during one of these events.

In a major upgrade in 2011, Shell added a professional truck fleet workshop and a challenging self-guided nationwide tour alongside "The Best Shell Rimula Truck Driver" campaign. This event covers health checks such as blood pressure and body composition tests and performances, plus interactive games to help teach truckers the benefits of looking after themselves while on the road.

And given the size of China, they are on the road a lot. I interviewed several drivers through an interpreter, and while the trucks are mostly modern, the trucking culture is out of the early days, with little hours-of-service regulation and a huge proportion of the transportation provided by owner-operators or very small fleets.

Overall, our visit to Shanghai was very instructive, showing how important this region is not just to Shell's efforts locally, but globally in developing the next generation of lube oils to boost fuel economy worldwide. As truck OEMs continue to develop products around the globe, partnerships that cover multimarket requirements are going to be increasingly necessary to meet fuel efficiency goals of the future. dp

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Page 4 of 65

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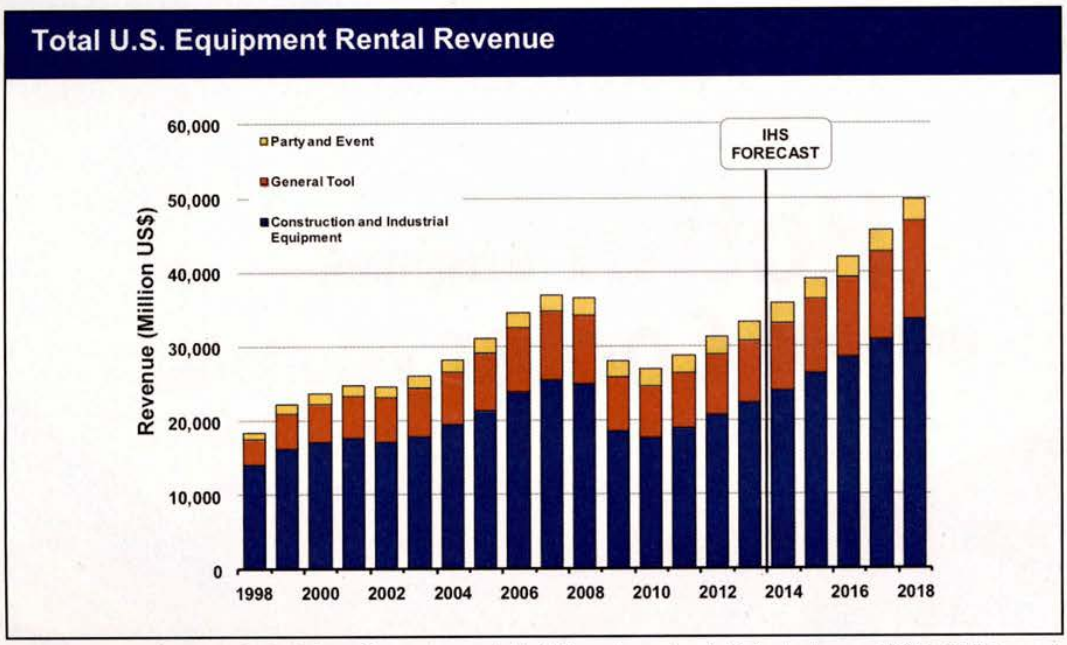

The American Rental Association's latest forecast expects the U.S. equipment rental industry to grow 7.3% in 2014 to reach $35.7 billion in revenues — almost back to pre-recession levels. Equipment rental revenue in the U.S. is expected to reach $49.8 billion in 2018.

RENTAL REVENUES CONTINUE COMEBACK

ARA expects revenues for rental equipment in the U.S. to approach $50 billion by 2018

The equipment rental industry in the United States is expected to grow 7.3% in 2014 to reach $35.7 billion in revenues — almost back to pre-recession levels — according to the American Rental Association's (ARA) latest forecast from the ARA Rental Market Monitor. These figures are slightly below the ARA's previous July forecast of 7.6% growth.

"The revision in our expectations has to do with the general economy and with the construction industry, where growth this year has not met expectations," said Scott Hazelton, director of Industry Consulting at IHS, formerly IHS Global Insight, the global information company that compiled the data for the ARA. "Construction will continue to improve in the fourth quarter, but it is not likely to accelerate enough to reach our earlier projections."

Nonetheless, the forecast said that the equipment rental industry's growth rate will more than triple the expected growth of the U.S. gross domestic product (GDP) in 2014 and exceed the growth of the industries it serves. According to the forecast, equipment rental revenue will continue to grow over the next four years, reaching $49.8 billion in 2018. This continues a growth trend that began after revenues bottomed out in 2010 at $26.8 billion — down from $36.5 billion in 2008 — due to the effects of the recession.

Among the equipment rental segments, construction and industrial equipment as well as general tool will experience near double-digit rental revenue growth in the U.S. over the next four years according to the forecast. The two segments are expected to average 8.8 and 9.7% annual growth, respectively, from 2015 through 2018. The party and event segment, while not growing as dramatically, is expected to average 3.2% annual growth during that same time.

The ARA forecast revenue growth for Canada at 5.4% in 2014 to $4.9 billion. Growth from 2015 through 2018 will average 4.8% annually, with 2018 revenues expected to hit $5.9 billion.

The ARA said it expects U.S rental companies to invest more than 30% of their revenue in new equipment over the next five years. Total investment is projected to reach $11.9 billion in 2014 and grow to nearly $15.5 billion in 2018. dp

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Page 6 of 65

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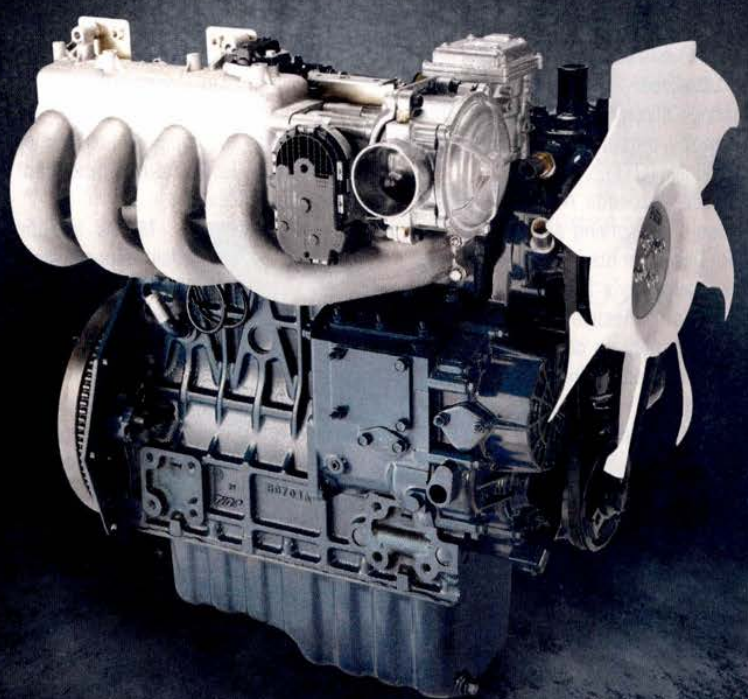

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Cummins Components Group President

T. Embree

Cummins Inc. has named **Tracy Embree** president of its Components Group, effective Jan. 1, 2015. Embree will become a member of the Cummins leadership team, reporting to Chief Operating Officer **Rich Freeland**. Embree is currently president, Cummins Turbo Technologies (CTT).

Embree succeeds **Anant Talaulicar**, who has been serving as both president of the Components Group while leading the company's India Area Business Organization. Effective Jan. 1, Talaulicar will serve solely as chairman and managing director of the India Area Business Organization.

Prior to serving as president of CTT, Embree worked in the MidRange Engine business, where she was responsible for the on-highway line of business. She has also held marketing and sales positions in Cummins' Emission Solutions and Filtration businesses and was executive director of the Chrysler business. Embree also spent two years in the Power Generation business as general manager for Cummins' Energy Solutions business in Kent, U.K.

Melka Named President At Kohler Engines

Following **Tom Cromwell**'s appointment to group president at Kohler Co.'s Power Group, the company has promoted **Brian Melka** to the role of president – Engines Americas.

B. Melka

Melka assumes full responsibility for the engines business in the Americas region, establishing strategic direction, managing operational demands, driving growth and profitability objectives, and attracting and developing talent. In addition, he will have worldwide responsibility for new product development, marketing and overall growth of the gasoline engines product lines.

Melka joined Kohler in 2013 in the role of vice president. Prior to Kohler, he served in numerous senior capacities at Rexnord Corp., where he most recently held the role of vice president – Global Mining and Product Management. Before joining Rexnord, he spent 12 years working for various Textron Inc. businesses, including Greenlee Textron and Jacobsen Textron.

AEM Elects 2015 Officers, New Directors

The Association of Equipment Manufacturers (AEM) announced its newly elected 2015 officers as well as directors elected at its recent annual meeting to the AEM board of directors and Ag and CE sector boards.

AEM officers and directors work on behalf of all AEM member companies to

continued on page 57

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Web: www.worldofconcrete.com

Feb. 22-25
The Rental Show
Ernest N. Morial Convention Center, New Orleans, LA
American Rental Association
1900 19th Street, Moline, IL 61265
Tel: (800) 334-2177 Fax: (309) 764-1533
E-mail: chris.coleman@ararental.org
Web: www.therentalshow.com

***Feb. 24-26**
4th Integer Emissions Summit & AdBlue Forum Russia
Moscow, Russia
Integer Research
Invicta House, 108-114 Golden Lane, London, EC1Y 0TL, U.K.
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Web: www.integer-research.com/conferences/russia-cis-2015/

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March 4-6
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NTEA
37400 Hills Tech Drive, Farmington Hills, MI 48331
Tel: (800) 441-6832 Fax: (248) 489-8590
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March 26-28
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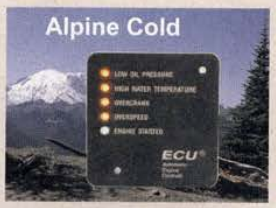

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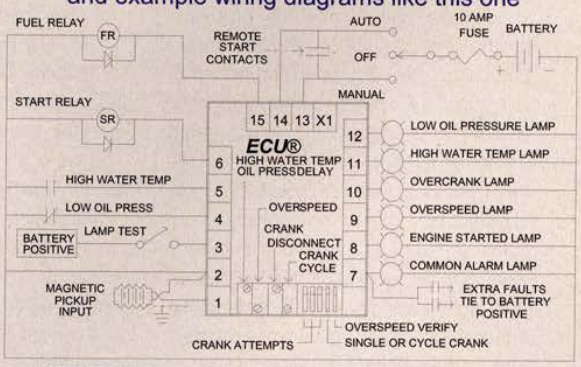

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A Big Wish For 2015

CHARLES R. YENGST IS PRESIDENT OF YENGST ASSOCIATES, WILTON, CONN.

At this time of year, I often like to make a "wish list" for the industry. Overall, I would like to see the industry prosper, and while in years past, some of my wishes have been made with tongue planted firmly in cheek, this year my wishes are more in line with what I truly hope comes true.

On a recent "60 Minutes," there was a segment about the decrepit condition of our nation's bridges and highways. This is a subject we have all watched for decades and fully understand. The unfortunate issue is that Congress has been asleep at the switch, politically polarized and apparently not seeing the real problem — nor does it seem to understand what's needed to rectify it.

Our bridges in the U.S. — and there are more than 70,000 of them, according to the broadcast — are in terrible shape. We cannot see the problems driving over or under these very important parts of our highway and rail infrastructure, but rust is taking over, and cement and asphalt are falling apart on nearly all of it. It's a wonder that we have not had more accidents and destruction because of the neglect.

It's up to Congress to put politics aside and get legislation moving that will not only put money toward the maintenance and upgrading of our infrastructure, but to make a systematic plan to begin working on the bridges, highways railways and airports to make them safe and in good working condition.

The Highway Trust Fund has in the past been directed by highway bills, usually in the hundreds of millions of dollars, which established six-year working periods. Today, we see six- or eight-month "band aid bills," sometimes called "pothole bills" that hardly cover the cost of pothole mix and tar to cover cracks and holes in the roads. The most recent bill passed by Congress and approved by the administration in August of this year called for $10.8 billion in funding, good until May 2015 and offering little or no direction. Is this the best we can do?

Gas taxes to help maintain infrastructure and highways have been in effect for about 80 years. The first gasoline tax of one cent per gallon went into law June 1932. That tax has progressively increased over the years so that it finally got to three cents per gallon in July 1956 and four cents per gallon October 1959.

It has bounced around since then. In October 1993, Congress set the tax at 18.4 cents per gallon, the current price. The current tax on diesel fuel was also set at 24.4 cents per gallon at the same time.

Meanwhile, inflation has increased 64% since 1993, which should put the gas tax with inflation at about 30 cents per gallon on a national basis. Today's motorists, therefore, are paying about half per mile what they paid in 1993. That's why the system is broken.

In June 2014, a bipartisan highway bill amendment implementing a six-cent gas tax increase in 2014 with another change of six cents in 2015 was debated by the House of Representatives. This amendment called for indexing the gas tax to inflation, ensuring the fact that the Highway Trust Fund would be viable for many years, which is not the case with the current 21-year-old bill. The amendment died in the House before being sent to the Senate because of concerns over raising taxes in an election year.

A new longer-term highway bill would create jobs, help machinery demand grow and make our roads, bridges and rails safer and more efficient. If we spend $40 to $50 billion a year for nationwide transportation maintenance, then we need to find ways to generate that revenue and manage it properly.

Are there other or better ways this could be accomplished in view of the fact that highways are used by more and more people, some with electric cars and hybrids? Fuel efficiency is a factor — better fuel economy means less gas tax revenue — and so is the politics that keeps throwing anti-tax arguments. Gasoline and diesel vehicles will be here for a long time, and certainly even long after electric vehicles become a significant part of the motor vehicle scene. Reforming the gas tax and getting our transportation system running again will have a positive impact. We need efficient transportation systems as they are the lifeline in our national structure.

I want to see funds flowing again for highways and new machines to do the work. It is time for a longer-term plan (perhaps four, five or six years in duration like previous highway bills), and one that won't go bust the first year from lack of money. In two years, the system should be working much better and road and bridgework might start to come back to the "normal" we once had.

I would be willing to bet that roughly 85% of the public is ready for such changes. None of us want higher gas prices, but with fuel prices dropping the way they are, there is no better time to move forward. People want improvements to our nation's roads and bridges — most of us drive cars and are tired of having the tires and shocks ruined from bad roads. We are also tired of a rundown and aged air traffic control system and our metro systems that are antiquated. If someone has a better idea to fix all of this, step forward.

Come on, Santa. All I want for Christmas is a real road bill. dp

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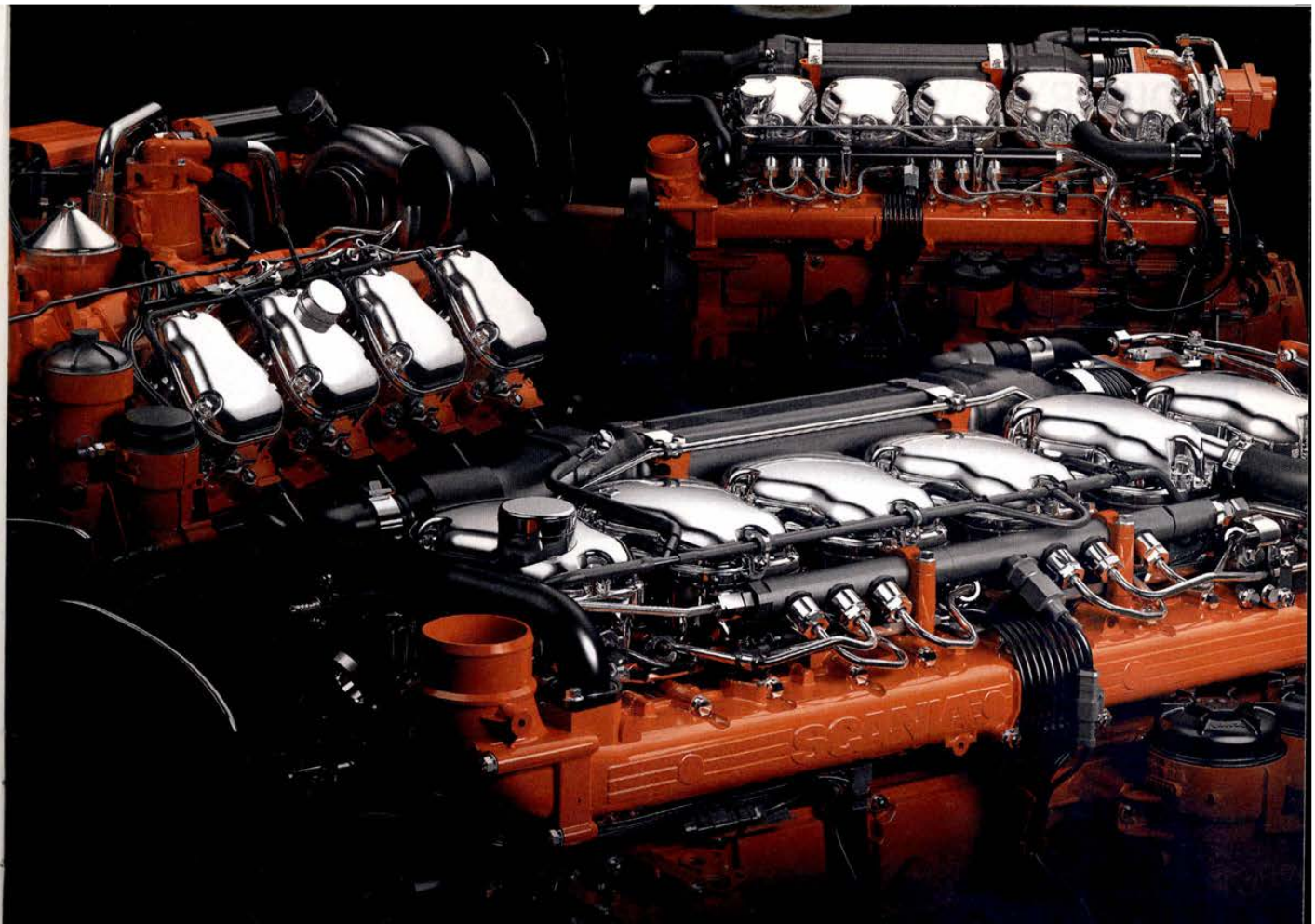
Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 10 of 65



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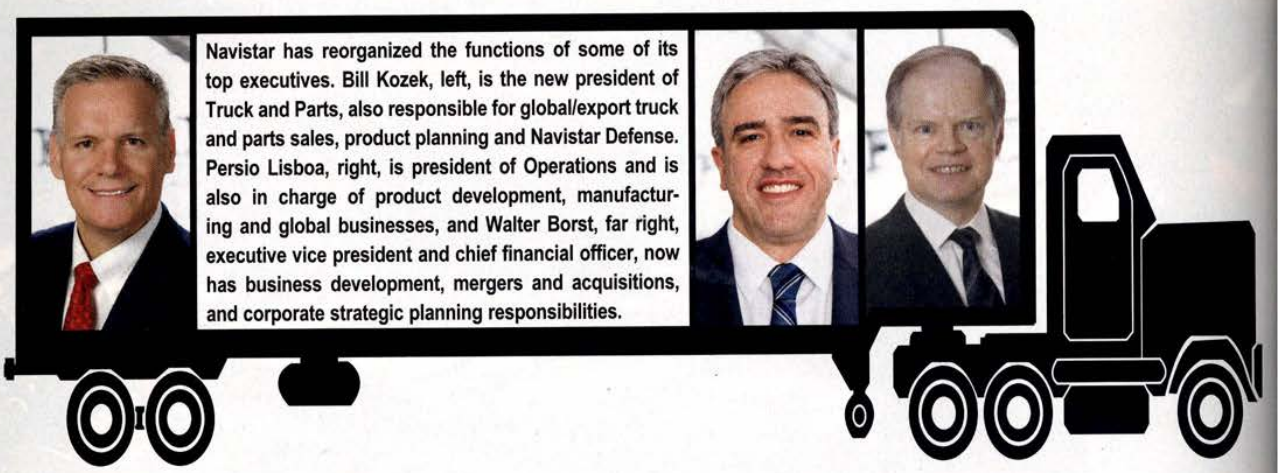

Navistar has reorganized the functions of some of its top executives. Bill Kozek, left, is the new president of Truck and Parts, also responsible for global/export truck and parts sales, product planning and Navistar Defense. Persio Lisboa, right, is president of Operations and is also in charge of product development, manufacturing and global businesses, and Walter Borst, far right, executive vice president and chief financial officer, now has business development, mergers and acquisitions, and corporate strategic planning responsibilities.

EXEC CHANGES AT NAVISTAR

Company reorganizes senior leadership; Allen retires, Kozek new president Truck and Parts

Navistar, Inc., the Lisle, Ill.-headquartered manufacturer of International brand commercial and military trucks, MaxxForce diesel engines, and IC Bus school and commercial buses, has announced it is restructuring its senior leadership team by giving three executives additional responsibilities. The company also announced that Jack Allen, 56, the company's executive vice president and chief operating officer (COO) since April 2013, is retiring after more than 33 years at the company.

"Today is a new beginning for Navistar," said Troy Clarke, Navistar president and CEO. "We are introducing a new leadership team and organization structure that will guide us into the future and enable us to accelerate our performance now that our turnaround is behind us."

Bill Kozek, 52, president of North America Truck and Parts, has been promoted to president, Truck and Parts, and is adding global/export truck and parts sales, product planning and Navistar Defense to his current responsibilities.

Persio Lisboa, 49, senior vice president and chief procurement officer, has been promoted to president, Operations, and is now also responsible for product development, manufacturing, and global businesses.

Walter Borst, 52, executive vice president and chief financial officer (CFO), is adding business development, mergers and acquisitions, and corporate strategic planning responsibilities to his portfolio.

These leadership and structural changes are effective immediately, the company said.

"We're a different company — a better performing company — than we were two years ago," Clarke said. "We've streamlined the organization, focused our efforts on functional excellence and implemented lean operating principles throughout the company. This new structure will build on those efforts and allow us to grow profitable market share as we more effectively plan, design, build and sell our vehicles, parts and services and deliver industry-leading uptime for our customers."

Borst joined Navistar in August 2013 from General Motors Co., where he most recently was the chairman, CEO and president of GM Asset Management. Previously, he was vice president and treasurer at GM from 2003 to 2010. He also served as CFO of Adam Opel AG in Russelsheim, Germany from 2000 to 2002. Prior to that time, he served in various treasury, controller, and financial operating capacities at GM.

Kozek joined Navistar in May 2013 after more than 26 years with Paccar, where he last served as vice president and general manager of the Peterbilt division, responsible for all aspects of Peterbilt's U.S. and Canadian operations. Before serving

NUHN15000022432

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 12 of 65

After more than three decades at Navistar, Executive Vice President and Chief Operating Officer Jack Allen is retiring.

as vice president and general manager of Paccar's Kenworth division, Kozek served in roles of increasing responsibility in Kenworth's sales, parts and finance operations.

Lisboa joined the company in 1988 in the marketing area of Maxion International Motores Brasil. Prior to roles in procurement, Lisboa served as vice president and general manager in the company's engine group, as well as several other leadership positions in South America, such as president of the Argentina subsidiary and vice president of sales and marketing for Navistar's engine group in Brazil.

Allen was one of the last links to the administration of Daniel C. Ustian, who was chairman of Navistar from 2004 until his abrupt retirement in August 2012. Most of Navistar's financial woes can be traced back to that era, when under Ustian's direction, Navistar sought to differentiate itself with an exhaust gas recirculation (EGR)-only approach to the 2010 emissions regulations. After spending hundreds of millions to develop the technology, Navistar was unable to meet the EPA standards, and engines in the field were troublesome, with high warranty costs that ultimately led to an erosion of Navistar's market share and financial performance from which it has still not recovered.

"Jack (Allen) has been an important leader at this company for more than three decades, and he played a critical role during our turnaround these past two years," Clarke said. "Now, we are counting on these three talented and energetic leaders to work with me and the rest of the organization to drive Navistar forward on its path to profitable growth." dp

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www.navistar.com

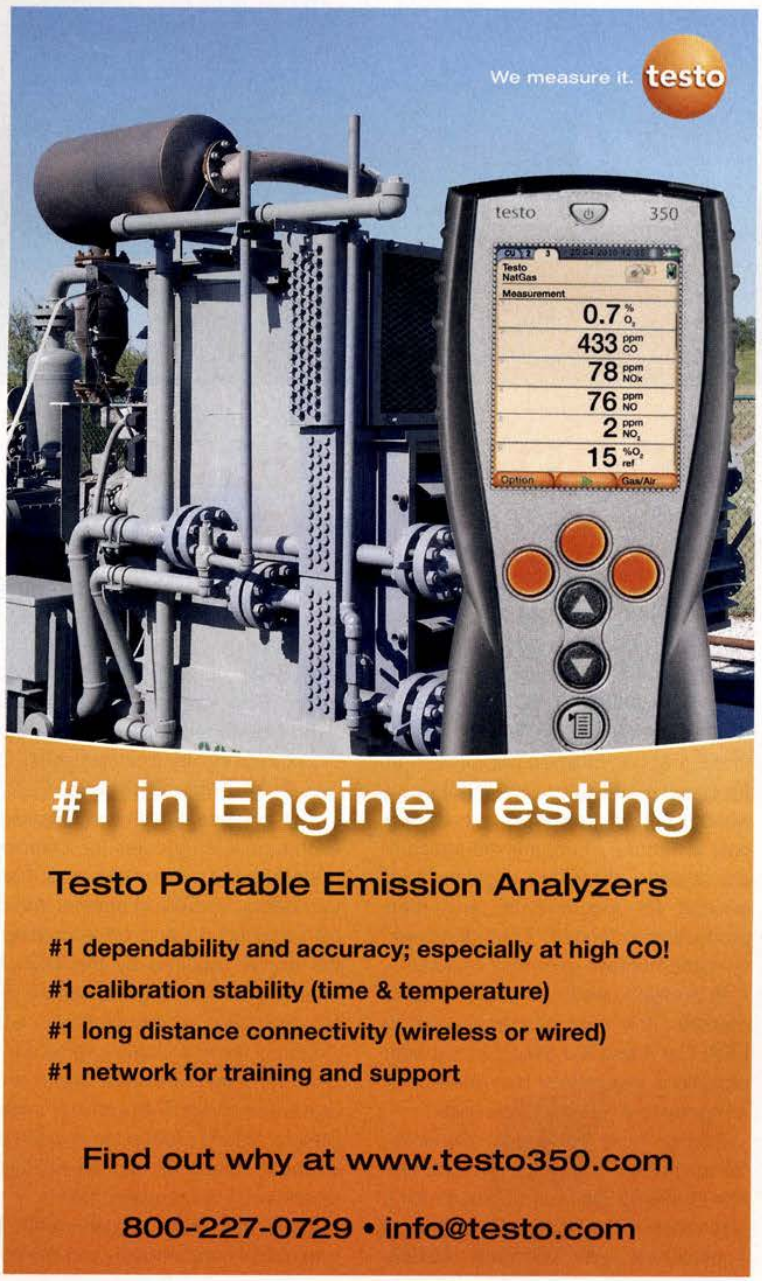

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 13 of 65

Rather than rely on a single large engine, Bombardier's TRAXX locomotive instead employs four Caterpillar C18 diesels, each rated 737 hp. Bosch Rexroth supplied a customized electric and hydrostatic fan-drive system with a dedicated fan control system. The hydrostatic fan drive is based on the A10VO series axial piston variable displacement pump driven off the engine.

A COOL CONCEPT FOR LOCOMOTIVES

Bosch Rexroth provides hydraulically driven cooling system for Bombardier multiengine rail concept

Diesel electric locomotives have traditionally been powered by larger diesel engines. While that combination has proven to be durable and reliable, it's not been without a few drawbacks. There are only a handful of engine manufacturers capable of making engines large enough for locomotives, and their production is limited. Thus there are a limited number of engine options.

In addition, as in all diesel engine markets, the cost of compliance to EPA Tier 4 and EU Stage 3b exhaust emissions regulations has added significantly to engine system costs.

Facing those limitations, Canadian transportation specialist Bombardier has chosen a different approach for a new version of its Transnational Railway Applications with eXtreme fleXibility (TRAXX) diesel electric locomotive range. The long-haul series TRAXX P160 DE-ME replaces a larger 3000 hp diesel engine with four Caterpillar C18 diesels, each rated 737 hp.

The engines, which are installed in exchangeable modules for lower-cost maintenance, overhaul and future upgrading, operate in parallel and can be switched on and off according to the power required by the load. For example, all four engines can be used for maximum acceleration and when climbing, while a single engine can be used for slower travel in urban areas and when idling. This strategy contributes to reduced fuel consumption and exhaust emissions as well as quieter operation, the company said.

"This approach reduces both the diesel fuel consumption and the overall life-cycle costs when compared to the large diesel engine version by up to 10%," said Juliane Storm-Ohm, project manager at Bombardier Transportation GmbH. Since last year, Storm-Ohm has overseen testing and licensing runs intended to confirm the lower emissions and fuel costs predicted by simulation prior to the project's launch.

While this new approach offers significant potential benefits in terms of emissions and fuel economy, it also presents a number of technical challenges. Chief among these surround engine cooling. "With this concept, the available space is even smaller than usual, the cooling loops and sensor data is split into multiple systems, but the fan-drive systems still have to

continued on page 16

NUHN15000022434

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 14 of 65

Off-highway engines by MTU. Tougher–whatever the conditions.

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Bosch Rexroth worked closely with Bombardier in the design and development of the cooling system, which includes top-mounted fan placements, leveraging its experience with cooling systems in other heavy machinery.

provide the required cooling capacity," Storm-Ohm said.

As part of a development partnership with Bombardier and acting as engineering and equipment provider, Bosch Rexroth provided the cooling system for the multiengine locomotive.

For the cooling systems of the TRAXX DE-ME drivetrain, Bosch Rexroth combined electric and hydrostatic fan drives with a dedicated fan control system. Additionally, development engineers utilized the Rexroth for Energy Efficiency process to develop the custom cooling system and drew upon its broad range of drive technologies in an effort to maximize energy efficiency.

From the beginning, Bosch Rexroth said its goal was to engineer the complete cooling package using an energy-based approach. The result, the company said, was a cooling system composed of components optimized for efficiency and to deliver cooling capacity as needed.

The new design of the Bombardier cooling system is intended to take advantage of the power density of hydrostatic fan-drive hydraulics. Bosch Rexroth's A10VO series axial piston variable displacement pumps produce demanded flow as needed, while the A10FM series hydraulic fan-drive motors are compact, which Bosch Rexroth said helps enhance the airflow path.

The control of the cooling system is based on the BODAS fan-drive system developed by Bosch Rexroth's mobile controls group. The scalable hardware and software package has already been used in numerous heavy machinery applications such as tractors, excavators and harvesters. The hardware was further developed, tested and adapted to meet the specialized certifications of the rail industry, the company said.

The system controller measures multiple sensor signals — engine coolant temperature, charge-air temperature, generator coolant and hydraulic oil temperatures — and from those values the required cooling capacity is calculated using Bosch Rexroth software algorithms. The controller modulates hydraulic circuit pressures and flows to correspond to the torque and speed needed at the shaft of the hydraulic motor.

Cooling system efficiency is increased, Bosch Rexroth said, by patented software functionality options integrated into the fan control package. The functions, after taking into account multiple system demands, are engineered to provide an optimal adjustment of fan speed to satisfy ambient conditions. "This allows for energy efficiency improvement, as well as reduced fan system noise emission to be achieved," said Ralf Kunkel, project manager at Bosch Rexroth.

Along with engine cooling, the system is also used to cool the power electronics of the inverter drive, which utilizes electric fan drives.

Bosch Rexroth worked closely with Bombardier in the design and development of the cooling system, leveraging extensive experience in the development of cooling system assemblies for locomotives and system performance modeling. This covers the range from the performance calculation and component selection to the software for the control, including integration with the complete system. In all, 12 faculties at Bosch Rexroth provided and coordinated extensive simulations of the entire cooling system prior to their final functional testing.

Bombardier conducted extensive flow simulations for air and exhaust gas flows in and around the moving locomotive to determine the best locations for the air intake openings. As the intakes supply the cooling air, their optimal placement is critical for maximum efficiency. Bosch Rexroth worked to respond quickly with the expertise and simulation support to satisfy Bombardier. "The challenge that lay before us for this project, was to quickly — and on schedule — implement the innovative multiple-motor concept," Storm-Ohm said. dp

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Bosch Rexroth's A10FM series hydraulic fan drive motors are compact, which is intended to help enhance the airflow path. The control of the cooling system is based on the BODAS fan-drive system developed by Bosch Rexroth's mobile controls group.

NUHN15000022436

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 16 of 65

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NEWSMAKER(S) OF THE YEAR 2014

GENERAC®

BRIGGS & STRATTON®

TWO OF A KIND

Wisconsin manufacturing icons Briggs & Stratton and Generac followed similar paths, made lots of news over the course of the year

BY MIKE OSENGA

For the first time in the 18-year history of the *Diesel Progress North American* Newsmaker Of The Year award, there is a tie. A pair of Wisconsin companies, **Briggs & Stratton Corp.**, Milwaukee, and **Generac Holdings Inc.**, Waukesha, have been selected by the editorial board of *Diesel Progress North American* as the 2014 Newsmakers Of The Year. This is the first time either company has been selected for the annual honor.

For those of you keeping score at home, the *Diesel Progress North American* Newsmaker Of The Year is awarded to the company, product, person, technology, trend or market that made the most news in the last 12 months.

When the *Diesel Progress North American* editorial board convenes to begin discussing the Newsmaker Of The Year, the first and most important question is, "What are people talking about?" In person, online or in print, what has the industry talking? Who is making news? As such, a few value judgments need to be made. Starting with "What made the most interesting (and impactful) news?" narrows the discussion considerably.

Given that guiding principle, **natural gas** was the leader for most of this year's Newsmaker Of The Year discussions. The combined subject of shale oil, fracking and American energy independence was a very hot topic of discussion in 2014. Exactly how real are natural gas vehicles going to be — or not going to be? Will there ever be a full range of gaseous-fueled engines available for all applications … off-highway, on-highway and stationary? Will natural gas really replace diesels? Or gasoline engines? Lots of chatter.

In fact, a lot of news releases, press conferences and assorted events in 2014 suddenly began to work the phrase "the oil and gas markets" into their presentations, all reflecting the decade or longer growth spurt expected for the natural gas industry.

But then, late in the evaluation process, Briggs & Stratton bought Allmand Brothers and launched its first air-cooled electronic-fuel-injection engine. Around the same time, Generac continued a spate of deals and bought Pramac and then MAC, and also made some interesting announcements with its own gaseous-fueled engine line.

Granted, none of these deals were the scale of a Cat-Bucyrus acquisition, or the more recent ZF-TRW and Siemens/Dresser-Rand acquisitions. All truly mega-dollar (or euro) deals. And it was interesting to note that the most recent deals by Briggs, Generac, ZF and Siemens all happened around the same time. M&A teams were busy from Labor Day to Halloween.

Our sister publication, *Diesel Progress International*, reflected that flurry and selected The Year of Acquisitions as its Newsmaker Of The Year for 2014.

Still, while they may have lacked the big-money panache of some of the others, the moves made by Generac and Briggs & Stratton really intrigued our panel. As we have written over the last few months, not only are the

NUHN15000022438

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 18 of 65

Engines And Equipment: Briggs & Stratton and Generac have made news in both engines and machines over the last 12 months. Briggs launched the 810 EFI, upper right, its first air-cooled, electronic-fuel-injected V-twin, while Generac has begun manufacturing its own 9.0 L spark-ignited engine, upper left, to be used in its generator sets. On the machine side, the acquisitions of Allmand Bros. and MAC gave each company a position in the engine-powered heater market, which gets each a spot in oil and gas.

two companies physically close to each other (less than 15 miles apart), but they seem to be moving down remarkably similar paths of growth as they make moves to diversify.

The two have some shared history in that in the late 1990s Generac sold its portable products group to a private equity company, which in turn sold it to Briggs & Stratton. Once the noncompete ran out, Generac re-entered the portable gen-set market, putting the two companies in competition on that front.

Briggs & Stratton also has a line of home standby gen-sets, a market that is at the heart of Generac. Thus another place to do battle. Further, Briggs' popular Vanguard engine line can trace its genealogy back to Generac.

Upping the ante, Generac bought Tower Light, an Italian manufacturer of light towers, in August of 2013 in a deal done in part to expand Generac's global position, but also to expand the light tower line that came along with its purchase of Magnum in 2011.

So Generac has clearly gone all-in on light towers. Now with its acquisition of Allmand, so has Briggs & Stratton.

Along with that, a lesser-known part of the Allmand Brothers product line includes engine-powered heaters. *Voilá*, Generac buys MAC and its line of engine-powered heaters. And so it goes.

And then there's engines. The parallel path theory splits when it comes to engines, but both companies made significant news in that arena as well.

As reported in October, Briggs & Stratton introduced the company's first air-cooled, EFI engine, an 810 cc Vanguard model with outputs of 24, 26 and 28 hp at 3600 rpm. Like its carbureted predecessor, the 810 EFI is a 90° V-twin.

Steve Lavender, senior director of engineering for the Briggs & Stratton Engine Group said, "We've been revamping our engineering as we've moved forward because until now all of our engineers have been mechanical. Now we've got electronic capability being added to our products and that will only continue to grow."

Likewise, Generac is on the move engine-wise. As reported in *Diesel Progress North American* last month, Generac has been manufacturing — and now has standardized on — its own 9.0 L natural gas engine across all its 100 to 150 kW gaseous-fueled industrial configured gen-sets. The 9.0 L joins Generac's 12.9 and 21.9 L models on one end of its engine range, along with its own 2.4, 5.4 and 6.8 L liquid-cooled natural gas engines.

And apparently there is also more to come from the engine side of Generac. "I can tell you that 21.9 will not be the biggest engine we will build," said Rich Thompson, Generac marketing manager. "So, yes you will see more Generac

continued on page 20

NUHN15000022439

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 19 of 65

Top Stories Of 2014 From dieselprogress.com

Based On Traffic

1. A Cummins Gasoline Engine?
2. GE To Develop High Speed Diesel
3. Hmm .. Komatsu & GE In Mining Equipment JV
4. Lucky 7: Generac Buys MAC
5. Ag Market Woes: Deere Announces Layoffs
6. Cat Moving Engine Production, Closing S.C. Plant
7. Report: Lister Petter Sold, Name Changed
8. First Air-Cooled EFI Engine From Briggs
9. Generac Buying Pramac America
10. Cat Consolidating Hydraulic Facilities
11. Cummins Offer Sulfur Tolerance Kits For Tier 4 Engines
12. Manitowoc Wins Ruling Against China's Sany
13. Yanmar America Announces Management Changes
14. Volvo Rents Becomes BlueLine Rental
15. Navistar Ending Mid-Range Diesel Production In Huntsville
16. Big Compression Order For Cat
17. It's October: Big Changes For Cat Senior Management
18. Lister Petter's Still Alive
19. Importers Pay $120,000 For Clean Air Act Violations
20. Army Buying High-Speed Backhoes

Based On Social Sharing

1. A Cummins Gasoline Engine?
2. CNH Industrial Acquires Sprayer Manufacturer
3. @WOC: Honda's First EFI Generator Introduced
4. Ag Market Woes: Deere Announces Layoffs
5. Deere Investing $40 Million In Brazilian Plant Expansion
6. Hmm ... Komatsu & GE In Mining Equipment JV
7. JCB Is Building A Golf Course
8. Yuchai To Get 100% Of Reman JV With Cat
9. John Deere Opens Brazilian Facilities
10. CNH Turkish Venture Opens Second Tractor Plant
11. AGCO Concludes Brazilian Crane Harvester Acquisition
12. Yanmar America Announces Management Changes
13. EcoFit, New Turbo, Fuel Pump, CCV Highlight Cummins IAA Launches
14. Army Buying High Speed Backhoes
15. ZF To Acquire TRW
16. Bonfiglioli Riduttori And Comer Announce Powertrain Acquisition
17. Cat Lays Off 60 At South Milwaukee Mining Plant
18. Liebherr Invests In Component Manufacturing
19. Same Deutz-Fahr Acquires Turkish Joint Venture
20. Volvo Trucks Invests In Manufacturing

electric-power-certified dry gas engines coming in the marketplace."

Adding it all up, the similarities between the two companies appear greater than the differences. Last month in an interview with Briggs Chairman, President and CEO Todd Teske, we asked him about the similarities. "You can make the observation," he said, "but I can tell you that we're looking to do everything we can to grow our company, and we're looking for ways to invest in things that are going to benefit us," he said.

"It's really difficult to comment on their strategy. You're seeing our strategy play out and if there are parallels with other companies, I guess there are parallels with other companies."

For what it's worth, there was a discussion among our editorial board members that ties are no fun, that we should just pick a winner. But in the end, we opted to kiss our sister and accept that both Briggs & Stratton and Generac were indeed worthy of recognition.

The companies are both very well-known names in the engine and engine-powered equipment markets that have been around for a long time. But there is now, in 2014, a sense that the two companies are truly coming of age. Both are really upping their respective games, are on the move, going into entirely new and different product and market segments, and are moving to the next level (pick your favorite sports cliché).

In the end, it was impossible for us to decide between the two and break the tie — no coin flips allowed. Thus Briggs & Stratton and Generac are the 2014 *Diesel Progress North American* Newsmakers Of The Year.

Which is not to say that nobody did anything else. As always, it was a busy year for the engine-powered equipment markets, even if there was not a single huge on-highway or off-highway deal as in recent years. When you look at the accompanying list of top stories in 2014 from dieselprogress.com, **Caterpillar**, **Cummins** and **Deere** made a lot of news, as they usually do. So did many others.

We found it was interesting that two companies, Generac and lift truck specialist **Crown Equipment**, decided to "go it alone" on natural gas engines. The news that GE might be looking to buy or develop a line of high-speed diesel engines, along with Cummins developing a gasoline engine, had everyone buzzing for a while.

NUHN15000022440

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 20 of 65

Something gathering a lot of speed as we go into 2015 is the whole subject of what happens to Tier 4 diesels and EPA 2010 emissions for truck engines as they move, via second owners, into what some euphemistically call "lower-regulated markets." Or to be truthful, in some cases totally unregulated markets. Without ultra-low sulfur diesel fuel and low ash diesel lube oils, these high technology engines can run into problems operating in environments that they weren't necessarily designed for. More for sure on that in 2015.

Personally, I thought **JCB's** announcement that it was building its own golf course was HUGE news, but the editorial board overruled me. In the end there were once again plenty of things to consider in choosing the 2014 Newsmaker Of The Year. Only this time, with a pair of very worthy candidates, we concluded that two would have to do. dp

Previous *Diesel Progress* Newsmaker Of The Year Recipients

2013: Cummins Inc.

2012: Navistar

2011: The Weirdness Of The North American Market

2010: Caterpillar Inc.

2009: The Global Economic Meltdown

2008: Selective Catalytic Reduction (SCR)

2007: Cummins Inc.

2006: Oshkosh Truck Corp.

2005: International Truck And Engine Corp.

2004: The Price Increase/ Shortage Boom

2003: Caterpillar Inc.

2002: Cummins Inc.

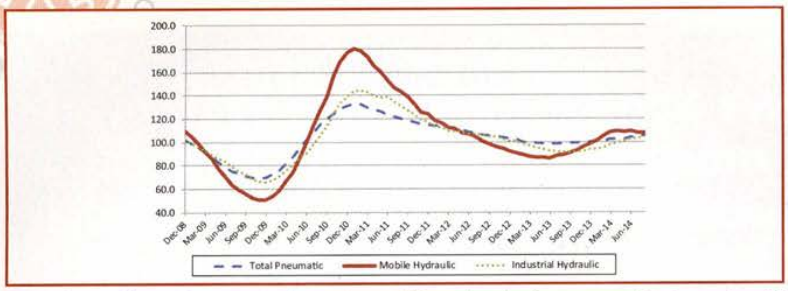
2001: The Market Rebound

2000: Daimler Chrysler Corp.

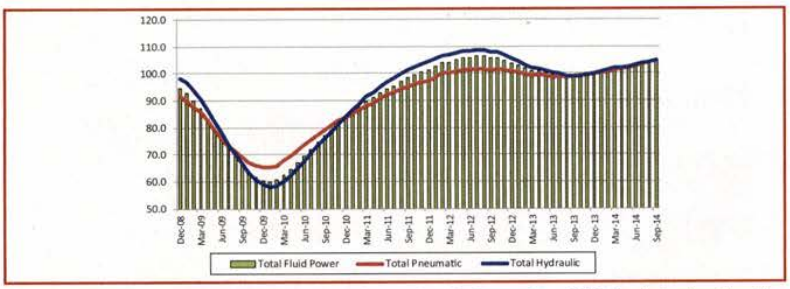
1999: The Power Generation Markets

1998: Caterpillar Inc.

1997: Dana Corp.



Each point on this graph represents the most recent 12 months of orders compared to the previous 12 months of orders. Each point can be read as a percentage. For example, 104.0 (the August 2014 level of the industrial hydraulic series) indicates that industrial hydraulic orders received from September 2013 to August 2014 were 104.0% of the orders received from September 2012 to August 2013 (Base Year 2013 = 100).



This graph of 12-month moving averages shows that in September 2014, both hydraulic shipments and pneumatic shipments increased (Base Year 2013 = 100).

Among all the indicators of the state of the economy, fluid power is unique. Encompassing the hydraulic technology used in mobile markets as well as hydraulic and pneumatic systems used in industrial and machine tool applications, fluid power touches nearly every segment of the economy as a whole and can help identify business trends in advance of many other signals.

The latest data published by the National Fluid Power Association shows industry shipments of fluid power products for September 2014 increased 9.4% compared to September 2013, and increased 1.6% when compared to the previous month. Mobile hydraulic, industrial hydraulic and pneumatic shipments increased in September 2014 when compared to September 2013. Mobile hydraulic shipments increased, while industrial hydraulic and pneumatic shipments decreased when compared to the previous month.

SHIPMENTS	
Total Fluid Power	
Jun-14	5.7
Jul-14	6.4
Aug-14	6.1
Total Hydraulic	
Jun-14	6.4
Jul-14	6.7
Aug-14	6.1
Total Pneumatic	
Jun-14	5.6
Jul-14	5.8
Aug-14	6.0

The table above is expressed in terms of cumulative percent changes. These changes refer to the percent difference between the relevant cumulative total for 2014 and the total for the same months in 2013. For example, the August pneumatic shipments figure of 6.0 means that for the calendar year through August 2014, pneumatic shipments increased 6.0% compared to the same time period in 2013 (Base Year 2013 = 100).

This information is drawn from data collected from more than 80 manufacturers of fluid power products by NFPA's Confidential Shipment Statistics (CSS) program.
More information is available to NFPA members. For information on membership, contact Leslie Miller at lmiller@nfpa.com or contact NFPA at (414) 778-3344.

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Page 22 of 65

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Virginia-based defense contractor PD Systems was recently awarded a subcontract to supply the U.S. Air Force with 110 ground power units (GPUs) over the next five years. GPUs supply shore power to aircraft for maintenance and other operations when the aircraft is parked on the ground. The U.S. Air Force plans to use the GPUs in overseas operations.

THE GROUND POWER BEHIND THE AIR POWER

Virginia-based defense contractor to supply 110 ground power units to the U.S. Air Force over the next five years

BY ART AIELLO

PD Systems, a defense contractor in Alexandria, Va., was recently awarded a subcontract through Boeing and FCX Systems to supply the U.S. Air Force with 110 ground power units (GPUs) over the next five years. GPUs supply shore power to aircraft for maintenance and other operations when the aircraft is parked. They provide power for the lights, air conditioning and avionics. The Air Force plans to use the GPUs in overseas operations. Each one will be rated for 75 kW output, and be capable of delivering both dc and ac power simultaneously.

"The GPUs must meet stringent operational requirements, and there are hundreds of specifications," said Mazen Badr, vice president and general manager for PD Systems. "The GPU is also required to be rugged for the extreme harsh environments encountered in military applications, including high wind, sand and dust storms as well as heavy ice and snow accumulating on the body of the GPU."

One specification PD Systems needed to meet was ensuring that the GPUs could run on jet fuel, specifically JP8, which is standard in most military applications. For that reason, the company specified a 4.5 L John Deere PowerTech Plus 4045HFG85 engine. The four-cylinder engines meet Tier 3 emissions requirements and include a four-valve cylinder head, high-pressure common rail (HPCR) fuel system and variable geometry turbocharger. Bore and stroke is 106 x 127 mm. Rated power is 179 hp at 1800 rpm.

"We analyzed, researched, and compared all of the engines and found that John Deere is the only engine in that size and capacity that could run on JP8 fuel," Badr said. "For military applications, that's a requirement without exception and a very important characteristic."

PD Systems chose an alternator from Italy's Mecc Alte S.p.A.

NUHN15000022444

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 24 of 65

Each GPU is driven by a four-cylinder, Tier 3-compliant, 4.5 L John Deere PowerTech Plus 4045HFG85 engine. The engines run on JP8 jet fuel, which is standard in most military applications.

The three-phase, direct-drive HCP 34-2LN/24 alternator is unique when compared to alternators used in most conventional power generation applications because its ac output frequency is 400 Hz — a requirement for military aircraft and many radar systems.

According to Badr, sourcing a 400 Hz alternator presents its own challenges. "There are not many of them out there off the shelf that are 400 Hz, because those are only made for the aircraft industry," he said, adding that Mecc Alte is one of only a handful of alternator manufacturers around the world that make 400 Hz units.

Operating temperature was another challenge for PD Systems to overcome. For this application, the GPUs must be able to function in ambient temperatures -40° to 140°F. The John Deere PowerTech Plus engine was attractive, Badr said, because it could function at the extreme high temperature without derating the engine's capacity.

"Ninety percent of the military products out there they tell you, 'We want it to operate at 125°F,'" Badr said. "You see that environment in the desert in the Middle East. But 140°F is

continued on page 26

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PD Systems selected a HCP 34-2LN/24 three-phase alternator from Italy's Mecc Alte S.p.A. Unlike many alternators, it delivers ac output at 400 Hz — a requirement for military aircraft and many radar systems.

also possible considering the environment and other heat-producing units in the surrounding area. And that was the case with these units."

PD Systems sized the engine to meet the environmental requirements, particularly the high temperature.

"For the alternator, we do the same," Badr said. "We just make sure that it operates at the same output. That's why sometimes we oversize them — put more metal into them, a heavier piece of equipment — to be able to get what we want out of it. It's much easier for an alternator, though, to meet the requirements than it is for an engine."

The temperature requirements also presented challenges to the cooling system. "You can't start with a commercial cooling system," Badr said. "You've got to start with a special cooling system that will not only cool the unit at 140°F but also is compact enough and has enough margin to meet a 110% load."

The GPUs have onboard fuel tanks sized for eight hours of continuous operation. Managing high temperatures requires operators to fill the tanks such that there is room for expansion. For the extreme cold temperatures, however, PD Systems is providing winterization kits to keep the lubrication and coolant systems warm.

Badr said that the company considered size and weight in the selection of all components. "These units don't really move a lot once they get to where they need to go," he said. "The requirement is to only travel 20 mph, not over the highway like other power generation equipment that we make for the military.

"While this compact size and weight is not a problem, what is a problem is the load distribution on the wheels and how we design it to be compact to fit in an aircraft. So we design it so the tire pressure is not over 100 psi and the weight distribution is done properly."

Size and weight were also factors in designing the steel enclosure, Badr said. The company took care not to add more steel than necessary, so as to not impact the unit's weight. However, the company did examine how the enclosure and its materials would impact electromagnetic interference (EMI) and electrostatic discharge (ESD) — two phenomena that must be minimized when working around military aircraft.

"EMI and ESD come into play in how we design the housing," Badr said. "What material do we interface with between the trailer and the housing? We need a very rugged housing. At the same time it must be compact, allow for the cooling system to operate properly and allow for EMI discharge so as not to become an antenna for other things happening in the air.

"When it comes to that unit sitting next to an aircraft, and specifically connected through power cables to the aircraft, you don't want the unit to interfere with the electronics and avionics of the aircraft. So all of this plays into how you package and ground the unit so as to make sure that the unit is not hazardous to the aircraft, and vice versa."

According to Badr, the company was particularly proud of how quickly they were able to design, validate and get U.S. Air Force approval for their approach. "It was an extreme challenge to design the unit, go through the Air Force's review processes, and 'hit a home run' from the beginning — you can't go back and redesign because of the tight schedule," he said. "This was possible because of our ability to properly size the engine and virtually design the unit, including full simulation of the cooling system.

"There were many factors involved in the design, testing and evaluation of this GPU system, against a stringent schedule. To be already in production in less than a year is unheard of in the power generation community, as most companies developing systems for military applications take two to 2 1/2 years. This was no doubt possible because of the expertise, commitment and ability to work as a team among the U.S. Air Force, Boeing, FCX and PD Systems." dp

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NUHN15000022446

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 26 of 65

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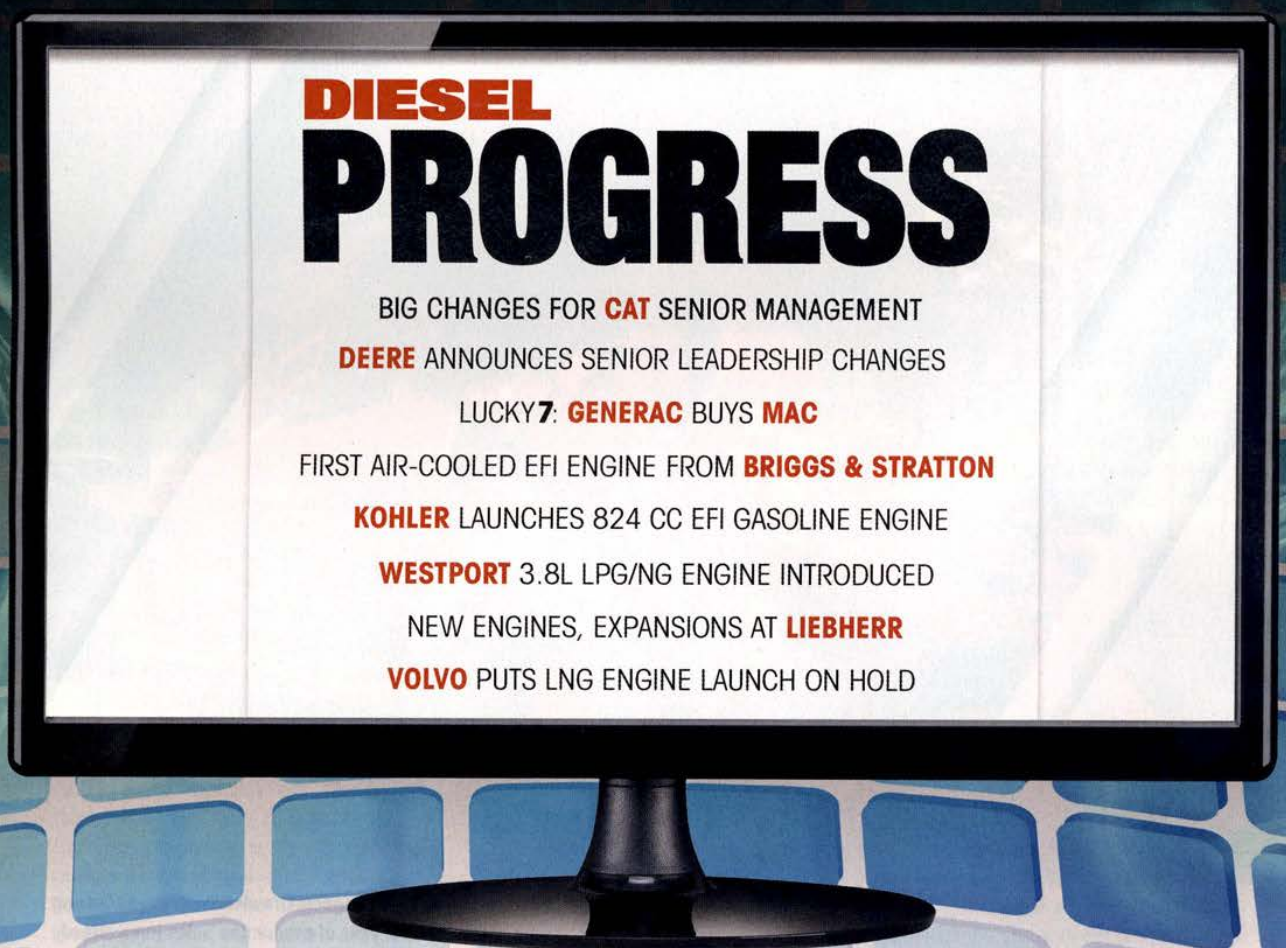

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INNOVATIVE USES of HORSEPOWER

A REAL CRAPSHOOT

Canadian manufacturer Nuhn rolls the dice with new mobile liquid manure agitator

Nuhn Industries Vice President Ian Nuhn developed the first working prototype for the company's Lagoon Crawler in 10 days. Getting the concept to the production machine shown here required a few more late nights, but in the first year of production sales have already exceeded expectations.

BY CHAD ELMORE

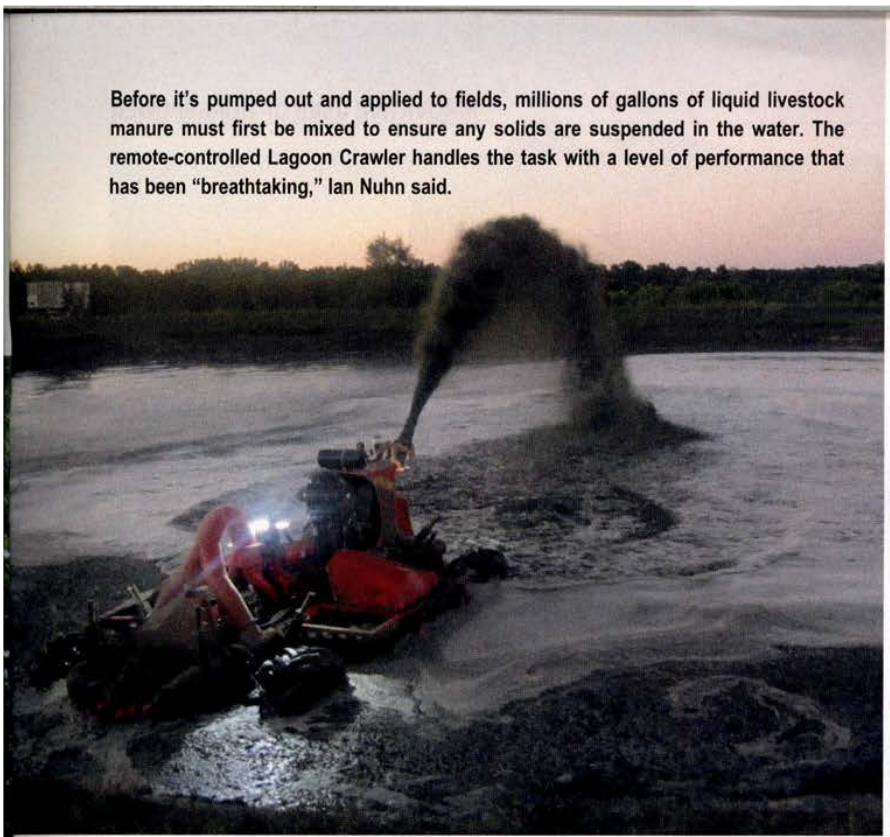
Ian Nuhn said he often feels sorry for the truck drivers who are tasked with hauling his latest machine between farm shows or out to customers. It looks like an exotic race car, but its true purpose catches travelers off guard.

"Our truckers will be listening on the CB radio, and there will be one know-it-all out there who thinks he knows what it is," said Nuhn, vice president of Nuhn Industries, Stratford, Ontario, Canada. "He will say it's for cleaning race tracks, stuff like that. It gets a lot of attention. At truck stops while filling up, the drivers get swarmed with people asking what it is. When they find out, it's like they're disappointed. They were expecting something really cool."

When the curious learn the Nuhn Lagoon Crawler is a remote-control

NUHN15000022448

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 28 of 65



Before it's pumped out and applied to fields, millions of gallons of liquid livestock manure must first be mixed to ensure any solids are suspended in the water. The remote-controlled Lagoon Crawler handles the task with a level of performance that has been "breathtaking," Ian Nuhn said.

vehicle for stirring millions of gallons of liquid manure, there are often more questions.

"When we tell them it's an amphibious vehicle for mixing massive manure lagoons that they have never actually seen, they are like, 'A. Why are there such big ponds full of manure?' and 'B. Why do they have to be mixed?' They're still interested, but their initial shock is funny," Nuhn said.

Livestock manure is stored as slurry in anaerobic or aerobic lagoons after being combined with water that's collected from washing out pens and rain runoff. The lagoon is a biological tank, decomposing waste before it's pumped out and the slurry applied to fields for its nutrients. Depending on local regulations, the lagoons are concrete or earthen basins with a depth of at least 8 ft. and hold an average of 3 million gal. They're typically the size of a football field; Nuhn said the biggest one he has seen covers 30 acres.

Before applying the liquid manure to a field, farmers or hired manure haulers must first stir the lagoon to ensure the solids are suspended in the liquid. This means hooking up a 50 ft.-long pump to a tractor's power take-off to agitate the contents of the lagoon. Once properly mixed, the concoction is pumped into tanker-like spreaders and injected into the soil.

"That does a decent job in an average size lagoon, especially if you drive the pump around the pit," Nuhn said. "But as lagoons are getting bigger it was difficult to reach the solids that built up in the middle. People were putting our pumps on barges to get the job done. There was already a demand for our pumps from people trying to agitate the lagoon's center, so we took it from there and came up the Lagoon Crawler."

Nuhn Industries was founded more than 100 years ago as a blacksmith shop in Ontario, and today is a specialty equipment manufacturer that focuses on liquid manure equipment. The family-run company has 75 employees, and its pumps and spreaders are used worldwide. Before the Lagoon Crawler made its debut last year, all of Nuhn's powered equipment was PTO-driven.

"The Lagoon Crawler was a pretty big leap for us," Nuhn said. "The company always comes out with something new for the show season, and in 2013 we didn't have anything new going into the farm shows. We knew there would be a demand for this type of a machine, and so we decided to go for it. Ten days before the first show I came up with the design, and we had a working prototype ready for the event."

The first Lagoon Crawler used a four-cylinder 4.5 L Cummins diesel engine rated 160 hp, and the "crawler worked fairly well." Subsequent field tests showed more horsepower wouldn't hurt, so the machine that went into production this year has a

continued on page 30

As it's hauled between shows and customers, the machine gets a lot of attention. The curious are often surprised and a little disappointed to find out its true purpose: agitating huge reservoirs of livestock manure.

NUHN15000022449

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 29 of 65

Lagoon Crawler owners are proud of their investment, and many have run it through local parades. Here, one of Nuhn's machines in Russia gets topped off with diesel.

6.7 L Cummins QSB6.7 rated 270 hp with 728 lb.ft. of torque at 1500 rpm.

On land, the engine powers four Nachi two-speed wheel motors up to a top speed of 7 mph, and independent A-arm suspension helps smooth out the ride. Propulsion in the lagoon comes from seven agitation jets: one on the front, two in the rear and four on the sides for steering. The machine's business end is the largest centrifugal pump the company has produced: a Quad Port Header pump with a 10,000 gpm capacity through a 14 in. inlet and a 10 in. pump discharge.

"We could have left an 8 in. pump on the crawler and it would have done a good job, but people have already seen the performance of that size pump," Nuhn said. "When we go to a 10 in. pump, no one has ever seen performance like that. Plus they get the mobility of a crawler. The performance has been breathtaking."

The crawler is operated wirelessly via a system that was custom-built for the application by a specialist in Wisconsin. Operators use the remote to operate, for example, the craft's direction on land and sea as well as speed, axle raise and lower, engine start and stop, and the direction of the agitation jets.

"The engine drives the pump and the agitators," Nuhn said. "We are mixing with that action, and by opening and closing different valves we can maneuver the crawler through the lagoon, as well. It does an amazing job and it's not really working the engine too hard. It's at about a 65% load so it is sized nicely for the application."

While the role of Nuhn's equipment in agriculture may not be the most glamorous, the products designed and built by the company are eye-catching in their red and yellow paint schemes, and have a level of fit and finish that's comparable to a custom motorcycle shop. The same company philosophy was used on the Lagoon Crawler.

"Guys will take it through parades in their local towns," Nuhn said. "We didn't have to go the extra mile that we did in building it. But this is a $150,000 machine, and if we would have just slapped metal together and made a simple barge I don't think we would have received the same response. I think because we made it look the way it does people are proud to fork over that kind of change and they are proud to own it."

Nuhn said they believed the market for such a machine would be around 20 a year. In the first year of production that number has already been tripled, and he expects sales to continue to climb.

So, Nuhn Lagoon Crawler sales are strong, and its proud owners have discovered that it can stir millions of gallons of manure like nobody's business. But there's another aspect to the product that deserves more attention: the fact that Ian Nuhn took the company's first diesel-engined product from a blank screen to operational prototype in 10 days.

"I knew I was going to be building something self-propelled at some point, so I had that engine sitting in my shop, and I was using all of the

continued on page 32

NUHN15000022450

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 30 of 65

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A 270 hp Cummins QSB6.7 diesel engine sits high above the surface of the manure pond. It drives a hydraulic system on land as well as pumps and agitators for propulsion and directional changes while at sea.

gate valves on other products," Nuhn said. "For that first one, we had all of the parts we would need.

"I started drawing the main frame in Autodesk Inventor on Friday night, and on Monday morning, when guys came to work, I had enough drawings for them to get started. I finished drawing it a few days ahead of them while they were still building it. After 10 days, I hopped on it and drove it around a local pond. It was fun and pretty rewarding."

As a showstopper, the Lagoon Crawler was successful, garnering coverage for the company in everything from local newspapers and television to international trade publications. Turning it into a production machine resulted in a few more late nights, however.

"The first 10 days were tough," Nuhn said. "But in the grand scheme of things that was nothing. Getting it from the first prototype to the second and then the third on to the production machines meant lots of little headaches that kept me up every night for months. I think I was a little young and naïve going into the project. If I knew how hard it was going to be, I don't think I would have jumped into it as quickly as I did. But now, looking back it's like, holy crap we did it!"

Turning it into a production machine meant giving the shop floor some consideration, as well. "That meant figuring out how to mass produce something of this complexity compared to what we were doing, with an engine, electronics system and 120 hydraulic hoses," Nuhn said. "The engine and hydraulic distributors were a big help."

Early on, one of the biggest challenges was that "a lot of the suppliers didn't take us seriously," Nuhn said. "It felt like this project quickly went to the back of their minds because they figured we'd be lucky to make five manure boats and then disappear. You want to be realistic with your forecasts but it's not like there is just one lagoon out there. They are all over, and now we have crawlers operating from North Carolina to California and in Russia, too."

For the fortunate ones who get to run a Nuhn Lagoon Crawler — owners have reported that their employees often fight over who gets to run it — "They have a machine that does the best job of anything out there and they have a machine that is just cool," Nuhn said. "It's a remote-controlled toy and that's something we never outgrow. It is like the Cadillac in the industry of mixing manure and nothing comes close to it. There really is nothing." dp

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 32 of 65

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CLEANING QUACKERS QUICKLY

Go-Devil's engine-powered Duck Picker designed to remove feathers in a flash without the fowl mess

Warren Coco, president of Go-Devil, cleans a duck with the Go-Devil Duck Picker, an engine-powered machine designed to make one of the messier outdoor jobs — removing the feathers from ducks — faster and easier.

BY MIKE BREZONICK

For those who love the outdoors, there are few things more enjoyable than a good day of duck hunting.

And even for the most avid waterfowlers, there are few things less enjoyable than removing the feathers from the day's bag.

Over the years, hunters have pursued ways to make the process easier, trying everything from dipping the birds in boiling water or molten wax to using grease-cutting detergents to remove the water resistant oils, then plucking and finishing the feather-removing process with a propane torch.

Yet for the most part, cleaning ducks has remained a messy, time-consuming process.

Warren Coco, a lifelong duck hunter and president of Go-Devil, the Baton Rouge, La.-based manufacturer of marine engine drives and hunting and fishing boats, figured out a better way. Later, he decided to make it part of his company's product line, which is how the engine-powered Go-Devil Duck Picker was born.

The Duck Picker is designed to remove the majority of feathers from a duck in a matter of seconds. It is powered by a 127 cc, single-cylinder, overhead valve air-cooled Briggs & Stratton 550 Series gasoline engine.

"We just started selling them about four years ago, but I've built them back to about the early '80s and have been using them for a long time," Coco said. "I'm an avid duck hunter. They have pickers out there on the market that I've used, but none of them work as well as mine.

"The engine is probably overkill, but it gives you the versatility of it being portable. You can bring it anywhere with you and set it up and pick, and then when you get done with it you just put it up."

The machine itself is simple and straightforward. A picker head is mounted on an aluminum casting that is designed to fit over the engine crankshaft. Set screws attach the casting to the crankshaft. The engine is mounted on an aluminum base plate that can then be mounted to a table with wood screws.

"We used to use aluminum bar stock, but I had a casting made just to eliminate a bunch of machining," Coco said. "Now we just bore it and use set screws to attach it because there's really no load on it.

"What I like to do is build a little table about 2.0 ft. square at the right elevation. I put it in the yard at my camp and I turn it so the wind's at my back. That blows the feathers away from you.

"You'll still get some on you so it's best to wear a raincoat when you use it. But the wind kind of helps blow the feathers away."

On the picker head are four rows of six rubber fingers that, as the engine spins the picker head, pull the feathers from the bird with no tearing or damage of the skin. "The rubber fingers are real soft rubber and they grab the feathers and jerk them out," Coco said. "It's just very, very high friction.

"When you start out, you pull the wing feathers out from under the armpits, but then you rub the duck on the picker, flip it around, roll him around and rub him around a few times, raise his legs and he's done."

And while it doesn't take long to pluck a duck, a lot does depend on the variety of bird.

"Different ducks are different," Coco said. "The smallest duck is a teal. I can do them all day long at about 30 seconds (per bird). I have done one in 13 seconds, but I'm good — I've done thousands.

NUHN15000022454

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 34 of 65

INNOVATIVE USES of HORSEPOWER

A LAND OR SEA LIFESAVER

Amphibious search-and-rescue vehicle designed for dangerous conditions

This search and rescue amphibious vehicle was developed by Cool Amphibious Manufacturers International LLC (CAMI) of Ridgeland, S.C. The vehicle incorporates two diesel engines — one for use on land and a marine diesel for use in water. The vehicle's drive system is designed to be modular, so CAMI is able to install nearly any brand of diesel engine and power train.

BY JACK BURKE

John Giljam began developing amphibious vehicles as a way to help people have a good time. He hopes his latest amphibious creation helps save lives.

Giljam, president of Cool Amphibious Manufacturers International LLC (CAMI), has developed a search-and-rescue amphibious vehicle designed to safely travel difficult, debris-filled terrain to transport rescuers directly to an accident or disaster site so they can provide medical assistance, deliver relief supplies or firefighting equipment, or evacuate victims. The amphibious vehicle is intended for local, national and global response to emergency disaster situations.

"This gives you the ability to take responders down each street, house by house, and pick a bunch of people up and bring them to a safe place and go right back out and do it again," Giljam said. "The efficiency and the ability to move people are exceptional."

Giljam's path to the amphibious world was circuitous. Giljam grew up around farm equipment and other heavy machinery. His father, Harold, was a farmer whose welding prowess was renowned around Giljam's home of South Lima, N.Y.

"It became well known rather quickly that Harold could fix things and they wouldn't break again," Giljam said. "So much so, he gave up the farm and did nothing but repairs."

Soon, the elder Giljam's business grew to include manufacturing. The company expanded greatly during the oilfield boom of the 1970s, and at one time the company was producing 100 to 125 oilfield trucks a year, Giljam said.

But when the oil boom went bust in the early 1980s, the company sought ways to diversify its portfolio.

"We did everything — millwright rigging, cranes, assembly lines in plants, things like that," said Giljam who took over the company after his father passed away in 1995. While visiting Hilton Head, S.C., he met his future wife, Julie, and after they married, they decided to settle in the area. Considering his business options, John Giljam noticed an old LARC-V (Lighter, Amphibious Resupply, Cargo, 5 ton) amphibious cargo vehicle sitting in pieces near an airstrip. The LARC-V was developed in the U.S. during the 1950s and used extensively during the Vietnam War.

Giljam refurbished the LARC-V, updating its mechanical transmission with his own hydrostatic drive system, which he said made the craft faster and more reliable. The couple used the LARC-V for giving tours in the region, but even with the upgrades, the LARC-V was difficult to keep in service because some parts were hard to come by.

So Giljam set out to develop his own amphibious vehicle for tours. That led to the Hydra-Terra, which can carry up to 49 passengers. Giljam's company has produced about 75 of the craft, which are deployed in 17 countries.

Up next was an amphibious motor coach. The Giljams call this vehicle the Terra Wind Amphibious Motor Coach — a luxury vehicle that has a 60 in. Jacuzzi; marble floors; leather furniture; mirrored ceilings; granite counter tops; and residential appliances, including a 22 cu.ft. side-by-side refrigerator; a four-burner glass cook top; microwave/convection oven; dishwasher; trash compactor; and a washer/dryer combination.

But the search-and-rescue vehicle

NUHN15000022455

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 35 of 65

CAMI delivered its first amphibious responder to the city of Bangkok, Thailand. That model incorporates Ford's 6.7 L Power Stroke diesel engine and a 6.7 L Cummins MerCruiser QSB6.7 diesel marine engine.

is probably closest to Giljam's heart.

"I had wanted to build a search-and-rescue vehicle almost from the beginning of CAMI," he said. "When New Orleans flooded (after Hurricane Katrina), that was just a horror that I felt we could have had a big hand in resolving."

Making the vehicle as modular as practical was a key design consideration for Giljam. After all, the vehicle would be working in difficult conditions with limited access to both parts and labor for repairs.

"In my past, having to deal with the LARC-V, I could replace 90% of that powertrain, but that other 10% could disable the vehicle at any time," he said. "If I eliminate that, make it with interchangeable, mass-produced parts, on the shelf and readily available, I've taken the downtime probabilities way down on the vehicle."

The first production vehicle was delivered to the city government in Bangkok, Thailand this year. The city has tentative plans to purchase 20 of the craft, Giljam said.

CAMI, which is based in Ridgeland, S.C., and has manufacturing facilities in Avoca, N.Y., is able to install nearly any brand of engine and power train into the responder, so meeting local emissions requirements and chassis standards isn't a problem.

"With any amphibious vehicle, there's a tremendous balance you have to do — engineering and mechanics. Everything you put on an amphibious vehicle matters and where it goes matters because you have to balance it," Giljam said. "Building the responder, we literally started with 'OK, what is the power train, where is it going to go, where is its center of gravity' and then we actually had to get x amount of displacement in the front, x amount of displacement in the back so that I can get it to float level."

The first production vehicle's power train is from Ford's F550 heavy-duty truck, which is powered by Ford's 6.7 L Power Stroke diesel engine. The 300 hp engine incorporates a Bosch high-pressure common rail (HPCR) fuel injection system. The marine engine is a 6.7 L Cummins MerCruiser QSB6.7 diesel engine.

The two engines give the vehicle more flexibility, Giljam said.

"There are times when the four-wheel drive will do everything you need to do and there are times when the marine engine is going to do everything you need to do," he said. "But when you hit that 12, 18, 24 in. of water, tires don't have enough traction to do things, but your propeller's not in enough water do much either."

In that situation, the operator can use both the four-wheel drive and the marine gear, which adds another 1000 lb. of thrust, he said.

"It is the ultimate get-through-whatever-the-terrain-is type of system, and they are independent of each other for that reason," he said.

The hull is formed from high-tensile, marine-grade aluminum alloys 5083, 5086 and 6061, which are lightweight, durable and designed to be extremely corrosion resistant. The hull is able to absorb and deflect energy from rough impacts, Giljam said.

"The shape of the bow was actually impacted by not only how much water I wanted to displace … but it was also designed to hit submerged cars and be able to push them out of the way," he said. "It is reinforced to the point

continued on page 38

The hull of the amphibious responder is constructed of high-tensile, marine-grade aluminum alloys and is designed to absorb and deflect energy from rough impacts.

NUHN15000022456

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 36 of 65

CAMI manufacturers several amphibious vehicles, including the Hydra-Terra, a tour bus designed to carry up to 49 passengers.

that if I hit a car under water, I don't care. In the streets, there are cars, debris, telephone poles — there's everything all over the place that you've got to deal with."

Giljam said that in the aftermath of a severe storm, rescue vehicles often face downed trees as well as power and telephone poles. Fire trucks aren't designed to drive over those large objects, and often heavy equipment is needed to remove the obstacles before the fire trucks can proceed.

"We made the amphibious responder able to climb over telephone poles — we put 17 in. of suspension travel on all the axles so you can literally drive up to a telephone pole, put the vehicle in low gear, and drive over it."

Locking differentials in both the front and rear mean there is always power to the wheels even if you have one or two off the ground, he said.

According to CAMI, the responder's modular construction means it will fit within a standard shipping container and can be trucked, shipped or flown worldwide. The vehicle also incorporates CAMI's patented use of Flotation Foam, approved by the U.S. Coast Guard and used in all amphibious vehicles CAMI manufactures, Giljam said

The amphibious search and rescue vehicle has a rated capacity of 2785 lb. It is 9 ft. 7 in. high, 25 ft. long and 98 in. wide. The vehicle can achieve speeds of 70 mph on land and 7 knots on water. dp

diesel Weblink

www.camillc.com

dp PRODUCT PIPELINE

Reservoir Sensor

A low-level sensing reservoir system from Dymax Corp. prevents empty material reservoirs from introducing air into dispensing lines, thereby eliminating contamination during the dispensing process.

The system utilizes an adjustable sensor for use with pressurized reservoirs and features an SB-100 controller that activates a warning when the material in the reservoir reaches a specified low level. The controller also features an external PLC connection that allows for a total line shutdown, saving time and money by stopping the dispense system when material reservoirs are empty, Dymax said.

The sensor configuration is adjustable, allowing operators to set specific levels of material to signal warning and automatic shutoff options. The low-level functions include remote visual beacon, audio buzzer and auto shutdown. There are no wetted components; the sensor does not contact fluids, so it's compatible with a wide range of materials.

www.dymax.com

Batteries

EnerSys has introduced the NexSys 12NXS120 and 12NXS158 thin plate pure lead (TPPL) batteries designed for small traction applications.

The Reading, Pa., company said that because the TPPL construction has high power density, the NexSys batteries typically occupy 30% less space than equivalent lead calcium products. NexSys batteries allow for rapid charging during shift breaks, with extended battery runtimes beyond conventional batteries, the company said. Applications include floor care and cleaning machines, pallet trucks, shuttle personnel carriers and industrial utility vehicles. The TPPL construction includes compressed absorbed glass mat (AGM) plate separators, which are designed to offer high electrolyte absorption and stability to enhance cyclic capability and provide extreme vibration resistance, the company said.

The NexSys 120-AH battery is 13.31 in. long, 6.81 in. wide, 10.71 in. high and weighs 94.8 lb. The NexSys 158-AH battery is 17.9 in. long, 6.66 in. wide, 10.75 in. high and weighs 117 lb.

www.enersys.com

continued on page 53

NUHN15000022457

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 37 of 65

Intelligent Braking

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INNOVATIVE USES of HORSEPOWER

FLOAT LIKE A BOAT, DRIVE LIKE AN ATV

Wilcraft amphibious vehicle brings safety, mobility to ice fishing

The latest Wilcraft amphibious ice fishing vehicle has hydrostatic drive and a Kohler gasoline engine.

BY CHAD ELMORE

When the temperature drops below freezing, the best time to catch fish can be the most dangerous for anglers. During the first few weeks of winter, a thin layer of ice spreads across Northern lakes. When it does, the oxygen level in the lake begins to decline, causing fish to slow down. Unfortunately, ice at that stage is often not strong enough to hold a man and a bundle of tip-ups, let alone a snowmobile. The best fishing returns late in the season. With spawning on the schedule, walleyes, for example, become more active. But rising air temperatures tend to melt ice along the shore first, stranding conventional wheeled or tracked machines out on the lake.

Tom Roering lives in Minnesota, and as an avid ice fisherman he understands the dangers that are inherent to the sport. When it came time to replace his fishing shanty, he set out to find a solution that would keep him and his young kids safe and dry throughout the entire season.

For his first prototype, built in 1998, he essentially added four wheels to a 12 ft. jon boat. Through regular testing on frozen lakes and snow-covered trails the design evolved into a self-propelled amphibious ice-fishing house that could be driven across the ice. It could also float like a boat if it found open water. Unlike a boat, however, the machine could pull itself back onto the ice and keep moving to the best fishing spot.

The first machines were built for Roering's personal use, but what happened next has helped push countless good ideas to market. When other anglers saw his amphibious shanty they wanted one of their own, and a specialty equipment manufacturer was born. A production vehicle was unveiled in 2004, and the concept was awarded a patent in February 2008. The jon boat's DNA can still be seen in today's Wilcraft (the first three letters of the name stand for water, ice and land), although the powder-coated .080 in.-thick aluminum hull is fabricated specifically for the application.

The rear-wheel-drive, gasoline-engine-powered craft allows anglers to stay mobile, because if the fish aren't biting, it's time to move to a different part of the lake. Directional

NUHN15000022459

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 39 of 65

There are few things more frightening than the sound of cracking ice while you're walking across a frozen lake. The Wilcraft mobile icehouse makes getting to the best fishing spot safer and much more fun.

changes on land and water are made via a tiller toward the rear of the craft. The Wilcraft can be lowered with three 1200 lb., 12 Vdc linear actuators in the front and back so that it sits directly on the ice. Fishing is performed through three 10 in. diameter holes on the right (starboard) side of the machine. The holes get sealed when moving across the lake, and the hull of the vessel can be raised up to 12 in. off the surface of the lake when it's time to go home.

Doing business as Multifarious Inc., Roering's company assembles each Wilcraft in its small factory in North St. Paul, Minn. The machine has attracted ice fishing enthusiasts throughout North America. Boat dealers have taken on the line, ensuring foot traffic even when the boats are in storage.

There are two different models of Wilcraft icehouses to choose from. The base model weighs 625 lb. and uses a Briggs & Stratton 302 cc gasoline engine that sends power to the rear wheels via a two-speed continuously variable transmission (CVT) with a locking differential. When traveling across open water or in the event the vehicle breaks through the ice, the operator stays seated and retracts the rear wheels, powers up to the ice, and with the push of a pole to keep the rear tires in contact with the slippery ice surface drives the Wilcraft back onto the ice.

Roering recently added a 725 lb. hydrostatic model that's quickly becoming a best seller. This model uses a 26 hp Kohler 742 cc gasoline engine with electronic fuel injection that runs a Hydro-Gear transmission to Dynamic wheel motors (the two-wheel drive version uses Parker-Hannifin motors). The wheel motors are different sizes front to back.

"Our design philosophy hasn't changed with the new model; we're keeping the Wilcraft light and easy to operate," Roering said. "The hydrostatic transmission simplifies it even more. It adds a little bit of weight and going to a 26 horse engine is where some of the additional weight comes from, too.

"We use 22 in. tires in front for clearance, and in the back we want the tires to be as big as we can go. That means we had to work out the timing with the wheel motors so the rotations are the same speed regardless of tire diameter. That was a huge learning curve — we didn't know a bunch about hydraulics two years ago."

Roering began engineering a hydrostatic version with the help of a local technical college that took the challenge as a class project. "They did OK, but they were looking more at theory rather than using off-the-shelf components, and it got more expensive and complicated than we needed," he said. "At the time I thought that was the nature of hydraulics, so we shelved the concept for a couple of years. Then a sales rep from a distributor came in and said it was definitely doable. That got us looking at it again, and after another long learning curve — if air gets in the line it's funny

continued on page 42

The Wilcraft's speed is limited to 20 mph and its direction is controlled via tiller steering. An aluminum engine cover and side curtains protect the engine from the elements.

NUHN15000022460

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 40 of 65

Although designed for ice fishing, the Wilcraft can be used year-round.

how poorly it performs — we arrived at the design we have now. It is rock solid and as exciting as all get out."

Roering said that part of the learning curve meant ensuring that the fluid system would work in sub-zero conditions all day long. "Some of the reps we dealt with were more familiar with warm-weather applications, and the hydraulic oil that was recommended was too heavy for winter," he said. "When the temperatures got down to -20°F it would not move. We switched to synthetic oil and the problem was solved. Now the temps can go down to -35°F and she still works nicely.

"There are a million different ways to put this type of a machine together. We started with the horsepower it needed and tried out different combinations of wheel motors to get the performance. So we basically have a shelf full of all different size wheel motors, so we might have a hydraulic component drive yard sale here shortly."

Roering said operators will benefit from the hydraulic system through the vehicle's effortless control of speed and instant direction change using a single flow control lever. "We don't have a real tight turning radius with a 9 ft. wheelbase, but you can go forward and back quickly, and it doesn't take much to do a 180° turn," he said.

The drive system is now watertight, too, so there are no longer any concerns about the CVT belts getting wet if the Wilcraft drops into a lake. "And, on the four-wheel-drive machine, once the front tires hit the shoreline it will pull you right up the bank through cattails and weeds, swamps and slues," Roering said. "Plus, when you travel across the water with the front tires grabbing the water it helps provide better navigation."

The mechanical drive version that started it all will still be offered, Roering said. "We are still offering it as a price point option, and it has a footprint that is lighter than anything else," he said. "They really have been a robust machine. Every one that we put out since 2006 is still out there running. We are proud of that. It's solid. But out of the most recent 10 machines we sold, nine were hydraulic. I expect that trend to continue.

"Once folks make the decision to buy, they usually want to get the best that a company has to offer. The Wilcraft is no exception. A few guys will pick one up on the used market to get comfortable with the concept and see if it works for them. Once they do, their next Wilcraft is an easy sell."

Although it's primarily marketed as a self-propelled icehouse, the Wilcraft option list includes a double-layer camouflaged enclosure so the machine can be used on land for hunting or as a duck blind out on the water. The 51 in. wide x 100 in. long x 61 in. high cabin includes openings in the sides and top for shooting.

"It would have been nice to have had more R&D dollars in the beginning to continue to look into the hydrostatic system early on, but everything evolves," Roering said. "We didn't have to beat a path to the market to stay afloat. We're growing and gaining credibility each year. We needed to have product on the market in order to sustain the company." dp

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www.thewilcraft.com

NUHN15000022461

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 41 of 65

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Design · Construction · Integration

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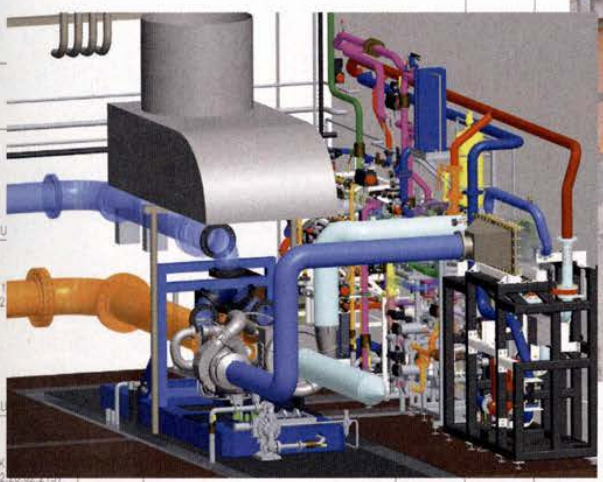

Tier 4 Two-Stage Locomotive Turbocharger Test Cell

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INNOVATIVE USES of HORSEPOWER

ROCKET MAN-EUVERS

Cometto selects Volvo Penta diesels for rocket fuel hauler

The AIT250 hauler is shown at Cometto's headquarters in the Italian Alps shortly before being shipped to the European Space Agency spaceport in French Guiana.

The European Space Agency (ESA) uses the Guiana Space Centre spaceport just outside of the city of Kourou, French Guiana, to launch spacecraft for the purposes of telecommunications, weather monitoring and satellites. Kourou's location 310 miles north of the equator is an ideal location for the task, with the Earth's rotation providing the spacecraft some added velocity.

It's at that space center in South America's tropics that a pair of Volvo Penta diesel engines powers a specially built hauler that is tasked with transporting the solid rocket fuel boosters used by the agency's Ariane 5 heavy-lift launch vehicle.

The Cometto AIT250 Fardier (a French word meaning dray) got its start far across the ocean at the foot of the Alps in Northern Italy. Based in the tiny town of Borgo San Dalmazzo is Industrie Cometto S.p.A., an equipment manufacturer that has built semi-trailers, modular trailers and self-propelled haulers since 1954.

Its products are manufactured on a per-project basis and can move a lot of weight: the largest trailers stretch up to nearly 200 ft. with 40 rows of wheels and can move a 7700 ton ship. The company has patented its steering and suspension system, with each axle able to bear up to 66 tons.

"The strength of Cometto machines

NUHN15000022463

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 43 of 65

One of two Volvo Penta TAD765VE engines can be seen in the Cometto AIT250 hauler.

(Photo credit: European Space Agency)

The AIT250's predecessor, the AIT200, is shown on site in Kourou, where it hauls rocket boosters containing solid propellant.

is in the design," said Luigi Terzuolo, technical director of Cometto. "We design all parts of these machines in-house — including the software used to steer our remote-controlled units. We know our products inside and out, so we can customize them as requested."

Cometto began its relationship with ESA in 1990, when the company delivered the AIT200 hauler to move rocket boosters around the Guianese spaceport.

With the AIT200 showing its age, Cometto delivered the AIT250 Fardier to Kourou earlier this year where it was put to work moving the bottom two segments of the rocket boosters. Hydraulically driven, the AIT250 can move backward and forward or side to side — making an otherwise long and unwieldy machine surprisingly maneuverable. It measures 55 ft. long and 18 ft. wide.

Each rocket booster segment weighs 165 tons, measures 49 ft. long and contains 118 tons of solid rocket propellant to launch the Ariane 5 main stage spacecraft. The fuel doesn't last long; the launch vehicle burns through the propellant in less than 2 1/2 minutes as it shoots into space at more than a mile a second.

The cargo is enormous, and the working conditions in Kourou can be treacherous. Situated along the Atlantic Coast in a dense swathe of

rainforest, the area is hot and humid, and the distinct possibility of a lightning strike makes hauling the fuel-filled segments dangerous business.

Cometto selected two 7 L Volvo Penta TAD765VE diesel engines rated 315 hp each. The company installed two engines to maximize uptime; if one engine experiences a problem, the machine can continue working, albeit at a lower speed.

"We've used Volvo Penta engines since 1995, so we already had a strong relationship with the company when we chose their engines for the AIT250," Terzuolo said. "At Volvo Penta we have only one person dedicated to working with us on both sales and engineering, which means that we can expect a quick response time — we don't get bogged down in a long chain of communication. Volvo Penta is more customer-focused than product-focused, and we appreciate the close collaboration we enjoy with them.

"But even though good service and a customer focus are highly important to us, they aren't enough on their own. Fortunately the engines Volvo Penta offers also happen to suit our requirements perfectly, providing us the power, reliability and efficiency we need." dp

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www.cometto.com
www.volvopenta.com/industrial

(Photo credit: European Space Agency)

A heavy hauler in its own right, the Ariane 5 launch vehicle lifts off at the Kourou spaceport.

NUHN15000022464

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 44 of 65

INNOVATIVE USES of HORSEPOWER

STANDBY POWER FOR SCIENCE

Kubota gen-set used to augment wind and solar power on floating environmental education center

While it relies primarily on the sun and the wind for its electricity, Groundwork Hudson Valley's Science Barge, a floating prototype sustainable urban farm also incorporates a backup diesel generator set. The barge is a popular destination for school groups, where students learn about sustainable hydroponic agriculture.

All farms rely on the sun and the elements to produce their bounty. The Science Barge, a prototype sustainable urban farm in the Hudson River at Yonkers, N.Y., does the same — with a diesel generator set as a backup just in case.

The barge, developed by New York Sun Works and acquired by Groundwork Hudson Valley in October 2008, is a floating environmental education center that incorporates a greenhouse and stations used to teach students the basics of hydroponics and renewable energy. Part of Groundwork USA, a national organization dedicated to helping communities revitalize neighborhoods and transform community liabilities into community assets, Groundwork Hudson Valley operates in the lower Hudson Valley area, developing an array of on-the-ground environmental projects that directly involve local residents, especially youth.

During its April-to-November season, the Science Barge grows fresh produce such as tomatoes, melons, greens and lettuce with zero net carbon emissions, no pesticides and no runoff. The bounty is sold at the Get Fresh Yonkers Farmers Market.

Engineered to operate completely off the grid, the Science Barge is said to be the only fully functioning demonstration of renewable energy supporting sustainable food production in New York.

Nearly all of the energy needed to power the barge is generated by solar panels and wind turbines, but when those fall short, the vessel relies on a Kubota GL7000-USA Lowboy generator set.

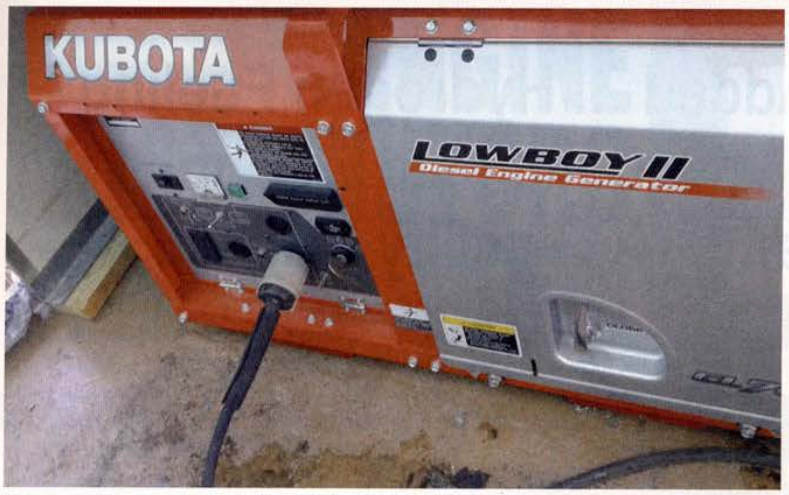
"I am an environmentalist to the core," said Bob Walters, director of the Science Barge, who is often referred to as "Capt. Bob," as he coordinates the operation of the vessel. "But the exhaust from the diesel generator assures me we can keep the hydroponic systems going."

The gen-set is driven by a liquid-cooled, two-cylinder Kubota Z482 diesel rated 10.9 hp at 3600 rpm. The naturally aspirated engine has a bore and stroke of 67 x 68 mm for a total displacement of 0.479 L, and it is directly coupled to a single-phase, rotating-field alternator that delivers 7.0 kW of 60 Hz standby power.

Earlier this year, Walters contacted Kubota Engine America (KEA), the North American distributor of Kubota engines and generators, to inquire about the unit, as the previous generator, also a Kubota unit, became "a

NUHN15000022465

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 45 of 65



Kubota Engine America (KEA) donated a GL7000-USA Lowboy generator set to the Science Barge to allow its hydroponics and pumping systems to operate when the sun and wind don't cooperate. The gen-set, rated 7.0 kW standby, operates on B20 biodiesel.

victim of the worst winter we had on the Hudson in 30 years."

"We had ice from shore to shore, seals swimming off the stern of the barge and American eagles resting on ice floes as they drifted past," Walters said. "The old generator was a victim of blown snow that drifted into the generator."

KEA donated the gen-set, as the company "felt that the Science Barge was a great representation of our brand statement — For Earth, For Life — linking food, water and the environment," said Carolina Pham, sales and marketing manager for Lincolnshire, Ill.-based KEA.

In its first eight months, the gen-set has been operated sparingly, under two hours a month, Walters said. "We have had an amazing season on the barge with lots of sun and wind," he said. The unit has the capability of extended operation, as it is fed by its own 7.4 gal. fuel tank — good for 10 hours at full load — as well as a remote 135 gal. tank. In keeping with the environmental theme of the barge, the gen-set runs on B20 biodiesel.

When the gen-set isn't operating, the barge relies on solar and wind power to operate all of the vessel's pumping and water purification systems (it uses rainwater and purified river water for its hydroponic gardens), as well as to charge an energy storage system that incorporates 16 Concorde AGM glass mat batteries wired together in a 48 V system. At full charge, the batteries are rated at 1040 Amp-hours at 48 V.

The 42 in. long x 24.3 in. wide x 27.5 in. high gen-set, which is designed to be low-profile, is positioned on the barge's deck outside the battery storage room. Also in keeping with the minimal impact to the environment — particularly appropriate in this venue — the gen-set is designed for low-noise operation, with a sound rating of 66 dB(A) at 23 ft.

A popular destination for school groups, camps and tourists, the Science Barge hosts thousands of visitors each year, drawing interest from around the world.

"We are always having amazing visitors," Walters said. "Most recently we had a film crew from Vietnam from their national TV station. The 'I Love New York' campaign brought a group of German travel agents. The Germans are interested in the technology we use." dp

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www.groundworkhv.org/programs/science-barge/
www.kubotaengine.com

dp DOTCOM

United Alloy Inc. (UAI) recently launched its new website, *www.unitedalloy.com*, revealing a global brand and image that targets their market reach, which now covers the OEM power generation, construction, agriculture and heavy equipment industries. The company said the site is intuitive to navigate and explore UAI's range of products, customer services and technical support, providing product technical details, fabrication capabilities, supply programs, relevant updates, employment opportunities and more.

Information can be uploaded or downloaded, and site visitors can request a personalized call from a qualified "solutioneer" or schedule an on-site visit. UAI has expanded serial production and fabrication capabilities in the last 18 months, including a 112,500 sq.ft. manufacturing and 30,000 sq.ft. warehouse expansion.

Gems Sensors & Controls, a supplier of standard and custom liquid level, flow and pressure switches, miniature solenoid valves and preassembled fluidic systems, has redesigned its homepage.

Enhancements of the multi-language homepage at *www.gemssensors.com* include streamlined navigation, improved depth of technical content and increased front-end accessibility to local sales support channels, the company said.

As with its legacy version, the new homepage is available in custom-translated English, Chinese, German and Portuguese. It is also geographically segmented, which should help ensure rapid customer response to support requests and RFQs, the company said. New page content has been added to reflect the company's expertise in OEM custom design and manufacturing engineering services. It also highlights new sensor offerings for oil and gas, medical sciences, off-highway vehicle, water and wastewater, marine and other markets.

NUHN15000022466

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 46 of 65

CNG Stations Added ... Hydrogen Fueling Competition ... New Cellulosic Ethanol Plant ... Merchant LNG Facility Opens ...

C.A.T. Inc. has signed an agreement with U.S. Oil for the construction of five GAIN Clean Fuel compressed natural gas (CNG) stations in the United States and Canada. The new stations will support C.A.T.'s recent acquisition of 100 Ryder CNG sleeper tractors. The stations will be located in Toronto, Ontario, Canada; Montreal, Quebec, Canada; Laredo, Texas; Charlotte, N.C.; and Scranton, Pa. Appleton, Wis.-based U.S. Oil has 38 GAIN stations in operation or under construction.

The U.S. Dept. of Energy launched a $1 million, two-year competition to develop affordable systems for small-scale, noncommercial hydrogen fueling. Successful entries in the H2 Refuel H-Prize competition will install and test systems that generate hydrogen from resources available at most homes, like electricity or natural gas, for refueling hydrogen vehicles. The H2 Refuel H-Prize will be administered by the Hydrogen Education Foundation.

A second-generation **cellulosic ethanol plant** capable of producing 25 million gal. per year recently opened in Hugoton, Kan. The plant is owned and operated by Abengoa, an international biotechnology company. The plant utilizes only second-generation biomass feedstock — nonedible agricultural crop residues such as stalks and leaves — for ethanol production.

The Hugoton facility will process 1000 tons per day of biomass. Of that, more than 80% is expected to consist of irrigated corn stover, with wheat straw, milo stubble and switchgrass constituting the remainder.

The facility also includes an electricity cogeneration component with a capacity of 21 MW that will generate enough electricity to power itself and provide excess power to the local community.

Love's Travel Stops plans to open its first CNG fueling location in Georgia. Upon completion, Love's existing travel stop in Thomson will be the company's 18th CNG location. It will also be the first connecting the East Coast with Love's Fast-Fill CNG for heavy-duty trucks as well as a CNG fueling option for passenger vehicles.

The decision to bring Love's Fast-Fill CNG to a new part of the country was made in part because of Werner Enterprises, one of the five largest truckload carriers in the nation. The transport company plans to purchase eight CNG trucks specifically for the Thomson area.

CNG is expected to be available at Love's Travel Stop in Thomson by spring 2015.

Ferus Natural Gas Fuels Inc. opened what it said was the first merchant liquefied natural gas (LNG) facility in Canada. The facility, located in Elmworth, Alberta, Canada, is strategically located in the heart of oil and gas activity in northwest Alberta and northeast British Columbia, and produces LNG fuel for engines used in drilling rigs, pressure pumping services, water heating for well fracturing and heavy-duty highway and off-road trucks. Other high-horsepower applications for this LNG are in rail, mining, and remote power generation. To support the entire LNG supply chain, Ferus NGF has also designed and built specialized mobile storage and dispensing equipment to provide full-service fueling solutions.

Currently, the facility can produce up to 50,000 gal. per day of LNG, and has the capacity to expand up to 250,000 gal. per day.

Spatco Energy Solutions, the North American distributor for Galileo Technologies, announced the sale of the first North American Galileo Cryobox Nano LNG Station to Terra Energy Group.

Scheduled to be operational in early 2015, the Cryobox is designed to capture natural gas that would otherwise be flared off from the oil and gas fields in North Dakota, converting the wellhead gas into more than 8000 gal. of LNG per day.

The Galileo Cryobox is a small-scale, transportable LNG production plant capable of converting pipeline or well-head natural gas into LNG. In addition to deployment in oil and gas fields, applications for Cryobox include marine bunkering, rail, mining, heavy-duty trucking and power generation.

The **European Commission** adopted an expanded list of the industry sectors and subsectors that will be granted relief from greenhouse gas emissions restrictions. Those on the list were deemed to be exposed to a significant risk of carbon leakage for the period 2015 to 2019.

The decision was reached following warnings by industry groups that manufacturers, threatened with having to pay more for emitting carbon dioxide in Europe and under pressure from global competition, would shift their most polluting operations elsewhere — an avoidance strategy known as carbon leakage.

The leakage list is revised every five years. This year's list expanded the number of industrial sectors allowed relief from carbon trading costs from 164 to 175. dp

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 47 of 65

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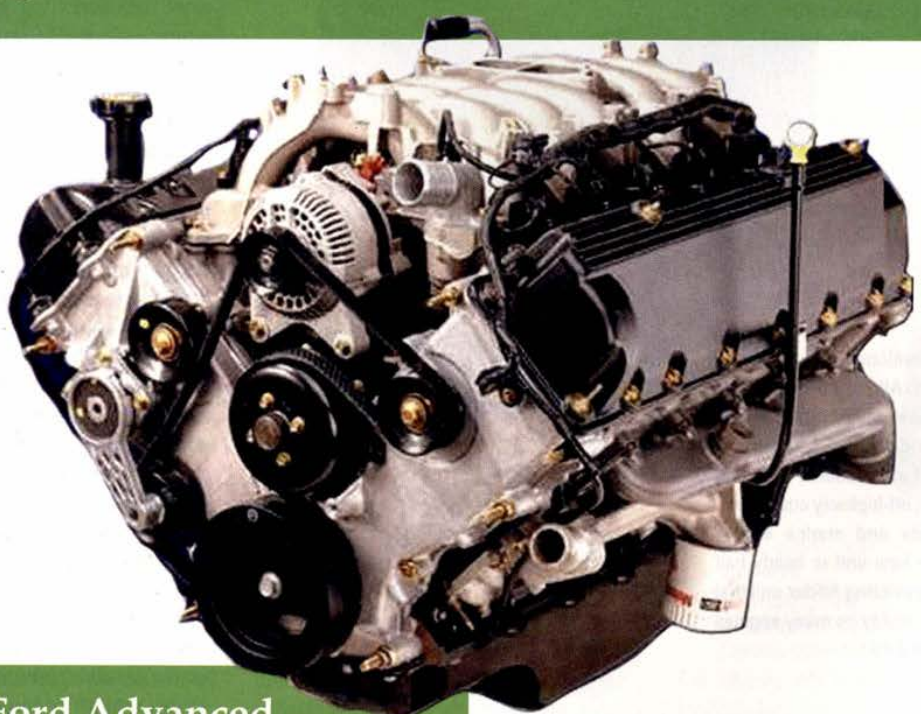

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MORE COMPACT CRANKCASE CLEANING

Alfdex develops smaller version of its oil mist separator system targeting medium-duty engines

Alfdex has developed a new smaller version of its Alfdex oil mist separator. The new units target diesel engines from 5.0 to 8.0 L used in a wide range of applications, including trucks, buses, off-highway equipment, generator sets and marine engine systems. The new unit is nearly half the size of the existing Alfdex unit that has been a mainstay on many engines between 9.0 and 16 L.

BY BO SVENSSON

Swedish filtration specialist Alfdex has developed a smaller version of its oil mist separator designed to clean the crankcase gases in diesel engines. The new Alfdex separator is engineered to meet the requirements of medium-duty engines with displacements of 5.0 to 8.0 L.

Like their larger predecessors designed for 9.0 to 16 L diesels, the new smaller units can be used in a broad range of engine applications, including trucks, buses, generator sets, off-highway equipment and marine applications.

A number of major truck manufacturers in North America and Europe are using Alfdex separators and the company said it delivers several hundred thousand units each year to help meet Euro 6, EPA 13, Tier 4 final and Stage 4 emissions regulations.

"Alfdex has, since the production start back in 2006, become the world's leading supplier of highly efficient solutions for the cleaning of crankcase gases from diesel engines, solutions that will satisfy environmental requirements for a very long time to come," said Anders Larsson, vice president, Alfdex.

"Our oil mist separator is a unique product which breaks new ground for crankcase ventilation on both present-day and future diesel engines by eliminating oil and soot from the blow-by. The separator, sealed for life, keeps turbochargers and intercoolers running at peak performance. Yet it reduces oil consumption and requires no maintenance or service."

Alfdex oil mist separators use a centrifugal separation technique to prevent unfiltered crankcase gases from returning to the inlet of diesel engines or being emitted to the environment. The oil mist separator is built around a rotating conical disc stack, which is driven by an oil turbine at the bottom of the unit. Part of the lubricating oil circulating in the engine is routed to a nozzle, which directs an oil jet to drive the oil turbine.

Oil and soot particles are removed from the gas by means of centrifugal forces of about 14.7 lb. at a separator speed of 7000 to 9000 rpm. Through centrifugal force, droplets and particles coalesce and form larger clusters that flow toward the outer edge of the discs. From there they

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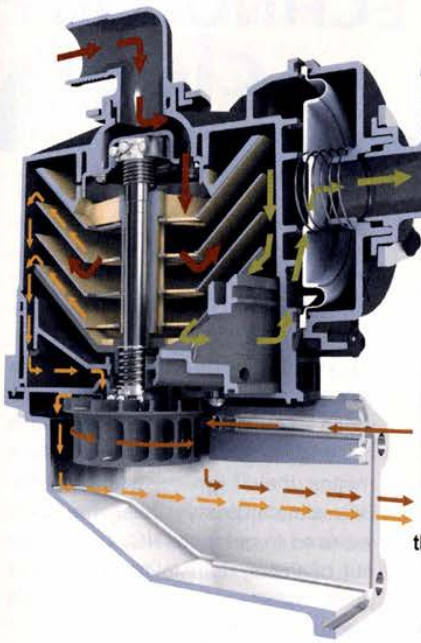
Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 49 of 65



The Alfdex oil mist separator is built around a rotating conical disc stack, which is driven by an oil turbine at the bottom of the unit. Oil and soot particles are removed from the gas by means of centrifugal forces that cause oil droplets and particles to coalesce and form larger clusters that flow toward the outer edge of the discs. From there they are discharged onto the inner wall of the separator housing.

are discharged onto the inner wall of the separator housing.

The droplets and particles then flow down to the bottom of the separator before finally being returned to the engine sump. The clean crankcase gases are then either returned to the engine (closed crankcase ventilation or CCV) or emitted into the air (open crankcase ventilation or OCV). In the CCV version, an integrated pressure control valve keeps the crankcase pressure at a requested level.

"The Alfdex oil mist separator is by far the most efficient solution for cleaning crankcase gases and the conclusion reached by leading diesel engine manufacturers," said Mats Ekeroth, managing director, Alfdex. "We work next door to the Alfa Laval center of separator development. This of course is a great advantage, since Alfa Laval has more than a 100 years of experience in separation technology."

The outer dimension of the new smaller unit has been reduced to almost half of the heavy-duty separator to fit the limited space requirements of medium-duty engines. In its capacity range, it provides the same high cleaning efficiency as the larger separator, Alfdex said. The separator will also be available with electric drive, the company said.

"The market for medium-sized trucks in the 6.6 to 16.5 ton range within EU is estimated to 70,000 and in North America to over 200,000 annually," Larsson said. "In Asia, the market is considerably larger with around 600,000 trucks/year.

"In a global perspective, the total number of medium-sized trucks manufactured annually is in the range of one million. But outside EU and North America the emissions legislations are still weak or missing."

"We have today an annual production of the Alfdex larger crankcase gas separators close to 500,000 a year," Ekeroth said. "We see a strong future also for the new, smaller version in a market where today simpler and less effective filter solutions are traditionally used. Such filters need frequent replacement and need destruction of the replaced media."

Alfdex believes that future engine development will require more efficient cleaning of crankcase gases, in particular in CCV configurations. dp

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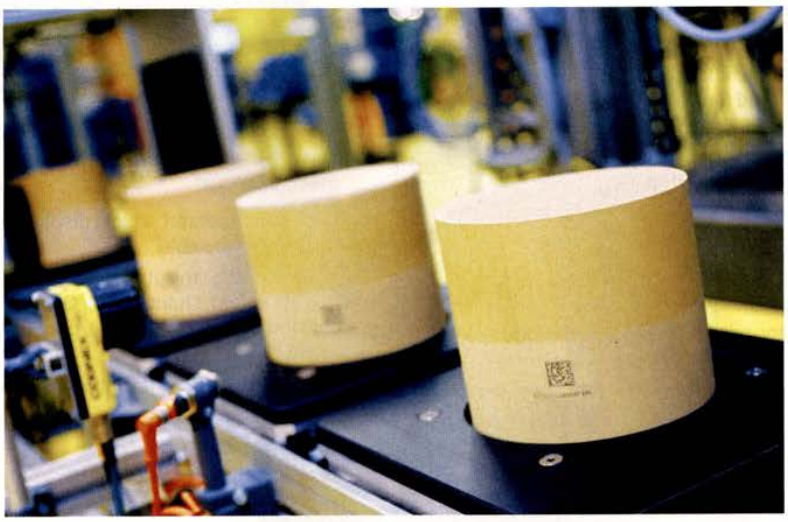
More stringent NO_x requirements drive improved conversion technologies



Johnson Matthey catalysts. The company said it is addressing ways to achieve a situation where NO_x emissions from heavy-duty diesel engines could eventually be comparable to passenger cars.

BY IAN CAMERON

Further emissions regulations for both on- and off-road vehicles continue to present engineering challenges for engine makers and OEMs. One such approaching regulation is the European Commission's proposal for Stage 5 off-highway regulations, which could take effect throughout the European Union from 2019. The increasingly tighter limits on the amount of pollutants and particles that vehicles release have revealed trends in emissions reduction, and have prompted the development of new and enhanced emissions technologies.

For example, as regulatory reductions in nitrogen oxide (NO_x) emissions increase, the need for more NO_x conversion and the further implementation of diesel particulate filters (DPF) to ensure particulate number compliance will also increase. There may also be an increased focus on other types of emissions, such as nitrogen dioxide and methane.

Andy Walker is heavy-duty diesel global technology director at Johnson Matthey, which makes emissions control catalysts. In remarks he made in September at the SAE Heavy Duty Diesel Symposium in Gothenburg, Sweden, Walker said that incoming solutions show "great potential" to meet constantly rising NO_x conversion requirements, enabling very low tailpipe NO_x and optimized fuel economy.

"The challenges facing the industry are varied," Walker said. "One aspect concerns fuel economy and carbon dioxide — the greenhouse gas reductions. What that is going to mean for the industry is an increase in the engine-out NO_x emissions, which means that if we assume that the NO_x standards stay the same, then we need to get more NO_x conversion out of the system to have the best optimum between fuel efficiency and criteria pollutants.

"But as we look at the way the regulations have gone and the way that we need to optimize the in-use performance — not just the cycle performance — we need to be looking at ways to further improve things like the low-temperature performance, because with improvements in engine efficiency and lower carbon dioxide, the exhaust temperature is going to drop.

"Ensuring higher NO_x conversion with lower temperatures, and ideally with reduced back pressure, is going to be one of the main drivers."

Low-temperature NO_x conversion can be increased by various means, he said, including SCR on Filter (SCRF) — which controls NO_x and particulate matter on a single substrate — and improved SCR catalysts. Further optimized ammonia slip catalysts will also enable very high NO_x conversions with minimized nitrous oxide emissions.

"Stage 5 in Europe on the nonroad side is almost certain to introduce a particle number regulation which will drive filter fitment across a wide range of systems," Walker said. "At the moment, many of those systems are just using SCR, so what we are going to see is the nonroad mobile-machinery industry looking very closely at SCRF

NUHN15000022471

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 51 of 65

because that does give the potential to have very high NO_x conversion, which is required with a lower space claim because the filter and the SCR catalyst are within the same substrate."

Walker also highlighted how the industry and Johnson Matthey are addressing ways to achieve a situation where NO_x emissions from heavy-duty diesel engines could eventually be comparable with passenger cars.

Within many on-road, heavy-duty applications, he said that "once they are up and running, there is a negligible level of NO_x coming out."

"When you look at, for example, obtaining very low NO_x emissions under cold-start conditions, just about all the tailpipe NO_x emissions occur in the first 200 seconds," Walker said. "So what this means, as a challenge for the industry, is that we need to find ways to improve the cold-start performance which, in general, can be done in two ways. One is to get the system as hot as possible and as quickly as possible, which in general means throwing a lot of energy at it — be it fuel energy or electrical energy, although there will be a fuel economy penalty associated with that. Another way is to trap the NO_x at cold start by developing a system that stores the NO_x at cold start and then releases it thermally. NO_x would be released thermally at a temperature at which the downstream SCR/SCRF components can deal with it.

"We have developed the Cold Start Concept catalyst which does this. We have components in there to trap the NO_x at low temperatures and then release them as we move towards higher temperatures — peak release temperatures of around 240°F, which means that in general we are getting a good overlap with the downstream SCRF which will be getting to that temperature on that timescale. This SCRF component will then convert the NO_x into harmless nitrogen." dp

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dp PRODUCT PIPELINE

Airless Skid-Steer Tires

Michelin has expanded its market footprint for its airless skid-steer tires with the launch of two versions of the Michelin X Tweel SSL airless radial tire: a 12N16.5 X Tweel SSL all-terrain for a range of surfaces, and a 12N16.5 X Tweel SSL hard surface for pavement use.

The all-terrain model, which is designed for more rugged off-road working conditions, will be applicable for uses such as construction and landscaping. The hard-surface tire, designed for more longevity on pavement and asphalt, presents an option for very high-use operations.

Both 12N16.5 X TWEEL SSL fitment's spokes are specially designed to enhance the tires' durability and endurance, the company said. The tires also have a deep underlying tread layer that allows the core outside tread to be retreaded numerous times.

Michelin said the 12N16.5 X TWEEL SSL all-terrain offers high-strength, poly-resin spokes, engineered to be self-evacuating in muddy conditions.

www.michelintweel.com

Inductive Linear Sensor

Alliance Sensors Group has announced the ME Series Linear Position Sensors for embedded use in measuring the ram position of hydraulic and pneumatic cylinders in industrial, mobile or subsea applications.

The ME Series is designed to be a drop-in form, fit and function replacement for embedded magnetostrictive sensors, but with much more robust construction and lower cost of ownership, the company said. They can also replace embedded resistance potentiometers. The sensors are based on a patented contactless inductive sensing technology that uses solid probe construction and requires only a simple conductive tubular target or a small diameter deep hole gun drilled in the cylinder rod for operation, rather than needing a permanent magnet ring, counterbored hole or any other type of special target, Alliance said.

Features include measurement ranges from 4 to 36 in.; operations to 5000 psi or 10,000 ft.; IEC IP-67 aluminum or stainless steel housing; 185°F operation (221°F option); and dc voltage or current analog output.

www.alliancesensors.com

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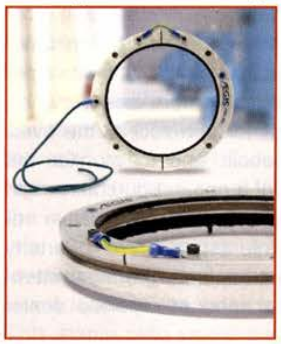


Electro Static Technology of Mechanic Falls, Maine, has released the Aegis iPRO-MR ring, which is designed to combine shaft voltage bearing protection with continuous monitoring of shaft voltage levels from a remote location.

The Aegis iPRO-MR is designed for use with large motors and generators in critical applications including power generation, turbines, UPS systems, emergency backup power systems, container cranes at shipping ports and others, the company said.

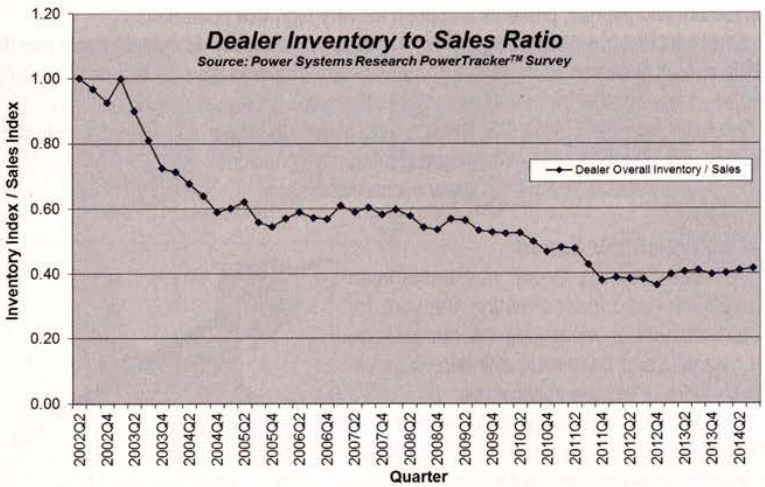
The maintenance-free, split-ring Aegis iPRO is designed to prevent damage that could otherwise cause generator or motor failure, unplanned downtime, costly repairs and lost revenues, the company said. Available in a range of sizes, the iPRO shaft grounding ring comes in mating halves to facilitate field retrofits on coupled equipment.

www.est-aegis.com

NUHN15000022472

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 52 of 65

Gen-Set Sales Marginal In Third Quarter, But Could Get Late Push



Dealers and distributors reported inventory levels rose 1.2% in the third quarter following a 3.0% increase in the second quarter. Looking year-on-year, inventory levels at the end of the third quarter 2014 were slightly higher than the same period last year.

BY JOE ZIRNHELT

Since 1998, Power Systems Research (PSR) has been continuously maintaining its PowerTracker series of syndicated surveys, conducting 1400 interviews each quarter among three key respondent groups in North America: generator set dealers and distributors, businesses and households.

PSR conducts 200 interviews each quarter among dealers and distributors. The focus of the survey is on recent sales and market observations for the current quarter as well as expectations for the coming quarter.

The PSR Business Consumer survey consists of 900 interviews per quarter among a wide cross section of businesses to gather their input concerning gen-set ownership, usage trends and motivating factors for purchase, including any concerns about the reliability and availability of electric power.

Finally, the Household Consumer survey consists of 300 interviews per quarter to learn more about ownership trends for gen-sets to the average household and to monitor the likelihood of a gen-set purchase.

While we find the cumulative responses interesting on a quarterly basis, what captures the most attention is the trend of reported dealer performance as well as the sentiments by household and business consumers. These important trends most often seem to develop over the course of several quarters and in some cases several years, thereby highlighting the importance of tracking the change on a quarterly basis and catching the trend at an early stage.

The latest results from the PowerTracker dealer and distributor survey showed that sales of gen-sets during the third quarter of 2014 were down 0.5% over second-quarter 2014 levels. The 0.5% third-quarter decrease followed a second quarter where sales were up 2.1% from first quarter 2014 levels. On a year-on-year basis, sales at the end of the third quarter 2014 were slightly down, 1.0% lower than sales levels in Q3 2013.

The PowerTracker dealer and distributor respondents were mildly optimistic in their outlook for the fourth quarter of 2014, expecting gen-set sales to rebound with growth in the range of 3 to 4% in the smaller power ranges below 50 kW, and 3 to 4% average growth in the power ranges above 50 kW.

When asked, "Why do you expect sales to change in the upcoming quarter?" comments from dealers focused on the following market observations:

- **End-of-year budgets.** The end of the year is approaching, and many business and institutional decision makers are often faced with a "spend it or lose it" decision.
- **Winter weather.** Particularly in the smaller portable ranges, adverse winter weather can turn the market within a matter of a few days during

Joe Zirnhelt is a vice president with Power Systems Research, a market research and consulting company headquartered in St. Paul, Minn. Phone: (651) 905-8400; Fax: (651) 905-8487; E-mail: jzirnhelt@powersys.com; Web: www.powersys.com.

NUHN15000022473

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 53 of 65

Demand for natural gas gen-sets — such as this Doosan NG160 unit powered by a PSI engine — is growing, according to dealers and distributors responding to PSR's PowerTracker survey.

a larger ice storm or winter-related power outage.

• **Awareness of needs.** More businesses are recognizing the need for backup power. Even a small outage is a loss of production time that translates to dollars and cents. In the current business environment, every minute of uptime counts.

• **Market knowledge.** We would say that this represents more of a "gut instinct" approach, but does prove there is some sense of being in touch and knowing the ups and downs of one's market territory over the course of a year. As one dealer so succinctly summarized, "I can just feel it."

When asked, "What changes have you recently noticed among particular customer groups or product categories within your market?" there were several comments that emerged as common themes:

• **Final Tier 4 requirements may hurt diesel sales for nonemergency applications in the short term.** In nonemergency applications, the numbers will be down in the short term due to the higher costs being passed along to the customer because of more stringent Tier 4 final emissions requirements.

• **Data center markets may be getting saturated.** Data center sales growth is softening as the market growth rates, according to some dealers interviewed, have stabilized.

• **More people are going online first.** Depending on the power range involved, a greater number of potential buyers are going online to price or buy their gen-set.

• **Natural Gas.** From one dealer in the mid-ranges: "I am seeing a trend towards natural gas. People are starting to get away from diesel."

On average, dealers and distributors reported inventory levels had increased 1.2% during the third quarter following a 3.0% increase during the second quarter of 2014.

Looking at the year-on-year changes, inventory levels at the end of the third quarter 2014 were slightly higher at 0.3% than at the end of the same quarter of 2013. Since late 2011 we can see a consistent leveling of the ratio of the inventory levels index to the sales level index. This stable ratio would suggest that there is a good balance existing for dealers' general level of anticipation of sales activity throughout the yearly sales cycle. dp

NUHN15000022474

Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 54 of 65

ADVERTISERS' INDEX

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COMPANY NAME	PAGE NUMBER
ACS Inc.	43
Carling Technologies Inc.	25
Cleanfix Reversible Fans	55
*Concentric Inc.	5
Cummins Filtration	17
Danfoss Power Solutions	Fourth Cover
*Deutz Corporation	Third Cover
ECU – Engineering Concepts Unlimited	9
Engine Distributors Inc.	49
Faria Beede Instruments Inc.	21
Flexible Metal Inc.	22
Go Power Systems	55
*JCB Power Systems Ltd.	33
*John Deere Power Systems	Second Cover
Johnson Matthey Environmental Catalysts and Technologies	35
*Kubota Engine America Corp.	7
MICO Incorporated	39
*MTU	15
*Racor Division – Parker Hannifin Corporation	23
Scania U.S.A. Inc.	11
Testo Inc.	13
Twin Disc Inc.	8
Veethree	51
Yanmar America Corp. Distributors Group	31
ZF Friedrichshafen AG	1

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continued from page 8

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New President For Parker Filtration Group

Parker Hannifin Corp. named **Robert Malone** as vice president and president – Filtration Group, and an officer of the company, effective Dec. 1. Malone succeeds **Peter Popoff**, who will retire effective Feb. 1, 2015.

Malone joined Parker in 2013 as vice president of operations for the Filtration Group, where he is responsible for five of the group's divisions and is the group sponsor for four of the seven global filtration platforms. Prior to joining Parker, he was president and CEO for Purolator Filters, a German-owned joint venture between Robert Bosch GmbH and Mann+Hummel GmbH. Malone also held senior leadership positions with ArvinMeritor Light Vehicle Aftermarket and Arvin-Kayaba LLC, including three vice president and general manager assignments and a vice president of sales and marketing role.

Popoff began his Parker career at Racor and served in engineering management positions before being named general manager of Racor in 1987. Parker acquired Racor in 1985. Subsequently, Popoff became vice president and general manager of Parker Racor globally before becoming vice president of operations for the Filtration Group in 2006. In 2008, he became a corporate officer and was named vice president and president – Filtration Group.

Miratech CEO

D. Glover

Dean Glover has been named CEO of Miratech Group. **Kevin O'Sullivan**, the president and CEO of Miratech Group, will become chairman.

Glover was most recently senior vice president of the products division of Global Power, which provides custom-engineered auxiliary equipment and maintenance-support services for the power generation industry. He has international experience and is a certified Six Sigma Master Blackbelt.

Miratech provides emissions and acoustical reduction solutions for natural gas and diesel reciprocating engines used in the natural gas production, oil and gas drilling, power generation, industrial, rail and marine industries.

ZF MARINE: Keith Stanley has assumed the position of product line manager – Pleasure Craft, for North and Central America at ZF Marine Propulsion Systems Miramar LLC, the North American arm of ZF Friedrichshafen AG Marine Propulsion Systems. Stanley joined ZF in 2011 as a key account manager and was promoted to engineering manager in 2012, with responsibility for application engineering activities for the region. In his new role, Stanley will have responsibility for both activities.

K. Stanley

Stanley has more than 15 years of experience in the pleasure craft industry in all facets of design and engineering for a number of prominent vessel manufacturers.

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 56 of 65

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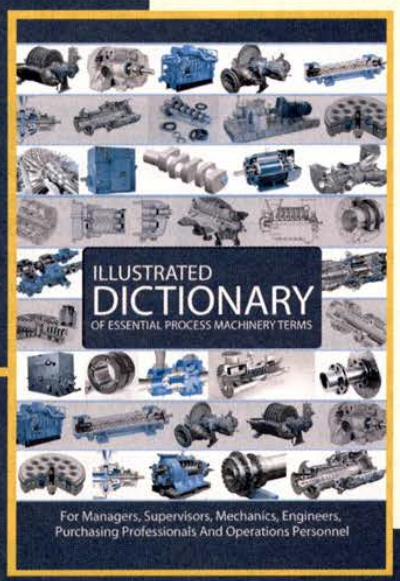

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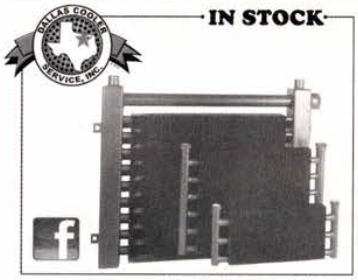

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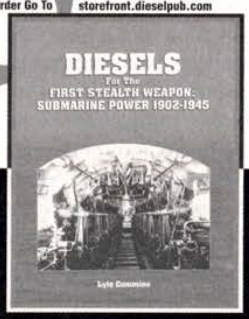

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Somaschini manufactures ground timing gears for heavy-duty truck applications, as well as other precision gear products. The company's plants in Entratico, Italy, and South Bend, Ind., produce large-volume series gears with highly automated manufacturing processes.

GEARING UP FOR GROWTH

Somaschini targets expanded gear business in global heavy-duty truck markets

BY ROBERTA PRANDI

Founded in 1922 in Milan, Italy, Somaschini S.p.A. is a family-owned company with the third-generation members of the family now managing the enterprise. Somaschini is a high-volume manufacturer of ground timing gears for heavy-duty truck applications, as well as ground gears, spline shafts and spindles, and Gleason bevel gears.

Alexander Lehmann, Somaschini's export manager, said the company produces its gears exclusively on customer designs, and that 70% of Somaschini's sales are in the on-highway market, especially U.S.A. and Europe.

The company owns two production plants in Northern Italy — the original facility and headquarters in Trescore, close to the city of Bergamo; and a new plant founded in 2007 in nearby Entratico, where large-volume series gears are produced with highly automated manufacturing processes. In 2007, the company also grouped all activities concerning the production of ground timing gears for the on-highway market into Somaschini Automotive S.r.l.

Since 2012, the Somaschini group has also owned a plant in South Bend, Ind., which has been built as a replica of the newest Italian facility, utilizing automated production methods and advanced manufacturing technologies.

"Somaschini North America is a modern production plant dedicated to large-volume series gears, mainly for the truck market," Lehmann said. "We count among our customers key OEMs, for example Daimler Trucks and Detroit Diesel Corp."

Somaschini manufactures about 3 million gears per year, between large-volume series components and smaller batches for heavy-duty and industrial applications such as marine or railway systems. "We employ all manufacturing techniques in-house, including turning, gear cutting, hard turning, lapping, grinding and gear teeth grinding." Lehmann said. "Our manufacturing department is largely automated to cope with high-volume series production and equipped with state-of-the-art machining centers, as for example renowned Reishauer machines."

Somaschini also employs a number of quality inspection tools and quality insurance processes, including dimensional and tooth control as well as metallurgical control. An in-process control procedure is in place, too, together with SPC and MSA. All produced gears also undergo a residual contamination control.

For the last few years, Somaschini has also cooperated with the Gear Research Centre, Institute for Machine Elements (FZG – Forschungsstelle für Zahnräder und Getriebebau) at the Technical University of Munich, Germany, for research and testing projects in the field of ground gears.

"Our gears have traditionally been renowned for their reliability and low noise performance," Lehmann said. "We are proud of our capability to supply precision and strength to all our customers. Our company's philosophy is that gears are not all the same, and partners cannot be found but built. This is why the relationship with our customers is key to our success and theirs." dp

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Exhibit 2068
Bazooka v. Nuhn - IPR2024-00098
Page 59 of 65

AEM Names 2014 Hall Inductees

The Association of Equipment Manufacturers (AEM) has announced the 2014 inductees to the AEM Hall of Fame, which recognizes and celebrates outstanding individuals in the off-road equipment industry.

The 2014 inductees into the AEM Hall of Fame are: E.G. Melroe and the Melroe family, Melroe Manufacturing & Bobcat Co.; Agustin 'Gus' Ramirez, Husco Intl.; Robert J. Ratliff, AGCO Corp.; John D. West, The Manitowoc Comp.; and Rollin Henry White, Cleveland Tractor Co. (Cletrac).

The inductees are evaluated by an independent panel of industry experts on five criteria: innovation, industry contributions, leadership, corporate citizenship/social responsibility and sustainability.

Patriarch E.G. Melroe designed and patented in 1940 a windrow pickup that lifted windrowed grain into combines and invented other agricultural implements, but he is best known for the development of the compact skid-steer loader. Despite performance and durability issues, customer demand kept the Melroes from halting production of their first skid-steer loader, and the Bobcat brand machine was introduced in 1962. The four-wheel-drive skid-steer concept became a model for other brands. In 2014, Bobcat built its one millionth loader.

Inducted with E.G. Melroe are his sons Les, Cliff, Roger and Irving; his nephew, Sylvan; and his son-in-law, Eugene Dahl.

Under Ramirez's tenure, Husco has been granted 107 U.S. patents since he took the helm in 1983. His technical vision contributed to the wave of hydraulically enabled technology that is being applied in the mobile equipment markets. Perhaps his most lasting legacy is advancing hydraulics system research and development through funding of the Husco Chair of Fluid Power at Georgia State Tech, establishing hydraulics as a key research priority at a major engineering school. The foundation provides approximately 120 university scholarships each year, many to minority students, for pursuit of engineering degrees.

Known for his philanthropic efforts, Ramirez serves as a director for numerous organizations, including past chair of the National Fluid Power Association.

Ratliff turned a struggling $200 million farm equipment business into a major, global manufacturer of agricultural equipment. Between 1990 and 2005, Ratliff brought more than 20 agricultural machinery companies under the AGCO umbrella. The company, headquartered in Duluth, Ga., sells its products in more than 140 countries.

Ratliff is a Life Honorary Director of the AEM, and he fulfilled numerous leadership roles for the National Association of Manufacturers (NAM). To advance education, the Robert J. Ratliff Baltimore Polytechnic Institute Incentive Awards Fund was established to fund annual student scholarships through the University of Maryland Incentive Awards Program.

Under West, Manitowoc brought a number of innovations to the industry, and the company was the first to use T-1 high-strength steel in booms, design a controlled torque converter for various crane uses and patent the Ringer concept, which doubled crane capacity. He foresaw market globalization and expanded the company overseas — today more than half of corporate revenue comes from non-U.S. markets — enabling Manitowoc to expand into a multibrand operation and diversify offerings. Efficiency and sustainability became key priorities for Manitowoc during West's time at the helm. He led a push to conserve water, lessen pollution, improve air quality and cut production overruns that led to material waste.

Although White's inventions in crawler tractor design date back to the beginning of the 20th century, his contributions are still widely used by manufacturers today. Of White's 100 patents, his invention of controlled differential steering was the most significant, making tractors stronger, safer and more maneuverable. This invention was adopted by the U.S. Army for use in all its tanks during World War II.

White established the Cleveland Tractor Co. (Cletrac) in 1916, which grew to become one of the largest crawler tractor manufacturers in the 1920s and 30s. The company led the industry in number of new products and sales volume during much of this time. Cletrac and its successor, the Oliver Corp., manufactured crawler tractors until 1965. Concepts developed by White are still in use, such as controlled differential steering, high-speed rubber tracks, continuous undercarriage lubrication and streamlined crawler tractor styling. Under White, Cletrac was one of the first U.S. tractor manufacturers to market overseas (during the 1920s).

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The latest Holset variable-geometry turbocharger, the HE300VG, was one of the next-generation components launched by the Cummins Components Business at the IAA show in Germany.

FOCUSING ON FUEL EFFICIENCY

Cummins unveils range of next generation components engineered to enhance fuel efficiency

BY IAN CAMERON

A range of "next-generation" components designed to improve diesel engine fuel efficiency by at least 10% were unveiled by Cummins at the IAA show in Hannover, Germany. The company said the new products "reflect the changing priorities of global engine and vehicle manufacturers whose future products are being developed to insulate customers from rising fuel prices."

Among the highlights were new aftertreatment and filtration systems, fuel pumps and starter-generators and turbochargers.

"Over the last few years we have seen continued demand for smaller, lighter, high-quality components to drive diesel engine efficiency improvements, as well as the industry requirement from manufacturers for equal and higher power outputs," said Suzanne Wells, executive director – Sales and Marketing, Components Business. "With fuel prices remaining high, we have continued to focus on developing our full suite of next-generation components technologies and enhancements to meet this significant engineering challenge.

"Within our components group, we are able to not only tap into our wider specialist expertise of the engine, but also supply integrated system solutions to optimize efficiency of the engine, which helps deliver performance, emissions reduction and reliability in a variety of environments. It also makes us well placed to deliver future-proofed solutions that take us above and beyond the Euro 6 emissions targets."

On the exhaust aftertreatment side, Cummins Emission Solutions unveiled its EcoFit Compact Box for heavy-duty and mid-range trucks and buses, which the company said enables easier vehicle integration for OEMs, with lower weight to minimize impact on payload and improve fuel economy.

The optimized catalysts and advanced urea dosing system incorporating the EcoFit UL2 liquid-only urea dosing system is engineered to deliver higher NO_x conversion rates and further improve fuel efficiency, Cummins said.

Cummins Filtration showed its newest EnviroGuard crankcase ventilation technology which utilizes a modular design that the company said enables customers to meet current emissions requirements while preparing them for future regulations by lowering total engine emissions.

Cummins Fuel Systems displayed a new fuel pump for heavy-duty engines. Developing injection pressures to 37,710 psi, the pump's leak-free design reduces parasitic loss and increases fuel economy by 1% over previous designs, Cummins said.

Cummins Generator Technologies meanwhile showed its new CorePlus integrated starter generator, a crankshaft-mounted electrical machine for mild hybrid and heavy-duty stop/start applications. Positioned between the engine and transmission, the unit can deliver peak torque as high as 487 ft.lb. and peak power of 121 hp at better than 95% efficiency, the company said. At 6.6 in. long and weighing 227 lb., it is able to fit a range of engines.

Finally, Cummins Turbo Technologies highlighted the latest Holset variable-geometry turbocharger, the HE300VG, that is designed to offer improved turbocharger efficiencies of up to 12% to enable improved fuel efficiency and reduced carbon dioxide emissions.

The turbocharger is 10% lighter than its existing counterpart, and benefits include enhanced integration with the engine system through a new actuator and improved durability and performance through its moving shroud variable-geometry mechanism, Cummins said. dp

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Exhibit 2068
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Page 61 of 65

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Volvo CE Moving Production To China ... Terex Selling Group To Manitex ... AGCO In Precision Ag Venture ... Engine Supply Deals For Deere & Deutz ...

The **Volvo Group** announced that **Volvo Construction Equipment** will discontinue development and production of its current product line of Volvo-branded backhoe loaders and motor graders. These products, heretofore manufactured in Europe and the Americas, will now be manufactured by Volvo CE's Chinese subsidiary SDLG. Currently, motor graders are built at Volvo CE's production sites in Shippensburg, Pa., and Pederneiras, Brazil, while backhoe loaders are manufactured in Pederneiras and Wroclaw, Poland. Ceasing European production of backhoe loaders will result in the closure of Volvo CE's operations in Wroclaw. Combined, Volvo said the moves are expected to reduce the Volvo Group's structural costs by approximately $471 million.

Terex Corp. said it will sell 51% of **ASV Inc.** to **Manitex International Inc.**, which will result in a joint venture for compact track loaders and skid steers that is 51% owned by Manitex and 49% owned by Terex. ASV will continue to sell its compact track loaders and skid steers under the Terex brand. The transaction is expected to be completed before the end of 2014. Included in the transaction is ASV's Grand Rapids, Minn., manufacturing facility and certain assets held at Terex's Southaven, Miss., distribution center.

AGCO Corp., Duluth, Ga. and **Appareo Systems**, Fargo, N.D., have announced a joint venture, building on the existing IAS (Intelligent Agricultural Solutions) business structure. The two companies said the collaboration will focus on advanced electronic technology centered around data collection, wireless communication, advanced sensors and intelligent machine control. The joint venture will develop technology for advanced machine control systems, sensing applications, automated subsystems, machine prognostics and machine health monitoring, specific protein and grain control systems, and development of electromechanical devices and systems.

John Deere Power Systems said that its PowerTech Tier 4 final/Stage 4 diesel engines will power three new air compressors from **Atlas Copco**: the XAS 750, XAS 1800 and XATS 1050 JD models. Production of the new units will begin in 2015.

Deutz has announced a new alliance with **Hitachi Construction Machinery Co. Ltd.** (HCM) for the supply of Deutz TCD 3.6 diesel engines to the HCM ZW100 and ZW120 series of wheel loaders. The wheel loaders are mostly aimed at the Japanese and U.S. markets, which will allow Deutz to successfully expand its international presence, particularly in the Japanese market, the company said.

In a move that can be considered a casualty of diesel emissions regulations, **Donaldson Co.** said it will close its Grinnell, Iowa, manufacturing facility. The facility manufactures mufflers and other exhaust products for off-road equipment. The Grinnell plant opened in 1952 to produce mufflers and air cleaners. The introduction of more stringent diesel emissions regulations has driven the requirement for more sophisticated emissions components and reduced the demand for mufflers, the company said.

Oshkosh Corp. said it will build a $100 million components manufacturing plant in Mexico that eventually will employ about 1000 people. The company said the new plant in Leon, Mexico will make components for a range of vehicles and equipment, including McNeilus refuse trucks, Con-E-Co and London concrete mixer trucks, IMT service and crane trucks, and JLG aerial lifts.

Sun Hydraulics Corp. and **Sturman Industries, Inc.** announced they have entered into a technology license agreement related to the use of Sturman's digital valve technology. Under the agreement, Sun will manufacture and sell valves that incorporate Sturman digital valve actuation technology in screw-in cartridge valves used in fluid power markets.

Danfoss has launched a Rapid Delivery Center (RDC) with certain of its North American distributors. The RDC program currently covers some models of the Danfoss H1B bent axis hydraulic motors, as well as its Series 45 open circuit hydraulic pumps.

Linde Material Handling North America Corp. announced that it will change its corporate name to **KION North America Corp.**, effective Jan. 1, 2015. The change will allow the company to better align itself with its European parent company, the KION Group, the company said.

Bridgestone Americas announced the opening of its first giant off-road radial tire plant in the U.S., based in Aiken County, S.C. dp

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Page 63 of 65

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