Evolving Trailer Technology

Volume • 9 / Issue • 2

Engineering Network
Connecting Automated Equipment

Rear Impact Guard Regulations
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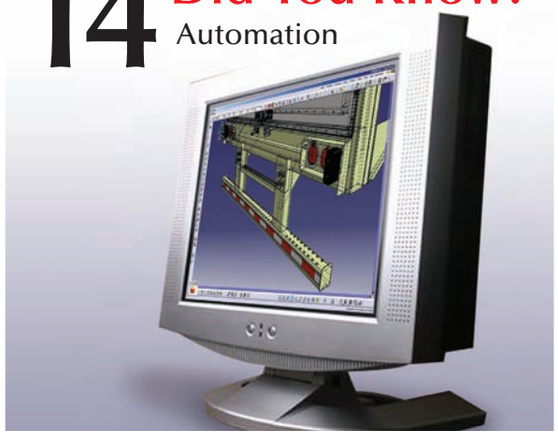
Road Simulator
Putting Trailers to the Test

Great Dane Trailers



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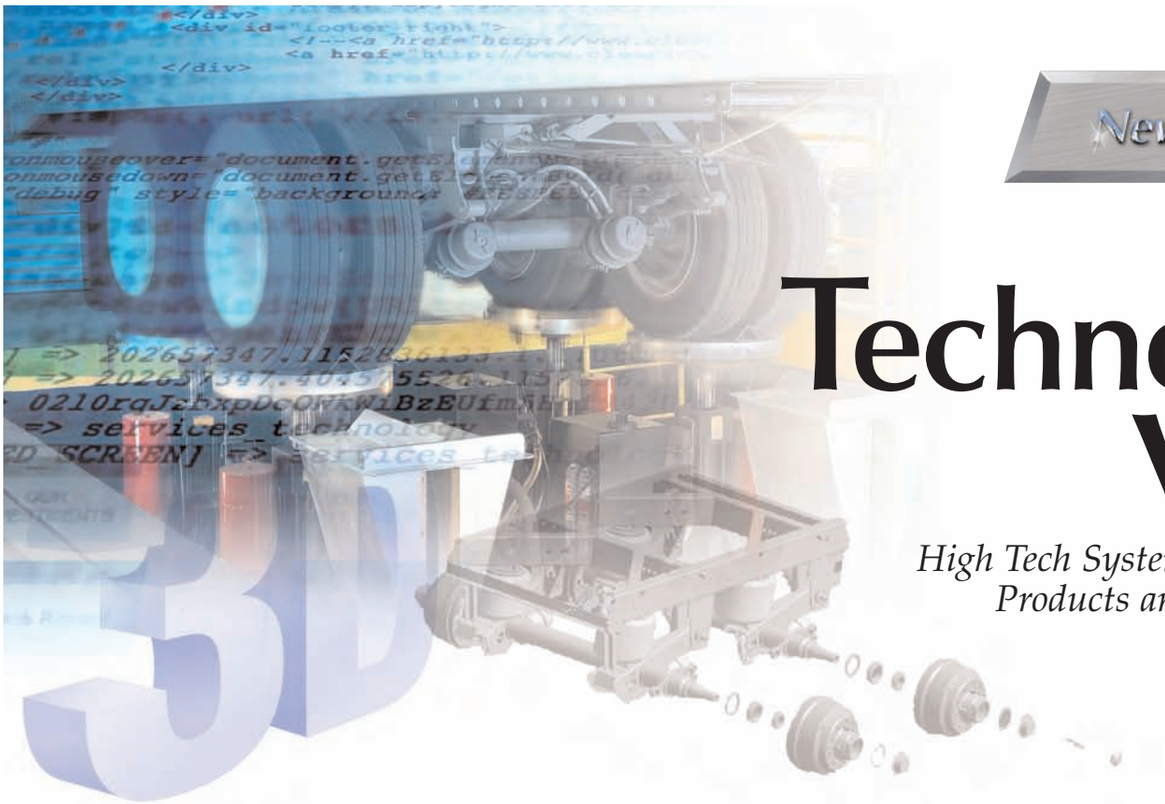


Technology Value

High Tech Systems Provide Superior Products and Customer Service

In virtually every aspect of Great Dane's business, a host of technologies are bringing greater value to products, customers, and research, design and manufacturing processes.

In the Savannah R&D Lab, technology is essential in the testing of new ideas and designs. This may come in the form of highly detailed computer analyses, destructive testing or the use of technologies, like the salt spray cabinet that helped develop several new anti-corrosion technologies. The R&D Lab also houses Great Dane's Road Simulator, a very powerful design evaluation tool that has made advancements to trailer design rapidly possible.

Great Dane's commitment to quality has driven the company to invest in automated technology for manufacturing plants to enhance production efficiency. Included are machines to automatically punch top and bottom rails where they attach to sidewalls, to drill holes and insert screws into dry freight van floors, and to mash rivets where the bottom rail meets crossmember end clips. Enabling more productive and efficient manufacturing processes, as well, is an Engineering Network that connects automated equipment at plants with a centralized engineering team.

Great Dane's ongoing efforts to enhance production quality are now benefiting from the use of advanced software called SmarTeam and a tool called CATIA that creates 3-D models of trailer orders and outputs drawings and a list of materials. "By integrating cutting edge technology in our manufacturing facilities, we are standing by our commitment to provide superior products and customer service," states Rick Mullininx, vice president, engineering.

CATIA and SmarTeam are one of three components in an overall PLM (Product Life Management) solution. Additionally, dealers and branches use the Internet to access a sales order entry system or GUI (Graphical User Interface). The third part of the structure is manufacturing systems in place at plants.

"The interconnected PLM technologies allow business processes to be applied and information to flow between systems in accounting, engineering, manufacturing, quality control and elsewhere within the company," relates Joe Dyer, manager of business technology and integration. "The various applications are able to communicate using programs developed by the IT department.

"Great Dane's use of technology makes us more efficient," Dyer says. "The systems and solutions we have adopted mean we can build better products for our customers."

Engineering Network

Connecting Automated Equipment Improves Efficiency and Productivity

Behind the scenes at Great Dane's manufacturing facilities is a very valuable tool that is helping build higher quality products and enabling more productive and efficient processes. This system, called the Engineering Network, connects automated equipment at nine plants with a centralized engineering team to adjust and calibrate, program, diagnose and repair problems in any plant from their home office. Instead of shop floor personnel manually setting up jigs and inputting critical data, this high-tech network eliminates the possibility of operator error by transferring data automatically from engineering to the machine.

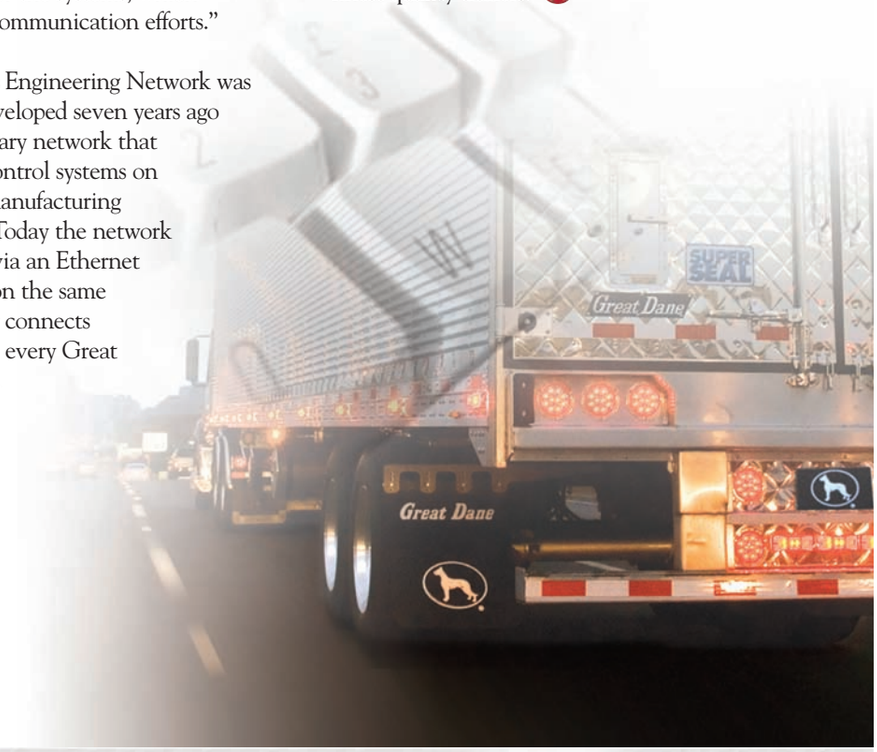
The Engineering Network is used for automation projects, including:

- Equipment used to install screws that attach hardwood floors to steel crossmembers in Great Dane dry freight vans.
- Systems to program exact values and dimensions for the foaming process on Great Dane reefers.
- Equipment to set the reefer floor flashing by using stored engineering data.
- Data monitoring for quality control during production to ensure that the foaming process meets high standards.

"The Engineering Network," explains Alan Whiten, Manufacturing Engineering Manager, "ensures that accurate data about each trailer is sent to automated manufacturing equipment, that new programs and processes are installed and are functioning correctly, and that problems are addressed quickly and often eliminated ahead of time. This not only keeps manufacturing processes moving without downtime, it also means that one source is responsible for the systems, which streamlines communication efforts."

Great Dane's Engineering Network was originally developed seven years ago on a proprietary network that connected control systems on automated manufacturing technology. Today the network is operating via an Ethernet connection on the same network that connects computers in every Great Dane facility.

"Cost savings from the Great Dane Engineering Network," Whiten states, "come from reducing the need to have engineers on site at every facility and the amount of time and expense required to have them travel to production plants to address problems that can be handled remotely. More importantly, the Engineering Network makes it easier for Great Dane to improve plant efficiency and productivity and to build the industry's finest quality trailers."



Great Dane's Road Simulator

Putting Trailers to the Test

Housed in the Savannah Research & Development facility is a one-of-a-kind testing capability. Great Dane, in fact, is the only trailer manufacturer to deploy and utilize a road simulation system to precisely reproduce the extreme force and motions associated with ground vehicle durability environments.

"A Road Simulator does exactly what its name implies," relates Jay Nelson, R&D Supervisor. "It simulates the road surface for the trailer. In other words, the trailer bumps and grinds in the exact same manner as it would on an actual road. This makes the Road Simulator a very powerful design evaluation tool that engineers can use to assess a trailer's strengths and make advancements to trailer design rapidly possible.

"The Great Dane Road Simulator provides full-scale compressed time trailer testing capability in a controlled indoor lab environment," Nelson continues. "The simulator precisely reproduces potholes, railroad tracks, frost heaves and undulating road features, permitting engineers to concentrate on analyzing stress data on the trailer rather than worrying about test track conditions, driver variability or other uncontrollable variables.

The MTS Tire-Coupled Road Simulator at Great Dane is a uniquely efficient tool for evaluating suspension components, conducting structural assessments, ride quality studies and overall vehicle durability testing. Drive-on vehicle loading simplifies test set-up and provides quick turnaround during evaluations. MTS pioneered tire-coupled road simulation in the early 1960s. Tire-coupled road simulators of today can be set up to generate demanding durability test cycles and automatically switched to produce ride profiles that can detect noises and ride quality issues.

Tire-coupled road simulators save time and money, while providing repeatable testing and a flexible platform for meeting a variety of testing needs. For over 25 years Great Dane has used the Road Simulator to continually improve trailer design, a benefit to the company and its customers.

New Rear Impact Guard Regulations

Great Dane Redesign Exceeds New Standards

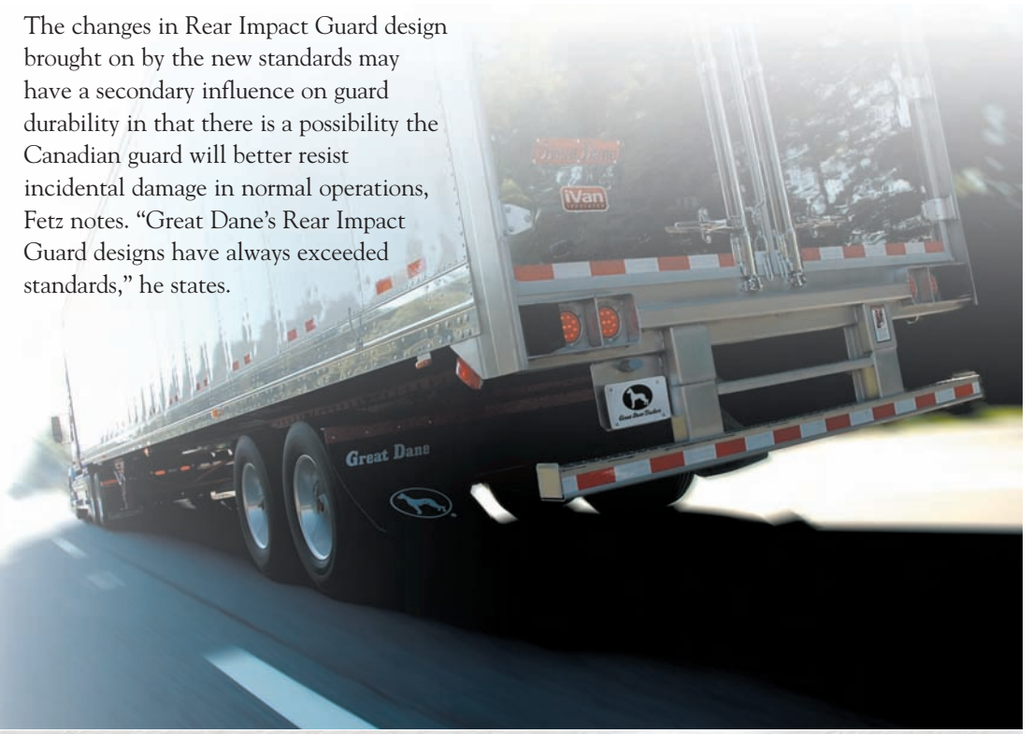
The development work is almost done and, at a glance, customers will not likely notice the difference, says Charlie Fetz, Vice President of Research & Development. "Beginning September 1, 2007," he explains, "Great Dane customers in Canada will begin receiving new trailers equipped with Rear Impact Guards that exceed newly enacted Canadian standards. The more robust guards for all trailer types are in the final stages of testing and are meeting all applicable requirements."

While there are differences between the new U.S. and Canadian Rear Impact Guard standards, Fetz points to four important criteria that are being met by Great Dane. In particular, new Rear Impact Guards:

- Cannot be more than 22 inches off the ground, a requirement that is the same in the U.S. and Canada.
- Will be able to resist specific force levels without deflecting more than a specified distance. U.S. and Canadian requirements for this standard differ in terms of the required force levels.
- Will absorb and dissipate energy when a load is applied.
- Will respond elastically after force application and after rebounding cannot be more than 22 inches off the ground (applicable only in Canada).

The changes in Rear Impact Guard design brought on by the new standards may have a secondary influence on guard durability in that there is a possibility the Canadian guard will better resist incidental damage in normal operations, Fetz notes. "Great Dane's Rear Impact Guard designs have always exceeded standards," he states.

"We offer a large variety of guard choices for all of our trailer models. Our customers will continue to have a substantial number of options that meet the new regulations with the best possible solutions for their operational needs."



Blue Bell Creameries

Celebrating a Century of Quality, now with Great Dane ThermoGuard

There's a simple explanation for the success of Blue Bell Ice Cream, ranked as one of the top three best selling ice creams in the country. "Our quality standards never change and are never compromised," says David Sommerfeld, assistant fleet manager. "We produce all of our own products and only transport it in our own trucks, including about 100 Great Dane Classic Reefer models. That way we control the integrity of our products."

Headquartered in Brenham, Texas, northwest of Houston, Blue Bell is a privately held, family-owned company that markets its premium ice cream in 17 states. The Blue Bell fleet of 85 tractors and its Great Dane trailers transports ice cream from its Texas plant to company distribution centers, where about 900 delivery trucks bring goods directly to retail locations.

"We're one of just a few companies that still handles our own products from the production facility all the way to store shelves," Sommerfeld states. "We feel that's the only way to maintain product quality. For us, Great Dane Classic Reefers are the right choice because of the way they are designed and built. Image is also important to us, and with proper maintenance and regular cleaning, our Great Danes hold up well and look good."

Great Dane Classic Reefers at Blue Bell are fitted with a mix of Carrier and Thermo King refrigeration units. Specifications for the trailers are written by Sommerfeld, Steven Glaesman, Blue Bell's trailer shop foreman, and Eurell Eubanks, sales representative at Great Dane's Houston branch, which has been supplying the fleet for 15 years.

"We're fortunate to have a very good relationship with everyone at Great Dane, including engineering and production people, and especially our branch," Sommerfeld says. "As a result, things get done effectively and any challenges that arise are resolved quickly."

Careful planning and spec'ing of trailers is an ongoing process at Blue Bell, which has added between seven and 15 Classic Reefers to its fleet annually for the past several years. Most of the purchases have been to handle growth, although Blue Bell has started trading some of its oldest units, including models that were in service for 20 or more years.

In its latest purchase of Classic Reefers, Blue Bell also opted to spec two units with Great Dane's exclusive ThermoGuard liner. "We anticipate learning how well the ThermoGuard lining will hold up in our operation and if its thermal efficiency will translate into fuel savings," Sommerfeld reports, "but we're always interested in new ideas from Great Dane that can enhance our ability to maintain product quality."

"Our quality standards never change and are never compromised."

David Sommerfeld
Assistant Fleet Manager

The decision to evaluate ThermoGuard is also a reflection of how Blue Bell conducts business with well-planned and thought out ideas. That's been the case, in fact, since the company opened its doors in 1907 when it was established as the Brenham Creamery Company to make butter from excess cream brought in from area farms. A few years later the creamery began making ice cream and in 1930 officially became Blue Bell Creameries, named for the native Texas bluebell wildflower.

Currently on leave from his fleet management duties, Sommerfeld is now on the road bringing a multi-vehicle exhibit named the "100 Years Tour" to 66 cities in states where Blue Bell's 50 different ice cream flavors are sold. Part of the rolling display is a chocolate colored tractor-trailer combination adorned with images of Homemade Vanilla cartons topped by 100 lit birthday candles.

A lot has changed since those early days at Blue Bell. Horse-drawn delivery wagons, for example, have been traded in for refrigerated trailers. One thing that hasn't changed, however, is the company's emphasis on delivering quality, and today Great Dane is proudly a part of that effort.

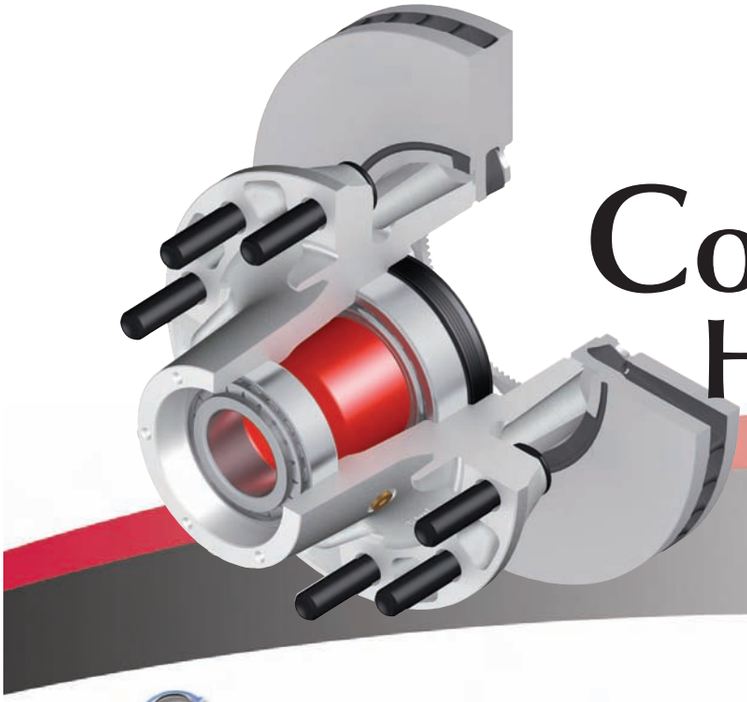
Extending the Useful Life of Refrigerated Trailers

Available as an option on all Great Dane refrigerated trailers models, ThermoGuard is a thin, lightweight lining that is designed to be stronger than traditional liner materials and nearly impossible to penetrate. The only liner that helps maintain the thermal efficiency of a trailer, ThermoGuard contains a revolutionary composite layer that seals a trailer's insulation more effectively.

Thermoguard advantages:

- Helps maintain excess cooling capacity
- Reduces operational costs by helping reduce cooling unit run-time, potentially more than 1,000 hours over five years
- Reduces costs for cooling unit maintenance and saves fuel
- Helps maintain insulation performance as the trailer ages
- Lightweight, saving up to 200 additional lbs
- Strong, durable, and puncture-resistant
- Helps extend the useful life of the trailer, increasing productivity and enhancing resale value

THERMOGUARD
FROM GREAT DANE



Vendor View

ConMet PreSet® Hub and Rotor

New Aluminum Hubs Save Weight and Offer Better Performance

CONMET® Pointing the Way™

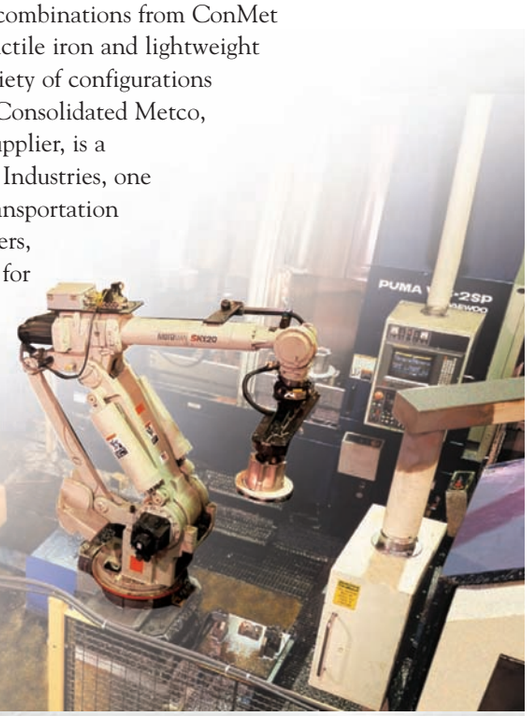
Consolidated Metco Inc. (ConMet®), the industry's leading supplier of lightweight, low maintenance technology for commercial vehicles, has developed several new PreSet® Hub and Rotor assemblies for use with trailer air disc brakes. Building on its success with PreSet hub technology used with S-Cam foundation brakes, ConMet developed the new PreSet Hub and Rotor assemblies for commercial trailers equipped with air disc brake systems.

The PreSet Hub and Rotor assemblies, according to ConMet, combines the low maintenance advantages of its PreSet hubs with an innovative aluminum hubs/hat shape rotor design for the "N" spindle and Haldex brake. Soon to be released is an aluminum hub/splined rotor design for use with the Bendix brake on both the "N" and "P" spindle. The result with both designs is a significant advantage in weight savings compared to traditional iron hub U shape rotors. The new assemblies, the manufacturer adds, also complements the advantages offered by today's air disc brake technology, including shorter stopping distances, less brake fade, faster application time and reduced susceptibility to the effects of water.

ConMet engineers worked closely with air disc brake manufacturers to develop the PreSet Hub and Rotor assemblies. The combination of its patented PreSet technology and leading brake rotors, the company notes, allows for a simple one-piece installation. In addition, the joint development effort has resulted in what it calls the "most reliable, cost effective hub and rotor combinations in the industry."

ConMet also makes available an interactive PreSet hub training CD-ROM designed for service technicians. The training CD-ROM instructs technicians on the proper identification, removal, servicing and reinstallation of ConMet's PreSet hub assemblies. Technicians answer questions at the end of each chapter and are notified of their overall score. After successfully completing the training session and correctly answering the questions, the technician is able to print out a customized PreSet hub training "Certification of Achievement."

PreSet Hub and Rotor combinations from ConMet are available in both ductile iron and lightweight aluminum, and in a variety of configurations for various axle types. Consolidated Metco, a major Class 8 truck supplier, is a subsidiary of AMSTED Industries, one of the world's largest transportation component manufacturers, specializing in products for heavy-duty vehicle, automotive, rail, construction/building, and general industrial markets.



Whiting Door Manufacturing Corp

Standing Up to the Elements with a New Family of Composite Doors

Since introducing the roll-up door to the trucking and transportation industry in 1953, Whiting Door Manufacturing Corp. has concentrated on designing doors that meet the industry's changing needs. That tradition continues today with the introduction of a new series of non-wood roll-up and swing doors.

"Our new 'family' of composite doors are made from materials that will not deteriorate due to moisture, which has been a leading cause of trailer door deterioration and reduced service life for the industry," says John Green, vice president of sales at Whiting. "The designs do not contain any wood, and like all Whiting products are easy to install, operate and maintain."

Now available on Great Dane trailers are three roll-up and two swing door Whiting composite door models, including:

PremiumPlate- A composite plate roll-up door constructed from 1/2-inch high-density polyethylene core and high tensile pre-painted steel facings with a baked on polyester finish - the same construction found on "plate trailers." The PremiumPlate door also features rigid tongue-and-groove panel joints, a full width rigid extruded aluminum-bottom seal retainer and E-coated hardware and hinges.

EuroCEL- A roll-up design with a polymer blend panel core edged with permanently bonded aluminum extrusions that form an integral panel joint to eliminate hinges and fasteners. Also standard on the EuroCEL door are a full width aluminum bottom U-channel for strength, and unique top closure brackets. This door does not need to be painted if the desired color is white.

Hinged Truss II- A roll-up hollow core extruded aluminum alloy double wall panel design that is ribbed for strength. The door's improved PVC panel joints have two seals and a sloping design to prevent moisture intrusion while also standard is a stronger, full width extruded aluminum bottom U-channel.

Innovator II- A significantly lighter swing door with a high impact polypropylene honeycomb core featuring a unique three-orientation cell structure that has more uniform properties and more stable tubular cells. Facings for the Innovator II include steel, stainless steel, hot dipped galvanized steel and pre-painted and mill finish aluminum.

Plate-Lok- A swing door made from a .512" thick high-density polyethylene composite core and steel skins.

With its selection of new non-wood doors for Great Dane customers, Whiting is helping meet the need for enhanced corrosion protection on trailers. The newest generation of Whiting doors is also continuing the company's long-standing tradition of setting new standards for the industry.

WHITING® SEA-LOK® DOORS
DOOR MANUFACTURING CORP.

Hartt Transportation Systems. Inc.

Proud to Deliver Quality with Great Dane

CASE STUDY

"With Great Dane Trailers," says William "Billy" Hartt, president of Hartt Transportation Systems, "there are no questions left unanswered. We've been operating Great Danes exclusively for over 20 years and there's nothing we've needed that hasn't been taken care of by the company."

Founded in 1948 with a single truck by Delmont Hartt, who still serves as the carrier's CEO, Bangor, Maine-based Hartt Transportation provides dry general truckload freight service for customers in all 48 contiguous states, as well as Ontario, Quebec, and Maritime Canada. The fleet of 400 tractors and 1,100 trailers includes 600 P-Series Dry Freight Vans, as well as some Great Dane Classic models.

"In addition to the growing volume of freight we handle on a for-hire basis," Hartt notes, "dedicated service now makes up about 50 to 60 percent of our business. To meet our customers' needs and attract new business, we rely on Great Dane because they provide durable, reliable trailers at a very favorable price."

Specified by Hartt along with Todd Cotier, director of maintenance, Hartt Transportation's Great Danes are built in the Brazil, IN and Danville, PA manufacturing facilities and supplied by Atlantic Great Dane, a dealership located in South Portland, Maine. Sales representative Tim Prouty has been working closely with the fleet for the past five years to ensure that specification needs are met and warranty issues are addressed. The dealer also supplies many of the parts required by Hartt's in house maintenance operation, delivering to the fleet 125 miles away at least once each week.

The 53-ft P-Series vans purchased by Hartt meet a mix of needs for the fleet. "While the trailers are built with the durability required by a large fleet," Hartt says, "Great Dane has also worked with us to meet requirements presented by some of our customers. For example, we haul about 60 loads per day of paper and bottled water that can reach maximum payload, so Great Dane has engineered an extra crossmember and enabled us to utilize Michelin X One single wide base tires in place of traditional dual tire and wheel assemblies. These specs let us handle the heavy load and save weight, which means we can get an extra pallet on per load. This is also the perfect example of how we can benefit from the expertise of our dealer and Great Dane."

Next on Hartt's agenda are two specifications it is considering for future P-Series purchases. One, based on requirements by paper mills, is to boost strength and reduce weight by spec'ing composite Havco floors. In addition, the fleet is also considering adding the Meritor Tire Inflation System (M.T.I.S.) by P.S.I. to keep tires at the correct pressure and send elevated wheel end temperature warnings to drivers.

". . .we rely on Great Dane because they provide durable, reliable trailers at a very favorable price."

William "Billy" Hartt, President
Hartt Transportation Systems

Opportunities to evaluate new trailer specifications come about regularly at Hartt as the carrier purchases at least 100 new Great Danes each year. "We've bought that many in each of the past five years," Hartt relates, "and most of those were to meet our growth needs. For example, we opened a facility in South Carolina recently with 18 vehicles. Today, there are 48 units in that location and our growth plan calls for fielding 70 tractors and about 200 trailers there by this fall."

Due in part to its ongoing growth, Hartt replaces very few trailers annually, and while the carrier has a ten-year life cycle planned those it has been retiring are about 15 years old. "That's one reason we stick with Great Dane for our trailer needs," Hartt states. "They hold up very well because they are designed, tested and built properly in the first place."

More than just providing what he calls "a product that works for us," Billy Hartt is quick to compliment everyone at Great Dane. "The support we have from the company's senior management to the engineering staff, the production employees and the people at Atlantic Great Dane has been absolutely great," he remarks. "They've not only been more than accommodating and have taken care of us one hundred percent of time, it's obvious they have a lot of pride in what they do."

Great Dane P-Series Dry Freight Van

P-SERIES

Durable and lightweight, Great Dane P-Series Dry Freight Vans are designed with features and options to help fleets enhance productivity and lower costs. Among the key features and benefits of Great Dane P-Series Dry Freight Vans are the following:

- **Welded Buckplate** that provides rear impact and hinge protection, and beveled end plate caps floor to prevent water intrusion
- **Steel Rain Gutters** that divert water to sides, and an extruded edge cap seals the perimeter of the roof for added protection against damage and leaks
- **Sturdy Rear Frame** made of high-strength steel and a steel-reinforced rear header minimize racking and ensure that the frame remains square throughout the life of the trailer
- **Front Impact Plate** of extruded aluminum eliminates the potential for rust while its heavy-duty rolled-lip protects front of upper coupler from 5th wheel impact
- **Hardwood Floor**- 1-3/8-inch thick- contributes to significant weight savings
- **Aluminum Options** including roof bows, side posts and scuffbands, add to weight savings

Did You Know?

Automation

Enhancing Productivity, Efficiency and Accuracy

At Great Dane, automation is more than a trend. In fact, throughout the company, high-tech automated equipment for manufacturing plants is creating a more ergonomic work environment, reducing operator fatigue and increasing productivity.

For example, Great Dane has machines that drill holes and insert screws into floors on dry freight vans, replacing the cumbersome and arduous process of using T-handled screwdrivers. These automated devices have been in use in the Kewanee, IL plant and are slated to be installed in the Jonesboro, AR and Terre Haute, IN plants this year.

Great Dane has also developed and patented automated machines to "drill and mash" rivets where the bottom rail meets crossmember end clips. Originally installed at the Savannah, GA plant in 2000, two lines in Terre Haute will receive the new automated machines this month.

Designed and built by Great Dane, a patent-pending "punch and squeeze" machine to automatically punch top and bottom rails where they attach to sidewalls is replacing a task normally completed by rigorous hand tooling. The new machine in the Jonesboro plant uses a vision system to line up punched holes and workers then insert rivets into the holes and the machine mashes them into place.

Behind the scenes, Great Dane is also using automated systems to enhance productivity, efficiency and accuracy. The Engineering Network, for instance, allows engineers to adjust and calibrate, program, diagnose and repair problems from one location instead of needing to be on site.

Great Dane has also put in place systems to enable engineers to program exact values and dimensions for the foaming process on reefers. The systems are used to send information to automated plant equipment electronically for each order based on an individual vehicle's serial number.

Advanced software to eliminate miscommunication between engineering, sales and production is also in use at Great Dane. With the automated solution, options are selected in the sales order entry system to create a 3-D model of the order and output shop floor drawings and a unique list of materials.

As these examples show, automation is making it easier for Great Dane to realize higher levels of efficiency and to continue to build the industry's highest quality trailers.