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75 GREEN SUPPLY CHAIN PARTNERS

TOP UNIVERSITIES FILL TALENT GAP

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INSIGHT

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How to Use Safety Measures to Reduce Lift Truck Accident Damage bit.ly/1Qk4jO5

John Ellis, Regional Sales Manager, Steel King Industries

Even the best warehousing operations can expect some lift truck impact, so it is important to minimize damage with proper safety equipment. Follow these safety measures to reduce costs, injuries, and down time.

Gamification: A New Way of Tracking and Improving KPIs bit.ly/1I5Rxkm

Jeremy Boudinet, Sales Coach, Ambition

Gamification enables logistics managers to use employee productivity data to create an intra-office competition. Learn how gamification can transform your company into a leaner, more organized, and better focused organization.

7 Ways to Get the Most Out of Your Incentive Program bit.ly/1KIpLOG

Tom Stretar, Senior Director, Labor Management Practice, enVista

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CHECKINGIN

Felecia Stratton

by Felecia Stratton | **Editor**

Engineering Green DNA

Sustainability and green are two words often used interchangeably. In truth, one is a subset of the other. Sustainability is inclusive, an ethical umbrella that covers a gamut of social, economic, environmental, and business issues.

But the idea of sustainment is integral to any green effort. Shippers often run into problems pushing environmental programs because they can't distill value and/or don't have leadership support. Unless the CFO is committed to green, assessing a green investment's internal rate of return, other than buzz, can be a pointless exercise.

Therein lies the problem. Organizations need to rethink how they measure ROI. Do they account for qualitative value? How do they benchmark that?

Inbound Logistics' annual Lean and Green issue offers some context. As supply chain management commands greater C-level attention, it creates opportunities for organizations to break through functional silos and initiate sweeping sustainability mandates.

Ford Motor Company, for example, made such a commitment in 1999 when it created an internal sustainability organization–feeding off the Lean legacy paved by its forebear. You can read more about Ford's journey in *Growing a Culture of Sustainability* (*p. 38*).

Asset-based 3PLs are proficient at engineering solutions that reduce both waste and cost. They often don't differentiate green reductions from cash savings. They're one in the same. For example, when Kenco was negotiating fleet lease terms with its vendor, Deni Albrecht, leader of sustainability, worked directly with the 3PL's transportation director to identify requirements. But he went one step further. A gearhead by nature, Albrecht specified truck transmissions, tire treads, and axles, among other things.

The savings were appreciable. Kenco's fleet increased fuel economy from 5.5 MPG to 6.5 MPG, approaching 20-percent savings.

DSC Logistics has delivered similar results. The 3PL was working with a customer to provide corrugate on demand and optimize shipment packaging. "With the way that parcel companies are structuring rates, having the smallest box creates transportation savings in addition to reducing material waste," explains Jim Chamberlain, senior director of industrial engineering and continual improvement for the 3PL.

Chamberlain points to another instance when DSC Logistics replaced pallets with slip-sheets on cross-country truckload moves. They sacrificed a slight bump in labor cost at the dock, but increased asset utilization by 10 percent.

As you consider your own sustainability efforts, it's worth asking whether green is part of your corporate DNA. If it is, ask value chain partners the same question: Why?

Green is a dialog that partners notice. Just ask Albrecht.

"People starch their shirts and stand up straight when you meet with them," he says. "They know you're not messing around–in a positive way. It's all for the general good of the economy, the environment, and our respective businesses." ■

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BPA WORLDWIDE

DIALOG

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SCHOLARSHIP WINNER

We are proud to announce the winner of the 2015 *Inbound Logistics*/AST&L Supply Chain Scholarship.

Karen Burlingame is a junior at Penn State's Smeal College of Business, majoring in supply chain management. In her application essay, Karen writes: "The field truly encompasses my passions and interests; I see supply chain as a lifestyle rather than just a major in school."

Karen wins a $2,500 education scholarship. *Inbound Logistics* joins with AST&L in congratulating Karen on her achievement, and in wishing her continued success in what is sure to be a bright supply chain career.

Nicholas Ammaturo @Nammat01
7 MAY 2015
Great week at ISM 2015 conference. Thank you @ISM @ThomasNet and @ILMagazine

I read with interest Joseph O'Reilly's article *Larger Ships, Larger Losses* in the April issue. O'Reilly talks about the challenges of handling 19-million TEU vessels. But what he seems to overlook is the advantage of only one sailing per year for vessels this large. Also, where will this vessel dock? I'm guessing somewhere on the West Coast since one vessel will handle one year's U.S. West Coast volume of 20.4-million TEU.

Was the article a typo, or an April Fool's joke?

Alan Davis, Partner, C-TPAT Practice Leader, Strategic Solutions Partners

Editor's note: Claiming April Fool's would let us off the hook, but no, it was a proofreading error. The copy should have read "19,000-TEU threshold."

I've heard firsthand how the procurement function is becoming a linchpin to supply chain transformation. It's good to see in your April issue that *IL* and ISM are following suit. I also appreciated the May *Dialog* tease. A handful of IT companies made *IL*'s inaugural Top 100 in 1999 and in 2015? Names?

Guy Schmidt, Quebec, Canada

Editor's Note: Demand Management, Kewill Logistics, Logility, MagicLogic Optimization, Manhattan Associates, McLeod Software, Oracle, SAP, Smart Software, and TECSYS were named Top 100 Logistics IT Providers in every year between 1999 and 2015.

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10TIPS

STEP-BY-STEP SOLUTIONS

Cutting Costs While Delighting Customers

North American companies increasingly are seeking data-driven supply chain strategies to lower costs while improving customer satisfaction. Robust technologies and advanced analytics drive the business insight needed to streamline processes and reduce costs from raw materials to end delivery. Sophie Dabbs, vice president of client solutions for third-party logistics provider Transportation Insight, discusses the art and science of how shippers can reduce cost while creating more customer value.

1 **Reduce cost-to-serve.** Gain understanding of true cost down to a customer and product level with an analysis that incorporates costs from transportation, production, customer service, and raw materials. Look for opportunities to consolidate orders and convert to lower-cost transportation modes.

2 **Gain visibility from end to end.** Door-to-door visibility enables companies to identify areas where they are incurring unnecessary costs. Connecting suppliers, carriers, and customers using a transportation management system (TMS), warehouse management system, and interactive mobile analytics allows you to quickly control cost.

3 **Eliminate waste.** By removing non-value-added activities, companies shorten lead times and save money. Solutions can range from reducing the number of times an order is touched in a warehouse to more complex inventory and working capital projects.

4 **Optimize network design.** Creating the most efficient supply chain lowers costs by eliminating unnecessary assets, facilities, processes, and suppliers. Network modeling software and analytical tools ensure optimal networks that deliver high customer service levels while staying agile to meet fluctuating demands.

5 **Find a partner.** Collaborate with an outside firm so you can focus on your core competencies. With a co-managed approach, you can maintain the control level you desire, whether that means continuing to handle transportation planning and carrier management in-house or outsourcing that function.

6 **Measure performance.** Regularly evaluating performance metrics helps to ensure customer service and meet on-time deliveries. Having measurements in place will help you see business trends and act quickly.

7 **Examine risk factors.** Onshoring and nearshoring create a shorter supply chain that lowers fuel usage, eliminates tariffs, reduces administrative time, and lowers landed costs while reducing the risk of a supply disruption.

8 **Consolidate loads.** Aggregating loads has the potential to lower logistics costs. Inversely, shipping less-than-truckload may be less expensive. It is important to understand your customers' expectations to help you decide. Other ways to lower costs include assigning ship day(s) of the week or utilizing multi-drop truckload.

9 **Eliminate expedited shipping costs.** Expedited shipments are sometimes unavoidable and you can implement strategies to manage those costs. Utilizing a TMS platform to quickly see cost and transit time will begin to increase cost impact understanding and change behavior.

10 **Understand the hidden costs.** You can mitigate the hidden costs of freight invoice errors by partnering with a freight bill audit and payment provider. Choose a firm that audits against your bills of lading and carrier contracts, and delivers detailed solutions. ■

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READER **PROFILE**

as told to Merrill Douglas

Kelvin Miller is an equipment and mobility readiness spare parts allocation supervisor with military contractor DynCorp International, in Dohar, Qatar. He has held this position since 2013.

RESPONSIBILITIES

Managing and shipping equipment to the field to support Air Force deployments in the Middle East.

EXPERIENCE

Section chief, materiel distribution, U.S. Air Force.

EDUCATION

A.A., psychology, Rose State College, 1989; A.S., logistics, Community College of the Air Force, 2009; B.S., logistics, materials and supply chain management, American Military University, 2013; M.S., transportation and logistics, American Public University, expected 2016.

Kelvin Miller: Home Away From Home for the Troops

MY FATHER SERVED IN THE AIR FORCE FOR 26 YEARS, flying into hurricanes and typhoons to collect storm data for the National Weather Service. We lived in Japan, California, Guam, and Mississippi. After I completed my associate's degree, I joined the Air Force as well. I was placed in supply, where I held several different jobs.

In my first job, we handed out chemical warfare gear, plus boots, clothing, and safety items. In other roles, I picked up, delivered, and ordered maintenance parts and worked in a warehouse. I deployed to Saudi Arabia and Kyrgystan, did two tours in Kuwait, and three in Iraq.

While serving, I earned an associate's degree in logistics from the Community College of the Air Force, and then my bachelor's degree from American Military University. When I made the transition to civilian life, I took my current job in Dohar, Qatar with DynCorp International.

As an equipment and mobility readiness spare parts supervisor, I support active duty Air Force personnel by handling war reserve material assets. These are mainly housekeeping sets, with all the items needed—tents, refrigerators, tables, chairs, washing machines, dryers—to provide living quarters for 500 to 1,000 people on deployment. My team manages the inventory and gets it ready to deploy when it is needed. I report to the supply chain manager, and several warehouse workers report to me.

I maintain data on these assets in three information systems, two operated by the Air Force and one by DynCorp. We are currently conducting a major

The Big Questions

What have you achieved in your career that makes you especially proud?

My father, who passed away in 2014, retired from the Air Force as a master sergeant. When I joined the military, I made it my goal to match my dad. I'm proud that I also retired as a master sergeant.

Describe an average day.

I wake up at 2 a.m. to get to work by 3:30 and work until 1:30 p.m. Then I hit the gym for a few hours. I come home, eat, and shower, then the day repeats. I work six days a week.

What's your alter ego dream job?

Pro bowler.

internal records overhaul, to match them against the physical inventory. We're doing research on our records and trying to locate certain property.

Normally, when equipment stays in the field for more than a few months, it's transferred from our books to the deployed unit. But we have some assets on our books that have been in the field for far longer than that. We're working to resolve any discrepancies.

The hardest job I've ever had to manage was the expeditionary theater distribution center in Kuwait. That happened when Iraq was still "hot," and all the troops going there filtered through Kuwait. We issued them body armor and chemical warfare gear. With so many people coming in and out, building equipment bags and receiving them again when the troops returned became a 24/7 operation.

When deployment ended, the troops were tired. They didn't want to go through the bag return process; they just wanted to go home. The biggest challenge was to get cooperation from the commanders to make sure their people listened to our instructions, so they could get in and out quickly.

As I work on my master's degree, my focus is on reverse logistics, which has become a popular discipline in the past few years. I look forward to becoming the first person in my family to earn a master's degree. That's my biggest ambition right now. ■

NOTED

THE SUPPLY CHAIN IN BRIEF

GREEN SEEDS

Container shipping line **United Arab Shipping Company's** eco-efficient container vessel is the first in a new class of liquefied natural gas (LNG)-ready ultra-large container vessel fleet. With a loading capacity of 18,800 TEUs, the vessel includes a shore-to-ship power supply solution for zero emissions at berth, and an energy-efficient integrated system to monitor and optimize propulsion systems, machinery operations, and navigation decision-making.

UPS Freight added 64 LNG tractors to its fleet. The new tractors replace older generation diesel-engine power units and will be used on designated routes in UPS Freight's less-than-truckload operations. The tractors reduce tailpipe emissions and average 600 miles to the tank.

Dairy farm **M&B Products** signed a full-service lease agreement with transportation and logistics provider Ryder for three compressed natural gas (CNG) heavy-duty vehicles. M&B Products will use the new CNG vehicles to support its distribution fleet, which services distributors in the South Florida region from Tampa to Miami.

SEALED DEALS

For the third consecutive year, stone fruit grower **Gerawan Farming** renewed an agreement to use **iGPS Logistics'** plastic pallets to ship its Prima brand of produce. Gerawan Farming hand-packs up to 100,000 boxes each day and uses iGPS Logistics' 48-by-40 inch plastic pallets.

Forward and reverse logistics provider **Encompass Supply Chain Solutions** will manage the spare parts supply chain for electronics manufacturer **Sony's** consumer electronics line. Encompass will supply parts to other distributors, authorized service networks, service dealers, third-party administrators, international affiliates, and end users through its distribution facilities.

Clothing company **True Religion** expanded its partnership with **Epicor Software** by adding the *Epicor QuantiSense Retail Business Intelligence* solution and the *Epicor ShopVisible* cloud retail order management solution to its Epicor Retail technology software already in use. The new solutions support a single, integrated view of all products, orders, and customers.

Seafood company **Marine Harvest ASA** selected on-demand global trade management solution provider **Amber Road's** *Restricted Party Screening* solution to monitor worldwide trading. Marine Harvest chose the solution to upgrade from manual to automated screening, and to boost compliance assurance.

m&a

Transportation and logistics company **American Fast Freight, Inc. (AFF)** acquired cold chain provider **Caribbean Shipping Services, Inc.** The purchase of Caribbean Shipping Services adds enhancements to AFF's operations on the eastern seaboard.

Third-party logistics (3PL) provider **SP Express** purchased order fulfillment provider **Marketing Support Solutions**. The acquisition expands SP Express' geographic footprint, and the company will continue expanding into the Midwest and to Europe, Canada, and Latin America.

GOOD WORKS

Trucking company **Con-way Freight** teamed up with children's charity **Kids Wish Network** to help deliver toys nationwide. In March 2015, Con-way transported 15 pallets of new gifts and toys from New Jersey to Tampa, Fla., to benefit the charity's Holiday of Hope programs. And in April 2015, Con-way transported 26 pallets of gifts from Tampa to Louisville, Ky.

Logistics provider **Purolator International** donated two trucks to **Long Island Cares-The Harry Chapin Food Bank**, a hunger assistance organization serving Nassau and Suffolk counties in New York. The trucks are both 14 feet and can each accommodate 2,500 meals. Long Island Cares is seeking an additional grant to convert the second truck into a food truck with a workable kitchen to prepare meals for its community.

Freight forwarder **ICAT Logistics** partnered with non-profit sustainability initiative **Rendez-vous: Haiti** to transport a donated pickup truck to a Haitian orphanage. The orphanage and its elementary school were in need of a vehicle for transportation and to haul goods.

Logistics and transportation provider **Yusen Logistics** transported 4,800 nutritional bars donated by pharmaceutical company Otsuka Pharmaceutical Co. to the non-profit organization **Peoples' Hope Japan (PHJ)**. The donation supports PHJ's Maternal and Child Health Improvement project in poverty-stricken areas of Cambodia, and helps aid health education within Cambodia's Kampong Cham province.

Logistics provider **Deutsche Post DHL (DPDHL) Group** deployed its **Disaster Response Team (DRT)** in Kathmandu, Nepal, following the 7.8-magnitude earthquake. DPDHL Group's DRT provides logistics support to help manage international aid and handle the goods at Tribhuvan Kathmandu International Airport for further distribution to those in need.

recognition

Retailer **DICK'S Sporting Goods** was named **Shipper Partner of the Year** by software provider Manhattan Associates. DICK'S Sporting Goods won the award for its carrier-friendly practices, performance, and efficiency.

Dean Newell, vice president of safety and training for **Maverick Transportation**, was named the **Truckload Carriers Association's Safety Professional of the Year**. The award is given to a safety professional whose actions and achievements have a positive benefit or contribution to improving safety on U.S. highways.

Transportation and logistics provider **USA Truck** received the **Tier 1 Core Carrier of the Year** award for the third consecutive year from metals manufacturer Alcoa. The award recognizes commendable dry van service in North America.

Expeditors, a logistics service provider, was presented with the **Planet Award of Excellence** by airfreight carrier Lufthansa Cargo. Expeditors won the award for its cooperation on the transport of temperature-sensitive goods and exemplary global commitment to digitalizing processes.

Supply chain consulting and IT services firm **enVista** was named to Symplicity's **Best Places to Work for Recent Grads** list. The award recognizes employers that offer a supportive company culture, competitive pay, and opportunities for growth.


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GLOBAL

THE WORLD AT A GLANCE

by Joseph O'Reilly

Kuwait Ports Authority officials visited DP World's Jebel Ali to learn from the global port operator.

GCC States Warm to Regional Collaboration

Gulf Cooperation Council (GCC) states—Saudi Arabia, Kuwait, United Arab Emirates (UAE), Qatar, Oman, and Bahrain—have long been hamstrung by independent-minded sovereigns who prefer to think and act unilaterally. Despite the formation of the trade bloc in 1981, collaboration, especially around transportation and logistics, often goes wanting.

It's why despite the Middle East's fast ascent as a global airfreight hub, the region is challenged by air traffic congestion. Airports and airlines do their own thing in the absence of regional partnership and authority.

Lesser economies have similarly failed to benefit from foreign interest and investment, especially in Emirati cities such as Dubai and Abu Dhabi. Different countries have unique strengths. For example, while UAE is the freight and distribution hub of the Middle East, Qatar is its knowledge center and Oman is fast gaining a reputation as an incubator for entrepreneurial businesses. The sum of the region's parts is more attractive than GCC states going it alone.

The maritime trade shows signs of progress. GCC countries are slowly seeing the advantages of connecting disparate transportation and logistics assets to create a more regional solution. For example, Oman Rail is tendering bids for the construction of a 750-mile railway extension that will link its three ports at Sohar, Duqm, and Salalah with the national rail network and the GCC-wide rail system.

Meanwhile, DP World, UAE's largest and most successful port operations company with a growing global portfolio, recently hosted delegates from the Kuwait Ports Authority to share marine, administration, technical, financial, and security best practices.

Both developments are positive signs that GCC countries are beginning to recognize their complementary assets and, more importantly, are receptive to further collaboration on a regional scale.

Cuba's Logistics Stock Rises

How will Cuba leverage improving diplomatic relations with the United States to spur economic development? The communist country has a population of 11 million people—one quarter live below the poverty line—and its proximate position between Florida and Panama makes it an ideal distribution hub for the Americas. From a labor and location perspective, Cuba has the requisite resources to become an attractive place to do business.

Now a third piece—logistics infrastructure—is beginning to materialize. Talk of transforming Cuba's Port Mariel into a regional transhippment hub received a shot of credibility when CMA CGM announced that it will operate a logistics platform at the port in cooperation with Cuban logistics company AUSA. The French steamship line has been active in Cuba since 2000, and is one of only three carriers that currently serve the country.

CMA CGM LOG, the company's freight forwarding and logistics arm, will operate a nearly two million-square-foot site in the Mariel ZEDM, a special economic zone dedicated to logistics and industrial activity at the port. CMA CGM LOG will be responsible for import deconsolidation and distribution on the island, export consolidation, and import/export warehousing.

China's 'Red Supply Chain' Holds No Bounds

China's maturation from the world's factory floor into a more balanced production and consumption economy continues unabated. In its wake, no country is safe—even at the risk of cannibalizing its own.

Taiwan shares an uneasy political relationship with its cross-strait neighbor, sovereign in name only. The country has a

India Courts a Seoul Mate

As Indian Prime Minister Narendra Modi looks to continue his ambitious modernization program, he is touting Korea as a potential model and suitor. Meeting with his counterpart South Korea President Park Geun-hye in Seoul recently, Modi underscored the importance of finding a partner that can share in his country's economic ascent.

"I am here at a time of renewed momentum in the Indian economy," he stated. "We are pursuing a comprehensive program of economic modernization that covers all sectors of our economy and all aspects of policies and procedures."

Modi is especially enamored of the prospect of leveraging Korea's well-regarded manufacturing pedigree to help spur India's domestic renaissance. He is specifically interested in luring Korea's defense industry to India as a means to build both economic and diplomatic ties.

Korea, in turn, has pledged $10 billion to finance infrastructure projects. The Ministry of Strategy and Finance and the Export-Import Bank of Korea will create a $1 billion Economic Development Cooperation Fund and provide $9 billion in export credits to India.

Reflecting the magnitude of the meeting, India elected to conduct a "2+2" dialog with Korea, involving both foreign and defense secretaries. It has employed such a format only once before, in negotiations with Japan in 2010.

Modri's trip to Asia, which included visits to both Mongolia and China, comes at an important juncture in India's reformation. The prime minister has been aggressive in reversing the country's regressive protectionist policies, and has similarly endeavored to simplify regulatory bureaucracy by rolling out the Goods and Service Tax.

One other important consideration: China's motivations and machinations to establish a new economic partnership and trade corridor with Pakistan-with whom India has a notably contentious relationship-no doubt upped the ante for India to seek further intra-Asian support.

India

Area: 1,269,219 square miles
Population: 1.2 billion
Median Age: 27
GDP: $2 trillion
U.S. FDI: $24 billion
Imports: $508 billion
Exports: $343 billion

EXPORT PARTNERS
U.S.: 12.4%, UAE: 10.2%, China: 4.7%
Singapore: 4.3%, Hong Kong: 4.1%

IMPORT PARTNERS
China: 11%, Saudi Arabia: 7.8%, UAE: 7.1%,
Switzerland: 5.5%, U.S.: 4.8%, Iraq: 4.3%

South Korea

Area: 38,502 square miles
Population: 49 million
Median Age: 40
GDP: $1.45 trillion
U.S. FDI: $33 billion
Imports: $543 billion
Exports: $628 billion

EXPORT PARTNERS
China: 26.1%, U.S.: 11.1%, Japan: 6.2%,
Hong Kong: 5%

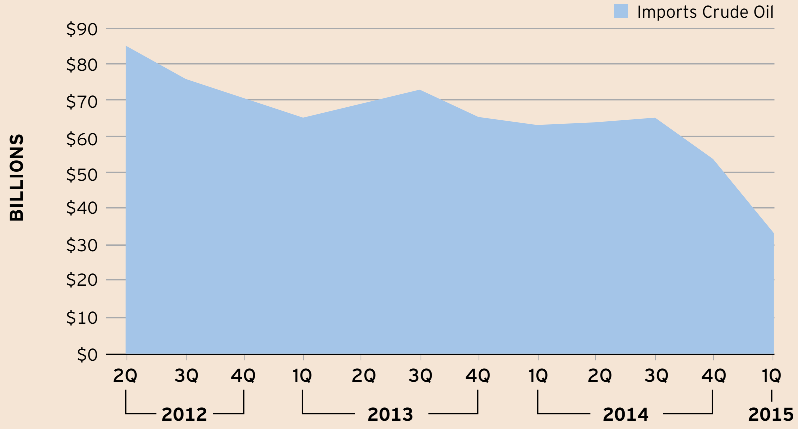
IMPORT PARTNERS
China: 16.1%, Japan: 11.6%, U.S.: 8.1%,
Saudi Arabia: 7.3%, Qatar: 5%, Australia: 4%

Sources: The World Factbook 2013-14. Washington, DC: Central Intelligence Agency, 2013; Bureau of Economic Analysis, U.S. Direct Investment Abroad well-entrenched legacy manufacturing high-tech electronics. For the longest time, this competency dovetailed with China's low-cost labor-driven model. Now, however, Taiwan faces new competition from China as it moves upmarket in the supply chain.

The threat of the "red supply chain" is very real, according to a recent article in Taiwan's *China Times*. Gou Tai-chiang, chairman of the Taiwan Electrical and Electronic Manufacturers' Association, fears China's shift to higher-value manufacturing will hurt Taiwan's semiconductor industry.

Supporting Gou Tai-chiang's claim, recent statistics from the Ministry of Economic Affairs reveal that Taiwan's export orders in April 2015 declined four percent year-on-year, the first drop since July 2013. China is Taiwan's largest export partner so any change in demand will have a corollary impact on Taiwan's economy. [ ]

U.S. Fracking Boom Continues

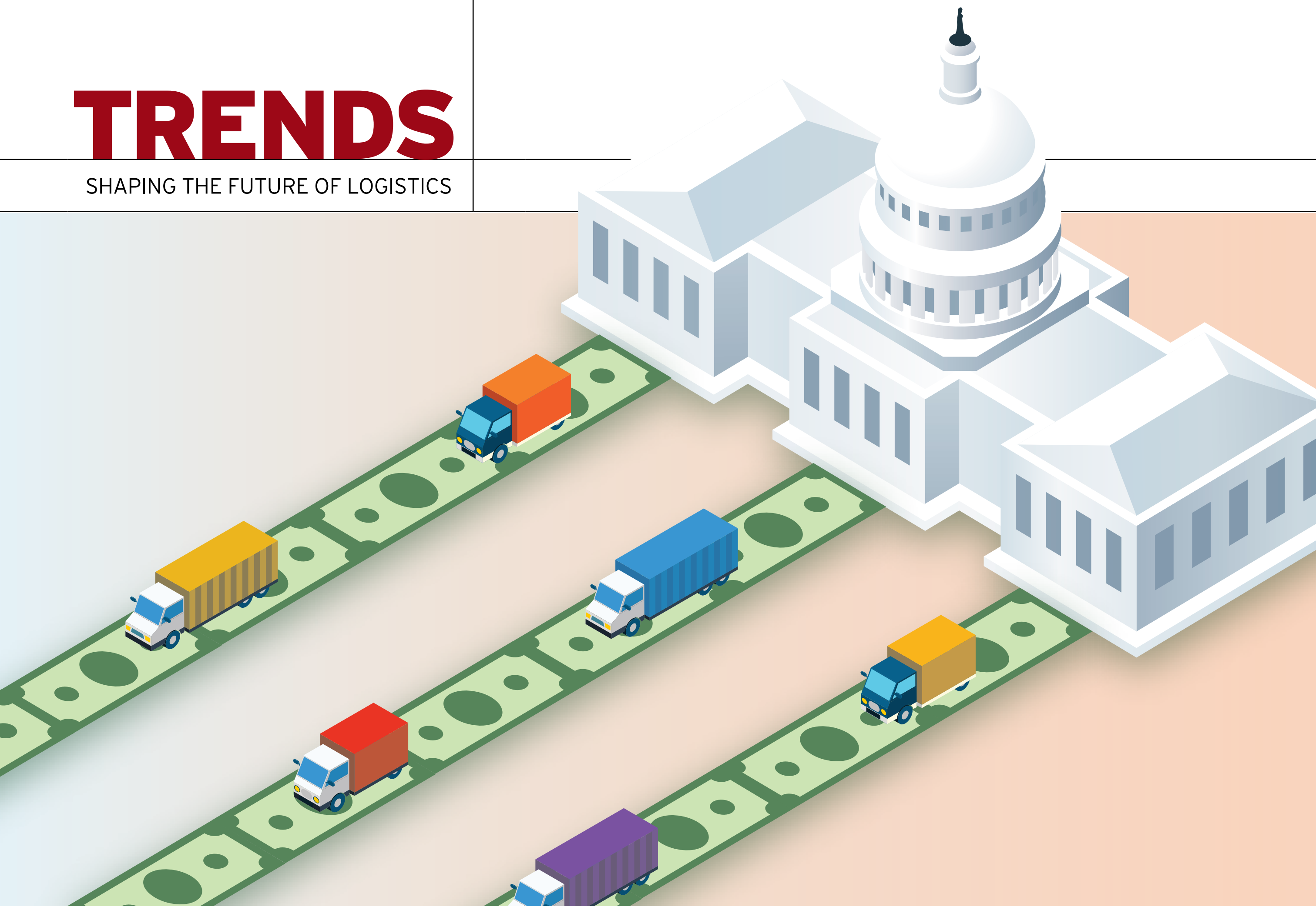


In Q1 of 2015, U.S. crude oil imports were at the lowest value seen in more than eight years. U.S. oil reserves continue to build up and push prices down, although U.S. oil exports slumped in Q1, dropping to similar values seen in 2013.

Source: Zepol Corporation | www.zepol.com

TRENDS

SHAPING THE FUTURE OF LOGISTICS



Highway Trust Funding: Déjà vu All Over Again?

by Joseph O'Reilly

News that U.S. Congress and President Obama are about to finalize a two-month extension to the lame duck Highway Trust Fund has elicited mixed reaction from industry. Some are optimistic because legislators were able to push through a bill without undue delay, especially as summer construction work picks up. But for many in the transportation and logistics sector, it's déjà vu all over again as Congress kicks the can down a crumbling road.

Beltway bloviators have labored for years to divine an appropriate mechanism that will finance much-needed infrastructure projects across the country. A well-developed and diversified transportation network that leverages rail, road, and port connectivity to reduce transportation and logistics costs has long been the key to U.S. trade competiveness. But that advantage is beginning to wane—and with it, perhaps, the promise of a U.S. manufacturing renaissance.

The American Society of Civil Engineers' (ASCE) quadrennial Infrastructure Report Card, most recently published in 2013, gave the United States an overall grade of D+. The Reston, Va.-based lobby estimates that America needs to invest $3.6 trillion by 2020 to maintain existing infrastructure across all sectors. Given current circumstances, that target seems untenable.

The problem is that Department of Transportation (DOT) spending and revenue—at both the state and federal levels—are arcing in opposite directions. A fixed gas tax, which funds the Highway Trust, hasn't been adjusted for inflation since 1993. As motor vehicles become more fuel efficient, revenues aren't keeping pace with infrastructure need.

TIGER'S UPROAR

Absent a national transportation and energy policy, states have been forced to go it alone, with mixed fortunes. Along the way, the federal government has made feeble attempts to stimulate progress.

The much-ballyhooed Transportation Investment Generating Economic Recovery (TIGER) Act was first introduced in 2009 to help spur smaller infrastructure plans in a "competitive" application process. The DOT categorizes these projects in six different buckets: Road, port, rail, transit, planning, and bicycle/pedestrian.

The first few rounds of TIGER funding were peculiarly directed toward non-freight bicycle, pedestrian, and mass transit projects in areas of the country where any sniff of utilitarian reason went wanting. Invariably, freight doesn't always rate when it comes to pork barrel politics.

Through six rounds of funding to date, public transit projects (including bikes and pedestrians)—which represent 22 percent of the total number of awards—have garnered nearly 30 percent of the $4.1 billion in total grants. And not all "road" projects have been dedicated to freight.

For example, during the 2010 funding cycle, the State of Oregon's section of the West Coast Electric Highway project—which has created a corridor of electric vehicle charging stations every 25 to 50 miles along Interstate 5 in the Pacific Northwest—received $1 million from American Recovery and Reinvestment Act funds, and more than $3 million from TIGER. Washington, Oregon, and California lead the country in terms of electric vehicle ownership. But these green

New GS1 Standard Eases E-commerce

E-commerce is rapidly changing the way that retailers do business as new rules of engagement emerge and evolve. While industry direction has been largely "lawless" thus far, a new GS1 standard for listing and classifying products across e-commerce platforms aims to bring more clarity and consistency to the online marketplace.

Developed in collaboration with 18 companies–including Best Buy, Bing, CNET, eBay, Google, and Walmart–the standards organization's Simple Product Listing ensures that products are accurately represented and easily discovered across all sales channels.

"Consumer demand and advancing technology have created an unprecedented need for accurate, authentic product information across any device," says Amit Menipaz, vice president, structured data at eBay Marketplaces.

"The GS1 US Simple Product Listing will help us standardize and simplify that information for sellers by reducing the complexity of data integrity challenges within our ecosystem," he adds. "This technology enables eBay's consumers to more effectively find what they are looking for across our global marketplace of more than 800 million listings."

In effect, the new standard empowers trading partners to use a single set of consumer-friendly terms that are linked to their existing internal product hierarchies so that consumers are presented with the same trusted information across all channels. By bridging the gap between retailers and suppliers, and providing an automated product classification system, users can streamline operations through more efficient data handling processes, which helps reduce costs and accelerates speed to market.

Best Buy was one of 18 retailers to contribute to the GS1 US Simple Product Listing Standard, which developed a single standardized set of terms enabling consumers to more efficiently find the products they are shopping for in any sales channel.

cars still account for less than one percent of total U.S. automobile sales.

Not surprisingly, Washington and Oregon's DOTs are currently strapped for cash because gas tax revenues are dropping faster than an electric car's speedometer. To their credit, both states are earnestly looking at new ways to generate revenue. Washington charges electric-vehicle owners an annual $100 registration fee. Oregon is going one step further by piloting a pay-per-mile scheme for all vehicle types that aims to replace the gas tax.

Beginning in July 2015, 5,000 volunteers will be allowed to sign up for Oregon's trial program, which uses special devices to collect information about how much they've driven and where. Drivers will agree to pay $0.015 per mile traveled on public roads in state. Those who are using gas-guzzling vehicles will receive credits for fuel tax charges they pay at the pump.

Electric vehicle owners and civil liberty groups have expressed concern regarding the new program. But Oregon is making a concerted effort to fix a problem it created—and, in the long run, the state may pioneer a revenue system that benefits others.

INDUSTRY REACTS

Concerned industry stakeholders have once again issued a call to action after the latest Highway Trust Fund impasse. Commenting on behalf of the Soy Transportation Coalition, an Ankeny, Iowa, lobby that stumps on behalf of 13 state soybean boards, Executive Director Michael Steenhoek lays bare Congress' failure to deliver a long-term national strategy.

"With respect to surface transportation, predictability of funding is almost as important as volume of funding," Steenhoek explains. "Most states develop a five-year plan for maintaining and improving their system of roads and bridges.

"Much of this construction work is reimbursed to the states by the federal government," he adds. "If it is not a reliable partner in funding transportation, states will be less confident to proceed with planning and executing many essential and expensive infrastructure projects."

Calling for a robust freight transportation plan, the Coalition for America's Gateways and Trade Corridors (CAGTC), based in Washington, D.C., has outlined a National Strategic Freight Mobility Program and Trust Fund that incorporates four key pillars:

1. A national strategy that guides long-term planning.
2. Dedicated funding mechanisms.
3. A set of merit-based criteria for funding allocation.
4. A partnership with the private sector.

"Freight mobility—on all modes—requires added capacity and improved efficiency to keep pace with growing demands," according to CAGTC. "And connectivity among the modes is key to efficient goods movement. Based on estimates of freight system needs, we believe a minimum of $2 billion in additional public investment is necessary on an annual basis."

What Keeps Risk Managers Up at Night?

Travelers Insurance Company has its clients covered. But what forces companies to seek shelter under the red umbrella in the first place? The New York City-based insurance company recently released its 2015 Travelers Business Risk Index, which polled more than 1,200 risk managers to differentiate whether certain threats cause them to "worry a lot" or "worry somewhat."

Medical cost inflation (24 percent) and cyber risk with regards to data breaches (23 percent) are the top two business concerns, according to the 2015 report. Increasing employee costs (21 percent), liability (21 percent), and regulatory compliance (20 percent) round out the top five worries.

While fears over medical cost inflation are still latent, concern dropped from 67 percent in 2014 to 60 percent in 2015. Risk managers also responded more favorably regarding rising employee benefit costs, which saw a drop from 62 percent to 56 percent. This is to be expected after businesses have had time to absorb the possible implications of the Affordable Care Act.

Meanwhile, security fears continue to build as the big data trend sweeps industry. Making the greatest leap from fifth in 2014 to second this year, concern over cyber risk has grown considerably, particularly among large businesses – nine out of all 10 industries surveyed report cyber risks and data breaches among their top five concerns.

While risks invariably change over time, how businesses limit their exposure is a constant challenge. The gap between how much U.S. businesses worry versus how prepared they are to manage these risks remains large. In fact, the top concerns are often among the three to five risks businesses feel the least prepared to handle.

What are U.S. businesses worried about?

	Worry a great deal	Worry somewhat
Medical Cost Inflation	27%	60%
Cyber Risks/ Data Breaches	23%	58%
Increasing Employee Benefit Costs	21%	56%
Legal Liability	21%	56%
Attracting and Retaining Talent	16%	53%
Regulatory Compliance	20%	51%
Broad Economic Uncertainty	16%	51%

Where that extra $2 billion per year comes from is the crux of the funding problem. But states are catching on. Several passed legislation that pegs gas taxes to inflation or the price of fuel, helping to fill the current void. Others made concerted legislative efforts to ensure that money collected for transportation infrastructure projects are allocated specifically for that—and not siphoned off from a general slush fund.

FINDING FUNDING

On a national scale, in April 2015 a bi-partisan group of U.S. congressmen introduced a bill that would similarly index federal fuel taxes in accordance with inflation. They have also proposed establishing a commission to find alternative funding sources and/or periodically raise motor fuel taxes to cover the remaining shortfall for the next decade.

Meanwhile, the Information Technology & Innovation Foundation (ITIF), another Washington, D.C.-based think tank, recently issued a report encouraging transportation policy to integrate IT into America's surface transportation system. The ITIF has specifically called on Congress to enact a new "Cement & Chips" funding approach that directs no less than five percent (approximately $2.5 billion) of the Highway Trust Fund allocated to states to digital and information technology systems-based infrastructure projects.

"The future of transportation lies not just in building new roads, but in bringing intelligence to every asset in the U.S. transportation network—from roadways and private vehicles to commercial truck fleets and public transit systems—thereby making transportation safer, more accessible, and more efficient," according to the report.

ITIF's recommendations are ambitious—perhaps too ambitious for a Congress that has been saddled by bureaucracy and indecision. But it demonstrates the type of innovative thinking required to formulate a long-term roadmap. Intelligent infrastructure is the future.

The consensus among industry observers is that the United States needs a consistent and flexible funding mechanism that allocates revenues toward critical infrastructure projects that meet specific, merit-based criteria. Restructuring the federal gas tax is a first step. Whether Washington can get it together after this latest extension expires remains to be seen. Unfortunately, freight transportation stakeholders have been down this winding, potholed road before—33 times in six years to be exact.

Let's hope it's not déjà vu all over again come August 2015. ■

BY PAUL A. MYERSON
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How to Cut Seven Non-Traditional Wastes

In my first column for *Inbound Logistics* in 2012, I covered the seven traditional wastes identified in Lean thinking: Transportation, inventory, motion, waiting, overproduction, overprocessing, and defects, more commonly known by the acronym TIM WOOD.

But there are other wastes to consider in your supply chain and logistics functions. Let's examine the following seven non-traditional wastes as identified in *End-to-End Lean Management: A Guide to Complete Supply Chain Improvement*, by Robert Trent.

1. Too many bits and bytes. The digital age produces less paper—at least in theory. However, technology advances guarantee plenty of data to go around. It is important to understand the difference between data and useful information. You can waste a lot of valuable time culling through useless information, such as emails, reports, and analyses.

2. Untapped creativity. People often take the path of least resistance, but that's not usually the optimal route. Creative skills take time to develop, but organizations can do their part by establishing a culture of Lean thinking, which includes training, support, and a motivational reward system.

3. Poor measurement. If you can't measure it, you can't improve it. In terms of Lean, build your organization's supply chain function to support overall strategies, which can range from responsive to low cost, each strategy having its own type of metrics.

In today's world, it is easier to gather measurements through technology solutions, aided by bar-code scanning and RFID. But make sure you measure, compare, and benchmark the right things. One source of standardized supply chain metrics is the Supply Chain Operations Resource model, which features more than 150 individual measurements.

4. Excessive overhead. The financial impact of an inefficient supply chain goes right to the bottom line. This can be a result of unecessarily high inventory levels to cover variability in a process, or underutilized assets such as forklift trucks, private fleets, and distribution centers.

5. Overdesign. Overdesign can result in the waste of overprocessing. Minimize overdesign by developing a Lean, collaborative product lifecycle management process that encompasses a product from inception to disposal of manufactured products. This strategy must also integrate people, data, processes, and business systems.

6. Duplication of effort. Duplicated effort across sites or geographic locations means they don't communicate and understand each other's processes well. Value Stream Mapping is one way to visualize duplicated effort, and come up with solutions that leverage collaboration between organizations.

7. Poor planning. Many companies do too much reacting, and not enough planning. A solid sales and operations planning process at both the grass roots and executive levels can help organizations shift the balance toward planning, while monitoring Lean performance metrics.

By focusing on adding value to the customer, you can significantly affect the financial bottom line, which is something that you must not lose sight of. As a result, identifying and eliminating all kinds of waste is a long-term battle worth fighting in today's ultra-competitive global economy. ■

Parts of this column are adapted from *Lean Supply Chain & Logistics Management* (McGraw-Hill; 2012), *Lean Retail and Wholesale* (McGraw-Hill; 2014) and *Supply Chain and Logistics Management Made Easy* (Pearson, 2015) by Paul A. Myerson with permission from McGraw-Hill and Pearson, respectively.

3PL LINE

BY JOHN COSTANZO
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It's Time for an Automotive Aftermarket Logistics Tuneup

In automotive repair shops across the country, demand for older model parts is matching demand for newer model regular maintenance parts. This is because the average vehicle on the road today is 11.4 years old, and expected to reach 11.7 years by 2019.

The result has transformed the aftermarket industry. Aftermarket SKUs are estimated in the millions, with original equipment manufacturers introducing 80,000 unique part numbers each year. Understanding how to manage inventory that large is vital to success.

This change comes at a time when other factors are putting pressure on aftermarket supply chains, including:

- Expectations of shorter lead times.
- Spotlight on quality, as parts recalls cause demand for quality control.
- Parts complexity, as electronics and robotics require development of aftermarket parts and services.
- Growth of hybrid and electric vehicles, which include unique parts and maintenance systems.
- Increasingly global supply chains.

These challenges highlight the need for aftermarket businesses to take stock of existing supply chain processes.

The first step is to conduct an in-depth assessment of current needs and priorities. Does your supply chain include cross-border transactions? Do you have different warehousing needs? Are you able to meet customers' expectations with existing logistics solutions?

Next, consider your logistics partner's capabilities. As business needs change, is your partner adapting? Consider:

- **Service customization.** An ideal logistics partner offers an individualized plan based on your specific needs, rather than a one-size-fits-all approach.
- **Innovative solutions.** A provider should offer forward-thinking options, and back them with results.
- **Customer service.** A quality logistics provider assigns a team of customer service professionals to work directly with an aftermarket business. Often agents solve a problem before the client knows the problem exists.

Stay Up to Date

It's important to stay innovative with supply chain practices. For example, route optimization software helps companies better manage distribution networks. The process calculates the most efficient service option, maps out direct routes, and matches available trucks and drivers. Some logistics providers do not offer route optimization in the normal course of building solutions.

Consolidating shipments is another source of efficiency that can reduce freight costs by as much as 10 percent. A consolidated shipment can cross borders as a single unit, reducing clearance wait times and fees. Once across the border, a consolidated shipment can be sorted and directed to appropriate distribution channels.

Aftermarket supply chains also benefit from smarter approaches to warehousing and distribution. Collaboration is becoming an increasingly common trend, as aftermarket players realize the efficiencies of combining forces with other businesses—sometimes even direct competitors—for greater efficiency.

Tremendous opportunities exist for aftermarket businesses to benefit from the innovations taking place in supply chain management. These changes come at an exciting time, as the aftermarket adapts to growing SKU inventories, globalized supply chains, increased performance demands, and a host of other pressures. One key to operating an optimal supply chain is making sure you have the right logistics partner for the job. ■

[IT MATTERS]

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Ditch the Spreadsheet and Grow Your Business with Quality Data

To optimize logistics execution, shippers must gain visibility by adopting new technologies that provide high-quality data. But at many companies, separate freight procurement and logistics management functions leave managers struggling to optimize processes beyond freight rates, producing results that may have a large financial impact and damage customer satisfaction.

Even today, many companies manage information manually. Excel spreadsheets and telephones are still tools of the trade, resulting in incomplete data that is often incorrect or late. This leaves logistics professionals without complete supply chain visibility, hindering business growth.

To deliver visibility, shippers and their providers must quickly adopt technologies that incorporate new and diverse sources of information. A unique opportunity exists for the supply chain to raise the bar on reducing costs and complexity, while playing a central role in enhancing customer experiences. The key to achieving these benefits is high-quality data.

Delivering on Data Quality

Regardless of how you manage information, if you can't trust the data, and it's not presented in an understandable format, you won't have time to change business practices.

Technologies that support improved data quality are available now. Digital platforms fostering collaboration among shippers, carriers, and freight forwarders deliver significant savings. But to enable true visibility and productive collaboration via digital platforms, the data must exist on three levels:

1. Collaborate. Large shippers can mandate visibility or collect fines when data is inaccurate, but smaller shippers struggle to gain access to timely, accurate data. This results in information gaps that exacerbate inefficiencies and customer dissatisfaction

To even the playing field, shippers need ready access to accurate and timely information. Participating in an integrated, collaborative digital platform provides real-time information from all transportation sources.

2. Automate. Manual entry is still prevalent, creating incorrect or partial data availability downstream. Each participant can have different coding and naming conventions for their shipments, creating a complex, mistake-riddled process full of discrepancies. Automation reduces those data quality errors.

3. Standardize. Carriers have their own format for delivering data, tracking hundreds of events and milestones in different ways, leaving logistics managers without a common format for reducing data complexity.

Consider the word "arrival." Does it mean the ship entered port? The container was unloaded at the dock? The shipment was turned over to ground transport? Discrepancies occur without standard definitions in place. Next-generation collaborative networks are driving new data quality standards that all supply chain partners can use.

Demand Better Data

The movement to optimize logistics through high-quality data is happening now. To benefit from systemic information quality improvements, industry participants need to speak on the importance of data quality.

Take full advantage of technologies that drive e-business through a collaborative network. Those who commit to high-quality data will compete more effectively, and lead the way in optimizing the movement of goods. ■

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Connected Vehicles and Smart Infrastructure

While the future of transportation may not include the flying cars from "The Jetsons" or "Back to the Future," it is still light-years beyond our current travel methods.

We are all familiar with the litany of concerns regarding our land-based transportation system, including inadequate infrastructure, traffic congestion, energy usage, pollution, and safety.

On a recent tour of the Transportation Technology R&D Center at Argonne National Labs, I was able to see first-hand some of the research the U.S. Department of Energy is coordinating to address these issues. Two of the most promising technologies are vehicle-to-vehicle communications (V2V) and vehicle-to-infrastructure communications (V2I).

According to a 2014 report from the DOT's National Highway Traffic Safety Administration (NHTSA), traffic accidents cause $277 billion in economic losses—or nearly two percent of the U.S. Gross Domestic Product (GDP)—each year. The NHTSA is currently working on a plan to require all new vehicles sold in the United States be equipped with V2V communication systems. The DOT estimates this technology could eliminate 70 to 80 percent of the accidents caused by driver error when used in conjunction with lane control, auto-braking, and adaptive cruise control.

Currently, the United States consumes over four billion barrels of oil annually for surface transportation. This represents over 60 percent of the total oil used in our country. Even a small change in fuel usage would have a significant effect on transportation costs. A European Commission project Safe Road Trains for the Environment (SARTRE) has shown in field trials that semi-automated road trains of linked vehicles offer the potential to reduce fuel consumption by eight to 16 percent. At the recent historical price of oil, this would equate to an annual savings of $30 to $60 billion per year in fuel costs.

A study commissioned by the American Society of Civil Engineers indicated that based on current transportation methods and technology, by the year 2020 we would need to spend at least $800 billion more on our roads and bridges than is currently planned to meet existing and projected transportation needs. V2V technology may alleviate the need for some of this spending. DOT studies show that adaptive cruise control has the potential to increase lane capacity as much as 100 percent by allowing cars to travel closer together. V2V technology will allow vehicles to platoon together, such that all the vehicles in a lane would simultaneously speed up or slow down, reducing stop-and-go driving and smoothing out traffic flow.

In addition to V2V technology, work is being done on traffic automation to wirelessly link vehicles to the physical transportation infrastructure. This involves dynamic traffic lights that can change their timing based on current traffic flows; traffic flow and route management, where cars are directed to alternative routes to minimize congestion; as well as managed lanes to improve safety and traffic flow. Researchers at Argonne National Labs have developed an integrated transportation model called POLARIS to test these concepts at a regional level by modeling travelers and traffic flows in the greater Chicago area. They have found that delays can be reduced by almost 20 percent using various combinations of these tools. According to Dr. Joshua Auld, who is instrumental in the research, "Understanding how V2V and V2I work together as a system is critical as different technologies sometimes work at cross-purposes in meeting goals of safety, mobility, and environmental improvement."

In order for the full benefit of these technologies to be realized, several things would need to happen, such as securing the network against hackers bent on causing harm, ensuring enough vehicles are equipped with the technology to reach a tipping point where the system works, and overcoming fears of "Big Brother" oversight.

Vehicle-to-Vehicle communications and Vehicle-to-Infrastructure technologies will revolutionize transportation by making our road system safer, more efficient, and less dependent upon the human element for effective decision-making.

WSI delivers tailored, integrated, end-to-end logistics and supply chain solutions designed to maximize operational efficiency, ensure reliable performance, and minimize costs. For more information, go to www.wsinc.com.


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Benefits of Partial Truckload Shipping

Q: What is partial truckload?

A: You hear a lot about less-than-truckload (LTL) and full truckload, but an often overlooked mode is partial truckload, or volume LTL. This mode has benefits shippers should consider when looking for faster transit times, less handling, and a more cost-effective solution.

Logistics professionals begin to look at partial truckload or volume LTL as an option when their clients have shipments that fall between LTL and full truckload. Definitions of partial vary, but are generally based on the size of the order (weight and linear feet) and service requirements (time sensitivity and the type of freight).

LTL networks are optimized for shipments generally less than 12 linear feet and one to six pallets. Full truckloads tend to contain 26 to 30 pallets and approximately 42,500 pounds. The partial "sweet spot" is between six and 18 pallets and/or between 8,000 and 27,500 pounds. Shipping partial truckload allows 3PLs to utilize their carrier networks to haul these shipments with carriers that have extra room on their trailers. Why pay for a full truckload if you don't have to?

DOUG WAGGONER
CEO
Echo Global Logistics

Q: What value does partial truckload have over modes such as LTL and full truckload?

A: Unlike LTL, partial truckload shipments usually do not require freight class, eliminating re-classing and the extra charges (like minimum density) that typically accompany larger shipments.

Partial truckload carriers usually do not stop at distribution terminals along the way to their destination, which generally leads to a higher percentage of on-time deliveries, faster transit times, and less handling of freight. Additionally, partial truckload carriers typically offer cargo insurance coverage comparable to truckload carriers, which is often greater than what LTL carriers offer.

At Echo we simplify transportation management by using partial truckload carriers to make time-sensitive deliveries for our clients as well as specialized services such as "no touch" delivery and white glove/final mile. Our experience in the truckload industry and our deep relationships with carriers ensure our clients know when shipping partial truckload benefits them and why. In 2014 Echo shipped over 90,000 partial loads through thousands of partial truckload carriers.

Q: What else should you know about partial?

A: To give an example, a 10,000-pound LTL shipment (seven pallets, class 70) moving from Chicago to Los Angeles can cost between $2,000 and $4,000 on a top-tier LTL carrier (but may be subject to linear foot provisions, leading to additional charges) and between $2,700 and $3,200 as a full truckload (depending on service requirements and capacity). However, that same shipment as a partial truckload costs between $900 and $1,050—a substantial savings opportunity for shipments that meet the criteria of partial truckload.

Although not all 3PLs specialize in partial truckloads, look for one that has not only the relationships with the best partial truckload carriers, but also the technology to support your transportation needs.

Echo Global Logistics | 800-354-7993
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Ford Motor Company's corporate social responsibility journey offers a roadmap for industry to travel.

by Joseph O'Reilly

Growing *a* Culture *of* Sustainability

Corporate America has been preaching green for the past decade. In the halcyon days of the mid 2000s it was easy, capitalizing on consumer demand for environmentally friendly products and solutions. Cash was flush. Green was a marketable trend.

Then a funny thing happened. The U.S. economy tumbled into a three-year tailspin. Industry contracted. Organizations cut operational fat. Fuel prices started rising. Cost reductions were deliberate and decisive. Green was an accidental consequence.

Following the recession, many companies understandably maintained a certain measure of austerity within their organizations. It was business prudence with a benevolent upside.

More recently, the maturation of social media and the matriculation of millennials into the workforce and consumer market—one creates transparency, the other demands it—has brought to industry a heightened sense of conviction that goes beyond green. Sustainability has become an indisputable truth.

Supply chain practitioners know this well. The logistics sector has long been on the leading edge of green innovation simply because efficiency and economy go hand in hand with reducing environmental impacts.

But supply chain has also become a target. The Internet and social media give consumers visibility to the seedier side of sourcing and procurement—where workers' rights, conflict minerals, and environmental impacts come under greater scrutiny. Consumers demand transparency and accountability, which is forcing manufacturers and retailers to double down on the triple bottom line.

Finding a common ground between cost and corporate social responsibility (CSR) remains a challenging proposition—unless organizations nurture a culture of sustainability.

"A business that makes nothing but money is a poor business," claimed 20th-century industrialist Henry Ford. It's a mantra that still resonates today for the automotive manufacturer.

Ford Motor Company's lean and green journey is a century in the making. Like other automotive manufacturers, the Dearborn, Mich.-based company is in a unique position. The products rolling off its assembly lines are mandated to be more fuel-efficient by regulatory and consumer demand. But there are internal pressures to reduce waste as well—a reality born from Henry Ford's own lean philosophy.

A Lean and Green Culture

Culture is a word laden in meaning. In the business sense, it can be defined as a shared system of beliefs or thinking imbued within all functions of an organization—sometimes, external value chain partners as well—that dictates the way people behave. Culture doesn't play well where silos exist. So as technology and business process assimilation help supply chains become more integrated across functions and extended global partners, companies have more opportunities to initiate sweeping sustainability mandates.

In 2007, Ford introduced a formal Blueprint for Sustainability to describe actions it was taking to increase fuel economy and reduce greenhouse gas emissions in its products. The plan struck a nerve. Ford has since expanded that roadmap to embrace sustainability in a much broader way.

"Sustainability is the intersection of social, economic, and environmental factors," explains Mary Wroten, senior manager, supply chain sustainability at Ford Motor Company. "If the good we're doing today puts us out of business tomorrow, then that's not a sustainable solution."

Wroten leads Ford's global supply chain sustainability team, which focuses on three pillars: environmental responsibility within Ford's supply chain, human rights and working conditions, and conflict minerals. The sustainability office works with both internal and external organizations to provide regulatory and technical expertise.

The roots for this formal roadmap were planted one century earlier, then revised at the dawn of the millennium. Henry Ford was notably obsessed with eliminating waste—in terms of both material and time. It was the driving force behind the automotive company's just-in-time manufacturing ethos and "verticalization," as Ford looked to control the means of transportation as well as supply.

The capitalist also bucked convention in 1914 when he introduced a $5 daily wage for assembly line workers—more than double the average pay of the day. It wasn't complete altruism. Ford recognized that paying workers well reduced turnover and created a middle class that could afford to buy the Model T—which helped popularize the fledgling idea of "automotion."

Steering a New Vision

In 1999, William Clay Ford Jr., Henry Ford's great-grandson, steered a new 21st century vision when he decided to create a sustainability organization within the company, handpicking his own key leaders to fill out the team. One year later, the company announced it would follow the Ceres principles, a voluntary 10-point corporate code of conduct that pledges continuous environmental improvement and performance beyond that required by government regulations. The non-profit was established after the Exxon Valdez disaster in March 1989.

The automotive company's advocacy was not without some opposition, as Ford Jr. recounts in the company's 2013-2014 sustainability report.

"My announcement was greeted with alarm in some quarters and skepticism in others," Ford Jr. writes. "Some felt that our commitment to sustainability would harm our business results; others believed it was an empty gesture that would not change how we operated. But in the years that

While regulatory and consumer demand dictate that today's cars be electric, or at least more fuel-efficient, Ford also embraces internal pressures to reduce waste.

followed, sustainability became a core element of our business plan."

2000 proved to be a watershed year. Apart from adopting the Ceres principles, the company also initiated a formal dialog regarding human rights in the supply chain. This was followed by the introduction of a Code of Basic Working Conditions (CBWC) in 2003, which covered workplace issues such as child labor, compensation, forced labor, freedom of association and collective bargaining, harassment and discrimination, health and safety, and work hours. A 2007 revision featured topics such as community engagement and indigenous population, bribery and corruption, and environment and sustainability. Importantly, the CBWC applies to all of Ford's facilities, as well as joint ventures and suppliers.

Also in 2000, Ford Jr. addressed the issue of water conservation—a timely topic today. Between 2000 and 2013, the manufacturer reduced water use across its global footprint by 61 percent, the equivalent of more than 10 billion gallons of water.

That the company's decision to create an internal sustainability task force in 1999 precipitated this cascade of initiatives is no small coincidence. Corporate

3PLs Walk the Talk

Not all companies have the resources or resolve of a global automotive manufacturer; nor are they in the camera's eye. Making a business case for sustainability can be a challenge, which is why many companies rely on their third-party logistics (3PL) partners for direction.

"We have a thriftiness DNA that lends itself to green," says Ken Heller, vice president of supply chain excellence for DSC Logistics, a Des Plaines, Ill.-based 3PL.

Indeed, 3PLs have a mandate to be efficient. Asset-based service providers operate on thin margins, so they have extra incentive to squeeze out costs, whether it's transportation, labor, or energy.

The sustainability play has become increasingly important as shippers demand it. Still, when it comes to outsourcing, most companies are fixated on cost.

"When we deal with customers, we focus on the economic and environmental aspects of sustainability–in that order–and less so on social. As a 3PL, we're driven by cost. We can bring up sustainability with our customers, but we're only going to be able to make that work if there's a return on investment," explains Rick Dineen, vice president of operations for DSC Logistics.

Following the Leaders

Leadership buy-in is another important consideration. For example, DSC has been trying to implement a lighting project that would save money and reduce energy consumption for a customer.

"The ROI was there as advertised, and better, but we got pushback," says Heller. "Finally the right people in the organization looked at it and they flipped the switch."

Dineen acknowledges that green considerations can be a tipping point if the expected ROI exceeds the norm. "It's about tying sustainability to cost control and adding value," he notes.

Finding a green ROI though, especially in a shorter-term 3PL contract, can present difficult choices.

Deni Albrecht, leader of sustainability for Kenco, a Chattanooga, Tenn.-based 3PL, offers an example. Kenco was working on a project with a customer to make lighting upgrades at a leased distribution facility in California. The 3PL had successfully completed four other installations for the company elsewhere around the country. But California's Title 24 specifications for energy upgrades make companies jump through hoops to get the necessary controls.

"Because the lease life in that facility was running out, the project was tabled," he explains. "With this customer, we focused on sustainment of the margin, not sustainability."

That's the nature of outsourcing. Decisions often simply come down to cost. But on other occasions, logistics providers and their customers become true gain share partners.

To point, Kenco is working with another client to construct a greenfield distribution facility–with instructions to make it LEED certified. Albrecht counseled the company to build the new facility with required green features, but to qualify it later as an existing facility rather than a new one. This way the customer has fewer upfront hurdles and capital investment.

That's the real value 3PLs bring to the table as neutral benchmarks. In many cases, shippers depend on them to perform the necessary due diligence, then make recommendations.

"We're looking at 50 different buildings–15 to 20 customers," says Heller. "If each one has a clever idea, and we can share that around our customer base, it's that much more powerful. Typically if it works for one company it will work for another."

Sustainability efforts often feed off grassroots action. In a vacuum, small impacts build momentum and eventually generate greater support. In a corporate environment, however, senior-level buy-in is critical. Without appropriate governance, supply chain collaboration can be difficult.

"You can go broke being green. It's not sustainable," says Kenco's Albrecht.

"Sustainability is about being lean, green, and a good corporate citizen. You have to do it all," he adds. "Sustainability is the mortar within all the different functional bricks that empower us to make core business decisions that are just as good today as they are tomorrow."

When companies appreciate supply chain and sustainability excellence in the same vein, opportunities abound.

social responsibility remains a continuous improvement journey.

"We continue to work with our supply base," says Wroten. "In 2014, we saw our first conflict minerals assessment; we're now getting ready to file our second report. Sustainability has been in our culture since day one."

What's Sustainable?

Defining sustainability remains a challenge for industry at large, which further complicates broader CSR efforts.

"Every company has a different definition," says Wroten. "Ford identifies sustainability as great product, strong businesses, and a better world—or the intersection of social, economic, and environmental factors. But how we define sustainability today will probably change in the next 10 years, especially as we factor in wireless connectivity and technology."

Once an organization has a clear understanding of its sustainability priorities, it can then set about creating a framework to measure and benchmark performance. Ford, for example, has an annual business plan review process where it defines critical needs.

"We have a forecast we work toward," Wroten says. "We have metrics, and define risks and opportunities. We constantly monitor the business environment—what's happening in the world around us—to see if we need to adjust the plan."

Senior governance is important. For example, when Alan Mulally came over from Boeing in 2006 to succeed Ford Jr. as president and CEO of Ford Motor Company, he brought with him the idea of creating a value roadmap—Ford only works on things that add value to the company.

So the manufacturer has metrics in place to deliver according to its value roadmap. When problems occur, senior leadership can help steer adjustments. Transparency up and down the chain of command is compulsory.

Driving Visibility

The importance of visibility in Ford's sustainability roadmap extends well beyond the enterprise. Consider that the company works with 1,200 suppliers with 4,400 production sites spread across more than 60 countries.

"Our biggest concerns often happen deep within the supply chain," says Wroten. "We're many layers removed from where minerals come out of the ground."

Ford has made a commitment to partner with its tier-one suppliers and make sure they are aligned in terms of human rights, working conditions, and the environment. It has a program in place to share knowledge and best practices—metrics to reduce water consumption, for example—with select vendors. The hope is that these partners will then cascade this information through their own respective networks.

Since 2003, Ford has also been training suppliers on its expectations for CSR. It recently developed an e-learning program, in collaboration with four other original equipment manufacturers (OEMs) and the Automotive Industry Action Group, that addresses human rights, ethics, the environment, and sustainable business practices. The manufacturer regularly audits facilities to drive compliance.

"We work with a third party that visits supplier facilities to ensure they are meeting our expectations," explains Wroten. "We believe workers are more likely to be productive when they are afforded decent working conditions. If we help our suppliers ensure their facilities are up to par, they will ultimately make a better quality product."

Ford's sustainability processes encompass a set of principles and best practices designed to drive a lean manufacturing environment.

At Ford, meeting and exceeding internal sustainability requirements doesn't go far enough. As the automotive industry becomes more integrated, and as technology continues to shape new product innovation, more opportunities arise to extend sustainability best practices within and beyond the automotive industry.

Many OEMs share the same tier-one suppliers, creating greater incentive for the industry to work collaboratively and ensure that expectations for human rights and the environment trickle down even further.

"The paradigm is changing," explains Wroten. "If we look out 10 years, we will not only have collaboration across the auto industry, we'll have cross-sector responsibilities as well. Our cars are 'computers with wheels,' requiring more alignment with the electronics industry in order to gain supply chain transparency." ■


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75 GREEN SUPPLY CHAIN PARTNERS

If you want your carbon footprint to be as small as possible, and your business to be sustainable, then make sure you are doing business with supply chain partners who feel the same way. *Inbound Logistics*' annual 75 Green Supply Chain Partners (G75) focuses on showcasing companies that demonstrate green best practices in their supply chain, logistics, and transportation operations. *IL* editors examined corporate sustainability initiatives, collaborative customer-driven projects, and participation in public-private partnerships, then ultimately chose the G75 based on four benchmarks: Measurable green results, sustainability innovation, continuous improvement, and industry recognition.

The following alphabetical list recognizes the achievments of companies at the head of the pack, who demonstrate their commitment to the environment and the global community, year after year.

A. Duie Pyle

Committed to reducing its environmental footprint through reduced consumption of fossil fuel, A. Duie Pyle buys 100-percent automatic transmissions; and performs proper inspection, engine maintenance, and tire specification to optimize rolling resistance. The carrier performs annual hands-on driver training on daily vehicle inspections, and annual one-on-one defensive driver training to optimize fuel consumption. Pyle installs auto-inflation systems for trailer tires and skirted trailers where possible. The carrier extends its commitment to green into its facilities – all docks are paperless, new shops have radiant heat flooring, and concrete terminal ramps have radiant slab, activated by snow detection devices.

Daily vehicle inspections | A. Duie Pyle

ABF Freight

ABF Freight was a pioneer in adopting fleet efficiency and sustainability measures that are now seen as proven methods for promoting a greener supply chain. The carrier, which was awarded a SmartWay Excellence Award from the U.S. Environmental Protection Agency, continues to pursue innovations and practices designed to enhance environmental performance and efficiency. For example, ABF limits its trucks to a top speed of 62 mph, and prohibits discretionary engine idling. As a result, every ABF Freight truck emits significantly fewer tons of carbon dioxide. The carrier also has reduced fuel consumption and enhanced operational efficiency through best practices that include a strictly followed equipment maintenance and replacement program.

Agility

Building more sustainable supply chains and mitigating the environmental impact of its operations is Agility's long-term, multi-faceted commitment. To that end, the 3PL focuses its efforts on green supply chains that enable the company and its customers to jointly address energy issues; energy efficiency achieved by preserving natural resources and reducing greenhouse gases; waste management measurements and widespread adoption of "recycle, reuse, reduce" practices; and policies that integrate environmental stewardship into its operations and culture. At the recent Asian Manufacturing Awards in Singapore, Agility was recognized for offering the "Best Solution for Sustainability."


Improved MPG | AAA Cooper

AAA Cooper

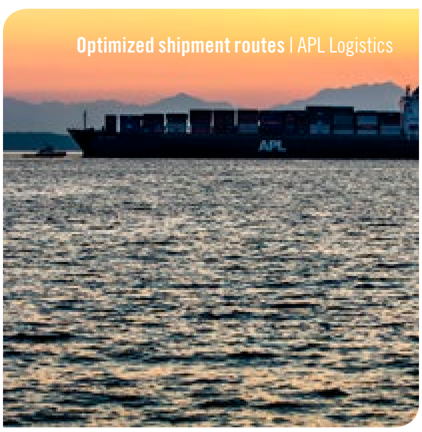
AAA Cooper is actively engaged in several green initiatives, including enhanced and full aerodynamic fairing packages; automated manual transmissions engineered with specific drivetrain modifications designed to improve overall MPG and reduced emissions; and use of wide-base tires, resulting in substantial MPG gains and reduced emissions. The carrier also operates a 100-percent fully skirted pup trailer fleet, with modernized tire pressure and monitoring systems that both increase and decrease tire pressure while operating to optimize for the best MPG and emissions. AAA Cooper's sleeper fleet is equipped with the latest generation of APU systems, and uses the plug-in system to allow operation without any fuel burn when parked.

Alliance Shippers

As an active EPA Smartway Partner, Alliance Shippers continuously looks for ways to provide green supply chain solutions. Since 2009, Alliance has decreased NOx mass emissions tons per year; and decreased PM10 and PM2.5 mass emissions. For the same reporting period, Alliance saw an increase in CO_2 emissions tons per year; however, miles and tons carried payload has increased by 20 percent; therefore, the overall analysis suggests that Alliance has ultimately reduced CO_2 carbon emissions by 27 percent since 2009.

APL Logistics

Using its carbon footprint calculator and green supply chain analysis, APL Logistics' engineers can identify more sustainable practices, including operational savings, for shippers. The 3PL's analysis tools estimate the amount of greenhouse gases produced by using fossil fuels for electricity, heat, transportation, and other purposes at each warehouse. Simulation tools help explore different warehouse configurations to reduce movements and double handling. APL Logistics also optimizes shipment routes and the overall logistics network to help reduce product carbon footprint. It also maximizes modal conversion opportunities to utilize ocean and rail.



Optimized shipment routes | APL Logistics

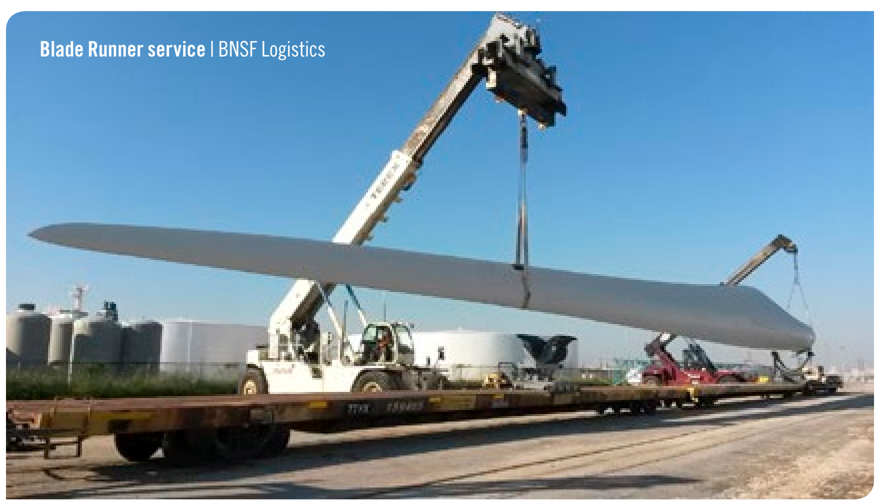
Intermodal options | Averitt

Averitt

Averitt was one of the 52 partners to launch the EPA's SmartWay Program in 2004. With the help of this program, Averitt established a systematic approach to emissions reduction and fuel conservation. The company's environmentally friendly practices include taking many steps to achieve high fuel efficiency; maintaining trucks and equipment using low-viscosity lubricants and engine oils; implementing recycling programs; using energy-efficient fluorescent light bulbs in its facilities; maintaining balance in the distribution network to reduce empty miles; and educating the workforce on how they can increase fuel efficiency, reduce engine idling, and improve processes that impact the environment.

BDP International

BDP International's sustainability program focuses on internal and external initiatives, including an interactive sustainability education program for all employees, along with programs focused on energy conservation, paper reduction, recycling, reuse, and transit. As a member of the Clean Cargo Working Group, the 3PL collaborates with industry peers and business partners, is able to measure its carbon emissions, and can access carrier environmental data. In 2014, 45 percent of office and paper supply purchases were environmentally conscious, and the company recycled electronic waste responsibly.



Blade Runner service | BNSF Logistics

BNSF Logistics

A SmartWay partner since 2005, BNSF Logistics continues to partner with leading retailers to develop and implement recycling programs for plastics, paper, technology, and other naturally replenished resources. The company embraces intermodal as an alternative to highway transportation, which increases energy efficiency and reduces emissions. The 3PL has demonstrated a year-over-year reduction in CO_2 grams/mile output from the use of contracted carriers and mode conversion, leading to a reduction in greenhouse gas emissions.

Cardinal Logistics

As a SmartWay partner, and to ensure it operates as safely for the environment as possible, Cardinal Logistics has made fleet advancements including operating new, lower emissions equipment and reducing fuel consumption. It has governed speed, installed Auxiliary Power Units, and implemented automatic idle shutdown and other modifications to increase MPG. In addition, the 3PL is testing renewable fuels, including adding CNG trucks to its fleet. Cardinal trained its team on proper maintenance and driving habits, and offers incentives for high MPG rates. The company's proprietary technologies help lower fleet emissions by reducing miles and monitoring for efficient performance.

CaseStack

CaseStack's consolidation programs help conserve natural resources by reducing dock congestion, improving warehouse efficiencies, and decreasing the number of trucks on the highway. The resulting supply chain consumes less energy and produces lower amounts of carbon emissions. From energy-efficient warehouse upgrades to a retailer consolidation program, CaseStack's commitment to sustainability and efficiency has been recognized and certified by numerous organizations, including the EPA's SmartWay Transport Partner program since 2010.

Eco-friendly trucks | Cargo Transporters

Cargo Transporters

A Smartway certified carrier, Cargo Transporters has equipped all tractors with renewal source-powered (battery) cab HVACs. Truck and trailer configurations include wide-base tires, tractor and trailer aero skirting, speed limiters at 63 mph, smart cruise, integrated navigation to reduce out-of-route miles, and E-ZPass and PrePass to reduce stops and starts. The carrier converted its operations center and maintenance shops to LED lighting to reduce utility usage, purchased two battery-powered cars for drivers to run local errands with no fossil fuel use, installed four electric vehicle charge stations, and uses solar-powered compacting trash and recycle stations across its facility.

Sustainable trucks
Cat Lift Trucks

Cat Lift Trucks

Cat Lift Trucks focuses on sustainability by offering a Tier 4 Final diesel-engine lift truck that provides benefits such as reducing PM emissions by up to 90 percent, and reducing NOx emissions by up to 50 percent. The truck offers low (or no) maintenance emissions systems, precise control over the combustion process, and higher productivity and lower cost of ownership by way of consistent performance with better fuel efficiency. Additionally, the company offers electric lift trucks that are battery-operated and do not consume fossil fuels or release harmful emissions.

Celadon

Celadon takes an aggressive, proactive approach to supporting a cleaner environment; to point, the trucker is a three-time consecutive winner of the SmartWay Excellence Award for increasing fuel efficiency, while reducing greenhouse gases and air pollution. Celadon maintains a young fleet with an average tractor age of less than two years. It installed auxiliary power units on its trucks to eliminate the engine's need to idle for comfort heating and cooling, installed ambient air temperature sensors on trucks to override the engine's ability to run between the ambient of 12 to 150 degrees F, and equipped trucks and trailers with fuel-efficient duals.

C.H. Robinson

An intense focus on research is C.H. Robinson's approach to supply chain sustainability. In one recent project, for example, the 3PL identified that current models for calculating LTL carbon emissions are inaccurate, as many approaches are based on truckload CO_2 emissions protocols. This research led to two new, more accurate, methods of calculating LTL carbon emissions. The models developed by the research are freely available to every logistics player, and provide a platform for future research. If adopted, these models can help the industry create a more precise account of LTL carbon emissions.

Covenant Transport

A leading advocate on environmental issues, Covenant Transport is committed to the mission of the EPA's SmartWay program, which encourages all carriers to utilize best practices to minimize fuel consumption and emissions into the environment. The carrier has implemented a number of technology enhancements to its fleet, and initiated several innovative policies and procedures that all add up to a cleaner environment and fuel cost savings.

Pallet pooling | CHEP

CHEP

As a pallet and container pooling solutions provider, CHEP has a 50-year history of reducing, reusing, and recycling resources. Using CHEP's equipment pooling solutions has been proven to significantly reduce energy consumption, environmental waste and CO_2 emissions. CHEP's sustainability approach is a commitment to helping pallet users improve overall supply chain efficiency and sustainability through its product and service offerings; working toward Zero Harm – zero environmental damage –by minimizing its environmental footprint; engaging employees and making a positive contribution to the communities CHEP operates in; and driving sustainability in the global supply chains it serves.

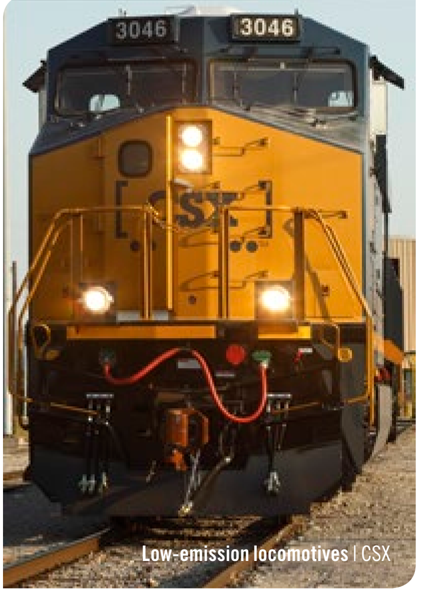
C.R. England

Whether it is operating natural gas fleets through its dedicated division, reducing fuel consumption through its intermodal network, or testing and implementing new technologies, C.R. England stays environmentally responsible. Over the past decade, C.R. England has played a leading role in tractor and trailer aerodynamics, overall weight reduction, and optimizing fuel economy and route selection. Additional improvements made over time to help stay green also include using increased aerodynamics and equipment, and implementing idling and speed reduction strategies. The trucker also has implemented new technologies to increase efficiency and reduce fuel consumption.

Increased aerodynamics | C.R. England


Con-way

With green buildings, stringent truck idling restrictions, speed governors, and active participation in government-sponsored programs such as SmartWay, Con-way demonstrates its environmental stewardship. Each of Con-way's operating companies have implemented and/or delivered sustainable programs and results in energy conservation and procurement, and waste reduction and recycling.



Low-emission locomotives | CSX

CSX

Over the past decade, CSX has updated its fleet to include low-emission locomotives that save approximately 12,600 gallons of diesel fuel each year. Friction modifiers and idle-reducing technologies added to its locomotives have led to increased fuel savings and reduced greenhouse gas emissions. CSX is also using trailing unit shutdown to optimize locomotive horsepower. This technology de-powers non-lead locomotives when not in use, creating significant fuel savings without any effect on velocity or reliability.

DB Schenker

DB Schenker has formulated a strategy that includes reducing CO_2 emissions by 20 percent to achieve Eco Pioneer status by 2020. To accomplish this, the company is improving the capacity utilization of its transportation modes, modernizing equipment and facilities, using a low-emission fleet, and teaching drivers energy-saving driving techniques. DB Schenker is also increasing its recycling rate by implementing in-house recycling programs and a reusable packaging system to put a majority of used materials and resources back into the materials cycle.

Green operations | Deutsche Post DHL Group

Deutsche Post DHL Group

In 2008, Deutsche Post DHL Group established GoGreen, a group-wide environmental protection program that focuses on improving carbon efficiency and establishing green logistics. The company implements green measures across all businesses, including air and road transport operations, buildings, and facilities. Deutsche Post DHL Group's climate protection target is to improve carbon efficiency by 30 percent over the 2007 baseline by 2020.

Fuel-efficient tires | Dupré Logistics

Dupré Logistics

The Dupré Logistics fleet operates on fuel-efficient specifications with a top speed of 62 mph, and utilizes fuel-efficient tires as part of an overall fuel conservation and emissions reduction strategy. The company utilizes Omnitracs and Green Road technologies to monitor safety and fuel economy supporting continuous improvement. Additionally, Dupré's participation in the Trucking Alliance, American Trucking Associations, and National Tank Truck Carriers provides the opportunity to be part of the policy and procedure conversations nationally. In 2015, the EPA gave Dupré a SmartWay Excellence Award for ranking in the best performance range for freight carbon efficiency.

DSC Logistics

Since 2011, DSC Logistics has been tracking sustainability on five metrics: electricity, natural gas, water, propane, and recycling across more than 40 locations. The 3PL's facilities maintain recycling, water and energy usage programs, and efficient lighting. The company's goals include waste stream reductions, LEAN initiatives focused on reducing process steps and waste in the supply chain, and strategic supply chain modeling to reduce its facilities' footprints.

Efficient Container | FedEx

FedEx

In 2014, FedEx saved 34.4 million gallons of jet fuel, bringing its total reduction in CO_2 emissions to 21.4 percent from 2005 levels, through its Fuel Sense program and modernizing its aircraft fleet. Since 2007, the Fuel Sense program's 45 projects have saved 334.2 million gallons of fuel. FedEx is actively engaged with partners to develop viable sustainable alternatives to petroleum-based jet fuel to help meet its goal of obtaining 30 percent of its jet fuel from alternative fuels by 2030.

Florida East Coast Railway

Florida East Coast Railway (FECR) offers an environmentally friendly alternative to moving goods by truck, thanks to rail's unique ability to fight highway gridlock, lower fuel consumption, reduce greenhouse gas emissions, and reduce pollution. For example, a single freight train can take the load of 280 or more trucks — equivalent to 1,100 cars — off overcrowded highways. Moving freight by rail also reduces the pressure to build costly new roads, and helps cut the cost of maintaining existing roads. In addition, FECR serves PortMiami, which has made a commitment to sustainable growth, recognizing its location and relationship to South Florida's unique ecosystems.

Mode conversion | Florida East Coast Railway

Freightliner

Freightliner is on a mission to drastically reduce fuel consumption and exhaust emissions. As part of Daimler AG's Shaping Future Transportation initiative, which strives to dramatically reduce fuel consumption and exhaust emissions in commercial vehicles of all classes, Freightliner offers one of the only conventional natural gas truck solutions in the industry. Available with liquefied natural gas or compressed natural gas fuel tanks, the company's natural gas trucks and tractors are designed for high performance in a broad range of applications.

GENCO

GENCO's Lean culture aims to maximize efficiency by eliminating waste. Reverse logistics is a critical component of the company's Product Lifecycle Logistics strategy, and GENCO's recycling services help maximize recovery value on every product, part, and material in the end-of-life product stream. The company can reclaim and extract value from 95 percent of products that previously ended up in the landfill. GENCO also uses value stream mapping to show the optimal process for a distribution operation, and identify how to reduce emissions.

GEODIS

GEODIS helps shippers meet their requirements for creating CO_2 transparency in the supply chain through an emissions reporting program that provides effective trade lane-related emission data. If shippers need more in-depth solutions, the company models the shipper-specific trade lane and offers potential opportunities for improvement and savings – both in costs and in emissions. In 2008, GEODIS established its Blue Attitude sustainability program to educate its staff on sustainable development, and promote sustainable development initiatives to shipper customers.

Georgia Ports Authority

The Georgia Ports Authority saves 6.8 million gallons of fuel annually through technology and engine conversion. At every stage, the port keeps cargo moving using the least possible energy in the process. The port converted all 27 of its ship-to-shore cranes from diesel to electric power to save 1.9 million gallons of fuel annually. By including fuel additives, the port's diesel fleet reduced total fuel consumption by five percent, and will continue to explore the use of alternative fuel to replace diesel-powered jockey trucks.


Energy-efficient operations | Georgia Ports Authority

Hub Group

Hub Group's initiative is to convert 75 percent of its 550 tractors to day cabs to save on idle time. In addition, some of the company's terminals use biodiesel to reduce its carbon footprint. An additional environmental initiative is an intermodal conversion to help reduce emissions and fuel consumption. Hub Group built its new corporate headquarters with re-purposed materials from the demolition of the previous building, and it is a LEED Gold certified facility.

J.B. Hunt

J.B. Hunt's Cool Transport service, a carbon-neutral transportation offering created with BlueSource LLC, combines offsetting verified emission reduction credits with existing J.B. Hunt transportation offerings to create carbon-neutral transport solutions. The company also uses simulators to train drivers to drive in the most fuel-efficient manner, and optimizes mileage to reduce total miles run by calculating the most safe, direct path from origin to destination and monitoring compliance with the best route.

LEED-certified facility | Inmar

Inmar

Inmar's reverse logistics solutions help shippers meet their sustainability goals. The company's pharmaceutical returns program reduces the carbon footprint for all trading partners by eliminating redundant touchpoints, and reducing unnecessary transportation of returned product. Inmar consolidates destruction, reduces re-packaging requirements, and facilitates recovery and recycling of product packaging. The returns program has saved more than 100 tons of CO_2 equivalent, and more than 107,000 cardboard boxes annually.

Intermodal efficiencies | J.B. Hunt

Kenco Logistic Services

Kenco's sustainability dashboards track electricity, natural gas, and water usage, and measure the output of landfill waste and recyclable materials. Kenco monitors the data to set goals toward lowering costs, reducing energy use, and producing less waste in customer warehouses. Since 2013, Kenco has upgraded lighting at eight facilities for an annual savings of more than $250,000. The lighting systems saved more than 1.5 million kilowatt hours annually, and are anticipated to reduce greenhouse gas emissions by more than 1,000 tons annually.

Landoll

A number of Landoll products support green warehouse and manufacturing operations. The company provides a series of lift trucks powered by lower-emissions fueling alternatives such as liquefied petroleum gas (LPG). Landoll's Bendi Electric Narrow Aisle line of lift trucks helps companies that can't afford to sacrifice lifting power to still save fuel and reduce carbon footprint.

LEGACY Supply Chain Services

LEGACY is committed to improving its facility and office operations to support green practices and integrate an environmentally friendly business model that inspires other companies to do the same. The company believes every green practice, whether large or small, creates an impact on the environment. The company implements green practices into its maintenance facilities through the recycling of fluids, batteries, and tires. LEGACY installs energy-efficient lighting in its facilities, and supports paperless transactions to cut down on materials.

Energy-efficient lighting | LEGACY

Lynden

Lynden's environmental policy calls for meeting or exceeding environmental regulations, maximizing fuel efficiency, and monitoring and guarding against accidents, emissions, and avoidable pollution. Lynden uses fuel as efficiently as possible by continually refining its processes and equipment. To maximize fuel efficiency, the company looks at everything from modern equipment to driver behavior and idle time, and from route planning to aerodynamics and payloads.

Maersk Line

Maersk Line has reduced harmful emissions by 40 percent, an average of 10 percent ahead of the rest of the industry, according to global benchmarks. Maersk's new target is to reduce CO_2 emissions per container moved by 60 percent by 2020, when compared with 2007 levels. That's the equivalent of 220 million tons, or the annual emissions created by all the passenger cars in France.

Lufthansa Cargo

Lufthansa Cargo set a goal to reduce CO_2 emissions by 25 percent by 2020. In addition, the cargo airline has invested in the more fuel-efficient Boeing 777F aircraft for its operations, with four currently in operation. Lufthansa also replaced heavy, large-volume materials used in cargo transport containers with lighter composite materials to reduce weight and save fuel. The airline has been operating with ISO 14001 environmental management certification since 2008.

Fuel-efficient aircraft | Lufthansa

Marten Transport

Marten Transport improved its overall miles-per-gallon by 1.3 percent in 2014, and 8.6 percent over the past five years. Marten's fleet has adopted APUs to save fuel, and excess idle engine usage has been reduced by nearly 45 percent from 2011 to 2014. In addition, the decrease in engine hours extended oil drain intervals by 50 percent. The company has also begun to focus on intermodal. In 2014, Marten moved nearly 30,000 truckloads by intermodal, reducing carbon emissions by 56 percent compared with using trucks alone.

MPG improvements | Marten Transport

Maryland Port Administration

The Maryland Port Administration (MPA) consistently shows its commitment to sustainability. A stormwater vault at the Seagirt Marine Terminal helps keep Chesapeake Bay clean by treating stormwater before releasing it back into the environment. The Port of Baltimore's dray truck replacement program, required use of ultra-low sulfur biodiesel, and commitment to hybrid and flex-fuel vehicles support the port's initiatives for cleaner air. MPA's installation of floating wetlands near the Baltimore World Trade Center have provided homes for aquatic life.

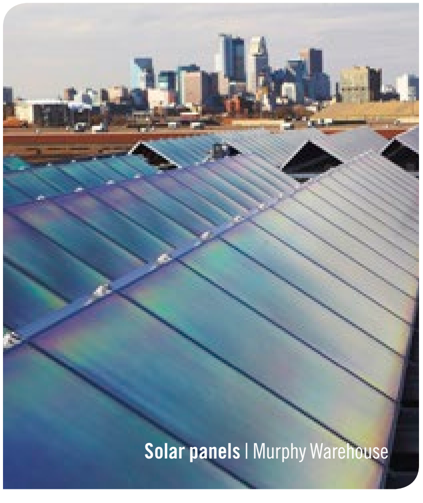

Zero solid waste program | Matson

Matson Navigation Company

Matson Navigation Company implemented its zero discharge policy in 1994, and is the only carrier to have a fleet-wide zero discharge program. Other initiatives include employee recycling and carpool programs, retrofitting equipment, and using low sulfur fuels to minimize harmful air emissions; use of electronic documents rather than paper; and cold ironing in ports where possible to reduce fuel usage and engine idling. The company's list of awards includes two William M. Benkert Awards for Environmental Excellence from the U.S. Coast Guard, Port of Seattle Green Gateway Partner, San Pedro Bay Clean Air Action Plan Air Quality Excellence Award, Port of Long Beach Green Flag Program Top Carrier, Guam EPA Environmental Stewardship Award, and recognition from the National Academies and Ocean Conservancy.

Murphy Warehouse Co.

Murphy has certified four warehouses with LEED and Energy Star ratings, and five warehouses by ISO 14001 standards. The company also ranks as one of the top solar producers in Minnesota. At its corporate headquarters, 100 percent of stormwater is retained on site, and the company is approaching near zero-waste operation throughout all campuses. Additionally, Murphy's greenhouse gas emissions are only 37.5 percent compared to facilities of similar size and type. Murphy is also part of the International Warehouse and Logistics Association's Sustainability Council.


Solar panels | Murphy Warehouse

Natural gas truck | NFI

NFI

A three-time recipient of the SmartWay Excellence Award, NFI ranks in the top 20 percent of SmartWay partners for overall environmental performance. NFI operates natural gas fleets in California, Texas, Pennsylvania, and Florida, and the company's fleet-wide MPG has risen three to five percent annually over the past six years. NFI's trucks use aerodynamic equipment such as AirTabs and trailer skirts, and are outfitted with speed limiters, battery auxiliary power units, and wide-based tires to reduce fuel usage. The company's headquarters operates on solar power, eliminating more than 14 million pounds of CO_2. More than 360 tons of plastic and 11,000 tons of cardboard go through NFI's recycling program each year.

Infrastructure project | Norfolk Southern

Norfolk Southern

Through a $5.6-million partnership with GreenTrees, Norfolk Southern's (NS) Trees and Trains Initiative is helping to restore six million native cottonwood and hardwood trees in the Mississippi Delta region. Over a 15-year cycle, the planted trees will generate 1.1 million tons of carbon credits, which can help companies offset their carbon footprint. A similar effort with The Nature Conservancy supports longleaf pine reforestation in Virginia. In addition, NS is on target to reduce greenhouse gas emissions by 10 percent per revenue ton mile of freight. The company also saved an estimated 10 million gallons of diesel fuel, and avoided more than 120 tons of GHG emissions by using LEADER train-handling technology.

Old Dominion Freight Line

An active participant in the SmartWay program, Old Dominion is continuously testing and adopting technologies – wide-based tires, highway speed reduction, idle reduction, automatic tire inflation, improved freight logistics, improved aerodynamics, and longer combination vehicles – to reduce emissions and improve fuel efficiency. Additionally, Old Dominion has implemented driver training that reduces fuel consumption and harmful emissions.

Improved aerodynamics | Old Dominion

ORBIS

ORBIS manufactures plastic packaging that can be repeatedly used during the course of its service life. It can then be reprocessed without entering the solid waste stream. In addition, ORBIS provides services that help find opportunities for sustainability improvements, and life-cycle assessments to compare reusable and single-use packaging. ORBIS also tracks and measures its own resource utilization to continuously conserve natural resources and reduce waste. The company shows its commitment to the environment as a member of the Reusable Packaging Association, the U.S. Composting Council, Canadian Compost Council, and the National Waste and Recycling Association.

Recyclable pallet | PECO Pallet

PECO Pallet

PECO Pallet has demonstrated a genuine commitment to environmental sustainability. The company was founded on the basic principle of reusing pallets to conserve resources. PECO's wood block pallets are built from responsibly forested timber, and are continually repaired, reused, and recycled. No harmful chemicals or hazardous materials are used on PECO pallets, and all materials are eventually reused or recycled — nothing goes to the landfill. By efficiently managing a controlled pallet pool, PECO pallets are turned an average of four times per year. Strict maintenance standards extend pallet life to more than 10 years.

CNG tractor | Penske

Penske

Penske advises shippers on dedicated contract carriage opportunities using alternative-fuel trucks, such as CNG tractors. Beyond alternative fuels, Penske also helps evaluate and implement the latest vehicle technologies for its customers and its own fleet, including 6x2 axles, adaptive cruise, and advanced aerodynamics. The company supports renewable energy generation and solid waste reduction, conducts an annual GHG emission inventory, and discloses GHG emissions to the Carbon Disclosure Project. Penske's transportation management service also promotes supply chain efficiency, and more than 85 percent of carriers used by the service are EPA SmartWay program partners.

PITT OHIO

In 2014, PITT OHIO improved MPG by 0.6 percent, equivalent to 83,000 gallons of diesel. The company added eight CNG tractors to its fleet, and opened a LEED-certified terminal in Harmar, Pa. PITT also upgraded facilities, including a LEED-certified vehicle maintenance shop. Total carbon emissions output per shipment dropped 1.4 percent, marking the third consecutive year of improvement.

Green ship incentives
Port of Long Beach

Port of Long Beach

The Port of Long Beach (POLB) adopted the Clean Air Action Plan in 2006 to reduce emissions. The port also committed to reducing diesel particulate emissions by 77 percent, NOx by 50 percent, and SOx by 93 percent before 2023. The port's Clean Trucks Program successfully reduced truck-related air pollution by more than 90 percent. POLB also requires ships in berth at its container terminals to run off shore power and shut down auxiliary engines. Additionally, the port offers incentives to green ship operators and service providers through its Green Ship Incentive Program and Clean Air Action Plan Awards.

Performance Team

Performance Team (PT) is a member of the Coalition for Responsible Transportation and has been an EPA Smartway Partner since 2008. Since 2010, PT transloaded more than 250,000 containers, resulting in a 30-percent carbon footprint reduction. The company upgraded 70 percent of its fleet to SmartWay-approved tires, and is committed to 100 percent by 2017. Other efforts include clean diesel drayage and dedicated fleets, trailer skirts and under trays, comprehensive recycling program for all facility common areas, recycling pickup for store delivery and dedicated fleet clients, green cleaning products at PT facilities, and using recycled materials as void fill to reduce waste.

Port of Los Angeles

Through the Clean Truck Program and its progressive ban on older trucks, emissions at the Port of Los Angeles are down more than 80 percent. The port's Voluntary Environmental Ship Index Program rewards vessel operators for reducing diesel particulate matter and NOx emissions from their ocean-going vessels. Other emissions-reducing technologies in use at the port include electric ship-to-shore cranes, electric rubber tire gantry cranes, and electric yard tractors. The port also maintains and protects 15 acres on its Pier 400 container terminal for the nesting of the California Least Tern, an endangered indigenous bird species, while numerous wetland habitat projects in and around the Port of Los Angeles protect other endangered species.

Protecting wildlife
Port of Los Angeles

Port of Seattle

The Port of Seattle calls itself "The Green Gateway" because of the low carbon footprint it offers to shippers bringing cargo to U.S. markets from Asia. The port implemented a Clean Truck Program, requiring all drayage trucks entering the port to meet 2007 federal emissions standards by 2018. Other clean air initiatives include plans to reduce carbon emissions from all port operations by 50 percent from 2005 levels, and reduce air pollutant emissions by 50 percent from 2005 levels. The Port of Seattle has undertaken many projects, including creating 177 acres of wetland, including 350,000 new trees and shrubs; enhancing two miles of stream habitat; and restoring more than 30 acres of intertidal and saltwater habitat.

Log yard stormwater treatment system | Port of Tacoma

Port of Tacoma

Among its sustainability efforts, the Port of Tacoma cleaned up legacy contamination areas to return more than 420 acres of property to productive use; restored more than 100 acres of high-quality habitat, with another 40 acres under construction; pioneered low-impact industrial stormwater treatment systems in terminals and log and rail yards that have dramatically reduced pollutants; retrofitted a marine cargo terminal to allow ships to plug into electric shore power to reduce diesel and greenhouse gas emissions; and developed a Clean Truck Program to meet the stringent goals of the Northwest Ports Clean Air Strategy, in partnership with the ports of Seattle and Metro Vancouver, to reduce port-related emissions.

Rooftop solar initiative
Prologis

Prologis

Prologis implements sustainable design and construction standards in new developments, and seeks certification with internationally recognized sustainable building standards, including LEED, BREEAM, CASBEE, HQE, and DGNB. In 2014, 20 Prologis development projects, totaling 8.5 million square feet across nine countries, received sustainable building certifications, bringing total certified projects to 52 million square feet globally since 2006. Approximately 68 percent of the company's operating portfolio has been upgraded with energy-efficient lighting, up from 62 percent in 2013. Prologis' rooftop solar initiative has developed more than 110 megawatts of renewable energy in six countries since 2007.

Propak

Since 1999, Propak has been conserving fuel and reducing emissions by limiting the maximum speed of its trucks. Since 2010, all trucks include automatic engine shut-off technology to reduce idling, improving fuel consumption and limiting emissions. After it joined the SmartWay program, Propak lowered CO_2 emissions by 15 percent, NOx by 17 percent, and particulate emissions by 59 percent. The company implemented technology that improved MPG by 18 percent, and reduced empty miles by nine percent. To further build on green initiatives, Propak converted lighting at its operations facilities, reducing KW usage by 35 percent; implemented electric lifts that reduced CO_2 by 20 percent; and recycled 95 percent of operational wood waste.

The Raymond Corporation

Raymond uses an Eco-Performance approach in the design of its forklift solutions so that they provide maximum economic and ecological benefits, helping warehouses and DCs operate more sustainably. According to United States Auto Club testing, the Raymond Swing-Reach forklift uses up to 40 percent less energy; the Raymond Reach-Fork forklift uses up to 21 percent less energy; and the Raymond Model 4250 stand-up counterbalanced forklift uses up to 17 percent less energy than other models. Raymond forklifts offer features such as less battery charging, which increases uptime and reduces CO_2 emissions.

Ruan

Ruan boasts a compressed natural gas fleet of 100 tractors, and the company's trucks feature auxiliary power units, lighter weights, and aerodynamic equipment. Ruan collaborates with engine manufacturers to develop engines that emit lower amounts of harmful emissions. On-board recorders monitor MPG, over-RPM, long idles, hard-braking, and speeding to improve fuel efficiency. Since 2007, Ruan has reduced paper consumption by 99 percent. The company has also won three consecutive SmartWay Excellence Awards.

Ryder

Ryder helps companies green their fleets and supply chains by focusing on carbon reduction in network design and transportation. For example, the 3PL has been helping to convert Bacardi's U.S. domestic shipments from truckload to intermodal. In 2009, 65 percent of Bacardi's shipments out of Florida were moved via truckload and 35 percent intermodal. Five years later, the spirits company has reversed that ratio in favor of intermodal. More telling, since 2006, Bacardi has reduced non-renewable energy use and greenhouse gas emissions from production by nearly 28 percent – well on its way toward achieving a 50-percent reduction by 2017.

Saia LTL Freight

Saia LTL Freight enforces a no-idling policy, trailer skirt installation, and aggressive equipment maintenance on its trucks. The trucking company has made a concerted effort to train drivers on more fuel-efficient behavior. For example, more than 75 percent of Saia drivers make 85 percent of shifts in the optimal range. Four years into its progressive shifting program, Saia's fleet increased to 6.3 MPG, which reduces the amount of diesel fuel consumed by approximately 775,000 gallons.

Gen5 CNG truck | Saddle Creek

Saddle Creek Logistics Services

Saddle Creek's CNG fleet helps shippers in the Southeast and Southwest make deliveries while reducing their environmental footprint. To date, the fleet has logged more than 35 million miles on CNG and reduced its carbon footprint by 38 million pounds – equivalent to planting 800,000 trees. By using CNG trucks instead of diesel fuel, Saddle Creek has replaced more than four million gallons of diesel with natural gas. The company is completing a $1.5-million upgrade to its fueling facility to accommodate a complete fleet conversion to CNG in the next few years.

DEF and diesel use | Schneider

Schneider

Schneider's sustainability and green logistics initiatives include a commitment to purchasing new tractors annually with EPA-certified, near-zero emissions engines and aerodynamic trailers with low-rolling resistance tires; driver training, incentives, and route optimization; and a voluntary 60-mph speed limit for every truck in its fleet.

South Carolina Ports Authority

South Carolina Ports Authority has been proactive in protecting the local environment and reducing the impact of port activities. Among its efforts, it electrified ship-to-shore cranes, and plans to electrify the rubber-tired gantry cranes at the new Inland Port to protect air quality. The port is also installing an electrified agricultural commodities transload facility to replace existing diesel operations, completely eliminating all emissions from the activity. The port has protected nearly 1,000 acres of land, providing fish and wildlife, water quality, and open space benefits. It also operates a Clean Truck Program, which requires all drayage trucks to certify that they are newer than 1994 in order to protect air quality.

Green port activities | South Carolina Ports Authority

Toyota Materials Handling U.S.A. Inc.

All Toyota internal combustion and sit-down electric forklifts sold in North America are produced at the Toyota Industrial Equipment Mfg. Inc. (TIEM) manufacturing facility in Columbus, Ind., a zero-landfill plant. During the manufacturing process, Toyota analyzes and minimizes the environmental impact of every product at every stage of the production cycle – from design and development to raw material and parts procurement to manufacturing and product disposal. TIEM successfully implemented and managed the Environmental Management System to achieve a 33-percent reduction in VOC emissions, an 80-percent reduction in HAP emissions, a 40-percent reduction in energy consumption, and a 65-percent reduction in natural gas consumption.

Eco-friendly lift truck
Toyota Materials Handling U.S.A.

TransGroup Worldwide Logistics

TransGroup is committed to improving supply chain sustainability by partnering with customers, the EPA's SmartWay program, and its carrier base to reduce the environmental impacts of their collective freight transportation and logistics operations. Specifically, the 3PL's TransNeutral eco-responsible transport logistics solutions help reduce fossil fuel consumption and greenhouse gas emissions; save money and conserve energy; close product lifecycle loops; maximize value of unused or end-of-lease/life assets; and support corporate sustainability initiatives.

Transplace

As a non-asset-based 3PL provider, Transplace's primary means to reduce emissions is determined by the transportation service providers and modes it chooses. The 3PL utilizes proprietary technology that allows it to search for SmartWay carriers as a special criterion. In addition, Transplace is continually looking at opportunities to convert truckload freight to rail/intermodal.

Transportation Insight

Transportation Insight (TI) provides a bundled enterprise logistics solution that integrates carrier sourcing, transportation management, business intelligence, and freight bill payment and audit. This helps companies reduce costs and streamline processes from end to end. TI's lean continuous improvement methodology blends traditional process improvement principles with logistics expertise and state-of-the-art technology to help shippers eliminate waste. On the technology side, users can tap TI's TMS to optimize transportation by energy costs, mileage, and fuel usage.

Union Pacific

The railroad's 2014 *Sustainability and Citizenship Report* documents the company's approach to operating safely, strengthening communities, engaging employees, and preserving the environment. Highlights include helping shippers eliminate an estimated 35.8 million metric tons of greenhouse gases by choosing rail over truck transportation; and completing 45 utility conservation projects, saving the energy equivalent of that consumed by more than 260 U.S. homes annually. Union Pacific's corporate goal is to reduce its locomotive fuel consumption rate by one percent each year from 2015 to 2017. Measured on a gross ton mile basis, this will result in a greenhouse gas emissions reduction of one percent annually.

LNG tractor | UPS

UPS

Since 2000, UPS has driven 350 million miles in its alternative fuel and advanced technology vehicles. The company's continued investment in these assets has it on pace to achieve a goal of one billion "green" miles by the end of 2017. UPS was recognized in 2014 for its global leadership in sustainability. It received a top ranking on the Carbon Disclosure Project's Leadership Index of S&P 500 companies for the fourth year in a row. With a score of 100 out of 100, UPS ranked among the top 10 percent of companies measured, and one of only 14 to receive a perfect score.

U.S. Xpress

By focusing on conservation and research, U.S. Xpress has helped to develop green initiatives that offer a payback in savings to both the bottom line and the environment. For example, implementing wide-based tires – when placed on the tractor and trailer in a 10-wheel setup – can improve fuel efficiency by as much as 10 percent. Through its routing software and on-board, touch-screen communications system, U.S. Xpress has been able to tighten its network and reduce out-of-route and empty miles by 30 percent compared to 2013.

Reducing empty miles | U.S. Xpress

Weber Logistics

Weber extends its commitment to green logistics to its suppliers. Scope 3 emissions are caused by vendors who supply goods and services to a company. To reduce Scope 3 emissions, all Weber vendors must be able to pass a test to ensure they are contributing to logistics sustainability goals. Weber was an early member of the EPA SmartWay Emissions Reduction program, and its fleet maintains the highest EPA rating available. To cut empty miles, the company continuously optimizes last-mile logistics and uses partner carriers in some areas to reduce travel.

Sustainable fleet | Werner

Werner Enterprises

Improving MPG and reducing emissions through advanced sustainability initiatives and capital investments are high on Werner's priority list. Since 2007, the carrier has conserved more than 120 million gallons of fuel and reduced its carbon footprint by more than 1.3 million tons, based solely on MPG improvements. A winner of the 2013 SmartWay Excellence Award, Werner was the only company to receive a 2014 SmartWay Excellence Award in two categories – Refrigerated and TL/Dry Van. Werner utilizes industry-leading sustainability technologies such as diesel-fired heating systems to reduce truck idle time; aerodynamic trucks; trailer skirts; tire inflation systems; and the latest diesel technology. Werner also maintains a small fleet of compressed natural gas trucks.

Energy-efficient lift truck | Yale

Yale

Yale provides equipment that optimizes the flow of goods while improving air quality, reducing energy consumption, eliminating waste, increasing recycling, and improving safety. The company has taken a number of steps to reduce its energy consumption, such as using LED task and overhead lighting with sensors to activate lighting only when required; implementing programs to recycle wood, cardboard, plastic, office paper, metals, and electronics; recycling lift truck batteries, tires, and oil; using storm water retention ponds to control run-off; utilizing pollution-filtering plants; and operating a modified work week structure at manufacturing facilities to reduce the impact of employee commuting.

Fuel-efficient truck | YRC Freight

YRC Freight

Since 2011, YRC has been recognizing employees whose work demonstrates a commitment to improving environmental performance. In 2014, winners included projects that led a comprehensive waste reduction program at a YRC Freight facility, which significantly reduced the facility's carbon footprint; installed environmentally efficient LED lighting at three Reddaway facilities, leading to a 20-percent reduction in energy usage; and upgraded lighting at a YRC Freight facility that led to the company's selection to participate in the Tennessee Valley Authority EnergyRight Solutions for Business program.

THE TOP UNIVERSITIES FOR SUPPLY CHAIN TECHNOLOGY EDUCATION

Worried about the talent gap? You can't go wrong staffing your supply chain team with recent graduates from these highly ranked university programs.

Supply chain management (SCM) is a relatively new field of academic study. Only in the past few decades have universities begun to offer SCM majors and concentrations, merging aspects of business, information technology, and logistics into one pedagogical framework.

Information technology (IT) plays a critical role in the complex web of supply chains that define the global economy. As a result, it has never been more important for new professionals in the supply chain field to have experience with the digital tools that are essentially the backbone of major supply chain operations.

To give prospective students – and their employers – greater insight into the curriculums of some top SCM programs in the United States, Software Advice, a Gartner information technology research and advisory company, analyzed the strength, depth, and variety of software- and IT-related courses in those programs.

To determine which universities to examine, Software Advice aggregated the most recent rankings for SCM programs from a variety of sources. It then determined the top programs in the nation based on their presence and placement in those rankings, providing a total of 15 undergraduate programs and 15 graduate programs in its aggregate "reputation ranking." From there, the company examined the SCM curriculums and course syllabi for all the universities in its reputation ranking. It primarily measured how many software- and technology-centric courses are required as part of the curriculum, and how many are offered as elective courses.

Software Advice then rated these courses based on the amount of hands-on instruction students receive, and the depth of the material presented on a scale of one to three. It also awarded points to universities that offer certain courses as part of their SCM curricula. After factoring in all these variables, Software Advice scored universities on a scale of zero to 36, and used these scores to create the list of top technology-focused universities (*see the list on page 66*).

To gain more insight into the survey and what its findings mean to both logistics job seekers and hirers, *Inbound Logistics* spoke to Forrest Burnson, market research associate for Software Advice:

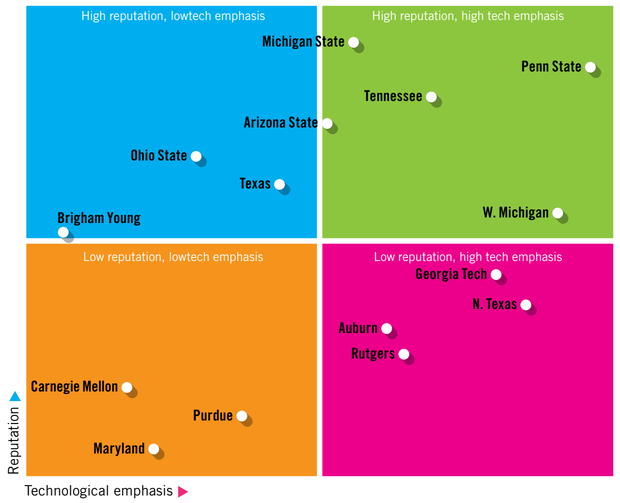
IL: How did you determine what schools to look at? And what methodology did you use to rank them?

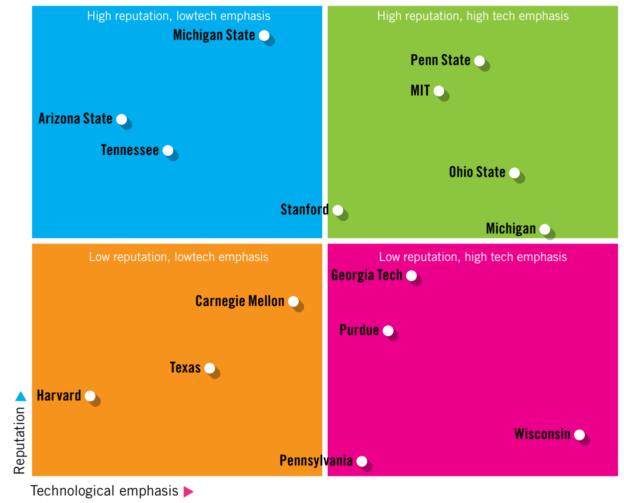
BURNSON: We compiled our sample by aggregating the top supply chain management programs from several other rankings, including Gartner's and *U.S. News and World Report*. We then ranked the schools based on factors such as the number of required software and technology-centric courses they offer in their programs, what percent of the entire curriculum those required courses constitute, and what electives are available. We rated each course on a simple scale based on the depth of its material, and the amount of hands-on instruction students receive.

IL: Why is information technology critical for new supply chain management professionals?

BURNSON: Supply chain professionals are vital assets to whatever company employs them. They not only make large enterprises work, but also make them more competitive. They're confronted by an insane volume of business data every day, and they need to be able to make sense of it in order for that enterprise to execute on its vision. You can't make sense of that data if you don't know how to use the right tools to process it. So, it's essential for new supply chain professionals to have a firm grasp of information technology when they enter the field. It's only going to become more important.

(continues on page 66)





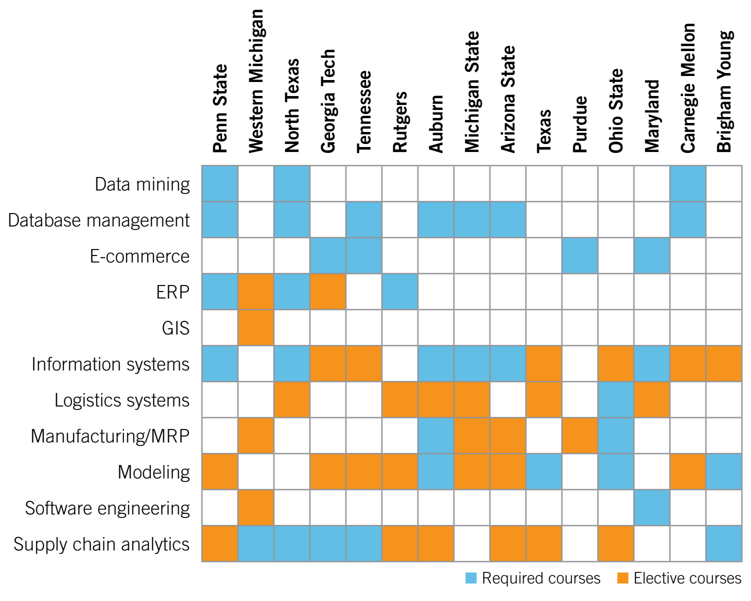
Undergraduate: Reputation vs. Technological Emphasis

To better understand how the reputations of undergraduate programs compare with their technological emphasis, Software Advice compiled both rankings into this quadrant graph. The upper right quadrant represents the leaders in SCM technology education. Penn State ranks at the top, primarily due to the strength of its elective offerings, which provide hands-on, in-depth coverage of SCM technology and include courses from both the SCM and Management of Information Systems departments. These course offerings are bundled together in the university's supply chain and information systems major, which significantly emphasizes the role of IT in supply chain management. In addition to standard, software-heavy SCM course fare, such as demand planning, and fulfillment and supply chain analytics, Penn State offers a host of courses in the MIS department.

Graduate: Reputation vs. Technological Emphasis

The University of Wisconsin is hot. On top of offering SCM students a number of electives in information systems, logistics systems, and analytics, Wisconsin also requires students to take an ERP course. Software Advice admits that the graduate programs in its sample are more difficult to compare than the undergraduate programs. While certain universities offer some sort of master's degree in SCM, others offer MBA degrees with a designated SCM concentration or a high number of SCM-related course offerings. Still other MBA programs don't offer either of these, but simply have a reputation for producing high-quality professionals.

As such, while Harvard is one of the world's most prestigious universities, its reputation ranking is low because of its slim offerings and lack of a concentration or track in SCM as part of its MBA program.



SCM Technology Courses

ERP emphasis is more prevalent at the undergraduate than graduate level. Four undergraduate programs on the list offer a class devoted to learning an ERP platform, compared to just one graduate program.

One caveat is that many universities have partnerships with ERP vendors, such as SAP and Oracle, and offer certificate programs for those platforms. They might also offer courses outside of the business school or SCM program, which may or may not be available to SCM students.

Although many graduate and undergraduate SCM programs don't offer courses devoted strictly to ERP, they still offer a variety of software- and technology-centric courses. Modeling, analytics, information systems and logistics systems are prevalent, and all are essential for SCM processes.

SOURCE: Software Advice

Top 15 Universities for Supply Chain Technology Education

RANK	UNDERGRADUATE	GRADUATE
1	Pennsylvania State University	University of Wisconsin
2	Western Michigan University	University of Michigan–Ann Arbor
3	University of North Texas	Ohio State University
4	Georgia Institute of Technology	Pennsylvania State University
5	University of Tennessee	Massachusetts Institute of Technology
6	Rutgers University	Georgia Institute of Technology
7	Auburn University	Purdue University
8	Michigan State University	University of Pennsylvania
9	Arizona State University	Stanford University
10	University of Texas at Austin	Carnegie Mellon University
11	Purdue University	Michigan State University
12	Ohio State University	University of Texas at Austin
13	University of Maryland–College Park	University of Tennessee
14	Carnegie Mellon University	Arizona State University
15	Brigham Young University	Harvard University

Note: A university's position on Software Advice's reputation ranking did not determine its position in the final list; this ranking was used merely as the basis for deciding which universities to include in the sample. The final list is based solely on the aspect of software and technology education, and is not indicative of the overall quality of these programs.

(continued from page 63)

IL: Why is there more emphasis on ERP in undergraduate courses compared to graduate courses?

BURNSON: Good question; I'm not entirely sure. But, if I had to guess, it might not get as much emphasis at the graduate level because there is an assumption that graduate students have some working background in supply chain management and logistics, so they might already have been exposed to ERP in a business environment. The graduate programs we looked at tended to be more rigid and structured, as they are generally two-year programs so they have a lot of ground to cover in a shorter period of time.

IL: What helped Penn State (undergraduate) and University of Wisconsin (graduate) rise to the top of the list?

BURNSON: Both programs offer a wide variety of software- and technology-centric courses in their SCM programs. Penn State's program is particularly special due to its 'cross-pollination' with the information systems management department—it's an interesting hybrid program in many respects. Similarly, Wisconsin clinched the top spot because of the strength of its elective offerings; graduate students there have a lot of choices. Wisconsin is also one of the few graduate programs to require a full ERP course.

IL: Why do some top SCM schools fall lower on your list?

BURNSON: The schools that didn't perform as well tended to offer fewer software- and technology-centric courses, and those they did offer tended to be more lecture-based. To be clear, this isn't to say they're not good programs—we're just looking at one measure and evaluating the universities based on that alone. All the universities we examined have well-regarded supply chain programs or a reputation for producing high-quality supply chain professionals.

IL: We've seen a lot of crossover between traditional business management (MBAs for example) and engineering programs and supply chain/logistics. Has a similar convergence happened between computer science programs, information systems, programming and supply chain?

BURNSON: Yes, a few programs in our ranking do just that. Penn State and Western Michigan University are probably the best examples of SCM programs that intersect with functions such as information systems and software engineering. I think we will see more of that convergence in the future. SCM, after all, is a relatively new field of academic study; it's constantly evolving. So many universities will begin looking more closely at what Penn State, Western Michigan University, Wisconsin, and other schools are doing and will adapt their curricula accordingly.

Read the full study at: www.softwareadvice.com/scm/industryview/top-universities-report-2015

Top Universities: 5 Key Findings

To learn more about what supply chain management courses teach students, and how they compare to one another, Software Advice ranked the top 15 universities at the undergraduate and graduate level, based on the extent to which they emphasize the teaching of SCM technology, software, and quantitative tools used by supply chain professionals, as well as the variety and depth of this coursework. Among the findings:

1. Pennsylvania State University ranks first for supply chain technology education at the undergraduate level, followed by Western Michigan University.
2. University of Wisconsin ranks first for supply chain technology education at the graduate level, followed by the University of Michigan.
3. Michigan State, described as the top school for SCM on other lists, ranks eighth and 11th on the list for undergraduate and graduate technology education, respectively.
4. Four of the 15 undergraduate SCM programs analyzed offer a class devoted to learning an enterprise resource planning (ERP) software platform.
5. Just one of the 15 graduate SCM programs analyzed offers a class devoted to learning a commercial ERP platform.

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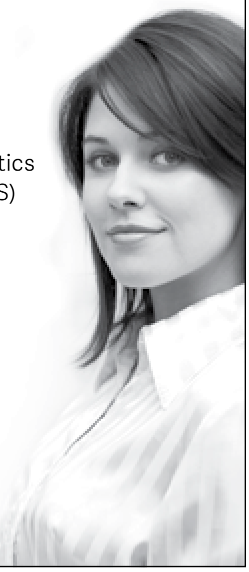

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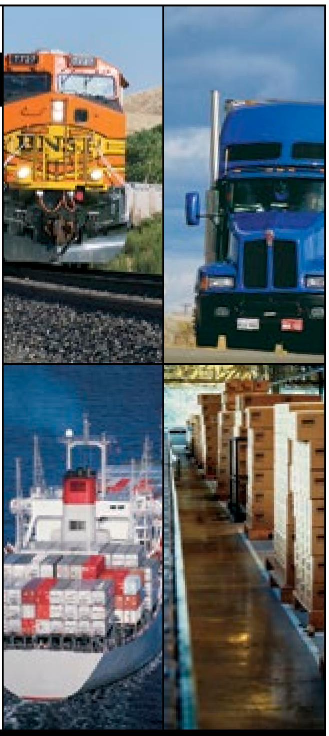

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As U.S. chemical production grows, chemical shippers and their partners refine their strategies to ensure trouble-free transportation, secure sufficient capacity, and navigate the regulatory landscape.

Thanks to an improved economy, the U.S. chemical market has been gaining strength in recent years and continues to grow. U.S. chemical production will increase by 3.7 percent in 2015 and another 3.9 percent in 2016, according to the American Chemistry Council's (ACC) latest annual report on the industry, published in December 2014.

U.S. companies made $805.1 billion worth of chemical shipments in 2014, according to the ACC. The group expects that figure to rise to $849 billion in 2015.

The word "chemical" covers a vast array of substances, including many that are sitting in your kitchen cabinets. But when people talk about the challenges of chemical logistics, they're often referring to substances that must be treated with special care. Such hazardous products include substances that might explode, ignite, emit toxic gases, corrode the skin, or otherwise cause serious harm if not handled properly.

The risk of danger is what makes chemical logistics different from most other branches of supply chain management. "The safety programs of the companies you're dealing with need to be impeccable," says Tom Voelkel, president and chief operating officer of Dupré Logistics in Lafayette, La. Anyone who transports or stores a hazardous chemical must thoroughly understand how to handle that product.

The consequence of any error can be grave. "If a carrier has a problem while hauling chlorine, for example, you'd have to evacuate a small town," Voelkel says.

Safety Training

Because of the potential danger involved, employees at companies that move and store hazardous chemicals require special training. Some training is dictated by the U.S. Department of Transportation (DOT), which regulates how companies prepare hazardous materials (hazmat) for transit.

At Pacific Coast Warehouse Company's (PCWC) chemical third-party logistics distribution center in Chino, Calif., each employee takes one full day of DOT hazmat training every three years, plus an in-house course on hazard awareness, says Mark Burks, the facility's manager.

Burks himself has also taken training in the Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), as required by the Occupational Safety and Health Administration (OSHA). "At first, I had to go through a 40-hour course," he says. "Now I take an annual eight-hour refresher course."


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PCWC's chemical distribution center (DC) provides third-party warehousing services for companies that use hazardous and non-hazardous chemicals in manufacturing. PCWC also handles various finished goods chemical products for retailers, distributors, and other customers.

At DCs owned by chemical distributor Brenntag North America in Reading, Pa., some employees require specialized training in handling chemicals. Brenntag buys chemicals in bulk from manufacturers, then repackages them in smaller containers–ranging from 55-gallon drums to 1,000-gallon bulk tanks–for delivery to local customers, using a private fleet.

"Employees who load the trucks learn to segregate materials that aren't supposed to come into contact with one another," says David Garner, senior vice president of operations at Brenntag. They also learn to affix the correct placards, indicating which hazardous materials the truck is carrying, according to the DOT's hazmat regulations.

Workers who repackage chemicals take a further level of training, focused on personal protective gear. DC staff follow rules laid out by DOT and OSHA, as well as the Environmental Protection Agency (EPA), which governs cleanup in case of a spill.

Be Reasonable

Beyond adhering to the letter of the law, many chemical distributors ensure safety by complying with the Responsible Distribution program, developed by the National Association of Chemical Distributors (NACD). This program, which is mandatory for NACD members, stipulates a series of safety measures every three years. A third-party auditor, chosen by the NACD, visits the company to make sure it's following those procedures to the letter.

"Part of the program is to make sure we train our customers, verifying that if we sell them the more hazardous chemicals, they have the processes, procedures, and systems in place to handle those products safely," says Garner, who chairs NACD's Responsible Distribution Committee.

Another safety program, called Responsible Care, is mandatory for ACC members. "To conduct business in the chemical industry, you need to be up to speed with the Responsible Care program," says Glenn Riggs, senior vice president, corporate strategy at Odyssey Logistics and Technology (OLT) in Danbury, Conn. Like Responsible Distribution, this program requires careful monitoring to make sure a company adheres to all of its standards. "We perform internal audits on our processes around all the requirements, and then ACC auditors visit every three years," Riggs says.

Odyssey started its business as a service provider to the chemical industry. Although it has broadened its scope, it continues to serve that market with general logistics and transportation services. Its chemical services portfolio also includes specialized offerings, such as fulfilling orders for chemical samples.

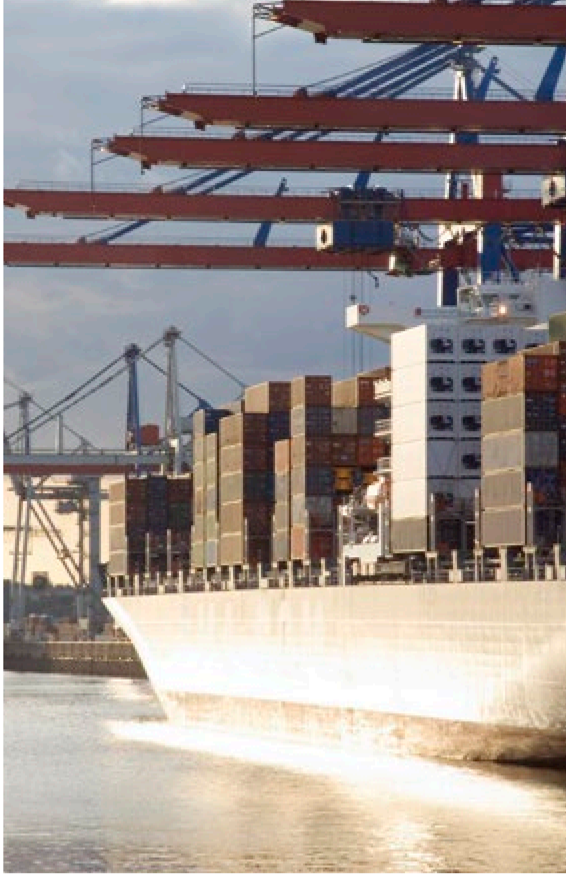
Special Rooms and Equipment

Along with special procedures, chemical warehouses also require special environmental controls. For instance, the chemical DC operated by Weber Logistics in Santa Fe Springs, Calif., has separate rooms for different hazard classes–flammables, oxidizers, corrosives, and toxics. It also has temperature- and humidity-controlled rooms.

Safety concerns call for special material handling equipment as well. "We need EE-rated non-spark equipment, to prevent any kind of spark from igniting a vapor or gas," says John Rantz, manager at the Weber DC. Special padding and static guards ensure electrical equipment won't set off accidents.

"Because safety is crucial, a chemical warehouse usually undergoes numerous inspections," notes Jim Emmerling, senior vice president of operations at Weber.

A&R Logistics, a leading dry bulk carrier serving the plastics industry with a fleet of more than 800 trucks and 1,200 trailers, is 100-percent e-Log compliant. A&R supports its fleet with a nationwide network of 23 terminals and 10 warehousing and packaging facilities.



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"Not only does the fire department regularly inspect us, but we also do our own internal quarterly audit," Emmerling adds. "And the majority of our customers do at least an annual walk-through and evaluation of our building, to make sure we're handling and storing their goods as specified."

Another practice for companies that ship via common carrier is to vet the firms that will transport hazardous chemicals.

"About 10,000 truck suppliers are out there," observes Riggs. "How do you screen that huge supplier base and create a list of carriers you can rely on to deliver your chemicals across the public domain?"

If a carrier doesn't give satisfactory answers, doesn't have adequate insurance, or just isn't making the right effort, Brown won't use that company. Brown's employees also check carriers' safety records on federal websites.

Many safety procedures are designed to keep hazardous chemicals from spilling or leaking–events that cause enough disruption and trouble to leave a strong impression on everyone involved. PCWC is extremely focused on safety and preventive measures. "That's a core reason why we continue to grow our business in the safety-conscious world of chemical storage, handling,

A division of CLX Logistics, ChemLogix's intermodal service specializes in using bulk ISO intermodal tank containers to ship bulk liquid chemicals long distances.

and distribution," Burks says.

One best practice is to conduct regular carrier surveys. "We send carriers a form that asks questions about how they train their people. Do they keep records? Do they do background checks? How about security–what kind of training do they offer, and how often are drivers trained?" says Douglas Brown, president of Brown Chemical Company in Oakland, N.J., and vice chairman of the NACD.

Besides giving employees safety training, and implementing meticulous procedures, chemical shippers and their partners use information technology to make sure chemicals flow smoothly and safely through the supply chain.

"Having a good transportation management system (TMS) that allows us to receive rich information from our customers, provide the best information to our carriers quickly, and get updates from carriers as events happen, is a best practice," says Mike Challman, vice president of North American operations at CLX Logistics in Blue Bell, Pa. "If the right information doesn't get to the right person at the right time, that can cause big issues."

Shippers and 3PLs use TMS solutions to manage many commodities. But tracking a chemicals shipment requires some additional data. "We track items such as product characteristics and what other products it can or can't come in contact with," Challman says. "We also make sure we know the regulatory requirements, including those for placarding."

Procedures for Plastics

Even chemicals that don't pose safety hazards require special procedures and careful handling. Consider plastic resin–a commodity well known to Houston-based A&R Logistics. Most of A&R's business involves dry bulk transportation, warehousing, packaging, and 3PL services for large companies that make plastic resins used in manufacturing.

In its transportation business, A&R primarily provides last-mile services. It transfers bulk loads of resins–which come in the form of pellets–from rail cars to its own tank trailers, and then moves them to consignees' manufacturing plants.

The big concern with resin is the risk of contamination. "All it takes to contaminate a load is a few pellets from a previous load that are a different color or a different type of chemistry," notes Mark Holden, A&R's chief executive officer. "We have to be very disciplined in our material handling and trailer cleaning."

A&R also must be cautious in its use of vacuum systems to load and unload dry bulk trailers. "We make


WE DON'T JUST MOVE PRODUCT.
WE MOVE MOUNTAINS.

sure all the hoses are sealed tight," Holden says. Drivers who operate those systems must monitor the pressure to make sure the pellets don't flow too fast. "If they're under too much pressure, the pellets will generate enough friction to make them melt," he adds.

In addition, operators work hard to avoid spills, even though spilled resin would create no environmental impact. "Our customers treat the inventory almost as if it were hazardous," says Holden. "So A&R treats it that way, too. It's a quality of service issue."

Complex Compliance

The sheer number of government agencies that regulate chemicals turns compliance into an especially demanding job.

"We have to directly interface with nine federal agencies just to

Weber Logistics operates a chemical warehouse in southern California with 13 different storage rooms to meet temperature range, fire prevention, and security requirements.

open the doors every day," says Brown. "Along with OSHA, the DOT, and the EPA, those agencies include the Food and Drug Administration (FDA), U.S. Customs and Border Protection, the Drug Enforcement Agency (DEA), the Transportation Safety Administration (TSA), and the FBI," he says. State agencies regulate chemicals, too.

The rules require not only special procedures, but also a great deal of paperwork. For example, companies that store and transport certain "chemicals of interest"–mostly substances that can be used to make illegal drugs–must file periodic

Delivering Safety and Security

Maersk Line Limited offers flexible and clean petroleum product and chemical transportation for oil majors, oil traders, and the U.S. government. To learn more about chemical shipments that move over the ocean, *IL* posed a few questions to Desmond Sherry, Maersk Line's key client director of chemicals.

What are the biggest challenges chemical shippers face today?

As chemical companies grow their global businesses, a higher degree of supply chain complexity comes with that expansion. Manufacturer customers in locations throughout the world rely on timely chemical deliveries to keep production lines up and running. Maersk Line understands this and focuses on providing chemical shippers with reliable transportation solutions. In fact, we are consistently rated number one in terms of Global Schedule Reliability, per SeaIntel.

Being a reliable carrier means more than just vessel schedule adherence. We hear from chemical customers that safety and security are paramount, as is the ability to effectively respond to major market challenges. Maersk Line has the people, processes, and safeguards in place that provide confidence and trust. As an example, when severe winter weather crippled supply chains in 2014, or when U.S. West Coast labor shortages impacted cargo flows, our Business Continuity Planning team was prepared to address the challenges, communicate their impact, and support our customers in every way possible.

What advice/suggestions would you give *Inbound Logistics* readers who are managing chemicals shipments?

There's a lot of talk today about the commoditization of container shipping and a focus on cost alone. We know that shippers want more and should ask their carriers to partner with them to help drive their success. A knowledgeable, dedicated carrier partner can make all the difference to a chemical shipper's supply chain. A stable, strong carrier will address exceptions quickly, provide solutions, and contribute to the shippers' bottom-line results.

As a chemicals transporter, what is Maersk doing to minimize the environmental footprint of its operations?

We constantly seek innovative and commercially viable ways to reduce our environmental impact, be it CO_2 and other air emissions, ballast water, or the materials we use to build our vessels.

We've reduced our relative emissions by 40 percent, and are on average more than 10 percent ahead of the rest of the industry, according to global benchmarks. We have now set a bold new target to reduce CO_2 emissions per container moved by 60 percent by 2020, compared to 2007 levels. When we reach our target in 2020, we will have saved the climate approximately 200 million tons of CO_2. This is the same as annual greenhouse gas emissions from more than 35 million passenger vehicles.

When transporting chemicals, safety is always a concern. What kinds of safety programs does Maersk have in place?

In 2014, Maersk Line was one of seven companies that launched the Container Ship Safety Forum (CSSF) to improve safety performance and management practices in the container shipping industry. The aim of this group is to collectively identify common safety hotspots across the industry, and to find ways to address underlying causes.

Over time, the CSSF is expected to become a platform to discuss and benchmark against one common safety standard and to provide shippers peace of mind that their cargo is in good hands.

reports with federal agencies. "We submit monthly reports to the Department of Justice and DEA, and annual and quarterly reports to Homeland Security," says Rantz.

Weber's reports on chemicals of interest include data such as quantities on hand, and quantities shipped in and out of the facility. The agencies match that data to reports filed by Weber's customers, to make sure no chemicals have gone astray in transit.

At Barton Solvents in Des Moines, Iowa, David Richards, vice president, regulatory compliance, oversees a staff of four people dedicated to fulfilling all regulatory requirements. "But even with a staff that size, it's difficult to do. Many companies are a lot smaller than ours, and I don't know how they do it," says Richards, who chairs NACD's regulatory committee.

When states create regulations that exceed federal requirements, it poses an even bigger challenge. For instance, California has tougher requirements for managing chemicals than most states. Industry players are trying hard to convince government leaders that it's not practical to observe a different set of standards for each state. "How would we go about our business if we had to do it differently in Pennsylvania, Connecticut, New York, and New Jersey every day?" Brown asks.

Wanted: More Space

Chemical shippers might face an abundance of regulations, but in another realm, many struggle with continual scarcity. Tight capacity, exacerbated by the ongoing driver shortage, is an issue for all kinds of shippers. But some say the problem is especially tough for companies that move chemicals.

Working for a 3PL that serves the energy market, as well as the chemical industry, Voelkel gets a firsthand look at the capacity situation for different commodities. "It's definitely harder to find trucks for the chemical loads," he says.

In part, that's because the chemical business often involves regional trips, and many drivers these days find those long-distance hauls unattractive. "Most professional drivers want to get home every night," Voelkel says.

"Capacity is also tight because bulk chemicals require specific kinds of tanker trucks," says Richards. "Finding those pieces of equipment is getting tough."

For bulk deliveries to customers, Brenntag operates a private fleet with 750 tractors and 1,500 tanker trailers. "Some of those trucks are specialized," says Garner. "A company might need a lined tanker or a different setup involving valves." In all, the fleet encompasses about 40 different types of equipment. Each of Brenntag's drivers is qualified to handle six to 10 of those varieties, but no one driver can handle them all.

The need for specialized training reduces the pool of drivers in a market that's already constrained.

Barton Solvents also operates its own trucking fleet. But for chemical shippers that rely on common carriers, things can get tough. "Shippers must allow for longer lead times as they work to secure the necessary equipment," Richards says.

To compound the problem, suppliers are also extending lead times, and putting tighter controls on how and when distributors can pick up their products. "It's a logistics nightmare trying to get all the shipments scheduled in a timely fashion," Richards notes.

License to Carry

One transportation capacity challenge facing PCWC stems from a recent rule change at the Federal Motor Carrier Safety Administration (FMCSA). It concerns intermediate bulk containers (IBCs), which are cube-shaped totes made to transport liquids. These usually hold 275 or 330 gallons. Carriers transport IBCs by loading multiple units on dry van trailers.

"The FMCSA now says that if you carry totes, you have to have a tanker license," Burks says. That adds complexity to the transportation supply chain, as carriers will either obtain

Transporting and handling chemicals requires specialized driver training and license endorsements.

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those additional, more stringent licenses or forego the business.

"A number of our good, reliable less-than-truckload (LTL) partners currently won't take loads that they might have taken in the past because of the need for tanker endorsement," says Challman. That has compelled the company's ChemLogix division to seek out new carriers.

"Some companies that are willing to handle these loads see it as an opportunity to increase revenue and market share," explains Challman. But carriers can't seize those opportunities unless they find enough drivers with the necessary endorsement on their licenses.

In some cases, CLX and its shippers avoid the need for a tanker endorsement through new shipping strategies. "Depending on where the shipment is going, and on our customer's requirements, we might be able to replace a large shipment of totes with a tank," says Challman. In other cases, the shipper might divide a shipment of totes into two or more, so none of them contains enough volume to trigger the endorsement requirement.

Because carriers are so overbooked, Brown Chemical Company is constantly looking for new ones. One tactic Brown uses is to scout out the carriers that its suppliers use to deliver product. "If it looks like they have their act together the right way, and they want to pull the lanes we're looking for, we'll give them a go and see how it works out," says Brown.

Tight capacity is prompting some shippers and 3PLs to change the way they do business. "When capacity was plentiful, you could throw your 10 loads in the air, and you would have 15 carriers vying for them," Voelkel explains. Today, some shippers have better success when they contract for dedicated capacity.

More shippers are also willing

Low-Cost Energy Complicates Chemical Logistics

The transportation capacity shortage hits the chemical industry especially hard, in part because of the connection between energy and chemical production. The boom in hydraulic fracturing (or "fracking") has produced an abundant supply of cheap oil and natural gas in the United States. Those energy commodities provide ingredients for a great deal of chemical production.

"Recent events have given a competitive advantage to the United States, to the point where, by 2017, the country is expected to become a net exporter of chemicals," says Nathan Buelt, manager of the ChemSolutions division at 3PL C.H. Robinson in Eden Prairie, Minn.

"The amount of investment going into North America for the chemical industry is massive," says Glenn Riggs, senior vice president, corporate strategy at Odyssey Logistics and Technology (OLT) in Danbury, Conn. "This used to be one of the higher-cost areas in the world for chemical production. As of 2013, it moved to second-lowest, next to the Middle East."

As more U.S., Canadian, and overseas companies build chemical plants in North America, those plants will be pumping out product in greater volumes. "We have to make sure all the transport and logistics networks can handle that," Riggs says. "But we're dealing with a driver shortage and tightening regulations, so we are fighting an uphill battle."

A&R Logistics, a Louisville-based company that focuses on dry bulk freight, has been ramping up capacity to accommodate an anticipated 40-percent increase in the production of resin and other chemicals. A&R currently operates 10 warehouse and packaging facilities and 23 terminals. Its fleet includes more than 700 tractors and 1,200 trailers.

"We recently opened three new facilities, in new geographic markets. We now have approximately two million square feet of warehouse/distribution capacity around the country, and we are looking to add more," says A&R CEO Mark Holden. The company has increased its warehousing and packaging capacity by 40 percent since Holden and other investors purchased A&R in 2012.

The company has added more rail car storage and expects to establish more locations for transloading resin from rail cars to trucks. "We're also looking to partner with some of the railroads to co-locate or to collaborate for transload facilities," Holden says. "And we're talking with our customers to find out where they want to locate facilities for export."

"The interplay between the chemical and energy industries illustrates one of the things that makes chemical logistics special–its need to continually respond to fluctuations in the world economy," says Buelt.

"There's such a wide number of inputs into the chemical supply chain," Buelt adds, referring to the many ingredients used to make chemicals. And, of course, chemicals themselves are crucial ingredients for many industries. "While macroeconomic trends influenced each industry that I've dealt with previous to the chemical vertical in their own way, I've seen large trends impact the chemical vertical in significant ways," he says.

Although chemical production in the United States in 2015 is higher than in 2014, the growth month-to-month seems to be levelling off, Buelt says. At the same time, a pullback in oil and gas drilling has freed up some bulk capacity for chemical shippers. So now, rather than simply helping clients find enough trucks and rail cars to transport their products, C.H. Robinson is helping them choose the right carriers to support their performance goals.

"If a chemical manufacturer has visibility and the analytics, they can see trends developing and firm up their supply chain, making sure the right carrier is getting the right shipment at the right time, save on costs, and drive a competitive advantage," Buelt says.

to pay for round-trip moves, even if they include empty miles. When the truck returns, the shipper can send it right out again with a new load, instead of searching for another truck.

"Shippers might be able to load the same or compatible product again, so they can forego the tank wash charge," Voelkel says. "It doesn't work for a 2,000- or 1,500-mile haul, but it might work for 1,000 or 800 miles, depending on the customer."

Capacity isn't equally tight in every region of the United States, but all the talk about shortages has pushed up freight rates everywhere, says Challman. For chemical shippers who can't pay a premium, another strategy for capturing capacity is to become an attractive customer.

Rates are part of it, but they're not the whole deal. "Other things to consider are: do you get the truck in and out without delay? Is the driver treated well at the facility? Are bills processed in a timely manner, and are the payments correct? Is the paperwork accurate, and does the load not change after it has been tendered?" Challman says.

Such soft issues are important. "A carrier will agree to work with a shipper who pays a couple of pennies less if it does well in these other areas," he adds.

Nathan Buelt, manager of the ChemSolutions division at 3PL C.H. Robinson in Eden Prairie, Minn., has also seen chemical shippers adjust their strategies in response to the capacity crunch. "With the increased production in 2014, the infrastructure for liquid bulk–whether pipeline, rail, or tank truck–didn't seem to be suitable to meet the production demand," says Buelt. "A lot of our conversations with customers were about bringing additional capacity to the market, and helping them lock in long-term contracts."

Shippers started thinking creatively about operating more efficiently with the available assets. They started putting more emphasis on providing the best service to their most important customers. ChemSolutions–which focuses on the bulk liquid market–helped those customers analyze their existing processes, identify opportunities to improve, and take better advantage of technology to gain visibility into the supply chain.

"We helped some clients tweak where they locate warehouses, where they carry safety stock, and what their inventory levels are," says Buelt.

Distributor Brenntag North America buys chemicals in bulk from manufacturers, then repackages them in smaller containers, and delivers to local customers via a private fleet.

Shifting Regulations

As if the volume and variety of regulations weren't daunting enough, companies involved in chemical logistics must also deal with rules that keep changing. "Within the next few years, we'll have to comply with more than 30 proposed changes from different regulatory organizations," says Richards.

For example, OSHA plans to change its permissible exposure limits for chemicals. "If OSHA tightens up those numbers, we'll have to review what our employees are possibly being exposed to," Richards says. "We might have to change some policies or procedures, or provide some additional ventilation to get us down to the new levels."

For companies that make or ship chemicals, probably the biggest regulatory change on the scene is OSHA's new Hazard Communication Standard (HCS). In 2012, OSHA updated its requirements for communicating information on hazardous substances that employees encounter on the job. The aim was to make those rules comply with the Globally Harmonized System of Classifying and Labeling Chemicals (GHS), an international standard.

June 1, 2015, was the deadline for complying with most provisions of HCS 2012. One big change the rules created is a new set of standards for

labeling containers that carry hazardous chemicals.

"The old hazard communication system was fairly broad," says Scott Dunsmore, vice president of training and business development at training firm Lion Technology in Lafayette, N.J. "The employer had to label the containers, and include certain information on the label. But there was no standardized format."

Under Hazcom 2012, containers must carry labels with specific pictograms to identify the class of hazard posed by the chemicals inside. For example, a skull and crossbones indicates a severely toxic substance; while an exploding bomb indicates an explosive substance, a self-reactive substance, or an organic peroxide.

Hazcom 2012 also revises the standards for safety data sheets (SDS), which provide detailed information about chemicals that companies buy.

Weber Logistics has seen the impact of these new regulations on the companies that use its chemical DC. Many customers have been busy updating their labels and sending the 3PL new SDSs. "Some of our customers have to put serious time and effort into what they need to relabel, what's coming from the manufacturer that has already been relabeled, and what is sitting in stock," says Rantz.

Any product in the DC that still has old labels requires an update. "We have to relabel it for the customer or send it to a vendor to be relabeled," he says.

The main impact of Hazcom 2012 falls on chemical manufacturers, who must provide the correct information, including SDSs and container labels, when they ship product to customers, Dunsmore says.

Lookalike Labels

One logistics challenge Hazcom 2012 presents involves the risk of mistaken identity: OSHA's GHS labels look a lot like the labels the DOT requires when companies ship hazardous materials. The two agencies regulate many of the same substances, but their lists are not identical.

"In many cases, hazards require labels in the OSHA world that won't work in the shipping world," says Dunsmore. For example, OSHA regulates chemicals that cause temporary skin irritation, but the DOT concerns itself just with corrosives that cause permanent damage.

"That's creating problems for shippers in certain cases. If their carriers pick up packages and see new GHS labels with pictograms, but no hazmat labels, they might ask, 'Why is this not prepared in accordance with the DOT?'" says Dunsmore.

Under regulations that the International Air Transport Association instituted in 2015, if a carrier receives a container displaying an OSHA GHS label, but no documentation related to the DOT's hazmat rules, it must give that package special scrutiny. The investigation might cause a shipping delay, even though the shipper has committed no violation. "Those transportation regulations are now building in potential hurdles," Dunsmore notes.

Manufacturers could also have trouble conforming to the new GHS regulations when they buy chemicals from other companies and blend them to make new products. To label their products and complete their SDSs correctly, they need accurate details about the ingredients. "Some manufacturers who make mixtures are not getting everything from their suppliers," Dunsmore says. In February 2015, OSHA granted manufacturers an extension on the June 1 deadline if they

Partnering with safe carriers is critical for chemical shippers. The National Safety Council recently recognized Dupré Logistics with three awards for excellence in fleet safety.

hadn't received all the information they needed on constituent chemicals, despite their best efforts. But that extension has limits. "As soon as you get the information, the clock starts on having to get the labels up," Dunsmore says.

Electronic Logs

Along with regulations specific to chemicals, companies in the chemical supply chain are also feeling the effects of new regulations in the broader logistics arena. Take, for example, the DOT's plan to require commercial truck drivers and fleets to use electronic devices to record drivers' hours of service. If released as expected in September 2015, this rule would go into effect in September 2017.

"Many large carriers have already installed onboard recorders. But the market relies a lot on middle- and small-sized carriers, too," says Riggs. Most of those companies have yet to implement the new technology, but under the new rules, they would have to.

Barton Solvents is currently working on complying with this new regulation. "We have a few units in, and we're testing them to see how they work and what they'll do for us," says Richards. "But that will cost about $1,000 per truck just to install, then $30 to $50 each month to the company we would use to run the program." His company also would need to train all its drivers to use the system.

As rules continually evolve, one way to keep pace is to join an industry organization that closely follows and reports on the regulatory agencies. Richards, for example, receives NACD's biweekly news brief. "I read it faithfully," he says. "It provides information about changes that are coming or are under consideration."

Although safety concerns, stringent regulations, and the struggle for capacity make chemical logistics a particularly complex discipline, shippers are rising to the challenge. In a thriving market, shippers will continue to optimize networks, improve processes, and keep chemical products flowing. CL

Expert Advice

With three decades of experience providing chemical management solutions, the experts at Rinchem Company, Inc., based in Albuquerque, New Mexico, address some hot topics.

What role does technology play in assisting small businesses that want to get involved in global opportunities in the chemical sector?

Technology can be a differentiator for smaller chemical logistics providers, especially when they are able to customize that technology to meet the specific needs of a particular vertical or niche. Larger 3PLs tend to target multiple markets, whereas smaller 3PLs can choose to leverage technology to focus on the specific needs of a particular market segment and, in many cases, do it better and more responsively than large 3PLs.

— **Rob Walker,** Vice President of Finance and Analytics

How can logistics partners help open new markets, particularly if a company has few assets on the ground?

Chemical manufacturers can utilize a third-party logistics provider to open up a new geography without many of the startup costs traditionally incurred during such a process. In many cases, 3PLs already have infrastructure, equipment, manpower, and systems in place to manage the chemical distribution network.

Utilizing a third-party logistics provider not only reduces cost, but it also increases the speed of time to market, which can be critical to the success of opening a new geography when opportunities arise.

— **John Fitzsimons,** Vice President of Operations

Recent Federal Motor Carrier Safety Administration regulations require drivers to have a chemical endorsement, thereby limiting capacity by shrinking the current driver pool. What can companies do to offset that?

Encouraging driver education is very important. Transportation providers that truly value top-quality drivers, and are willing to pay for drivers who maintain those endorsements, will have the pool they need. Aiding drivers without such endorsements to take steps to obtain them is extremely important.

Making sure that drivers with such endorsements don't lose them is also critical. Transportation providers with robust, recurring training programs, performance tracking, and safety audits will keep drivers with hazmat or other endorsements from losing them. For their efforts, those companies will ultimately have fewer out-of-service drivers.

A final critical component that can help offset a shrinking driver pool because of increased driver regulation is for transportation providers to reduce attrition. They can do this by providing both financial and non-financial incentives for drivers to stay, as well as implementing recognition and reward programs that recognize driver accomplishment and keep employee satisfaction levels high.

— **Adam Moore,** Transportation Program Manager

Given the complexity of fast-changing regulations governing the chemical value chain, how can companies mitigate compliance risks?

The compliance landscape for chemical storage and transport is constantly evolving. Companies must have good governance practices, and proper risk mitigation policies and strategies in place that keep pace with new legislation. Companies can also reduce potential risks by selecting a third-party logistics partner that specializes in the storage, transport and handling of chemicals.

— **Michael Ziembowicz,** Quality, ESH Manager

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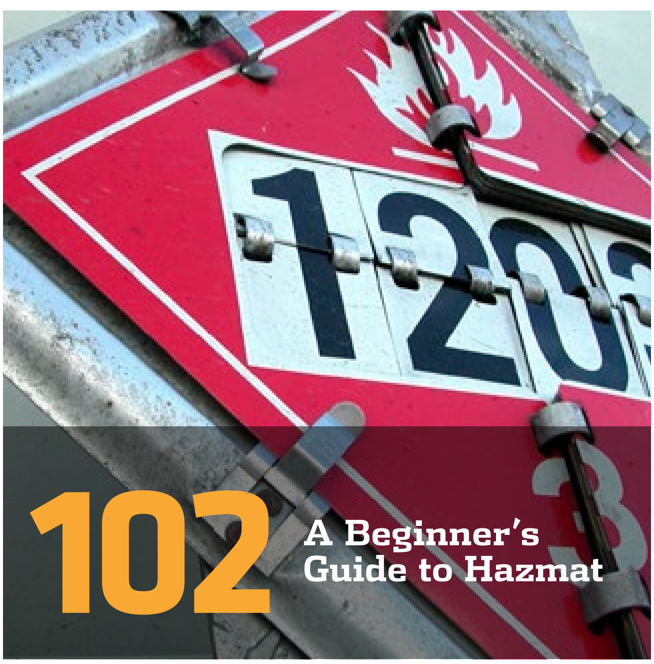

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Welcome to the inaugural edition of *Inside Logistics*, an editorial collaboration between the Institute of Supply Management and *Inbound Logistics*. Putting together the resources and expertise of these two entities provides you with an overview of the growing collaboration between procurement and supply management and logistics functions.

This collaboration is rooted in history. *IL's* parent company, Thomas Publishing Company, shares a 100-year relationship with the purchasing procurement and supply managers organization, which was founded in 1915. In fact, one reason Thomas Publishing created *Inbound Logistics* was to encourage purchasing managers to work more closely with logistics managers in a new discipline we call demand-driven logistics.

To continue and expand on this longstanding partnership, we're proud to present this first in a series of shared content offerings.

The cooperation between procurement and supply chain management is obvious in the four articles we selected for this inaugural offering. You'll see how pursuing emerging markets benefits from closer linkage between supply chain functions; how an evolution in logistics practices reflects tighter integration between supply, demand, and logistics; how all functions must work collaboratively across the supply chain to ensure safe handling of hazardous materials and end-to-end chain of custody controls; and how expeditious deployment of medical, humanitarian, and logistics teams helped fight the deadly Ebola outbreak.

Inbound Logistics readers understand full well how tighter integration with purchasing/procurement, combined with demand-driven logistics practices, can enhance the competitive position of any enterprise as these functions co-evolve, collaborate, and cooperate.

Felecia Stratton

INSIDE LOGISTICS
JUNE 2015

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Emerging Markets Demand Better Global Intelligence

Before planting a flag in an emerging market, shippers need to conquer specific challenges; some ally with a 3PL as ammunition.

By Beth Goodbaum

AS MORE COMPANIES SHIFT OPERATIONS TO EMERGING markets, they are looking for third-party logistics (3PL) providers offering global-wide strategies to conquer challenges that pose a threat to business. Longstanding cultural and language barriers aside, there is a growing need to develop first-rate operating models that provide visibility, security, and educated talent to keep up with supplier needs. A few core emerging markets—Mexico, Colombia, Turkey, Poland, and Vietnam—have become established sourcing sites due to their attractive exports and cost efficiency. But each country reveals a unique set of challenges.

When conducting business operations abroad, it's imperative for shippers to remember that the well-established practices they are familiar with in the United States, including labor laws, infrastructure, security, and technology are often radically different in global markets.

"Shippers who enter emerging markets with the mindset that 'it works in the United States and Europe, so it should work here' tend to struggle the most," says Brett Bissell, chief operating officer of contract logistics at CEVA Logistics, a global 3PL. "Shippers who are ready and prepared to be flexible will more quickly launch their overseas operations successfully."

Bissell recommends that shippers consider several key points when expanding business in unfamiliar markets, including labor laws, which can be radically different from country to country, and also within a country's regions. He emphasizes the dangers of importing a copy-paste process or approach from a more developed country, which might result in increased costs or unsustainable liabilities. If using a 3PL, Bissell recommends choosing one with local teams who can review the correct processes in detail, and suggest optimal solutions that cut costs and offer flexibility.

Local 3PL teams must be aware of technological challenges, especially in regions where traditional platforms are not supported. Another major consideration is infrastructure. "Point-to-point distances on a map do not indicate the optimal logistics network," Bissell says. This is another area where local teams can discuss the larger strategic growth objectives.

While some of these challenges are universal, others are specific to some of the top emerging markets.

MEXICO: ACCOUNTABILITY, TRANSPARENCY, VISIBILITY

Divided by a 2,000-mile border, Mexico and the United States have strong export ties. In 2013, Mexico was the United States' second-largest goods export market, and the third-largest supplier of goods imports. The North American Free Trade Agreement (NAFTA) helped bolster business due to its market-opening rules, which provided opportunities for increased trade relations.

In recent years, Mexico has presented cost-savings opportunities to companies choosing to nearshore operations in an effort to cut time to market, reduce inventory warehouse space, speed cash-to-cash cycles, and cut transportation costs, notes Troy Ryley, managing director of Transplace Mexico, a 3PL that maintains a primary operations center in Monterrey, supported by operations and personnel in Mexico City, El Paso, Nuevo Laredo, Laredo, Puebla, San Luis Potosi, and a few smaller cities. An increasing number of U.S. retailers are shifting operations to the country to avoid the costly and complex processes involved in moving products across the U.S.-Mexico border, he adds.

Despite such attractive prospects, working with the country can pose a risk to the flow of operations. Missing across the Mexican supply chain are accountability, transparency, and visibility. In terms of imports and exports, shippers are prone to miscommunication as a result of multiple points of contact during the supply chain process.

"A shipper moving cargo must effectively communicate with up to five groups involved in the process, including a U.S. carrier, a U.S. customs broker, a Mexican forwarder, a Mexican crossing agent, a Mexican customs broker, and a Mexican trucking company," Ryley says. "Because multiple parties and hand-offs are involved, shippers often become frustrated and lose track of freight at the border."

Companies that do business in emerging markets such as Mexico often partner with third-party logistics providers to tap their expertise. Penske Logistics, for example, has extensive experience in supply chain management in Mexico, including operating this Querétaro crossdock.

Identifying and managing expectations of operational responsibilities and processes can be challenging and requires top-of-the-line communication. "As a best practice, trading partners should create communication that aligns the involved parties with the desired service outcomes, and establish a process that defines clear accountabilities and is supported by a contingency plan," says Mike Burkhart, director of Mexico for C.H. Robinson, a 3PL that has been operating in Mexico for 25 years. "This type of proactive communication helps simplify the complex nature of cross-border shipments between the United States and Mexico."

As they face the complexities of intra-Mexico and cross-border freight transportation, more shippers are looking for an experienced partner to optimize and manage the process, Ryley adds. "Transplace, for example, works with shippers to help them understand the stringent regulations and ensure compliance," he says. "We also employ a bilingual Transportation Management System (TMS), which features capabilities tailored for the Mexican market."

Tax law changes are another top challenge shippers face when working with Mexico, says Mike Cassidy, managing director of Penske Logistics Mexico. He notes that Penske has worked to understand laws and stay ahead of changes by making significant investments in systems to help the company and its shipper clients adapt.

"An additional challenge is highway infrastructure," says Cassidy. "Mexico needs continued investment to improve its roads and bridges. And, with more companies bringing their business to Mexico, there needs to be a huge focus on creating an improved highway system."

COLOMBIA: INFRASTRUCTURE CHALLENGES

Infrastructure is also a concern in Colombia, the United States' 21st-largest goods trading partner, with $40 billion in total (two-way) goods trade during 2013. The country is plagued by a vastly underdeveloped transport network, due to its mountainous regions, insufficient funds, violence, and overall corruption.

To put it in a global perspective, Colombia's quality of overall infrastructure ranks 104 out of 148 countries, according to the 2014-2015 World Economic Forum.

In working with countries vulnerable to security threats, Ty Bordner, vice president of solutions consulting at global trade management solutions provider Amber Road, refers to the Customs-Trade Partnership Against Terrorism (C-TPAT). This initiative allows for better risk assessment and targeting, and frees U.S. Customs Border Protection to allocate resources to more questionable shipments.

"The rest of the world is copying programs like C-TPAT, so each country may operate their program under a different name," says Bordner. "These programs are designed by the developing nations, the United States, and Europe, to vet their suppliers from a security standpoint."

TALKING TURKEY

Part of the MINT group of countries (the others are Mexico, Indonesia, and Nigeria), Turkey is one of the top emerging markets, with an expanding manufacturing sector driving food, textile, clothing, iron, and steel exports. Turkey is currently the United States' 34th-largest goods trading partner, with $18.7 billion in total (two-way) goods trade in 2013, according to the United States Trade Representative. Goods exports totaled $12.1 billion; goods imports totaled $6.7 billion during the same year.

"Turkey's economy has been growing and is expected to grow six to seven percent in the next five years," says Matt Goker, general manager of ATA Freight Line, a global provider of fully integrated supply chain solutions, with a specialization in agricultural machinery. "It has a young workforce, which presents a lot of opportunities for business."

Goker has witnessed the biggest shift in Turkey's trade within the past 10 years. "When I started out in sales, we were seeing a huge amount of textile garment business flowing out of Turkey into the United States, and many Turkish manufacturers were not well-known, which presented some trade risks."

Since then, as the country moved away from banned, low-quality production to quality-oriented premium products, it created a more alluring environment for potential business, especially in key areas of industrial commodities such as spare parts for automotive production.

As infrastructure grows more challenging in Turkey, visibility becomes increasingly important. "Visibility is more important in Turkey than in the United States, because shippers don't have the support from key suppliers that would give them the needed visibility," says Goker. He points to the efficiencies of tracking products through UPS and FedEx, and emphasizes how this type of visibility is surprisingly not common on the commercial side within Turkey.

As a solution to visibility challenges, many logistics providers offer real-time solutions. For example, ATA Freight Line offers Vizio, a company under the group of ATA companies that provides real-time shipment information. "We get 90,000 data points every day, and one good part about this system is acquiring that many data points," Goker explains. "This allows us to run statistics and analysis; the tools give us predictability about how shipments will move months from now. We factor in weather conditions, political risks, and other variables that impact transit time."

CEVA's global network covers more than 170 countries with 1,000-plus sites. The 3PL leverages its sector-focused expertise, global and local resources, and advanced technologies to deliver supply chain services to shippers exploring emerging markets.

Such a system provides a well-educated guess as to where a shipment is at any point in a given year, which is especially crucial because there are a fewer number of truckers in Turkey that can provide detailed shipment information.

POLAND: BUILDING A FRAGMENTED INFRASTRUCTURE

While much of Europe struggled with the global financial crisis over the past several years, Poland experienced GDP growth of more than 20 percent between 2008 and 2013, according to the Department of Commerce. In 2013 alone, the United States sold $3.9 billion worth of merchandise in Poland, up 16.5 percent from 2012.

Even with business growing in the country, shippers can face the same problems trading with Poland, such as bureaucratic barriers and a tax system that impedes business.

"One main transport and logistics challenge is dealing with fragmented Polish infrastructure," says Tom Sullivan, general manager at C.H. Robinson's Warsaw office. C.H. Robinson opened its first Polish office in 1997. In September 2012, the company acquired Apreo Logistics, a freight forwarder based in Warsaw.

"While infrastructure from Warsaw to the western part of the country is extremely developed, other routes that travel from the north to the south are slow and premature," Sullivan explains, warning that U.S. companies need to be aware that there are no major highways connecting lines of transportation that are similar to the U.S. highway system, which can pose complications for truckers serving those routes.

> "If using a third-party logistics provider to help meet global challenges, choose one with local teams who can review the correct processes in detail, and suggest optimal solutions that cut costs and offer flexibility."

Another challenge stems from economic issues due to geopolitical activity. "The recent German labor law increasing the country's minimum wage consequently changed the way carriers in the European Union do business," says Sullivan. The dissimilar currency exchanges between the two countries have heavily impacted transportation costs in Poland.

To help its shipper customers alleviate some key challenges facing logistics, and to streamline processes, C.H. Robinson uses its Navisphere technology platform to give better visibility to operations, with access to an online platform that allows businesses to view and manage shipments abroad.

"As automation becomes a mainstream strategy for creating business efficiencies in Poland, as it has in the United States, these tools will continue to help shippers mitigate risk and reduce cost with more streamlined supply chain processes," Sullivan explains.

VIETNAM: FINDING THE RIGHT SUPPORT

In Vietnam, which boasts an attractive market for machinery, cotton, and apparel, working with talent has shifted 3PL operations. "Vietnam is a pretty interesting market for our customers for two reasons," says CEVA's Bissell. "Just as in China, there is an available workforce that the government is looking to help develop, so it's an attractive place from that perspective. But it's also an attractive place because the market itself is growing. I've been visiting Vietnam over the past several months, and even during this short period, roads are getting built, and airports are brand new. "The government is investing heavily in helping the country grow, and I think it's having a big effect."

Bissell adds that many of CEVA's customers are either establishing presences in the country or actively thinking about it, which prompted the company to set up a freight management system there.

Challenges within Vietnam include an unsophisticated workforce. "In most countries you do business with, the workforce has been through several jobs. They understand what is expected of them, and they know how to approach the work that you're offering," says Bissell.

In Vietnam, where footwear and apparel have a strong and growing presence, workers are new to established processes. "They need more hand-holding, and a much more basic level of training than some of the other geographies," he explains.

Workforce is critical now, especially when Vietnam needs to drive up its productivity growth performance as the country's labor force is expected to decelerate over the next decade, according to a 2012 McKinsey Global Institute report. "One issue we're finding within Vietnam is the need to translate more of the materials and tools that we use," says Bissell. "We are working to ensure basic instructions are translated, and making sure that IT tools are available in both languages, and in both scripts."

To that end, though, it's imperative that businesses consider cultural differences abroad. "Local customs and culture flow directly into management operations and execution processes," says Burkhart. "It is important to be flexible to adapt to these differences in order to produce a more desirable outcome."

Perhaps most of all, he notes, developing a genuine appreciation for culture differences can improve business outcomes.

Beth Goodbaum is a contributing editor for *Inbound Logistics*.

A Logistics Evolution

Trends and challenges in today's supply chains mean evolving logistics networks must be prepared to deliver results in an ever-changing business environment.

By Mary Siegfried

DEMANDING CUSTOMERS, COMPLEX SUPPLY CHAINS AND EVER-changing relationships with third-party logistics providers are prompting supply management practitioners to closely examine the adaptability and agility of their logistics networks. And that's a good thing, experts agree, because logistics will play an ever-greater role in delivering high-performing results.

Over the past 40 years, logistics, an integral part of supply management, has evolved along with the changes that have taken place in business. Up until the 1980s, logistics was largely regarded as a field that required "strong backs and not much thinking," explains H. Donald Ratliff, executive director, Supply Chain & Logistics Institute at Georgia Institute of Technology. But all that changed in the 1980s, he says, as ERP systems allowed analysis of data and greater automation.

The evolution continued in the 1990s with manufacturing growth in China, the emergence of complex supply chains and the realization that departments could no longer operate in silos. Ratliff says the 2000s brought improved supply chain visibility and communications, explosion of mobile devices, continued globalization and the start of online sales.

The introduction of cloud computing, Software-as-a-Service and Business-Processes-as-a-Service in the

2010s, Ratliff says, rounds out the logistics revolution.

However, the revolution is far from over because there are several new challenges and trends affecting logistics networks. Some of the challenges and trends we'll examine include:

- Flexible fulfillment and omnichannel
- Improved logistics integration
- Changing 3PL roles/relationships.

FLEXIBLE FULFILLMENT, OMNICHANNEL

Meeting the needs of today's demanding customers, who expect an "always-on, always-open" shopping experience, is a challenge and opportunity for supply management practitioners today and into the future, says Shanton Wilcox, vice president, logistics and fulfillment leader for Capgemini Consulting in Atlanta.

Capgemini's *2015 Third-Party Logistics Study* finds that omnichannel supply chains are still maturing. One-third of study respondents said they are not prepared to handle omnichannel retailing, with only 2 percent rating themselves as high-performing in omnichannel.

Wilcox says flexible fulfillment and omnichannel are prompting businesses to "throw the doors wide open" as marketing creates excitement around delivery and fulfillment to improve the customer experience and extend the brand. "But it's logistics that has to deliver on those promises," he adds.

> An important aspect of a high-performing logistics network is having it integrated throughout the supply chain and the company.

There have been pilot programs focused on delivering products to customers wherever they are and whenever they want it. "But what I always hear from supply management professionals is they have to build something that is repeatable and scalable. They can't build a solution for New York, one for London and another for Santiago. It has to be cost-effective and efficient," Wilcox emphasizes.

And that's where supply management and marketing have to work together to balance "wildly expanding consumer expectations" with the cost of flexible fulfillment.

"Supply management has to be at the table to tell executives they can meet the demand, but with a cost to the company," Wilcox says. "They have to be sure customers are asked, 'If we charge you $3.50 every time you use a delivery option, do you still want it?' As customer requirements settle down into true business requirements, companies will determine how to build the capabilities to match the needs."

As omnichannel matures, supply management can provide a pragmatic viewpoint and set expectations, including price tags around various fulfillment options, Wilcox says. In the study, for example, companies report that their existing infrastructure can't support true omnichannel. E-commerce distribution centers are designed to pick, pack and ship partial shipments, with remaining distribution centers used for full shipments.

Retailers currently are trying to create more in-store integration with online channels, using stores as fulfillment centers for Internet shopping sites, and to facilitate online order pickups at stores. "Companies have to determine how much of their current infrastructure they are willing to take apart to build new delivery channels," the study notes.

Joel Sutherland, managing director and adjunct professor at the Supply Chain Management Institute at the University of San Diego, sees omnichannel as a challenging process issue for supply management practitioners. He recently worked with a retailer struggling with fulfillment and omnichannel issues both online and in its stores.

"The business found that online consumers would find an item, check online availability and, after being notified it was in stock, order it only to get a notice later that it was not available," he says. "Other consumers would check store availability online, receive notice the item was in the store, then drive to the store only to find it was not in stock."

Sutherland emphasizes that failures in fulfillment mean companies have failed customers' expectations. "If you think about it, consumers are more upset if a company says it has something in stock and doesn't, than if they are told from the start that the item is not available," he says.

His investigation into the problem found a major area for improvement at the store level: timely updating of inventory. When an item was sold at a store, the inventory decrement was not immediate. Store managers were waiting until the end of the day or even a few days to update inventory. Also, items were often logged as "in stock" when they were received by the stores, but they were not actually placed on shelves.

"This was a timing issue," he says. "When you receive it how fast does it go into inventory? When you sell it, how fast is inventory depleted? If your inventory is 75 percent to 80 percent accurate, you are going to have some very upset customers."

IMPROVED LOGISTICS INTEGRATION

An important aspect of a high-performing logistics network is having it integrated throughout the supply chain and the company. Sutherland says there was great excitement in the industry years ago because it was thought technology would bring about integrated logistics systems.

"It has come a long way, but I think we are still stuck in neutral," he says. "We haven't really integrated an organizational structure or developed an overarching strategy that capitalizes or leverages the opportunity of such a system."

The key to breaking down barriers for an integrated logistics system is effective sales and operations planning (S&OP), Sutherland says. And S&OP is as much a cultural issue as it is a business process issue. "There has to be a collaborative culture and environment where sharing information upstream and downstream in the supply chain is valued," he emphasizes.

He recalls his work with Toyota as vice president of operations at Denso, one of Toyota's largest suppliers, which shared the Toyota Way culture and processes. Integration was practiced and valued at Toyota and its supplier companies, he says.

"Their system of integration made sure that any department that would be affected by a decision was involved upfront, including procurement, finance, manufacturing, marketing and HR," he says. "They realized that if production plans included working with your suppliers and setting up a manufacturing schedule, but failed to include planning for the labor force in the distribution environment, it all falls apart."

Sutherland saw the importance of logistics integration recently while working with a company that came to him for help with a "systems issue." He says the company was sourcing all the right materials, creating a solid supply base and planning for demand, but when the products "hit the docks and the distribution centers, they were getting hammered."

The company wasn't sharing information throughout the supply chain, leaving the distribution centers, one of the final links in the supply chain, with a manpower shortage. "It told them this was less of a systems issue and more of a cultural issue in terms of developing a collaborative environment for sharing information throughout the company," he says.

Wilcox says the trend for greater integration will be more pronounced as flexible fulfillment becomes a stronger customer demand in many industries. Companies will need to have an aggregate view of orders, inventory, warehouse, distribution and transportation. He says upgrading back-office systems is one way to provide the foundation for information sharing throughout the supply chain.

Sutherland adds, "Right now we know what it takes and we have the enabling technology for an integrated logistics network, but there's not always the commitment from upper management."

CHANGING 3PL RELATIONSHIPS

As part of an integrated strategy, an increasing number of companies use 3PLs to manage logistics, ranging from transportation, distribution, freight forwarding and warehousing. Because of this reliance on 3PLs, Wilcox says the relationship between supply management organizations (which he collectively calls "shippers") and 3PLs is critical to meet future company and consumer needs.

Capgemini's 3PL study finds 67 percent of shippers surveyed are increasing their use of outsourced logistics services, and 26 percent report a return to insourcing many of their logistic activities. However, 53 percent say they are reducing or consolidating the number of 3PLs they use.

Most 3PL-shipper relationships remain transactional and cost-focused, he says. The Great Recession prompted both shippers and 3PLs to re-examine what accounts, customers and services are profitable and to be more specific and pragmatic about what they expect of each other and the relationship they desire.

"Many want a more collaborative partnership, but I don't think we are quite there yet," Wilcox says. He says transactional, operational and repetitive activities are the most outsourced, while the more strategic, IT-intensive and customer-facing are outsourced to a lesser degree.

During workshops for the 3PL study, Wilcox says there was increased interest and acceptance of 4PL services, which could also change the evolving relationships of shippers and 3PLs.

Global economic pressures, transportation service rate increases and expanding cloud technology could all lead to nontraditional services providers such as 4PLs in the future, Wilcox notes. A 4PL would be a lead logistics provider – a virtual or non-asset based company – that would be a single interface between the client/shipper and multiple logistics providers.

"A 4PL could piece together all the players, offer consistent service and look for the most cost-effective providers," he says. The 4PL is an evolving operating model, but one that could be more dominant in future years.

LOOKING TO THE FUTURE

There are many other issues supply management practitioners could be tackling in the future, including rearranging logistics networks as nearshoring takes hold and properly managing global risk throughout the supply chain. But no matter the challenge, it's clear that as companies continue to compete on a global scale, their logistics networks will be a key differentiator in meeting customer needs and helping complex supply chains function efficiently and effectively.

Mary Siegfried is a senior writer for *Inside Supply Management*®.

A Beginner's Guide to Hazmat

Getting ready to ship hazardous materials? Maybe you're shipping them already and don't even realize it. Here are the basics you need to know to ship safely and comply with current regulations.

By Merrill Douglas

When you move hazardous materials, you face two kinds of risk. One is that your freight will trigger a disaster—a toxic spill, an explosion, or a fire. The other is that you'll run afoul of hazmat transportation regulations. Even if the goods you ship never cause any harm, an audit that finds you noncompliant could saddle you with serious fines.

If you're new to hazmat, or you want a refresher, here's an introduction to the basics, plus advice from the experts.

THE BASICS

A hazardous material is a substance or material capable of posing an unreasonable risk to health, safety, and property when transported in commerce, according to the U.S. Department of Transportation. The DOT is just one of many bodies that regulates hazardous materials, also known in much of the world as "dangerous goods." The United Nations develops model rules for hazmat transportation; governments and transportation organizations worldwide use these rules as the basis for their own regulations.

Through its work, the UN provides an objective and consistent way to classify hazardous materials. "By doing certain tests, you can measure whether or not your products fall within the UN's definition," says Larry Bierlein, an attorney whose practice focuses on hazmat regulation, and who serves as general counsel to the Association of Hazmat Shippers (AHS) in Washington, D.C.

The UN's system divides hazardous materials into nine major classes, most with two or more subclasses (*see sidebar, page 105*). Each class and subclass comes with its own set of rules.

Different rules also apply to different transportation modes. For example, hazmat shipped by air often has extra packaging requirements that don't apply to ground or ocean transportation. "Products shipped by air might need to have special provisions to meet pressure requirements, for example, or accommodate the way the plane moves up and down," says Gary Lindsey, a senior executive account manager with the Dangerous Goods Division of Berlin Packaging in Bridgeville, Pa.

Hazmat regulations from the U.S. DOT, Transport Canada, the International Air Transport Association (IATA), the International Maritime Organization (IMO), and other bodies follow the UN's lead. Each tailors the rules to some extent, but the general trend is toward worldwide harmonization.

To comply with the regulations, shippers have to first recognize that they're moving hazardous materials, classify them correctly, and learn which rules apply. Then they need to meet requirements in three major areas—training, packaging and marking, and communication with the carrier.

IS IT HAZMAT?

If your company makes chemicals, or uses them in production, you probably know which ones fall under hazardous materials regulations. "When scientists or other compliance experts are part of a company's research and development process, it's their responsibility to identify if an item is hazmat," says Forest Himmelfarb, vice president, software and services, at Labelmaster, a Chicago-based firm that offers labeling, placards, packaging and software for hazmat compliance.

But shippers might not realize hazmat regulations also cover products that aren't industrial chemicals. "One example might be aerosols you bought from an office supply store and are now distributing across the company," says Tom Ferguson, director of technical services at Currie Associates, a Queensbury, N.Y.-based company that provides hazmat training, auditing, and consulting. They could be cosmetics moving to retail stores, or lithium batteries loaded inside laptop computers.

You might neglect those products if you confuse hazmat regulations—which apply strictly to goods in transit—with regulations on dangerous substances from the Occupational Safety and Health Administration (OSHA) or the Environmental Protection Agency (EPA). The lists of substances that those agencies regulate overlap, but they're not identical.

A TOUCH OF CLASS

Besides confirming a substance falls under hazmat rules, shippers have to classify it to determine which rules apply.

For many companies, the starting point for hazmat classification is the Safety Data Sheet (SDS) they receive from the supplier of a hazardous substance. The SDS—a document governed by OSHA—explains what the material is made of and what dangers it may pose, and provides instructions for safe handling.

But the SDS is not a foolproof guide. "Sometimes the document arrives with incorrect data," says Dale Kettler, hazardous materials compliance manager at Cabela's, an outdoor sports equipment retailer in Sidney, Neb. Cabela's relies on well-trained employees in its distribution centers (DCs) to notice discrepancies. "Then we'll do a little more investigation."

Also, not every hazardous product comes with an SDS. Many exceptions are what the hazmat regulations call articles or devices, which fall outside OSHA's purview. Lithium batteries, automotive airbags, and self-inflating life vests are examples.

One of the best ways to learn to identify and classify hazardous materials is to read the regulatory documents. For ground transportation in the United States, the rules reside in Title 49 of the Federal Code of Regulations (49 CFR). For most air carriers, the hazmat "bible" is the IATA Dangerous Goods Regulations manual.

Aviall, a Dallas-based Boeing company and leading provider of new aviation parts and aftermarket services, maintains an in-house team of experts to identify and classify the hazardous materials it ships. These materials include additives, adhesives, cleaning products, deicers, greases, lubricants, oils, paints, and sealers.

"Our Environmental Health and Safety team inspects every item Aviall offers for an initial hazard determination," says Jon Pelis, manager of dangerous goods compliance at Aviall, which also provides aftermarket supply chain management services. "This data is captured in our SAP enterprise resource planning system, and is validated upon receipt by Aviall's trained chemical receiving personnel, and again by our shippers."

WHAT MODE, AND HOW MUCH?

Once you know what kind of hazmat you're shipping, you can focus on just the rules that pertain to those products. You also need to bear in mind your modes of transportation, and whether your shipments are international or strictly domestic.

The answers to those questions determine which regulations you'll have to study. "To be compliant, everyone needs to have

the appropriate book and not assume that all agencies are identical," says Bierlein. "There are differences."

In addition, you have to consider the units in which you're shipping a hazardous material. Different regulations might apply to substances shipped, for example, in a bulk tank or in retail-sized bottles.

"The smaller the package, the more confusing the regulations," says Bierlein. Materials shipped in units defined as "limited quantities" fall under less-stringent packaging requirements, even if you're shipping a full truckload of those units. Materials

Aviation parts and aftermarket services provider Aviall maintains an in-house team of experts to identify and classify the hazardous materials it ships, and operates local warehouses to meet shipper requirements.

shipped in even smaller units, such as sample vials, are called excepted quantities, and subject to even less regulation.

But exemptions don't apply to every material. One case in point is a small cylinder of compressed gas used to fuel a camping stove. "That would have to be shipped by the manufacturer under special labeling, generally under a special permit," says John Storlie, a partner in consulting firm Retail Environmental Solutions, LaCrosse, Wis.

And the definition of unit size can be tricky. For example, one rule relaxes the regulations for shipping liquefied petroleum gases that come packaged "in containers of not more than four fluid ounces capacity (7.22 cubic inches or less) except cigarette lighters," Kettler says. It took a DOT audit to reveal to Cabela's—and to pretty much everyone else who shipped the same product—that the exception didn't cover 3.8 ounces of gas in a container large enough to hold 10 ounces. The size of the container nullified the exception.

"The key word in the exception was capacity," Kettler says. The lesson learned was to take every regulation literally.

Shippers looking for an easier path through the complex web of hazmat regulations might turn to technology for help. Labelmaster, for example, offers the cloud-based Dangerous Goods Information System (DGIS) to help hazmat shippers apply the right regulations to the right shipments.

Large carriers such as UPS and FedEx encourage customers to use the hazmat expertise built into their automated shipping systems. "These will not only tell you what hazmat products you have and how they have to be packaged, but will also print the right documents," says Bierlein.

GETTING COURSEWORK ON COURSE

Although it's important to study the regulations, it takes more than that to establish a compliant hazmat transportation program. Everyone involved in that program must also take formal training.

In the United States, the DOT requires a company to train and test all employees involved in shipping hazmat, and to retain training records. All those employees must receive general awareness training to make them familiar with hazmat regulations. They must also receive training tailored to their specific jobs, plus safety training to prepare them for possible accidents. The company must re-train its hazmat employees every three years.

Training can be delivered in a variety of ways, either in person or online. Himmelfarb favors the classroom for first-time instruction. "The hazmat regulations are so complicated, you need an intensive, instructor-led course to be able to understand them and learn how to comply," he says. "Recurrent training can be done through an online learning platform, if it's prepared well."

But not every company can afford face-to-face training. "Most of my clients like to have training in their automated learning management system, using computer-based learning modules," says Storlie. "It's a great way to keep track of who has been trained, and keep those records in place for compliance."

Hazmat managers at the bulk division of truckload carrier Schneider take a course from the Transportation Safety Institute at the DOT Training Center in Oklahoma City, says George Grossardt, the division's senior vice president and general manager, in Green Bay, Wis.

Even when shippers develop a strong hazmat training program, they might err by failing to extend it far enough. "The most common mistake in retailer logistics programs is not providing adequate training to enough of the staff," says Storlie. Employees who pick items from cases, and pack them together for shipment to stores, must study hazmat requirements if any of those items fall under hazmat regulations.

"Those materials have to be compatible," Storlie says. "They have to be in the proper packaging, and correctly labeled and marked."

At Aviall, all employees in operations take general hazmat training, even if they don't handle hazmat materials, so they can identify potential problems in their areas. "The Aviall hazmat curriculum covers a 23-point training program that goes above and beyond generic certification courses," says Pelis.

To reinforce the lessons provided during training, Kettler's department at Cabela's creates procedures manuals for preparing hazmat shipments. "They give step-by-step instructions, with pictures, for the proper way to pack and ship each individual hazardous item, based on the product's classification," he says.

DRUM, BOTTLE, BOX

Depending on what you ship, and how much, hazardous materials might move in anything from a bulk tank container to a 55-gallon drum to a small plastic, metal, or glass container or corrugated box—or in some combination thereof. The regulation books spell out how to pack each class and subclass of hazmat, and what markings to put on the packaging.

Beyond understanding the packaging instructions, it's also important to know about the relevant exceptions. "If companies get strategic about that—maybe by changing the quantities they're shipping—they can see big cost savings," notes Himmelfarb.

When a shipper works with Berlin Packaging Dangerous Goods Division, a consultant helps the company choose the right packaging and figure out the workflow required to assemble those units. "And then you have to make sure you have the right closure equipment in place, such as torque wrenches, so you're meeting all the specifications prescribed for the package," adds Steve Sowa, the division's director of business development.

Whether they call for a wrench, a specific kind of tape, or another mechanism, it's important to follow the manufacturer's instructions to the letter. "We've seen a lot of oversight and enforcement over the past several years based on package closures," says Ferguson.

After you close a package correctly, you must also label it to indicate the type of hazard inside. The regulations dictate the label formats. For example, the label for a gas that's an inhalation hazard shows the number 2 (for the gas classification), the words "inhalation hazard," and a skull and crossbones.

Companies that import products must be especially vigilant about packaging and labeling. Outside North America, Europe, and Japan, compliance with packaging and labeling regulations can be spotty. If a supplier takes a shortcut, that could spell big trouble once the product arrives stateside. "Then you have a package moving across U.S. roads that doesn't meet the q uality standards," says Bierlein.

Sowa at Berlin Packaging recommends several other best practices. For example:

- Ship the package as it was tested. If it has multiple components, you have to make sure every component is used when you put the shipment in transit.
- When you're shipping liquid, make sure you have a leak-proof secondary container.
- Use enough cushion and absorbent, especially if you're shipping by air, depending on the level of chemical you're declaring.
- Make sure you have the proper pressure test documentation for air shipments.

9 Classes of Hazardous Materials

1. Explosives
2. Gases (non-flammable, flammable, and poisonous)
3. Liquids (flammable and combustible)
4. Other flammable substances
5. Oxidizing substances and organic peroxides
6. Toxic and infectious substances
7. Radioactive substances
8. Corrosive substances
9. Miscellaneous

GET IT ON PAPER

Hazmat packaging rules are designed to prevent mishaps. But, of course, mishaps do occur. That's where the rules on documentation and signage come in.

Hazmat travels with a special bill of lading (BOL) that includes information such as the classification, quantity, and type of packaging.

The carrier uses this information, in part, to stow the freight safely. "For example, some materials on a truck can't be next to each other, and some materials traveling by ocean can't go below deck," says Bierlein.

The BOL also must provide a phone number the driver can call in case of a traffic accident, leak, or other emergency. It's important to highlight this emergency contact information, so the driver or a public safety officer can spot it quickly. "If the driver is incapacitated, the BOL has to be accessible, and that information has to be clearly articulated, so an emergency responder knows how to react," says Grossardt at Schneider.

Following an accident, the emergency contact person can tell first responders the safest way to contain a leak, fire, or other danger involving the hazardous freight. "The product might react poorly to water, for example," Grossardt says. Many shippers outsource the job of emergency contact to third-party service providers, he adds.

If the load is large enough, the shipper must also give the

carrier a placard that replicates the hazmat label. Mounted on a trailer, intermodal container, or other conveyance, the placard tells first responders at a glance what kind of hazard they're dealing with. Responders then check the paperwork for more detail.

Placards are the shipper's responsibility, but sometimes shippers forget them. To avoid problems, each Schneider driver who hauls bulk hazmat travels with a suitcase full of placards. "I'd like shippers to do a better job of making sure they have the right placards when the order leaves the facility," says Grossardt.

POTENTIAL PENALTIES

To make sure shippers take hazmat regulations seriously, the DOT and other agencies impose financial penalties for violations. These can vary greatly. For example, in 2013, the DOT assessed a penalty of $505 against a company that had failed to provide initial and recurrent hazmat training to employees. In 2014, it proposed a civil penalty of $238,000 against a company that had offered two small packages of hazardous materials to FedEx without declaring them. One package contained eight liters of a corrosive material; the other contained 12 fluid ounces of a flammable material.

> "If you shipped a lithium battery per all the regulations five or six years ago, and then jumped ahead to today and tried to do it the same way, you'd be non-compliant."

Companies shipping hazmat by any mode should carefully comply with all regulations. But mistakes are most likely to come to light when shipping by air. "The airlines are required to inspect every shipment, so undeclared or improperly declared hazardous materials show up a lot more often," says Ferguson.

One further challenge hazmat shippers face is keeping up with changes in hazmat rules. "The regulations are moving targets," says Ferguson. A training refresher every three years might not be enough to keep employees up to date. "A new regulatory requirement might come along in six months," he says.

Regulatory changes in the hazmat world are different from changes in, say, the rules that govern hours of service for truck drivers. They're not big, discrete changes that affect everyone. Rather, they're a collection of many small modifications. Some will apply to a given company; others won't.

The United Nations meets every two years to modify its model hazmat regulations. In January 2015, the U.S. DOT released a document, more than a half-inch thick, that incorporates those changes into its own rules.

Regulators rarely make large changes to the hazmat rules. "The system has been in place pretty much as it is since the 1970s," Bierlein says.

One thing that has seen significant change, though, is the set of rules on lithium batteries. "If you shipped a lithium battery per all the regulations five or six years ago, and then jumped ahead to today and tried to do it the same way, you'd be non-compliant," Ferguson says.

A good way to keep up is to find an ally who continuously tracks hazmat regulations. "Get involved with a consultant or, perhaps even better, a trade association that provides routine updates," says Ferguson. Along with AHS, the Council of Safe Transportation of Hazardous Articles (COSTHA) and the Dangerous Goods Advisory Council (DGAC) represent hazmat shippers. Trade associations for specific industries also follow hazmat issues for their members.

At Cabela's, Kettler relies on a variety of industry groups and publications to stay up to date on regulatory changes. "We also monitor the Pipeline and Hazardous Materials Safety Administration (PHMSA—part of the U.S. DOT) site for proposed rulemaking," he says. "In addition, I'm a member of the Retail Industry Leaders Association (RILA) compliance committee, which shares information on rulemakings and issues that pertain to the retail environment."

Technology can help, too. An online compliance system such as Labelmaster's DGIS always incorporates current regulations. "We have a regulatory department that keeps up with changes, and makes sure the software is up to date," Himmelfarb says. Even if the shipper doesn't know that a rule has changed, the software will prepare the shipment correctly.

COMPETITIVE ADVANTAGE

Like hazmat products themselves, the field of hazmat compliance may seem fraught with danger. But hazmat travels safely on our roads and rails, and across the seas and skies, every day. With proper attention to training, process, and packaging, a shipper can navigate the perils of hazmat regulation and reach the other side all in one piece.

In fact, a strong hazmat program can actually strengthen a company's position in the marketplace. "If managed properly, compliance built into operational processes increases efficiency while providing safe packages to our customers," says Pelis at Aviall. "Compliance and productivity must coexist. When they do, everybody wins."

Merrill Douglas is a senior contributing editor for *Inbound Logistics*.

Supply Chains in Crisis

As the deadly Ebola outbreak threatened West Africa, a team of medical, humanitarian and logistics experts teamed up to respond to the deadly virus. The lessons learned by the team could provide a logistics blueprint for handling future crises.

By Jarrod Goentzel and Ian Heigh

DURING THE RECENT DEADLY EBOLA OUTBREAK, A UNIQUE group of experts and organizations formed a supply chain to improve the delivery of humanitarian aid. New supply chains often emerge during a crisis, relyingdo you on processes honed by professionals over the years. This Ebola effort leveraged the strengths of new and traditional groups through a coordination model that companies have long used – supply and demand planning, early and often.

As the Ebola epidemic spread in 2014, resources were appropriately focused on setting up Ebola treatment units while hospitals that provide other critical services were closed or severely constrained. Consequently, healthcare workers lacked enhanced training on infection protection and control (IPC) for Ebola and the personal protective equipment (PPE) supplies to safely deliver healthcare services despite lethal infection risk.

Doctors at the University of Massachusetts Medical School (UMMS) and Boston's Children's Hospital, who had worked with the Ministry of Health in Liberia for more than seven years, together with their colleagues at the Liberia College of Physicians and Surgeons (LCPS), sought to fill this gap in training and equipment. Realizing that the supply chain was critical, the medical specialists also teamed up with experts from the Center for

Transportation and Logistics at the Massachusetts Institute of Technology and from Avenir Analytics, a firm that specializes in supporting humanitarian agencies in response planning and implementation. Together they formed the Academic Consortium Combating Ebola in Liberia (ACCEL).

ACCEL proposed an intervention to provide IPC training coupled with three months of appropriate supplies to protect healthcare workers in hospitals prioritized by the Liberia Ministry of Health. The operation began in November 2014 with a grant from the Paul Allen Tackle Ebola Initiative.

PLANNING A CRISIS RESPONSE

While it's common for businesses to plan operations based on actual demand or agreed-upon sales forecasts, the practice is less evident in international emergency response. Donors typically release funds after the onset and ramp up aid in the immediate aftermath. With limited funding to mobilize resources initially and time pressure to deliver assistance quickly, organizational planning between technical programs and the supply chain is often overlooked.

In contrast, ACCEL experts combined knowledge of the Liberian health community and of commercial and humanitarian logistics capacity to plan its response from the start. The medical program director, international supply chain director and Liberian supply chain director met in Boston in November 2014 to draw up a plan. The initial plan included three main components.

1) Scope and implementation. ACCEL worked directly with the Liberian Ministry of Health to prioritize efforts based on budget constraints, selecting 16 of 21 government hospitals. Hospital staff training used a curriculum developed by the health ministry for safe care and sanitation. Training was delivered in each facility over one week by specially trained LCPS/ACCEL teams consisting of a doctor, midwife, water-sanitation technician and a psycho-social expert. ACCEL also provided three months of consumable and reusable personal protective equipment, and water and sanitation (WASH) items, which arrived simultaneously with the team.

2) Demand plan. The medical program director combined knowledge of current Ebola protection requirements with seven years of experience in Liberian hospital facilities, which was critical in determining specifications for and quantities of PPE and WASH commodities. Quantities were based on several factors, such as the number of hospital beds, surgeries, childbirths, Ebola emergencies expected, and healthcare and sanitation workers. Teams classified hospitals as large, medium and small, delivering standard kits for each.

3) Supply plan. The demand plan provided a basis for calculating supplies required over time and specifying necessary operational assets. The supply chain design incorporated resources already in place and knowledge of existing operations to reduce duplication and setup time. For example, the Logistics Cluster, a coordination body established by the international humanitarian community, worked with the Liberian government to establish a warehouse and distribution system. In addition, the health ministry, with assistance from the Clinton Health Access Initiative, tracked Ebola commodities (both in stock and planned) with a weekly interagency supplies/pipeline spreadsheet.

INTERNATIONAL PROCUREMENT

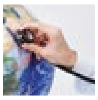
With the initial plan in place, and a mid-January 2015 training launch agreed on by the government, ACCEL conducted an RFP for the complete set of supplies required. Precise product specifications were difficult to determine, as several standards for treatment were circulating. Reference to standards, such as ISO 16603 for clothing that protects against contact with blood and body fluids, helped link specifications across health organizations and with manufacturer offerings. Ensuring that all products met standards was especially critical given the life or death risks of product failure.

Approved suppliers for UMMS were invited to bid. One large-scale commercial distributor stood out in its ability to provide a complete catalog of PPE and WASH items with relatively short lead times. The distributor used relationships with a large network of manufacturers to find capacity for products in high demand. Using a supplier with a catalog preapproved for the medical school's procurement organization saved significant time. The distributor's warehouse was able to consolidate the large shipment for international transportation.

The time line dictated air transportation, although capacity was constrained because most commercial airlines had suspended operations into Ebola-affected countries. ACCEL used new air-bridge capacity that emerged through the efforts of Airlink, which also received a Tackle Ebola grant from Paul Allen. Airlink established the air bridge from the United States and Europe directly into West Africa. The Liberian government's National Ebola Command Center established a clear process to quickly facilitate customs clearance for all humanitarian aid shipments. As a result, the deployment of supplies was rapid – the MD-11 charter with ACCEL cargo departed Miami on January 11, 2015, and the first hospital delivery was completed the morning of January 16, 2015.

IN-COUNTRY OPERATIONS

Effective execution relied on the capabilities of the ACCEL staff and its partners in Liberia. The Liberia College of Physicians and Surgeons' existing capabilities and relationships in-country helped ACCEL quickly set up operations. Because the college



focuses on teaching, setting up an operational agency with a supply chain required specialized support from logistics professionals. After recruiting a national logistics manager, warehousing and transport officer, procurement officer and head driver, the logistics team developed the following three core processes.

1) Local procurement. To save costs and ensure products were appropriate for the context, the team purchased 13 of the 68 SKUs locally. It also established an auditable process for local procurement, based on rules used by the LCPS to ensure compliance with national requirements.

2) Warehousing and transport. ACCEL established an agreement with the Logistics Cluster to accept internationally and locally procured PPE and WASH supplies in the central store in Monrovia, the capital of Liberia. The cluster also provided trucks to move goods to each location. ACCEL worked closely with the cluster team and submitted service requests to plan receipts and dispatches in advance.

3) Fleet services. Safe transport was crucial for the training teams traveling throughout the country, and it was determined that ACCEL needed nine 4WD vehicles. Through an innovative arrangement, the United Nations Mission for Ebola Emergency Response transferred eight vehicles from other U.N. operations in the region to ACCEL, which were inspected, repaired as needed, and equipped with safety kits, communication systems and tools. It also established maintenance and fueling contracts, and its drivers were trained and tested on standard procedures.

Standard forms (electronic and paper) and spreadsheet tools were developed to support and track the processes. Data were consolidated in a weekly report to provide management with progress updates.

After the first few weeks, the health ministry requested expansion of the program from the original 16 to all 21 hospitals. The logistics costs, which represented more than 70 percent of the original budget, were tracking well under budget due to procurement savings, operational efficiencies and contributions from partners. These savings, combined with Ministry of Health supplies identified in the interagency supplies/pipeline spreadsheet, enabled ACCEL to cover all 21 hospitals with the original budget by the third week of March 2015.

MAKING A DIFFERENCE

The training and supplies had a major impact on the Liberian health system. By the end of March 2015, more than 2,200 healthcare and sanitation workers were trained and equipped to safely provide health services. Several hospitals that had been closed were reopened. The minimum standards for safe-care provision, as measured by a checklist established by the Liberian health ministry, increased from 61 percent to 86 percent after the first round of training. Most important, thousands of patients had access to health services that otherwise would not have been available from January through March 2015.

The ACCEL supply chain procured more than 70 metric tons of supplies, internationally and locally, and delivered them to hospitals across the country within 12 weeks. By the end of March, the vehicle fleet had safely transported ACCEL teams nearly 35,000 miles. Team capabilities combined with budget savings allowed improvements to hospitals, including construction or modification of Ebola triage areas, construction of safe waste-disposal incineration facilities, rehabilitation of water systems and deployment of shipping containers for supplemental storage.

LESSONS LEARNED

This Ebola-response supply chain brought together a mix of development and humanitarian emergency experts, each with important core competencies for the situation. They further leveraged international and national service providers, both commercial and humanitarian, in operating the supply chain. Combining expertise and tailoring partner capacities was possible because of the demand and supply plan devised at the start and updated through the implementation.

The rapid scale-up of operations relied on a capable in-country organization. LCPS provided a solid foundation of human resources, standard processes and key partnerships to ramp up operations. It also provided a link to the Ministry of Health to ensure the intervention was coordinated with other initiatives. The school was able to set up and manage its supply chain using a simple design provided by experienced logistics professionals and supplemented by control mechanisms to ensure goals were achieved.

The efforts of the ACCEL team have contributed to the work of other aid agencies in supporting the government of Liberia to contain the Ebola outbreak, although critical work remains to achieve zero new Ebola cases in West Africa. ACCEL training teams are making second visits to each hospital to refresh training, train workers who were not available during the first round, assess the quality of new practices and determine supply consumption under these guidelines.

Even the most resilient supply chains will occasionally be overwhelmed by a crisis. The ACCEL supply chain was designed to be rapid and temporary, building on local capacity to provide a boost for government systems that were overwhelmed. Consistent and coordinated demand and supply planning was a key component in maximizing the impact of the project. Investment in planning and information systems, and in training professionals to use them, is essential for supply chains to keep pace with the aggressive viruses of the future and other challenges in delivering assistance to people in need.

Jarrod Goentzel is director of the MIT Humanitarian Response Lab in the Center for Transportation and Logistics at the Massachusetts Institute of Technology in Cambridge, Massachusetts. Ian Heigh is head of planning and operations support for Avenir Analytics, which is based in Lamaca, Cyprus.

Casebook | by Tamara Chapman

Supply Chain Sustainability: Creating a Climate for Change

When the bottom line needs boosting, savvy companies seek to cut, cut, cut. Not jobs. Not prices. Not investments, or dividends to stockholders.

> When companies get serious about cutting costs by reducing their carbon footprint, they call in the Climate Corps.

Instead, they cut carbon emissions. And in the process, they slash costs. It's a move that's not just friendly to Planet Earth, it's downright benevolent to the operating budget.

Cutting carbon emissions may seem daunting, however, because nearly every activity associated with producing, storing, moving, and selling products relies on consuming fossil fuels, a main source of carbon emissions. When companies need help identifying ways to shrink CO_2 emissions—and the expenses associated with them—they can turn to the Climate Corps fellowship program run by the Environmental Defense Fund (EDF).

Through Climate Corps, the EDF provides participating companies access to a high-achieving, innovation-minded graduate student hand-picked from one of the nation's leading universities. In creating the project, the EDF wanted to identify "some really smart MBA students, pair them with our experience, and match them with a company," explains Jason Mathers, the non-profit organization's senior manager of supply chain logistics.

Armed with the EDF's intensive training on best practices, fellows spend one summer with their host company, collaborating with on-site teams to identify ways to slice carbon emissions and the costs associated with them.

Since its inception in 2008, the Climate Corps program has helped identify roughly $1.4 billion in potential energy savings for host companies. That translates into more than 1.9 million metric tons of greenhouse gas reductions.

When using Environmental Protection Agency and EDF calculators, this is equivalent to avoiding the annual emissions of 400,000 cars or 10,000 tractor-trailer trucks, Mathers says.

Originally, the Climate Corps program focused on finding cash and carbon savings in commercial buildings, because, as Mathers notes, "about 40 percent of our energy consumption in this country relates to commercial buildings."

But a staggering amount of energy is also consumed distributing products—in fact, moving goods from Point A to Point B accounts for about 16 percent of corporate emissions in the United States, Mathers adds. And the movement of freight accounts for about six percent of human-generated global warming, the EDF reports.

"We want to bring down this source of carbon emissions," Mathers says. With that in mind, he introduced a green freight initiative to the Climate Corps program. Its first foray into the transportation realm, which occurred in summer 2014, paired a Duke University graduate student with Massachusetts-based Ocean Spray Cranberries, Inc.

From Mathers' perspective, the fellowship was the perfect kickoff to what he hopes will become a fruitful initiative that reaches hundreds of companies across the nation, particularly major brands with the highest potential to achieve dramatic results. "We haven't met a company yet that hasn't had an opportunity to reduce emissions," Mathers says. "Wherever the emissions are, we want to get them."

For Ocean Spray, the decision to participate in the Climate Corps' green freight fellowship program was a no-brainer. In fact, the company has periodically turned to outside organizations—EDF included—for expert advice on meeting its challenges.

"Ocean Spray has long sought to capture efficiencies, drive down costs, and reduce the carbon impact of our complex distribution network," says Ocean Spray's logistics manager, Keli Sanford. "EDF, along with MIT's Center for Transportation and Logistics, have been important partners in this area, and we knew that the Climate Corps program would underscore the important work that has already been done, while bringing fresh ideas and thinking into the process."

Fresh ideas came in the person of Eric Chappell, a student in a three-year graduate program combining course offerings from Duke's Fuqua School of Business and Nicholas School of the Environment. With an undergraduate degree from the University of North Carolina at Chapel Hill, where he majored in economics and Mandarin, Chappell also had internships and some professional experience on his resume, having worked with an international research company analyzing market challenges facing Afghanistan and Eastern Europe.

In addition to his experience and education, he brought an intense passion for sustainability—and for logistics challenges—to the fellowship. The supply chain, he says, offers a wealth of opportunities for cost and carbon cutting. "If you are serious about fighting climate change, the supply chain will have great impact," he says, adding that the process will result in "making a company more resilient and competitive, as well as more sustainable."

Going into his summer at Ocean Spray, Chappell kept resiliency and economic viability top of mind. To add momentum to the company's sustainability efforts, he

> "I think a lot of companies are nervous about moving into the sustainability space. But Ocean Spray was ready for some kind of disturbance."
>
> —**Eric Chappell,** Fellow, EDF's Climate Corps program

Ocean Spray is committed to managing its business in a way that minimizes environmental impact. To that end, the beverage manufacturer participates in EDF's Climate Corps program, which embeds MBA students to identify and implement sustainability best practices.

aimed "to make proposals with a low barrier for capital expenditures," he says. Such proposals would reinforce the value of sustainability, and the savings could possibly fund additional efforts.

Ocean Spray was just as interested in making the most of the fellowship. To prepare for Chappell's 10-week fellowship, the company identified several areas for him to target.

"First, we needed him to become familiar with Ocean Spray's logistics network and internally developed carbon-tracking tool," Sanford explains. "We then gave him the chance to review optimization opportunities with a fresh set of eyes and external expertise, with the goal of identifying three to five projects that would be prioritized based on potential for cost and carbon reductions.

"Eric was then charged with developing and refining tools to support future projects and prioritizations such as our Green Freight Guidelines and a project evaluation tool. Finally, we asked him to provide recommendations for a carbon-efficient logistics strategy and to set targets, activities, and recommendations—all in support of final reporting."

Reporting to the company's sustainability manager, Chappell plunged into the Ocean Spray trenches, where he made it a point to learn about how the company deals with its freight issues day-to-day.

"My office was in the transportation department," he recalls, "so I could work with them more frequently than the sustainability manager did. And that was probably the number-one factor that led to this project's success. I could understand their motives, and their alternatives. I asked everybody, 'what keeps you up at night?'"

The answers—which encompassed a wide range of black-swan, perfect-storm, and nature-run-amok events—helped him understand the thinking behind decisions related to everything from stocking levels to transportation modes.

PUTTING ENERGY INTO SAVING ENERGY

The Environmental Defense Fund's (EDF) Climate Corps fellowship program aims to pair some of the nation's brightest MBA students with a broad range of corporate partners. The fellows embed with their host companies over one summer, working to identify and implement best practices for saving energy–and, as a result, reducing carbon emissions.

To date, one in three Fortune 100 companies have hosted a fellow, some more than one, the EDF reports. An estimated 400 Climate Corps fellows have been placed since 2008. These fellows have uncovered an average of $1 million in energy savings for each organization involved.

The fellowships serve the EDF's climate-change priorities while bringing value to participating companies, students, and educational institutions, according to Jason Mathers, the EDF's senior manager of supply chain logistics.

HOW CLIMATE CORPS BRINGS VALUE:

- For just the cost of the fellow's summer stipend, companies benefit from actionable plans that lead to quantifiable results.
- Climate Corps introduces companies to, in Mathers' words, "some really smart MBA students"–in other words, the next generation of innovators and business leaders.
- The program provides a way for the nation's leading business schools to transfer some of their intellectual capital to the real world.
- The talent pool of business professionals is enriched by EDF training, with its emphasis on green principles and on identifying opportunities for maximizing energy efficiency.

Although EDF assesses no charges for the program, it does ask that participating companies pay a $15,000 stipend for the 10-week fellowship, and assume any costs associated with office space and research-related travel.

The best candidates for a fellowship are firms with large warehousing or freight operations–companies that know they can make improvements, but don't know how to accelerate the process.

The key for a match is if the company has been thinking about participating, but hasn't been able to move forward," Mathers says.

To learn more about the program, visit www.EDFClimateCorps.org.

Getting on Track

While working in the transportation department, one of Chappell's first tasks was to evaluate Ocean Spray's greenhouse gas emissions tracking tool. This, in turn, led to an analysis of the firm's truckloads and transportation lanes.

A review of truckloads pointed to a number of strategies that could lead to significant cost and carbon cuts. Chappell's analysis revealed that Ocean Spray would cut costs if it dispatched full truckloads to their final destination, which would result in fewer trips, and fewer greenhouse gas emissions.

To present his case, Chappell asked two questions: What's the cost and value of stock on the shelves? And what's the cost of dispatching partially filled trucks? The cost of partially filled trucks exceeded the cost of warehousing the goods. In other words, it made sense for Ocean Spray to position itself to deliver more goods less frequently.

What's more, Chappell argued, partially full shipments put the company at risk for lost sales. What if bad weather prevented the timely delivery of products from the East Coast to a regional distribution center? That could result in a shortage of product on grocery store shelves. "You risk losing the sale, and the customer," Chappell says.

That argument resonated with Ocean Spray. It also resulted in immediate action. "Eric brought to light inefficient ordering strategies within our Canadian market," Sanford says. "He identified frequency and size of orders as drivers of excess energy demands. With this data, we were able to begin discussions with an important Canadian customer in order to reduce spend and increase consolidation."

Changing Lanes

While inefficiencies in ordering strategies provided a sizable opportunity for cutting emissions and costs, the biggest potential for savings resulted from Chappell's examination of transportation lanes. Here, he saw that in certain regions—particularly the Southwest, with its vast expanses of open country between major markets—it made more sense to ship products via rail rather than truck.

When Opportunity Knocks

"Eric found that shifting to intermodal from over-the-road was the largest opportunity to reduce emissions," Sanford says. "By utilizing the GHG Emissions Tool that Eric refined during his fellowship, we were able to identify the lanes contributing the highest percent of total emissions.

"We identified 34 lanes, representing 31 percent of total emissions from transportation," Sanford adds. "Of these, 17 were identified as being particularly optimized for switching to intermodal, based on a number of criteria including length of route, and readiness for optimization."

Chappell credits Ocean Spray with having an open mind and eagerness to revisit conventional wisdom. "Some sustainability concepts haven't been in the market long enough," he says, "so I think a lot of companies are nervous about moving into the sustainability space. But Ocean Spray was ready for the next step. It was ready for some kind of disturbance."

While that may not be the case everywhere, Chappell says more companies will come to see that cutting carbon emissions is good not just for the environment, but critical for future viability. "You can grow by raising prices or reducing costs," he says. "Reducing costs will be a lot more popular."

For any sustainability-minded company considering a partnership with the Climate Corps, Sanford offers this advice: "EDF fellows provide immediate, hands-on help to reap sustainability's financial and environmental benefits, but you need to recognize that you're on a journey. There is much more that can be done, and needs to be done, to measure environmental impacts." ■

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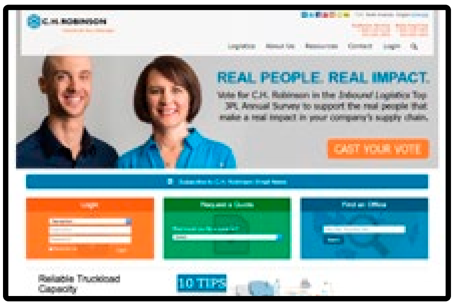

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Founded in 1905, C.H. Robinson Worldwide, Inc. is one of the largest third-party logistics companies in the world, providing multimodal transportation, fresh produce sourcing, and information services to more than 32,000 customers globally, ranging from Fortune 500 companies to small businesses in a variety of industries. For more information about our company, visit our website at www.chrobinson.com.

CLX Logistics • www.clxlogistics.com

CLX Logistics is a global provider of comprehensive logistics management, technology, and supply chain consulting services to a broad base of industry verticals. From chemical and energy to manufacturing, retail, agriculture, automotive, and heavy haul, we help clients in nearly every industry to realize sustainable supply chain value by employing a mix of managed services, on-demand global TMS technology, and comprehensive transportation management services to improve performance and reduce cost. CLX Logistics is dedicated to solving its customers' most vital logistics challenges.

IN THIS SECTION:

Chemical Logistics

Dupré Logistics • www.duprelogistics.com

With specific emphasis in the chemical, consumer products, and beverage industries, Dupré's unique solutions provide expertise in dedicated fleets, transportation management/brokerage, materials handling, and reverse logistics. Dupré works to understand your business and measure how our system meets your expectations.

Lynden • www.lynden.com

Over land, on the water, in the air–or in any combination–Lynden has been helping customers solve transportation problems for almost a century. Operating in such challenging areas as Alaska, Western Canada and Russia, as well as other areas around the globe, Lynden has built a reputation of superior service to diverse industries.

Odyssey Logistics & Technology • www.odysseylogistics.com

Odyssey Logistics & Technology combines deeply skilled industry professionals with a leading technology solution to provide multimodal logistics management services to the chemical industry and other process manufacturers. Odyssey Logistics & Technology enables these companies to outsource any part of the management and transportation of their raw materials and finished goods. They achieve cost savings through reduced transportation and infrastructure costs, measurable customer service and process improvements, and improved data quality and management.

Weber Logistics • www.weberlogistics.com

Weber provides warehouse services throughout the Western United States, with 6.5 million square feet of space across 19 modern distribution centers in California, Arizona, Nevada, and Utah. Warehouse services include dedicated contract warehousing, shared warehousing, temperature-controlled storage, e-commerce fulfillment, crossdock services, and a wide range of value-added services, such as product postponement, kitting services, and hazardous material storage.

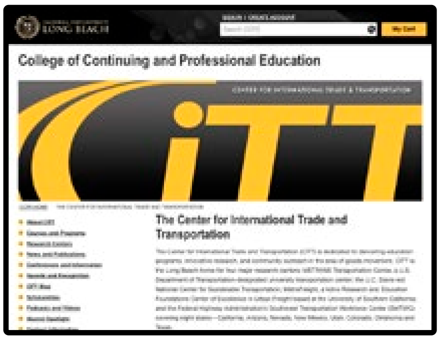
WSI (Warehouse Specialists, Inc.) • www.wsinc.com

Reliability is everything. At WSI, that has been our approach to integrated logistics and supply chain solutions for more than 40 years. Our promise of Condition, Count & Time ensures accurate, timely, and sound performance—every time. Recognized as one of the top 3PL companies in North America, WSI delivers custom solutions for warehousing/distribution, fulfillment, transportation, import/export, information technology, and customer support services. Depend on WSI for increased efficiency, reduced costs, and absolute reliability.

EDUCATION

California State University, Long Beach • www.ccpe.csulb.edu/citt

The Center for International Trade and Transportation (CITT) acts as a catalyst for growth, and offers a neutral ground for addressing issues along the entire global logistics pipeline. CITT is a partner with METRANS, a University Transportation Center funded by the U.S. DOT and Caltrans. The Global Logistics Specialist (GLS) and the Marine Terminal Operations Professional (MTOP) are industry-driven training programs. The GLS serves both users and providers of global logistics services. Classes are offered on the CSULB campus and in an innovative online format. The MTOP program addresses all aspects of terminal operations from container terminals, breakbulk, and RoRo to cruise terminals. For more information, visit this website.



Duquesne University, Palumbo-Donahue School of Business
www.duq.edu/business

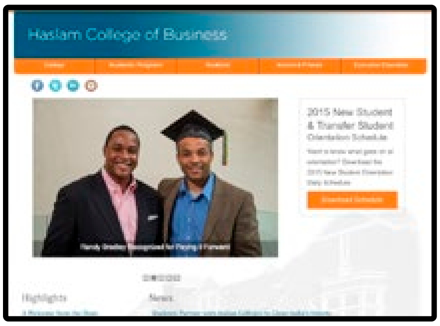
Duquesne University's Palumbo-Donahue School of Business is nationally recognized for distinctive and innovative education in sustainability and supply chain management. The hands-on curriculum gives students the practical wisdom they need to add sustainable value and efficiency to any company's supply chain. Ranked #12 in the nation for its BSBA with a supply chain management major and an optional health care supply chain track. Ranked #1 in the United States for its MBA with a sustainability focus. Learn more: www.duq.edu/business

University of San Diego • www.sandiego.edu/msscm

The University of San Diego's ISM-approved Master of Science in Supply Chain Management is delivered via e-learning with only a few on-campus sessions per year. Through relevant curriculum with applied learning, you'll develop leadership competencies that will enable you to initiate change and drive improvements across increasingly complex supply chain networks. Join us now for two years that will change your life!

IN THIS SECTION:

Education – Logistics IT



University of Tennessee, Haslam College of Business • haslam.utk.edu

The Executive MBA (EMBA) for Global Supply Chain gives students the opportunity to gain access to the international community of supply chain executives and leading scholars, and acquire knowledge from the #1 globally ranked faculty for supply chain research. Much of the program's design is rooted in feedback from supply chain senior executives who sit on the Advisory Board of UT's Global Supply Chain Institute. These executives know what it takes to run world-class supply chains and their input was critical to creating a curriculum that delivers the core competencies expected in high performers.

University of Wisconsin-Superior Certified in Transportation and Logistics • www.uwsuper.edu/ilctl

The CTL (Certified in Transportation and Logistics) is a senior-level credential, recognizing professionals who demonstrate a deeper understanding of the fundamentals of the profession through successful completion of six modules. The program starts on the second Wednesday of every month, is entirely online, and can be completed within eight months or at your own pace. For more information, contact us at ctl@uwsuper.edu or 800-370-9882. This program satisfies the requirements for the credential and is offered in partnership with the American Society of Transportation and Logistics (ASTL).

GLOBAL LOGISTICS

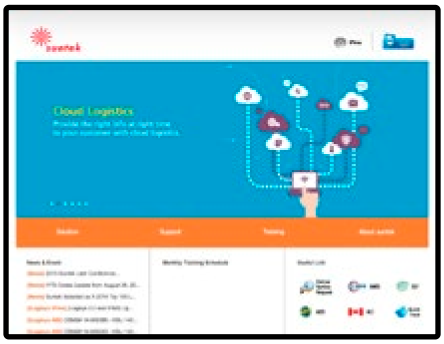
NFI • www.nfiindustries.com

NFI is a fully integrated supply chain management provider offering dedicated fleets, logistics, distribution, warehousing, intermodal, global, commercial and industrial real estate, consulting, transportation brokerage, and solar services across the U.S. and Canada. NFI owns facilities nationwide and globally, more than 2,000 tractors, and more than 7,000 trailers. Privately held by one family since its inception in 1932, NFI operates 20+ million square feet of contract and public warehouse and distribution space, and generates more than $1 billion in revenue annually. NFI is an EPA Smartway Transport and WasteWise Partner and is dedicated to increasing energy efficiency and reducing the impact of the freight industry upon the environment.

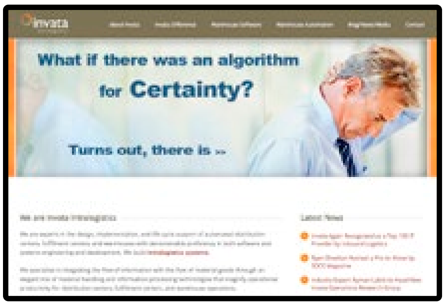
LOGISTICS IT

Suntek Systems Inc. • www.ilogisys.com

Suntek provides its logistics management software, *iLogisys*, for freight forwarders, NVOCCs, 3PLs, and customs brokers. As the company's flagship solution, *iLogisys* offers simple and efficient methods of logistics operation, collaboration tools between related parties, extensive supply chain visibility, B2B EDI connectivity, and more control over business management. The cost-effective and feature-rich *iLogisys* products boost your customer satisfaction, and increase sales opportunities for business growth.



MATERIALS HANDLING



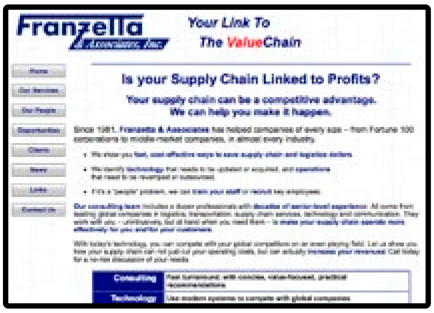
Invata Intralogistics • www.invata.com

We are experts in the design, implementation, and life cycle support of automation systems for distribution centers, fulfillment centers, 3PLs, and reverse logistics centers. We offer complete intralogistics solutions that begin with in-depth operational analysis and end with fully optimized, purpose-built, turnkey systems. Our warehouse automation solutions incorporate an elegant mix of advanced material handling technology (ASRS, sortation, order fulfillment systems, etc.) and algorithmic-rich warehouse software (WMS, WCS) in scalable, supportable, and financially justifiable configurations.

RECRUITING

Franzetta & Associates, Inc. • www.franzetta.com

Franzetta & Associates, Inc. is an all-encompassing supply chain consulting firm. One of the services we provide for our clients is specialty focused recruiting. Through the years, our impressive list of clients includes Fortune Top 10's as well as mid-market and small firms. We know the business and understand your needs. We have access to many top-notch logisticians, and will be able to more than accommodate your requirements. We nurture close relationships with both our clients and recruits to ensure success for both. E-mail: resumes@franzetta.com or call (814) 466-9010.



RETAIL LOGISTICS

Performance Team • www.performanceteam.net

Performance Team is the only thing that should come between your products and your customers. For nearly 25 years, Performance Team has been offering its expertise to the retail and manufacturing industries with a broad range of supply chain services including: trucking, distribution, logistics, and fulfillment. Through 11 domestic hubs, over 5.1 million square feet of warehouse space, and a fleet of more than 400 trucks, Performance Team's skilled team of employees processes approximately $100 billion in wholesale goods. See why Performance Team continuously earns a reputation as the premiere trucking, consolidation, and distribution company in the United States; log on to www.performanceteam.net.

SUPPLY CHAIN MGMT/OPTIMIZATION

Penske Logistics • www.penske.com

Penske Logistics is an award-winning logistics services provider with operations in North America, South America, Europe, and Asia. Our products and services range from dedicated contract carriage and distribution center management to transportation management and fully customized solutions. No matter what your needs or industry, Penske Logistics engineers supply chain solutions that deliver business results like boosting productivity, improving service, and shrinking carbon footprints. Call us today at 1-800-529-6531 to learn more.

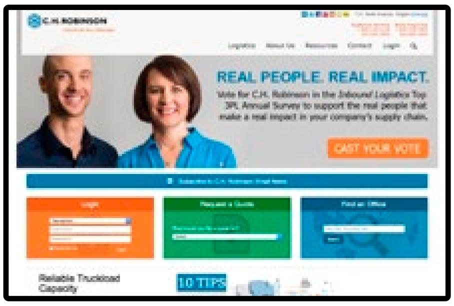
SUSTAINABILITY

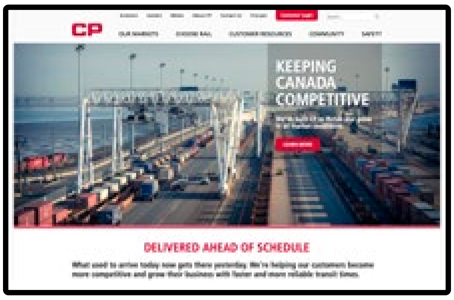
APL Logistics • www.apllogistics.com

APL Logistics is a global supply chain specialist in the automotive, consumer, industrials and retail verticals. We provide a comprehensive range of origin and destination services in over 60 countries, including freight and transportation management, customs brokerage, warehousing, distribution and supply chain consulting. APL Logistics offers customized technology solutions and applications that help customers analyze and optimize their supply chains. For more information, visit: www.apllogistics.com

C.H. Robinson Worldwide, Inc. • www.chrobinson.com

Founded in 1905, C.H. Robinson Worldwide, Inc. is one of the largest third-party logistics companies in the world, providing multimodal transportation, fresh produce sourcing, and information services to more than 32,000 customers globally, ranging from Fortune 500 companies to small businesses in a variety of industries. For more information about our company, visit our web site at www.chrobinson.com.





Canadian Pacific Railway • www.cpr.ca

Expressway, another example of ingenuity by Canadian Pacific Railway, is a revolutionary short- to medium-haul transportation service that combines the best of truck and rail. Dedicated trains with scheduled departures from dedicated terminals (Toronto, Montreal, Windsor, Detroit) handle standard, non-reinforced truck trailers on specially designed railcars. Our automated check-in system processes drivers in under 15 minutes. Future expansion is planned for Chicago.

DSC Logistics • www.dsclogistics.com

With experience, knowledge, and IT – as well as supply chain capabilities that are adaptable, versatile, and focused on changing customer needs –DSC Logistics helps companies reach their business goals. DSC provides supply chain analysis and design, strategic solutions-based consulting, systems integration, process improvement, and management of logistics operations such as warehousing, transportation, packaging, and fulfillment. In today's business environment, filled with rapid and unpredictable change, DSC manages change and information in the supply chain by using a strategy called sense-and-respond and by being ready for anything!

White Paper Digest

Industry experts amass supply chain management best practices and skill sets, and invest in new research and evaluation tools. Now you can benefit. *Inbound Logistics* has selected this collection of whitepapers that will give you a jump on important supply chain issues. For more information on any of these whitepapers, visit the Web sites listed below.

Amber Road

TITLE: ***Aberdeen Group Report: Strategic Sourcing and Segmentation: Prescriptive Control Tower Approach***

DOWNLOAD: *bit.ly/1IYjahW*

SUMMARY: Today, many companies are bypassing the store/DC and shipping straight to the end consumer, which can impact margins and profitability across the supply chain if not optimized. Download Aberdeen Group's prescriptive control tower report to learn what leading companies are doing to reengineer inventory and fulfillment flows from source to end consumer, including a framework for strategic sourcing and segmentation.

3PL Central

TITLE: ***The Five Point Tune-Up For Your Warehouse***

DOWNLOAD: *bit.ly/1IYj7CM*

SUMMARY: Is your warehouse 100-percent prepared to seize the opportunities before it? To help ensure that it is, download 3PL Central's latest whitepaper, *The Five Point Tune-Up for Your Warehouse*. Written by industry professionals, this guide was specifically created to help you catapult your warehouse to unprecedented levels of performance and profitability. Download your free copy today.

enVista

TITLE: ***Think Like a Big Shipper***

DOWNLOAD: *bit.ly/1FdefSW*

SUMMARY: Are you a small or mid-size company that would like to achieve meaningful transportation cost savings like a big shipper? Do you need help developing and implementing strategies that deliver significant return on investment? Don't underestimate your ability to make impactful changes in your operation. Download this whitepaper now to learn how to realize savings like big shippers.

J.B. Hunt

TITLE: ***660 Minutes: How Improving Driver Efficiency Increases Capacity***

DOWNLOAD: *jb.ht/HoursofService*

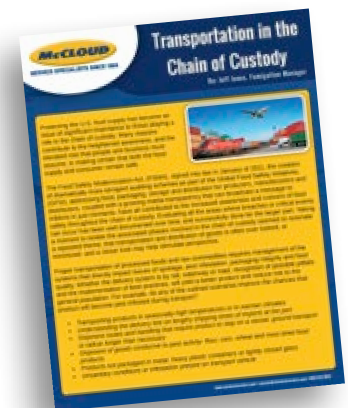
SUMMARY: Recent industry research has found that since the July 2014 changes to Hours-of-Service, drivers spend an average of only 390 minutes (6.5 hours) of the 660 minutes of available driving time behind the wheel. There are many pressures acting upon capacity, and many upcoming regulations, which could inhibit driver hours. This whitepaper helps shippers and carriers attain a strong understanding of Hours-of-Service, and helps them pursue best practices for improved driver utilization.

Mettler Toledo

TITLE: ***Understanding New Food Labeling Regulations***

DOWNLOAD: *bit.ly/1MJfMGL*

SUMMARY: With the release of an overhaul to the BRC Issue 7 Food Safety guidelines, as well as further changes on the horizon for the EU and the United States, Mettler Toledo has compiled all the latest regulations in an easy-to-understand guide that goes through each set of regulations in detail. In addition to giving manufacturers a handy reference tool, this whitepaper also forecasts developments on the horizon, and recommends the best way to ensure compliance with labeling regulations moving forward.



McCloud Services

TITLE: ***Transportation in the Chain of Custody***

DOWNLOAD: *bit.ly/1MJfNuj*

SUMMARY: Pest infestations while processed foods and raw commmodies are transported are more likely to increase during summer months, which can directly impact food quality and consumer health. Proper transportation of food items is often overlooked, and transportation directly impacts issues such as spoilage, pest infestation, packing integrity, and food quality. Download this free whitepaper to learn proper prevention methods, create a plan to predict pending problems, act swiftly when an issue does arise, have efficient routing systems in place, manage inventories to eliminate surplus, and prevent historical challenges.

BestTransport

TITLE: ***Crossing Over: TMS Delivering Big Value for Small Shippers***

DOWNLOAD: *bit.ly/1KqAPym*

SUMMARY: No matter the size of your shipping operation, the logistics are complicated. Optimizing loads, reducing dock dwell, load tendering, meeting deadlines, and many other issues combine to challenge your business every day. Transportation Management Systems (TMS) have long been a mainstay in large shipping departments, while smaller shippers have been left using manual systems such as spreadsheets, or worse. Not anymore. A SaaS cloud-based TMS will show you the money – with little to no investment up front, and big value to your bottom line. Find out more by downloading this free whitepaper.

Share your whitepaper with *IL* readers!

WhitePaper Digest is designed to bring readers up-to-date information on all aspects of supply chain management. We're building a database of SCM whitepapers, and you can help. E-mail us with whitepaper recommendations: editorial@inboundlogistics.com

INBRIEF NEW SERVICES & SOLUTIONS

Shipping company **AAL** expanded its Pacific Service liner route to include Port of Prince Rupert in British Columbia. The port has newly established road and rail links, and is a gateway for project cargo imports to the oil-rich mining area of Alberta, Canada, and the wider Pacific Northwest.

//Transportation//

CaroTrans, an ocean freight consolidator, began a weekly less-than-containerload service from Montreal, Quebec to Le Havre, France. This direct service offers a 14-day transit time, and freight can originate from as far west as Vancouver.

Integrated logistics service provider **DB Schenker's** jet cargo division launched a weekly air service linking Hong Kong to Chicago and Houston to meet the needs of the oil and gas, automotive, and industrial sectors. The service provides guaranteed capacity and uses Boeing 747-8 F aircraft.

Container shipping company **CMA CGM** launched a weekly service between Morocco and Northwest Africa. The service improves transit time between Mauritania, Senegal, and Morocco by eight days.

Rail carrier **CSX** opened an intermodal terminal on 89 acres in Salaberry-de-Valleyfield near Montreal, Quebec. The facility expands CSX's intermodal network capacity and offers Canadian shippers domestic and international service that connects with the railroad's 21,000-mile network in the United States.

LSO, a parcel carrier, expanded its shipping services to include new cities and ZIP codes throughout Louisiana, including Baton Rouge, Lafayette, Lake Charles, Metairie, New Orleans, and Shreveport. In Louisiana, LSO provides next-day and day-definite guaranteed deliveries.

Evergreen Line started a Vietnam, Singapore, Malaysia service. In addition to providing transportation services within its port coverage, the offering also connects to the company's global service network via transshipment hubs in Singapore and Tanjung Pelepas.

// Technology //

Total Quality Logistics, a freight brokerage firm, released *Carrier Dashboard 4.1*, a mobile app with speak-and-search technology for truck drivers on the road searching for loads to haul. The app uses GPS tracking to yield better search results, sends alerts automatically when desired loads and lanes become available, and can send manual or automated location updates.

Paragon Software Systems released *FleXipod*, a mobile proof-of-delivery system for real-time visibility. In addition to traditional electronic proof-of-delivery functionality, *FleXipod* enables users to create, manage, deploy, and utilize fully configurable data capture forms to change driver workflow.

Machine-to-machine provider **Numerex's** *FASTrack PrePaid* vehicle tracking solution monitors vehicle fluid levels, sends maintenance reminders, and performs remote door unlocking. It also can monitor driving behavior patterns, including excessive speeding, braking, and idle time – information that fleet managers can use to identify opportunities to improve fuel efficiency and road safety.

TMS provider **InMotion Global** will merge its *LITE TMS* and *Ascend TMS* systems. *Ascend TMS* offers automatic route review and load optimization, real-time spot rates, and intuitive load management.

Florida East Coast Railway (FECR) launched an online portal, *FECR Connect*, that allows rail shippers to track freight shipments and equipment across the network. It also streamlines the process of submitting and managing shipping instructions electronically.

// Products //

Hyster Company's H300HD2S and H330HD2S industrial lift trucks offer 30,000 to 33,000 pounds of capacity with a short wheelbase for use in tight spaces. The new models have on-demand load-sensing hydraulic and cooling systems, and wet brake axles. Users can customize the lift trucks with masts, forks, and carriages.

Mobile computing platform provider **Advantech-DLoG's** TREK-570 in-vehicle computing box supports delivery operations and intra-vehicle communication for local, regional, and long-haul fleet management. TREK-570 provides real-time data transmissions across borders with built-in radio frequency and dual SIM card design.

As part of its expansion program, the Panama Canal Authority installed the 16th and final gate for the new locks on the Pacific side of the canal. The final gate is one of the heaviest, at 4,232 tons. With all 16 gates installed, the next step is to flood the lock chambers.

ClearSpan Fabric Structures' Metal Building has steel side walls and can be engineered to meet required building codes or snow/wind loads. By eliminating internal support posts, the building allows for maximum usable space.

Chemical provider **Kafko International's** Oil Eater Tuff Rug quickly absorbs oil leaks, dirt, and grime in forklift aisles and high-traffic walkways. Made of 100-percent recycled materials, the product is available in 36-inch by 150-foot rolls.

Janam Technologies' XG3 rugged mobile computer for bar-code scanning is sealed to IP65 standards for use in wet and dirty environments. It has Wi-Fi and support for Voice Over IP for voice and data across manufacturing facilities, distribution centers, plant floors, loading docks, and seaports.

Automatic data-logging systems provider **OCEASOFT's** Atlas module is a temperature-tracking solution for high-volume shipments that require hundreds or thousands of modules. The Atlas module's single-use temperature-tracking tool can read measurements through isotherm wrapping or container walls via smartphones and tablets using Bluetooth technology.

// Services //

3PL **SCI Logistics** opened a new facility dedicated to fulfilling the healthcare industry's highly specialized requirements. The 78,000-square-foot facility offers inbound inspection, material segregation, kitting, and product disposition. A warehouse management system, temperature and humidity monitoring, and a control system provide shippers with real-time data about the storage of their products.

Estes Express Lines, a trucking company, opened a new terminal in Kent, Wash., to accommodate increased demand in the Northwest. The terminal features 65 doors, 24,000 square feet of docking area, and 5,000 square feet of office space.

Materialogic, a fulfillment and logistics provider, moved to a new 163,000-square-foot distribution facility in St. Louis, Mo. The facility increases Materialogic's storage capacity by 20 percent in the St. Louis market, and serves e-commerce companies that need retail store replenishment.

APL Logistics, a 3PL, opened a container freight station at the Tungya Collins Terminal in Cakung, North Jakarta. The station extends APL Logistics' footprint in Indonesia, where it offers export consolidation and warehousing services. It also complements the company's existing facilities across Asia as a sourcing hub for both international and domestic distribution.

3PL **Yusen Logistics** moved its New York operations to a new 32,134-square-foot warehouse. Located adjacent to the entrance of JFK International Airport in Springfield Gardens, N.Y., the warehouse

Weighing and measurement solutions provider **Intercomp Company's** CS1500 LED Crane Scale can handle capacities ranging from 500 pounds to 20,000 pounds. The scale comes with a five-digit LED display, and wireless weighing technology provides viewing and recording weights remotely.

is close to the area's major highway system. The facility offers a wide range of import and export services for both air freight and ocean cargo shipments.

Crown Equipment Corp., a materials handling company, will open a Green, Ohio, facility in summer 2015. The facility will provide a complete parts inventory, a full-service maintenance department, battery and charger service, rental fleets, and forklift remanufacturing.

Container shipping service provider **ContainerPort Group** opened a transportation terminal in Atlanta that is centrally located to all Atlanta-area rail ramps. The facility offers intermodal regional trucking services and mounted container storage.

Less-than-truckload carrier **Old Dominion Freight Line** opened a 23-acre service center with 141 doors in Phoenix to replace a smaller facility. The new location serves cities in the area, including Phoenix, Tempe, and Chandler.

LTL provider **Southeastern Freight Lines** opened a new service center in Lubbock, Texas, with 37 dock doors. The service center places Southeastern closer to its customer base, which allows for earlier deliveries and pickups.

3PL **CEVA Logistics** is constructing a multi-user facility in Truganina, Australia. The facility will include four warehouses, a loading and staging area for car carrying operations, and an office. The facility will support industrial, automotive, and consumer and retail customers, and is close to Melbourne's road and rail network, the Port of Melbourne, and Melbourne International Airport.

Reusable packaging manufacturer **ORBIS'** BulkTote allows fork truck entry on all sides for easy handling and line-side part delivery. Designed to hold up to 500 pounds, the BulkTote can replace wire baskets, steel tubs, or wood/corrugated packaging with a reusable handling solution.

CALENDAR YOUR LOGISTICS DATEBOOK

OCT 5

American Production and Inventory Control Society

APICS 2015

www.apics.org | Las Vegas, Nev. | OCT 5-7

AUDIENCE: Supply chain and logistics professionals
FOCUS: Best practices in sustainable supply chains, solutions exhibition, the future of supply chain and operations management, de-mystifying distribution operations, supply chain packaging, insider tips on zero-waste initiatives

SEPT 28–30, 2015 Princeton, N.J.
Worldwide Business Research

LogiPharma 2015

www.logipharma.com

AUDIENCE: Pharmaceutical supply chain stakeholders
FOCUS: Supply chain integrity, visibility, and risk management; customer-driven supply chains; working capital management and optimizing inventory; supply chain planning and forecasting

CONFERENCES

AUG 20, 2015 Smithfield, R.I.
Banneker Industries

8th Annual Supply Chain Management Summit

www.scmsummit.org

AUDIENCE: Logistics and supply chain professionals
FOCUS: Supply chain strategies and best practices, breakout sessions on current supply chain challenges, supply chain perspectives from the C-suite

AUG 23–25, 2015 San Diego, Calif.
Quartz Events

SCOPE Fall 2015

www.scopefall.com

AUDIENCE: Logistics, materials handling, operations, procurement, supply chain, and transportation professionals
FOCUS: Applying supply chain strategy to drive value, the evolution of distribution and logistics partnerships, making sustainability a competitive advantage, merging retail supply chains, automating export compliance

AUG 31 - SEP 2, 2015 Chicago, Ill.
International Quality and Productivity Center

Food Safety and Logistics Summit

www.foodsafetyandlogistics.com

AUDIENCE: Cold chain stakeholders
FOCUS: Proactive versus reactive approach to the food safety supply chain, opening communication between supply chain parties, RFID tags and retail, challenges of the Food Safety Modernization Act

SEPT 11, 2015 Los Angeles, Calif.
USC Marshall Center for Global Supply Chain Management

3rd Annual Global Supply Chain Excellence Summit

globalsummit.uscsupplychain.com

AUDIENCE: Supply chain and logistics professionals
FOCUS: Vertical markets breakout sessions; competency sessions on supply chain risk, procurement, manufacturing, logistics, and distribution; supply chain outlook; emerging market supply chains

SEPT 20–22, 2015 Ft. Lauderdale, Fla.
Intermodal Association of North America

Intermodal EXPO

www.intermodal.org

AUDIENCE: Supply chain and transportation professionals, intermodal shippers and stakeholders
FOCUS: The future of intermodal in 2015 and beyond, effects of maritime labor uncertainties, chassis provisioning, intermodal conversion, managing drayage relationships, intermodal legislative update, intermodal solutions exhibition

SEPT 27–30, 2015 San Diego, Calif.
Council of Supply Chain Management Professionals

CSCMP's 2015 Annual Conference

www.cscmp.org

AUDIENCE: Supply chain, logistics, and transportation professionals
FOCUS: Supply chain innovations, cultivating an environment that fosters leadership, manufacturing performance from a supply chain perspective, supply chain best practices, supply chain infrastructure

OCT 5–9, 2015 Boston, Mass.
International Quality and Productivity Center

GDP & Temperature Management Logistics Global Forum

www.coldchainglobalforum.com

AUDIENCE: Cold chain stakeholders
FOCUS: Evolution of the supply chain, FDA's risk-based supply chain strategies, applying data analytics to the temperature-controlled supply chain, supply chain distribution practices

OCT 19–21, 2015 Chicago, Ill.
Customized Logistics and Delivery Association

PARCEL Forum '15

www.parcelforum.com

AUDIENCE: Distribution, logistics, supply chain, and warehouse managers; small-package supply chain stakeholders
FOCUS: Educational tracks and case studies; dimensional weight pricing; home delivery strategies; distribution center tours; regional carrier, warehousing, and materials handling exhibition

SEMINARS & WORKSHOPS

SEPT 18 & 25, 2015 Bethlehem, Penn.
Lehigh University Center for Supply Chain Research

APICS Certified Supply Chain Professional Certification

bit.ly/1HjqVOy

AUDIENCE: Logistics and supply chain professionals
FOCUS: Supply chain management best practices, concepts, metrics, techniques, and methodologies; impact of sales and operations planning on the supply chain; implementing change in supply chain management

RESOURCE CENTER

06.15

INBOUND LOGISTICS **WORKS FOR YOU!**

3PLs

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www.ardoingitright.com 502-777-7020

APL Logistics pg. 9
www.apllogistics.com 602-586-4800

C.H. Robinson pg. 17, 75
www.accelerateyouradvantage.com 800-323-7587

CaseStack pg. 27
www.casestack.com 855-638-3500

CLX Logistics pg. 87
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DSC Logistics pg. 7
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Pacific Coast Warehouse pg. 83
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Old MacDonald Had Nothing on This Farm

It's hard to pick up a retail, architectural, or home and garden magazine without seeing pictures of old, worn-out shipping containers being transformed into pop-up stores, or used as low-cost building materials for homes and restaurants.

Now, uses for these containers have gone even greener as companies sprout up to offer retrofitted containers as greenhouses. One example is Freight Farms, which was founded in 2010 and offers a locally sourced produce alternative that can be used in big cities where space is limited. Each container can grow as much as one acre's worth of food, using only 10 percent of the water a traditional farm uses.

Restaurants and grocery stores currently use these container greenhouses as tools for sourcing their own organic produce. But the day when we see hundreds of shipping containers neatly lined up in previously un-farmable deserts or cold climates may disrupt the produce supply chain sooner than you think.

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