WorldCargo news

The soft side of shipping automobiles

A new software program improves the efficiency of shipping cars in containers

While ro-ro is dedicated car carriers or PCTCs is the obvious choice for shipping new cars in large batches, there has always been a demand for containerised shipments, for many reasons, including:

- Large numbers of cars discharged from a PCTC may need to be moved long distances inland, for which rail could be more cost-effective than trunk haul by 'haulaway' trucks. Obviously, dedicated double-deck wagons may be used, but containers are more universal, and intermodal rail provides access to more railheads for distribution by haulaways to local dealers.
- Purely overland shipments may be containerised for safety/security reasons, and/or because of an absence of facilities to handle trains of dedicated automobile wagons.
- 3PLs often prefer to ship small batches and/or premium marque automobiles in containers, for added protection and security.
- High-value vintage/veteran autos will certainly be shipped in containers.
- Cars owned by migrating families or, say, diplomatic or military personnel being transferred overseas, have to be transported somehow and containers may be the only practical solution.

Horses for courses

Very expensive and/or rare cars, whether new or vintage, may be shipped singly in 20fts, because their value can stand the freight cost. Two automobiles can usually be transported racked one-over-one in a 20ft high cube (HC) – Indian Railways, for example, uses 20ft HCs for 'weigh out' cargo one way, and two cars the other way – or on the floor of a standard 40ft (unless of course they are more than around 5.5m long). Again, this might work for, say, special/rare vehicles being shipped overseas to auctions or rallies, but, usually, it is not a cost-effective proposition for a 3PL or forwarder.

Over the years, a number of specialist companies have offered car racking systems of one kind or another, to load three cars into a 40ft container. As lifting and tilting is required, a 40ft HC must be used, as the extra 304.8mm of internal height, compared to a standard 8ft 6in high container, is vital to achieve the required tilt angles.

Several years ago, for example, Cronos developed a car rack on which the vehicles were driven, tilted and lashed, one by one, before the rack was pushed using an FLT and the rack's front rollers into a 40ft HC container as a 'one shot' load (*WorldCargo News*, November 2007, p18).

A headache!

A key problem with any racking system for containers is calculating the correct lifting height and tilting angle, especially given the practically endless variation in vehicle lengths and heights, boot (trunk) heights, etc. These may not even be the same for nominally the same models, as there are often variations according to the year of build.

On top of that, the load planner must allow for clearance to prevent any chance of the lashed and secured vehicles coming into contact with each other or with the container sides or roof in heavy seas. Trans-Rak International (TRI), for example, insists that its customers provide a minimum of 80mm clearance all-round.

Essentially, planning the load is a manual and time-consuming job, with loaders resorting to the use of paper cut-outs of cars or playing around with Photoshop images and then superimposing rack poles and tilts within the confines of the container profile. The 'guesswork' is often tested using metre sticks (yardsticks).

Warwick the loadmaker

Now, however, WMG, a research and education group at the UK's University of Warwick, working in conjunction with TRI, has come up with bespoke software that automates the task of finding the optimal placement of cars, allowing for any combination of make or model, and enabling four cars to be shipped inside a 40ft HC.

So, for example, if a forwarder already using TRI's racking system has to ship 300 cars, he can complete the job with just 75 40ft HCs instead of 100, saving on freight costs and the environmental impact of the shipments. With a 45ft, it may be possible to ship five or six cars, depending on the size of the cars, and even more with a 53ft. TRI itself has distributed a drawing to illustrate the impact of the software. This shows five of its R-Raks in a 45ft with six cars loaded "three on three." In this case, the cars are subcompact Fiat 500s.

The software was developed by Piero Filippin, innovation manager at WMG SME Group. The SME team provides support for innovation in small and medium sized manufacturing businesses such as Trans-Rak. Its object is to accelerate productivity and growth in manufacturing SMEs by applying research-led tools and techniques, building sustain-

The WMG software increases the racking potential in a 40ft high cube container from three to four vehicles

A VW Passat in a palletwide container with TRI's R-Rak Pallet-Wide

able and collaborative relationships.

Users select the number of cars and the makes and models they wish to transport. A numerical process simulates hundreds of thousands of different loading scenarios and generates a report of the most efficient combination of cars in each container, as well as their exact positioning.

"The solution developed for TRI has transformed the manual-based processes previously used for establishing the optimal placement of a set of cars," says Filippin. "The new software-inspired system allows specific vehicles to be selected from a comprehensive list, meaning a quicker view can be gained in relation to vehicle configuration. This has helped save considerable time, resource and money.

"The new system is a great example of how digital technologies can provide added value to manufacturing, and will help those involved in vehicle transportation to reduce costs and improve customer service."

Examples

Providing some challenging examples, Filippin shows how the software enables two 2004 Ford Focus Sedans to be co-loaded with a 2008 Ford Mondeo Wagon and a 2010 Ford Fiesta RS. It turns out that the Sedans should be loaded first. The first Sedan is reversed into the container and lifted to the software-determined optimum height and tilt angle of 630mm and 20 degrees respectively. The second Sedan is driven in forwards until it is partially underneath the first one. Next, the Mondeo Wagon is reversed in, lifted to 760mm and tilted to 17 degrees, allowing the Fiesta to be driven in forwards as the fourth and last car.

In another example, the four cars to be loaded into a 40ft HC are two 2012 Ford Focus models, a 2008 Ford Mondeo Wagon and a 2006 Toyota Camry. Rather than work this out manually, the software shows instantly that the first car to be reversed in, lifted and tilted back is a Ford Focus. The lift height is 750mm and the tilt angle is 18 degrees. The Toyota Camry is driven in forwards, partially underneath the first car. The Mondeo Wagon is then reversed in as the third car, and lifted to 760mm and tilted to 17 degrees, allowing the Ford Focus to be driven in forwards, partially underneath.

In all cases, of course, the software also indicates the precise positioning of the R-Rak poles along the sidewalls of the container. The lifting height, tilt angles and stop points of the lower cars all respect the minimum 80mm 'exclusion zone' that TRI insists its customers apply.

Filippin is confident that only a really skilled loader can beat the software. He cites the case of a chess master who, depending on the size of the cars, has been able to fit a very small car between the wheel centres of a car lifted and tilted above it. But such skills are very rare (and costly) and, in any case, it's still a time-consuming job.

Paul Donaldson, managing director of TRI, said: "The software developed by Piero Filippin will enable users to deploy our equipment more efficiently, further reducing the number of containers that need to be shipped for a given number of vehicles."

TRI has not yet released the software to its customers, who are mostly forwarders or car makers' 3PLs or 4PLs, and, occasionally, private shippers directly. Wesley Payne, TRI's marketing and design engineer, says the company is working with another software developer "to improve and update the program, to make it more efficient and have further capabilities". Release is expected during 2017.

Nobody owns it

It is important to point out that WMG's software carries no IPR. As Filippin explains, the work was financed as part of an EU European Regional Development Fund (ERDF) programme, specifically for English West Midlands companies (cf TRI). Now the funding is coming from the UK government's Catapult programme.

WMG is one of seven centres in the HVM (high value manufacturing) sector of the Catapult scheme. The aim of HVM Catapult is to help accelerate new concepts to commercial reality and thereby create a sustainable high value manufacturing future for the UK.

Palletwide R-Rak

Significantly in terms of the software, TRI has come up with R-Rak Pallet-Wide, a width-adjustable version of R-Rak that can be fitted in ISO or palletwide containers. This opens up the European 45ft palletwide market for R-Rak. TRI says that the new product has been "developed specifically for the European market", but it adds that it has been extensively tested in the USA and conforms to AAR specifications for the secure protected shipment of finished vehicles in containers. This may suggest that it could be used in US 53ft domestic containers in the future, allowing ≥6 vehicles to be loaded, according to vehicle size.

In other development, TRI has come up with the Driverless Loader (DL) Rak to load wide vehicles in containers. Vehicles are loaded onto a dolly and then rolled into position within the container. As no drivers are required for loading, the risk of damage to doors and vehicle sides is reduced. This is similar to the Levaton platform, whereby a wide body and/or very valuable car is driven onto and prelashed to a platform with a ramp end and an FLT pocket end. An FLT then places the load in the container (*WorldCargo News*, December 2012, p13). ❑

Demand for containerised shipments includes high-value vintage/veteran autos, such as these Caterham Super 7s, secured with TRI's R-Rak

New car terminal planned for Cuyutlán

Mexico's trade in vehicles is booming and the sector's prospects are very bright.

On the production front, Mexico's output of vehicles is expected to increase by 50% to approximately 5M units by 2020 and, of this total, in excess of 80% will be exported. Imports are also rising strongly (up more than 37% in 2015) as consumer demand for compact and subcompact-style cars has soared.

Most of these vehicles are being sourced from manufacturers in Asia, including India. With exports to this region also growing, there is an increasing demand for dedicated maritime facilities for the handling of these vehicles.

In 2015, for instance, the number of vehicles handled at Manzanillo rose by 12% (to 13,659 units) with imports jumping by 50% to 13,141 units. The much larger car-handling facilities at Lázaro Cardenas also registered growth, with the near 358,000 units handled up 17% on the corresponding period of 2014.

SSA Mexico is developing a new car terminal at Lázaro Cardenas, and hopes to start construction work on the Terminal Especializada de Automóviles (TEA) car terminal later this year. Phase one, which will involve expenditure of US$56M, will lead to the commissioning of two berths (600m of quay line), 210,000 m^2 of storage area and a capacity to handle 400,000 CEU a year.

Although Lázaro Cardenas is the established auto port on Mexico's west coast, Ignacio Peralta Sanchez, the state governor of Colima, is eager to capitalise and share in Mexico's growing automotive business.

But with space at Manzanillo limited, he has proposed that dedicated vehicle-handling facilities be developed at the port of Cuyutlán, which is located just 42 km south of Manzanillo.

Currently, Cuyutlán only has a specialised terminal for handling natural gas, but it has deep water and space that could, according to Peralta Sanchez, house a car-handling facility 15 times larger than the terminal at Manzanillo.

His plan is to also use the location to construct facilities where the processing, testing and customisation of imported vehicles can take place before they are distributed to dealers and retail networks across Mexico.

Various studies are underway as the state government and associated interests make initial evaluations on the design and investment requirements for the project so that it can move forward to the engineering, procurement and construction phases.

A private operator will be sought to manage the dedicated car terminal.