



MAERSK
CONTAINER INDUSTRY

NEXT-GEN EFFICIENCY IN REEFER OPERATIONS

NEW TECHNOLOGY AND SMARTER WAYS OF WORKING

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A reefer typically circles the world four times under extreme handling and weather conditions. Every year. Over a typical working life of 15 years, maintenance and running costs rapidly add up. There is evidently huge potential in reducing inefficiencies and costs in reefer operations.

The good news is that a combination of new technology and smarter ways of working is paving the way for modern reefers. Transparency in performance and consumption, better interfaces and connecting to smart systems across the supply chain will be the elements that power this transformation.

To achieve these goals, there needs to be a strong focus on making life easier and more efficient for shipping carriers and service providers from the moment the reefer is in operation. Truly transforming the industry is going to need everyone to work together, right along the transport value chain, to implement new technology.

There is a pressing need for us to look at opportunities to standardize, using tried and tested processes. This is not going to be straightforward in an industry that has traditionally been resistant to this kind of thinking.

CUTTING ENERGY COSTS

Energy costs have always been a pain point for shipping lines and are therefore a crucial development focus for reefer manufacturers. Increasing the energy efficiency of reefers has a direct and measurable cost benefit. For example, Chiquita recently put some numbers on the impact of its recent fleet renewal with 2,500 Star Cool containers. The savings will be substantial.

For every new container, Chiquita has stated that it achieves energy savings of up to 35% compared to their older units. This impressive figure looks even better when you add in the energy saved by Star Cool's

embedded energy-saving software. This automatically shuts down the container compressor when it is not actively needed, saving up to 58% of energy consumption when compared to older units. As a result of these improvements, Chiquita is making electricity savings of 34 million kilowatt hours per year, which translates into an annual reduction of 17,000 tons of CO2 emissions.

PROTECTING AND OPTIMIZING CARGO QUALITY

While saving energy is one factor in reefer operations that can be achieved using existing technologies, the challenge is to not compromise cargo quality in the process. This is why MCI's energy-saving software was originally built around produce quality. In effect, the energy savings are a by-product of increased cargo quality, making it a genuine win-win.

The software avoids undershooting the

set point. While the fruit is still warm, the cooling system is run at full capacity to rapidly reach the desired temperature. Once the cargo is at set point, the fan and compressor speeds are optimized to provide precisely the cooling required to keep the fruit in perfect condition. By avoiding over-cooling, the fruit arrives at its destination in optimum condition and far less energy is used in the process. This unique principle enables Star Cool reefers to demonstrate a 50-75% reduction in energy use compared to conventional reefers.

Container lines and fruit multinationals are using the software to optimise their reefer operations while improving cargo care. At the same time, the energy savings will definitely benefit the terminals too.

THE VALUE OF TOTAL TRANSPARENCY

Transparency in terms of performance and energy consumption holds huge potential for eliminating costs and enables operators to take strategic decisions. For example, all Star Cool reefers come with a built-in energy meter that provides container lines with a super-efficient and precise surveillance tool to measure kilowatt hours consumed in real time. This can be done either manually or via modem, throughout the transportation window including at the terminal. The energy meter also allows for a more individual cost assessment of equipment coming into the terminals, which will benefit planning for terminal operators.

GAINING STRATEGIC INSIGHTS

The container lines are telling us that they will use the energy meter to examine the cost of operating a certain shipping lane compared to the freight rates they are charging. This will provide them with full cost transparency, right down to the individual reefer. At the same time, they will be able to supply factual carbon footprint data to their customers, which is an important value proposition when selling against airfreight.

We were the first to introduce this technology and at least one vendor has already followed suit. Eventually, I believe energy meters will become a standard feature that will be beneficial for the entire supply chain.

REPLACING DOWNTIME WITH UPTIME

The reefer industry has a system called PTI (Pre-Trip-Inspection), which checks that the machine is functioning correctly. This is carried out by the depot before loading the reefer with cargo and is a straightforward operational process. However, no one is earning anything with the reefer while this is being carried out. On top of that, the PTI itself costs money. To correct this



inefficiency, we reshaped the process and called it ITI (Intelligent Trip Inspection), which has made PTI obsolete. Instead, the reefer carries out a self-diagnostic check while it is in operation, thus replacing downtime with uptime.

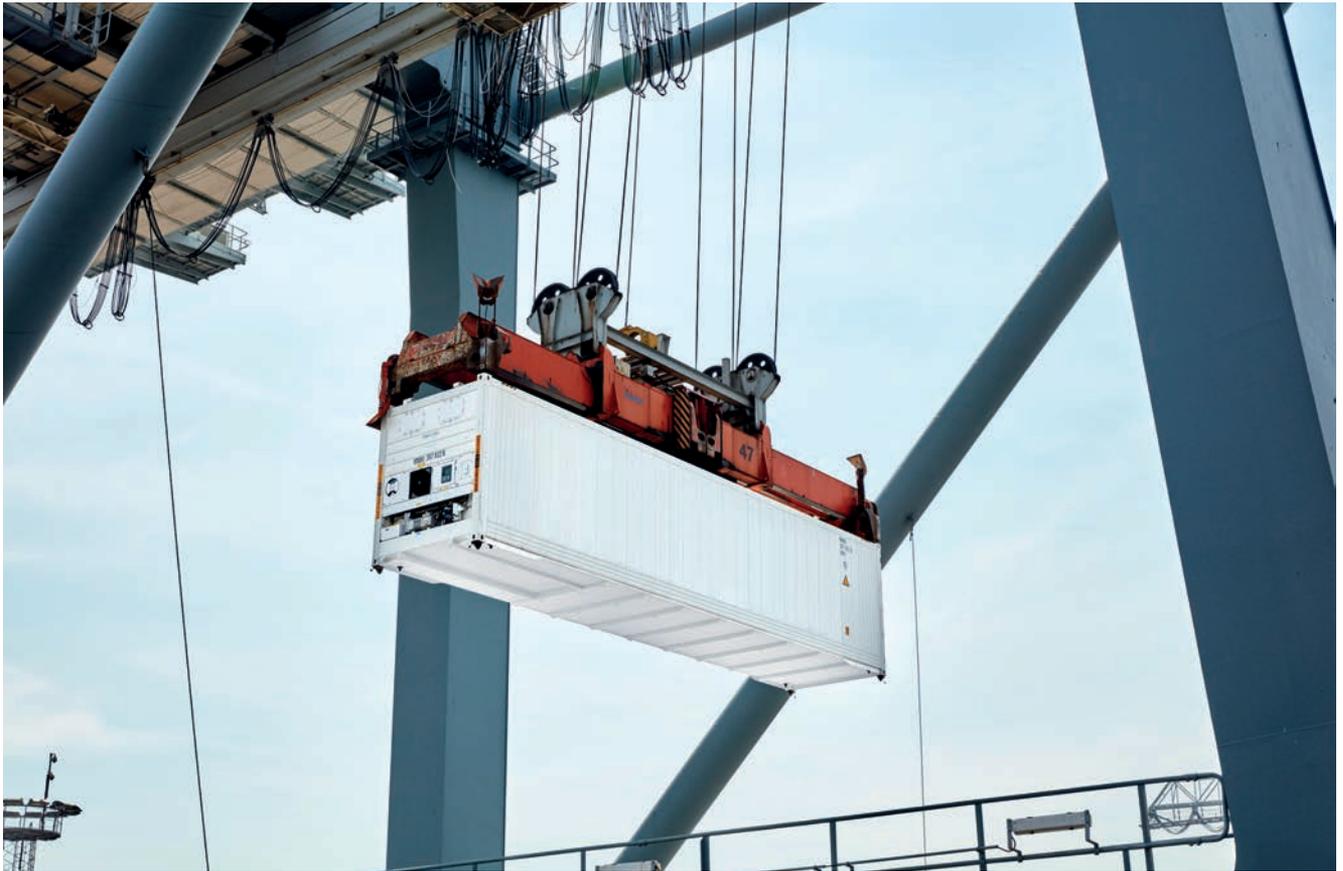
A standard feature on all Star Cool reefers, ITI provides an enhanced digital inspection system that confirms whether the container is ready for the next trip and alerts operators in the event that any steps in the ITI process need investigation. This is a further example of how the smart use of technology can give shipping lines increased transparency that can be transformed into measurable cost savings.

MOBILITY AND EASE OF OPERATIONS

The maintenance and running costs incurred throughout the typical 15-year working life of a reefer are unavoidable. However, this is an area that can be significantly optimized if handled more efficiently.

Technicians are the frontline caretakers of the reefers. Giving them the tools they need to work smarter can go a long way to maximizing reefer uptime and supporting the proper planning of service activity to reduce downtime. Up to now, work processes have often been cumbersome and time-consuming for technicians. Our most recent tool is an app that makes it easier for technicians to carry out onsite service and maintenance work. The app provides quick and easy access to the information and technical support they need, right where they need it – at the reefer.

The app enables technicians to look up alarm codes and access the latest troubleshooting techniques. If the reefer needs servicing or repair, additional tools like guides, manuals and service videos can be instantly called up on the app. Warranty checks can be carried out onsite by simply scanning the container number: the app



displays all warranty information for specific parts. This also saves time for admin staff by automating the sharing of updates and guides via the app. We are looking forward to further developing the app's features in collaboration with technicians.

TWO MACHINES ON ONE PLUG

Another example of using smart technology to improve efficiency is Star Cool's unique electrical circuits. Whereas a standard reefer outlet is rated and protected to 32 amps, Star Cool's main circuit protection is just 16 amps. This enables the operator to run two Star Cool reefers on each power outlet – 100 per cent safely and in all cooling situations. The benefits include ensuring smooth operations during peak season, either on shore or onboard the vessels. It is even possible for ports to slightly over-book, because they now have a smart solution that can effectively double capacity without needing to modify the electrical grid. This is good for business and good for customer satisfaction too.

CONNECTING WITH SMART SYSTEMS

To achieve further transparency in cold chain operations, certain shipping carriers have introduced Remote Container Management (RCM). One of MCI's customers, Maersk Line, pioneered the development of this technology. This innovative system takes the reefers online and brings real-time transparency into

cold chain operations. It has the potential to provide significant operational cost savings as well as adding value from within the supply chain. The carrier's customers will get unprecedented visibility into their cargo during transportation, enabling better operational planning and increased customer satisfaction.

Connecting reefers to smart systems and making use of the abundance of data generated is a major focus for MCI and an area where we will see real transformation in the near future. Besides smart features such as the automated replacement of PTIs and the energy meter function, we expect to contribute a lot more value-adding innovation in the future.

TRANSFORMATION IS THE KEY

No one in our industry is under any illusion that things are going to get easier in the intermodal business any time soon. If anything, increasing digitization, Industry 4.0 and constantly increasing competitive pressure will squeeze margins even tighter.

Truly transforming the industry is going to need everyone to work together, right along the transport value chain, to implement new technology and finds ways to standardize processes. But I have no doubt that the smart use of technology has the power to keep us all in the game – as long as we keep focusing on sustainable cost reduction, energy savings and increased levels of customer service. The players who are

strong in the future will be those who have embraced change – taking efficiency and energy reduction onto a new level. That will be good for the industry, for the end-consumer and ultimately for our planet too.

ABOUT THE AUTHOR

Chief Commercial Officer of Maersk Container Industry (MCI) since 2005 and has held various positions during the past 21 years within Maersk. Based at MCI's R&D and test centre in Southern Denmark, he spends much of his time on the road visiting customers and partners around the world.

ABOUT THE ORGANIZATION

Maersk Container Industry (MCI) develops and manufactures refrigerated containers, dry containers and the Star Cool™ refrigeration machine for the intermodal industry. With around 5,000 employees, MCI has R&D and test facilities in Denmark, two production facilities in China, one in Chile and a global network of over 400 service providers.

ENQUIRIES

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