Forewarned Is Forearmed

Environmental Impact of Tank Containers

Future Business - The risk of climate change is now recognized and the science is well established. Governments around the world have committed to reductions in CO2 of 60% or more by 2050. Their challenge is to encourage the right practices through fiscal and other incentives. The International Tank Container Organization (ITCO) has taken a preemptive step into the future by assessing the environmental impact of tank containers compared with other handling methods.

Broader international agreement on the risks of climate change is evolving from greater clarity on the impact of a failure to act. As a result, emissions trading and control schemes are being put in place which are effectively a tax on "emissions-inefficient" operations. They are not yet global measures and, as such processes are devised and settle in, there will be significant regional and national variations. However all initiatives are in line with the Kyoto Protocol; Copenhagen in 2009 can be expected to set tougher targets to wider areas of industry. The message is clear, energy inefficiency and emissions performance will carry penalties in the future that will raise operating costs; relative failure by any business will become a competitive disadvantage.

Cost Implications

Kyoto called for a reduction in emissions of 60% by 2050. Some have gone further in their commitment; the UK Government has established an Office for Climate Change and has committed to lowering emissions by 80% by the year 2050. Attainment of these goals will require regulation and taxation to achieve the right behaviors and change.

The first mechanism that has been selected by the European Community to drive emissions downward is ETS - Emissions Trading Scheme. This is an allowance and cap approach designed to incentivize companies to become more energy efficient. Where they cannot achieve their objectives they must purchase the allowances from companies that are over-performing against their allowances. As yet, ETS does not cover all areas of industry such as transport. However there can be no doubt that measures will be extended or introduced.
For example, the UK is to introduce in April 2010 the CRC (Carbon Reduction Commitment) which will extend the coverage to 20,000 companies. This approach responds to EU regulation requiring Governments within the community to set an allowance and "cap" for specified installations based on a unit of allowance being equivalent to one ton of CO2.

All of this is in its infancy and most organizations have limited actual experience of what it all means and how they will need to change. The only fact that is beyond doubt is that emissions will cost money in the future; governments only have the taxation and regulation levers to influence operating and consumption practices. As a result companies that are concerned about their costs, corporate social responsibility and achieving sustainability will be well advised to understand their carbon footprints and the reduction strategies that are available to them. "Forewarned is forearmed" is the adage.

In 2008, LCP Consulting developed and applied for the first time a carbon footprinting methodology called Carbon-to-Serve. It was designed to overcome gaps identified by LCP in carbon emissions assessment tools; these tend to give neither an end-to-end evaluation nor sufficient transparency of the assessment to be able to conduct sensitivity analysis and scenario modeling.

With this in mind, the International Tank Container Organization: ITCO, commissioned LCP Consulting to evaluate the environmental performance of tank containers compared with their main alternatives of drums and bulk bags, and to provide a benchmark and support the opening of a dialogue on the key drivers. The Board of ITCO considered that the tank container industry's stakeholders (customers, suppliers and operators) would benefit from this evaluation as they all start to formulate and operationalize their carbon reduction strategies. The evaluation was completed in a matter of weeks and is now available for interrogation and discussion by any interested parties.

**Scope Of The Evaluation**

There were two objectives for this evaluation: first, to support the industry and its stakeholders by providing a reference point on the emissions status of tank containers; and second to provide a comparison and sensitivity analysis against alternative handling media.

The report details the evaluation of the environmental performance of the tank container to transport non hazardous materials vs. the use of either steel drums or bulk bags; it uses the Carbon-to-Serve toolset. The evaluations were based on a representative supply chain between the Shanghai region of China and the Ruhr valley in Europe and, where appropriate, the return journey. The evaluation included the manufacture of the respective container, transportation on empty legs,
cleaning and waste disposal. As such the end-to-end nature of the assessment is as complete as it can be. Emissions data on each element of the chain has been taken from British Government published standards (DEFRA) and crossed checked with other EU sources. The conclusions are based on the basis of grams of CO2 per round trip liter shipped showing the relative attributes of the different handling media for the transportation of non-hazardous liquids:

- Tank Container holding 24,000 liters: 268.9 g/liter
- Bulk bags holding 24,000 liters: 276.9 g/liter
- Drums of 213 liters each with 80 shipped in a container: 502.3 g/liter

An equivalent and more tangible measure is that the carbon creation for the tank container is about the same as driving two economy class cars to Shanghai and back. The evaluation provided some powerful insights into the carbon intensity of liquids' supply chains; some were unexpected. The key points are summarized as follows:

- The most significant carbon steps in the tank container and bulk bag chains are the loaded ocean legs which account for more than 95% of emissions;
- This applies even though the CO2/ton-km for shipping is very much better than for all other modes of freight - weight and distance are the drivers;
- For drums, the emissions generated by the manufacture of the single trip drum are the majority of its difference with the other handling methods but it is also less effective in loading and transportation;
- The manufacture of the bag and its disposal are not significant drivers of emissions;
- The result is surprisingly insensitive to running the return ocean leg empty and the carbon impacts of the local movements, cleaning, repositioning and disposal; and
- There is a discrepancy of as much as 40% in the published emissions statistics for international shipping from different sources; if companies are to be held accountable for their chain emissions, this gap needs to be narrowed or made more specific to vessel types. Energy efficient liner companies will have a competitive advantage.

In summary, the tank container appears to be the most energy efficient way of moving intermediate quantities of bulk liquid materials between and within continents with a sea leg. It is very much better than drums and marginally better than bulk bags. Operators and shippers should be most concerned going forward with the specific emissions credentials of their carriers, the routings used and the return load balancing; these factors offer major opportunities to contain or reduce emissions.
"For the future, the study carried out on our behalf by Professor Alan Braithwaite and his colleagues at LCP Consulting shows that if the carbon footprint of tank container and other containerized shipments is to be further reduced, the atmospheric emissions generated by container ships themselves will have to be cut," points out Reg Lee, president of ITCO. "While shipping is the most environment-friendly of all the transport modes per ton-mile of cargo, there is still room for further improvement. In this respect ITCO is pleased to note the many measures currently being implemented by the maritime community to improve bunker fuel quality, reduce ship exhaust emissions, boost engine performance and streamline the efficiency of shipboard systems."

As businesses start to formulate their responses to the challenges of climate change and global regulation of emissions, prioritization of focus and action on changes will be vital to deliver the improvements required. This can only be achieved through transparency, comparison and scenario modeling. We hope that this report will provide a platform for understanding, debate and discussion in the industry based on the facts presented.

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