Reefer Containers
The present and the future
Reefer History

The marine container that Malcolm McLean, the founder of Sea-Land, introduced in 1956 was purely for the transport of general cargo or what is called dry cargo.

The first refrigerated marine containers, based upon converted truck units, came into use in the 60’s.

Maersk Line received the first “reefers” with “integrated” cooling units in 1975.

In between there has been the “Porthole” or “Conair” concept with an insulated 20’ container connected to a central reefer plant.

Today a reefer is the synonym for a container that can transport both chilled and frozen cargo.
Reefers – the present
Coldstore in Motion

- Reefers are in principle designed and built to transport cargo already pre-cooled to the right carrying temperature.

- During transport the reefer is to maintain temperature, provide fresh air ventilation or de-humidification, where required.

- The normal reefer type is a 40’ High Cube. 20’ standard height is used to a lesser degree.

- 40’ standard height* types are still around and in regional corridors 45’ pallet wide* reefers are also used

* Not operated by Maersk Line
From field to consumption

Grower/Shipper:
- Growth
- Maturity
- Harvested
- Cooled
- Treated
- Sorted
- Packed
- Stored in Cold store/Stuffed in Reefer Unit

Shipping Line:
- Gate in and Terminal storage
- Transport on Oceans
- Gate Out/Delivered to Customer
- Stored in cold store
- Transported in reefer truck
- Delivered to supermarket
- Stored at supermarket (Not optimal temperature)
- Put into display supermarket
- Transported home by consumer
- Stored in fridge (Not optimal temperature)
- Final consumption

Consignee:
Perceptions or at least some of them

**A reefer can only maintain temperature**

- A modern reefer has enough cooling capacity to cool down a cargo like bananas, that are traditionally hot stuffed.

- But the optimal process is pre-cooling of the cargo in a dedicated facility.

**A reefer needs to be pre-cooled before loading of a cargo**

- Unless the loading takes place in a controlled environment, which is seldom the case, then pre-cooling is a waste of energy and a recipe for cargo damage.

**A new reefer is better than an “old” reefer**

- The cooling capacity is sufficient to compensate for a degrading insulation and if maintained correctly a reefer can fulfill the requirements until it is retired.

- Maersk Line operates a reefer for up to 15 years.
What about energy?

- Reefers are increasingly getting more energy efficient as the manufacturers have focus on this.
- Wageningen University (WUR) in the Netherlands developed the QUEST method 5 years ago.
- Maersk Line started to use this method in 2007 and are now part of developing the next generation.
- Any shipping line can use the WUR QUEST program!
- Environmental impact of reefer shipments is and will be a focus item for the end consumers.
Special services

• Besides temperature, fresh air ventilation and humidity control there is an increasing trend to offer special services

• Services includes Controlled Atmosphere, lower temperatures than the usual limit of -30°C, air quality control systems, chemical treatments, monitoring of cargo conditions etc.

• Shipping lines are embracing different strategies

  • One common denominator is that Controlled Atmosphere systems are on the increase

  • As of now +15 special services systems are on the market and that will likely increase

  • In general existing systems are one way, you activate them and get the result later!
Reefers – the future
Process in Motion

- Reefers will not only be a coldstore but will provide the ability to have individual cargo carrying conditions.

- Every chilled shipment will be special and not equal to others.

- Two way on-line communication and control will be provided

- The dominant reefer type will be a 40’ High Cube. *Maersk Line is phasing out 20’ reefers*

- The “standard” reefer will provide “special” services

- Special size types will still be used in niche markets* 

* Not operated by Maersk Line
Data interpretation

• Presently voyage data has to be obtained by physically accessing a reefer either to download the reefer unit datalogger or to remove customer temperature monitors

• The future will be wireless and test systems are on the market

• Customer voyage monitors will be an integrated part of the solution

• The future process will be 2 way: Monitoring and control
Food Safety

- Strict hygiene rules enforced on dairies, farm process plants etc.

- Limited rules or policies directed towards maritime transport of food stuffs

- No definition of “clean”

- The future is different (by definition) and food safety will be an important topic in the reefer shipping industry
Energy consumption and reefer performance

Maersk Line project to push the boundaries

- Back-up or supplementing power
- Cooling and refrigerants
- Tare weight vs. payload
- Controls and software
- Ventilation and Airflow
- Insulation vs. max. cube
- Hygienic design
- Recycling

Maersk Line project to push the boundaries
The Future
What is unlikely to happen

- A reefer will not replace a proper pre-cooling process for sensitive products

- Transit times will not improve significantly

- The 40’ High Cube Reefer container will not be pallet wide (Euro pallet)

- The Porthole system will not resurface
  - But we will only know in the future
"Those who do not think of the future are worthy of their ancestors."
Winston Churchill