



Low Carbon Emission Reach Stackers and Empty Container Truck

PROTOTYPE DESCRIPTION

The Eco-Reach Stacker (SEA-EcoRS) and the Eco-Empty Container Truck (SEA-EcoLIFT) are two prototypes developed by Hyster at the Big Truck Development Centre of NIMH under the framework of the European project SEA TERMINALS.

These machines will provide outstanding and innovative equipment focused on reducing fuel consumption and CO₂ emissions.

The prototype will be deployed by means of real life trials at the Noatum Container Terminal Valencia, Port of Valencia, Spain.

OBJECTIVES

The main objective of the prototype is to deploy the latest technology on fuel consumption reduction concerning container handling Reach Stackers and Empty Container Handler trucks.

In addition, few performance data from this type of machines have been gathered using Stage IIIB engines during real life operative. In consequence, another objective of the SEA TERMINALS prototypes is to test and deploy the prototypes in real life conditions, gathering information of real-life duty cycles of the container handling trucks. All the systems from the prototypes are measured, controlled and monitored while they are being operated at the Port Container Terminal.





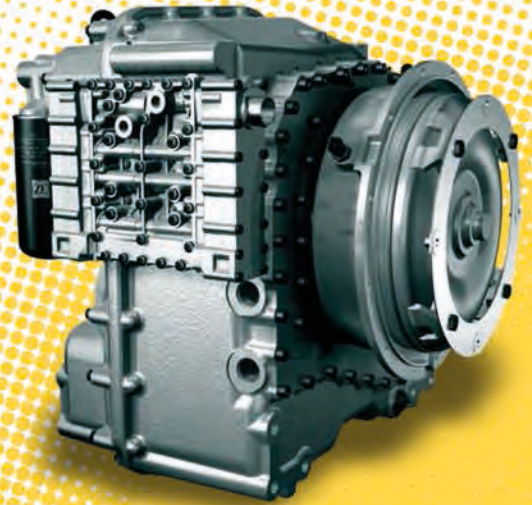
ENGINEERING PROCESS

Connected Efficient Dynamics leading to Profitable Low Emissions

- **Connected:** Use of Telemetry for Duty Cycle knowledge to adapt and improve truck systems
- **Efficient Dynamics:** Improve multiple systems: Right sized Engines, smart Transmissions, on demand Hydraulics & Auxiliary systems which relate to fuel consumption and container handling
- **Profitable Low Emissions:** Optimise and reduce Total Cost of Ownership while compliant to latest emission standards.

Main Features of the Prototypes

- MY2015 designed for latest emissions regulations (Stage IV)
- Engine enhancements to improve fuel consumption
- High performance & Eco E-low engine modus (remotely switchable by Port operator)
- Start stop, Hibernate idle
- Highly efficient 5-speed Transmission
- Free wheel stator & shift point optimisation
- Lock up clutch (study only)
- On demand cooling
- Tire pressure monitoring
- Drive and work lights are all LED lights
- Improved Truck Telemetry system and Duty Cycle parameter determination for fuel consumption optimisation
- Container size and stacking height detection for productivity calculation
- Connection to SEAMS Platform and Blackbox Concepts (Noatum)



**August
2014**

**CO₂ and Fuel saving
solutions development**

- Finish prototype concept.
- Engine, Transmission and Hydraulics enhancements.
- Telemetry and duty cycle parameter development.

**September
2015**

Design Validation

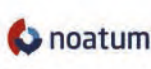
- 2x A-build truck built and tested at Hyster premises.
- Field test at the Port of Valencia of innovative truck enhancements.
- Telemetry and Duty Cycle parameter analysis.

**November
2015**

Evaluation

- Evaluate results.
- Develop business case studies for each of the tested Trucks and systems enhancements.

SEA TERMINALS PARTNERS:



IMPLEMENTING BODIES: