HYSTER

**STRONG PARTNERS.
TOUGH TRUCKS.™**

Trans Middle East – Jeddah, 26. & 27.10.2016

LATEST TRENDS AND AUTOMATIZATION IN FORKLIFT TRUCKS

LATEST TRENDS AND AUTOMATIZATION IN FORKLIFT TRUCKS

> Agenda:

> Where we are today? Automatization in Ports
> Automated Forklifts?
> Today' s demands of port terminals?
> Sea Terminals Project – smart & energy efficient solutions
> Clean engines
> Telemetric systems
> Automated Maintenance: Greasing Systems
> SOLAS – Weight verification
> Radar Eye / Camera Systems

WHERE WE ARE TODAY?
AUTOMATIZATION IN PORTS

- Change came with developing automated / semi automated terminals
   - RTG' s automatization started back in the 90' s
    - AVS' s since 2005

- Straddle carriers

since 2005, later Sprinter Carriers: For horizontal transport only

AUTOMATED FORKLIFT TRUCKS?

- Already available for intralogistics in production and warehouses
- Not that far with automated EC' s, RS' s and FLT' s
  - Why?
    - FLT' s & Container Handlers need to be more flexible for complex operations and therefore skilled operator essential
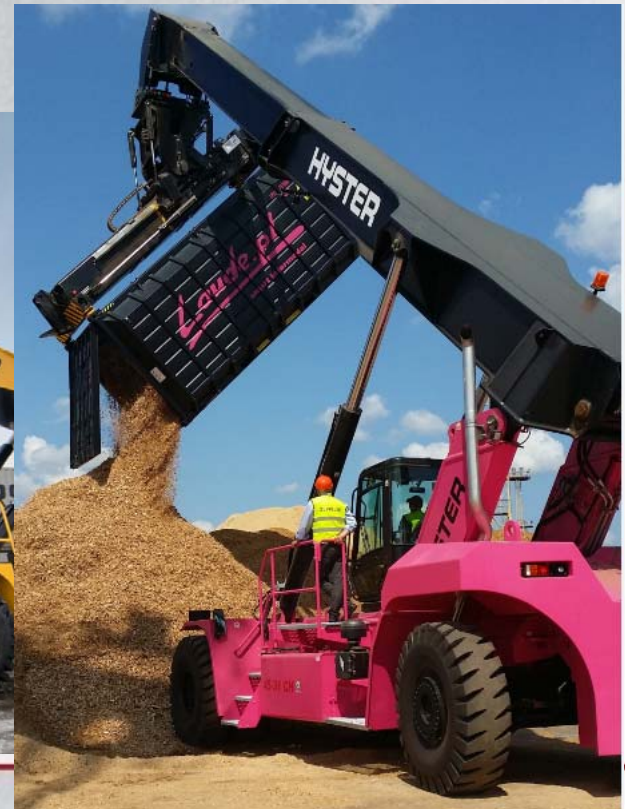
TODAY' S DEMANDS OF „ADAPTIVE PORTS"?

- Clean Technology / reduction of emissions
- Tracking of Equipment: Check productivity and costs
- Ease of Maintenance: Automated Greasing Systems (Best practice to reduce TCO)
- New requirements: SOLAS
- Safety: Camera and Radar assisted systems
- Demand for flexibility (Best practice steel handling RS)

SEA TERMINAL PROJECT

Target / Description:

▸ Reducing fuel consumption and CO_2 emissions

▸ Prototype tested under real life trials

ENGINEERING PROCESS:
Connected Efficient Dynamics leading to Profitable Low Emissions

- **Connected**
- **Efficient Dynamics**
- **Profitable Low Emissions**

RESULT: STAGE IIIB / IV LOW EMISSIONS

Fuel savings achieved through

- Intelligent design
  - Exhaust Gas Recirculation (EGR)
  - Engine Right Sizing
- ECO – eLo performance mode
  - RPM management
  - Throttle Response
  - Shift point selection
- Idle Management
  - Hibernate idle
  - Optional Empty Seat Engine Shutdown
- Truck Systems
  - Cooling on Demand
  - Variable fan speed on engine, charge air cooler and transmission
  - Matched Hydraulics

Stage IIIB EGR engine | ECO-eLo Mode | Idle Management | Truck Systems | Right sizing
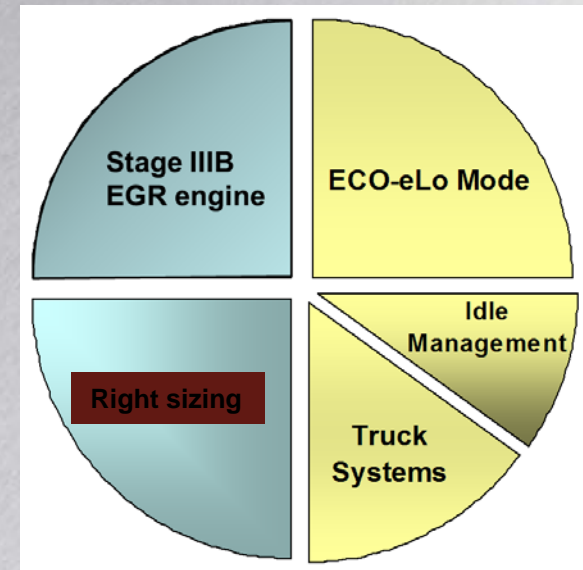
Up to 20% fuel saving

TELEMETRY: TRACKING SYSTEMS

- Why Telemetry systems?

- Supervision of Truck Fleet and drivers
  - Who is driving?
  - Where is the truck?
  - Performance of operation
  - Daily checks and accident prevention

- Automated diagnostic functions
  - Truck conditions
  - Service
  - Hrs / consumption
  - Pro active maintenance

TRACKING SYSTEM

Monitoring

- Truck monitoring via web portal
- Remote Hour Meter / Usage tracking
- Cost of Operations
- PM Tracker
- Impact Sensing
- Fault code tracking

Fleet Management Module inside truck

+

Access

- Truck monitoring via web portal
- Remote Hour Meter / Usage tracking
- Fault code tracking
- Impact Sensing
- Cost of Operation
- PM Tracker
- Access control by operator (swipe card)
- Unattended and/or No Operation Truck Shutdown

Card Reader

+

Verification

- Truck monitoring via web portal
- Remote Hour Meter / Usage tracking
- Fault code tracking
- Impact Sensing
- Cost of Operation
- PM Tracker
- Access control by operator
- Unattended and/or No Operation Truck Shutdown
- Operator pre-shift checklist

Operator Display on truck

REACHSTACKER OPERATOR PERFORMANCE

Operator	Fuel consumption	Idle	Container per hour	Fuel per container
Driver 1	14,9	49%	13,0	1,14
Driver 2	15,3	55%	13,0	1,18
Driver 3	20,0	32%	18,1	1,11
Driver 4	19,6	34%	16,2	1,21
Driver 5	18,7	27%	15,9	1,17
Driver 6	18,0	32%	15,4	1,17

TRACKING SYSTEM - MOVIE

Selected Equipment (Total Number of Equipment : 1)

Design Center	Factory	Equipment Range	Site	Department	Product ID	Serial Number	Asset ID	Service ID	Class
BigTruck	All	All	Nijmegen	~~RST-Technical~~ Department and Projects	1063	C222E01681 L	Asset 1063	Hyster 1	Big Truck

Session Drive Summary Period

30 SEP 2013 20:08:51 – 30 SEP 2013 22:48:37

Measurement Unit

Metric

Operator (Card Number)

~~Leny Crommeing~~ (37485)

Session Details

| Service Meters	Start	End	Elapsed
Main Service Meter (hours)	2254.1	2256.7	2.6
Drive Motor / Engine Runtime Meter (hours)	2254.1	2256.7	2.6
Hydraulic Operation Meter (hours)	528.5	529.1	0.6
Transmission/Traction Operation Meter (hours)	1551.6	1553.2	1.6
Odometer (km)	10154.5	10166.1	11.6

Statistical Meters	Values	Notes
Key Switch 'On' Duration (HH:mm:ss)	02:39:33	
Operator Presence Duration (HH:mm:ss)	02:37:37	
Moving Duration (HH:mm:ss)	01:08:03	
Hydraulic Function Duration (HH:mm:ss)	00:37:28	
Working Duration (HH:mm:ss)	01:45:31	
Distance Driven (km)	11.6	
Lift Duration (HH:mm:ss)	00:00:00	
Lower Duration (HH:mm:ss)	00:00:00	
Auxillary Hydraulic Duration (HH:mm:ss)	00:00:00	
Average Speed (kph)	8.5	
Peak Speed (kph)	20	
Low Speed Operation Duration (HH:mm:ss)	00:35:27	* Equipment's speed is below 10 (kph)
Medium Speed Operation Duration (HH:mm:ss)	00:32:36	* Equipment's speed is between 10 (kph) and 20 (kph)
High Speed Operation Duration (HH:mm:ss)	00:00:00	* Equipment's speed is above 20 (kph)
Low Level Over-speed Count (count)	0	* Equipment's speed is between 25 (kph) and 35 (kph)
High Level Over-speed Count (count)	0	* Equipment's speed is above 35 (kph)
Low Level Over-speed Duration (HH:mm:ss)	00:00:00	
High Level Over-speed Duration (HH:mm:ss)	00:00:00	
Reverse Gear Operation Duration (HH:mm:ss)	00:07:37	
Forward Gear Operation Duration (HH:mm:ss)	00:59:01	

# PROACTIVELY REDUCE DOWNTIME

Checklist completion
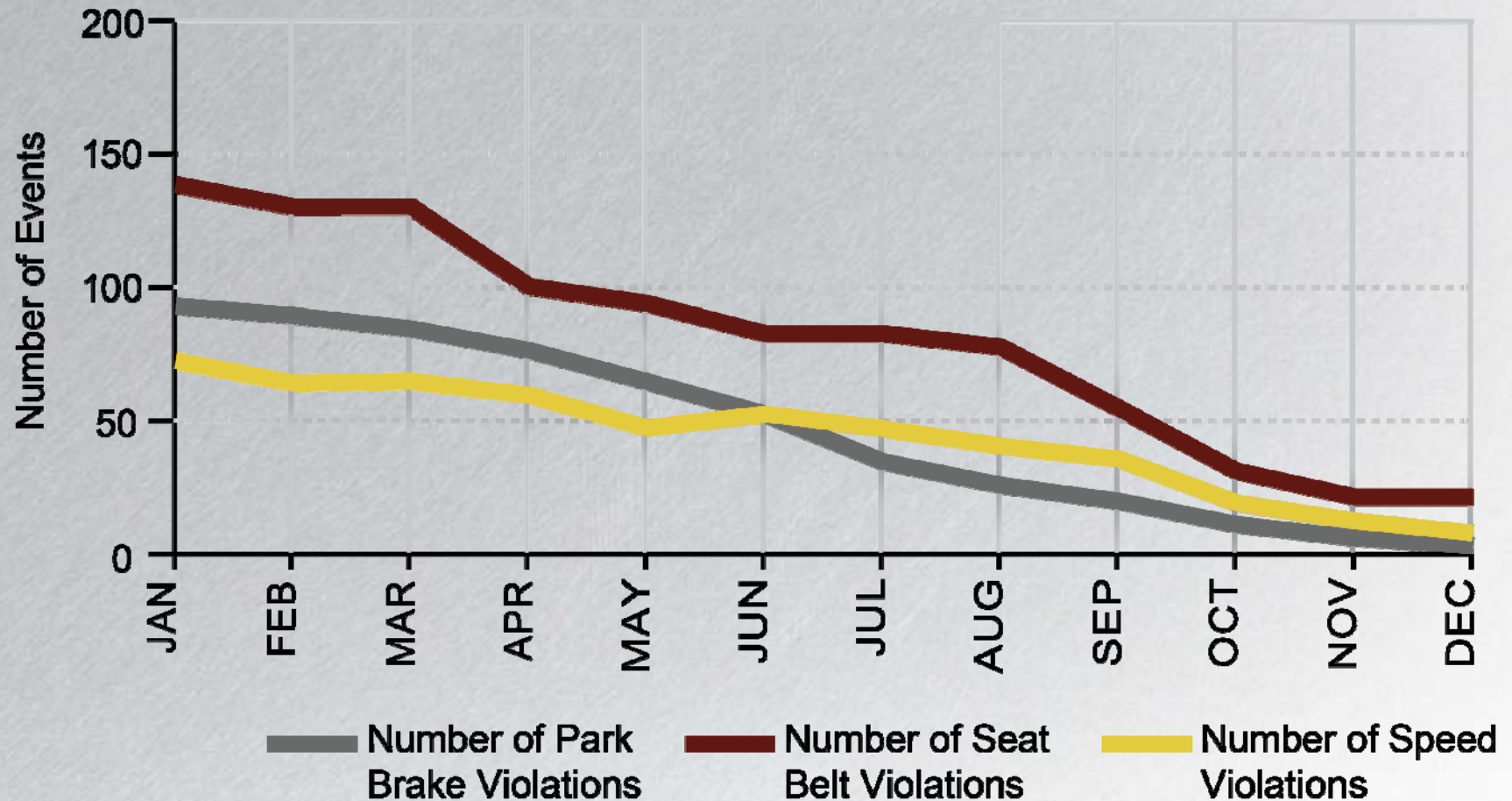
BEST PRACTICE: REDUCTION TOTAL COST OF OWNERSHIP

Example: Automatic Central Greasing system on ReachStacker

▶ 58 grease points in total (all points under 1000 hours greasing interval), 23 on the basic truck and boom, 35 on the container spreader

▶ 'Twin-line' greasing system for precise and even distribution of grease to the many grease points

▶ Cab display for indication of selected interval grease mode, timer operation, pump cycle and error codes

▶ Sales option is also available for basic truck and outer boom only

▶ Spare parts available for system and pump servicing

▶ Fill using EP-2 grease
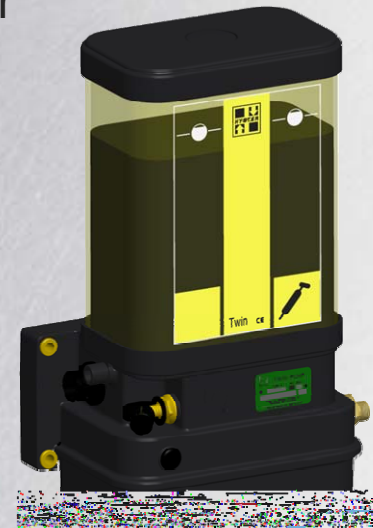
SAFETY OF LIFE AT SEA (SOLAS)
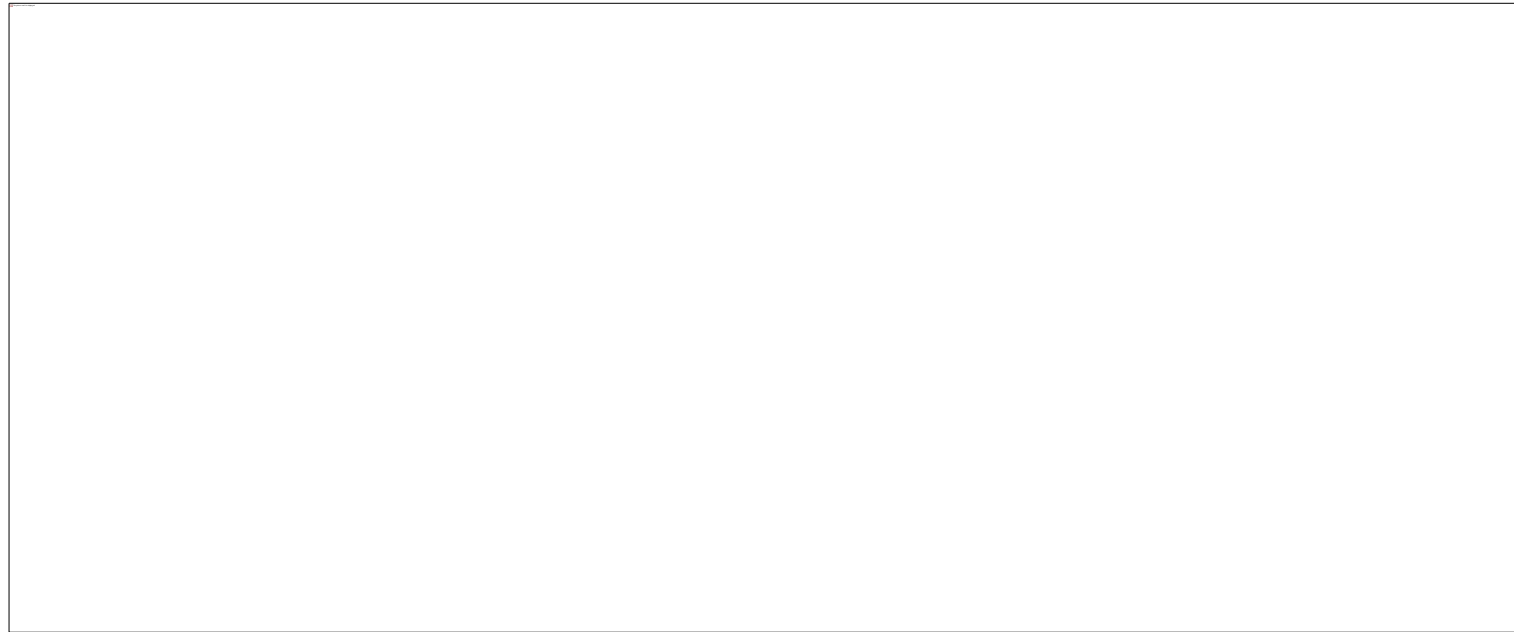
SAFETY OF LIFE AT SEA (SOLAS)

Weighing solutions

Two methods are officially allowed - Either way the objective is to increase port safety:

Method **1**

The shipper (or third party) weighs the
complete packed container

Method **2**

The shipper (or third party) weighs
all individual items of the container

The weighing equipment used must meet the applicable accuracy standards
and requirements of the State in which the equipment is being used.

SOLUTION FEATURES

STATIC

- The cost-effective solution for SOLAS compliant weighing in specific countries
- Available for Hyster ReachStacker models: D222 and C222 (for C222 please contact Sales)

System
- Based on hydraulic load sensing technology
- Maintenance free
- Weighing **error** <2% of load weight
- Quick and easy to use
- Static container weighing within 15 seconds

Display
- Full colour display (day/night setting)
- Gross, Tare and Net weight
- Time and date of weighing recorded into memory

Data Transfer
- Printing, data transfer and data storage options available
- CANBUS and USB output
- Data transfer possibility to TOS system

STATIC+

- The solution for SOLAS compliant weighing in countries where Legal for Trade regulations are applied
- Available for all Hyster ReachStackers and Laden Container Handlers

System
- Minimum workflow disruption - container weighing during truck light maneuvering
- Based on hydraulic load sensing technology
- Maintenance free
- Highly accurate: weighing error <1% of load weight
- Optional upgrade to Legal for Trade requirements (field-installed)

Display
- Custom fields: container I.D., destination, location etc.
- Gross, Tare and Net weight
- Short and long total (e.g. per ship)
- Time and date of weighing recorded into memory
- Overload warning functionality

Data Transfer
- Printing and data transfer options available
- Serial RS232
- Data transfer possibilities to TOS system using radio, WIFI or cellular technology

1. STATIC

> Based on existing load moment system = Hydraulic pressure sensors (standard LLMI system)

- No maintenance
- OIML R51 class Y (b) [pending approval]

> **Standard kit:**

- LLMI based weighing system with touchscreen operator interface
- Data storage
- CAN data output
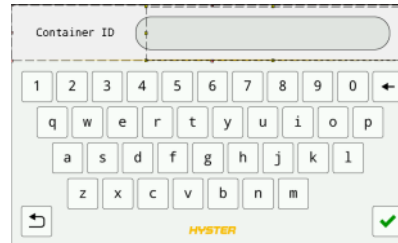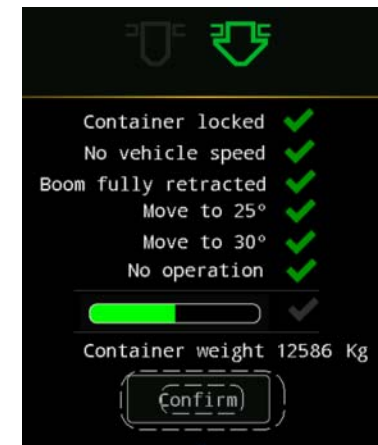
> **Options:**

- Printer
- WIFI module
- USB output

> **Weighting procedure:**

- 1. Pick container (boom fully retracted)
- 2. Raise boom up from 25 to 30 degrees angle
- 3. Verify and send weight

Home screen

Container ID entry

2. STATIC+

- The extensive solution regarding compliance to SOLAS regulations in most stringent regions

  - R51 approvals for Loadrite system for most important regions globally

  - Extendable to meet Legal for Trade requirements

- Accuracy within +/- 1%

- Available for all laden container handlers

- Mesuring trough pressure sensors:

  - 1. Pick container (boom fully retracted)

  - 2. Lift load for 5 seconds on flat/even surface (Minimal manoevering allowed)

  - 3. Verify and send weight

- **Based on the Trimble Loadrite L2180 system**
  10.000 units already existing on machines (wheel loaders etc)

INCREASING SAFETY: RADAR AND VIDEO SYSTEMS

- To increase safety during operation
- Reduction of accidents
- Audible & visible alarms in cabin
- Available for all Trucks

- Other common option to improve operations: Front facing cameras (on Forks or spreader)

DEMAND FOR FLEXIBLE TRUCKS:
EXAMPLE STEEL APPLICATION CAPABILITIES

- One truck
- Quick Disconnect tool changer & interchangeable attachments
- The most versatile solution for multi-product stock yard operation
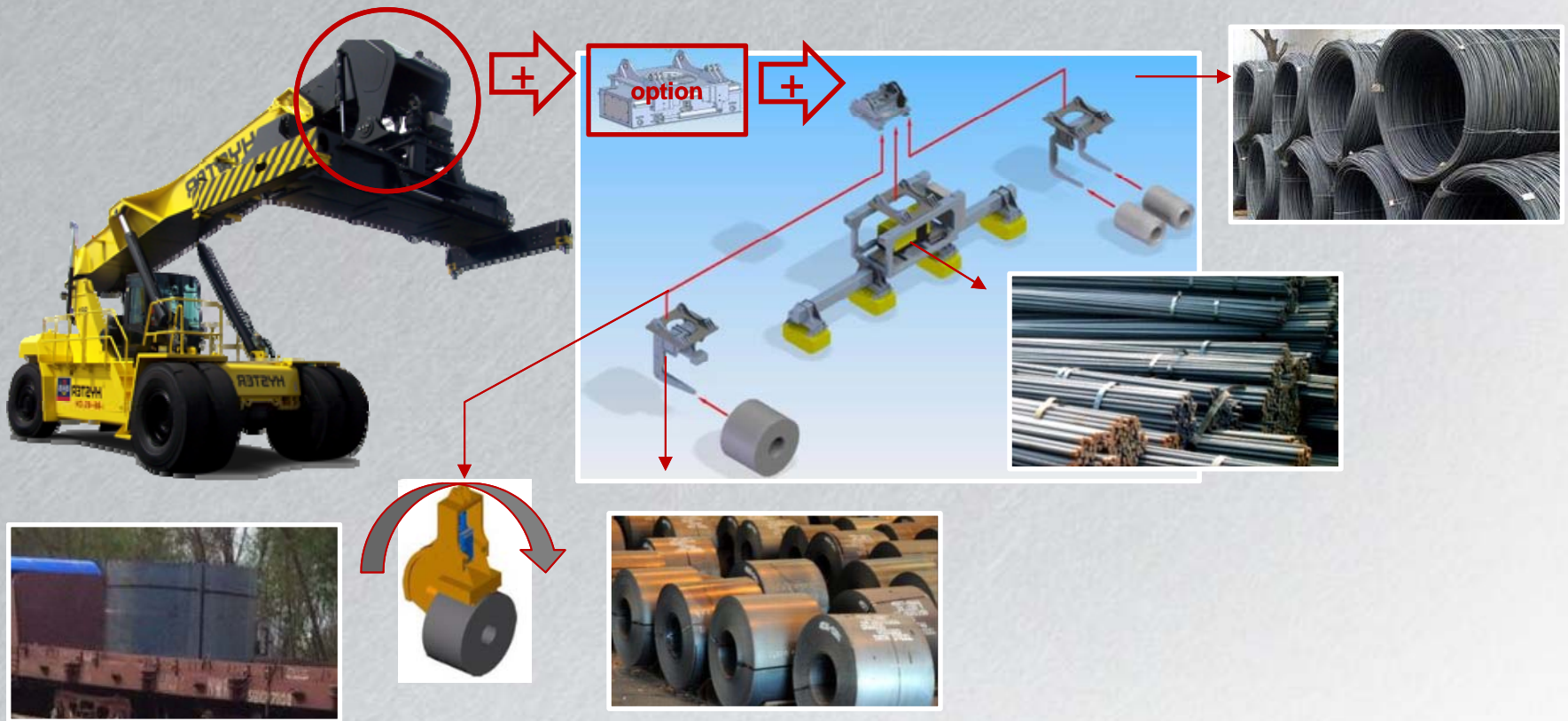
MORE THAN 80 YEARS OF EXPERIENCE

1929	1944	1989	2009
Hyster founded in Portland Oregon (USA) as the Williamette Ersted Company	Company name officially changed to Hyster Company	Hyster Company purchased by NACCO Industries	

- 1953
  start Hyster plant in Nijmegen
  via Geveke (now called Heffiq)

FULL LINE - BIG TRUCKS

H8-16XM6

H16-22XM-12EC

H40-50XM-16CH

H16-18-7.5-12

H36-48XM(S)-12

H16-18XM(S)-12

H25-32XM

RS45-46

GLOBAL MANUFACTURING & INDEPENDENT DEALER NETWORK

Danville, Illinois
NA Parts Distbn

Portland, Oregon
Corporate Headquarters
CB Development Centre

Ramos Arizpe, Mexico
Fabrication

Sulligent, Alabama
Component Parts &
Cylinder Transmission

Greenville, NC
Americas Headquarters
Warehouse Dev Centre
Americas Marketing HQ
Narrow Aisle, Motorized
hand & Electric Truck
Assemble

Berea, Kentucky
Electric Rider & ICE
Truck Assembly

Craigavon, N. Ireland
ICE truck, Cylinder Transmission
& mast Assembly

Fleet, England
European Marketing HQ

Sao Paulo, Brazil
Lift truck Assembly & Parts
Distribution

Irvine, Scotland
European Divisional
Headquarters

Nijmegen, Netherlands
Big Truck Assembly
Big Truck Dev Centre
Parts Distribution

Masate, Italy
Narrow Aisle Truck Assembly
European WHE Dev Centre

Shanghai, China (JV)
Truck Assembly

Obu, Japan (JV)
Truck Assembly, Parts
Distribution & Dev Centre

Cavite, Phillipines
Fabrication

Pune, India
Engineering Support
Centre

Sydney, Australia
Asia-Pacific Headquarters
Asia-Pacific Marketing
Parts Distribution

Thank you

One solution meeting all global requirements