Automating container terminals
Safer, greener and more productive
Automating container terminals – Safer, greener and more productive

- ABB today
- ABB Ports history in brief
- Automation
- Remote operation
- Control room design
- Training with simulator
ABB today
Power and productivity for a better world
ABB’s vision

A leader in addressing power infrastructure and control needs for utilities, industry and transport & infrastructure

A leader in operational asset effectiveness – uptime, speed, yield – and efficiency

Contributing to decoupling growth from environmental impact
- Less energy per unit GDP
- Less pollution per unit energy
Shaping the world we know today through innovation
Pioneering technology since 1883

Say hello to YuMi!
Well positioned in attractive markets
Long-term market growth drivers intact

### Power & Automation

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Our aspiration: #1 or #2 in all businesses
Power and automation are all around us
You will find ABB technology…

orbiting the earth and working beneath it,

crossing oceans and on the sea bed,

in the fields that grow our crops and packing the food we eat,

on the trains we ride and in the facilities that process our water,

in the plants that generate our power and in our homes, offices and factories
ABB Ports history in brief
World leading within power and automation
130 years of collaboration worldwide

1883  Elektriska Aktiebolaget is established in Stockholm.

1890  Merger with Wenströms & Granströms Elektriska Kraftbolag to Allmänna Svenska Elektriska Aktiebolaget – ASEA.

1988  Merger between ASEA and Swiss based Brown Boveri Company (BBC) forming ABB
History of innovations
Solutions for cargo handling since 1897

- Founding fathers
  - 1883
- First crane installed
  - 1897
- ASTAT Technology
  - 1966
- DC converter
  - 1969
- PLC, GPO, Cabin View
  - 1983
- Direct Torque Control
  - 1996
- 100 STS and 100 RTG systems
  - 1966
- Load Position Sensor
  - 1992
- AC drive for STS crane
  - 1987
- 1997
  - First fully automated stacking crane
- Multilane chassis guide
  - 2000
- Unmanned yard cranes
  - 2002
- STS with auto landing
  - 2005
- Dual hoist and remote control of STS cranes
  - 2010
ABB Ports offering

- Crane automation for container and bulk
- Terminal electrification
- Service and Support
- OCR and process automation
The new landscape of container terminal operations

Challenges

....safety

Source: Constructiondigital.com
New challenges

A new level of terminal capacity and productivity is needed

- The terminals can not just add equipment and staff based on the growing peak needs
- To keep total cost for the transport chain the terminal must be flexible for volume variations by having:
  - more dense stacking
  - less interruptions during operation
  - smooth integration with hinterland activities

How can terminal operators achieve higher productivity and better utilization of resources?

How does this affect the role of the equipment operators?
Automation
Automation is the solution – safer, greener and more productive

Automation:
- Predictable production
- Just in time
- Steady smooth pace
Automation is the solution – safer, greener and more productive

MIT Panama

APM Terminals Lazaro Cardenas

SSA Tuxpan
The terminal operator’s role
Driving yard productivity with automatic stacking cranes

Improved stacking capacity based on:

- Stacking 5/6 high with wide cranes
- Optimum path in trolley and gantry directions
- Optimum distribution of work load between the cranes in the block
- Minimizing empty travel by double cycling
- Fully automatic cycle including automatic container pick-up and landing on road chassis

> 600 Automated and unmanned stacking cranes with ABB automation
The terminal operator’s role
Upgrading terminals - automation step by step

**Introduction of automatic stacking cranes in an RTG terminal like MIT Panama**

- First automatic stacking cranes in Latin America now in operation in an “RTG terminal”
- Automatic landing on terminal chassis and guided landing on road chassis
- Remote operators do exception handling as well as TOS planning
The terminal operator’s role
Driving quay side productivity

Improved STS productivity based on:
- Automation - sway/skew/path control
- Automatic/guided landing on lashing platform/vehicle/quay
- Automated handoffs by means of OCR, vehicle identification and process integration
- Tandem/double hoist operation
- Double trolley or other means of decoupling with vehicles
- Higher hoist/trolley speeds
- Remote operation

75 STS cranes with ABB remote control in 7 terminals worldwide
Remote operation
The equipment operator’s new role
The new “office”
The equipment operator’s new role
A new way of working based on Intelligent automation

- From driving and being in continuous control of the machine to supervision and exception handling
  - STS cranes: Automatic operation of whole cycle except landing on ship and supervised landing on manned vehicles.
  - Automatic stacking cranes: Fully automatic cycle including automatic container pick-up/landing on road chassis
  - Intermodal cranes: Same process as ASC.
- Unified process for all crane types
- Multi-skilled team enables assignment of staff based on present needs
The equipment operator’s new role
Remote Control Station – modern and ergonomic working environment

- Built-in crane operation knowledge
- Superior visibility of the process compared to the views from a crane cabin
- Attractive working environment for the next generation port staff
- Larger pool of candidates in terms of age and physical abilities
- Modern design with focus on operator ergonomics, adjustable to each operator’s specific needs
The equipment operator’s new role
Remote Control Station – modern and ergonomic working environment

- Automation and control system for all types of container handling cranes
- Modern and ergonomic Remote Control Station for operators
The equipment operator’s new role
Safer, healthier…

- Safer working environment – humans separated from machines
- Improved occupational health
  - No exposure of operators to vibrations and braking/acceleration
  - Reduced or eliminated headaches, pain in the neck and back
  - Team work and collaboration
- Located outside the gate - (ISPS)
- No special clothes or safety gear
- No transports in terminal
- Flexible operation, the team can select longer or shorter working slots and breaks
Control room design
The terminal operations team
Peak performance requires collaboration

The key to handling of operational peak situations is to utilize all equipment and all staff

- All located together
- Trained to perform at least 2-3 roles
- The team environment provides attractive working conditions and opportunities to continuously develop personal skills.
- Time efficient and continuous operation of all cranes
- Any crane in operation within seconds
- Easy shift/meal breaks
- Lighting and noise control solutions
Training with simulator
CORPORATE DILEMMA

WHAT IF WE TRAIN THEM AND THEY LEAVE?

WHAT IF WE DON'T...AND THEY STAY?

INVESTING IN EMPLOYEES
Training packages

Maintenance training
- Base
- Advanced
- On site
- Factory

Maintenance training

Simulators for operator training

- Conventional
- Remote
Simulator training
Customer’s voice from Vietnam

“We never thought that simulator training would be so efficient. Bringing an ABB CS800 crane simulator to Vietnam, was the smartest thing we have ever done”

Rob Baigrie (Project responsible SSA/SSIT) and Frank Birkenbach (Training responsible SSIT)
CS800 crane simulator
One software – two training environments

- Conventional STS, RTG & MHC
  - No accidents during training
  - Less damage on goods and equipment with well trained operators
  - Training in the operational team environment prior to operating real equipment

- Remote STS
  - Assessment of operator candidates
  - All automation functions and TOS work order interface
  - Graphics adopted to your crane
ABB CS800 conventional crane simulator
In 40’ HCDD

- When doors are closed it is a seaworthy shipping container
- Double door-container gives access from both ends
- Company logo and exterior color on request
Finally

Remember, your employees are your biggest asset and they will perform safer, greener and more productive supported by automation.
Thank you for your attention.
Power and productivity for a better world™