

Radio communications in port operations

The global shipping industry employs around 1.6 million people and it is predicted that some eight billion tonnes of freight will be handled through sea ports in 2014.

The emergence of new economies continues to bring strong demand for commodities, which, when matched to unrelenting worldwide demand for low cost manufactured goods, has fuelled the growth of shipping as the most cost effective method to transport goods, accounting for some 90 percent of all goods traded between countries.

Modern sea ports play a key role in the development of the global economy and efficiency, not just geographical location, has become the driver to attracting traffic. Like every other industry, the never ending quest for increased efficiency and improved customer service defines modern port operations and it is not surprising with billions of pounds of revenues at stake.

As a result, operations have become more complex, where logistics, inventory controls, 'just-in-time' service and sophisticated tracking systems are basic requirements that need to be balanced with the need for increased security and a safe working environment.

Communication is key

In this highly competitive sector it is vital to release capacity through the faster turnaround of vessels, and key to achieving this is seamless and effective communications between all departments and functions in both voice and data.

Clear reliable voice and data communication between port management and their many teams plays a pivotal role in delivering operational efficiency and improved safety and security; not easy across large areas with steel containers, mechanical handling equipment interfering with radio signals and a noisy

working environment.

As one of the world's leading manufacturers of radio communications equipment and systems, Kenwood's analogue and digital two-way radio systems are employed at some of the most modern ports in the world including petrochemical terminals where its specialised analogue, ATEX and digital hand-portable radios are used to enhance the flow of cargo by reducing the incidence of bottlenecks.

Kenwood Nexedge digital at SP-PSA Port, Vietnam

Singapore-based PSA International is the second largest port operator in the world with 28 ports in 15 countries. Kenwood's NEXEDGE digital system has been installed at two of its facilities to date, Mersin International Port in Turkey and SP-PSA International Port in Vietnam.

Opened in May 2009, SP-PSA is Vietnam's first deep water container terminal. Located at the mouth of the Cai Mep-Thi Vai river south of Ho Chi Minh City in Ba Ria-Vung Tau Province, this new terminal gives Vietnam direct shipping access to strategic shipping lanes. The opening event was marked by the arrival of Singapore's 288-metre long APL Alexandrite, the largest container vessel to call at any Vietnamese port.

SP-PSA Vietnam is ideally positioned to serve the fast-growing intermodal container traffic in the region. The industrial heartland of Vietnam is directly linked by road and inland waterway networks to the port, assuring future expansion of port facilities. Highway 51 and the inland waterway to Ho Chi Minh City, Dong Nai and surrounding provinces further expand the port's access to southern Vietnam. The port has an annual capacity of 2.2 million TEU, a total quay length of 1,200 metres and 12 quay-side cranes.



Photo courtesy of PSA International

Kenwood's NEXEDGE digital system has been installed at PSA's Mersin International Port (pictured), Turkey.



Selecting a future-proof communications system

SP-PSA needed a radio communications system that would accommodate its staff and facility size, as well as offer further expansion without additional licence expenses. Port officials decided on a Kenwood Nexedge digital two-way radio system throughout the SPA-PSA International Port.

The terminal employs more than 100 staff requiring 24/7 communications for service, safety and security to port users. The system is principally used in coordinating port maintenance, crane operations, staff and supervisory control and security. Supervisors use both the broadcast and group call features of the radio system to manage daily operations. The budget for the system was tight and the site radio system coverage demands were challenging, so too were the stacked containers, enormous metal structures and a large footprint. The initial brief demanded 100 percent coverage over an area with a radius of two kilometres as a minimum requirement.

Following installation, SP-PSA officials confirmed that the minimum coverage radius was exceeded by more than double, with a five-kilometre radius coverage achieved. The port performed coverage tests with the hand-portable radios and reported that direct communication was possible up to three kilometres, and with five-watt trunking, up to five kilometres.

This coverage was achieved without antenna towers and with a single five watt repeater. The entire SP-PSA system includes 111 radios, both hand-portable and mobile radios for vehicles, four antennas, rack-mounted repeaters, duplexers and a VPN router. Port management determined that 15 talk groups would be sufficient to accommodate key departments and functions so the system was configured to provide 15 group IDs and 120 unique/individual IDs. Splitting the radio population into separate talk groups allowed for efficient communication with

the relevant individuals for any given circumstance and situation. In case of an emergency, all radios can be called simultaneously and all staff members can be informed of an incident for example. Dedicated security staff can also be mobilised wherever they are in the terminal by a single call, should the need arise.

Legacy with future-proofing

The FDMA technology employed in digital two-way radios was specifically selected as it provides a 6.25 kilohertz narrowband operation, higher spectrum efficiency and better resilience against radio signal interference. The benefit of narrowband technology in this application is that the port would not have to seek additional frequencies to double its voice traffic as operations expand in the future. Furthermore, with its automatic mixed-mode operation it allows the port to communicate in analogue-to-analogue or digital-to-digital in voice and data. This enables a smooth migration path from any existing analogue radios to full digital operation over time. Direct mode operation provides two independent 6.25 kilohertz channels, with a 12.5 kilohertz channel spacing for communication requirements outside the trunking system or in case of the scenario of a radio fallback.

It was important for the port to maintain constant voice integrity throughout the facility, without coverage problems or dropouts, so the shift to digital led to greater clarity even in high noise areas. The Nexedge system employs enhanced forward error correction (FEC), resulting in an audio stream that is less susceptible to noise at every level of signal strength. This results in fewer lost or misinterpreted calls, which allows the port to maintain high productivity and efficiency and just as importantly, the reassurance of being able to depend on the system in the event of incidents or emergencies.

The Kenwood Nexedge system at SP-PSA Vietnam currently employs 12.5 kilohertz channel spacing but will migrate

to 6.25 kilohertz to double the number of available channels as necessary for the planned personnel and activity expansion.

About the author

Jens Toobe started his wireless communications career in 1993 in Germany with a University Degree in wireless communications engineering. Toobe has been with the JVCKENWOOD group for 15 years and has held various technical, sales and marketing roles. Some of his current duties include business development in Europe, the Middle East and Africa (EMEA) and government/wireless regulator liaison. Toobe is an active Kenwood representative in local and international industry forums.

About the organisation

Established in 1946, Kenwood is a leading manufacturer of professional two-way radio communications products and systems with over 67 years of experience. Kenwood products are sold in over 160 countries worldwide and have earned a reputation for high quality and reliability with the ability to perform even under the most extreme conditions.