



Market Segment:
Rail Infrastructure

Country of installation:
Norway

Year of Installation:
2016

End customer:
Bane Nor

System Integrator
Zenitel
Innotronic of Scandinavia
SAC Sweden AB

Solutions:
Public Address &
Voice Alarm System.

Key Products:
VIPEDIA

Holmestrand Station

The Requirement

Holmestrand train station is a new station engineered into the mountainside of the Holmestrand municipality along a tunnel 12km in length. The officially titled "Holm-Nykirke project" incorporating the construction of the double-track tunnel and the construction of the train station began in the Summer 2010.

The Customer/End User

Bane NOR (formerly Jernbaneverket) is a state enterprise in charge of the national rail infrastructure.

Bane NOR's purpose is to provide accessible rail infrastructure with efficient and user friendly services, including the development of hubs and freight terminals.

Bane NOR has 4,500+ employees with the main head office located in Oslo, Norway.

Blasting of the rock cavern, to thirty five metres wide and eighteen metres high, commenced in December 2011 and concluded in 2014.

The station hall, approximately eight hundred and seventy metres long, thirty metres wide and twelve metres high along with the double track train line opened to the public in December 2016 provides the Holmestrand community with valuable high-speed inter-city links.

Zenitel partnered with Innotronic of Scandinavia and SAC Sweden AB to deliver a comprehensive EN54 certified public address and voice alarm (PAVA) system at Holmestrand station.

Engaged by Bane NOR the design, supply, installation and commissioning of the new EN54 compliant PAVA systems at Holmestrand station harnesses many of the disciplines Zenitel offers customers.

The Solution

Zenitel had already supplied long-line PAVA systems to more than 300 stations for Bane NOR, however Holmestrand station was the first to utilise Zenitel's new VIPEDIA range of products.

The VIPEDIA range which includes audio routers, amplifiers and microphones, are all certified to safety standard EN54-16 and internationally recognised by the Loss Prevention Certification Board (LPCB).

The solution at Holmestrand station provides audio routing between twelve analogue inputs and twelve analogue outputs. The VIPEDIA-12 also includes provision for sixty-four internally stored Digital Voice Announcement messages and hosts Zenitel's VIPA long-line public address software. Four VIPEDIA-12 audio routers were locally linked to provide routing from any or all of their inputs to a total of forty-eight zone outputs, all configured via an Ethernet network.

Two EMS10 Emergency Microphone Stations provide live and pre-recorded message broadcast. Each feature graphic LCD displays together with 'Power', 'Voice Alarm', 'System Fault', 'Fault' and 'Speak Now' indicators. The EMS10's implement router hardware bypass to ensure continued all-call microphone operation in the event of matrix digital signal processor (DSP) or central processing unit (CPU) failure.

Two additional, MPS10 paging microphones are able to broadcast live, store-forward and recorded messages into user selected zones in addition to providing EN54-compliant emergency functions and mandatory indicators / controls.

V2000 amplifiers provide high-quality transformer-less audio output, configurable in software from 25W to 500W output per module. Seven were installed per V2000 chassis at Holmestrand station to provide a total of almost 19,000 Watts of 100V output. Integrated EN54-4 certified battery chargers in the V2000's charger battery packs, each with enough capacity for a fully loaded V2000 amplifier as well as one VIPEDIA-12 and peripherals- avoids the need for external battery chargers. Installed LSZDC amplifier cards provide amplifier health monitoring, standby switchover, loudspeaker line earth leakage monitoring and loudspeaker line 'End of Line' (EOL) monitoring.

Configured using a user-friendly graphical software interface, the V2000's standby modes and low quiescent power requirements provide improved environmental performance ensuring the PAVA system at Holmestrand station minimise its carbon footprint too.

"Zenitel has been a key supplier to Bane NOR for around ten years, delivering over 300 stations using the Vipedia and IPAM ranges of PAVA equipment. Their customer focused approach to design, manufacture and maintenance ensures we continue to work together"

Roy Strand, Bane NOR

12km
length of the
rail tunnel

7
D-series amplifiers
per V2000

19,000
Watts of 100V
output

300+
stations delivered to
Bane NOR

The Solution

Integral to the operation of the PAVA system at Holmestrand station and across Bane NOR's network of train stations is Zenitel VIPA software suite. Running on Zenitel hardware at every train station with Zenitel IPAM installed, and now also VIPEDIA installed hardware, VIPA software provides audio-over-IP, routing control and fault reporting capability between Bane NOR's Control Centre and all of the remote train stations, including Holmestrand station.

VIPA, one of the first audio-over-IP systems, developed and designed specifically to meet the requirements of long-line public address systems, delivers live broadcasts using UDP multicast over IP. Multicast broadcasts offer the benefit over Unicast broadcasts of requiring just single audio streams to deliver audio to any number of stations Bane NOR's Control Centre chooses to, which reduces required bandwidth.

VIPA also delivers the ability to stream digital voices announcement (DVA) messages from the Control Centre or to trigger them at remote locations on the station network, subject to bandwidth availability. An additional advantage of VIPA software is that live audio broadcasts can be transmitted in high or low bandwidth modes. This can be particularly useful where network bandwidth is more restricted, as in



Prime Minister of Norway Erna Solberg greets the press at the opening event.

Photo: Anne Mette Storvik, Bane NOR

the examples of legacy / brownfield installations on Bane NOR's network. VIPA also provides detailed fault monitoring of remote train stations via IP as well as providing a software API for interfacing with third party train timetabling/messaging systems. VIPA has also been interfaced with a custom software module which allows JBV to trigger messages at stations using legacy PA systems across other

stations on JBV's network using a module which uses DTMF tones to control remote stations. Developed by in-house software teams at Zenitel, VIPA's modular architecture and software development kit (SDK) allows VIPA to integrate with other third party PA systems, should it be required.

“In consultation with Bane NOR, Zenitel developed the standard IPAM range to meet all of the requirements for the Bane NOR project, which has successfully been implemented in more than 300 stations. Zenitel then introduced the VIPEDIA range of EN54 certified solutions in 2015 and this was chosen for the new-build project at Holmestrand station”

Henry Rawlins, Zenitel



The successful introduction of new VIPEDIA range of products at Holmestrand is already being replicated in other stations across Bane NOR's network with installations taking place at Oslo Airport's Gardemoen train station.

Roy Strand, Department Manager for Bane NOR comments "Application Solutions (Safety and Security) Ltd has been a key supplier to Bane NOR for around ten years, delivering over 300 stations using the Vipedia and IPAM ranges of PAVA equipment. Their customer focused approach to design, manufacture and maintenance ensures we continue to work together".

"Everyone at Zenitel works incredibly hard to develop and deliver our EN54 certified voice alarm products, so we're genuinely proud to be chosen as a supplier to one of the most prestigious railway projects in Europe"

- Peter Stewart, Zenitel Technical Director

Why Zenitel?

Zenitel is well positioned to drive the future of intelligent critical communication solutions. Through our portfolio of IP products and solutions, with built-in intelligence and a focus on cybersecurity, we provide organisations with superior, scalable security and flexibility. Zenitel is the proven, preferred choice for environments requiring crystal-clear audio to ensure the protection of human life, property, assets and the management of critical activities. With interoperability at all levels, we seamlessly integrate with access control, video management and security platforms.