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Dark secrets

A digital PMR system has revolutionized on-site communications at Ireland's most celebrated industrial location – the historic brewery where Guinness stout is produced. A day trip to Dublin gave [Richard Lambley](#) an opportunity to explore



Occupying 63 acres of land on the south side of the Liffey, the St James's Gate Brewery, home of Guinness, has been a part of Dublin's history for more than 250 years.

Crammed into this site, not far from the city centre, are some 52 buildings ancient and modern. Representing the gradual evolution of production methods as new facilities have been established over the years and older ones have fallen into disuse, they range from elegant eighteenth-century offices, laboratories and warehouse buildings to modern glass and steel structures, including facilities such as a modern experimental brewery. There's even an underground reservoir.

For the general public, the big attraction is the Guinness Storehouse, a visitor centre dedicated to the history and making of the famous dark brew. Its seven storeys, modelled inside in the shape of a giant pint glass, are topped by a gallery offering spectacular views across the brewery site and the city itself.

In the working part of the brewery, on-site communications are provided by a Kenwood Nexedge digital PMR system. This equipment, replacing an earlier analogue installation, is the work of the Dublin-based PMR

supplier BP Multipage – whose customer, both at the brewery and at other Irish sites operated by Guinness's owner, the drinks giant Diageo, is the security company G4S.

"We look after their interests in relation to PMR", explains Philip Pratt, of BP Multipage. "They've come up with a number of different projects that we've worked with them on, and we also look after their own equipment. They have a mixture of various different manufacturers' equipment. In the main it would be Kenwood, because we are the distributors here in Ireland for Kenwood. But we also import Motorola products."

On the Guinness brewery site, the Nexedge system supports some 55 radios, from a mobile installed in the private ambulance to the handportables carried by security staff and maintenance workers. These are managed from a central control room at the brewery, where we meet Darragh McNicholas, contract services manager for G4S. Darragh points to a map on the wall which shows the complexity of the crowded site, hinting of fearsome radio coverage problems. The site is sliced through

Above: entrance to the Guinness brewery – a part of Dublin's history for 250 years



Tracks still lying in the roadways are a relic of the narrow-gauge goods railway which once served the 63-acre site. A tunnel, still in use, led them under the street outside

by a busy main road, with tunnels beneath to link the two parts.

“At the moment you’re standing here”, Darragh says, indicating the spot with a finger. “There’s a fire station up here and you came in at this gate over here. We have a whole other site on the other side of the road.

“Product comes in up here and it’s roasted, fired down a pipe by compressed air to the brewhouse which is just over here”, he continues, his finger tracing paths across the map. “Then it goes from the brewhouse, here, underground to the fermentation plant down here. And that’s our keggings line here. And we also have a tank station over here, because the Guinness extract is exported all over the world for canning.”

On the control desk, twin screens display the status of radios connected to the Nexedge system (this would include any alarms or man-down alerts), and a bank of CCTV monitors behind presents an overall view of activity

across the site. Four talkgroups are currently in use on the radio system.

Kenwood’s dispatcher software also allows text messages to be typed at the keyboard – and although this facility is not yet in use, Darragh foresees a future for it as a quick method of exchanging updates without tying up the radio channel.

In addition, the software records a complete activity history, showing who has called whom, with time and date stamps. If there is an emergency, a red warning will flash on the screen, indicating the number of the person who is in trouble. The microphone on the calling radio will then go live.

G4S has worked as a contractor at the brewery for more than two years, but Darragh received a compelling reminder of the critical importance of communications when a fire at the lager plant damaged the old radio system. “When that happened, power was shut off”,

he recalls. “It went in the flaking plant as well, and the system didn’t survive it, as such. We ended up with very, very poor radio communication, and we were very badly exposed on site from applications point of view.

“Coverage around site had been difficult anyway. A lot of the buildings are metal and there’s liquid, which radio signals don’t like.”

What, then, was the reason for switching to digital? Darragh says the requirement was simply for a good system. “We had a good look around to see what was out there and what was the best fit for us”, he explains.

“And we were willing to spend the money on it. But there was all the additional stuff that it would give us – the lone worker, the man-down system as well. And there was stuff down along the line that we may be able to tap into, such as PABX [interconnect] and that sort of thing.”

Furthermore, he adds, what works in Dublin could also be repeated at other G4S sites in Ireland, and within other Diageo plants too. The systems could even be interconnected, if required.

But even on its own, the digital radio system at Guinness, with its improved coverage of the site, has been a revolutionary improvement, in Darragh’s opinion. “It’s savage, it’s

Left: equipped with digital radio – the brewery’s ambulance; Below: like many radio users at the brewery, Darragh McNicholas, contract services manager for G4S, uses an earpiece with his radio. Other users of radio accessories include the brewery’s firecrew, who have been provided with special headsets for use with their breathing apparatus. “Previously, they had no communications at all and simply had to shout to each other”, Darragh says





unreal, it's ridiculous now!", he enthuses. "No, but I mean it *is!*"

With the system in place, he is now looking towards making fuller use of it. "What we've done with this system, as well, is that our crisis management team have got radios themselves up in the crisis management room, so they are straight into the system with us as well. That's been quite beneficial.

"We've also got lone worker units which the maintenance department have taken off us. They are taking 18 of those for their own staff, and we are going to be monitoring them here."

The central base station is situated on the top of the flaking plant, the site's tallest building. Down-firing antennas concentrate the signal, ensuring good signal penetration between and into the closely-huddled buildings. Running about 5 watts on UHF, the base sta-

At the security control desk, Eddie Connors is in charge. Right: Kenwood radios recharging in the control room. In addition to its Nexedge digital radios, the site has explosion-proof ATEX-rated analogue radios for maintenance staff working on the brewery's tanks. No Nexedge ATEX radio is available yet, but the Nexedge system supports analogue as well as digital communication and can handle a mixed population of radios

tion provides solid coverage virtually everywhere on the site.

"What we did was we set up a test", explains Philip Pratt. "We brought up to digital base station, set up an aerial and did coverage tests. We had a wander round and we gave Darragh an outline of exactly what the achievements were in terms of coverage."

A benefit of the narrow-band Nexedge technology is that it has doubled the speech capacity of the brewery's existing PMR channel, a useful improvement. "We got the agreement of ComReg, which is our Commission for Communications Regulation, to split the channel into two", Philip continues. "So we

could obviously use the existing allocation."

With two independent 6.25 kHz channels operating side by side within this standard business radio spectrum slot, an emergency could be in progress on one channel and yet other staff would be able maintain their normal activities at the same time on the second channel. "It's small things, but there's an incredible difference in it for us", comments Darragh.

We leave the control room for a tour of the site, picking our way across old the railway lines which cross the courtyard. At one time, products and materials were transported around the site by a private, narrow-gauge steam railway.

Downtilt antennas mounted on the brewery's tallest building provide good radio coverage



Below: this graceful Victorian stairway, one of many distinctive architectural features of the site, led to the Brewer's Laboratory. Right: industrial landscape on the brewery's lower level





Clockwise from top left: the 'hot tunnel', built to carry steam-pipes beneath a main road which bisects the brewery site, which was one of the few areas not reached by the UHF Nexedge signal; an antenna installed within the tunnel as part of a coverage reinforcement system provided by PMR supplier BP Multipage; Dave Gerachty, service manager for BP Multipage, with the tunnel booster he installed, a bidirectional amplifier by the French manufacturer ETSA; and, on a wall outside, the pickup antenna which feeds the tunnel amplifier

This even served the lower level of the plant on the other side of the road, its tracks descending to a tunnel by way of a spiral incline.

In the air is the unmistakable, rich scent of brewing. Darragh says it's coming from the fermentation plant. He adds that it smells different on different days, depending on which way the wind is blowing.

Plunging down several flights of steps, deep below ground, we head into another of the brewery's subterranean passages – the so-called 'hot tunnel', which once carried steam pipes from the power plant to the lower level. Lined with cast-iron segments, like the tubes on the London Underground, it still carries a bundle of large industrial pipes alongside

the pedestrian walkway. BP Multipage's radio coverage tests identified this tunnel as a main problem area, made more serious by a bend half-way along it.

"This is a key passageway within the site", Philip explains. "We actually go under the road on to the other part of the site where the flaking plant is, so it's a key access route. There



The 'cold' tunnel is one of several underground passageways which link the two main parts of the brewery site. Here, signals were good and no radio coverage reinforcement was needed





The cityscape seen from the top of the Guinness Storehouse includes churches, Phoenix Park – said to be Europe’s largest city park – and, in the foreground, some of the brewery buildings themselves. To the right is St Patrick’s Tower, the remnant of a windmill

was some existing coverage in the stairwell area – but once you go five metres into the tunnel, it’s not good.”

To fill in this dead spot, BP Multipage installed a micro-repeater box, which we shortly pass, just inside the far end of the tunnel. A cable connects it to a pick-up antenna mounted on a wall outside, and a second antenna installed just under the roof of the tunnel directs the signal back along the route we have walked.

“That’s actually supplying coverage right down the tunnel to the far end, even with the bend”, comments Philip. “And the beauty of it is we are on minimum gain. It has 40 dB gain, but we have tolerance there to go 60 dB, so we have plenty in reserve if need be. But it’s quite a simple solution.”

“When we are on the lower level here, just be careful”, warns Darragh McNicholas, as we leave the tunnel. “We are going to stay on a walkway but there are forklifts knocking around – trucks. This is a bit more industrial here.”

As we make our way between the tanks, pipe runs, chimney-stacks and other structures, he points out the former oil-fired power station, now stripped out, and a new CHP station, whose surplus power is fed into the national grid.

Shortly we reach the other pedestrian tunnel, the ‘cold’ tunnel. An information board

outside tells us that it was excavated by the engineer James Greathead, renowned for his work on the London Underground, and that it once carried beer lines from the vat houses to the racking shed, where Guinness stout was poured into wooden casks for distribution.

Running alongside it is an older tunnel which once carried the narrow-gauge railway track. But today this contains only pipes – and possibly the ghosts of long-departed locomotives and their crews.

Darragh explains that Guinness’s advertising has often made creative use of the picturesque and atmospheric character of the brewery’s historic home. “An awful lot of the ads Guinness do for the brands are actually shot

on site here”, he says. “There was one where the guys were opening a vault and found a recipe, and that was shot in this tunnel.”

From a radio point of view, there is less to say about the cold tunnel: the central antennas face straight into it, ensuring a reliable signal. “When we did our coverage tests, we managed to get complete coverage right through this tunnel without having to install a repeater”, says Philip.

We finish our tour in the rooftop gallery of the Guinness Storehouse – site of a former hop store. There, visitors can complete their tour with a pint of the brewery’s signature product while enjoying a panoramic view of the city’s landmarks, and of course some of the many curiosities to be found on the brewery site itself.

- www.guinness-storehouse.com

