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During 2020/21 various ABI Mobilram rigs and attachments have been hard at work on some of the UK's 'smart motorway' projects.

Smart motorways are part of a schedule of major travel infrastructure upgrades taking place and will bring much needed increased capacity to some of the UK's most congested arterial highways. A very broad range of ABI Mobilrams have been utilised for these projects by our esteemed UK customers. Some examples of the many ABI Mobilrams and attachments which have been deployed for these specialist works include:

- TM22 Mobilram /MRZV36VV /VDW10050
- TM20 Mobilram /MRZV36VV /MDBA7000
- TM17 Mobilram /MRZV30VV /VDW8360
- TM 14/17 VSL Mobilram /MRZV20VV
- TM14/17V Mobilram / Delmag D30-52
- TM13 Mobilram /MRZV12VV /MDBA
- TM12 /15 LR Mobilram /MRZV20VV

In all cases the rigs have been used for the installation of steel sheet piles. The work has been carried out alongside live motorways with the equipment often operating in restricted spaces - there would have been no other efficient way to have carried out these improvements. The M1 runs from London, north to Leeds linking with the M25 and M62, the M4 is the main strategic route from London to Wales and the west of England (carrying some 130,000 vehicles a day) whilst the sections of the M6 being worked upon are some of the most heavily congested roads in the country at peak times.

Work commenced early in 2020 and continued throughout the challenging pandemic crises into 2021. Huge credit should be given to all personnel that continued to operate during this period.

Smart Motorway Upgrade Projects:

M4 Motorway Junctions 3-12,
M6 Motorway Junctions 13-15,
M1 Motorway Junctions 13-16.

Clients: Various

Equipment used: Broad range of Mobilrams and piling attachments

Applications: Steel sheet piling with vibrators, pre-auger equipment and impact driving.

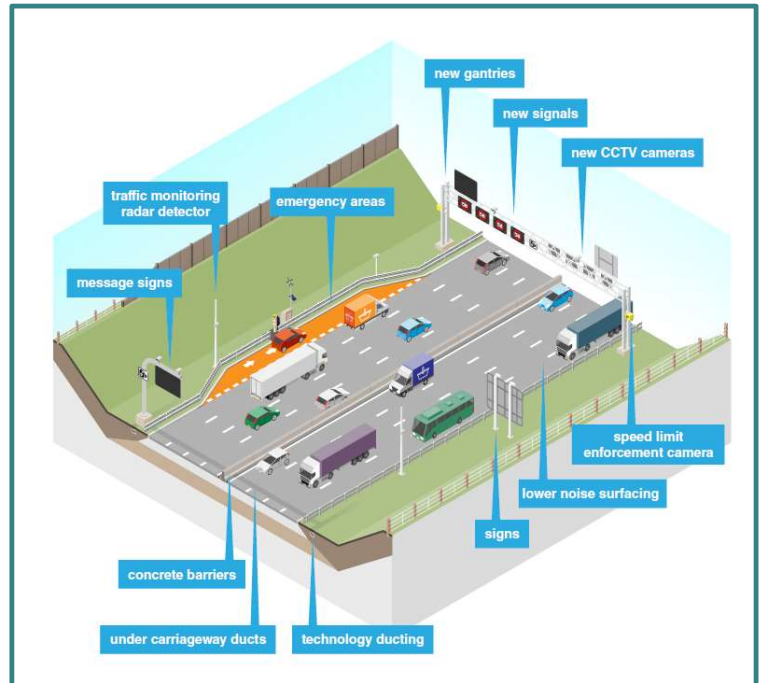


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The motorway upgrades will lead to 'all lanes running' – meaning that there will no longer be a dedicated hard shoulder. Instead, there will be 4-lanes of traffic running at all times, with 'emergency refuge areas' (ERAs) sited at strategic intervals for broken down vehicles and other emergency situations. In addition, these motorway sections will employ variable speed limits, and other lane signalling, which require the installation of overhead gantries at periodic distances. Sections of the motorways that did not previously have a section of hard shoulder will have a fourth lane created, and particularly congested sections, such as from junction 4 to 4b of the M4 (Heathrow Airport to the M25) will have an additional lane – taking that section of road to 5 lanes wide.



The main work for the ABI Mobilrams has been the installation of sheet piling as retaining wall structures to create spaces for the ERAs, gantries and other technology installations. The sheet piles ranged from the lightest 'Z' section AZ12-770 to the heaviest AZ52-700 piles, as well as some specialist HZM sections. Piles up to 17m in length were installed to depths of up to 12m.



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In most cases the relevant ABI Mobilram was coupled with its latest generation MRZV-VV vibrator. These vibrators have both variable static moment and variable frequency – both being fully adjustable ‘on the fly’. This patented technology makes them ideal for this type of work as the vibrator’s performance can be easily adjusted by the operator to suit ever changing soil conditions. The ABI range of MRZV-VV vibrators work at high frequencies, generally above the natural frequency of the soil, so only minor negative resonances are generated and therefore less transmitted ground vibration.

It is the adaptive nature of these vibrators which allow for greater control during piling, and higher production rates on the job – as well as impressive ‘green’ credentials, with gains in fuel efficiency and reduced emissions; all whilst achieving the highest quality installation. The Mobilram rigs too are applauded for their efficiency and flexibility – both on the ground as well as in their range of application. Their rapid docking system allows for the quick interchange of drilling and piling attachments, and ABI’s unique Efficiency Drive Systems offer huge fuel savings without any loss of piling performance.

Efficiency Drive is used as standard in our latest generation machines, controlling the delivery of hydraulic power and generated engine power to minimise system losses, thus optimising machine performance. Efficiency Drive combined with the very latest EU Stage V engines ensures the Mobilrams generate the lowest exhaust emissions of any telescopic leader rigs on the market – this advanced technology also reduces noise emissions and internal machine wear.

Whilst working on these smart motorway projects the rigs encountered a variety of ground conditions from soft clays and loose sands to strong mudstones and sandstones. It was not just extremes in ground conditions that our clients had to deal with during these works – they were also working in narrow corridors, on steep slopes, near water courses, around bridges and tunnels, and adjacent to gas and water mains - not to mention in areas with endangered wildlife and other sensitive neighbours!



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In total Mobilram rigs installed 5km of sheet piles along a 28km stretch of the M6, and whilst the bulk of the works were carried out on these motorway schemes by the TM17, TM20 and TM22 rigs, two smaller models were substituted when the operating space became too tight for their size.



The TM 14/17 VSL was already scheduled to take over from the TM17 on some of the sections of the M4 –but even this rig struggled for space on some occasions which is where our newest ABI model TM13 Mobilram was able to take over proceedings. Despite its diminutive size, and the smaller MRZV 12VV vibrator this was able to handle proceedings admirably.



Paul Kelly, Contracts Director at Dawson WAM Ltd says:

“We like the ABI rigs as they offer quick docking systems for changing between attachments (pre-augering, vibro-driving and impact driving), offer both powerful and efficient performance, and have the most powerful rig mounted vibrators available in the UK, minimising the need to impact drive.

We were also extremely impressed with the new MRZV 12VV vibro on the TM13 – thinking originally that this machine may have struggled to take over from the TM14/17VSL with MRZV 20VV, but in fact it proved itself more than up to the job!”

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One section of works on the M1 motorway was particularly close to ABI Equipment's HQ in Northampton. This section of work extended from Junction 13, at Milton Keynes South, to Junction 16, the Upper Heyford interchange, for connection to the A45/Daventry and A4500/Northampton. This section involved the installation of 38No new ERAs and upgrading of two existing. Here the ground conditions were particularly challenging and in this case two Delmag impact hammers were utilised to complete the installation to ground level – our D19-52 and D30-32 units.

The use of rig mounted impact hammers offered two key advantages at these locations. One was the ability to continue working alongside live motorways. The other is that these hammers do not require 'leg guides' as would be typical of crane suspended equipment. Consequently, the sheet piles could be driven flush with ground level eliminating the waste associated with pile cut-off.

A rig mounted impact hammer also offers the possibility to continue back driving in higher windspeed conditions versus crane suspended,



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The ABI TM12 /15 LR (Long Reach) was put to good use on the M1, with its extended reach capability it removed the need for extensive groundworks and soil stabilisation to be undertaken before the piling operation could be started. The long reach capability meant that the TM12/15 could be positioned on secure stable ground further back from the pile line whilst still being able to reach the pile positions. We also saw the bigger brother of this machine commissioned into service for the first time during this period of works – the TM20 LR.



Photo Credit:- Sheet Piling (UK) Ltd - www.sheetpilinguk.com

Andrew Cotton, SPUK Managing Director says:

“Our long reach Mobilrams have become the rig of choice for motorway projects around the UK. By using them we have considerably reduced the environmental impacts of the piling work on ancient woodland and species such as dormice and badger, which have habitats in the undergrowth.

The use of long reach technology has also removed the need for expensive earthwork stabilisation and groundworks when undertaking this type of project. Resulting in both cost and time savings. Indeed, the work on the M1 has been completed three months ahead of schedule.”