ABB’s Power Quality team at Ellesmere Port has helped the West Coast Main Line to prepare for the advent of the new high speed trains by developing special track-side high voltage resistor/capacitor damping networks.

The Need
GTBBJV, the joint venture between GTRM and Balfour Beatty Rail for the overhead line electrification project, together with their customer Railtrack, is modifying the electrical supply system to mitigate the effects of high frequency currents associated with the new generation IGBT (Insulated Gate Bipolar Transistor) traction control systems.

The IGBT trains employ four quadrant converters which provide the DC supply to a pulse width modulated three-phase variable-voltage, variable frequency inverter which, in turn supplies the traction motors. The apparent fundamental switching frequency of the converters is of the order of 2 to 4kHz, which is close to the resonant frequency of the AC electrified line. Without damping, this could give rise to unacceptable high voltage, high frequency inductive interference which could damage the 25kV power supply network and interfere with signalling systems.

The Solution
ABB was called in to work with GTBBJV engineers to create a damping solution to ensure that the 25kV nominal supply voltage is maintained within defined limits. The solution comprises high voltage capacitors and resistors which are installed alongside the track.

It is anticipated that a total of 107 systems will eventually be installed along all of the West Coast Main Line’s 641 route miles which extend from Glasgow Central to London Euston.

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