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EMC - good practice makes perfect

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## EMC - good practice makes perfect

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Since 2007 EMC regulations have applied to all fixed installations, and from August good EMC engineering practices will be required to protect electronic equipment from lightning voltage surges. Keith Armstrong, from Cherry Clough Consultants, explains what the term 'good EMC engineering practices' actually means

As equipment, systems and installations become ever more complex, and the electronics within them ever more sophisticated, the risk of electromagnetic interference (EMI) causing financial losses and safety incidents is increasing. "The First 500 Banana Skins" has 500 examples of real-life EMI incidents, which range between hilarious and frightening.

The introduction of new EMC regulations last year meant that, for the first time, EMC requirements apply to all 'fixed installations'. A 'fixed installation' can be a commercial or industrial site; national infrastructure such as the electrical, telephone, road or rail networks; or a system within a building, such as its mains distribution network, computer network, HVAC system, production line, etc.

The owners or operators of every fixed installation must now appoint a 'Responsible Person', who is responsible for its EMC compliance. Some sites might have a single person responsible for everything; others might have several people each responsible for different fixed installations.

Each Responsible Person must ensure their fixed installation does not interfere with other equipment, especially radio and telecommunications, and operates as intended despite the EMI in its operational environment. They must also ensure that good EMC engineering practices are used, and apply the EMC installation/use instructions provided with purchased equipment. These activities must be documented, and the documents kept ready for inspection by the relevant national authorities for the operational life of the equipment.

At the moment there is almost no active enforcement of these new EMC requirements in the UK. However, EMC enforcement agents (in the UK: Trading Standards Officers and, where safety is an issue, Health & Safety Inspectors) can immediately close down fixed installations that they think have EMI problems, and have done so in the past as a result of receiving complaints.

BS EN 62305, the new lightning protection standard, which will be applied throughout the EU in August 2008, will mean good EMC engineering practices must be used to protect electronic equipment from lightning's voltage surges and pulsed magnetic fields. Likewise, an IEC standard on good EMC engineering for wiring installations is now being added to all national electrical codes throughout the EU, and will appear in the 18th Edition of the IEE Wiring Regulations. Non-compliance with either of these would make it impossible to obtain site insurance.

M&E contractors and installers will soon start to see good EMC engineering requirements in their contracts, but everyone needs to understand that the new EMC Directive/Regulations only apply to the owners or operators of a fixed installation. So, for example, a specification that states: "The work must comply with the UK 2006 EMC Regulations" is meaningless, because a contract cannot make a law apply to someone it does not cover.

A specification that states: "Good EMC engineering practices must be used" is also meaningless, because the EMC practices required depend upon the operational electromagnetic environment at the site and how the Responsible Person has chosen to control the resulting EMI issues.

Any specification for subcontract work should specify exactly what good EMC engineering practices are required, in practical detail, and exactly what EMC verification or validation procedures are required (e.g. inspections; in-situ EMC testing, etc.).

At the time of writing, most Responsible Persons and M&E contractors and installers lack appropriate EMC knowledge. Many think that all they need to do is follow the relevant national electrical codes (e.g. IEE Wiring Regulations) – but at the moment these have nothing to do with EMC compliance and even when they do, they will not control all of the EMC aspects of a site, and neither will they include all the practical good EMC engineering details required.

For example, many believe that good EMC engineering comprises of using single-point ('star') earthing systems; terminating cable screens at only one end; and connecting filters and cable screens to 'earth' using any length of green/yellow insulated wire. In fact these techniques are decades out of date. In almost all cases they are now known to be bad EMC practices, and have been recognised as such since at least 2001 by installation standards such as BS EN 50174 (structured wiring systems, Ethernets).

There is also the belief that constructing systems and installations from CE-marked products and equipment, and following their suppliers' instructions, is all one has to do for EMC or safety – but in fact this has no technical or legal basis. Another belief is that complying with the EMC Directive also takes care of the possibility that EMI could increase safety risks – which by law it does not.

So it seems there is no escaping the fact that we all need to learn about good EMC engineering practices, and start to apply them, very soon.