



The Future of EMC Engineering

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Simulation versus Experience – Which is Better?

As a contributing author to present a series of controversial articles with the intent of raising awareness and discussion, I present a topic that is controversial—whether we should perform simulation analysis on systems and circuits or forgo this aspect of engineering analysis and go straight to production using the skills of an experienced engineer and rules of thumb.

For those that believe computational analysis is a primary aspect of successful design engineering, allow me to play devil's advocate and say experience is better than simulation. As a manager, if you had to hire an engineer for a specialized task, would you prefer a senior level person with years of experience and whom has probably never performed a simulation in their life, but understands Maxwell's Equations and physics, or a junior engineer who knows how to use simulation tools with minimal hands-on experience in design engineering but understands computational analysis?

There are those who believe that if you do not perform simulations on a printed circuit board design (PCB), i.e., SPICE or FDTD, you are not doing the job of being a competent electrical engineer. Rules of thumb are obsolete in their opinion and should never be used. What about the thousands of companies worldwide that have never simulated anything, nor ever will because they do not have expertise or the money to purchase software, but produce incredibly fantastic products? My question to these people—what are you going to simulate, only a schematic prior to layout, or full-blown post layout, which rarely occurs in many companies after the layout is completed? One must use rules of thumb to create a first-pass PCB layout based on mechanical, electrical or other reasons before simulation can occur. Rules of thumb get us near the finish line; however,

for high-technology products, one must simulate to ensure functionality. How many hours will overworked engineers in a small company be given, who need to get product out the door quickly, to perform a post-mortem simulation versus an experienced engineer that says “Do it this way because it will work based on sound engineering knowledge and years of experience.”

If a crisis condition occurs in a PCB after a prototype is built, who would we want to solve the problem, a simulation specialist after the fact or a senior engineer, especially if the non-compliant product generates EMI based on unknown parasitics. A senior engineer can quickly identify the problem area and usually incorporates a fix without the need for simulation.

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