



Made for Each Other?

Do you have difficulties aligning needs of design and manufacturing personnel in producing wire wound components? Well, get ready to unwind the rivalry and to produce quality transformers.

You, I, and all in the industry know the life-long conflict of the design and production guys. The designer emphasizes that the design is manufacturable and manufacturing argues ‘its a dog.’ Constantly new transformers are designed and the history keeps on repeating. The conflict does not go away. It is left to us to resolve it in a given organization if we want to produce the transformer that is ‘designed for manufacture’ and that can be ‘manufactured to design specifications’ – without design guys cursing manufacturing personnel and vice versa.

My 30 plus years of working in the transformer industry have taught me an important fact that the designer wants to pack 5 lbs. into a 1 lb. bag, and manufacturing wants designers to stuff 0.75 lbs. in a 1 lb. bag. Designers want two wires routed through the same slot of a bobbin, and production people want one wire routed in every other slot of the bobbin, leaving one slot without a wire and so on. I also learned that the individual needs are conflicting by nature, and the battle is eternal. But let me tell you, one need not fight it nor live with the frustrations forever. There is a solution.

Isn't it like, when on a nice, breezy, spring night a husband wants the window open and the wife wants it closed? On a Sunday morning the wife suggests to go to Denny's and the husband to IHOP. You wonder, where is that perfect couple “Made for Each Other?”

While there is no perfect couple, we know with the same certainty that there are some couples live happier than others do. Likewise, there is no perfect match between Design and Production guys' needs, yet your team could be happier than those continuously living in frustrations. We just need to ask what happier couples do that unhappy couples don't. In its answer, dwells a solution for the constantly battling design and production guys.

The happier couples accept the fact that individual needs are inherently going to be different, conflicting at times, and there is not a perfect solution that would satisfy their each and every individual need. And, instead of constantly fighting and getting frustrated, a couple works out a solution that meets a higher ‘common goal’ and at the same time meets their selected individual important needs.

There was a high frequency power output transformer that manufacturing was producing but wished that they didn't have to. It was so difficult to manufacture that they despised its production. There were five windings packed on a small bobbin with the secondary winding having inter-layer tapes. There were also inter-

winding insulating tapes. The coil was ‘filled’ up to the bobbin rim making the cores assembly difficult, even after pressing the coil. A designer was driven by cost and size constraints and manufacturing had to use highest possible wire tensions to wind and slow down automatic winding machines to lay the inter-layer tape during the secondary winding. To assemble the core, they had to press the coil in both directions and yet had high Hipot rejects due to scratched tape. All these caused lot of rework, high reject and it resulted in a high overall cost way above the budgeted cost.

The production was going on and so was the constant bickering between design and production personnel, until one transformer engineer (Samaritan) came along and decided to do something about it. He empathetically understood and recognized the individual needs and issues of the designer and production personnel, brought both sides together across the table and worked out an optimum solution, design changes if you will, that was mutually acceptable to both. The solution also met the overall business needs.

The transformer was redesigned to use a multi sector bobbin in place of a single sector bobbin. That resulted in the reduced voltage-buildup in the secondary winding to a manageable limit and helped removing the need of the inter-layer tapes. Higher strand litz wires replaced the lower strand litz wires to help reduce the bobbin ‘fill.’ The same size wire was now used for primary and secondary windings making it possible to use one setting, in place of two, for both the windings. The resultant coil was less ‘full’ than before and easier to wind and assemble. The cores were inserted without pressing the wound coil. The transformer size and the printed circuit board footprint were not changed. The temperature rise was the same as before. The reject rate was reduced. The cost target met. The win-win solution made the design and production guys happy and met the higher goal of the business i.e. to be in budget and profitable.

It was like the couple agreeing to go to Denny's on one Sunday and to IHOP on the next, or sleeping with the window cracked open on the husband's side. Those are mutually acceptable compromises made with the understanding of meeting a higher goal of living a happier life instead constantly fighting the unsolvable situation and remaining unhappy.

Energized by the successful optimized and compromised solution, the designer and production personnel were willing to work collaboratively going forward. Both identified and exchanged their individual needs. Production people came to know the design criteria – Cost, size limitations, maximum temperature rise, acceptable maximum voltage per mil of insulation, safety agencies needs, etc. The design guys got production capability information. They also got a list of do's and don'ts from production people. The solution resulted into an on-going collaborative effort to work out the optimized transformers that were “designed for manufacturing” and “made per design.”

As can be seen, the solution gets to the core (pun not intended) and provides insight to resolve the eternal conflict between designers and manufacturing personnel. This time-tested solution would help bring the harmony in meeting the conflicting demands of Design and Manufacturing. And most importantly, making design and production guys happy troupers in the process, and what's more – make the customer happy with a quality product. And, your peace of mind is frosting on the cake.

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