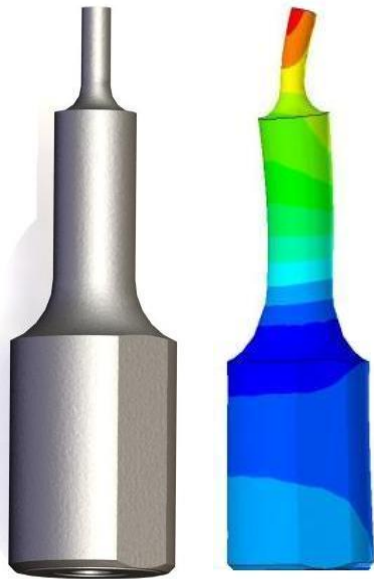


SONOTRODE OPTIMIZATION



Before correction ; significant reject rate



After correction; multiplied lifespan

Smoothly functioning sonotrodes are extremely important for the whole ultrasonic welding process. Sonotrodes have to oscillate in the right frequency; the oscillation in itself, the amplitude and also the amplitude distribution have to be correct.

Furthermore, their manufacture must be geometrically precise, the used materials have to be suitable for the different applications, and the no-load power has to be as low as possible.

Only when all requirements – and also some more – apply, it can be said that the sonotrode has been correctly designed and built.

However, this is not always the case.

There are many instances of wrongly designed or wrongly built sonotrodes being used or of sonotrodes which have improperly been refinished. In those cases, the welding performance decreases, the whole process becomes unreliable and the necessary error analysis usually takes a considerable amount of time and effort.

That is why, when designing new sonotrodes, we bear so much importance to the optimisation of the existing ones.

On the basis of our extensive analytical options and calculating methods, we are able to evaluate sonotrodes in a quick and cost-effective way regarding their quality of oscillation and, subsequently, optimise them.

The sonotrode shown above is a typical example of a wrong vibration behaviour. Although having worked in the right frequency, the “wrinkling stress” at the tip has led to an extremely fast cracking. The failure rate was considerable – most of the times the cracks occurred after only a few welding performances. It immediately resulted in a breakage and the sonotrode had to be scrapped and replaced.

With only some small changes to the geometry the sonotrodes’ lifespan was considerably extended and the welding results also improved considerably.

By the way: When constructing a sonotrode for the first time, we always perform an FEM – Analysis.



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