Subject: Re: Diaphragm Breakup Modes
Posted by Wayne Parham on Thu, 28 Mar 2013 04:49:53 GMT
View Forum Message <> Reply to Message

Yes, those are breakup modes. Standing waves that form ripples across the surface of the diaphragm. The lines show the center of the fold, where the diaphragm is actually not moving. It is the zero-crossing point of a standing wave along the surface, with complementary ripples on either side.

This is why cone damping is so important in a midwoofer. At low frequency, the cone moves as a rigid piston but as frequency increases, the cone begins to flex across its surface, with standing waves forming across it. If a cone is not well damped, the modes are severe and response is jagged. But if the cone is damped enough, you won't even be able to tell the modes are there because they are so highly attenuated.

Ironically, stiff cones aren't the key here, because they tend to break away sharply causing the most severe notches and peaks. A stiff diaphragm tends to have low internal damping.

If the diaphragm were so rigid it would not flex through the entire passband, that would be ideal. An example is beryllium diaphragms in compression drivers. But in larger diaphragms, such as midwoofer cones, it is nearly impossible for them to be rigid enough to stay pistonic through their range. In this case, the goal is not to be rigid, but rather to be well damped, slightly flexible but resistant to twisting.

What you want is something fiberous, something that allows movement but with a lot of resistance. Good old paper seems to work best, especially if made with ridges or other details along its surface. The material and shape (both overall and detail) of the cone are key to providing effective mechanical damping.

Cool video! Thanks for the link!