

**Discussion, Antonio ATA Cooled Feed
Test Report Vibration of the Copper Feed Structure
2015-08-13, Minex Engineering, Matt Fleming, Ver 0**

Version	Date	Comment	Initials
Version 0	2015-08-13	Preliminary. (generated to show testing setup)	MCF

Contents:

None at this time

Summary:

Vibration testing of the copper portion on the Feed & Pyramid Assembly, 30-29-230, was conducted on August 13 at Minex. Anthony Brock of Polytech brought in a Scanning Laser Vibrometer. Two types of testing were performed. In one arrangement a modal analysis was performed on Assy 230 by itself. In the other arrangement the Assy 230 was scanned while operated as it normally would be with the fan and cryo cooler active. In both tests the feed had the glass dome removed and was at ambient temperature.

For the modal analysis the Assy 230 was mounted on the usual stainless base plate and supported on a foam pad. It was then attached to a shaker signal generator in order to explore resonant modes. See figure 1 & 2. The Laser Doppler Scanning Vibrometer is programmed to seek specific points on the object to be scanned. Once the point locations are programmed in the unit the scanning session is started. The unit will automatically point to the 1st programmed point and take data while the shaker provides spectrum from 5 to 20 kHz. It then moves on to the next programmed point. The accompanying signal processing software can produce a displacement image of the programmed points superimposed on a photo of the scanned object. It can also create a video clip of the motion for any frequency selected. This allows one to quickly find the vibration modes that are of most relevant concern. Although displacement magnitudes can be determined they are not the values that occur on the device during operation. That is the reason for the second series of testing.

For the vibration during operation test the feed was arranged as shown in figure 3. Plenty of data was taken. I will have to wait a week or so before I can process it all. The important discovery was that the displacement difference between the tip of the arm and the capacitor post was between 2 and 5 microns. Based on preliminary analysis this will not produce stresses in excess of the yield strength or fatigue strength numbers for BeCu. More analysis of the data is needed and general double check of the arrangement are needed.

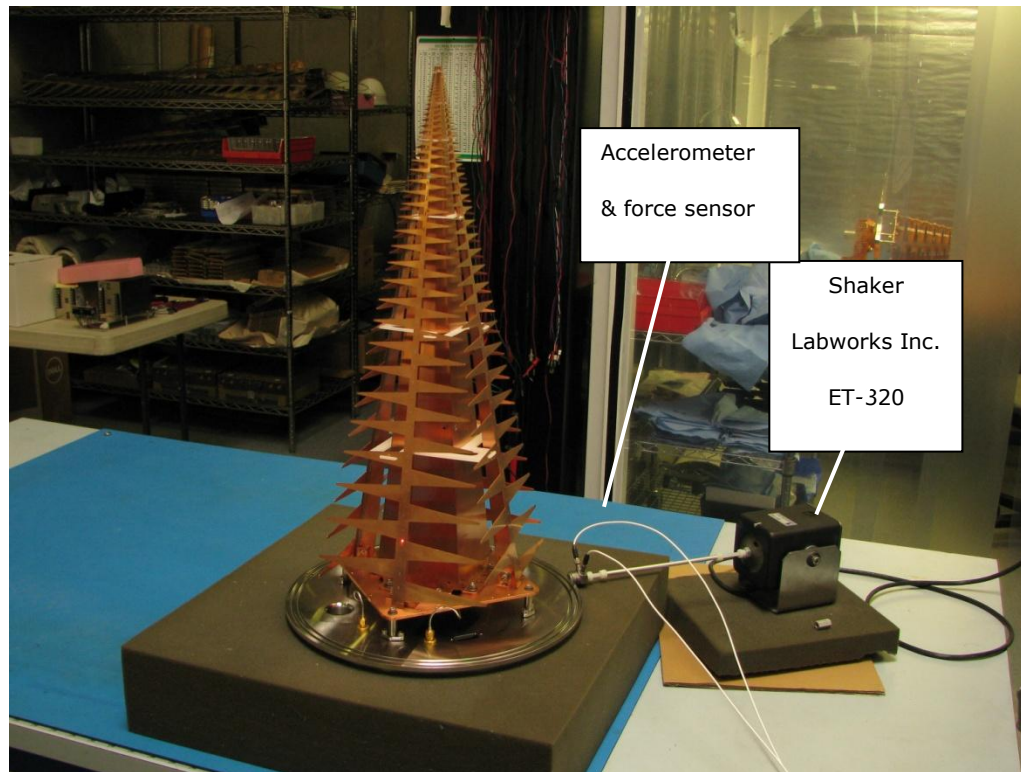


Figure 1 Modal Arrangement.

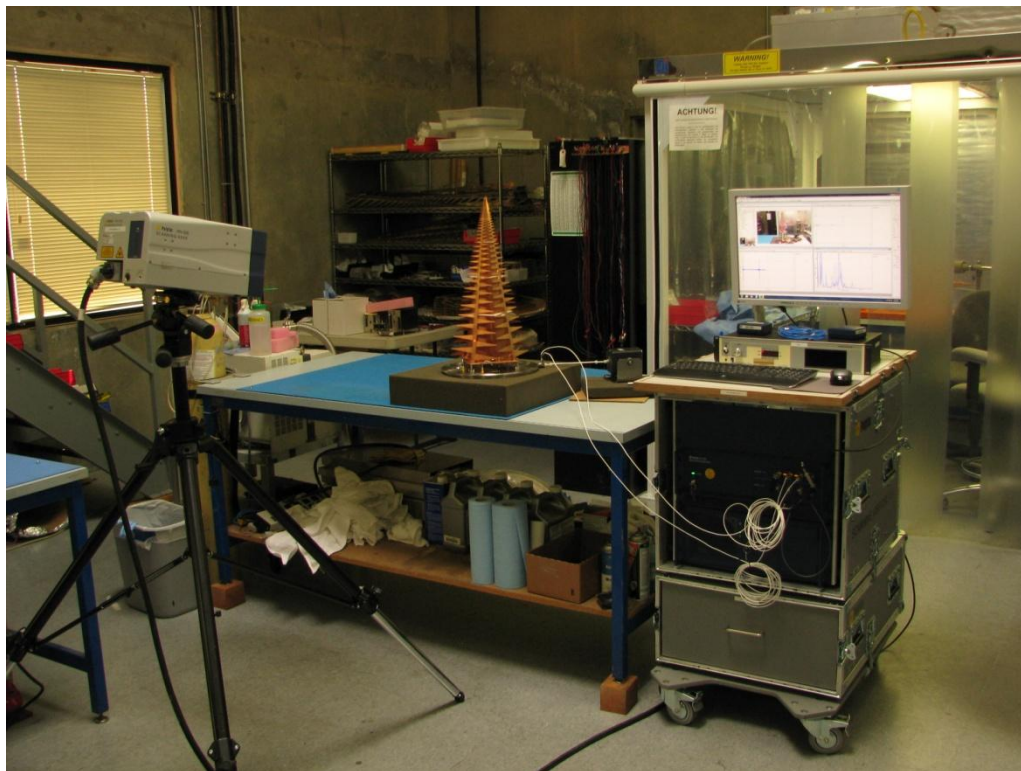


Figure 2 Testing in Modal Arrangement.

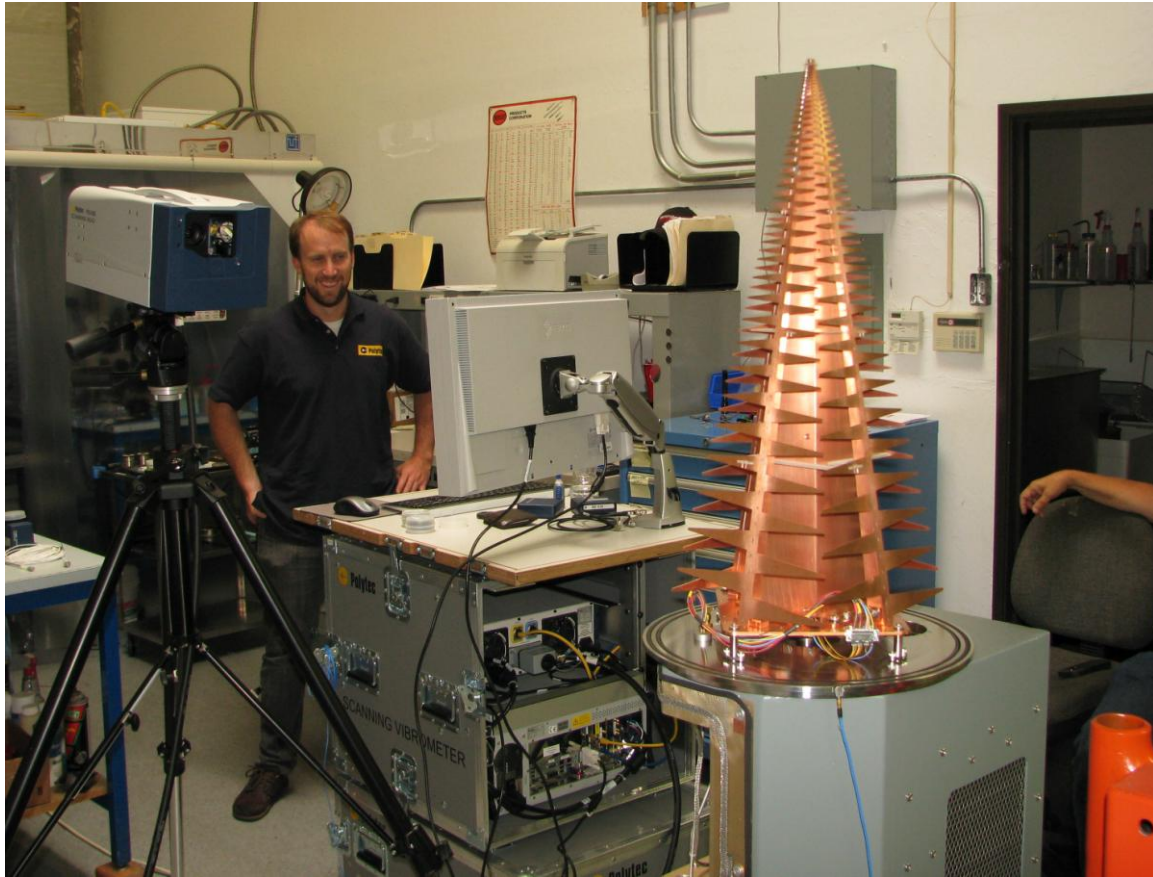


Figure 3 Testing During Operation.

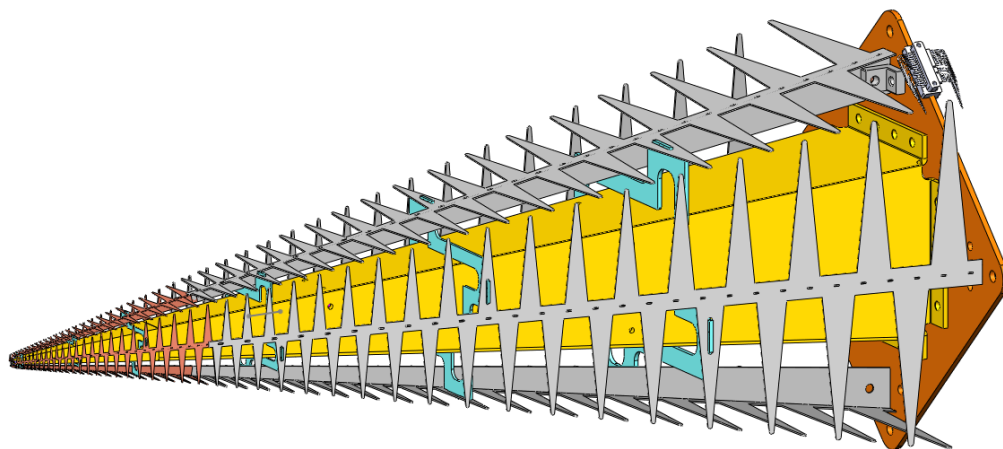


Figure X Feed structure with sheet copper base, pyramid & arms assy 30-29-230

Labworks Inc. PA-119 power amplifier & ET-1320 shaker.

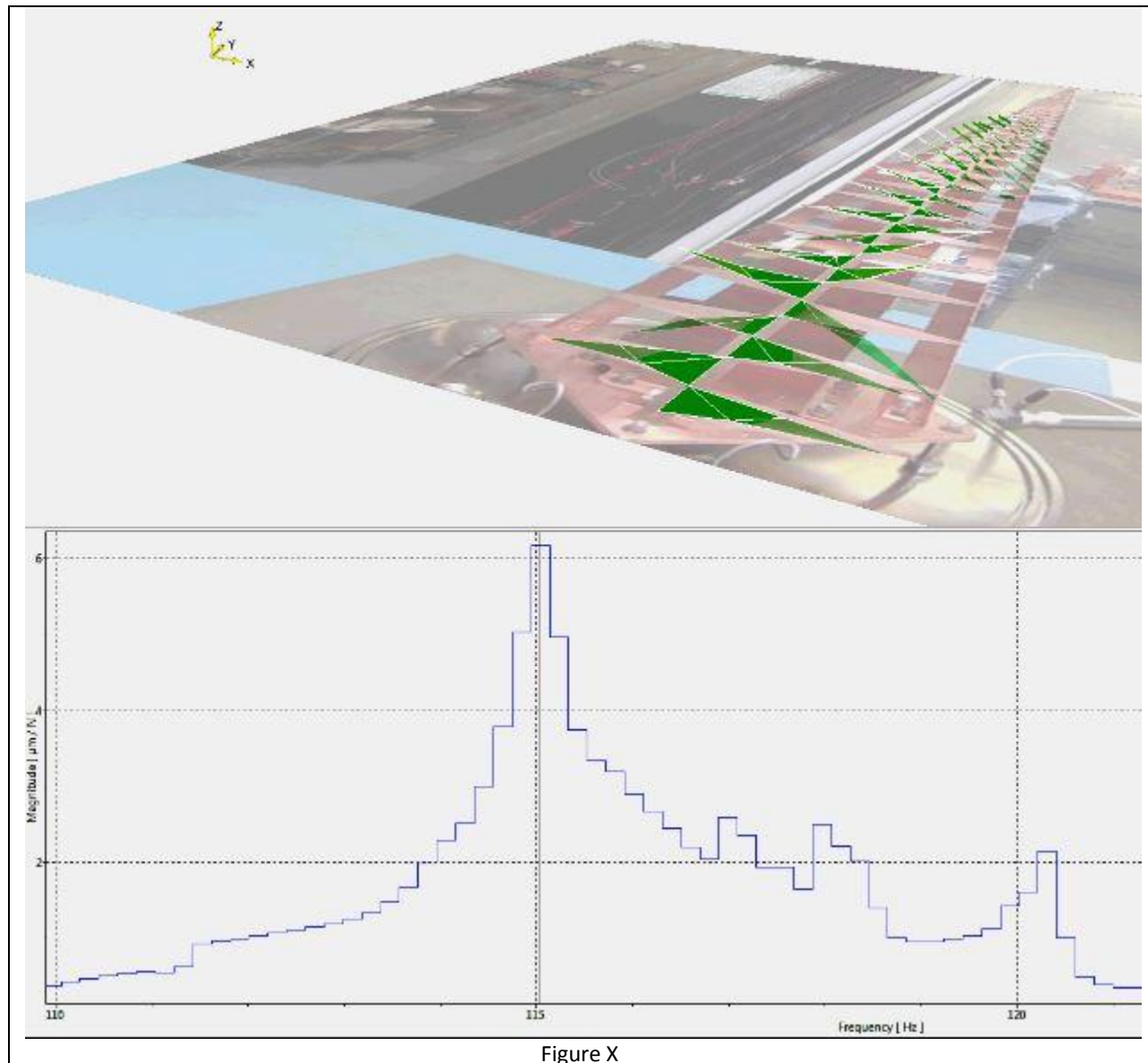


Figure X

